# CORROSION RESISTANCE TABLES

Metals, Nonmetals, Coatings, Mortars, Plastics, Elastomers and Linings, and Fabrics

*Fifth Edition, Revised and Expanded*

**Philip A. Schweitzer, P.E.**

**PART C, ISO-POT**

# CORROSION RESISTANCE TABLES

## Part C, ISO-POT

# CORROSION TECHNOLOGY

*Editor*
**Philip A. Schweitzer, P.E.**
*Consultant*
*York, Pennsylvania*

1. *Corrosion Protection Handbook: Second Edition, Revised and Expanded*, edited by Philip A. Schweitzer
2. *Corrosion Resistant Coatings Technology*, Ichiro Suzuki
3. *Corrosion Resistance of Elastomers*, Philip A. Schweitzer
4. *Corrosion Resistance Tables: Metals, Nonmetals, Coatings, Mortars, Plastics, Elastomers and Linings, and Fabrics: Third Edition, Revised and Expanded (Parts A and B)*, Philip A. Schweitzer
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ADDITIONAL VOLUMES IN PREPARATION

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MARCEL DEKKER

MARCEL DEKKER, INC. NEW YORK · BASEL

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**Library of Congress Cataloging-in-Publication Data**
A catalog record for this book is available from the Library of Congress.

**ISBN:**

**Part A, 0-8247-5673-8**
**Part B, 0-8247-5674-6**
**Part C, 0-8247-5675-4**
**Part D, 0-8247-5676-2**

This book is printed on acid-free paper.

**Headquarters**
Marcel Dekker, Inc.
270 Madison Avenue, New York, NY 10016, U.S.A.
tel: 212-696-9000; fax: 212-685-4540

**Distribution and Customer Service**
Marcel Dekker, Inc.
Cimarron Road, Monticello, New York 12701, U.S.A.
tel: 800-228-1160; fax: 845-796-1772

**Eastern Hemisphere Distribution**
Marcel Dekker AG
Hutgasse 4, Postfach 812, CH-4001 Basel, Switzerland
tel: 41-61-260-6300; fax: 41-61-260-6333

**World Wide Web**
http://www.dekker.com

The publisher offers discounts on this book when ordered in bulk quantities. For more information, write to Special Sales/Professional Marketing at the headquarters address above.

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Current printing (last digit):

10 9 8 7 6 5 4 3 2 1

**PRINTED IN THE UNITED STATES OF AMERICA**

# Preface

The field of corrosion resistance is one of constant change. Research and development is continuously underway, both involving new materials and expanding the uses of known materials. These advances are particularly important for such areas as chemical processing and pollution control. Increased knowledge of corrosion resistance and the mechanisms of corrosion is a vital factor in this work.

This fifth edition of the corrosion resistance tables has been prepared in an attempt to provide the most current information available. Data on the corrosion resistance for the materials and corrodents covered in the previous editions have been greatly expanded, and data for 83 additional corrodents have been incorporated in this edition.

*Philip A. Schweitzer, P.E.*

# Introduction

For years the chemical engineer has been faced with the problem of selecting the proper material to be used for the construction of processing vessels, storage tanks, valves, piping systems, and whatever else comes into contact with potentially corrosive chemicals. During the early days of the chemical engineering profession, the list of materials from which to choose was relatively small, consisting primarily of various metals and their alloys.

As technology made advances, new alloys were developed as well as synthetic materials such as plastics. Simultaneously, new chemicals came into being, many of which required the newly developed materials of construction for safe handling.

However, the problem of material selection is not limited to the chemical engineer. Many industries that use chemicals in their everyday operations cannot be classified as members of the chemical processing industry, yet they have the same problems of selecting the proper materials of construction to handle these products. This is particularly true in the area of pollution control. Many processes for the elimination of air and/or water pollution involve chemical changes in the pollutants that result in problems of corrosion that were not present before.

The dictionary defines corrosion as "eating or wearing away by slow degrees," a definition that is rather broad and does not restrict the application of the word to the destruction of metals. This is as it should be because of the availability of so many nonmetallic materials of construction.

Most reference sources for the selection of proper materials of construction are devoted to either a specific group of metals or alloys, plastics, rubbers (synthetic and natural), gasketing materials, or packing materials. An individual with the problem of selecting materials of construction must usually make a selection in more than one of the preceding categories, which necessitates going to several sources for the information. It is the purpose of this book to provide one source from which all the components of a system may be selected, including processing vessels, tanks, pumps, piping, valves, gaskets, packing, etc.

These corrosion tables have been prepared with the intention of assisting not only the practicing engineer, but whoever may be charged with the responsibility of selecting the proper materials of construction for a specific application. Any table of this type should be used only as a guide since it is extremely difficult, and at times impossible, to duplicate actual operating conditions. To fully guarantee the suitability of a particular material of construction, corrosion tests should be conducted under actual operating conditions.

In the tables, all the chemicals are assumed to be in the pure state or in concentrated or saturated aqueous solutions, unless otherwise indicated. Concentration percentages used are by weight.

Two types of notation have been employed to indicate the suitability of a specific material of construction—one for metallic materials and one for nonmetallic materials. This is necessary because their mechanisms of corrosion differ.

## CORROSION OF METALLICS

The four most common forms of corrosion of metals are

1. General corrosion
2. Galvanic corrosion
3. Stress corrosion cracking
4. Intergranular corrosion

### General Corrosion

Metals resist corrosion by the formation of a passive film on the surface, which in a sense is also corrosion but once formed prevents further degradation of the base metal. Most metals form this film after a period of time of exposure to the air. *Passivation* is the name applied to the chemical treatment procedure that helps to form the film more rapidly. For example, exposure of austenitic stainless steels to nitric acid will produce this protective film.

As long as these films remain intact, they protect the base metal from further attack. Certain chemicals attack various films at varying rates. When this occurs, the metal is said to corrode. Such interaction between a chemical and a metal can be determined from the corrosion tables. This type of corrosion is known as general corrosion.

### Galvanic Corrosion

Galvanic corrosion occurs when two or more dissimilar metals are in contact, or when metals having the same analysis have different surface conditions and an electrolyte is present.

Under these conditions an electrolytic cell is formed. All metals and alloys have certain "built-in" properties that cause them to react as an anode or a cathode when in contact with dissimilar metals or alloys. Whether a particular material will react as a cathode or an anode can be determined from the relative positions of the materials in the galvanic series. The farther apart two materials are from each other in the galvanic series, with all other factors being equal, the greater the rate of corrosion. The material closest to the anodic end will be the one to corrode. For example, if tin and zinc were in contact, the zinc would corrode, whereas if tin and copper were in contact, the tin would corrode.

The rate of attack is also affected by the relative size of the materials and the specific electrolyte present. A small anode area in contact with a large cathode area will result in a rapid severe attack. Conversely, a large anode area in contact with a small cathode area will lessen the rate of galvanic attack since the same total electromagnetic driving force of corrosion will be spread out over a larger area. The higher the degree of ionization of the electrolyte, the greater the rate of attack.

Galvanic corrosion can be prevented by judicious use of dissimilar metals.

| Galvanic series | |
|---|---|
| *Anodic (corroded) end* | Hastelloy C (active) |
| Magnesium | Brasses |
| Magnesium alloys | Copper |
| Zinc | Bronzes |
| Aluminum 5052 | Cupro-nickel alloys |
| Aluminum 6061 | Monel |
| Cadmium | Silver solder |
| Aluminum AA 2017 | Nickel (passive) |
| Iron and carbon steel | Inconel (passive) |
| Copper steel | Ferritic stainless (passive) |
| 4-6% Chromium steel | Austenitic stainless (passive) |

| Galvanic series | |
|---|---|
| Ferritic stainless (active) 400 series | Titanium |
| Austenitic stainless (active) 18-8 series | Hastelloy C (passive) |
| Lead-tin solder | Silver |
| Lead | Graphite |
| Tin | Gold |
| Nickel (active) | Platinum |
| Inconel (active) | *Cathodic (protected) end* |

### Stress Corrosion Cracking

All metals are subject to stress corrosion cracking, which results from residual or applied stress in the metal. Residual stresses can occur as a result of cold forming or quenching after heat treating. Annealing after fabrication will minimize these stresses. Applied stresses can result from faulty design, vibrations, flexing, and excessive expansion and contraction due to thermal changes.

The particular corrodent will determine the degree of effect. Halogen salts are among the materials that will attack metals most vigorously when stresses are present.

### Intergranular Corrosion

Corrosive attack involving intergranular corrosion occurs only at the grain boundaries of austenitic stainless steels. All austenitic stainless steels contain carbon in small amounts. When this material is heated to the sensitizing range (850 to 1650°F), such as in welding, carbon is precipitated out at the grain boundaries in the form of chromium carbide. The chromium has been taken from the grain boundaries, changing the composition and making this area even more susceptible to corrosive attack.

This effect can be minimized by annealing the stainless steel after it has been sensitized. This is done by heating the alloy to 1800°F or higher, depending on the specific alloy, and then quickly cooling it through the sensitizing range to prevent the carbon from precipitating out. Another way to reduce this effect is to limit the carbon content to less than 0.03%. This extra-low-carbon (ELC) stainless steel can be welded without the danger of carbide precipitation.

## CORROSION OF NONMETALLICS

Plastic materials are attacked by solvation and chemical reactions. Solvation is the penetration of the plastic by corrosive elements that cause softening, swelling, and ultimate failure. Plastics, in contrast to metals, do not exhibit a useful corrosion rate; they usually either completely resist attack or deteriorate rapidly. Because of this difference in corrosion mechanism, the two types of notation used in the tables were established.

Plastic and elastomeric materials are compounded by the manufacturer. Properties of the materials produced can vary from manufacturer to manufacturer. By compounding, it is possible to improve specific mechanical/physical properties, but usually at the expense of another property. Consequently, materials that have been produced to improve a mechanical property may have had their ability to resist corrosion reduced. Since all plastic or elastomeric materials produced may not have the corrosion resistance indicated in the charts, the manufacturer of the material to be used should be consulted. The same reasoning applies to the physical/mechanical properties required for the application.

A word of caution should also be given regarding temperatures. The table shows only the resistivity to corrosive attack at various temperatures. Although the material may be corrosion-resistant at a specific temperature, this does not mean that the physical/mechanical properties would be satisfactory at these temperatures. These must be investigated at the operating temperature to ensure that the material has the proper mechanical strength for the application.

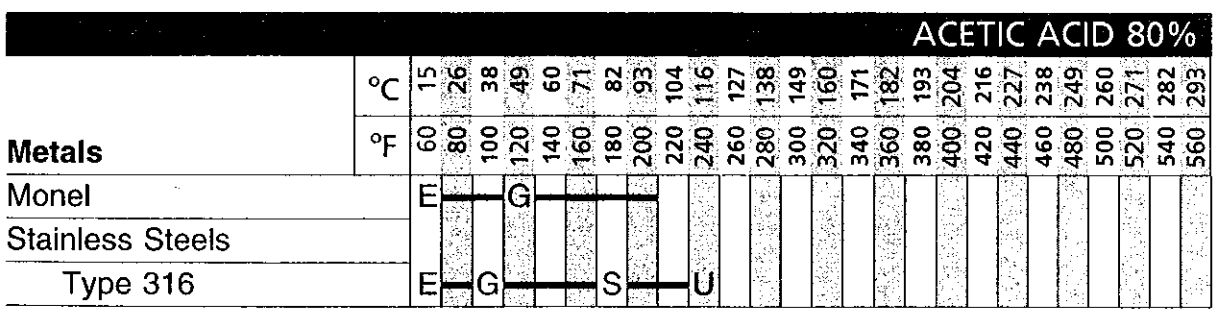
# Using the Tables

The tables are arranged alphabetically according to corrodent. Unless otherwise noted, the corrodent is considered pure in the case of liquids, or a saturated aqueous solution in the case of solids. All percentages shown are by weight.

There are four pages for each corrodent: one for the resistance to metals; one for the resistance to nometallic materials, coatings, and mortars; one for the resistance to plastics; and one for the resistance to elastomers, linings, and fabrics.

## TABLE NOTATION

Since corrosion is a function of temperature, the tables indicate the suitability of each material at varying temperatures. Symbols used to designate specific corrosion rates are shown on the bottom of the metals pages. The use of the temperature scale is explained by the following example:




From the sample table, it is seen that in the presence of an 80% solution of acetic acid, monel has a corrosion rate varying with temperature rated as follows:

- From 60 to 120°F, excellent (E): <2 mils penetration/year.
- From 120 to 210°F, good (G): <20 mils penetration/year.
- There are no data for temperatures beyond 210°F.

Type 316 stainless steel has a corrosion rate for the same corrodent varying with temperature rated as follows:

- From 60 to 100°F, excellent (E): <2 mils penetration/year.
- From 100 to 180°F, good (G): <20 mils penetration/year.
- From 180 to 240°F, satisfactory (S): <50 mils penetration/year.
- Above 240°F, unsatisfactory (U): >50 mils penetration/year.

Nonmetallics are only rated as resistant (R) or unsatisfactory (U), because they do not exhibit a useful corrosion rate, as explained previously.

## Other Notation

Further information regarding the corrosion of specific materials by certain corrodents is provided by the following symbols. In the tables, the symbols follow the applicable material or corrodent name.

| Symbol | Meaning |
|---|---|
| 1 | Material is subject to pitting. |
| 2 | Material is subject to stress cracking. |
| 3 | Material is subject to crevice attack. |
| 4 | Not for use with carbonated beverages. |
| 5 | Material should be passivated. |
| 6 | Alkaline. |
| 7 | Acid free. |
| 8 | Acid free and passivated. |
| 9 | Material is subject to intergranular corrosion. |
| 10 | Synthetic veil or surfacing mat should be used. |
| 11 | Material will cause stress cracking in many polyethylenes. A stress crack-resistant, high molecular weight polyethylene must be used. |
| 12 | Material is subject to stress cracking when wet. |
| 13 | Corrodent will be absorbed. |
| 14 | Corrodent will permeate. |
| ALL | Data applies to all concentrations. |
| ELC | Material is low-carbon grade. |
| SAT | Solution is saturated. |

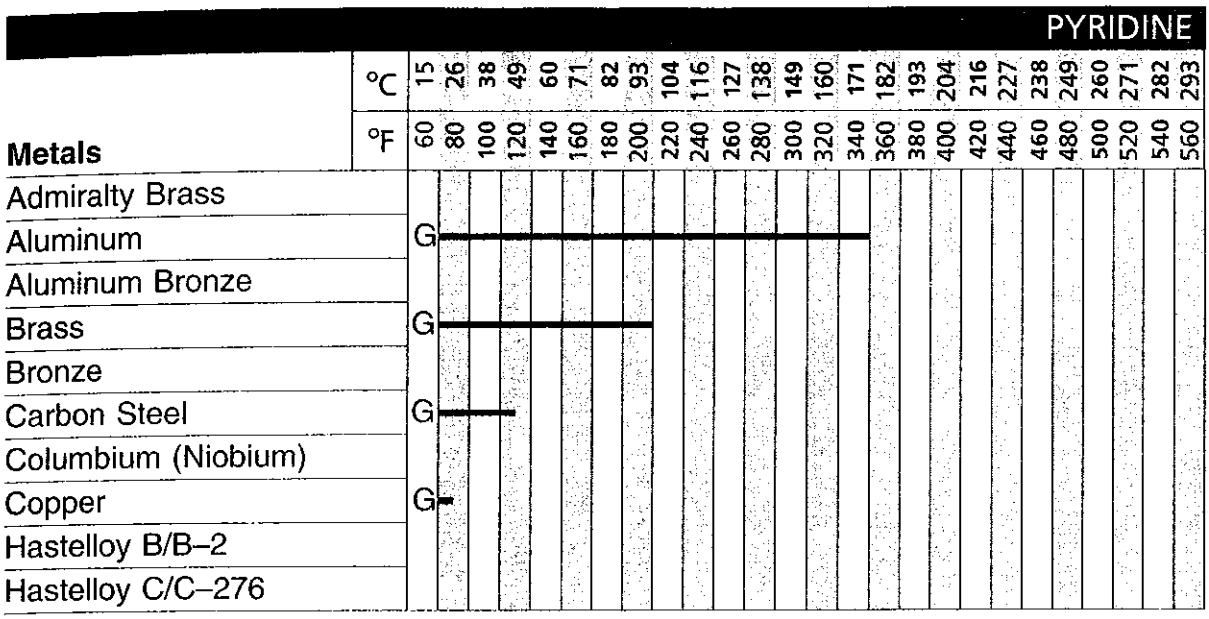
## General Notes

- Incolloy category is applicable to grades 800 and 825 only, unless otherwise specified.
- Inconel category is applicable to grade 600, unless otherwise specified.
- The mortars specified are for use fully immersed or subject to constant flow.
- The coatings specified are for use fully immersed or for wet spills or wet fumes.
- There are many epoxy formulations. Where epoxy is shown as being a satisfactory material of construction, it indicates that there is a suitable formulation. Manufacturers should be consulted for the suitability of their specific formulation.
- See Appendix 3 for plating solution compositions.

## READING THE TEMPERATURE SCALE

When using the tables, note that the vertical lines refer to temperatures midway between the temperatures cited (see the sample table below). Thus, aluminum is corroded by pyridine at a rate less than 20 mils/year between 60 and 350°F. Brass, carbon steel, and copper have the same corrosion rate between the temperatures of 60 and 210°F, 120°F, and 80°F, respectively.

When a material is indicated to be unsatisfactory at a specific temperature, it is also unsatisfactory at all temperatures above the one shown. A blank in the chart indicates that no data are available.


PYRIDINE
°C
15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293
°F
60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560
Metals
Admiralty Brass
Aluminum
Aluminum Bronze
Brass
Bronze
Carbon Steel
Columbium (Niobium)
Copper
Hastelloy B/B–2
Hastelloy C/C–276
G
G
G
G

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| Ferric Sulfate | 1341 |
| Ferrous Ammonium Citrate | 1345 |
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| Ferrous Hydroxide | 1353 |
| Ferrous Nitrate | 1357 |
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Methyl Chloride 2005
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| | |
|---|---|
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| Sodium Dichromate | 2905 |
| Sodium Ferricyanide | 2909 |
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| Sodium Fluoride | 2917 |
| Sodium Hydrosulfide | 2921 |
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| Sodium Hydroxide 15% | 2933 |
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| Sodium Iodide | 2965 |
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| Sodium Metaphosphate | 2973 |
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| Sodium Nitrate | 2981 |
| Sodium Nitrite | 2985 |
| Sodium Perborate 10% | 2989 |
| Sodium Peroxide 10% | 2993 |
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| Sodium Phosphate Alkaline | 3001 |
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| Sodium Silicate | 3009 |
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| Sodium Sulfite 10% | 3021 |
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Sulfur Dioxide Dry 3121
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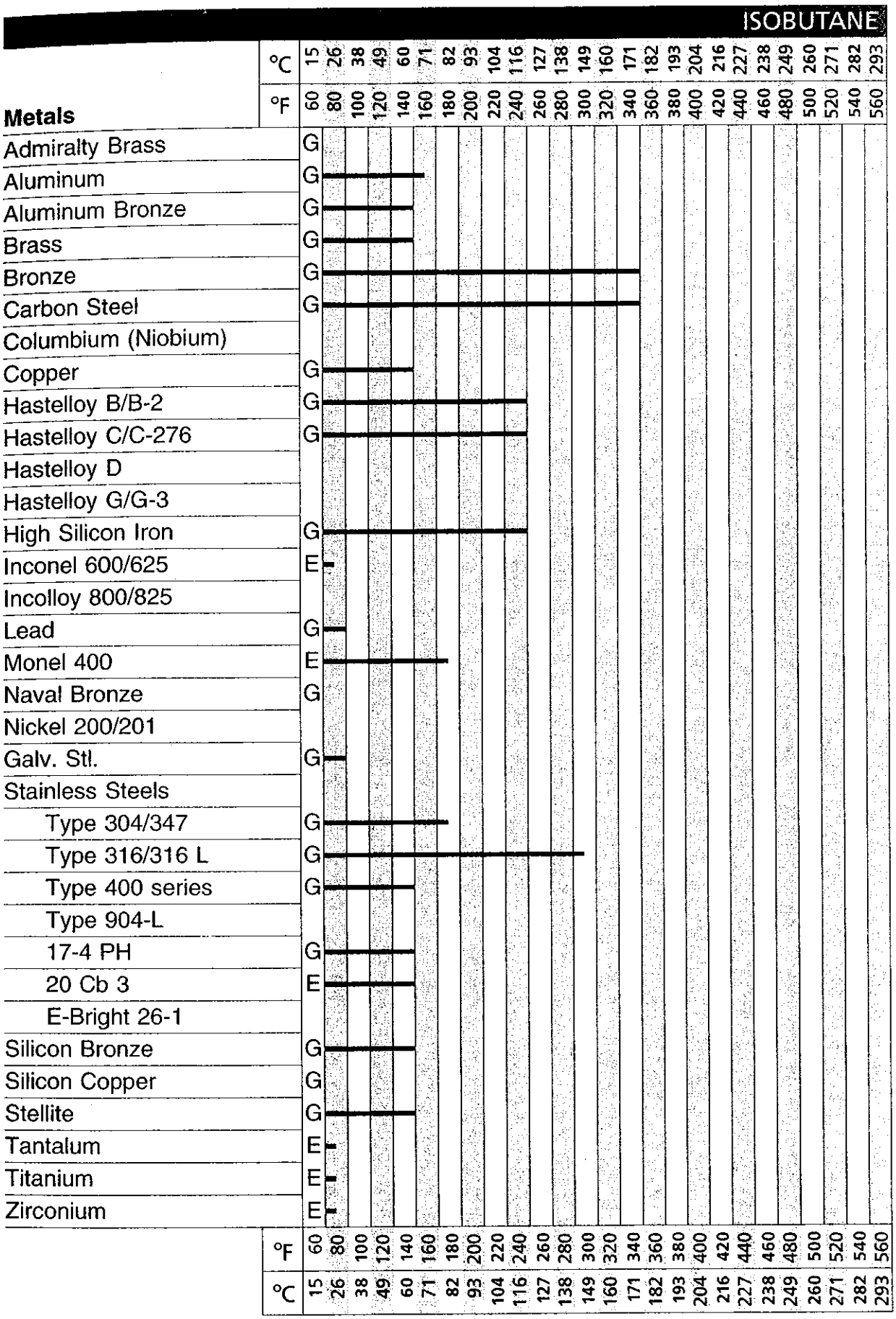
*Appendix 1: Chemical Synonyms* *A-1-1*
*Appendix 2: Cross-Reference of Trade Names to Generic Names* *A-2-1*
*Appendix 3: Plating Solution Composition* *A-3-1*




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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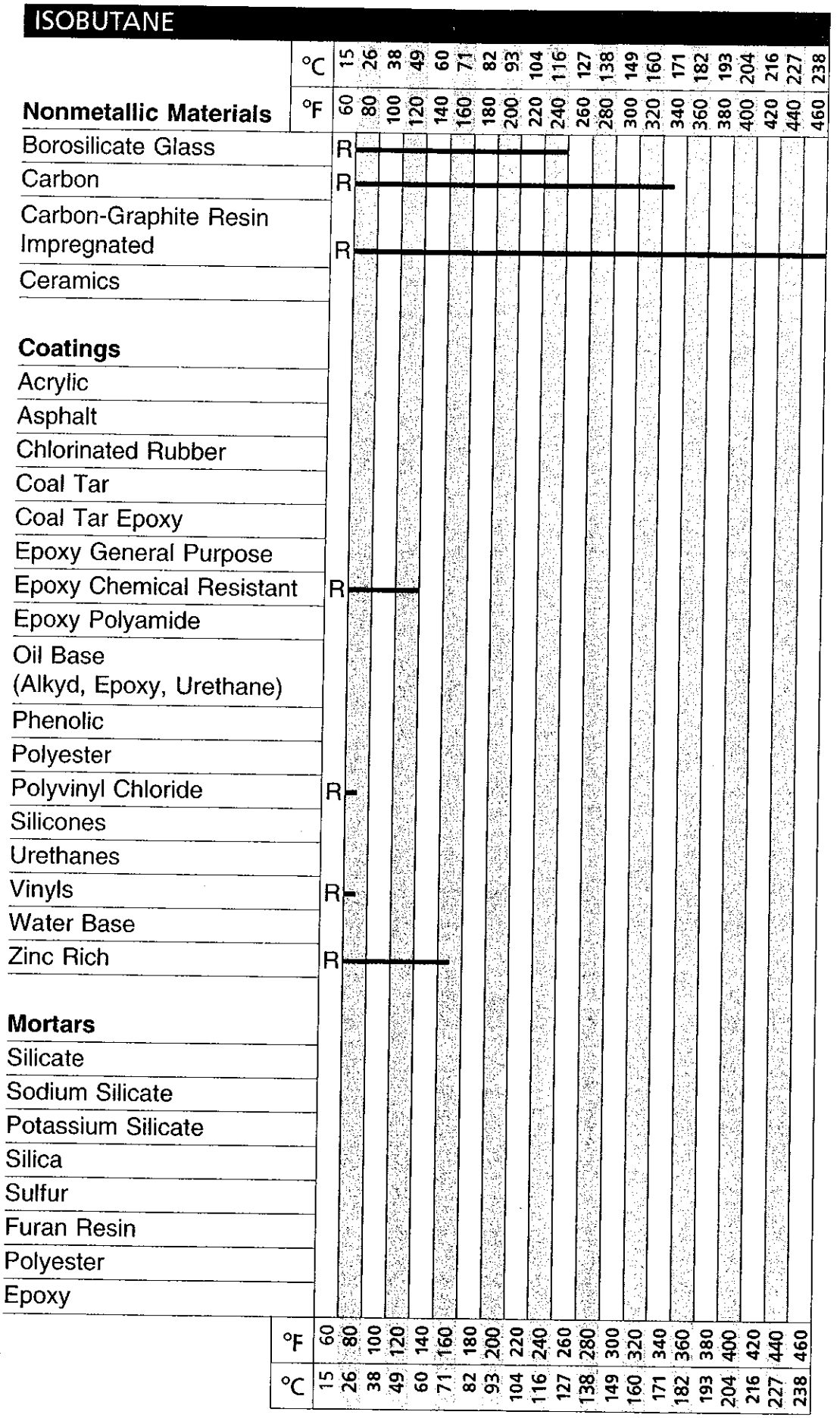




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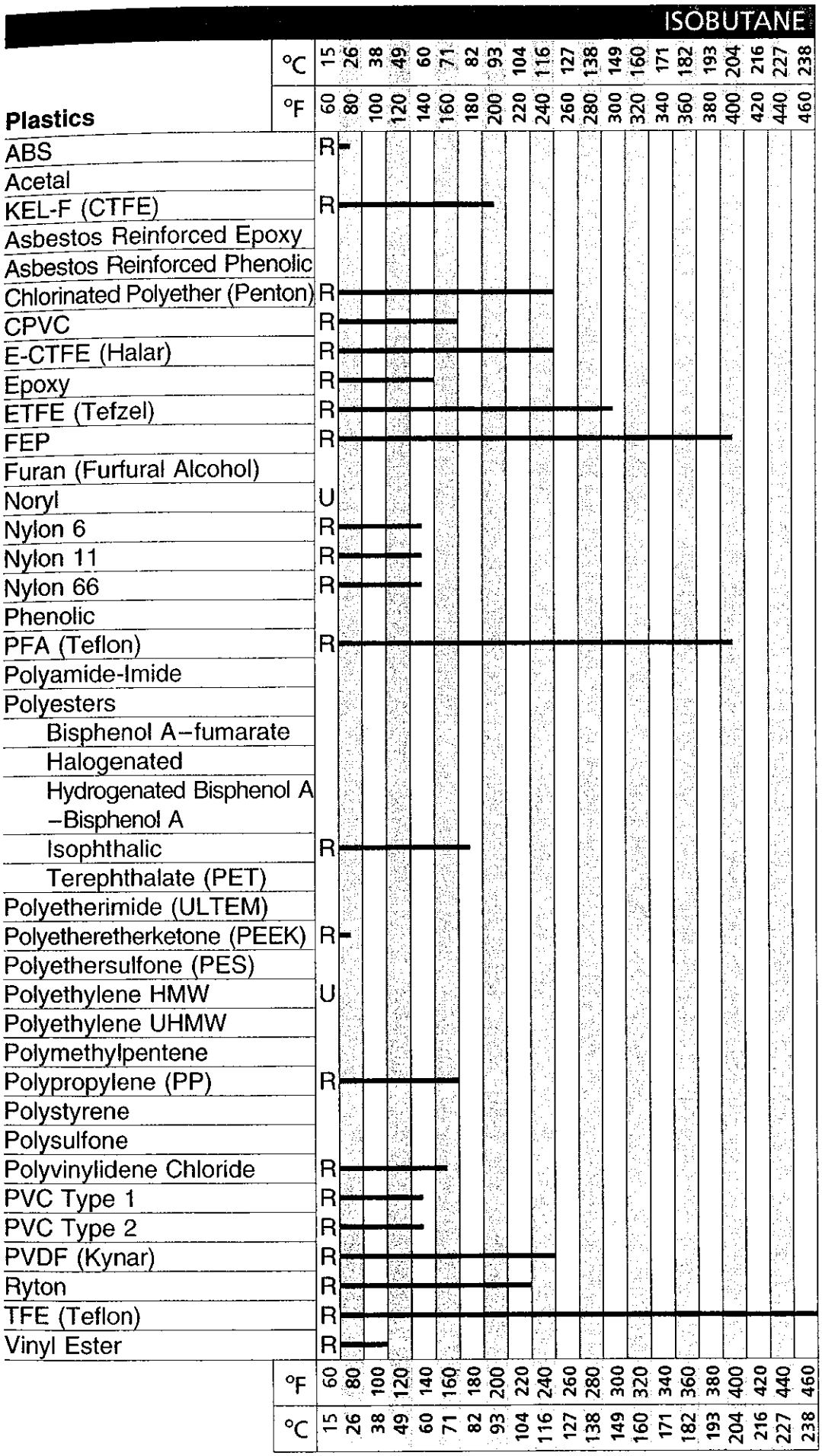



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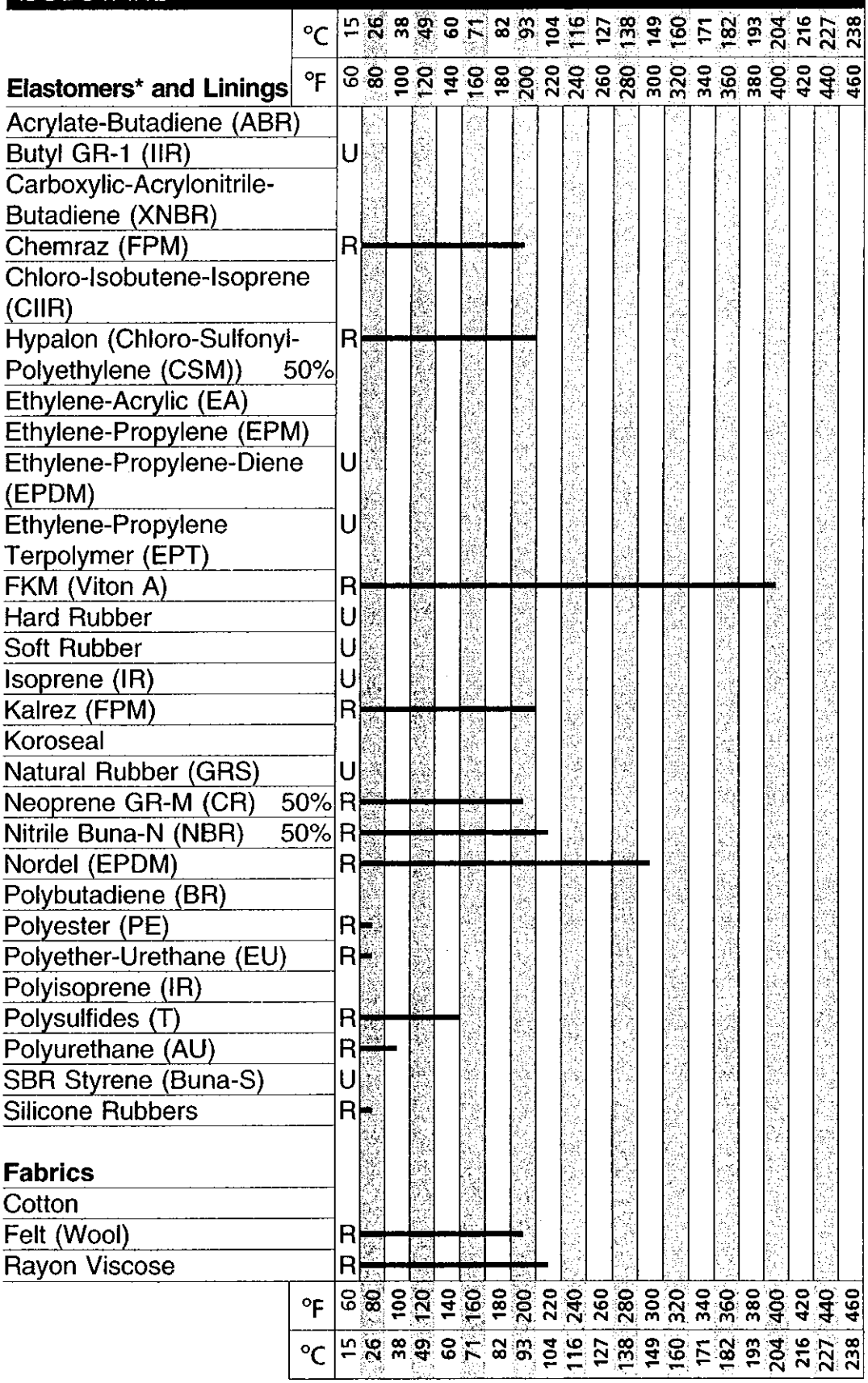


*See also Nylon 11 under PLASTICS



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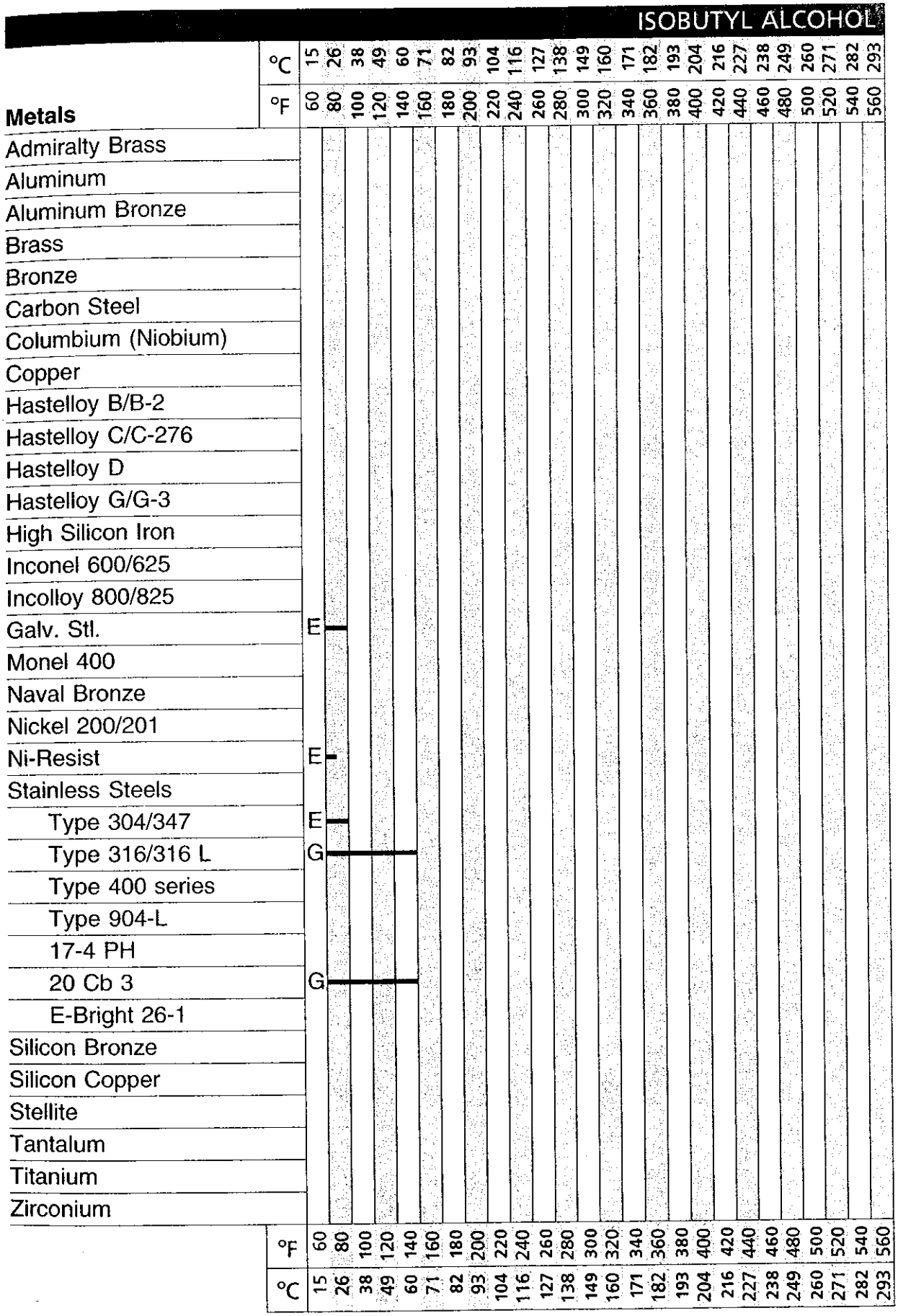


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

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| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | R | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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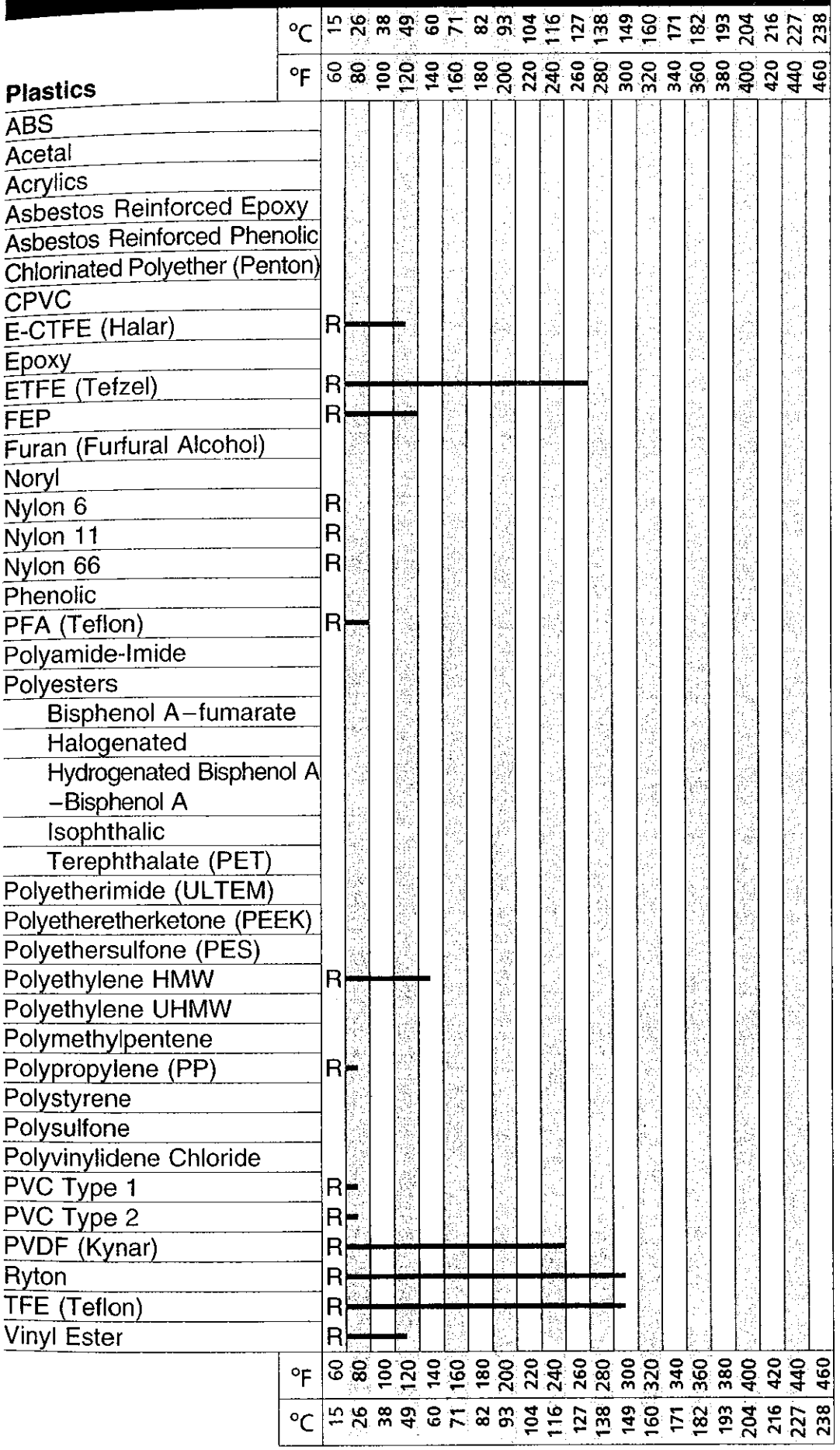
# ISOBUTYL ALCOHOL





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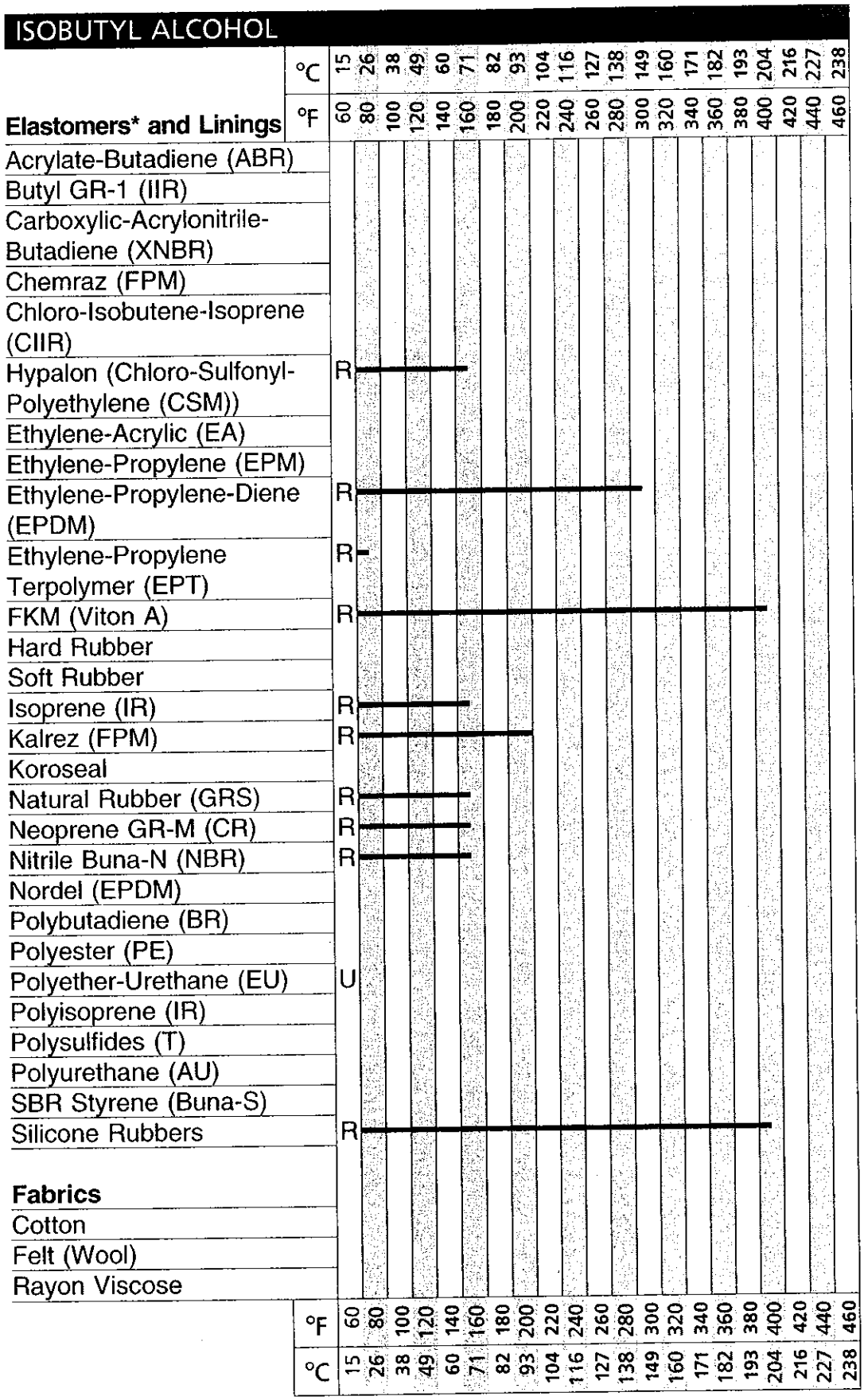
## ISOBUTYL ALCOHOL




*See also Nylon 11 under PLASTICS





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## ISOOCTANE

| Metals | °F | °C |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | G | |
| Brass | G | |
| Bronze | G | |
| Carbon Steel | G | |
| Columbium (Niobium) | | |
| Copper | G | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | G | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Galv. Stl. | G | |
| Monel 400 | G | |
| Naval Bronze | G | |
| Nickel 200/201 | | |
| Ni-Resist | G | |
| Stainless Steels | | |
| Type 304/347 | G | |
| Type 316/316 L | G | |
| Type 400 series | G | |
| Type 904-L | | |
| 17-4 PH | G | |
| 20 Cb 3 | G | |
| E-Bright 26-1 | | |
| Silicon Bronze | G | |
| Silicon Copper | | |
| Stellite | G | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## ISOOCTANE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | U | | | | | | | | | | | | | | | | | | | | |
| Silicones | | U | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | R | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | R | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | R | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | R | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | R | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | R | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | R | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | | R | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | R | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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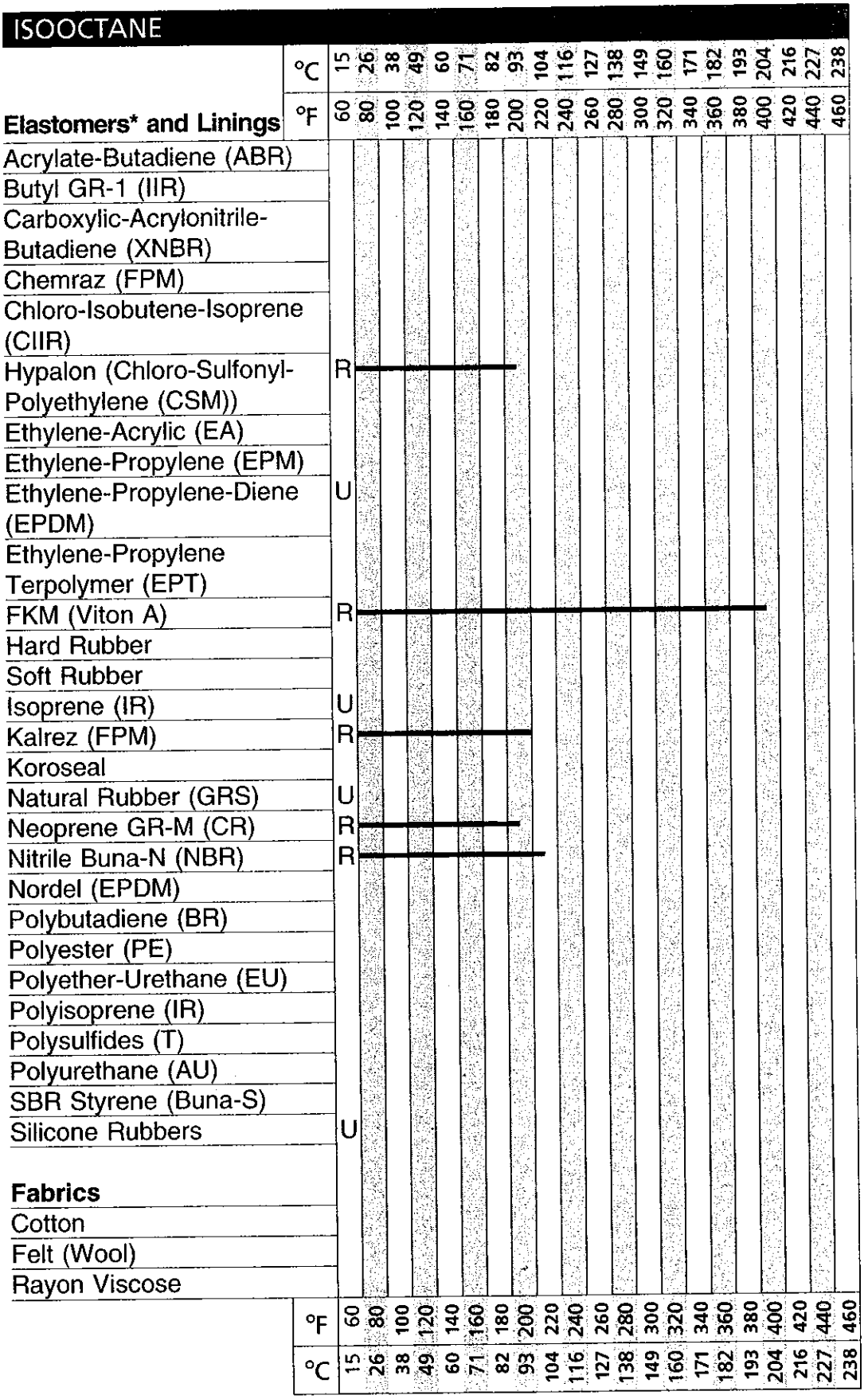
## ISOOCTANE

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# ISOPROPYL ACETATE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Galv. Stl. | | E | — | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | G | — | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | E | — | — | G | — | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | G | — | — | — | — | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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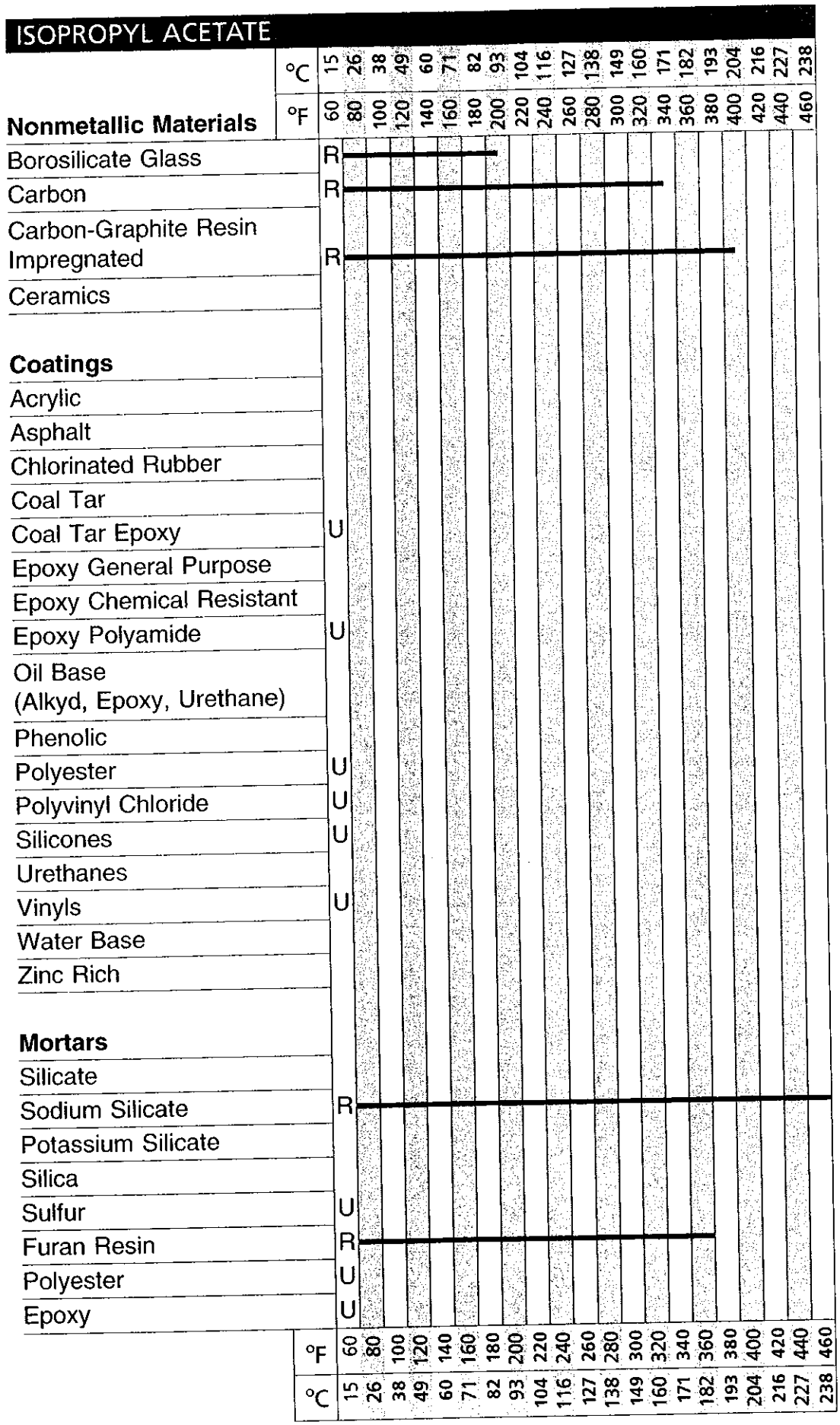
## ISOPROPYL ACETATE



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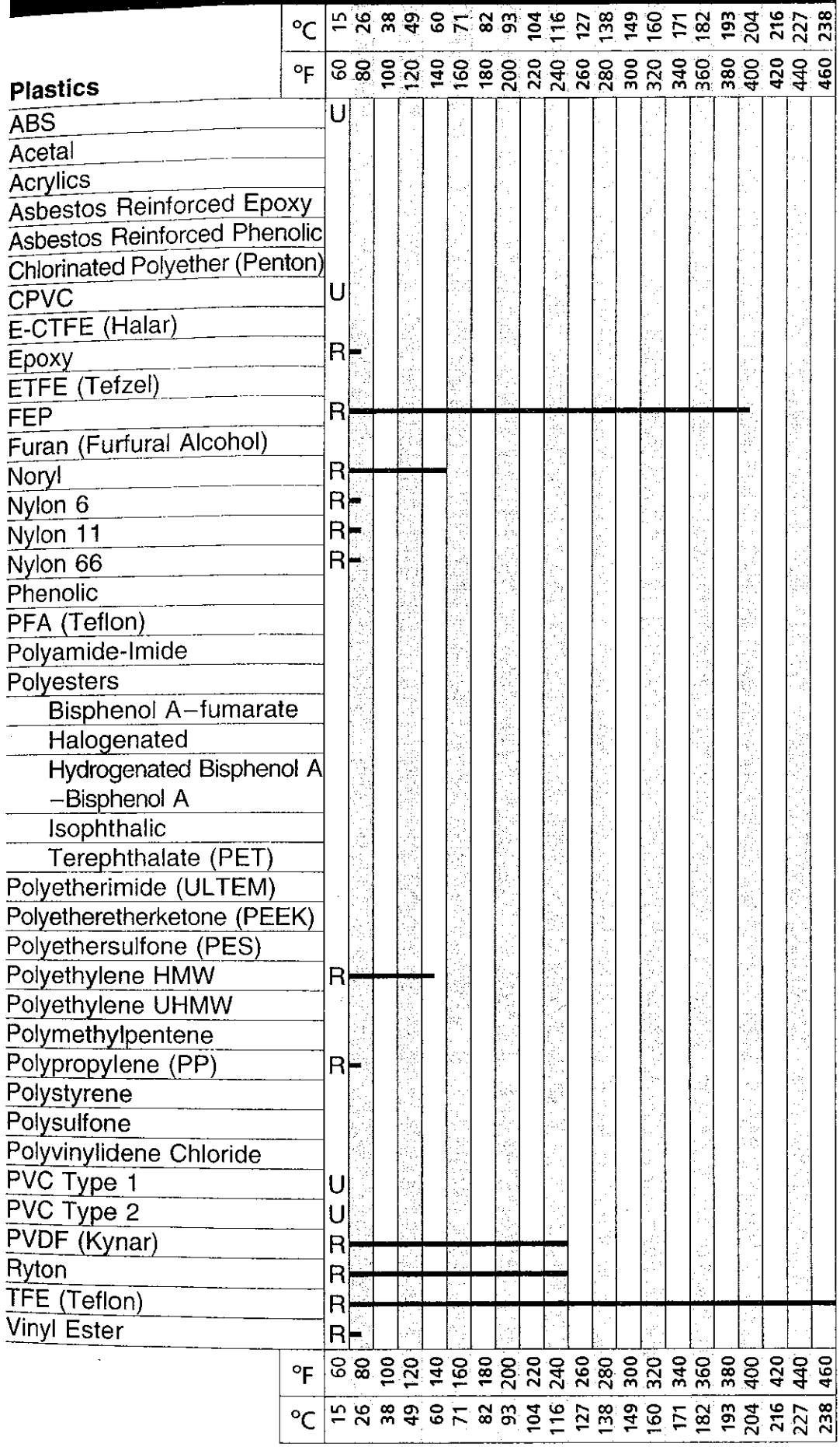


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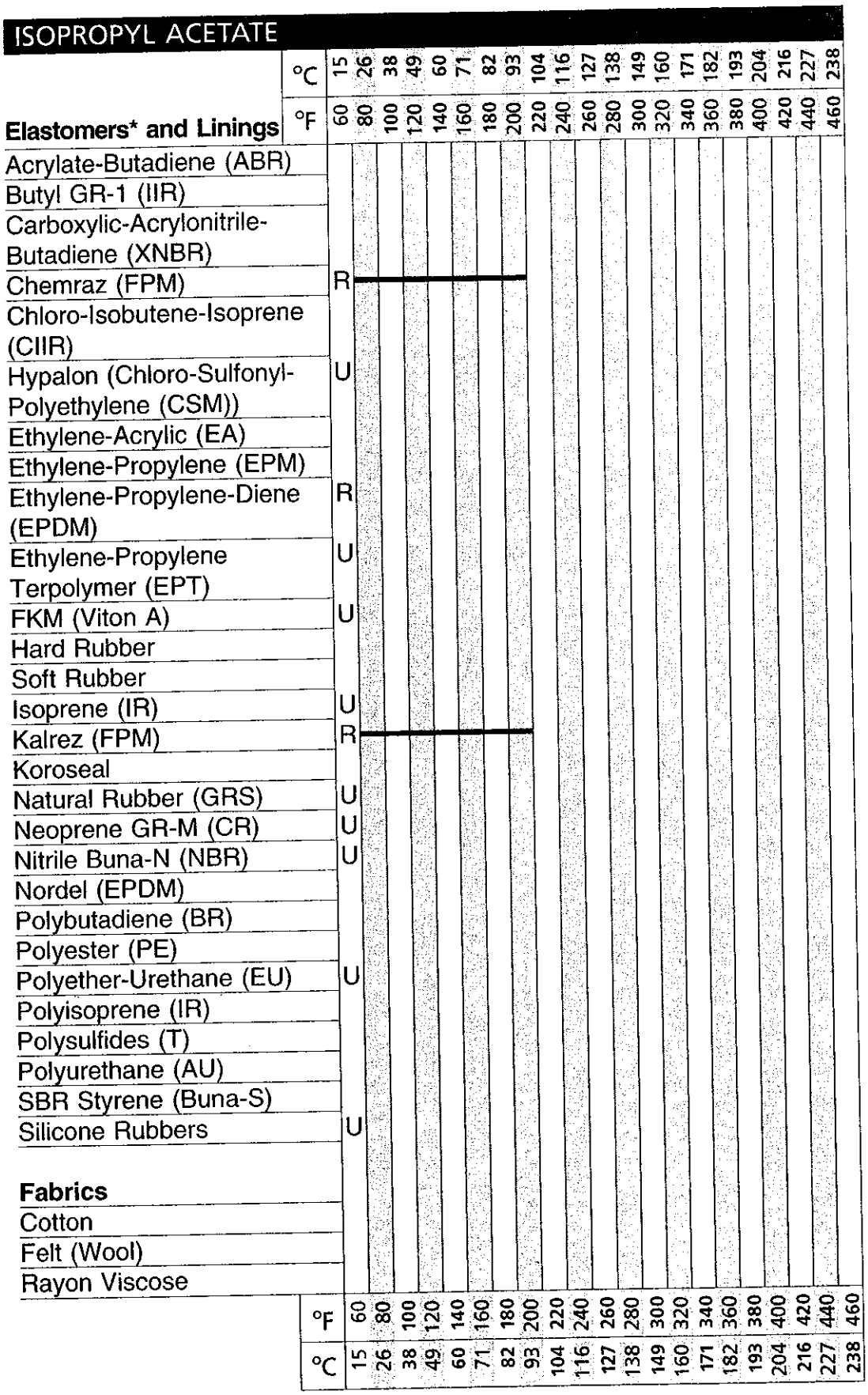


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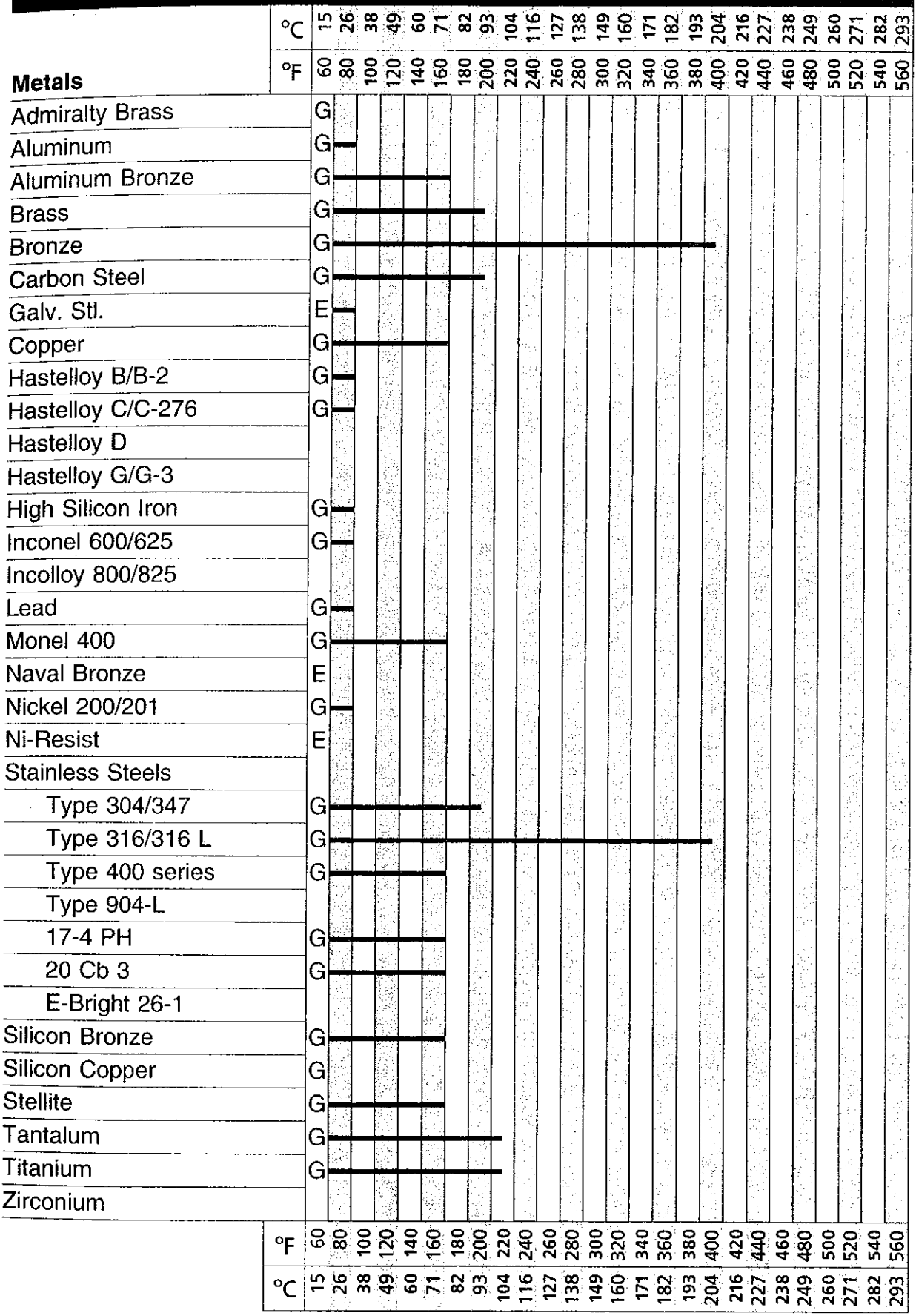


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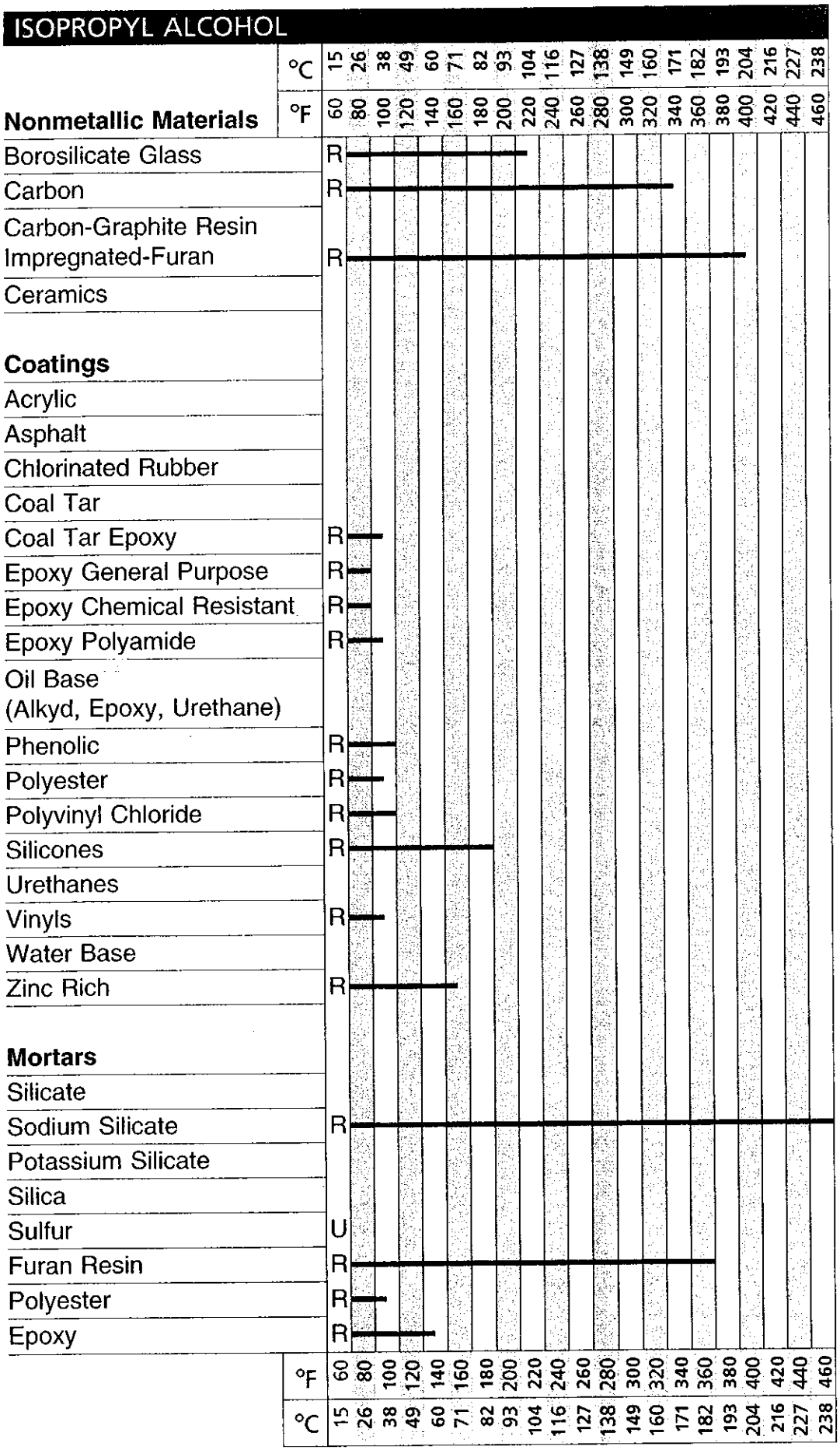




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# ISOPROPYL ALCOHOL

| Plastics | |
|---|---|
| ABS | R |
| Acetal | R |
| Acrylics | |
| Asbestos Reinforced Epoxy | R |
| Asbestos Reinforced Phenolic | R |
| Chlorinated Polyether (Penton) | R |
| CPVC | R |
| E-CTFE (Halar) | R |
| Epoxy | R |
| ETFE (Tefzel) | R |
| FEP | R |
| Furan (Furfural Alcohol) | R |
| Noryl | R |
| Nylon 6 | U |
| Nylon 11 | U |
| Nylon 66 | U |
| Phenolic | R |
| PFA (Teflon) | |
| Polyamide-Imide | |
| Polyesters | |
| Bisphenol A–fumarate | R |
| Halogenated | R |
| Hydrogenated Bisphenol A –Bisphenol A | |
| Isophthalic | U |
| Terephthalate (PET) | U |
| Polyetherimide (ULTEM) | R |
| Polyetheretherketone (PEEK) | |
| Polyethersulfone (PES) | |
| Polyethylene HMW | R |
| Polyethylene UHMW | R |
| Polymethylpentene | |
| Polypropylene (PP) | R |
| Polystyrene | |
| Polysulfone | |
| Polyvinylidene Chloride | R |
| PVC Type 1 | R |
| PVC Type 2 | R |
| PVDF (Kynar) | R |
| Ryton ALL | R |
| TFE (Teflon) | R |
| Vinyl Ester ALL | R |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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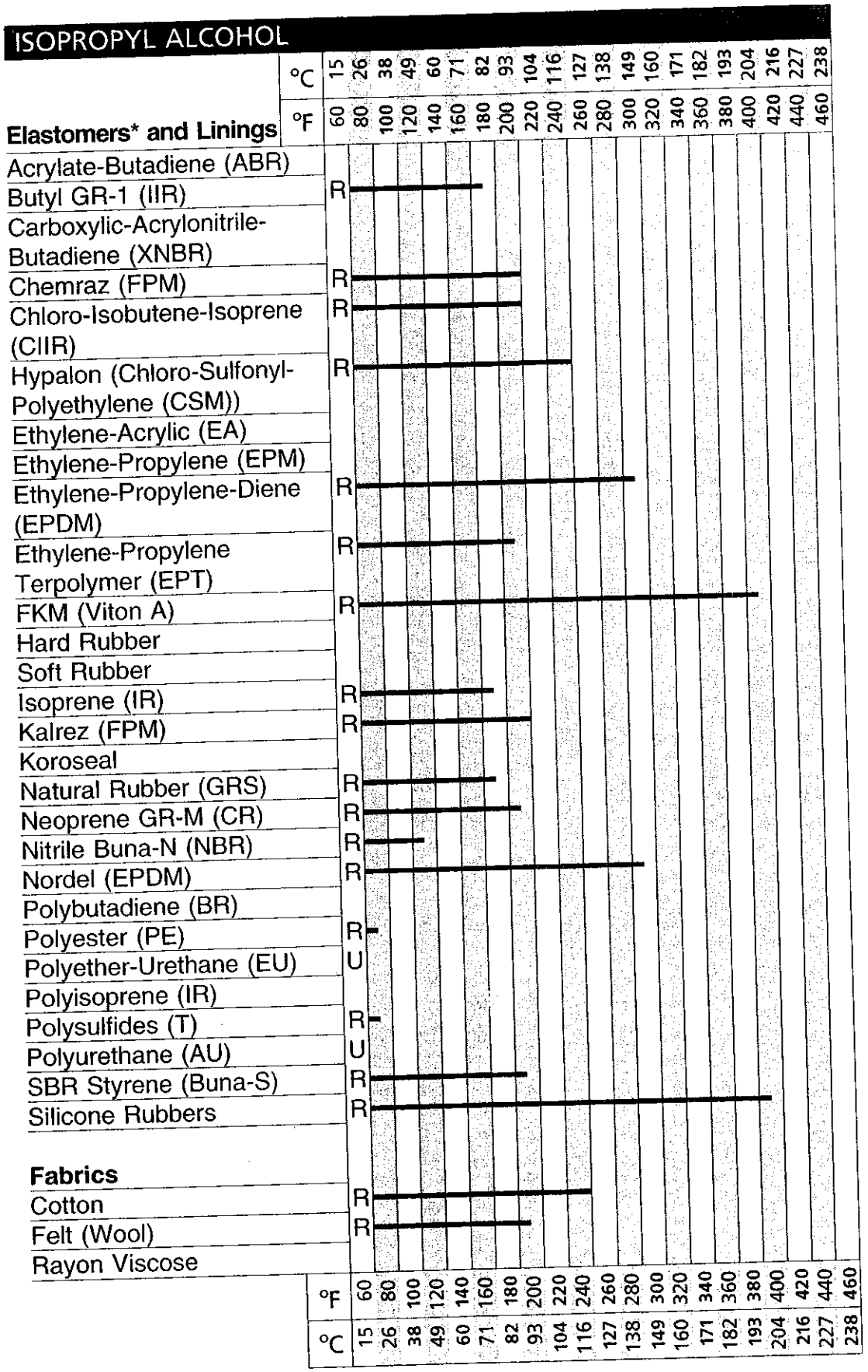


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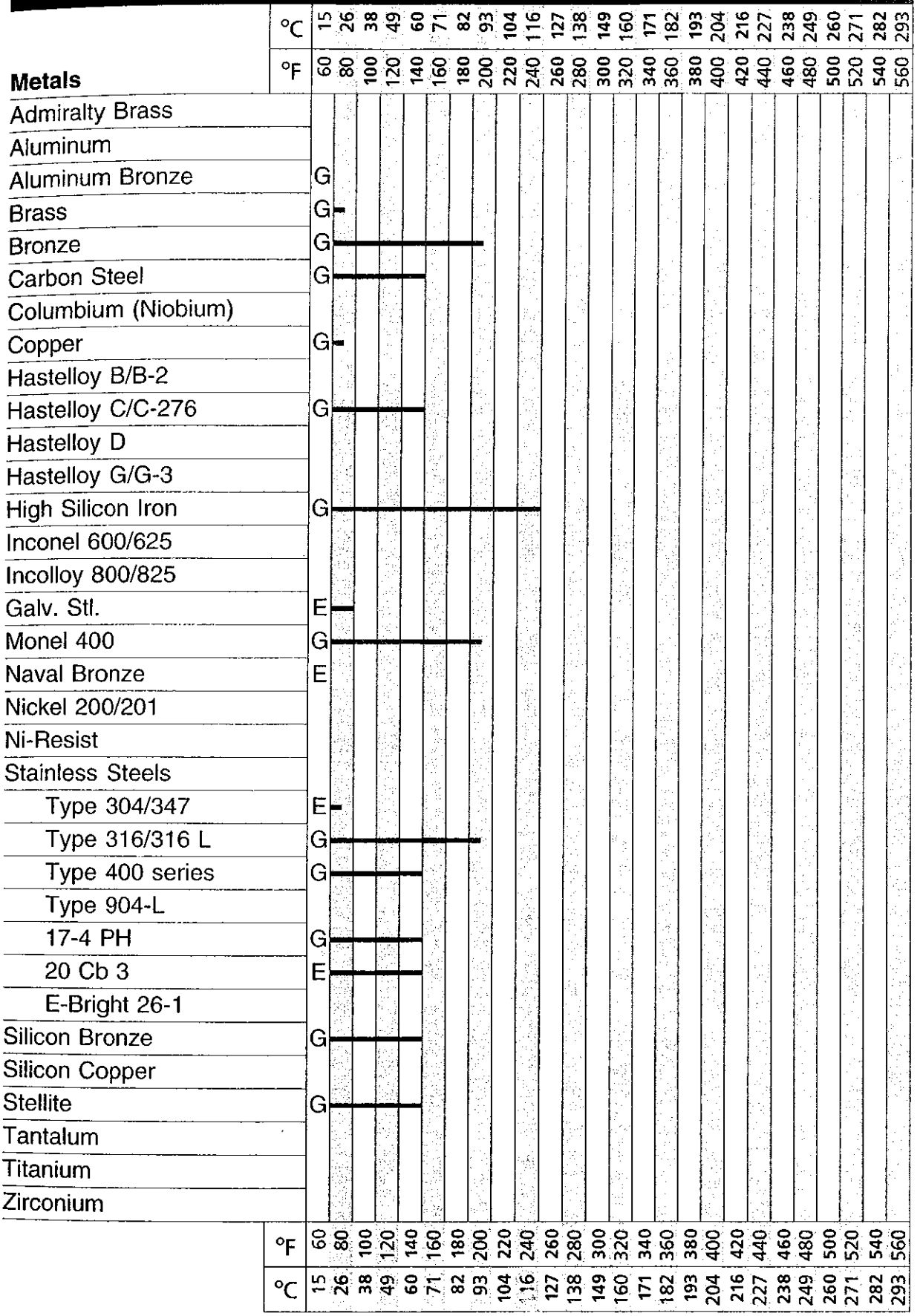


FOR METALS

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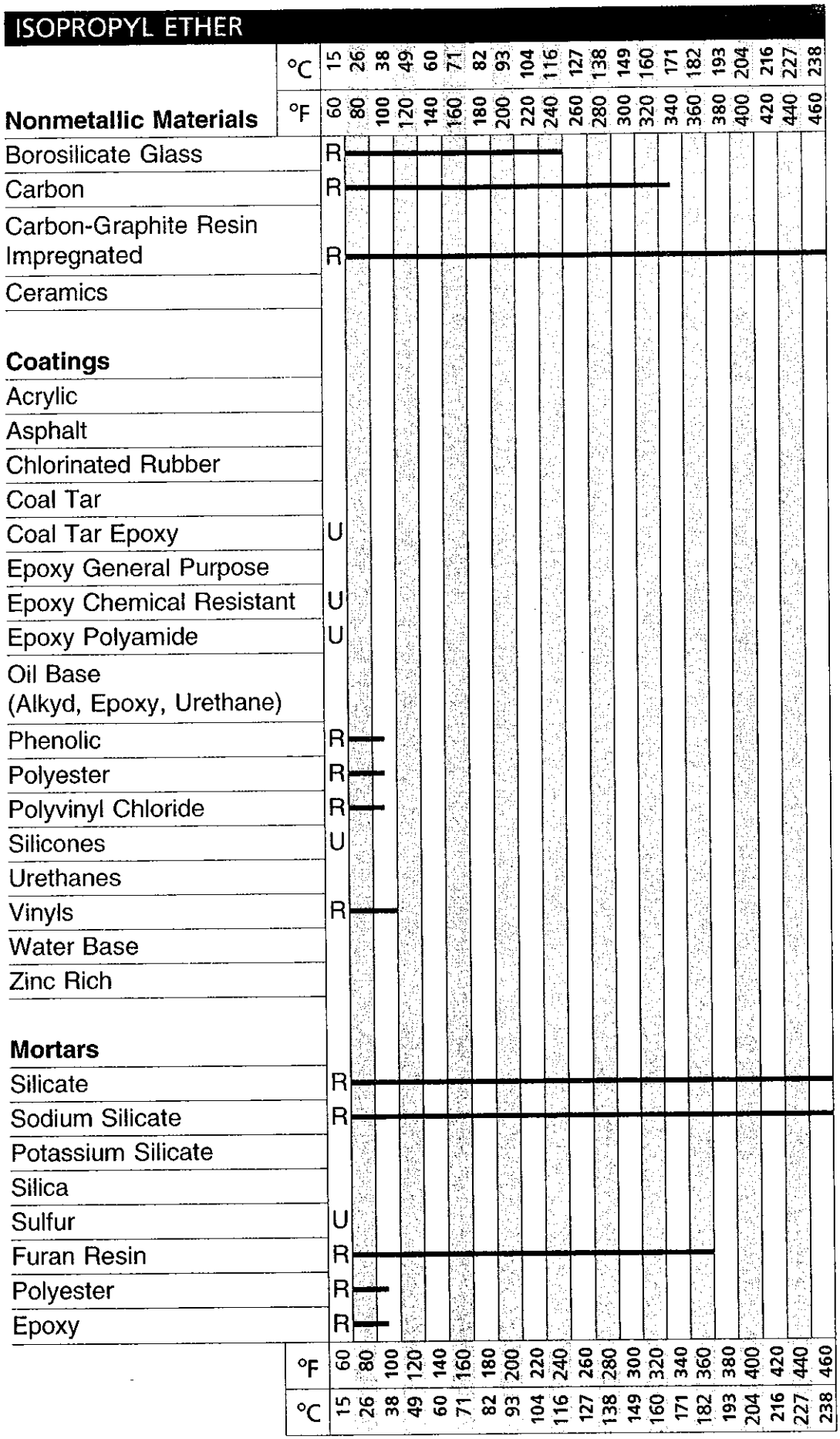
# ISOPROPYL ETHER



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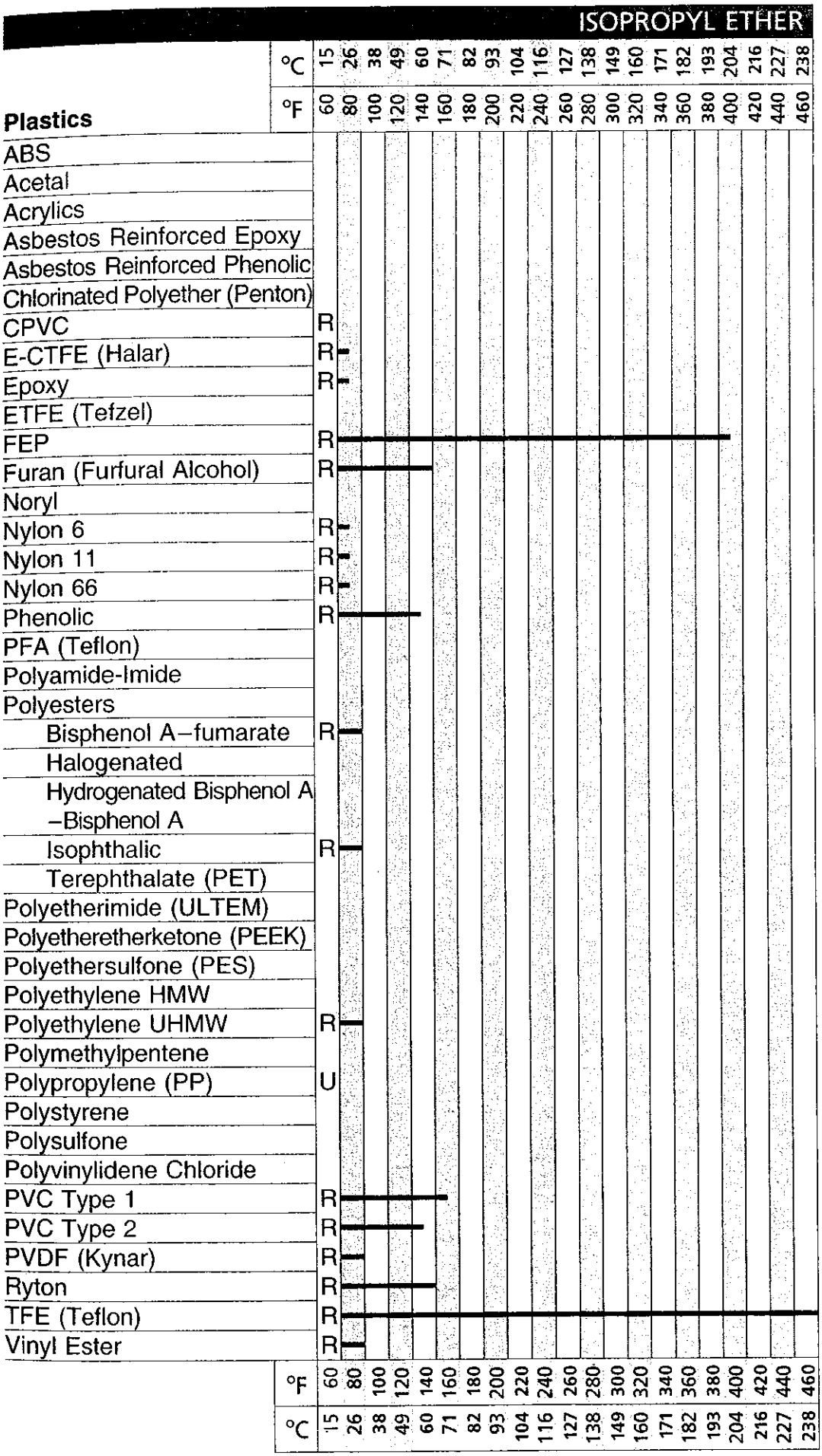


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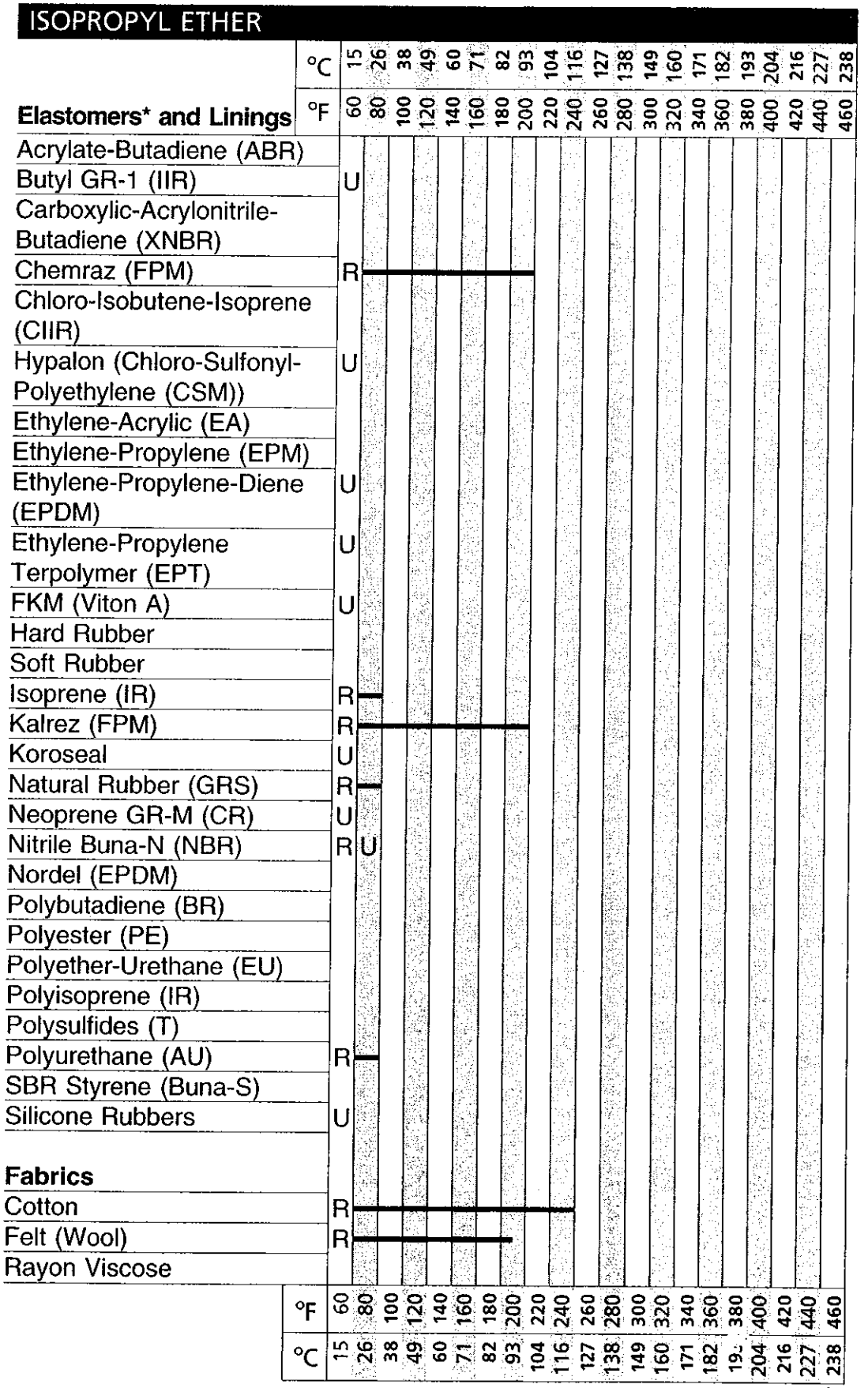
## ISOPROPYL ETHER

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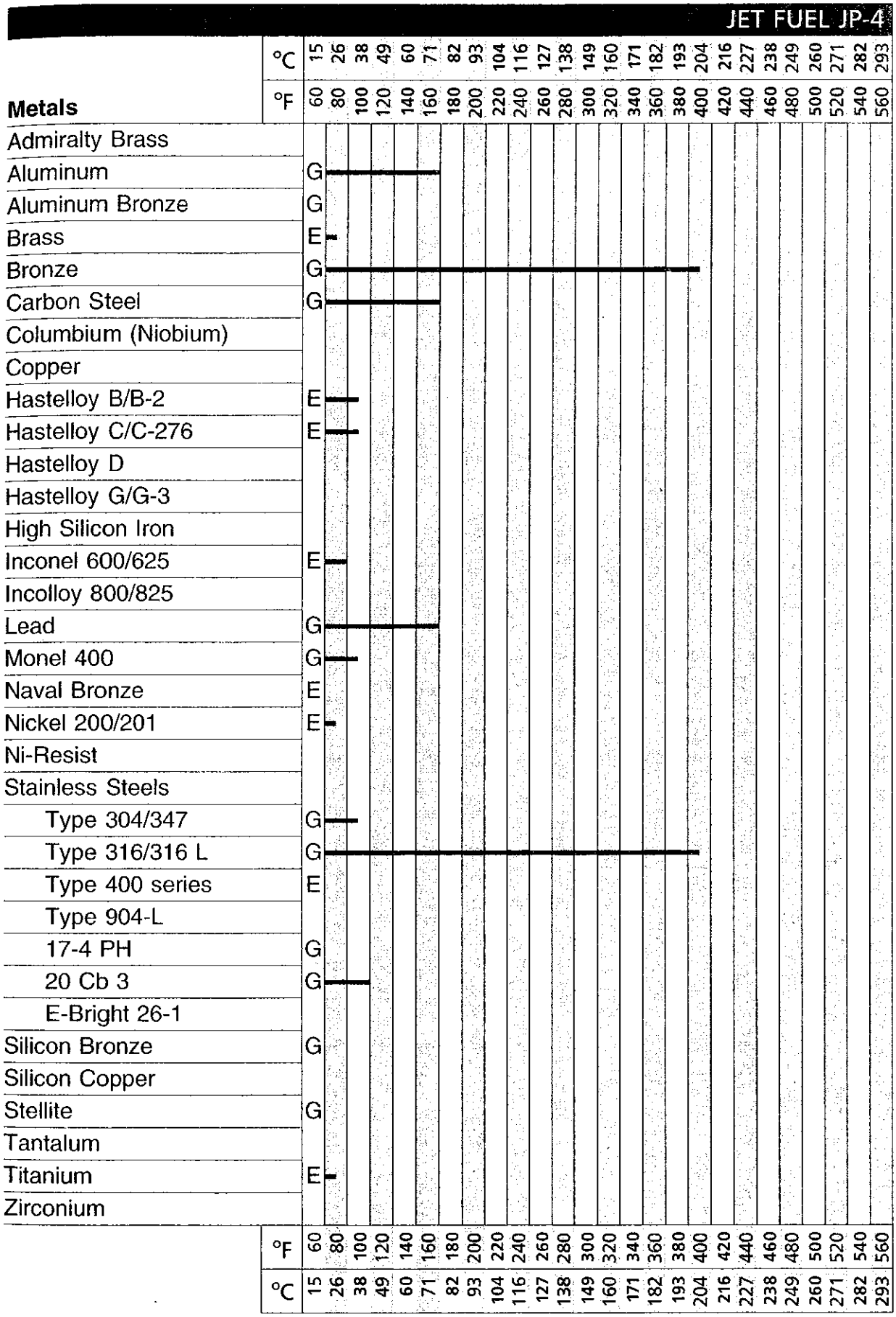
## JET FUEL JP-4




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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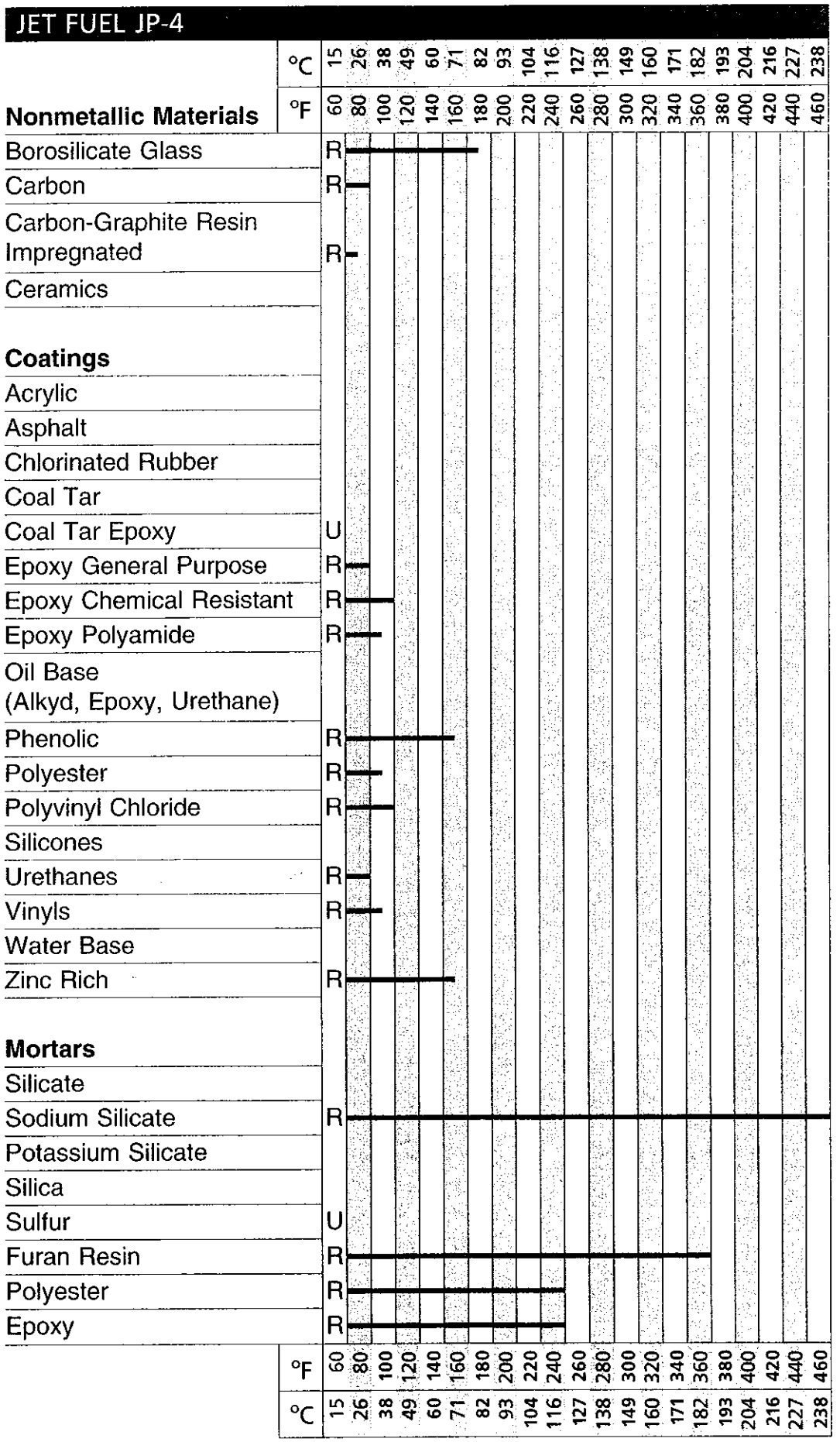
## JET FUEL JP-4



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## JET FUEL JP-4

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | R | |
| Acrylics | R | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | U |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | U | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | R | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | U |
| Polystyrene | | |
| Polysulfone | R | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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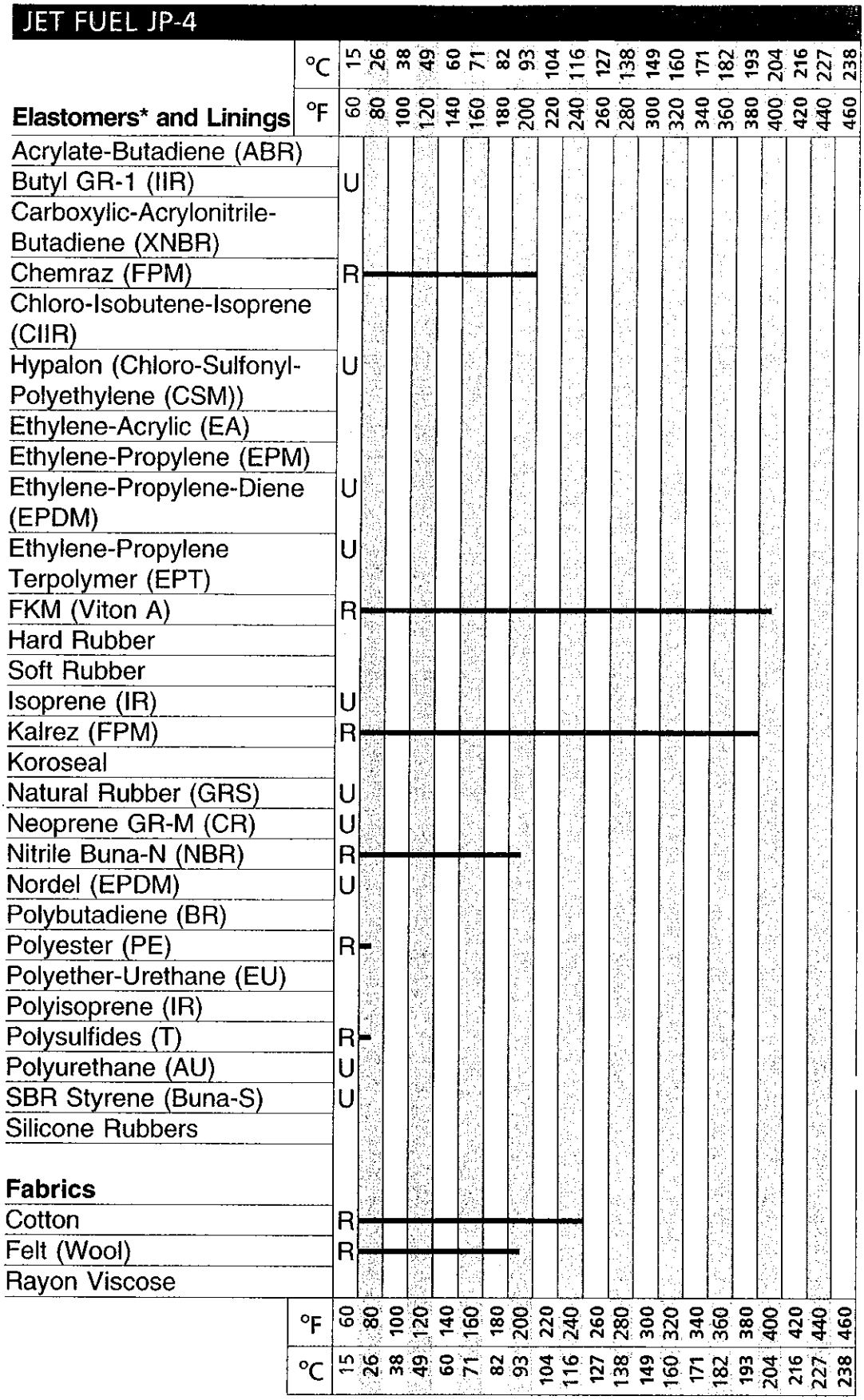
## JET FUEL JP-4

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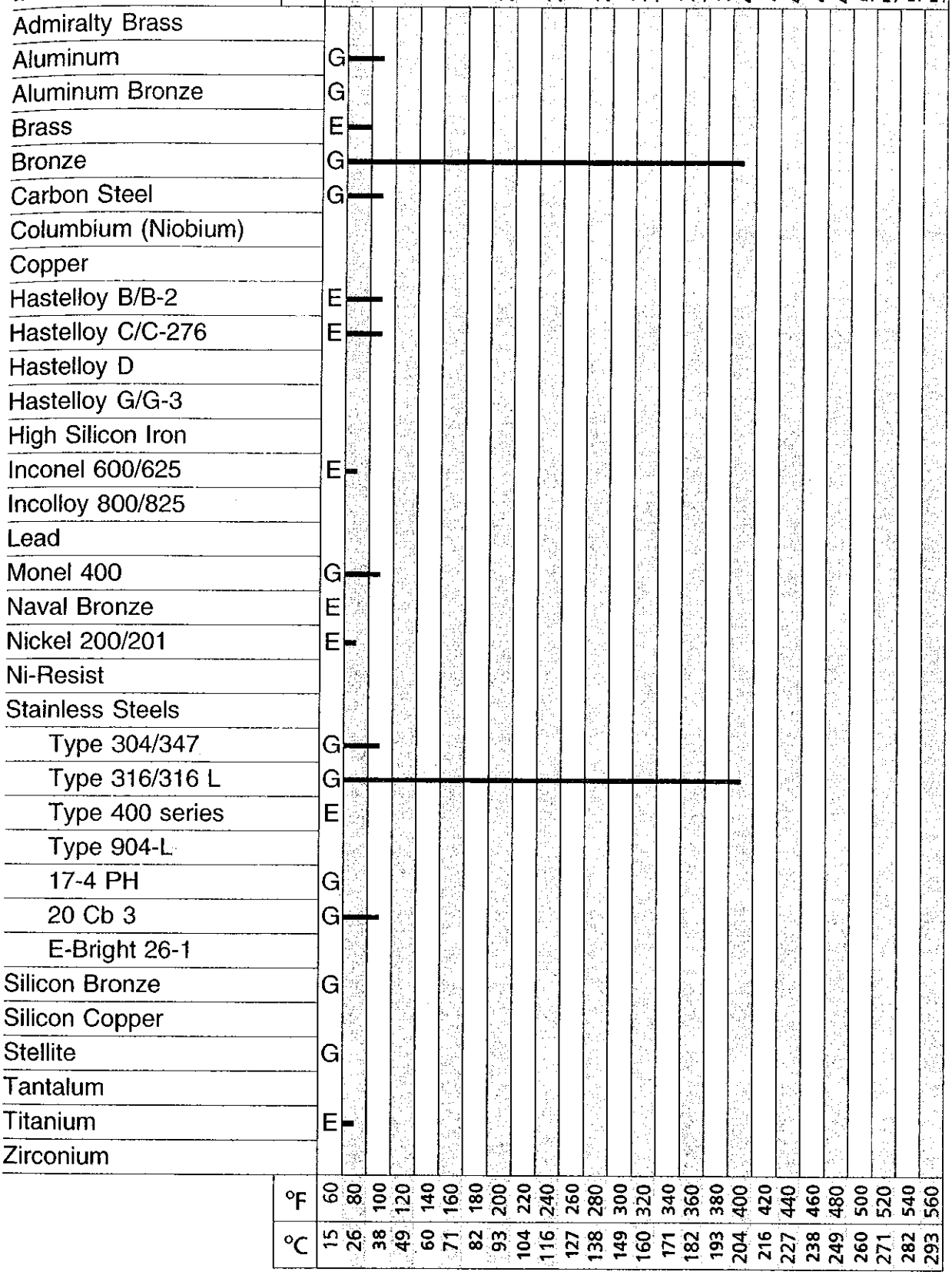
## JET FUEL JP-5




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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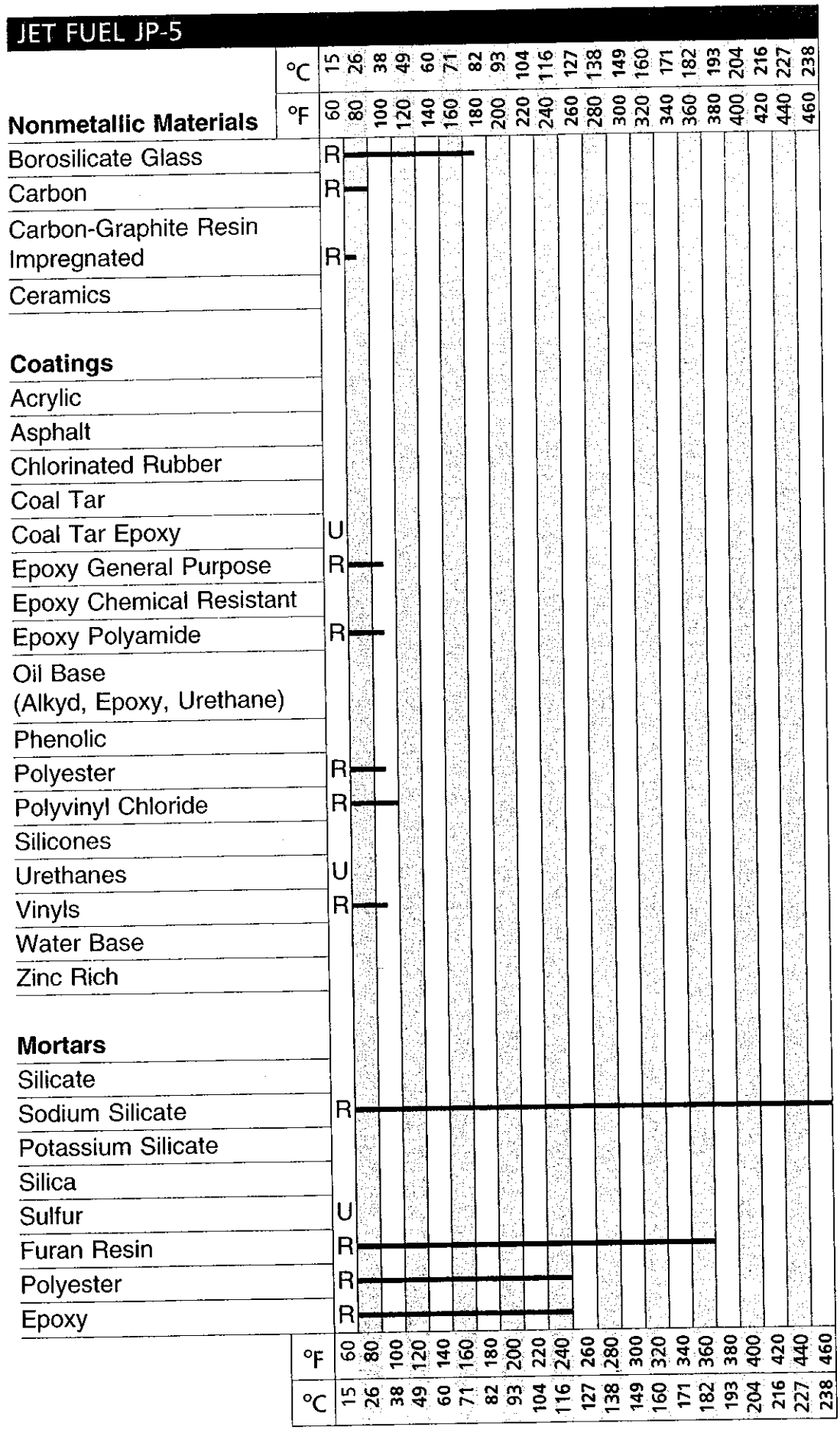
## JET FUEL JP-5





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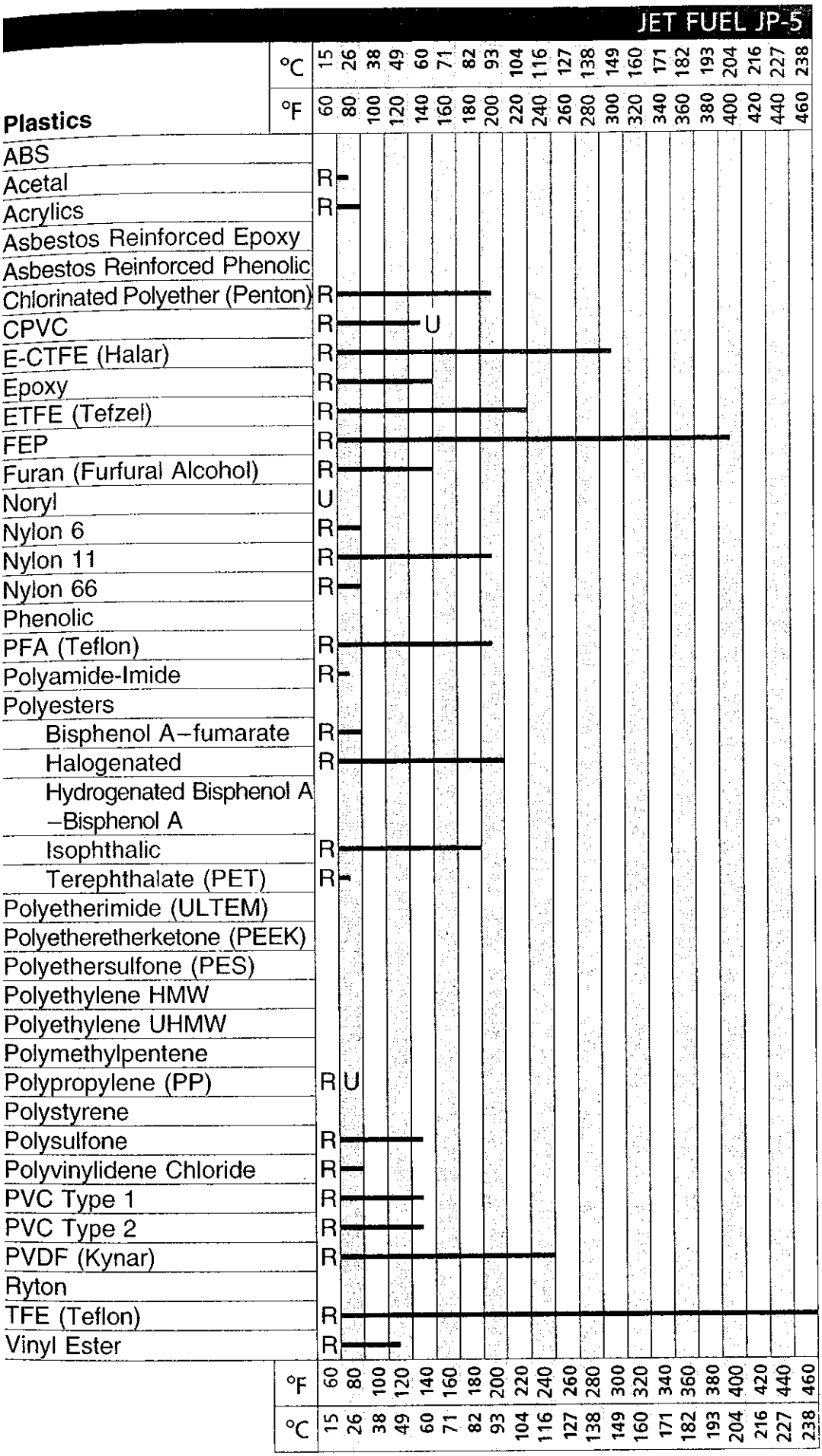



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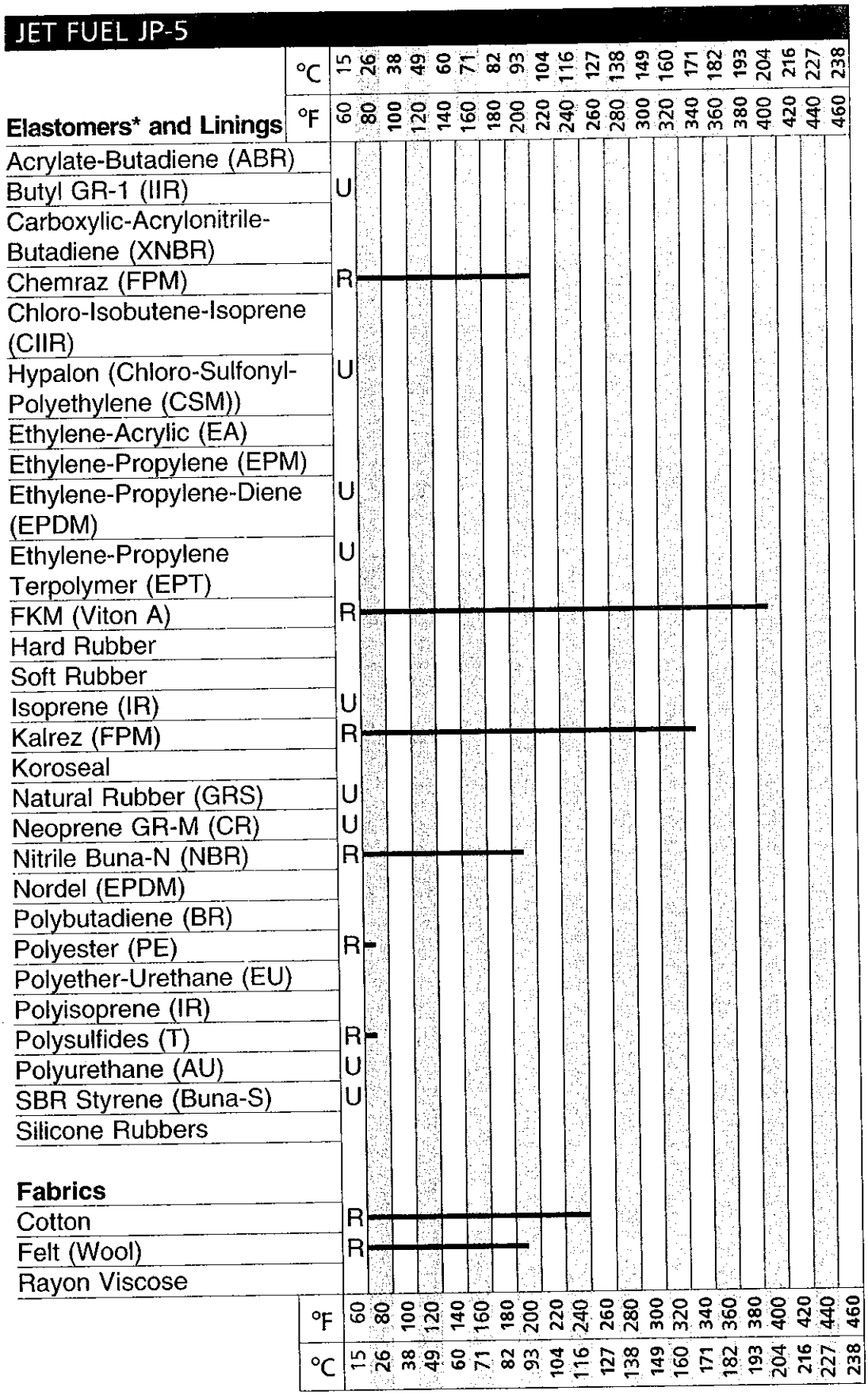
## JET FUEL JP-5

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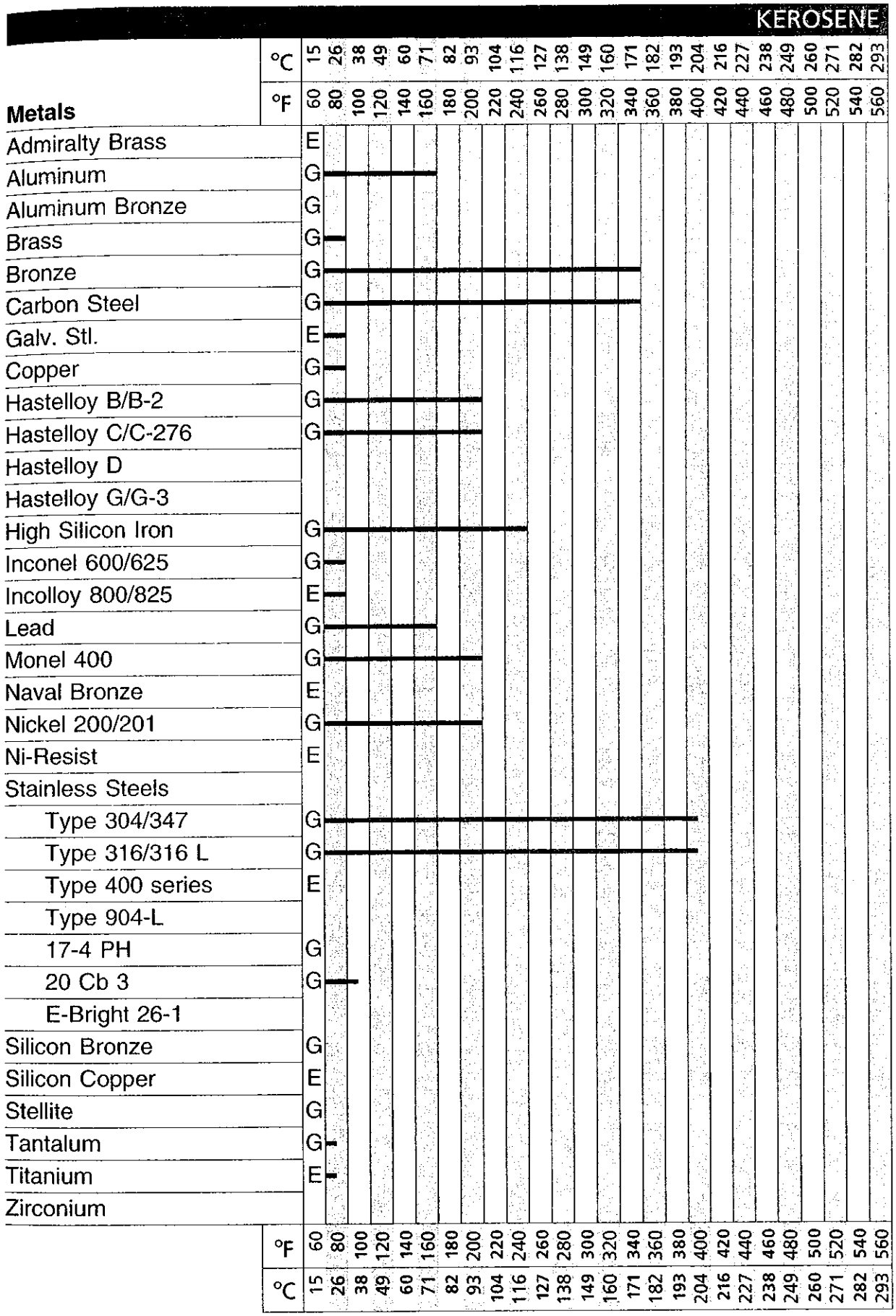
## KEROSENE




FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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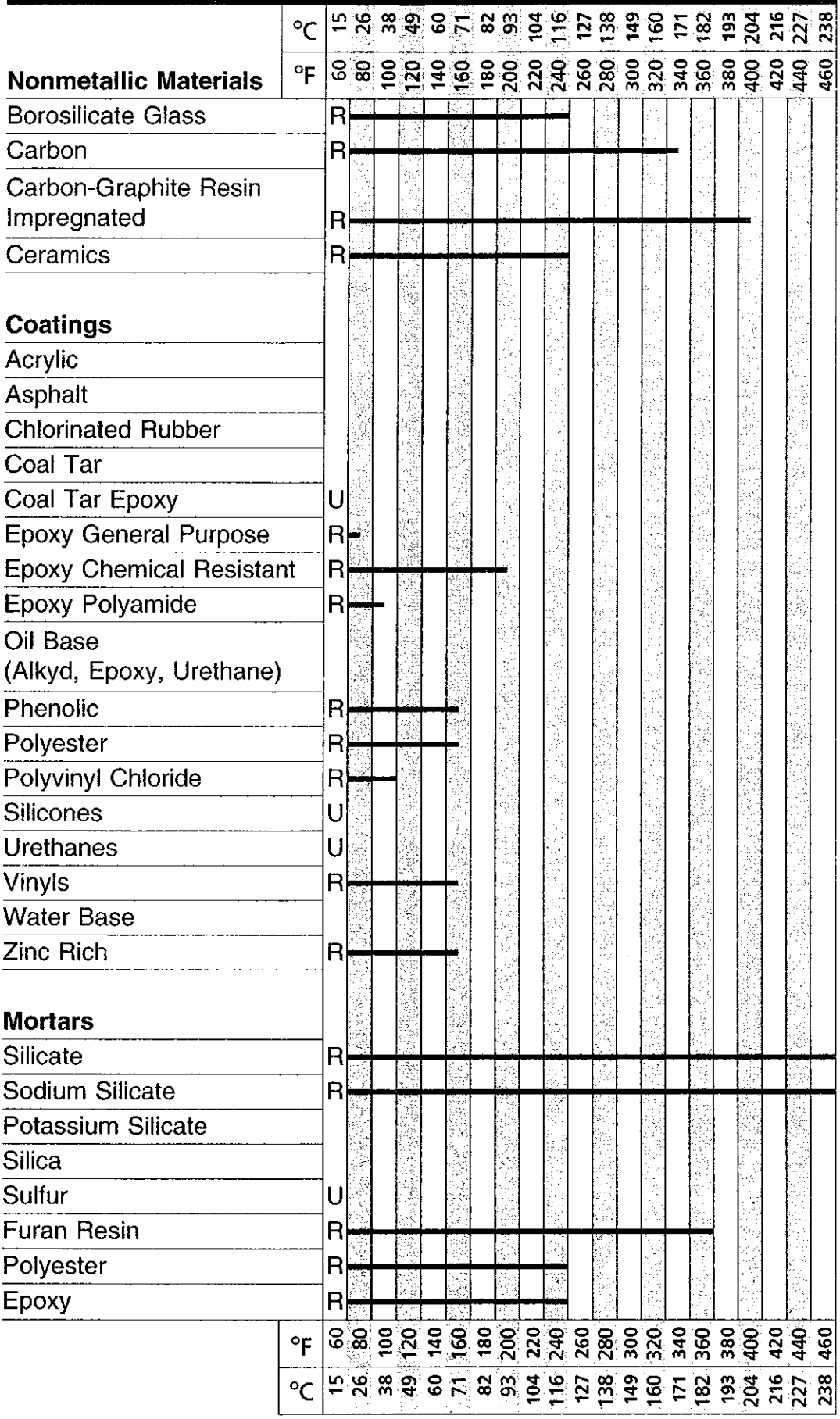
## KEROSENE



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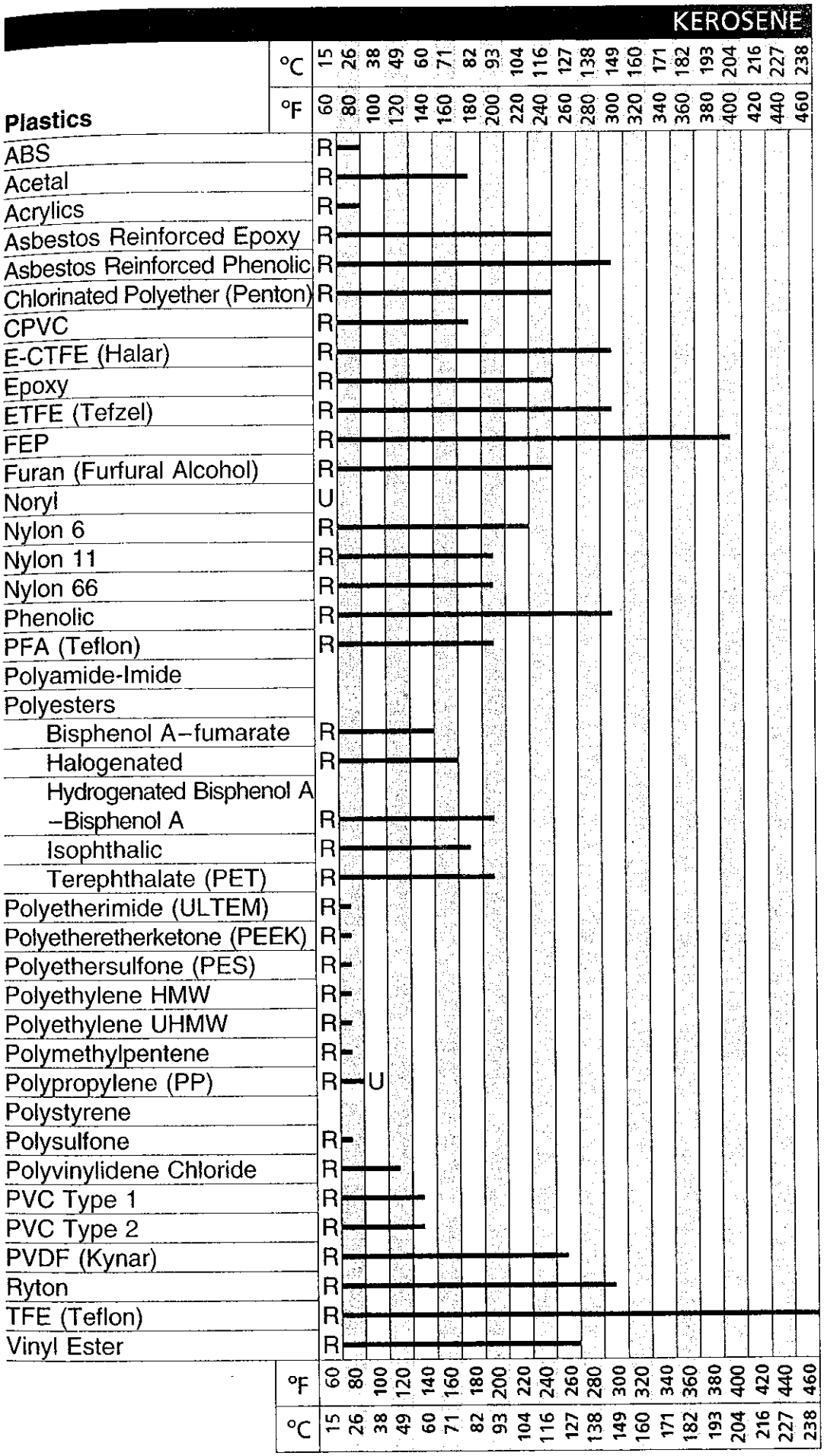



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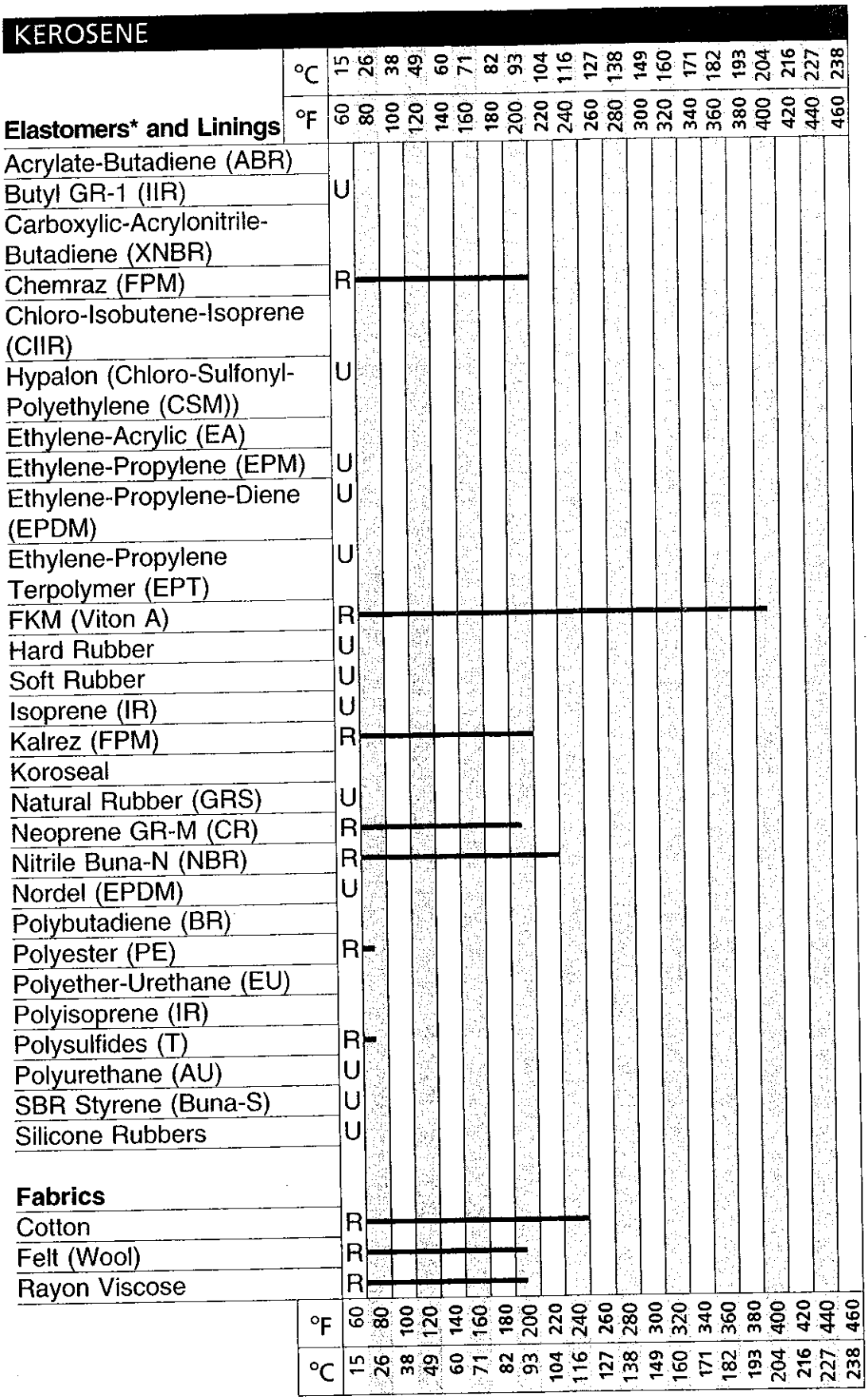
## KEROSENE

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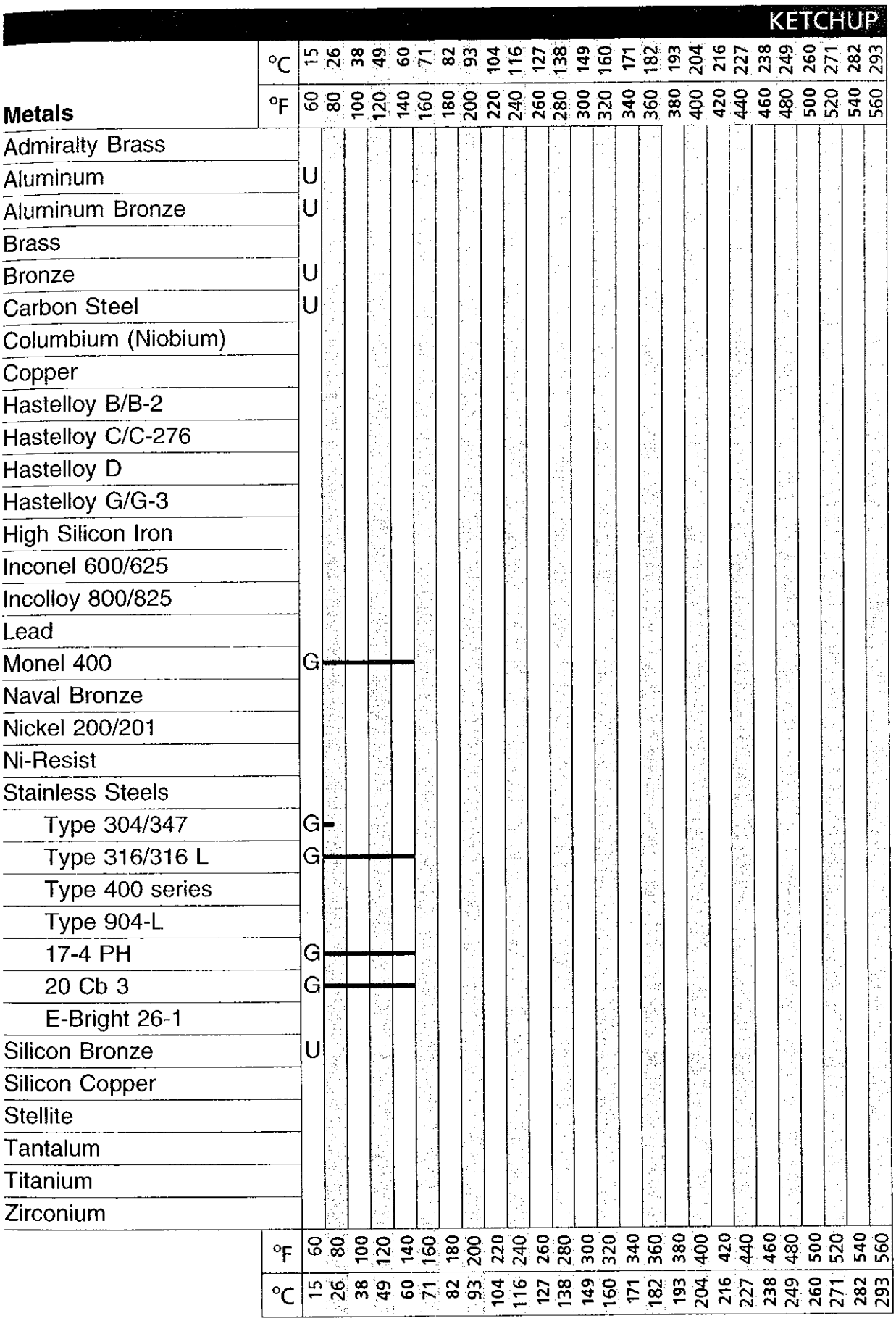


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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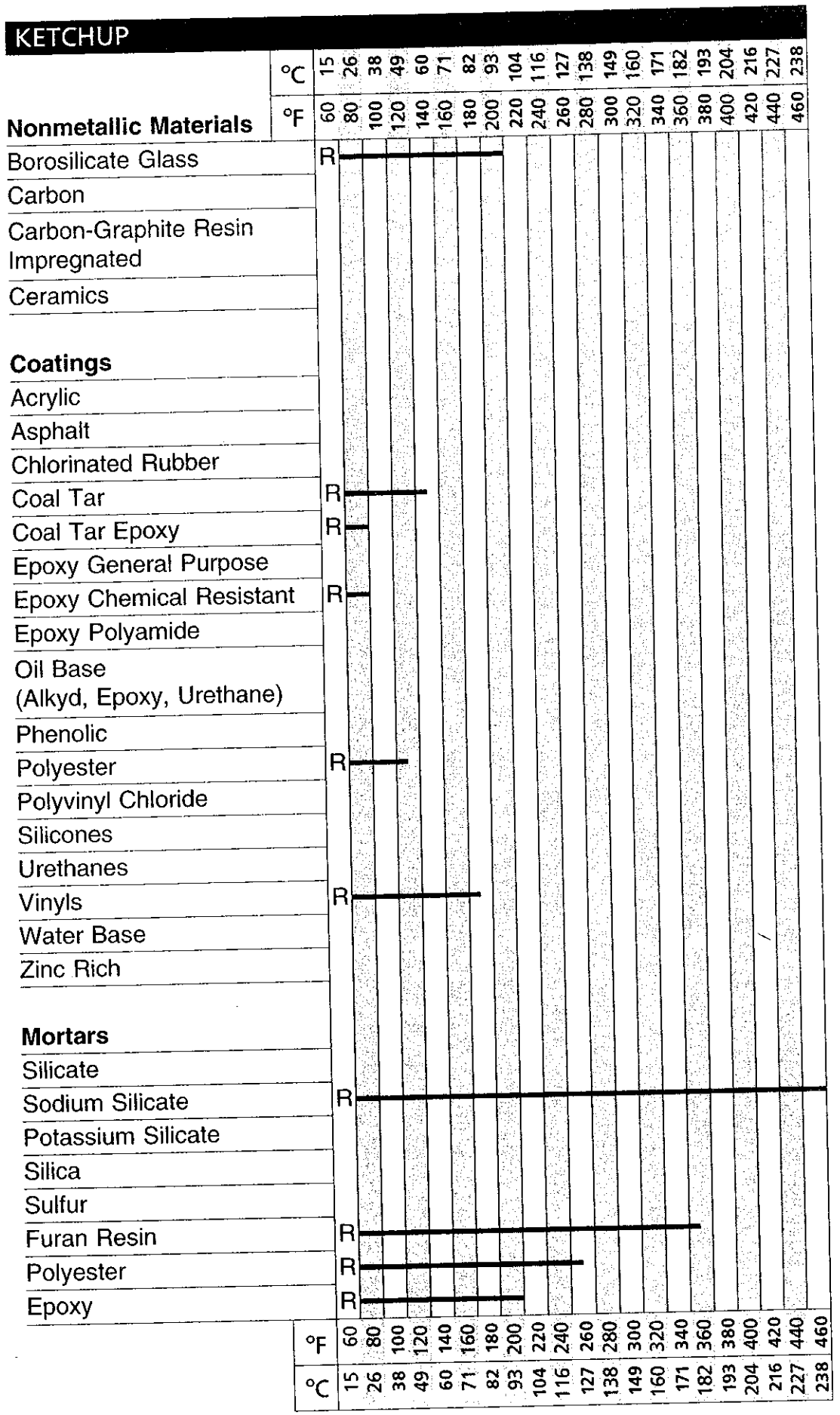




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| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | R | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | R | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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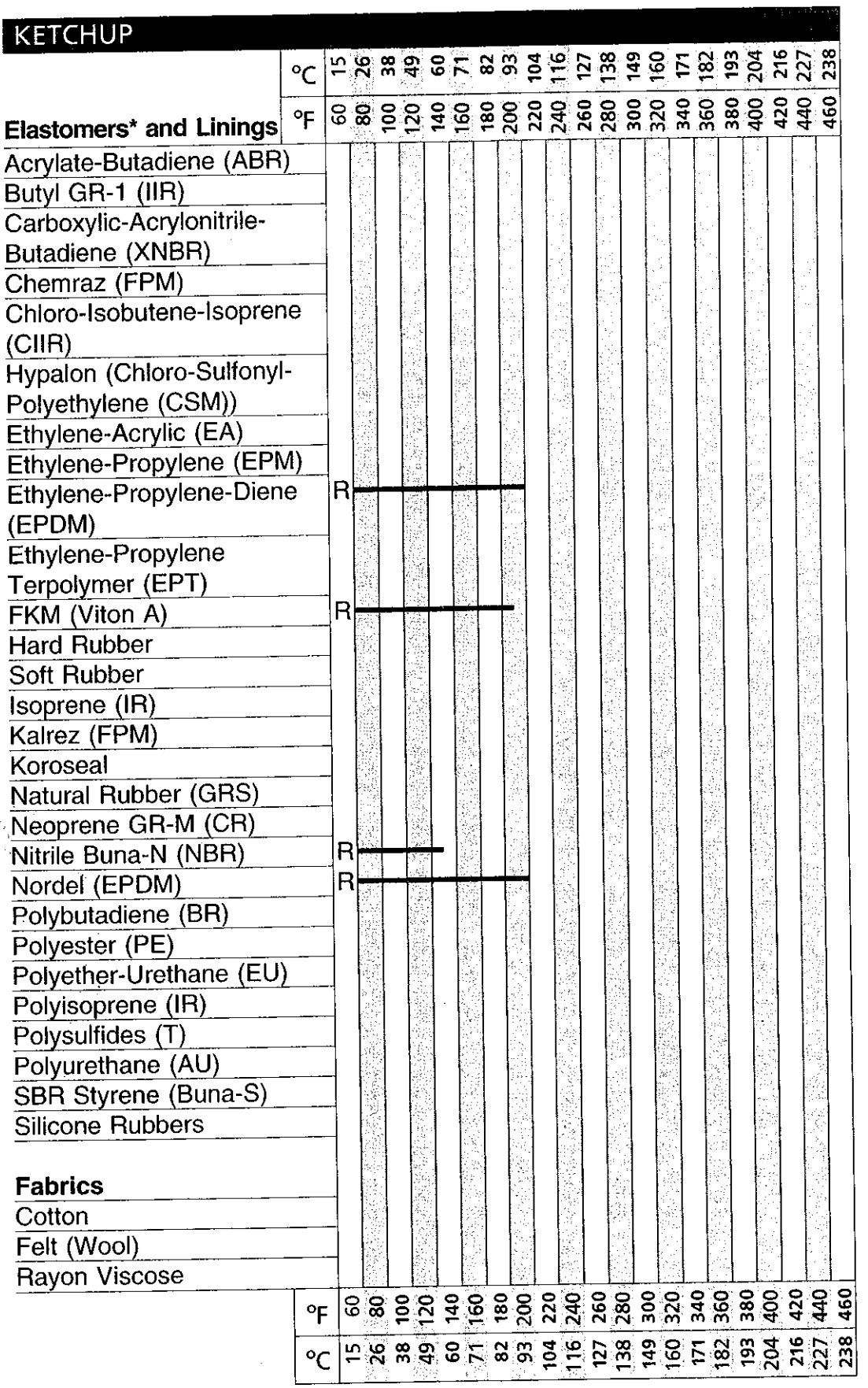
## KETCHUP

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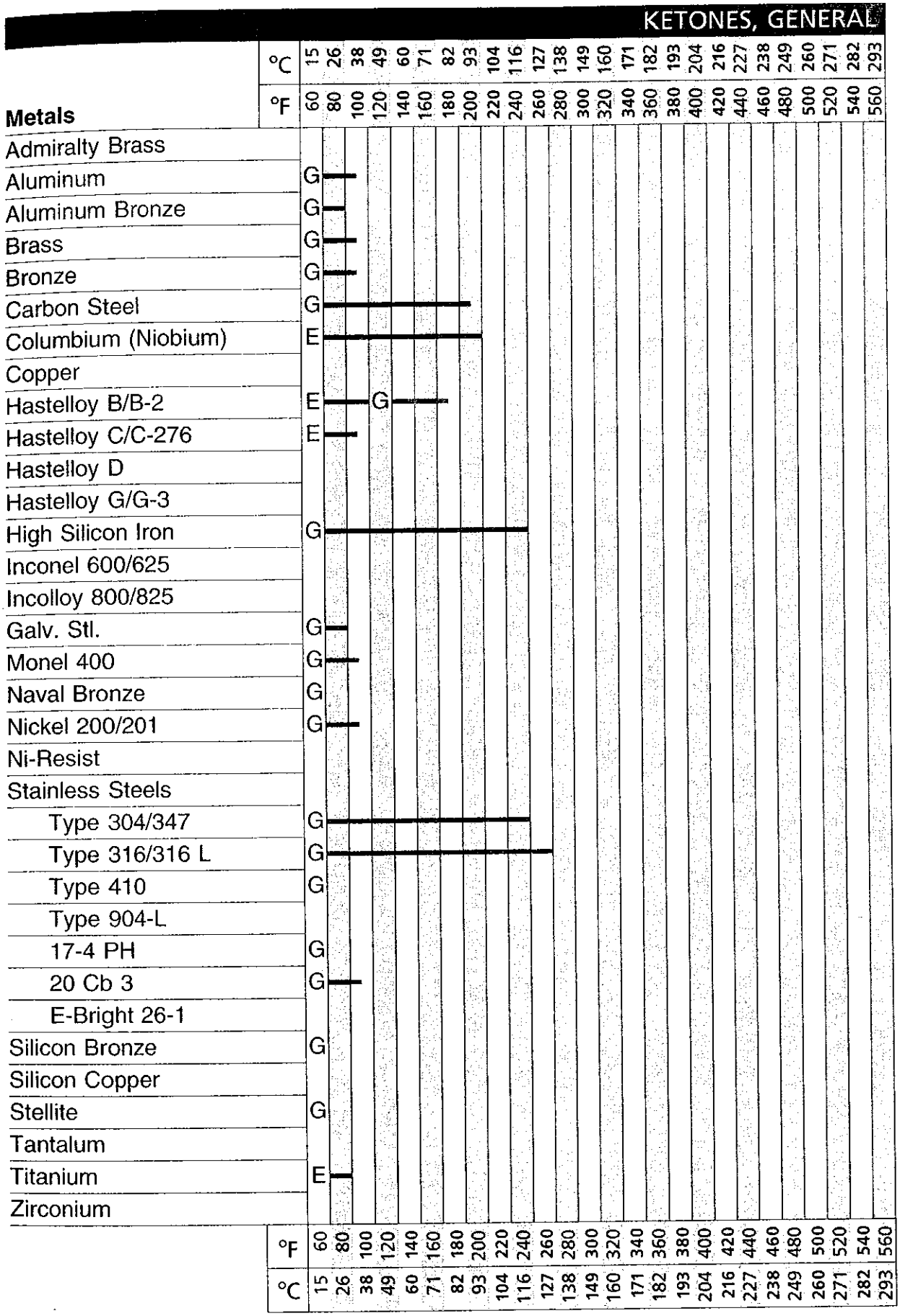


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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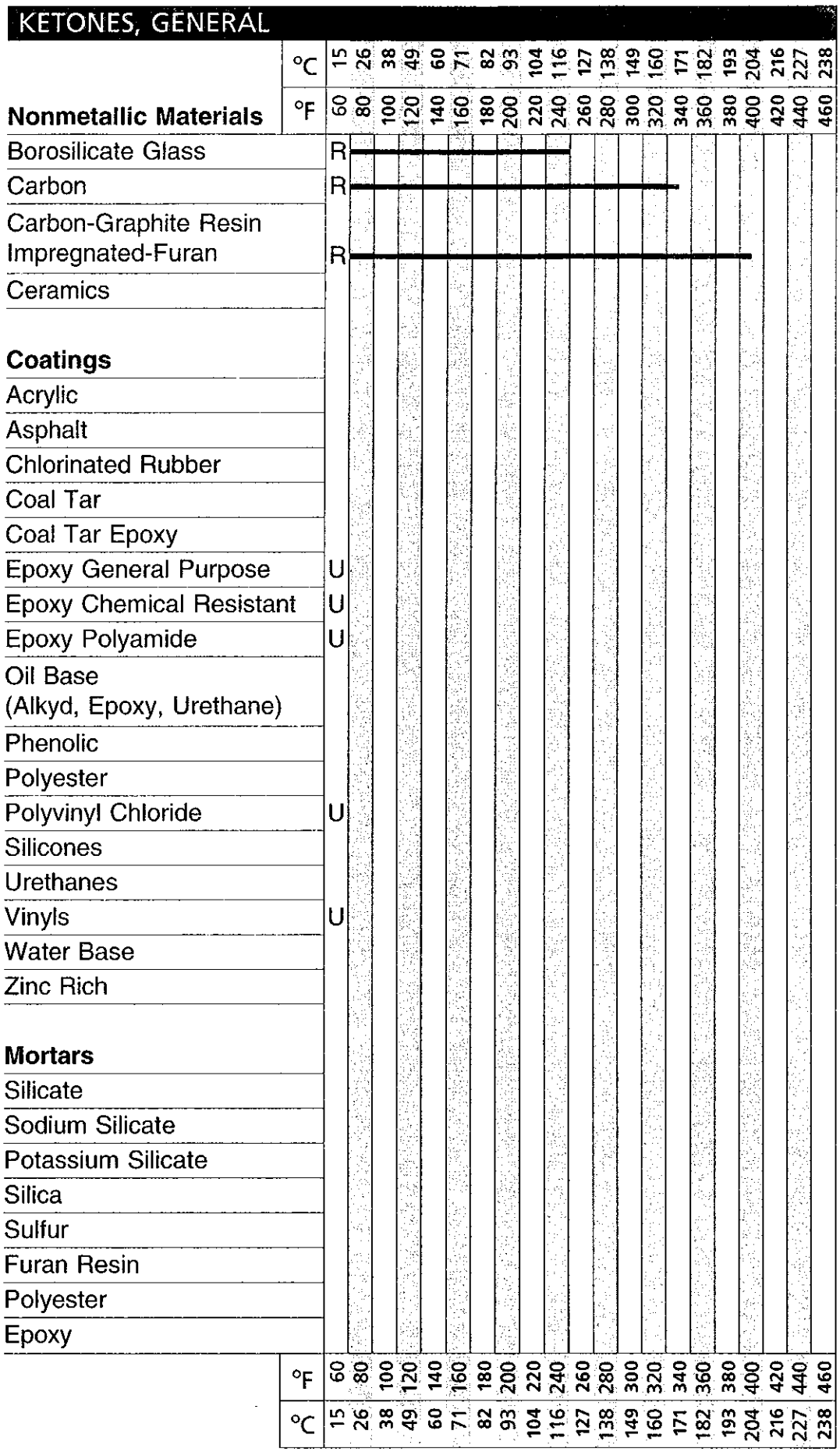
## KETONES, GENERAL



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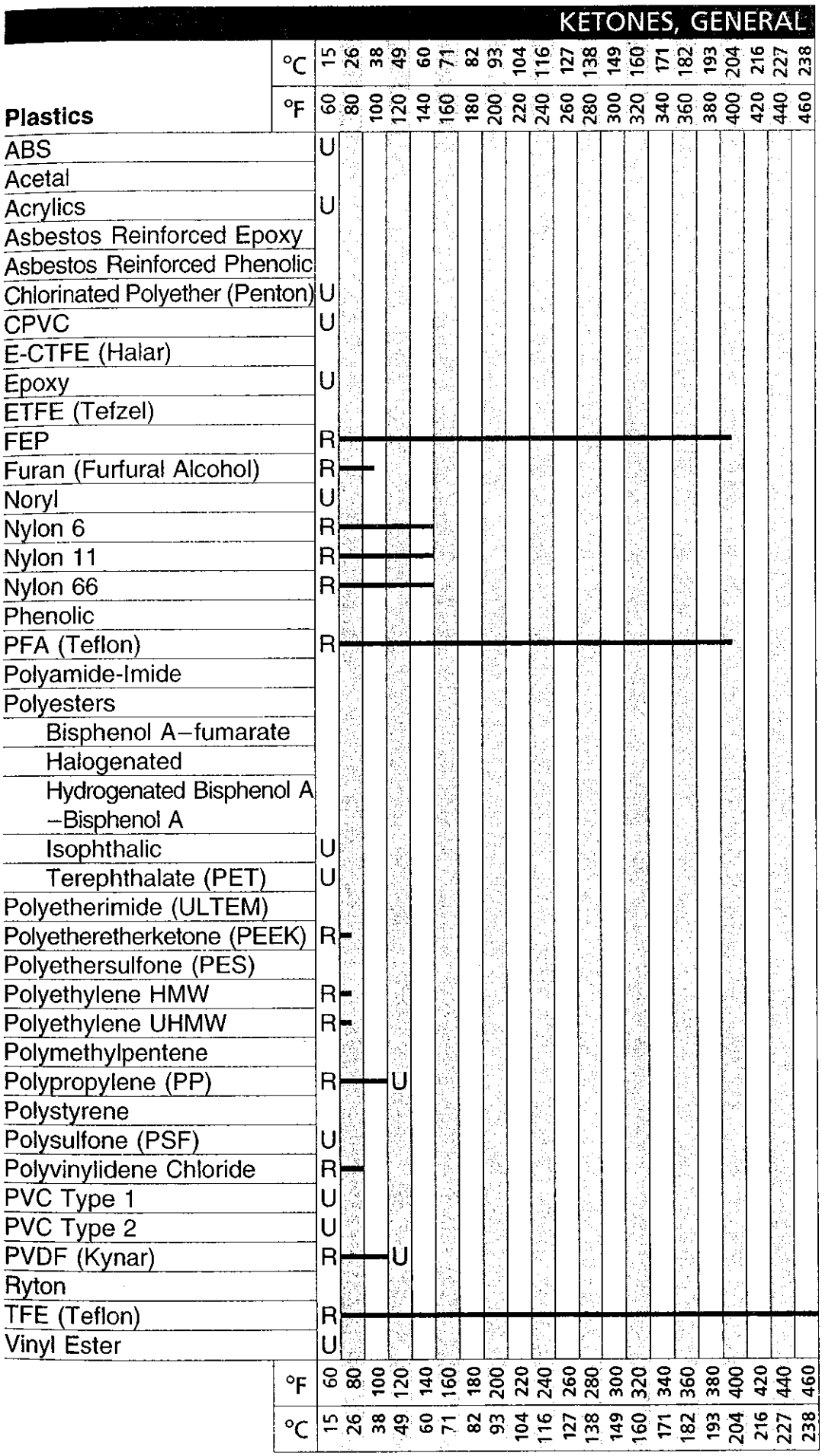
# KETONES, GENERAL

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## KETONES, GENERAL

| Elastomers* and Linings | °F | °C |
|---|---|---|
| Acrylate-Butadiene (ABR) | | |
| Butyl GR-1 (IIR) | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | | |
| Chloro-Isobutene-Isoprene (CIIR) | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | | |
| Ethylene-Propylene-Diene (EPDM) | U | |
| Ethylene-Propylene Terpolymer (EPT) | | |
| FKM (Viton A) | U | |
| Hard Rubber | | |
| Soft Rubber | | |
| Isoprene (IR) | | |
| Kalrez (FPM) | | |
| Koroseal | | |
| Natural Rubber (GRS) | | |
| Neoprene GR-M (CR) | U | |
| Nitrile Buna-N (NBR) | U | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | | |
| Polyester (PE) | | |
| Polyether-Urethane (EU) | | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | | |
| Polyurethane (AU) | | |
| SBR Styrene (Buna-S) | | |
| Silicone Rubbers | | |
| **Fabrics** | | |
| Cotton | R | |
| Felt (Wool) | R | |
| Rayon Viscose | | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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# KRAFT LIQUOR

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | U | |
| Brass | U | |
| Bronze | | |
| Carbon Steel | U | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | E | |
| Hastelloy D | | |
| Hastelloy G/G-3 | E | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | | |
| Type 316/316 L | E | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | E | |
| E-Bright 26-1 | | |
| Silicon Bronze | U | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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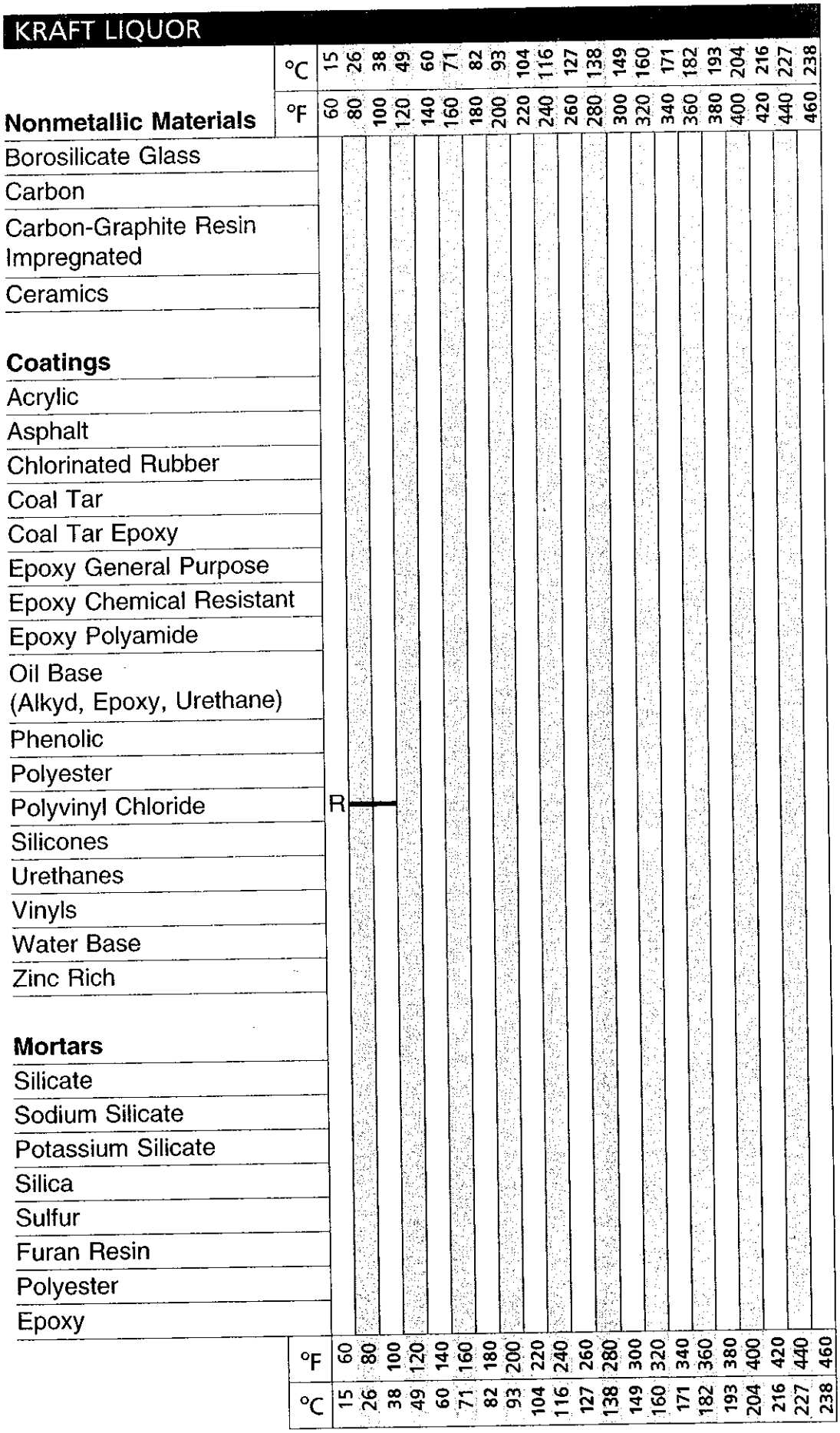
## KRAFT LIQUOR



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## KRAFT LIQUOR

| Plastics | °C | °F |
|---|---|---|
| ABS | R | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | R | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | R | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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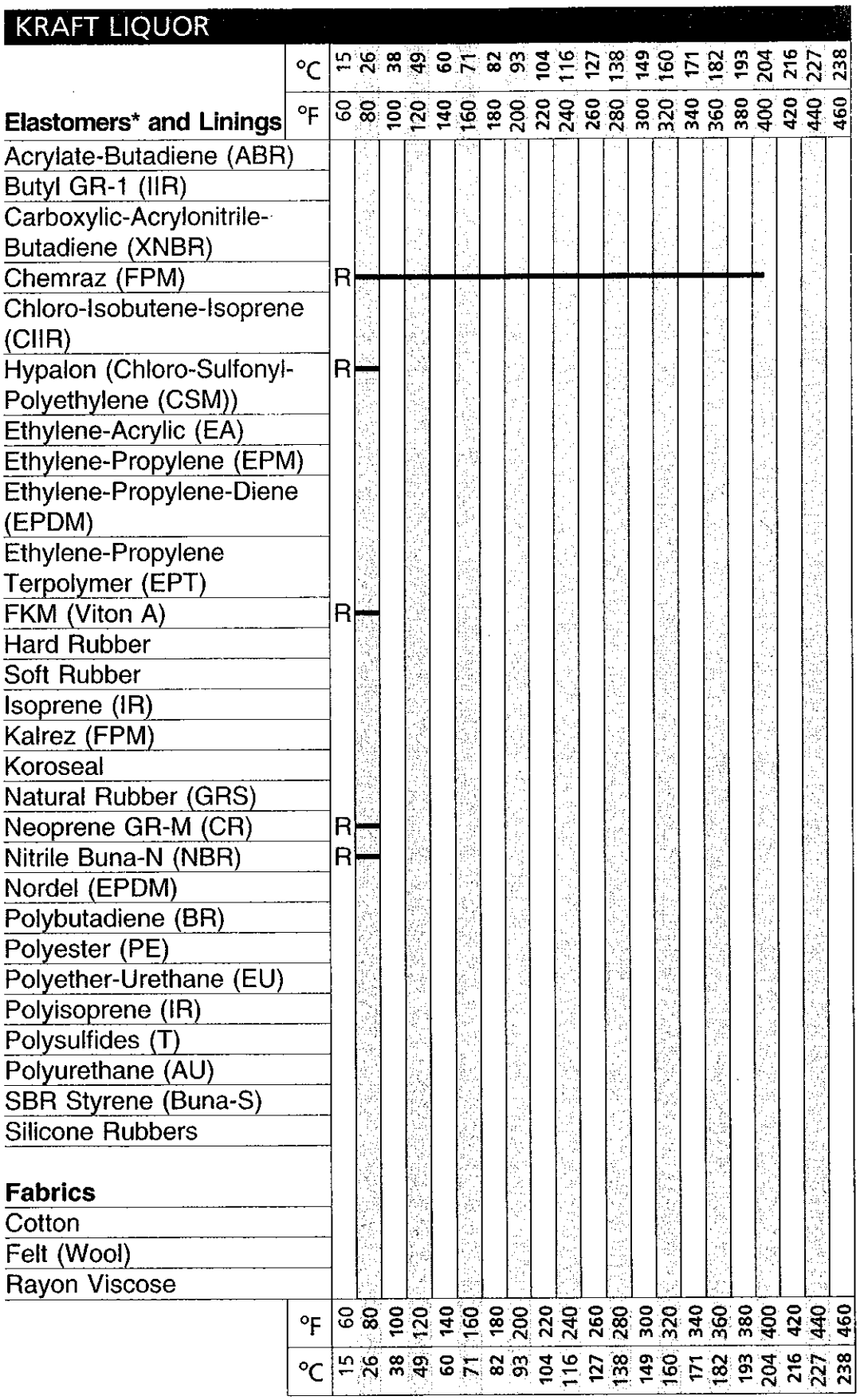


*See also Nylon 11 under PLASTICS



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# LACQUER THINNER

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# LACQUER THINNER

| Nonmetallic Materials | |
|---|---|
| Borosilicate Glass | R |
| Carbon | |
| Carbon-Graphite Resin Impregnated | |
| Ceramics | |
| **Coatings** | |
| Acrylic | |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | |
| Coal Tar Epoxy | |
| Epoxy General Purpose | |
| Epoxy Chemical Resistant | |
| Epoxy Polyamide | |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | |
| Polyvinyl Chloride | |
| Silicones | |
| Urethanes | |
| Vinyls | |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | |
| Sodium Silicate | |
| Potassium Silicate | |
| Silica | |
| Sulfur | |
| Furan Resin | |
| Polyester | |
| Epoxy | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |



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# LACQUER THINNER

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | | |
| Vinyl Ester | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |

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## LACQUER THINNER

| Elastomers* and Linings | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | U | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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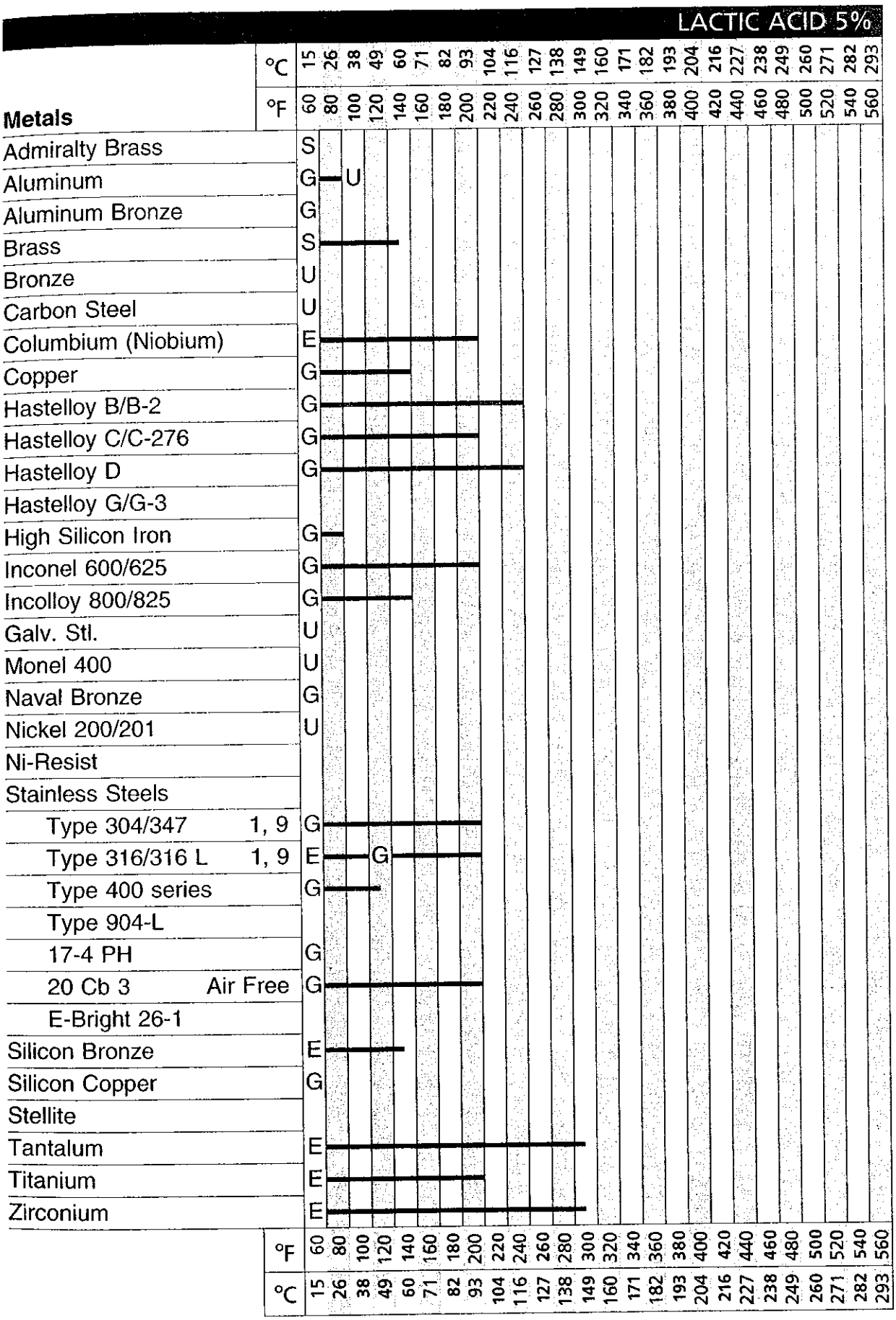


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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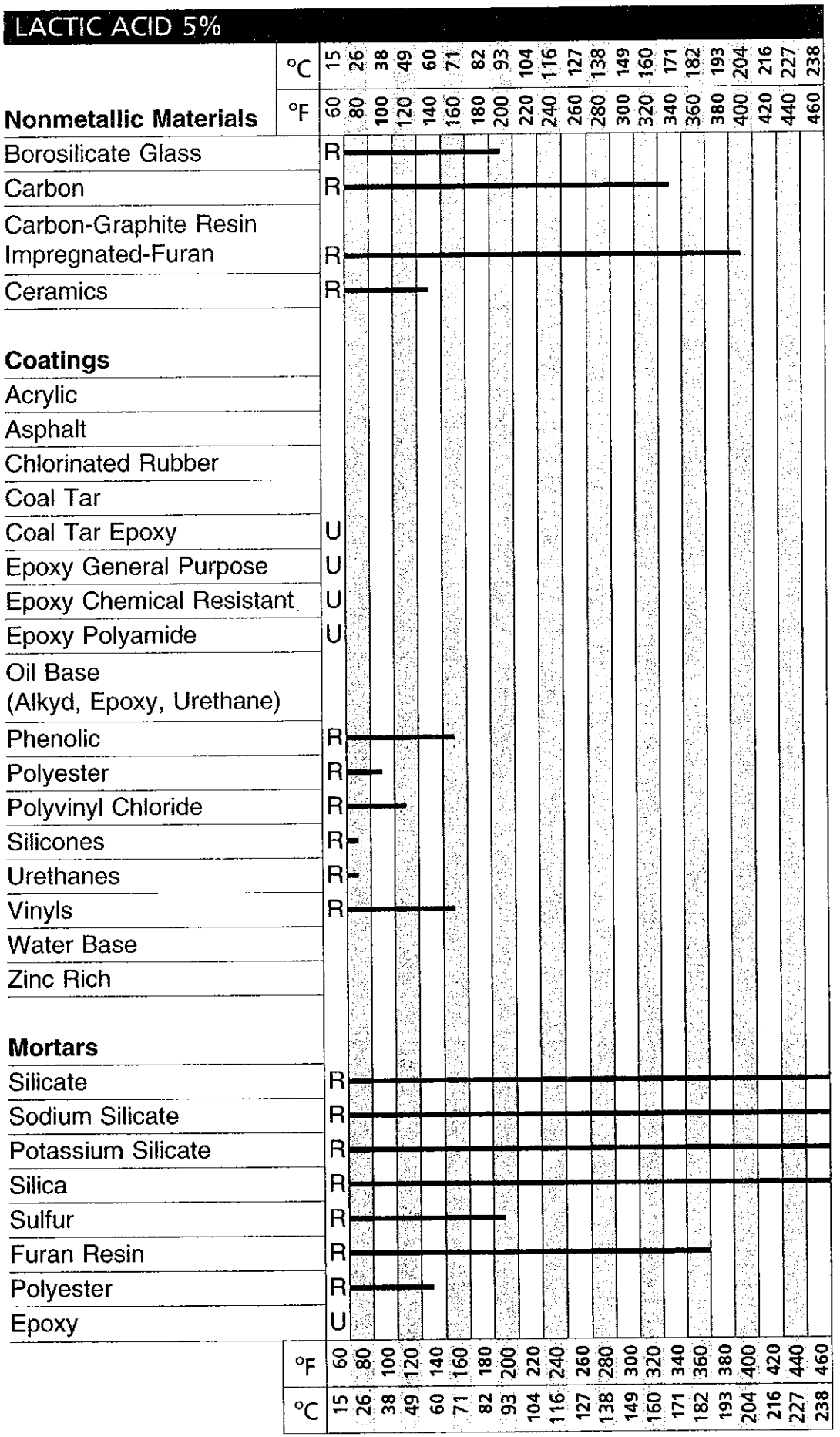




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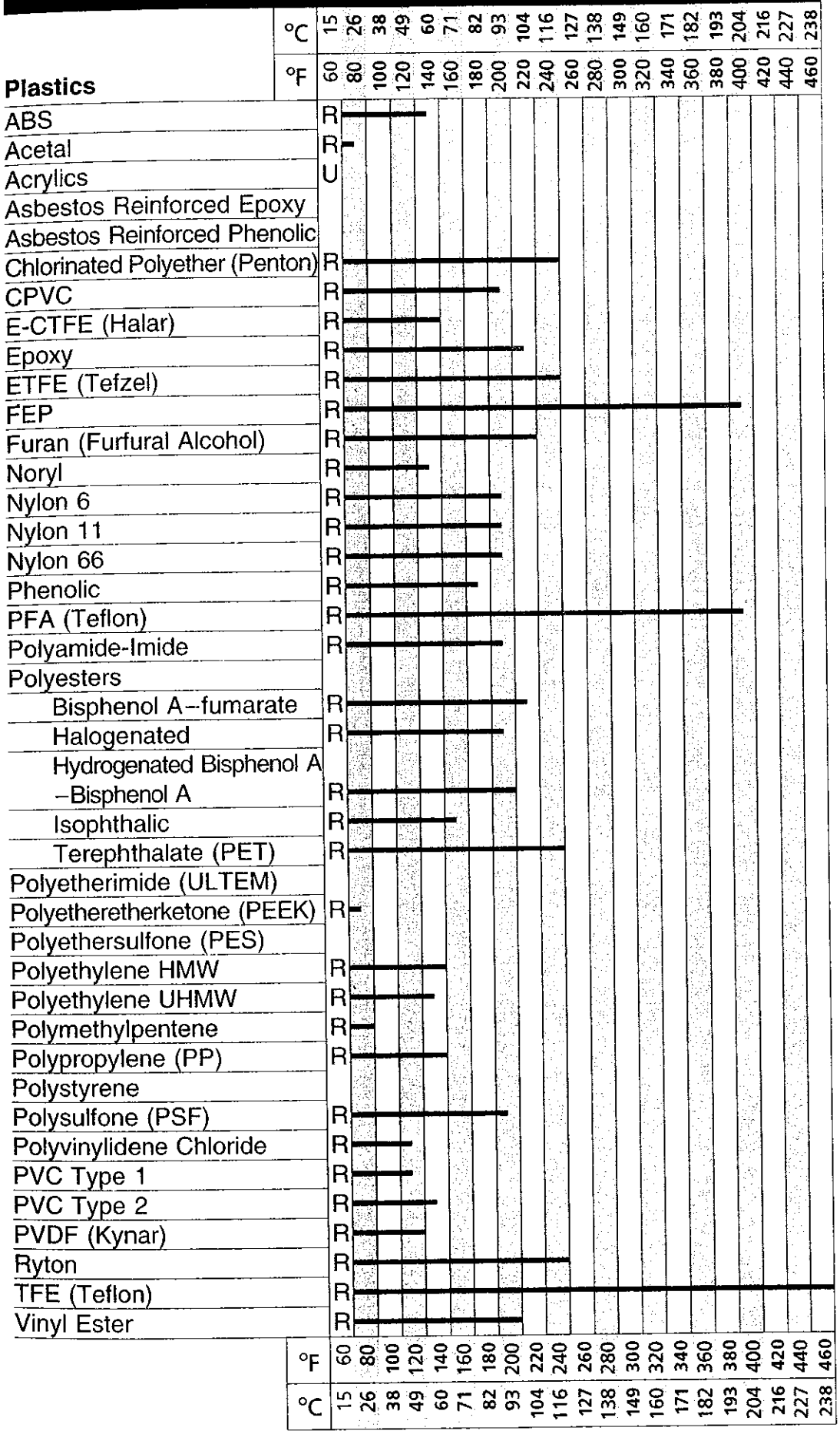



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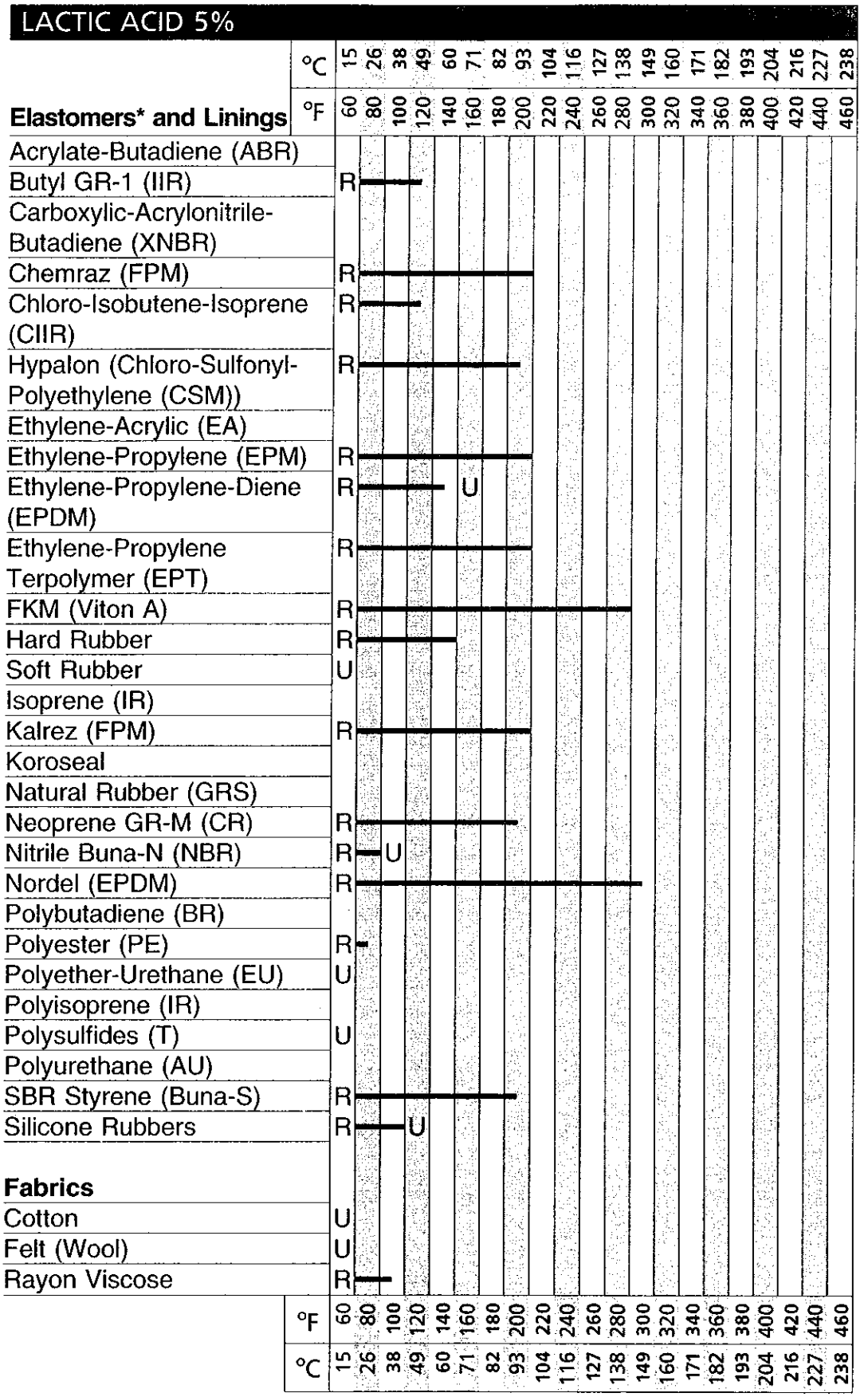


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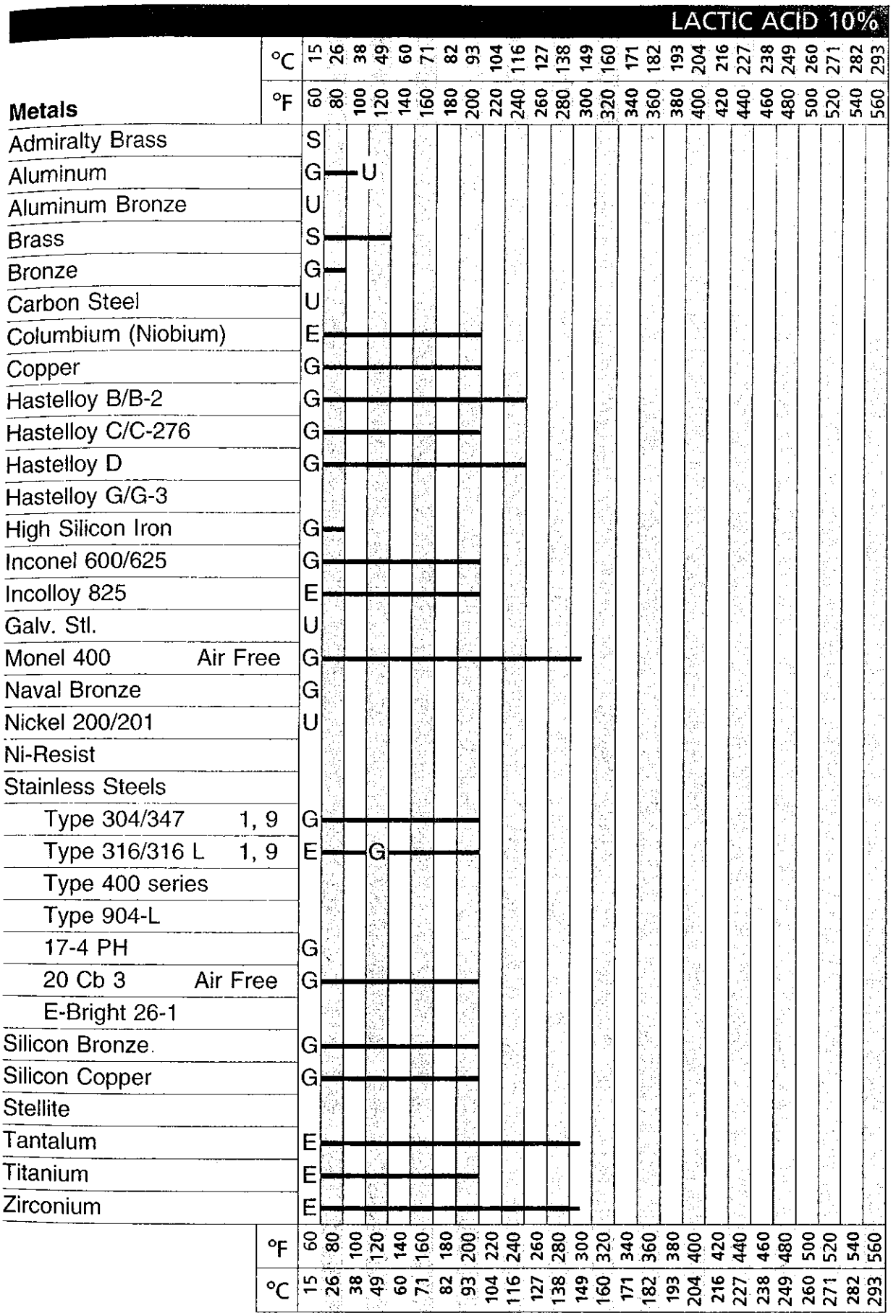


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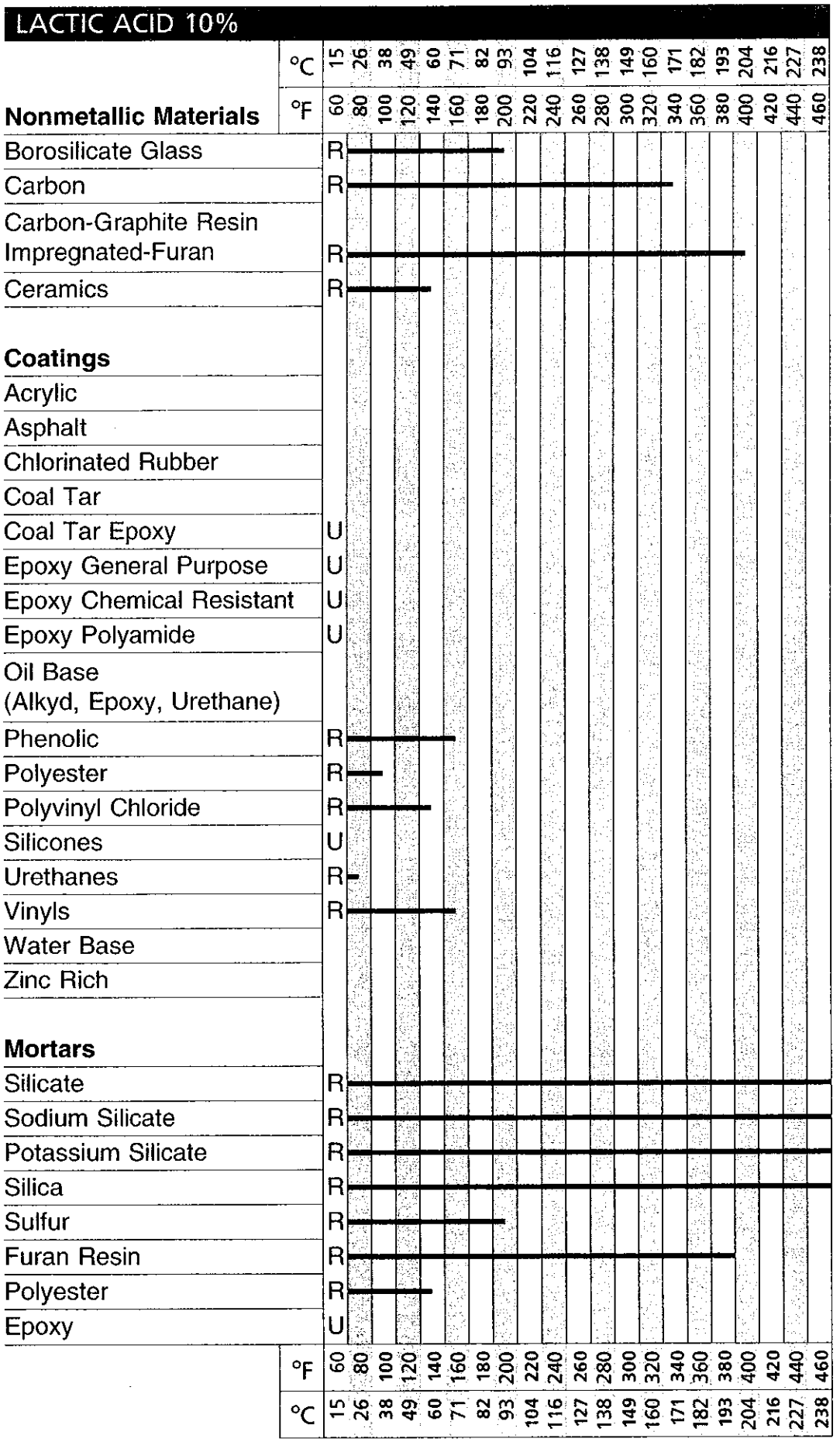




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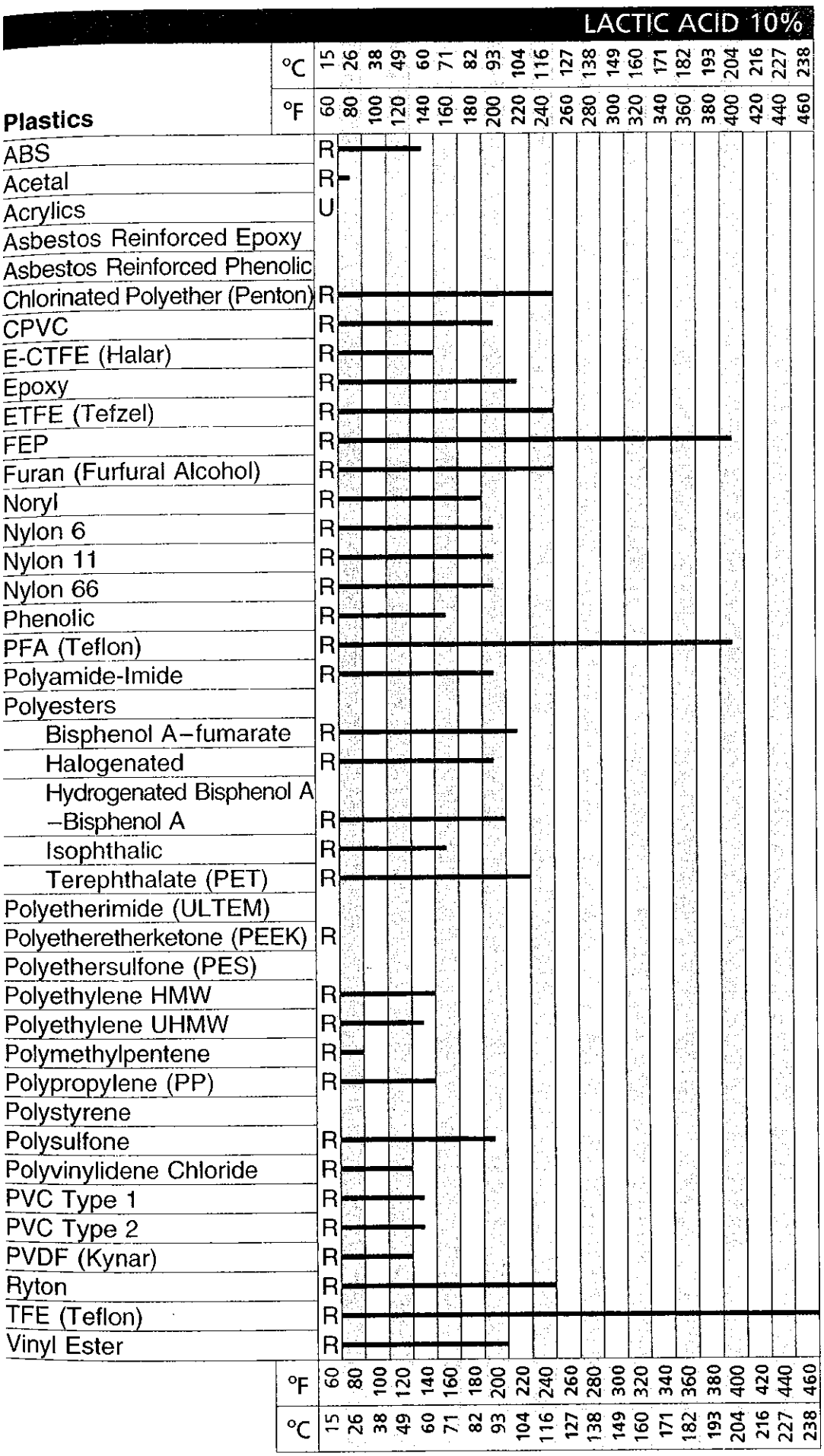


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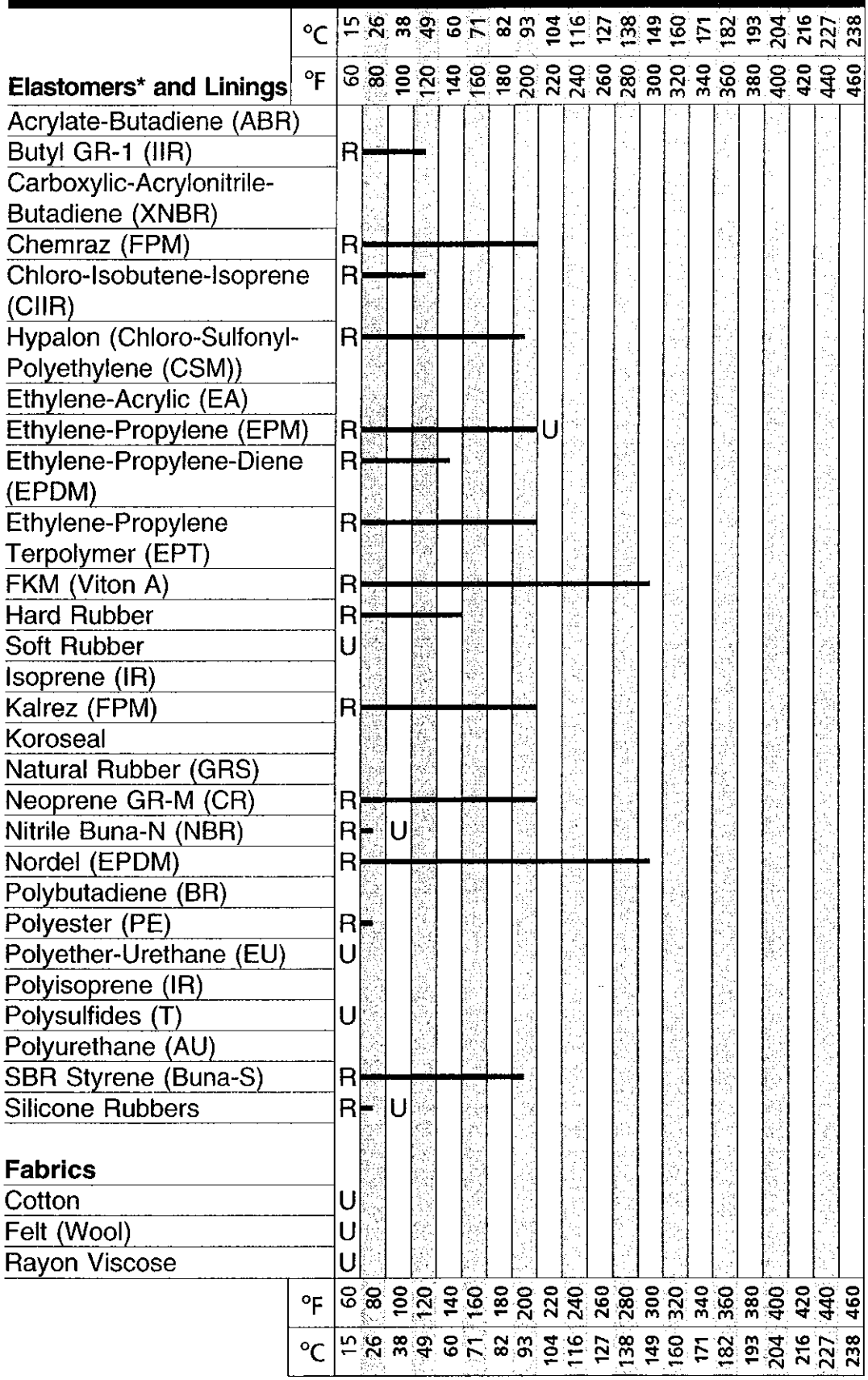


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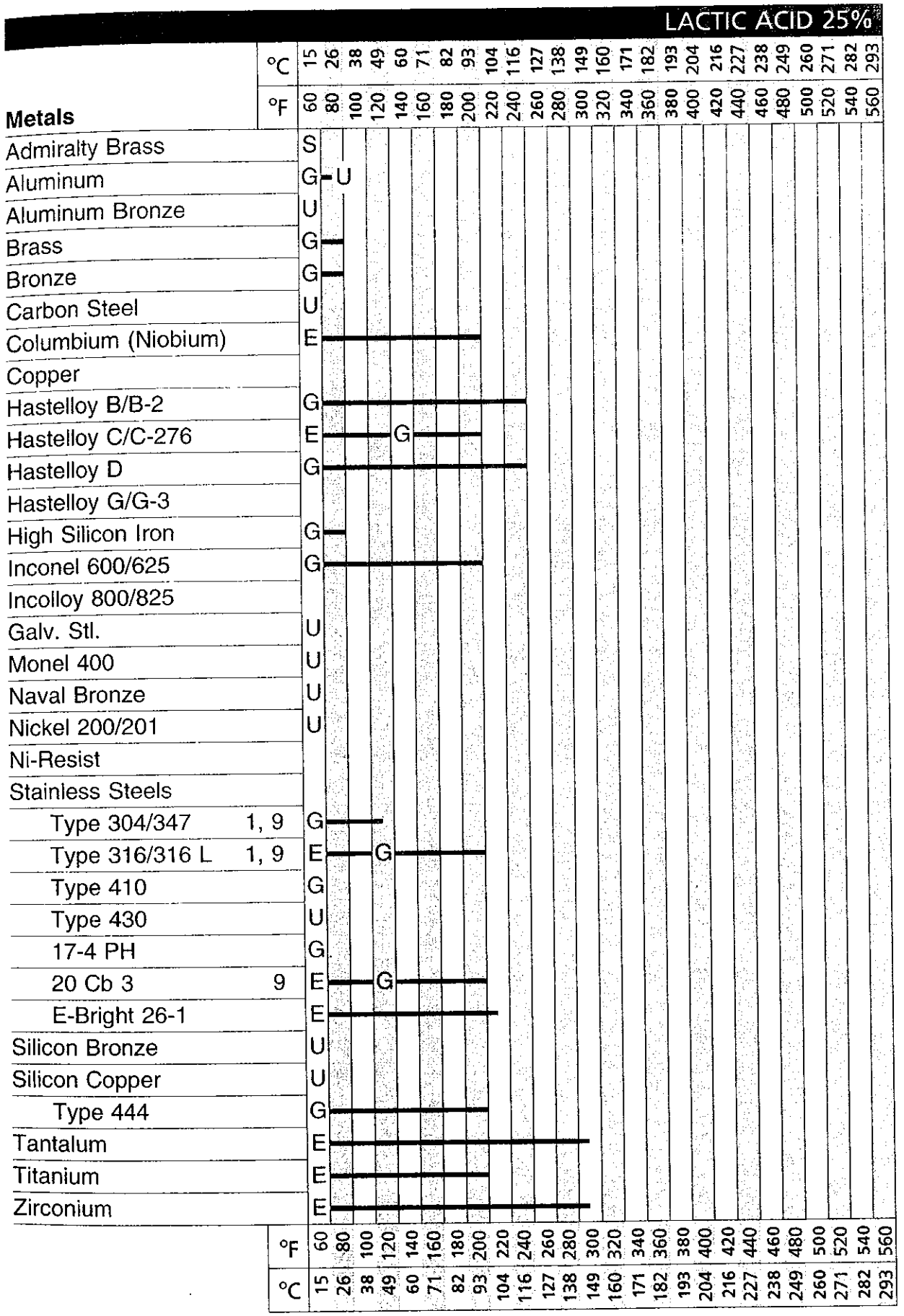


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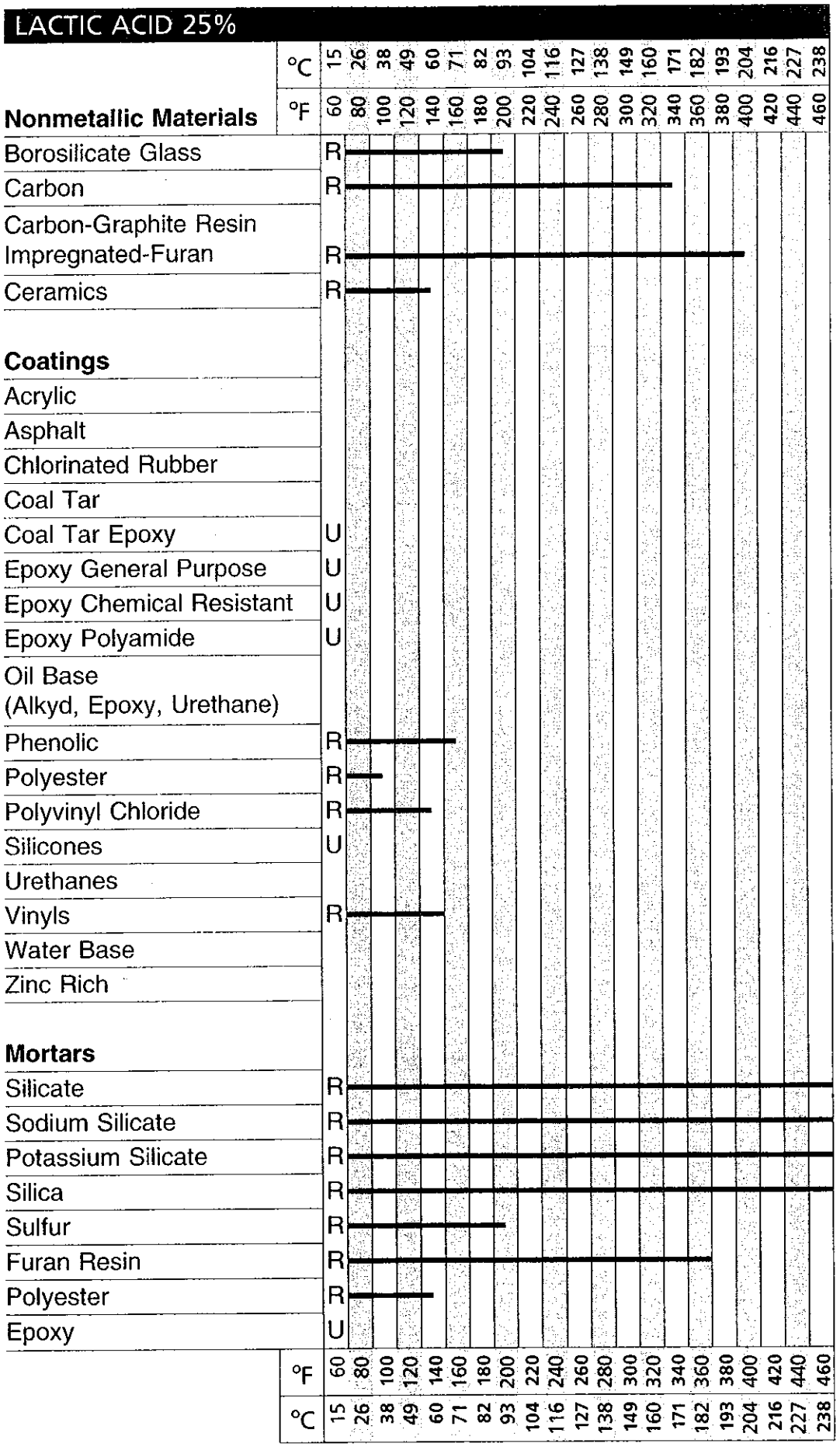






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## LACTIC ACID 25%

| Plastics | °C | °F |
|---|---|---|
| ABS | R | |
| Acetal | U | |
| Acrylics | U | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | R | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | R | |
| PFA (Teflon) | R | |
| Polyamide-Imide | R | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | R | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | R | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | R | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | R | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | R | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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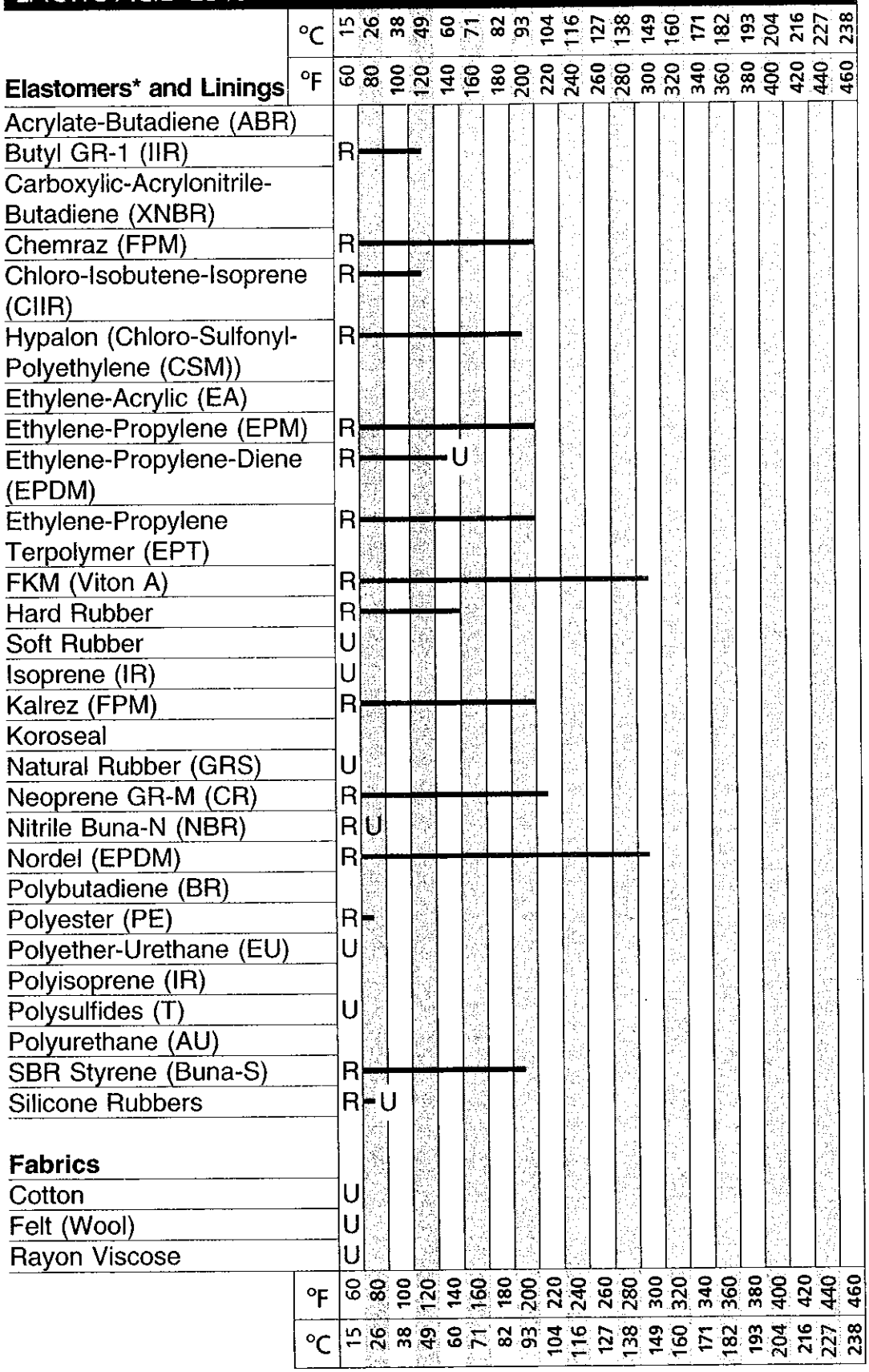


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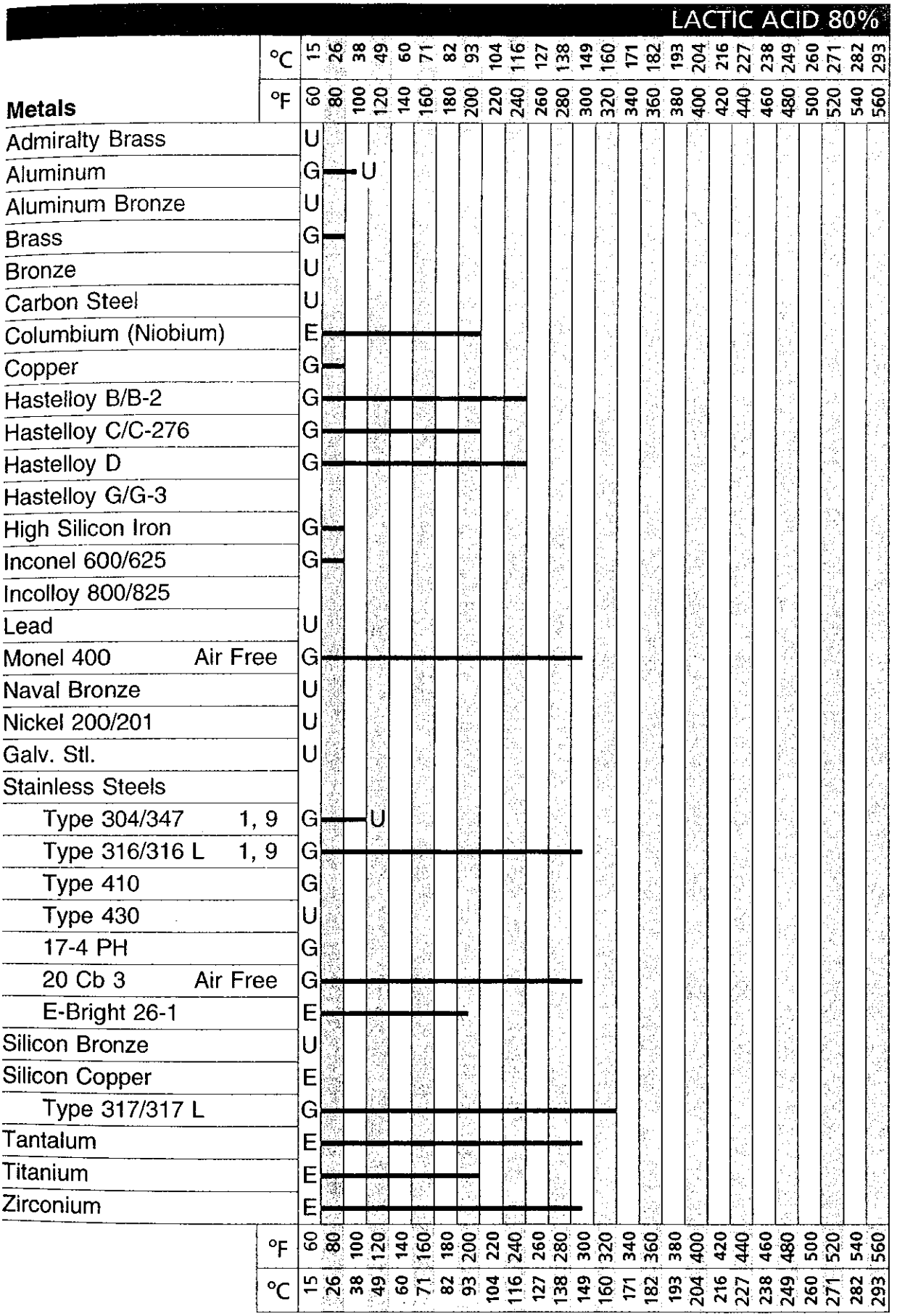


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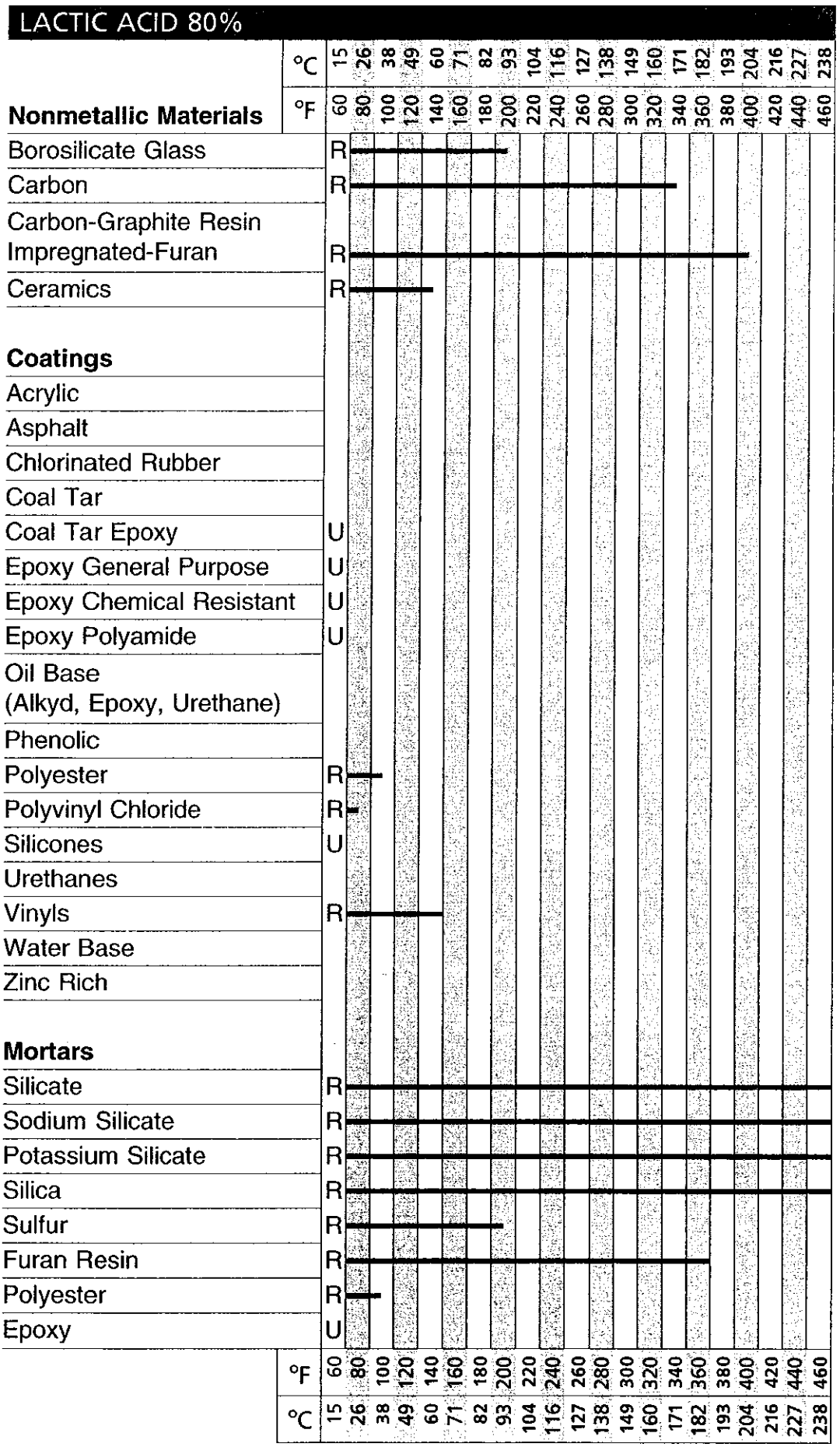




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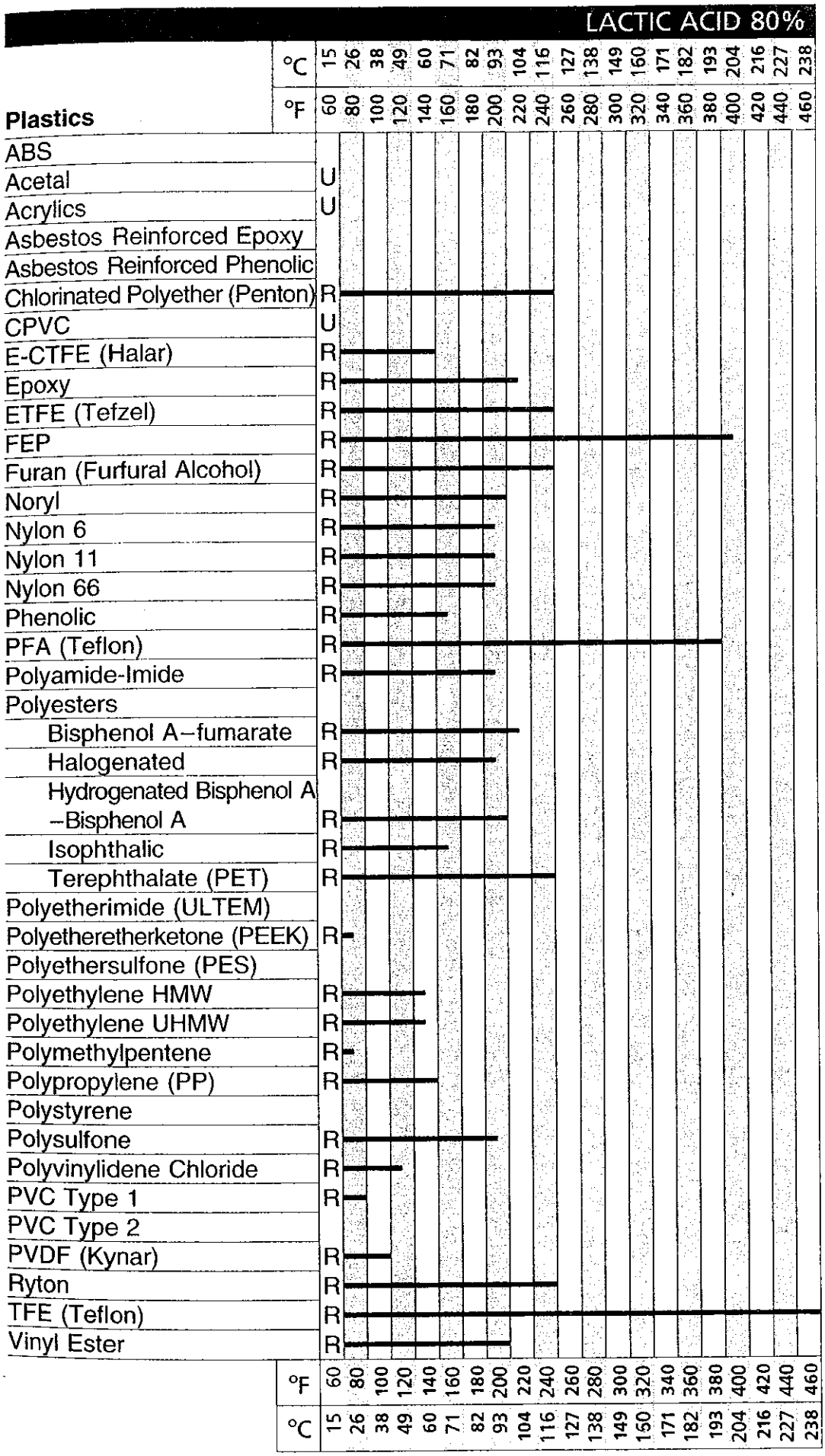



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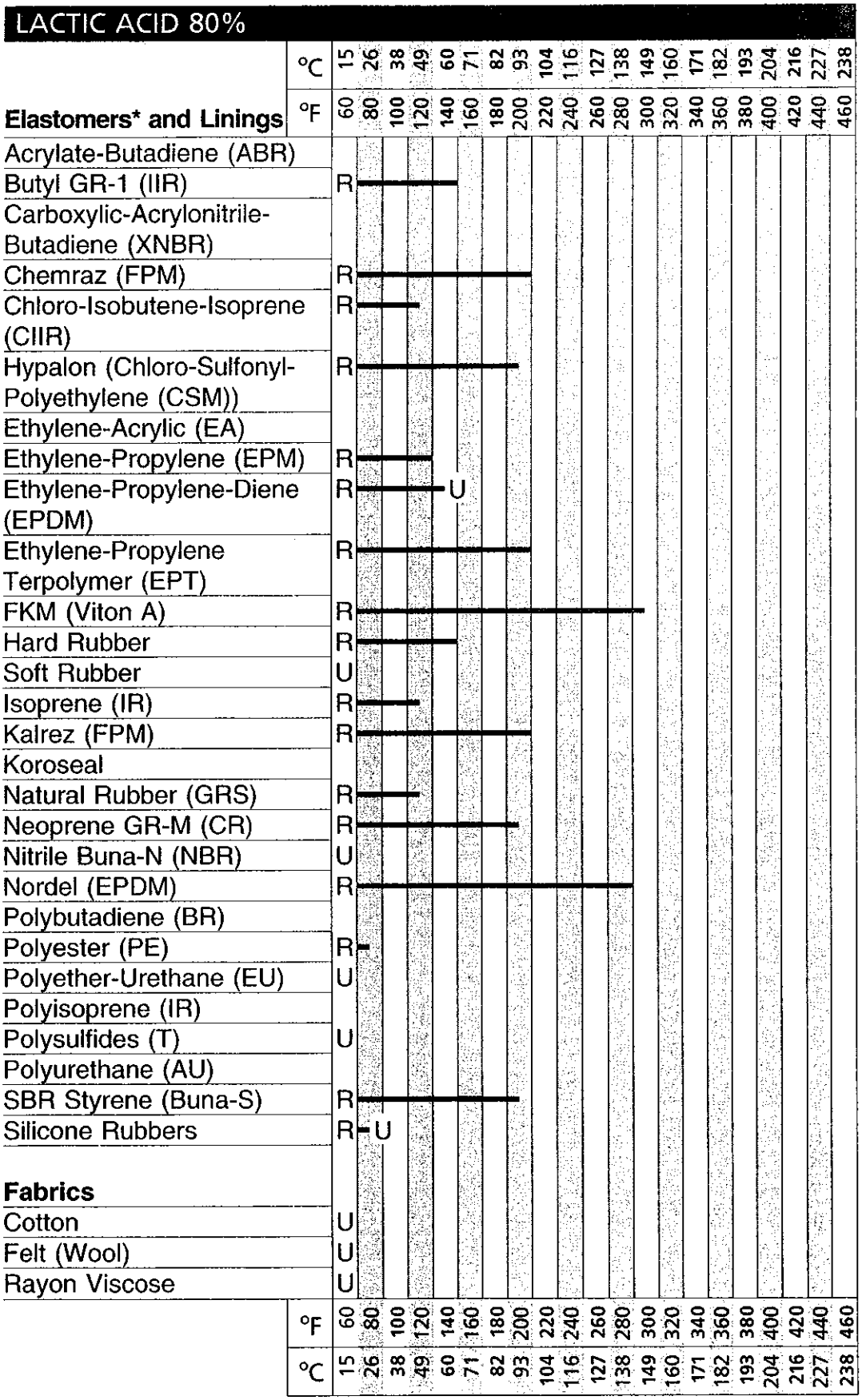


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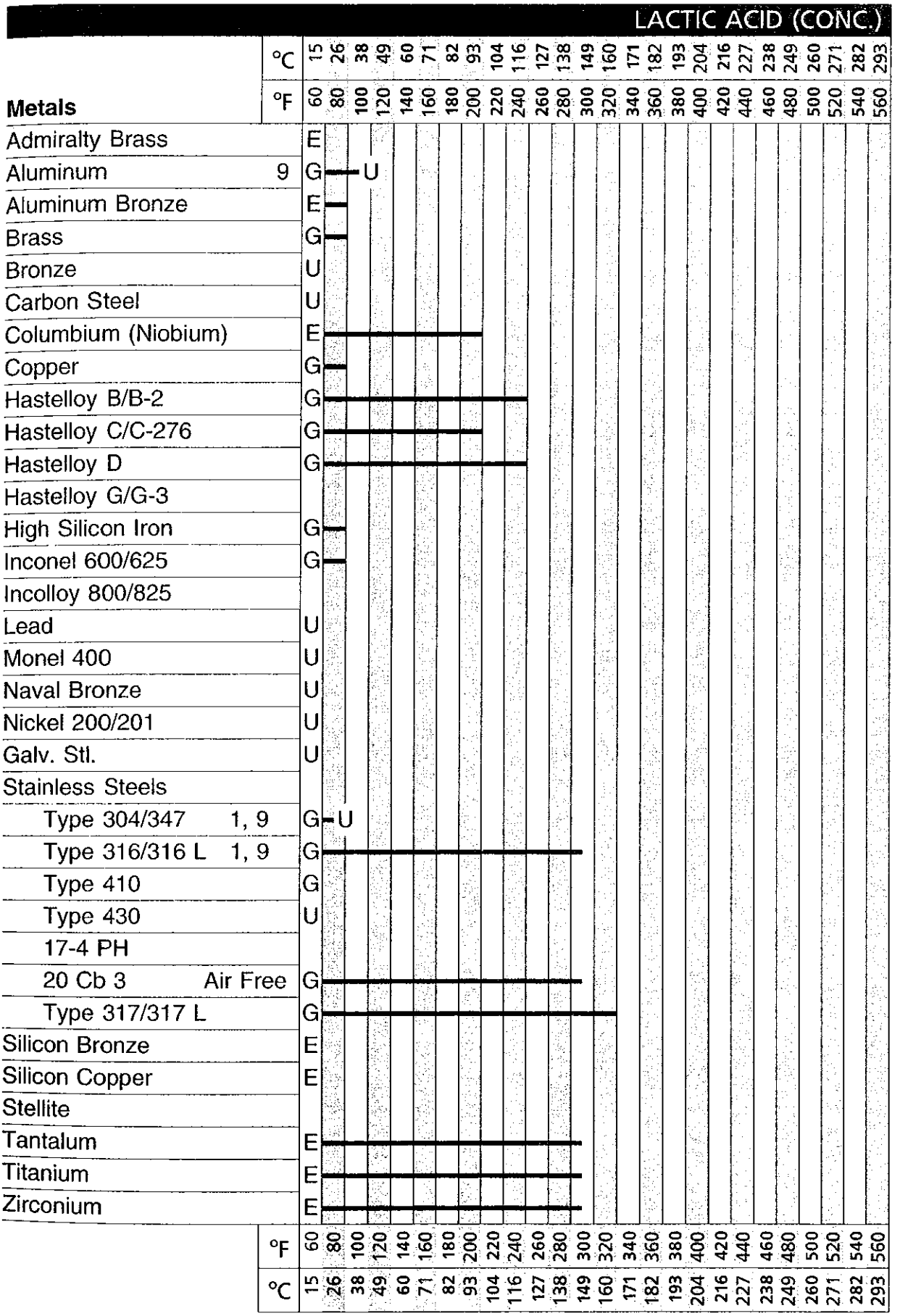


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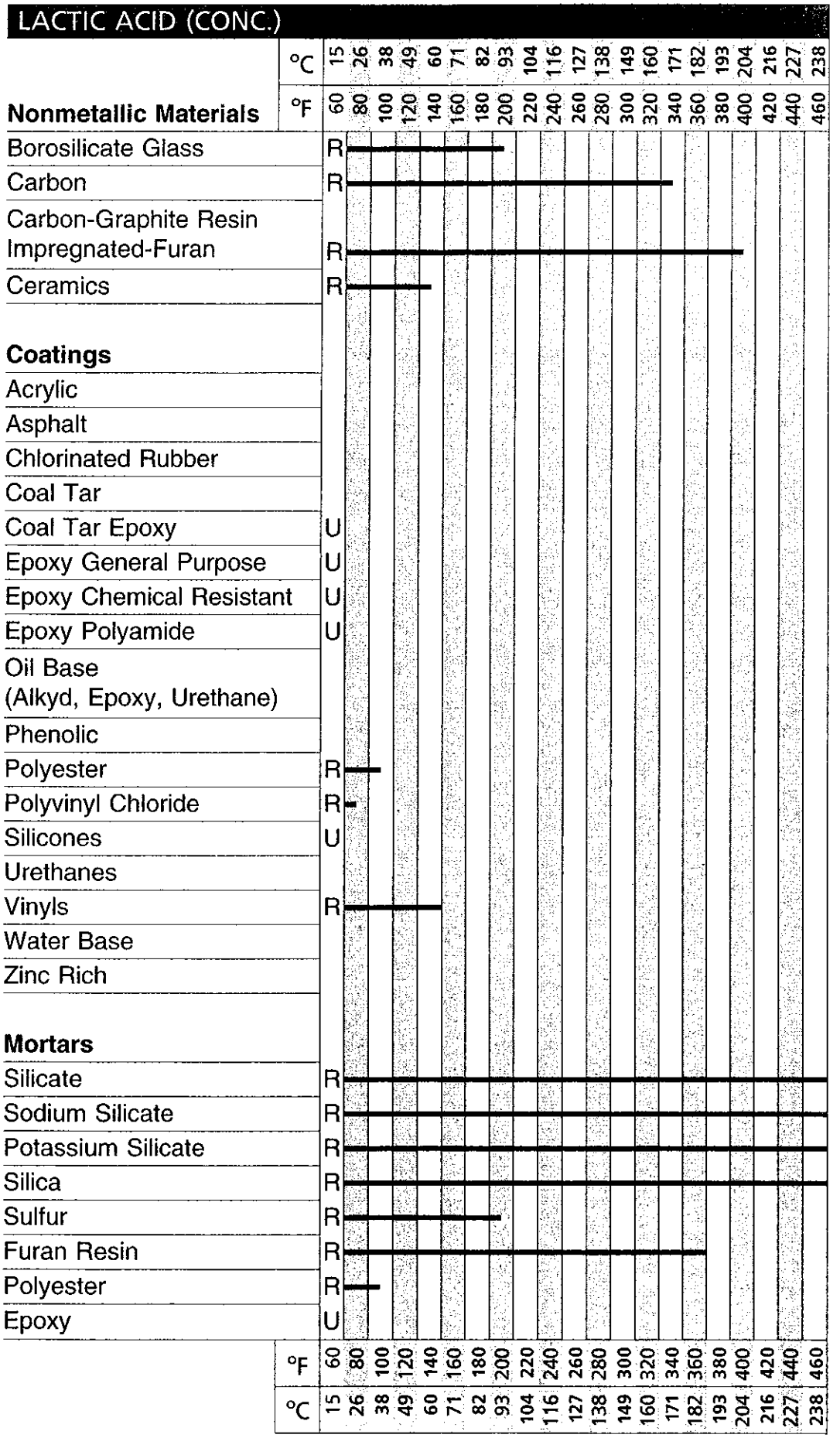




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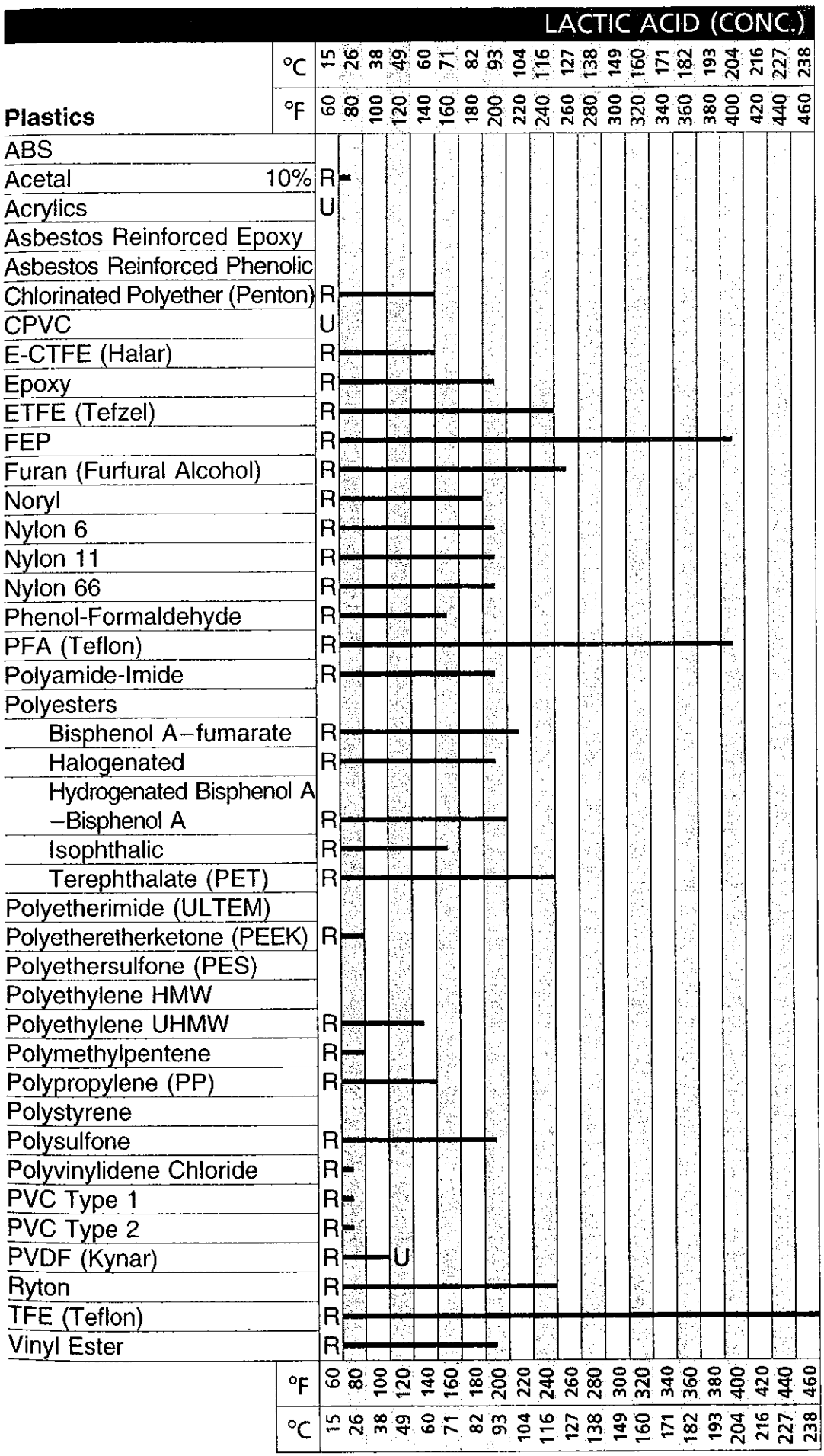



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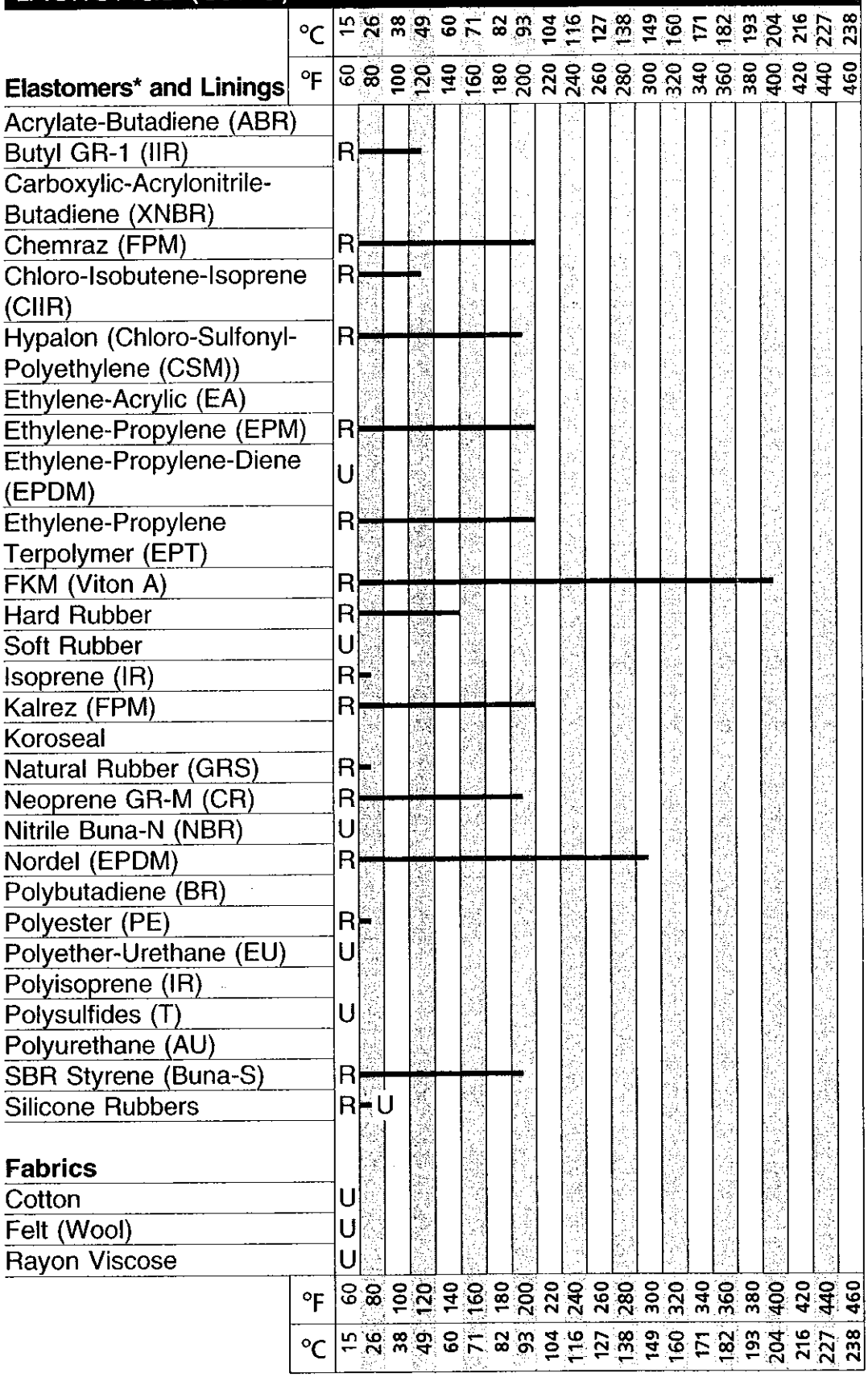
## LACTIC ACID (CONC.)




*See also Nylon 11 under PLASTICS



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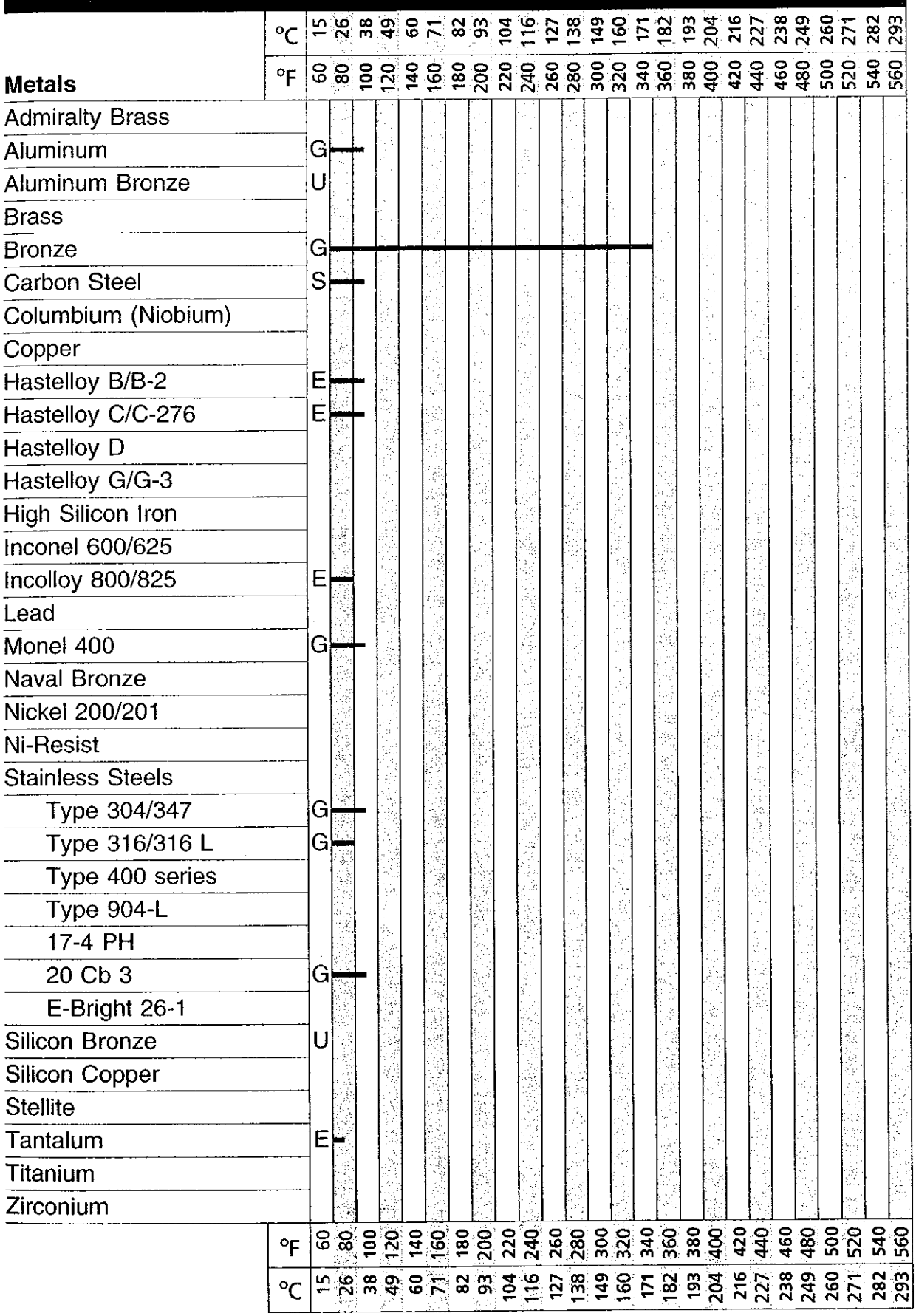


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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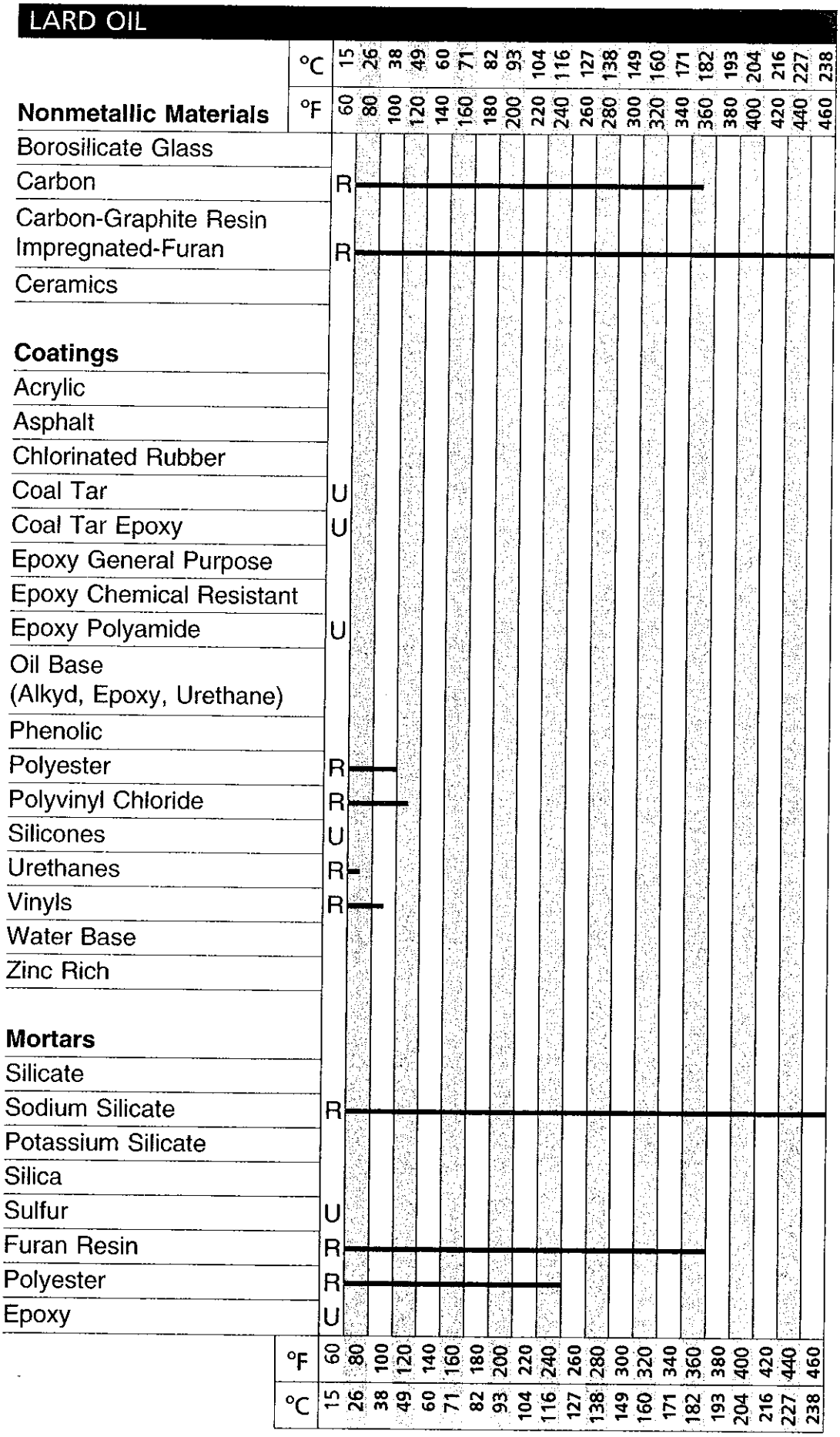
## LARD OIL



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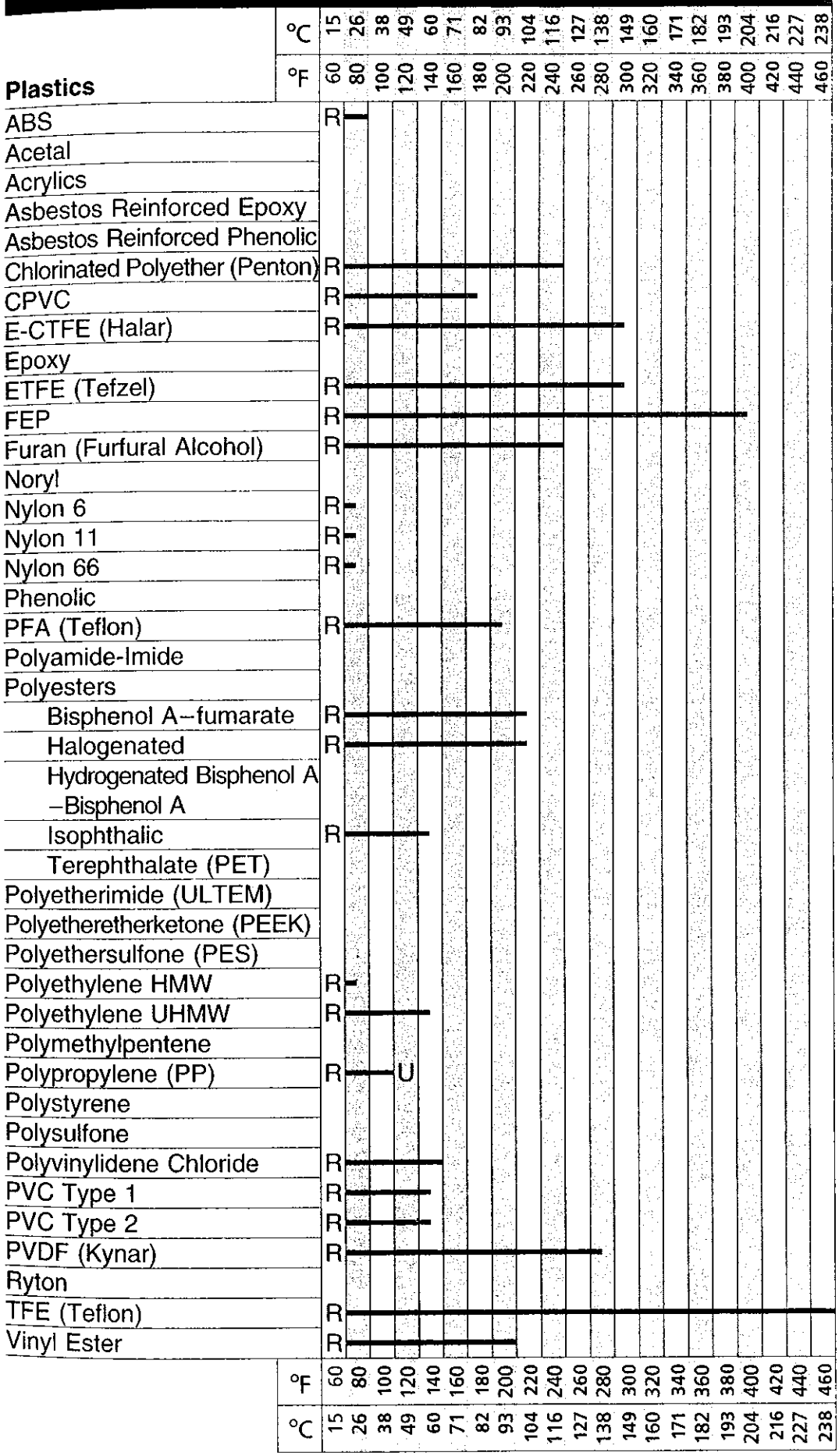
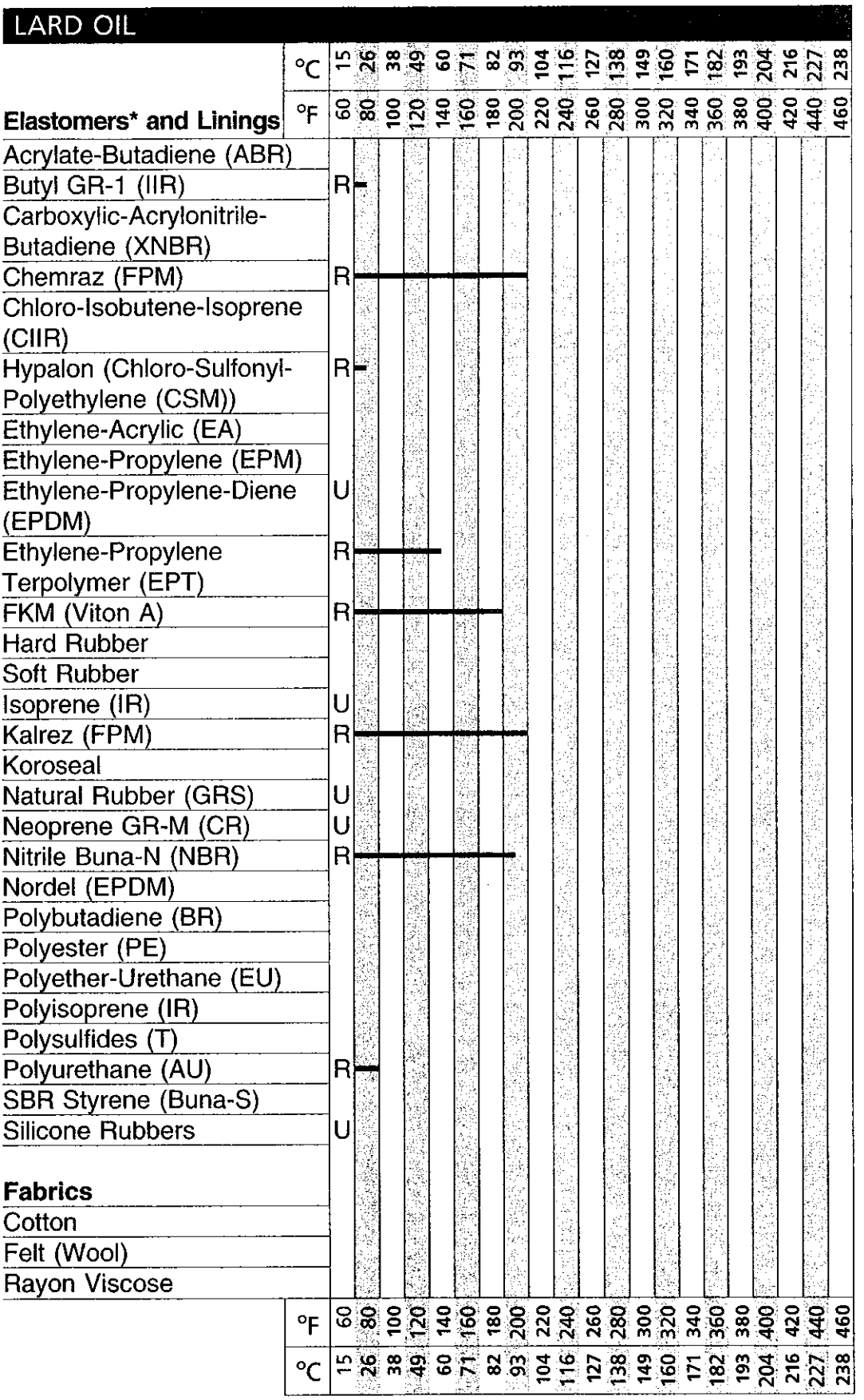
## LARD OIL


°C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238
°F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460
Plastics
ABS R
Acetal
Acrylics
Asbestos Reinforced Epoxy
Asbestos Reinforced Phenolic
Chlorinated Polyether (Penton) R
CPVC R
E-CTFE (Halar) R
Epoxy
ETFE (Tefzel) R
FEP R
Furan (Furfural Alcohol) R
Noryl
Nylon 6 R
Nylon 11 R
Nylon 66 R
Phenolic
PFA (Teflon) R
Polyamide-Imide
Polyesters
Bisphenol A–fumarate R
Halogenated R
Hydrogenated Bisphenol A –Bisphenol A
Isophthalic R
Terephthalate (PET)
Polyetherimide (ULTEM)
Polyetheretherketone (PEEK)
Polyethersulfone (PES)
Polyethylene HMW R
Polyethylene UHMW R
Polymethylpentene
Polypropylene (PP) R U
Polystyrene
Polysulfone
Polyvinylidene Chloride R
PVC Type 1 R
PVC Type 2 R
PVDF (Kynar) R
Ryton
TFE (Teflon) R
Vinyl Ester R
°F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460
°C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

## LARD OIL

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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

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FOR NONMETALLICS

R = Resistant

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## LATEX

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | R | R | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | R | R | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | R | R | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | R | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | R | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | R | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | R | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |


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## LATEX

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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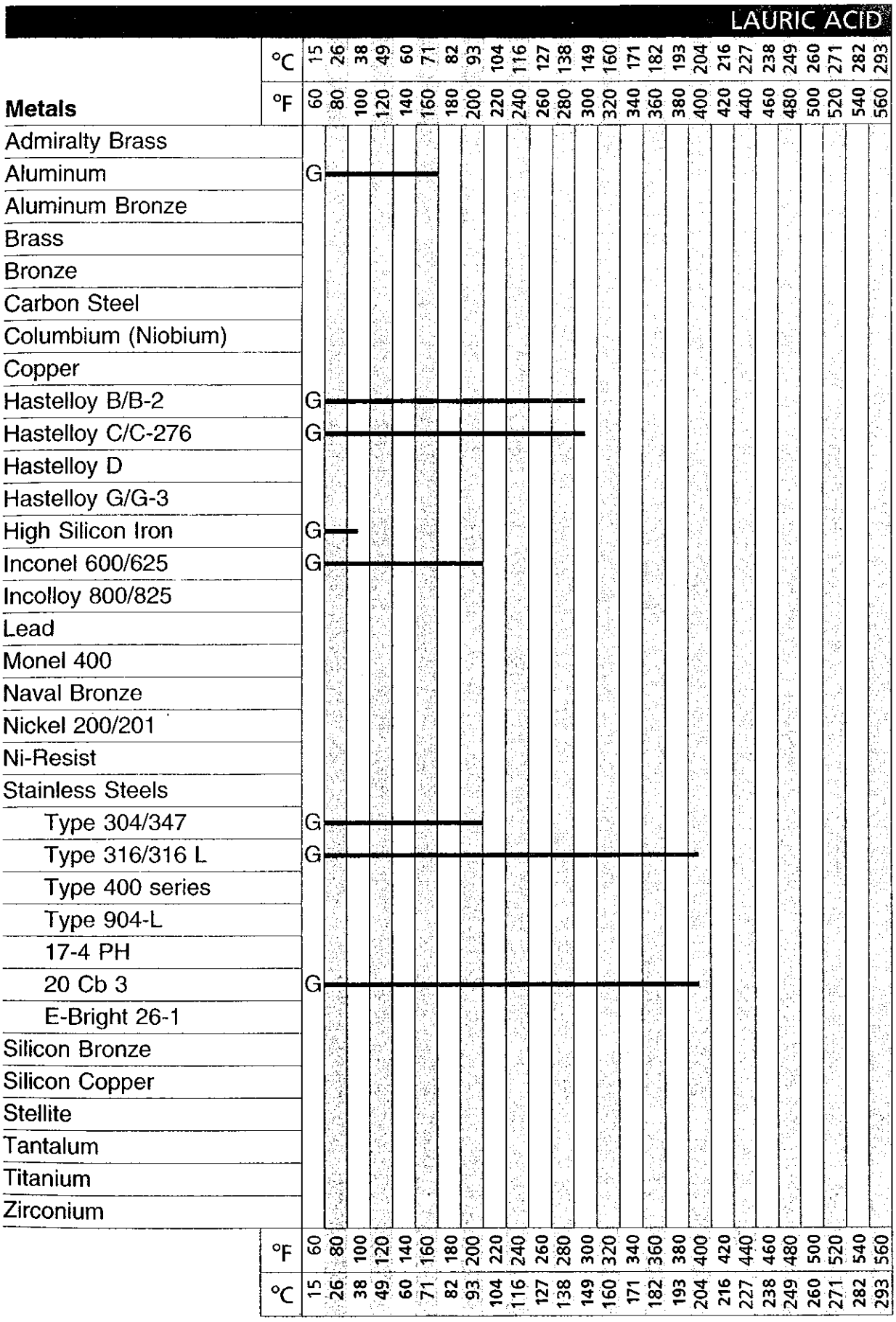


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

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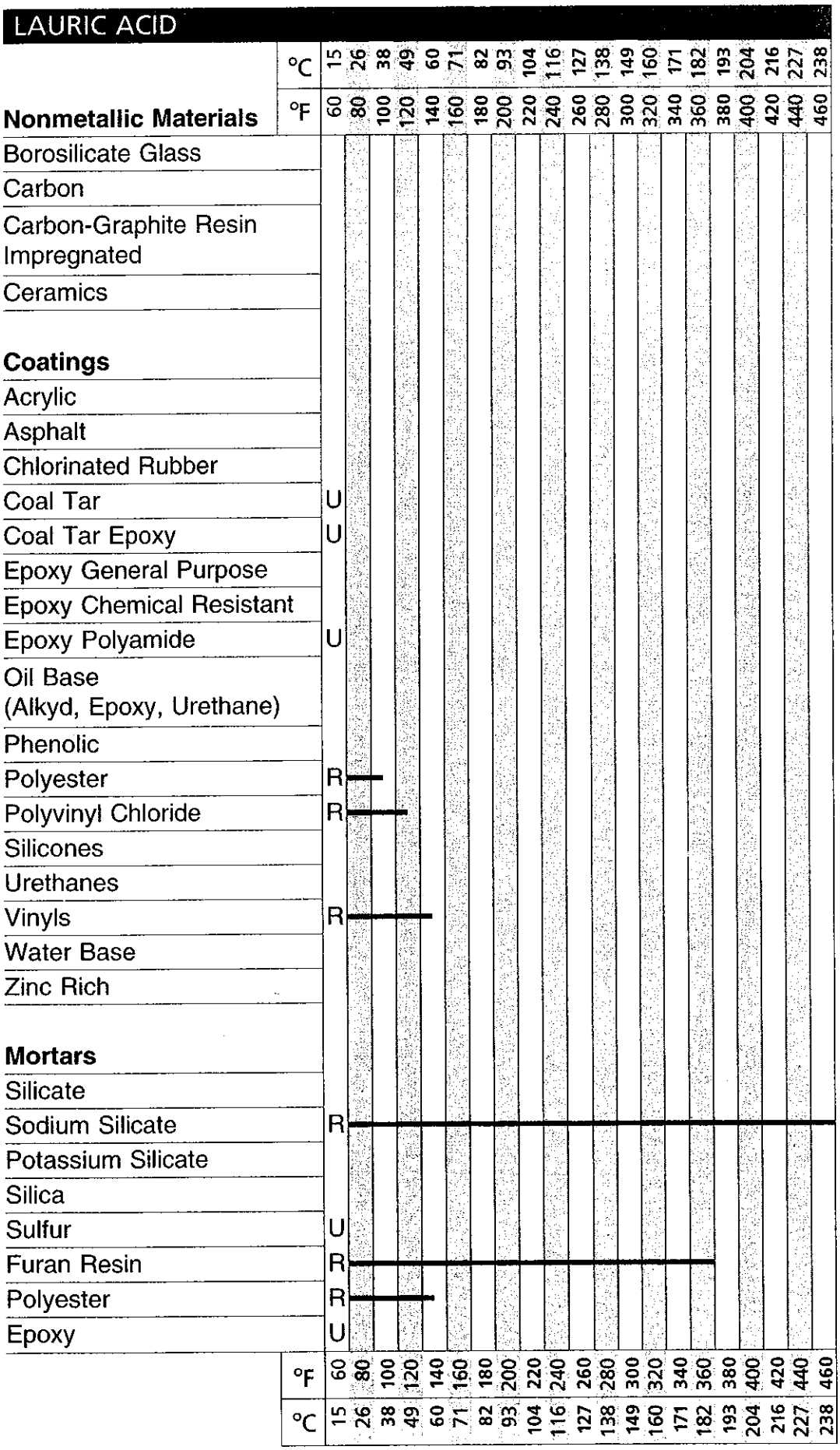






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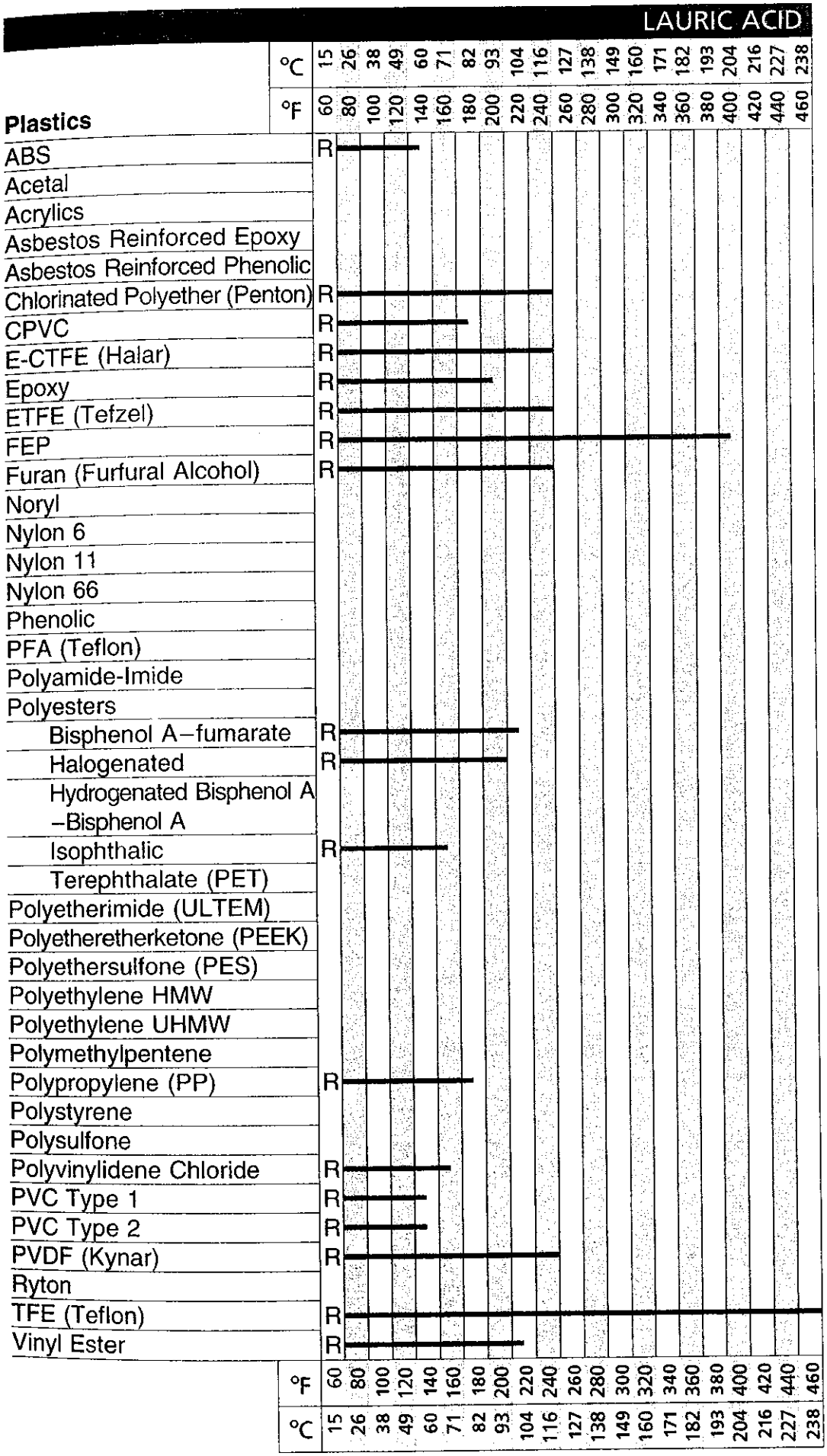


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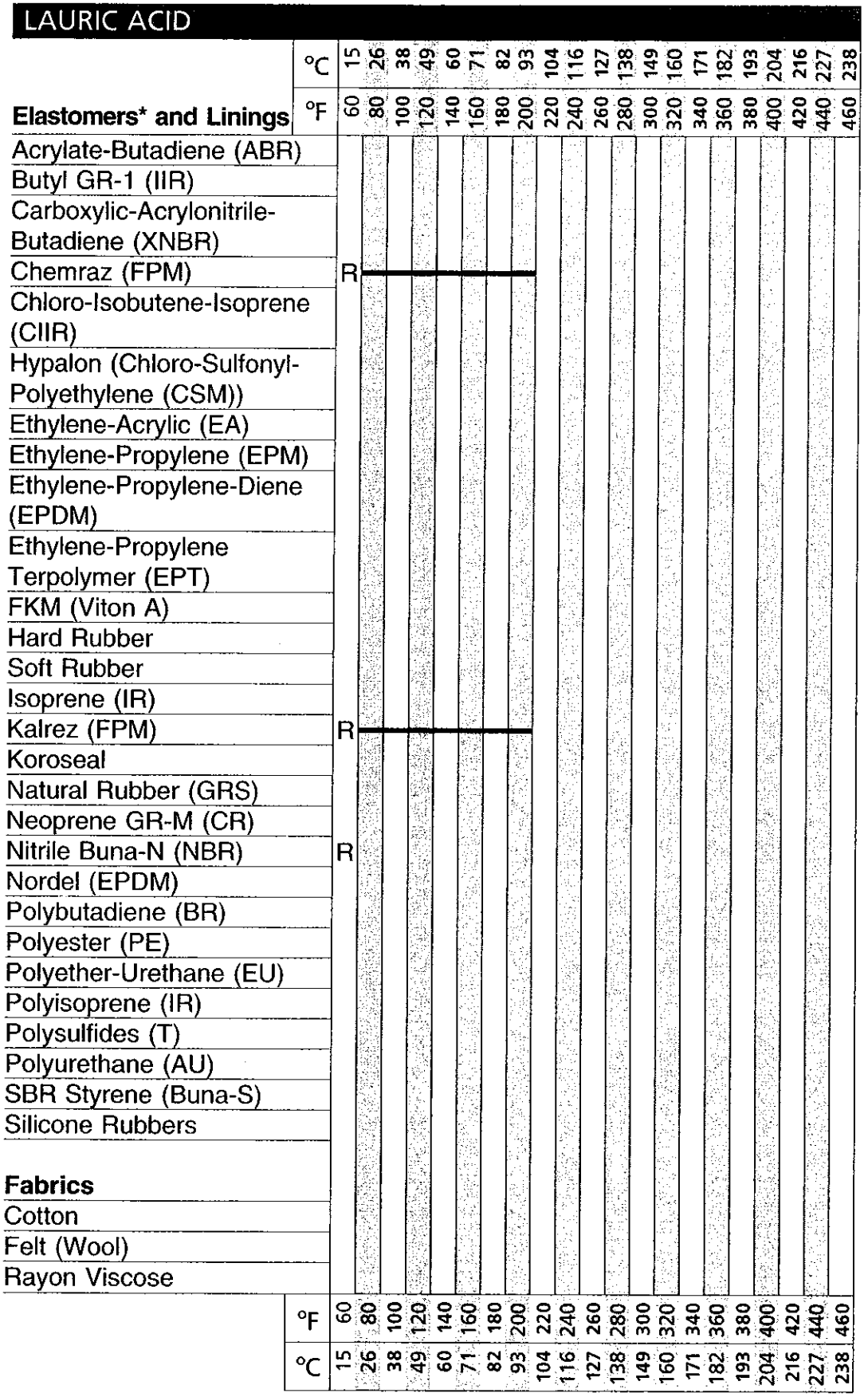


*See also Nylon 11 under PLASTICS



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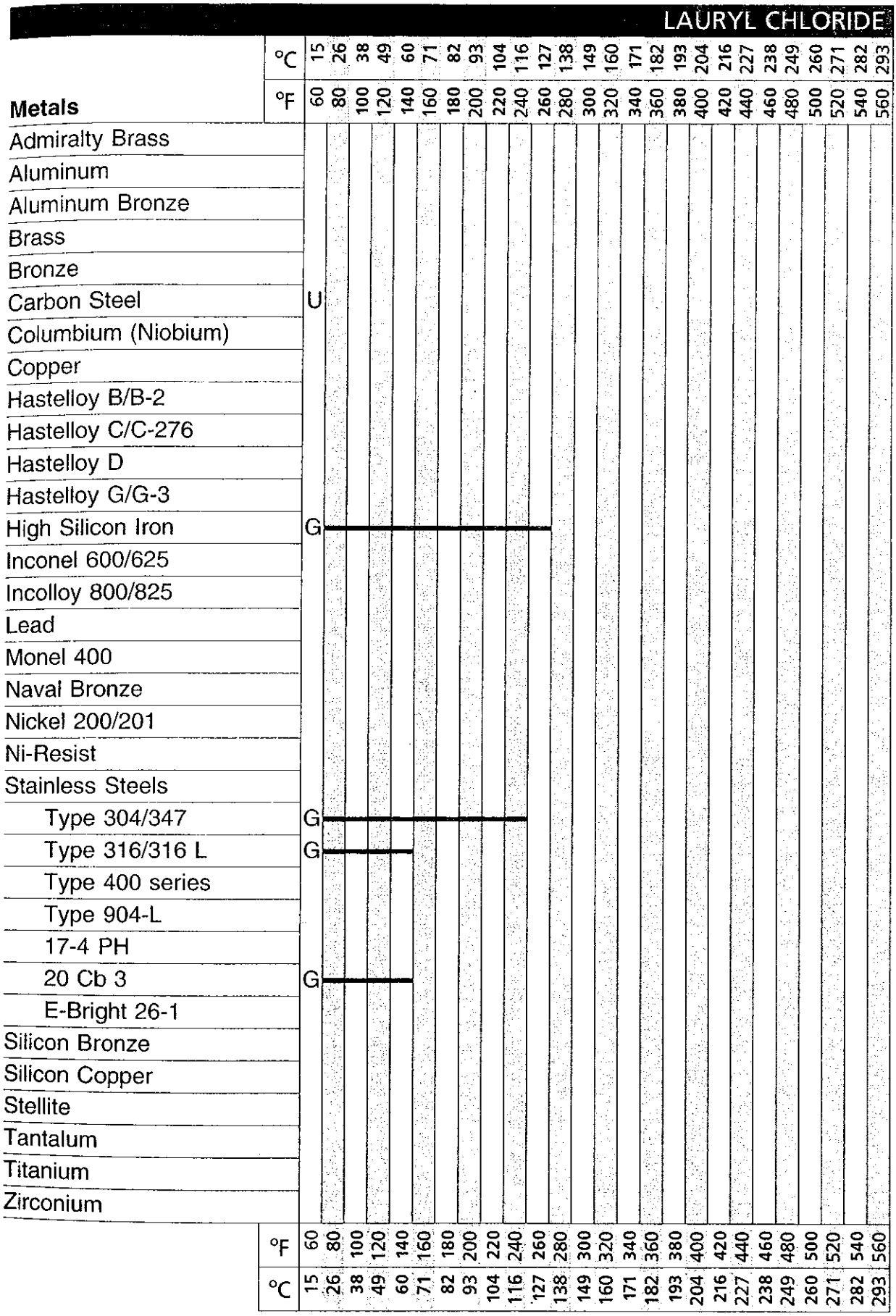


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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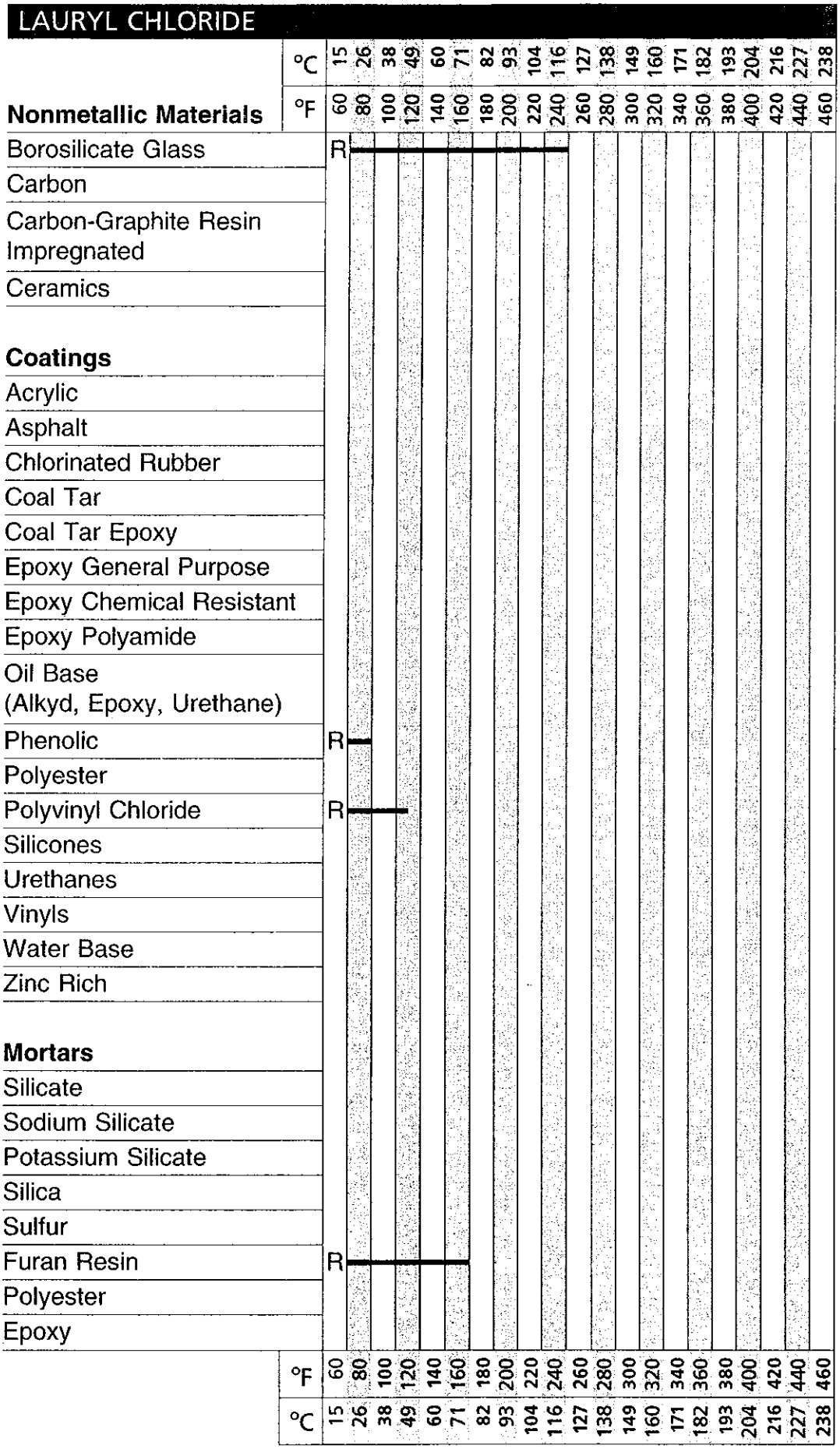




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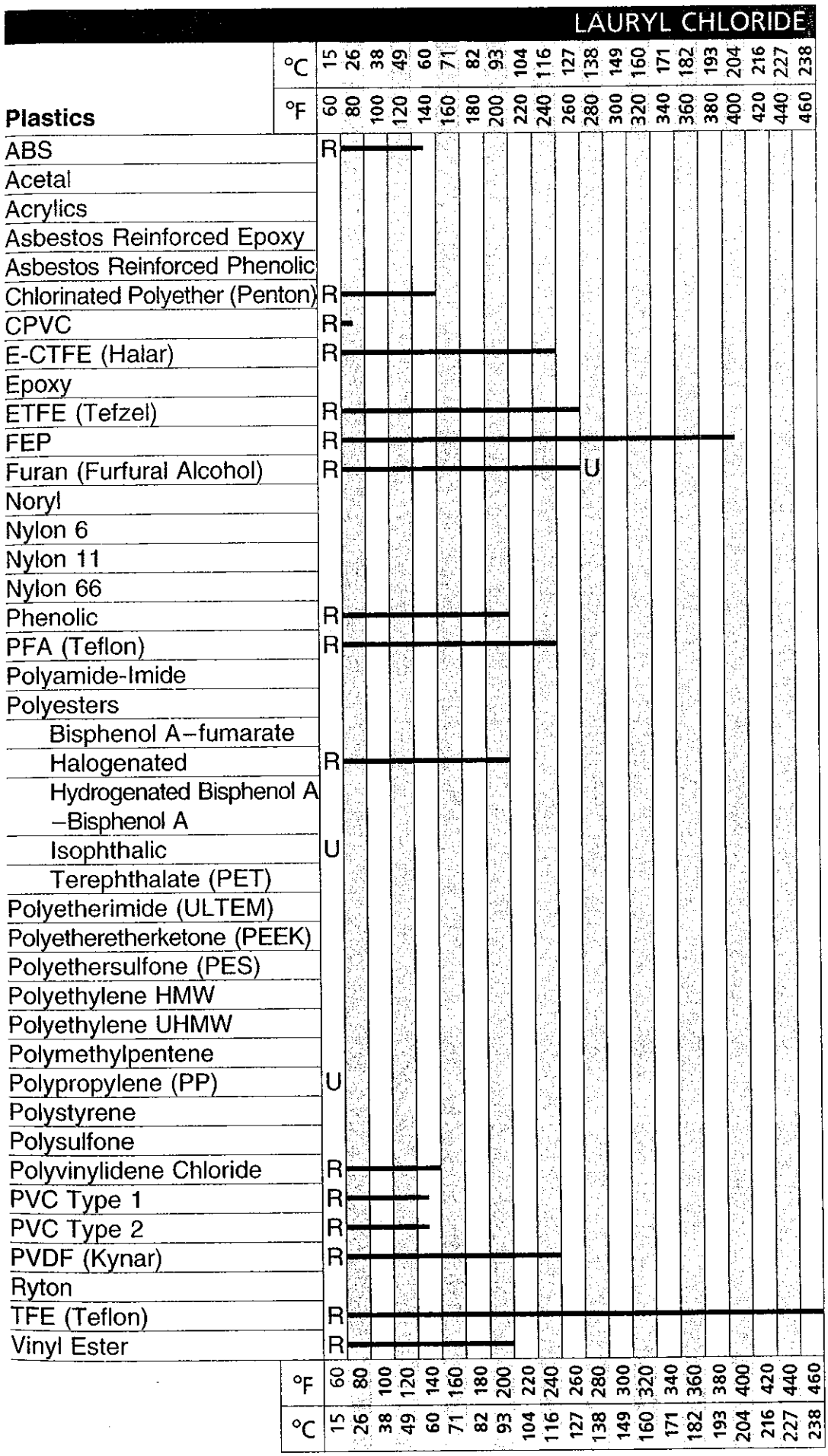


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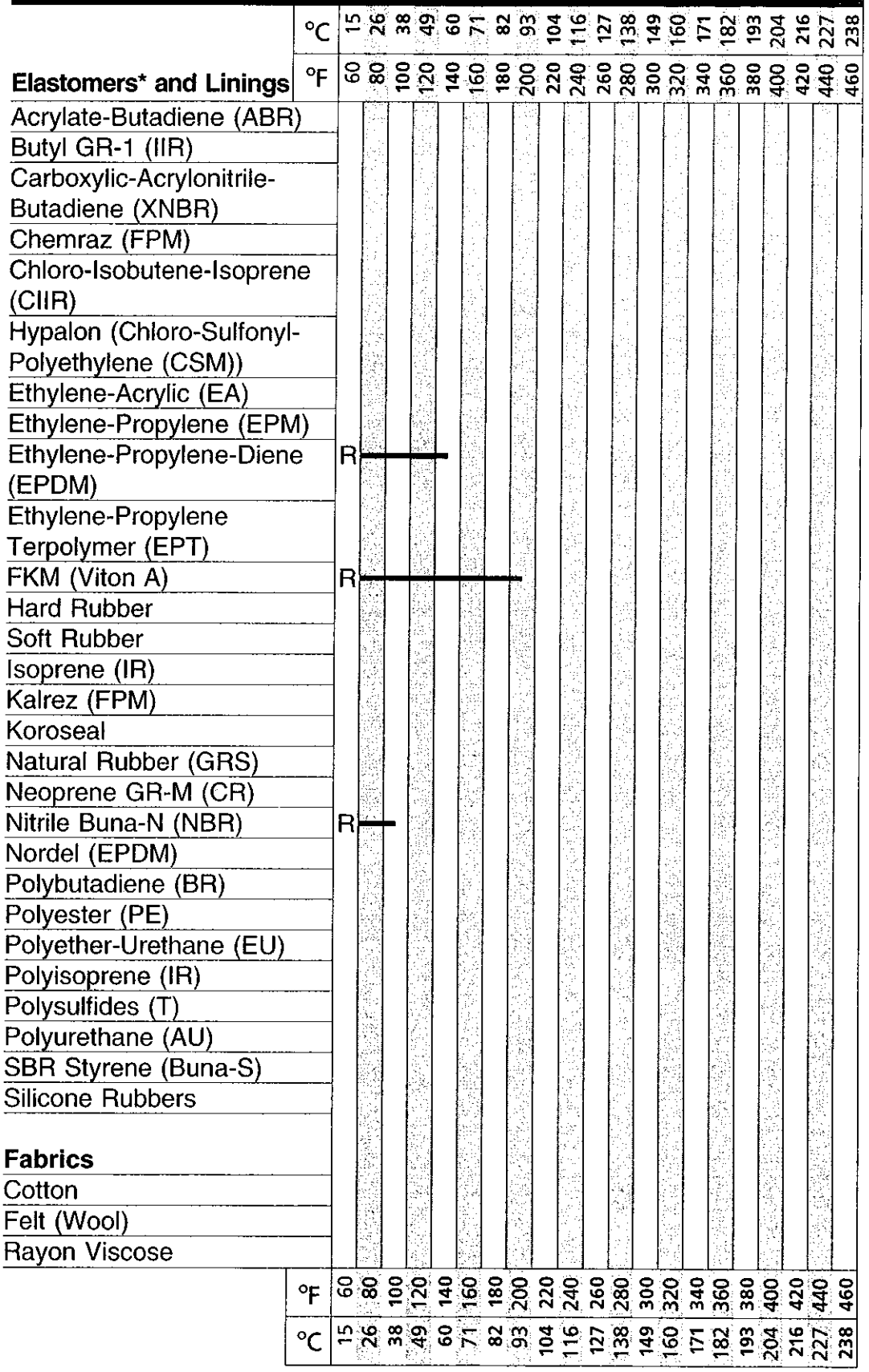


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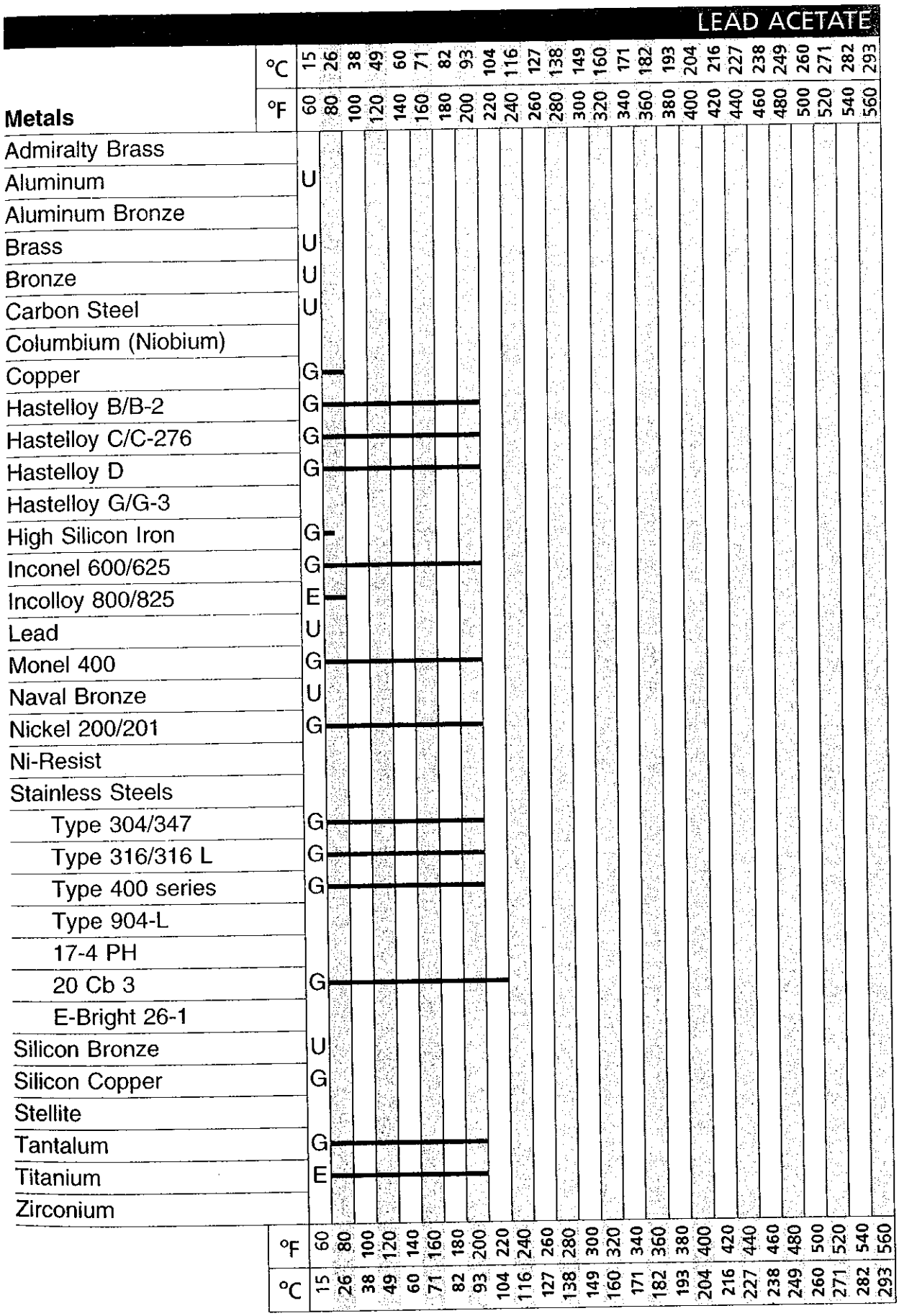


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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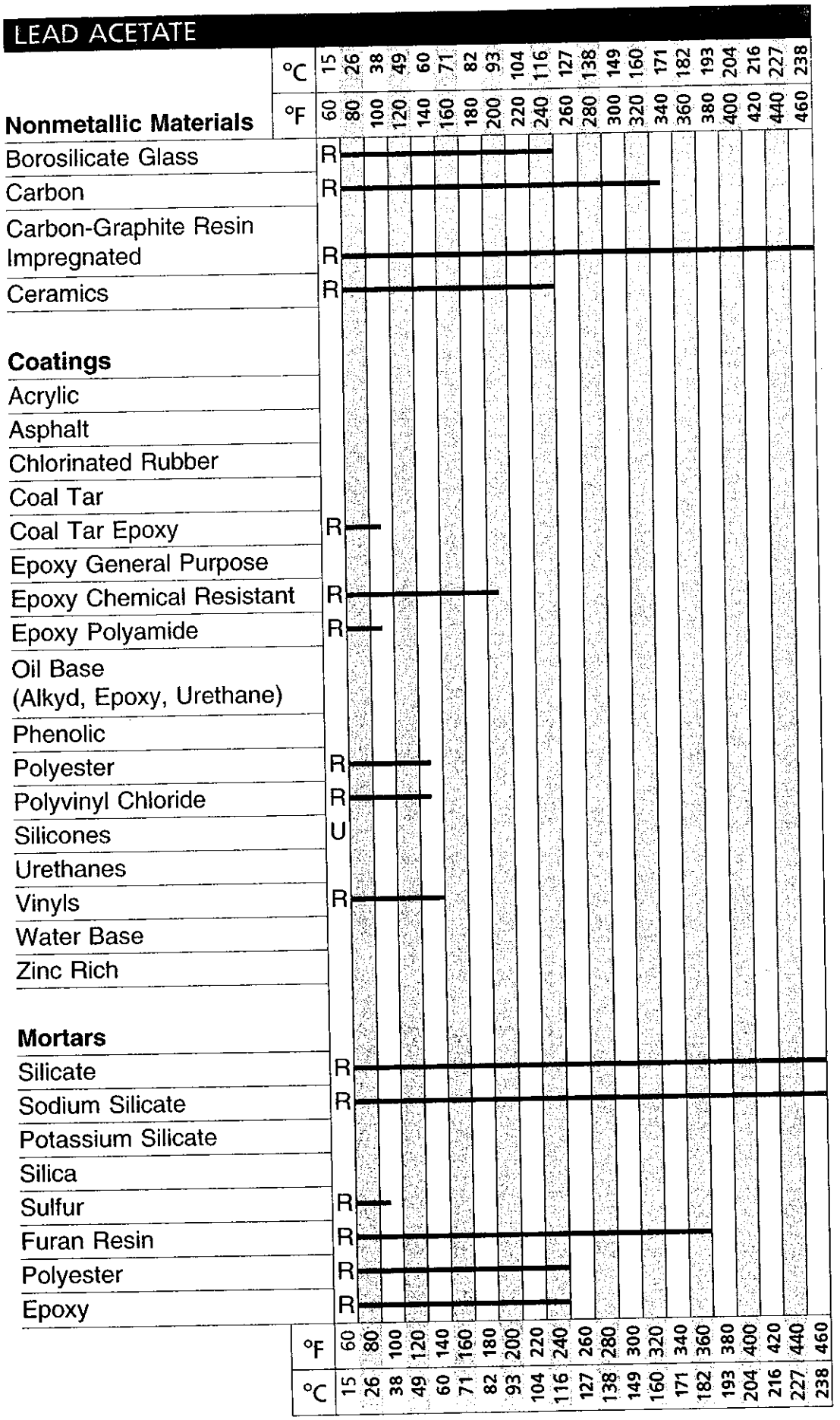




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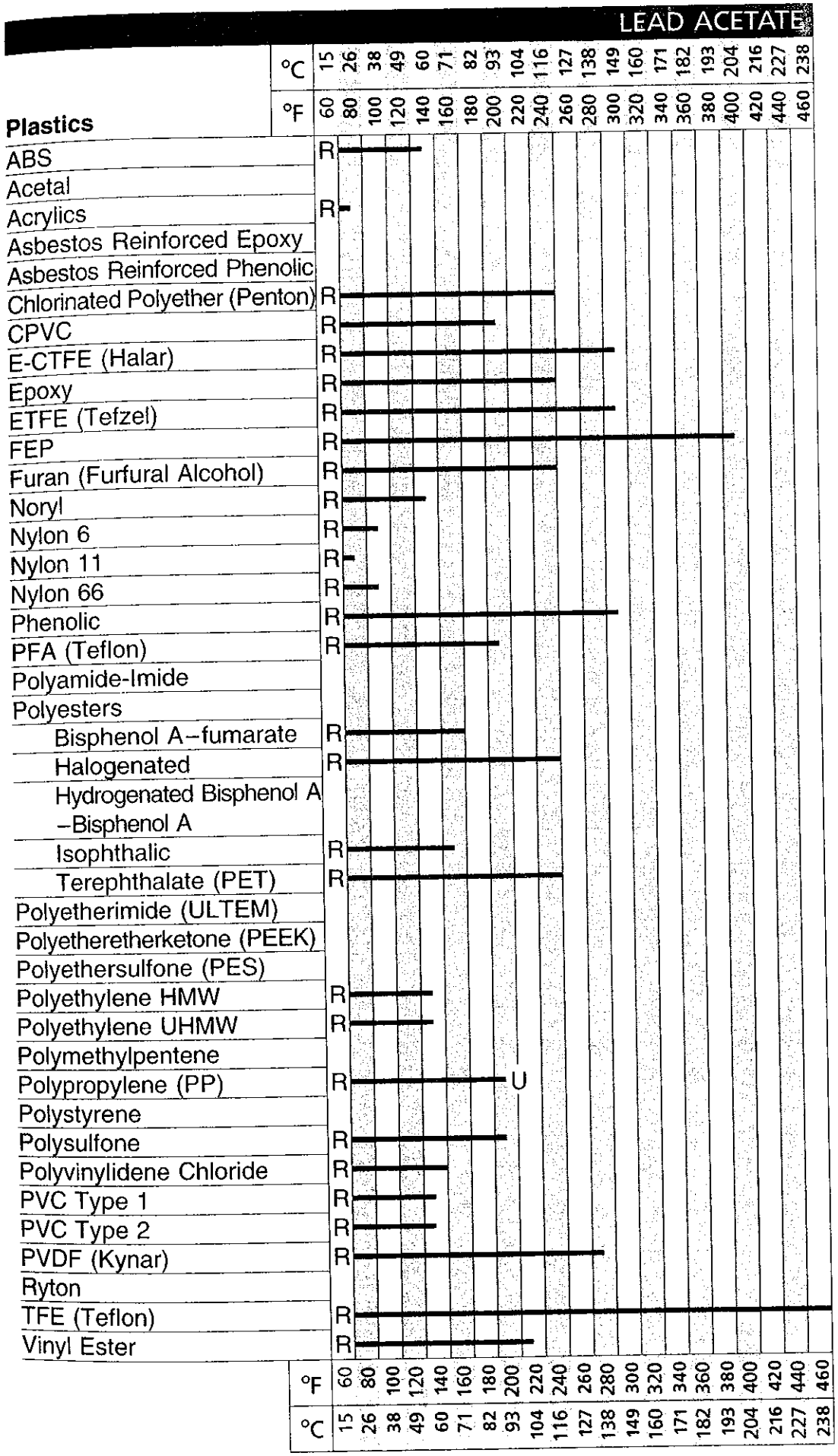



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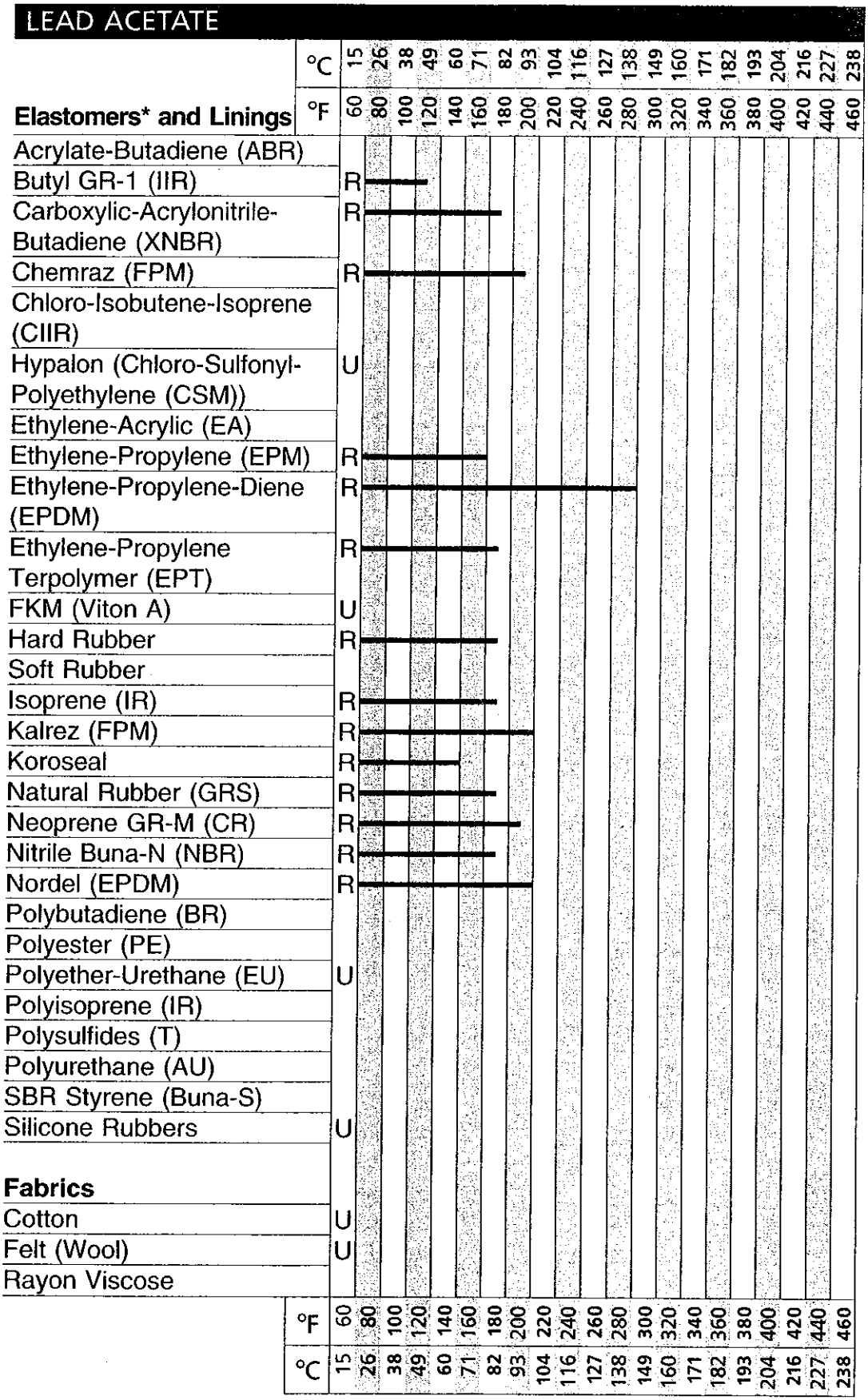


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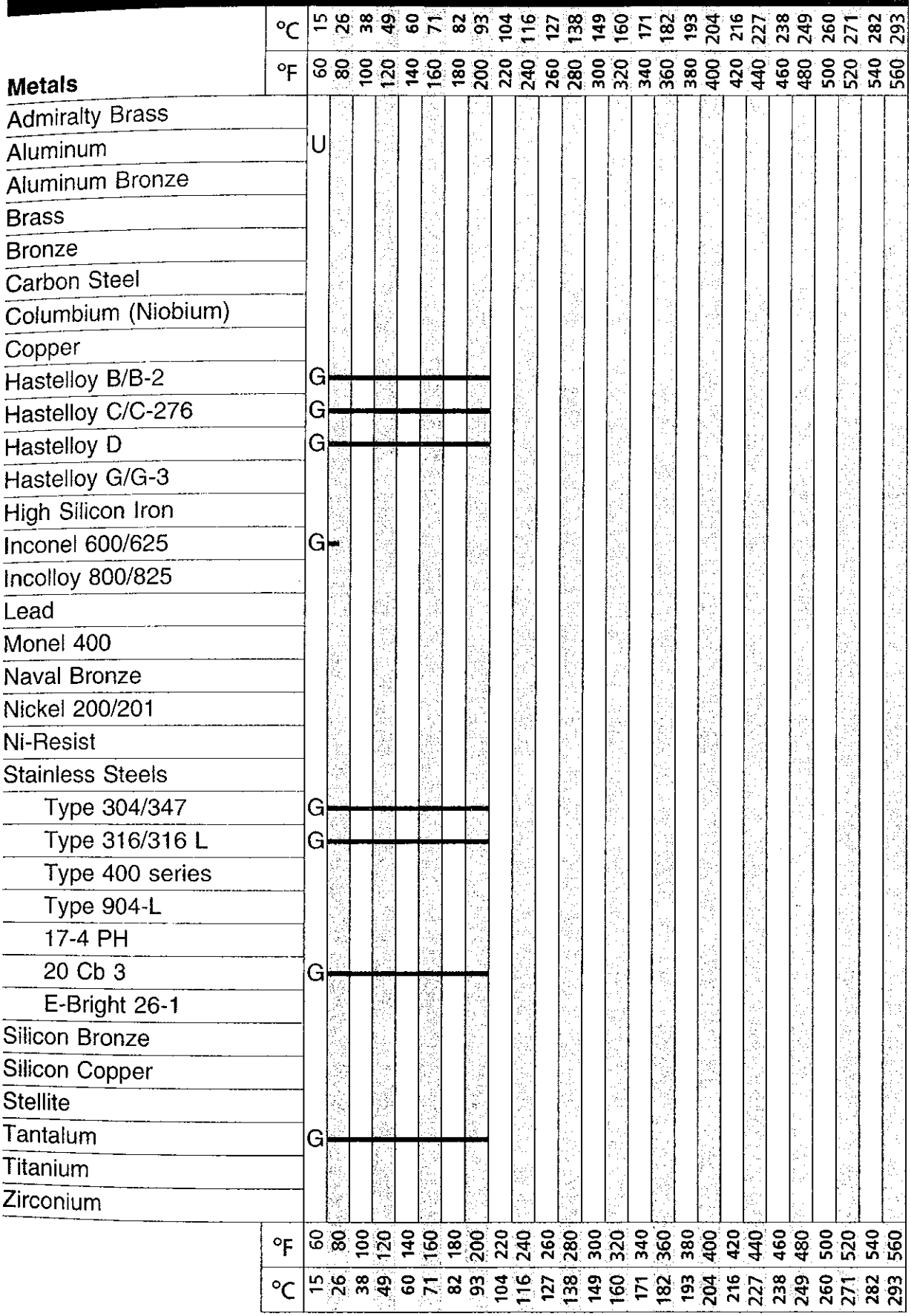


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FOR NONMETALLICS

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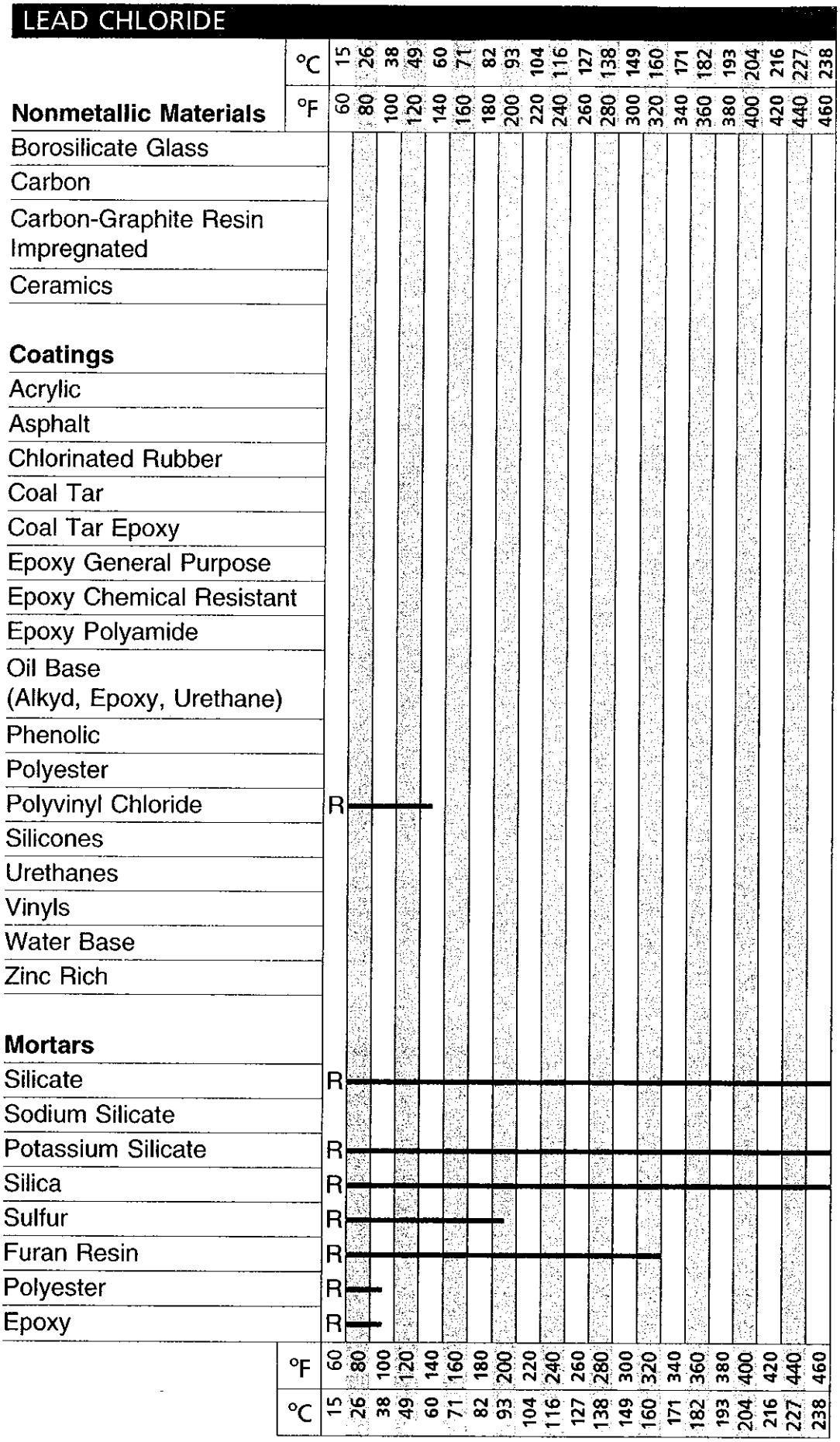




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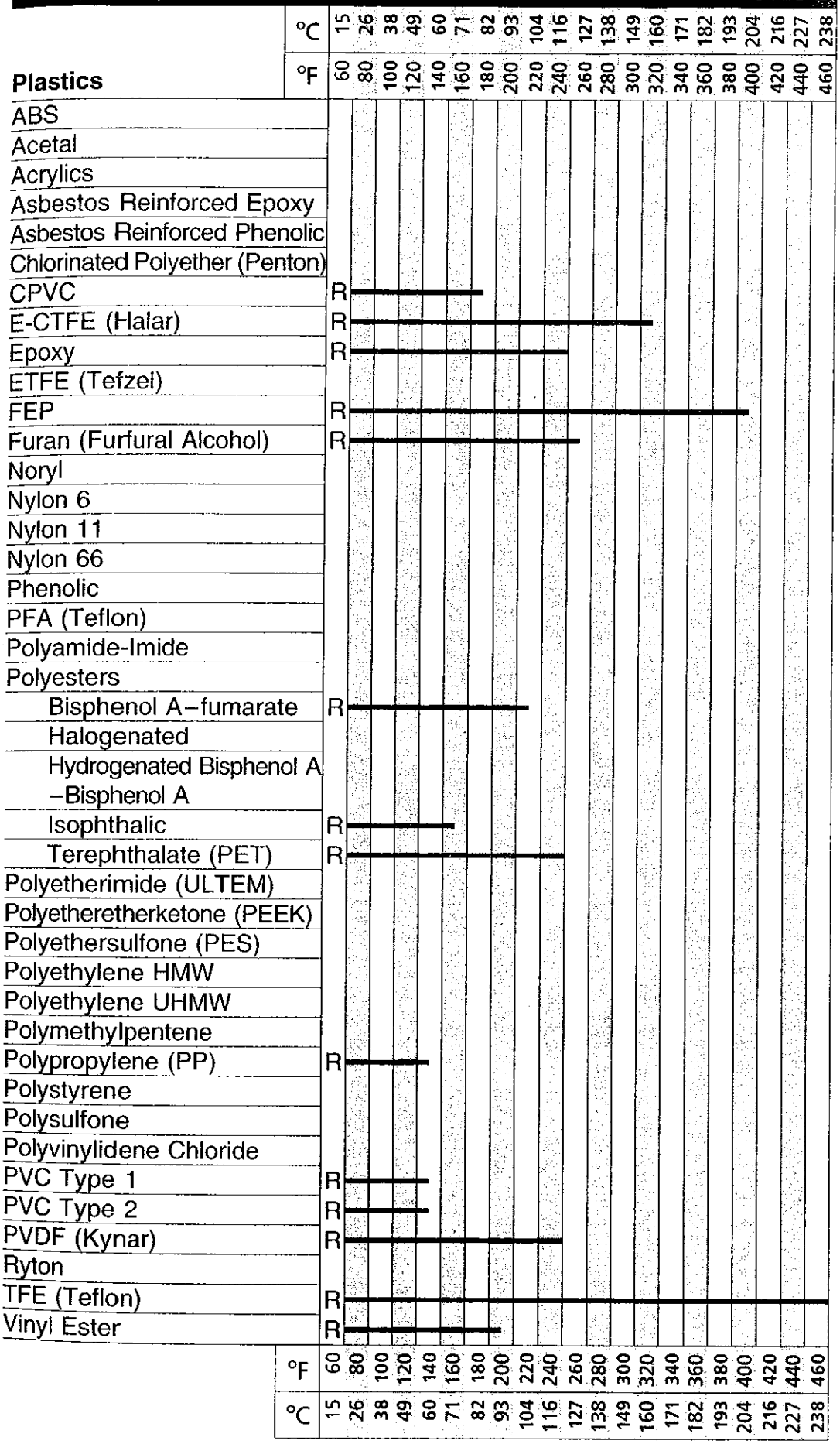


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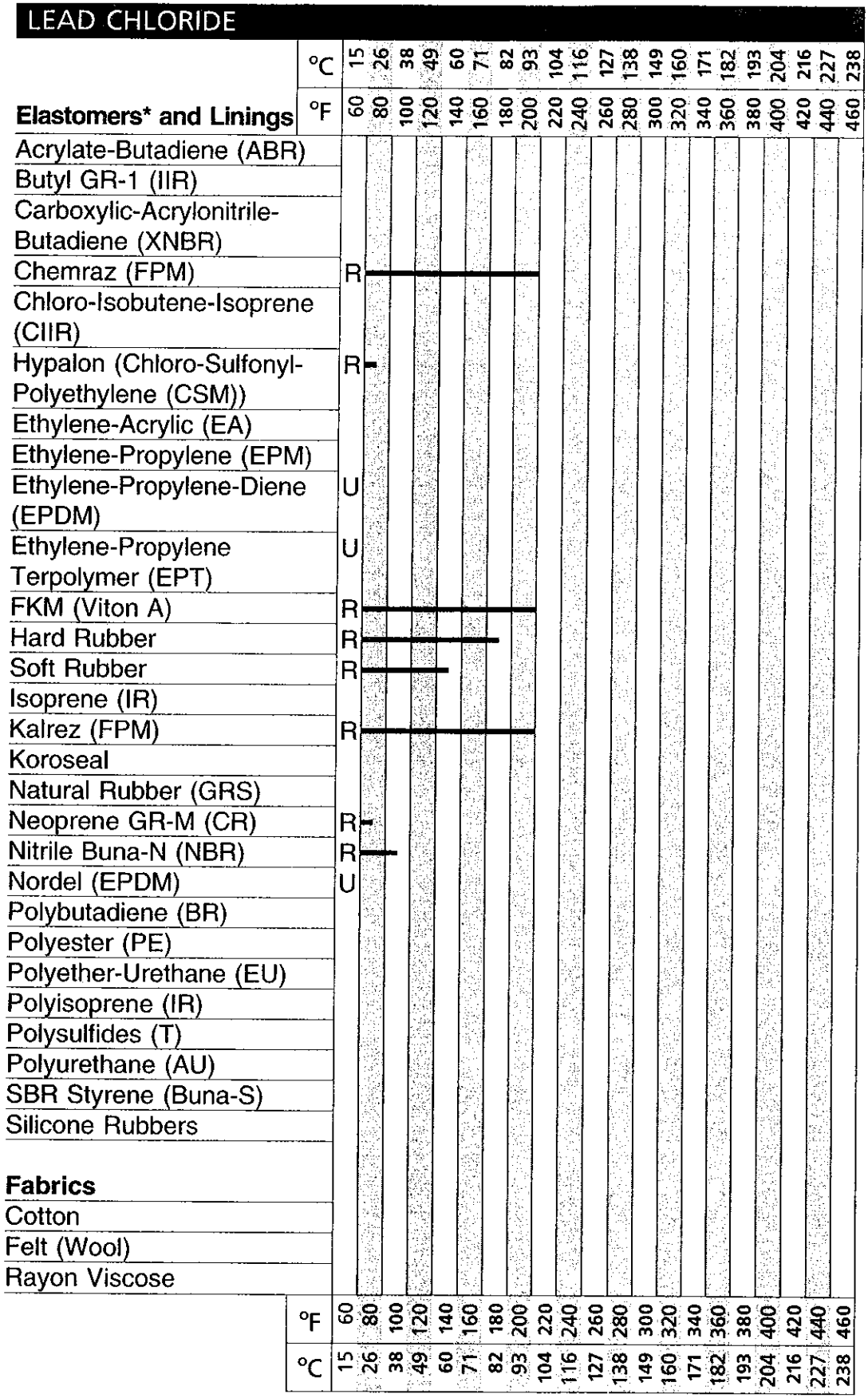


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## LEAD NITRATE

| Metals | |
|---|---|
| Admiralty Brass | |
| Aluminum | U |
| Aluminum Bronze | |
| Brass | |
| Bronze | |
| Carbon Steel | U |
| Columbium (Niobium) | |
| Copper | |
| Hastelloy B/B-2 | G |
| Hastelloy C/C-276 | G |
| Hastelloy D | |
| Hastelloy G/G-3 | |
| High Silicon Iron | |
| Inconel 600/625 | |
| Incolloy 800/825 | |
| Galv. Stl. | U |
| Monel 400 | G |
| Naval Bronze | |
| Nickel 200/201 | |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 30% | G |
| Type 316/316 L | G |
| Type 400 series 30% | G |
| Type 904-L | |
| 17-4 PH | |
| 20 Cb 3 | G |
| E-Bright 26-1 | |
| Silicon Bronze | |
| Silicon Copper | |
| Stellite | |
| Tantalum | |
| Titanium | |
| Zirconium | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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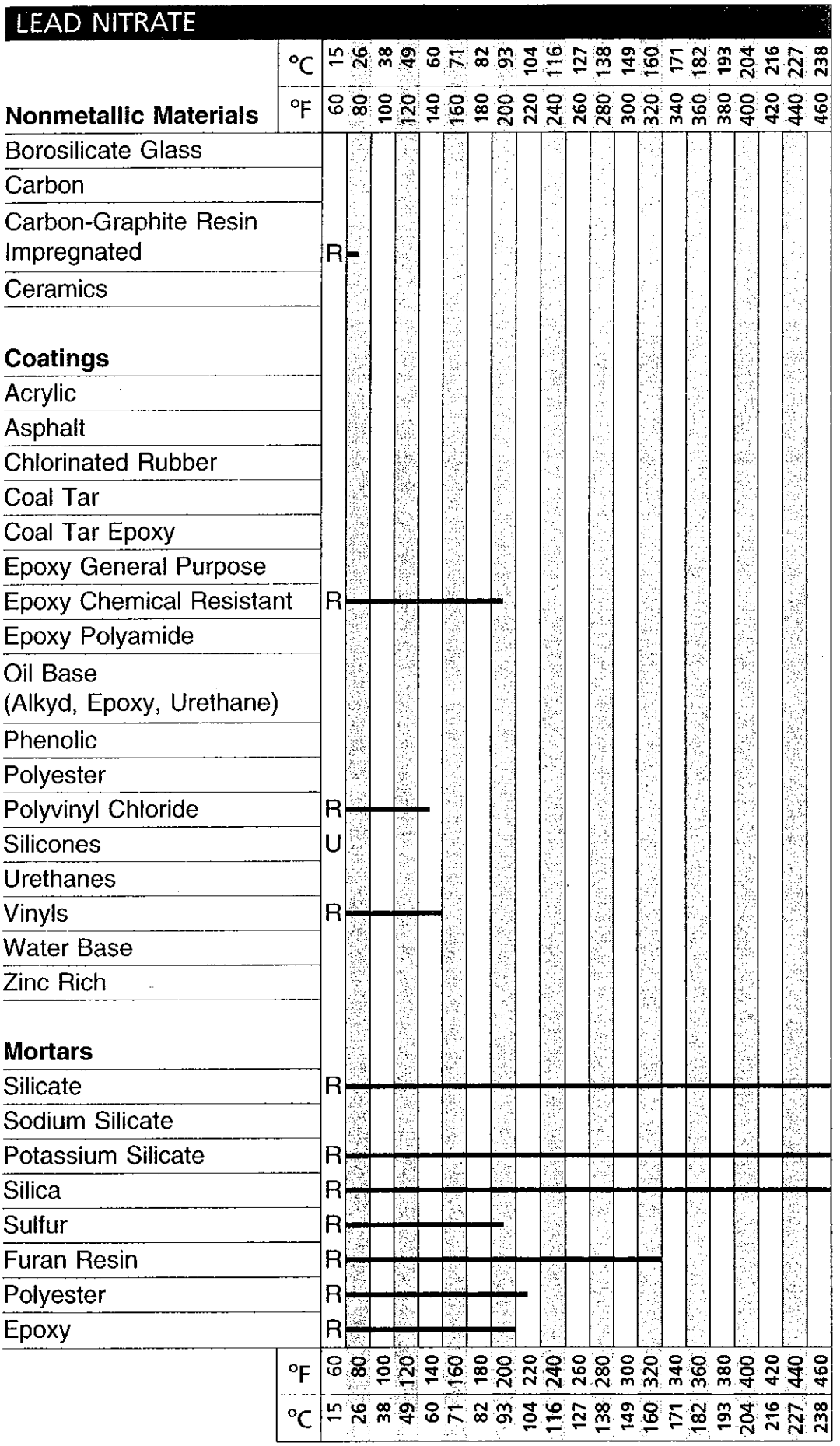




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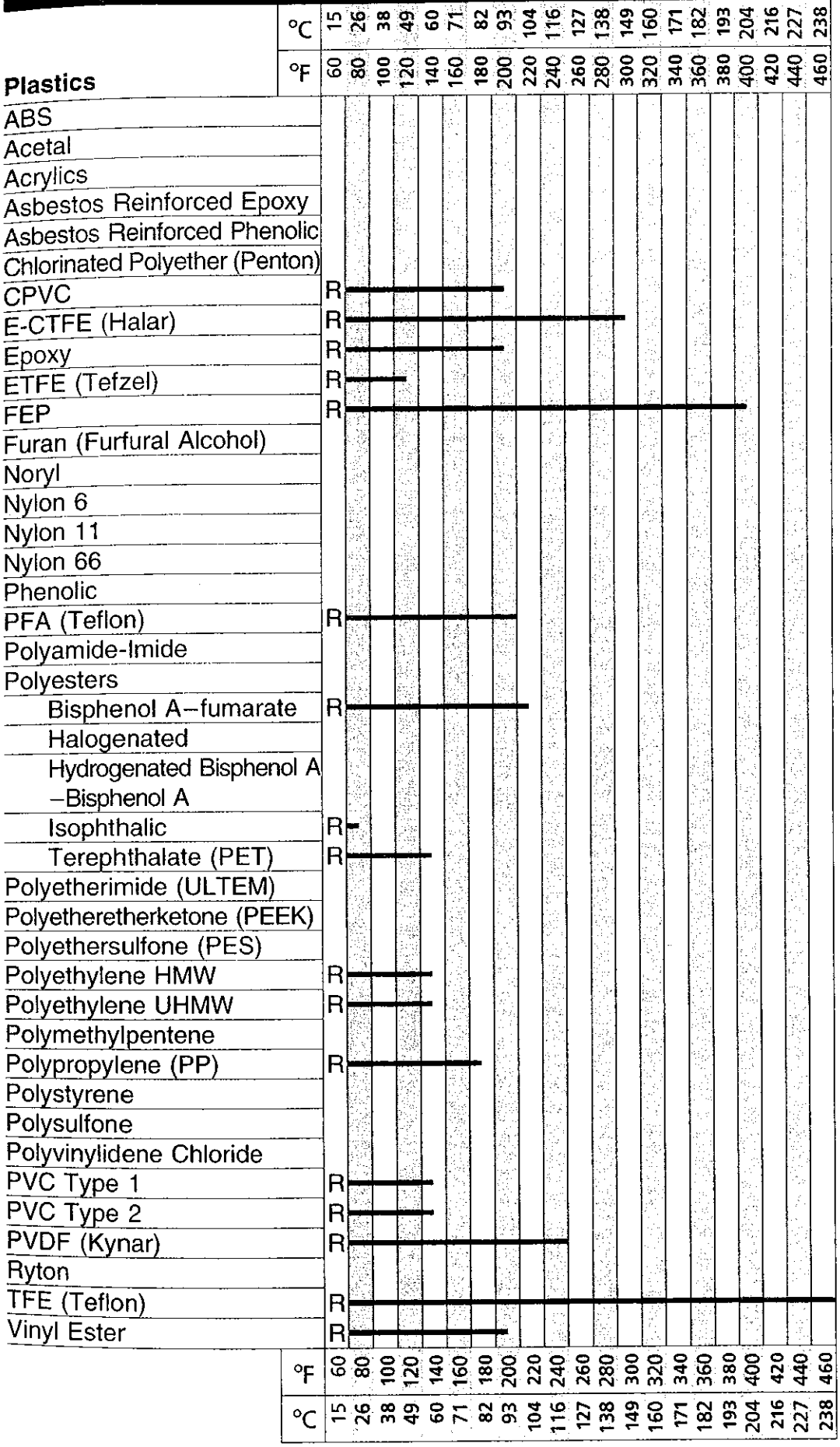


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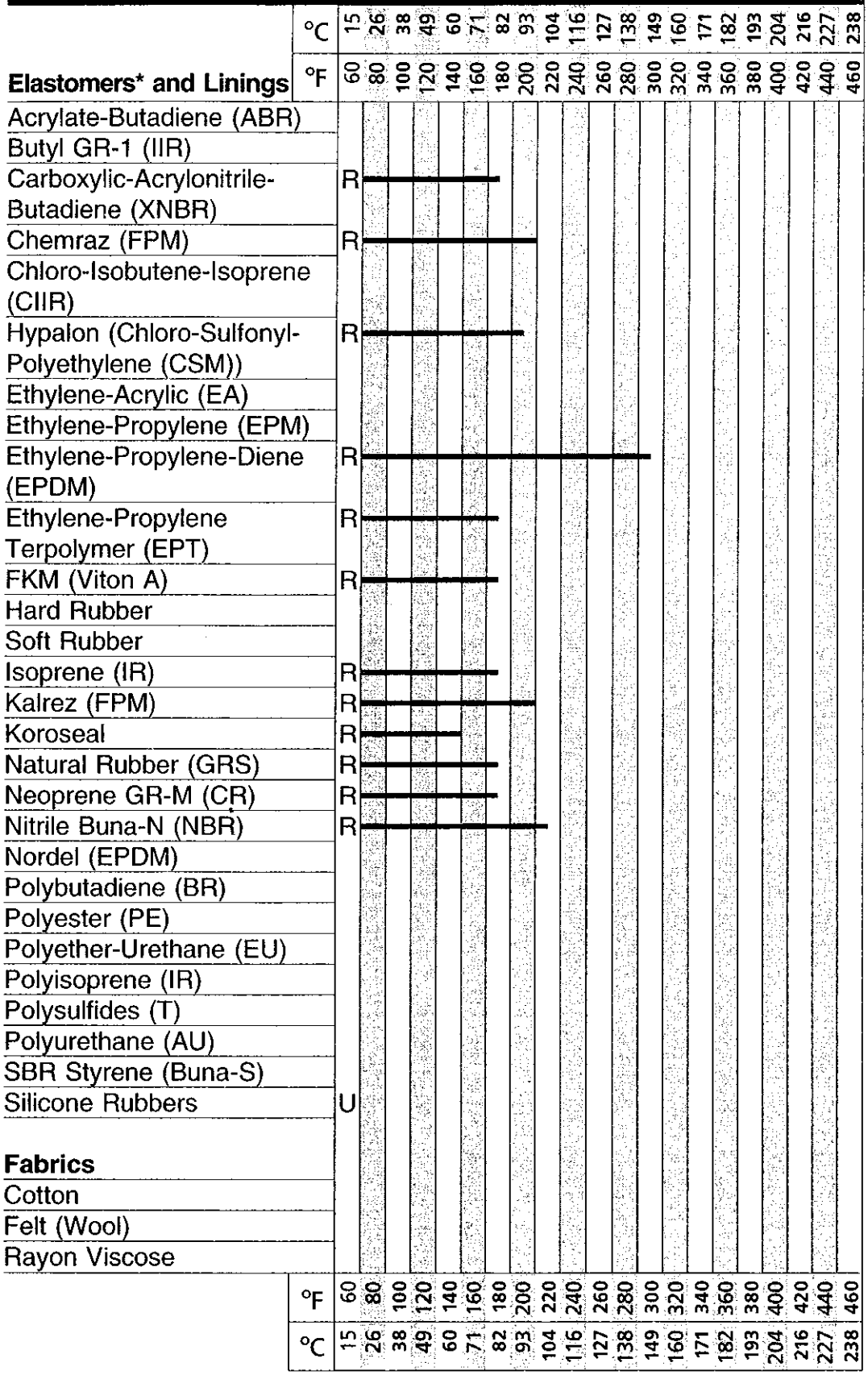


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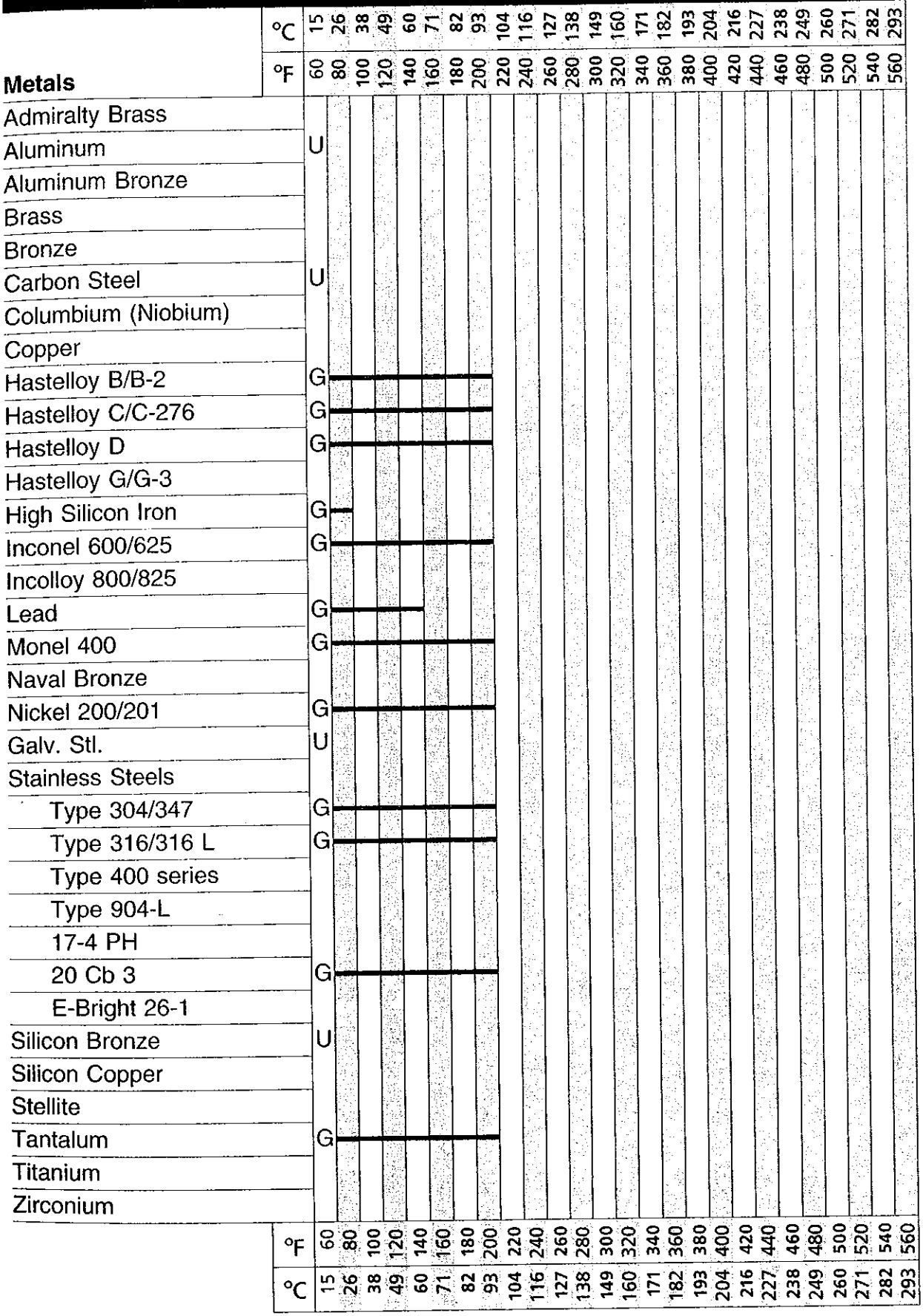


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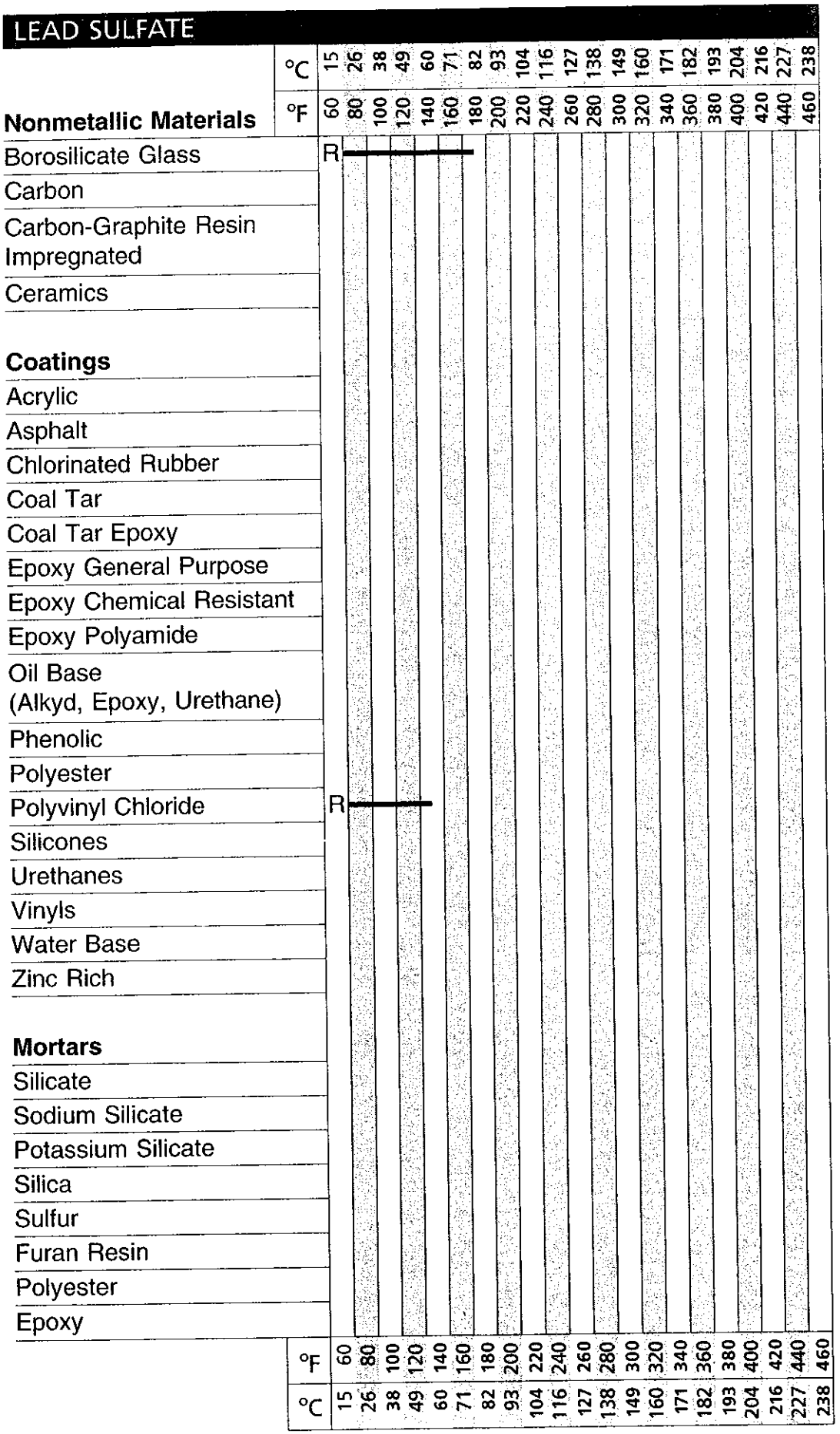




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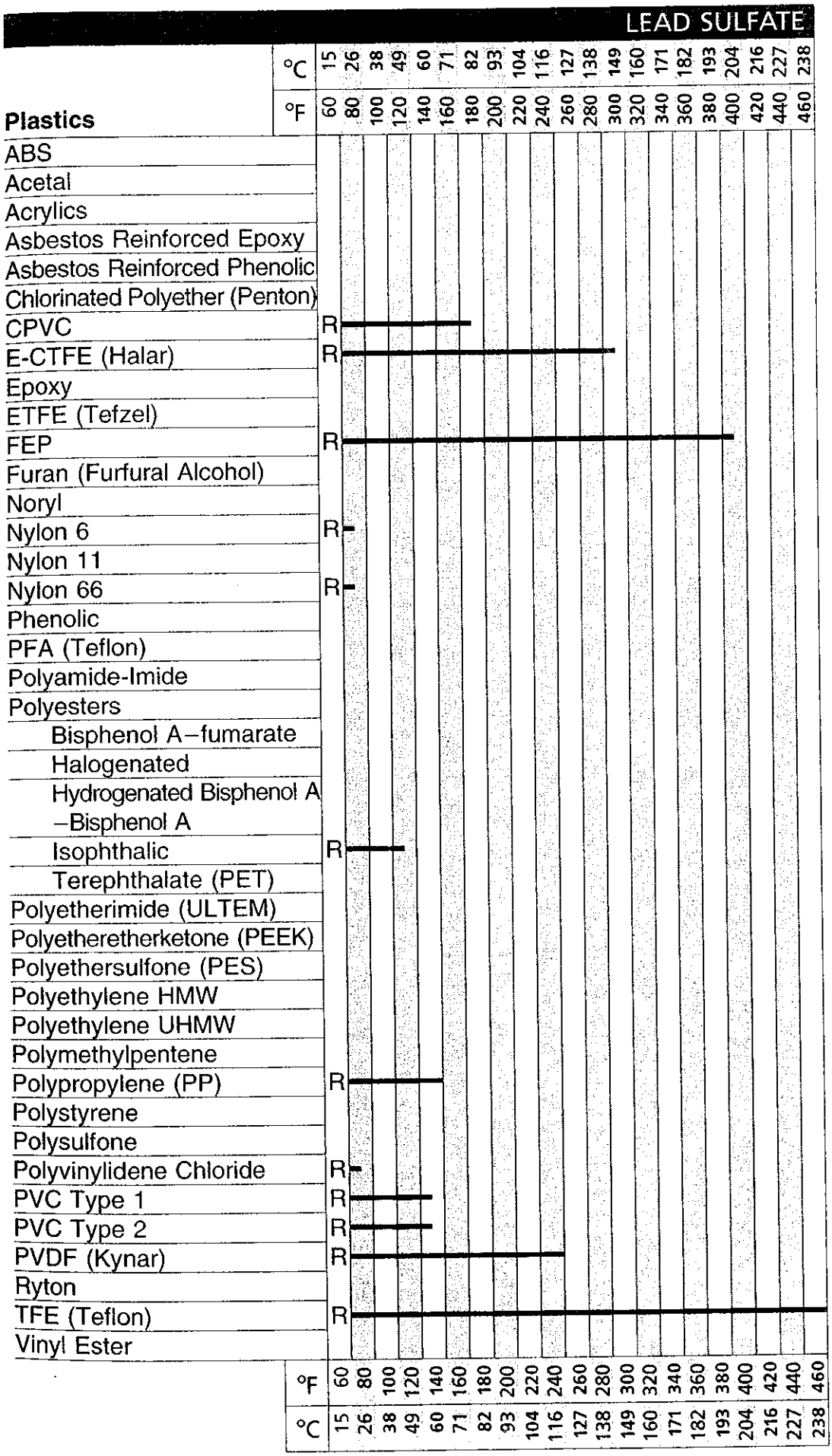


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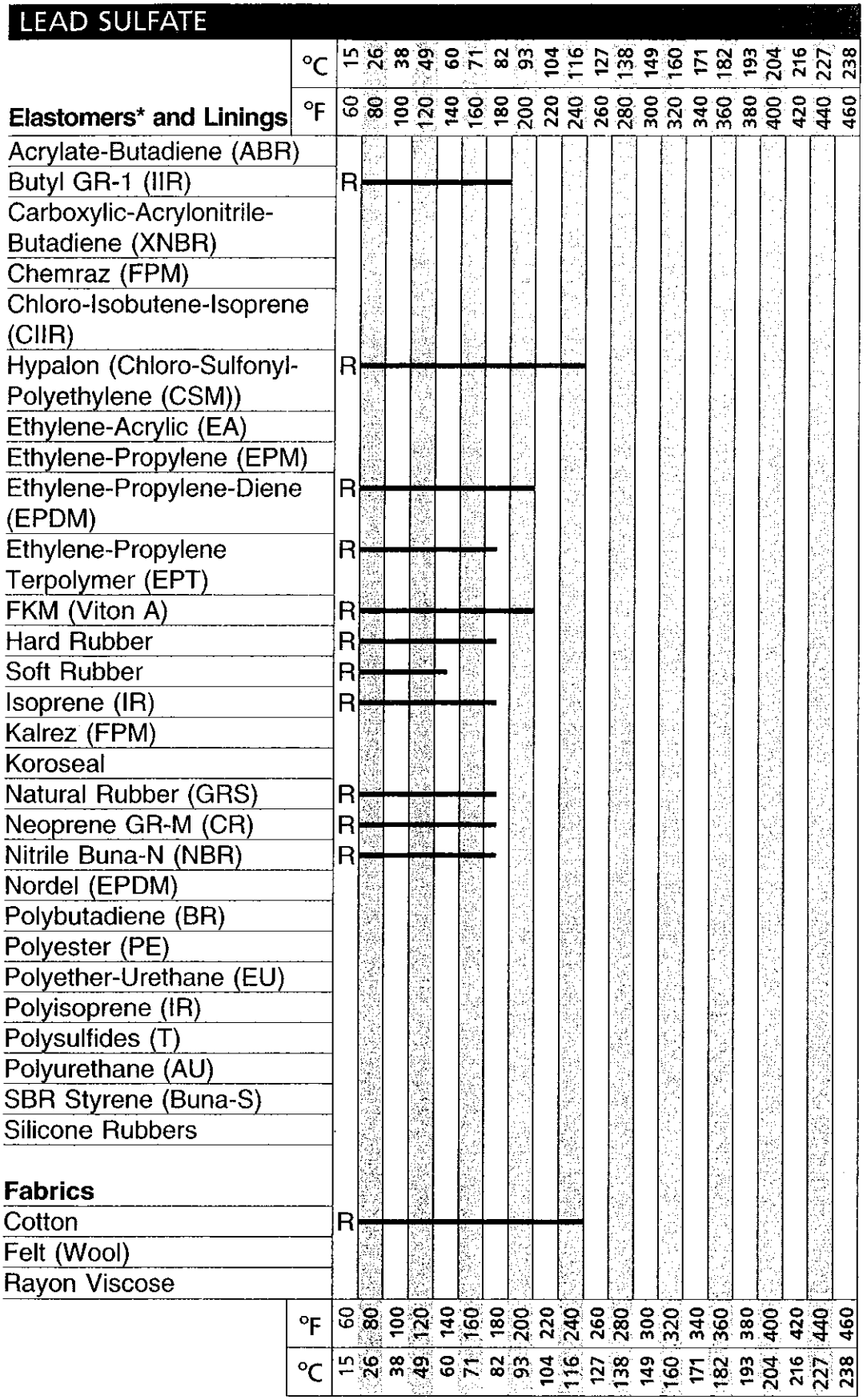


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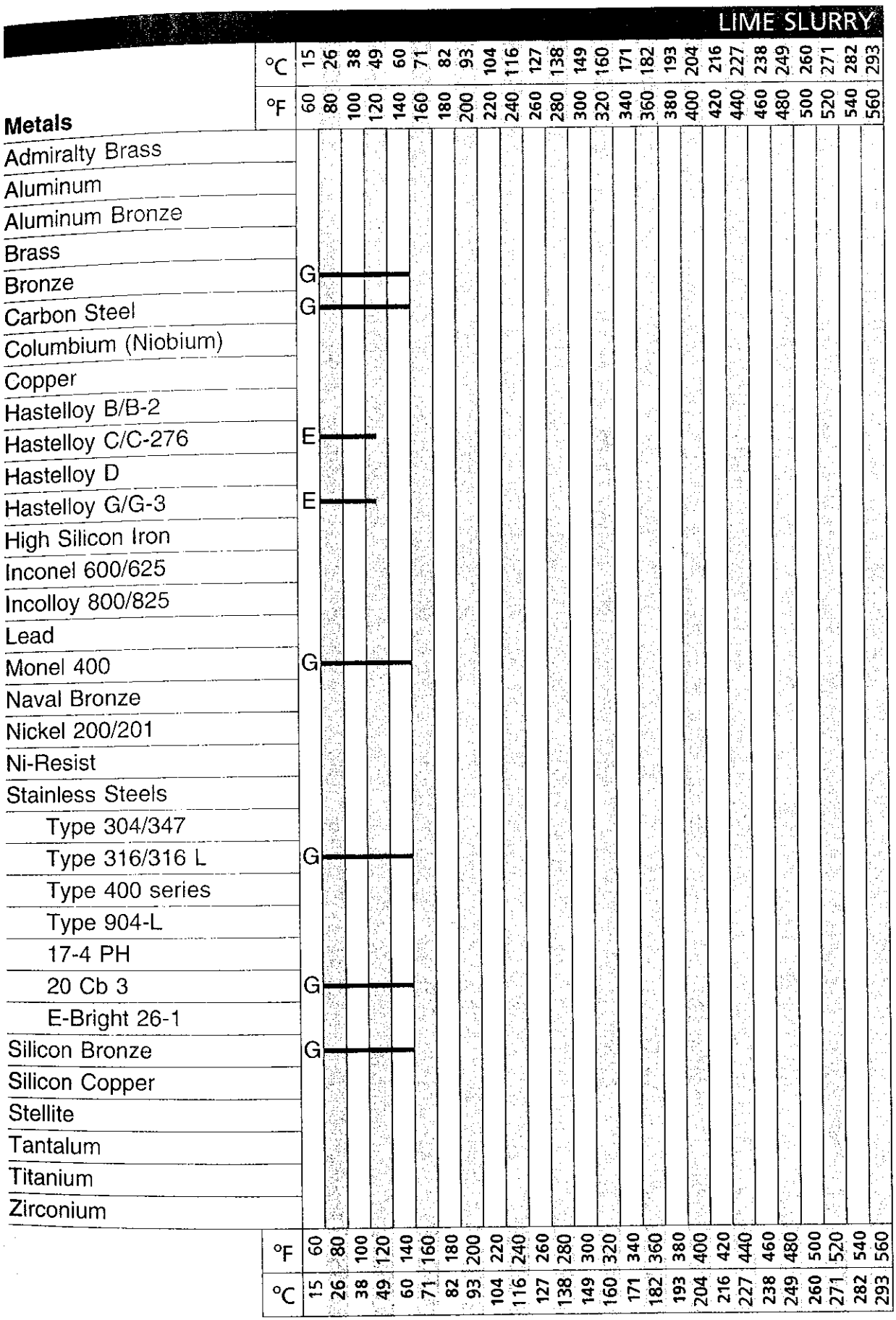


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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# LIME SLURRY

| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nonmetallic Materials** | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | R | — | — | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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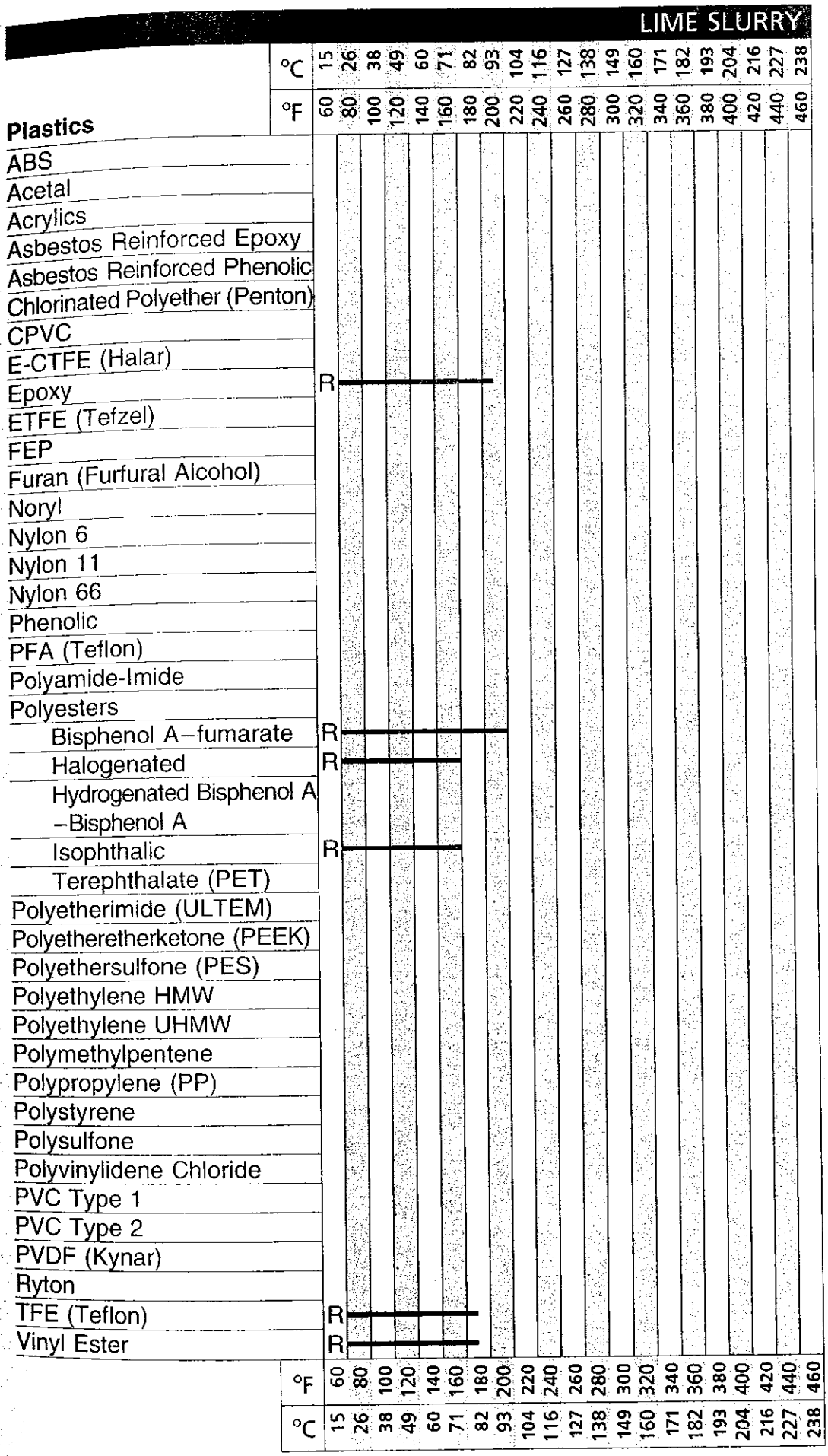


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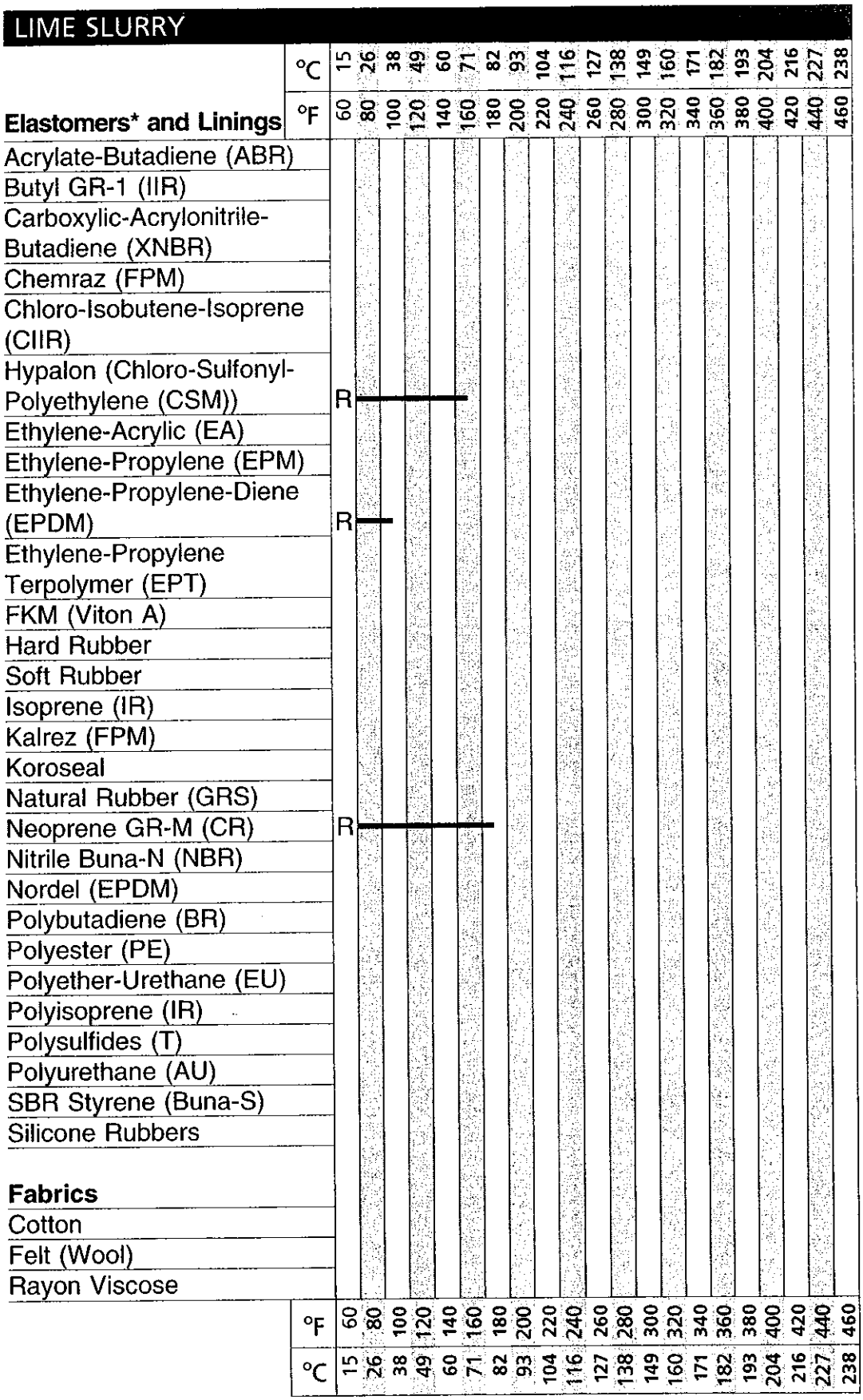


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| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | U | |
| Aluminum Bronze | U | |
| Brass | U | |
| Bronze | S | |
| Carbon Steel | S | |
| Columbium (Niobium) | | |
| Copper | S | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel | | |
| Incolloy | | |
| Lead | | |
| Monel | G | |
| Naval Bronze | U | |
| Nickel | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | G | |
| Type 316/316 L | G | |
| Type 400 series | G | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | | |
| E-Bright 26-1 | | |
| Silicon Bronze | U | |
| Silicon Copper | S | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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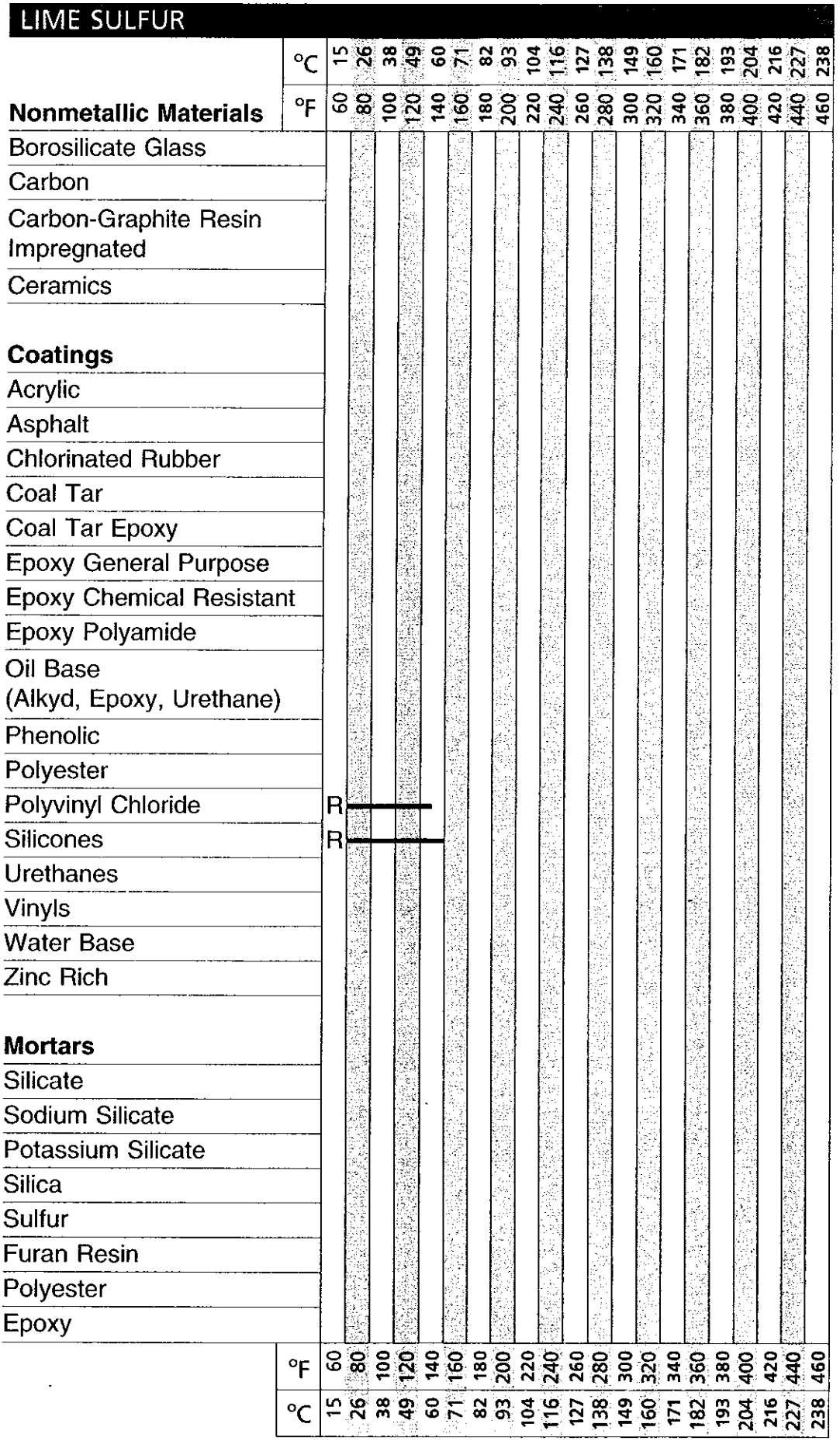




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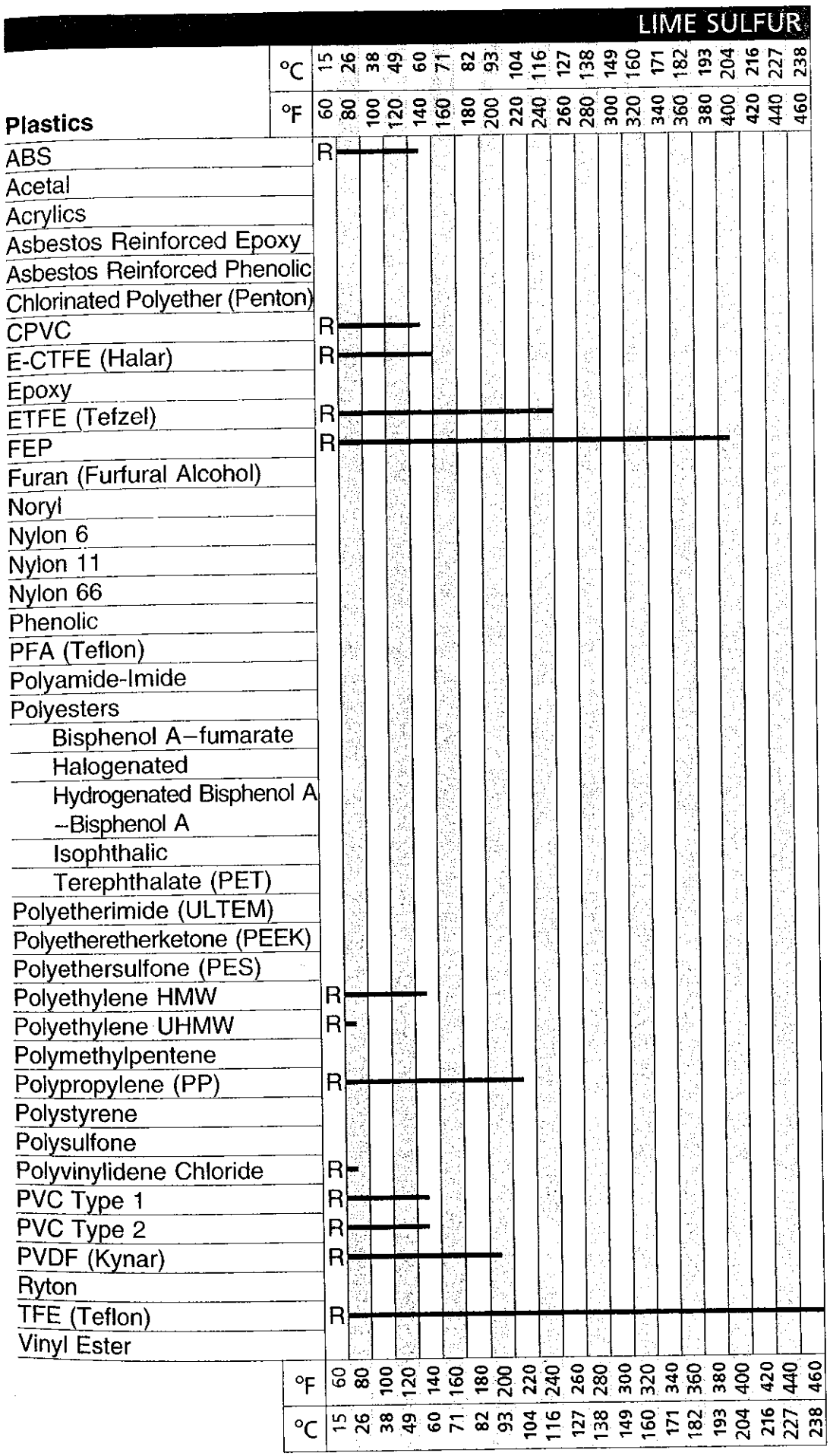


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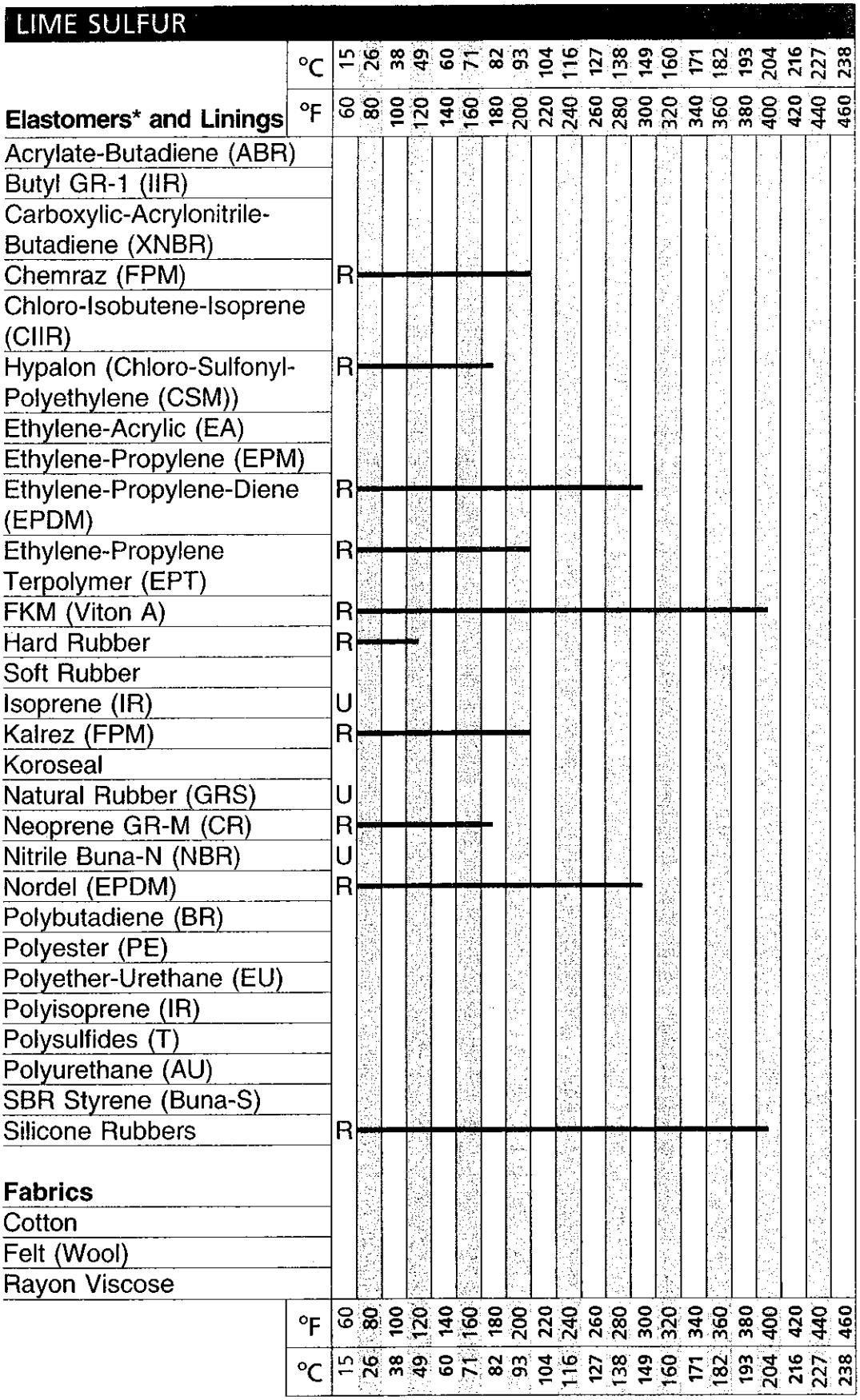


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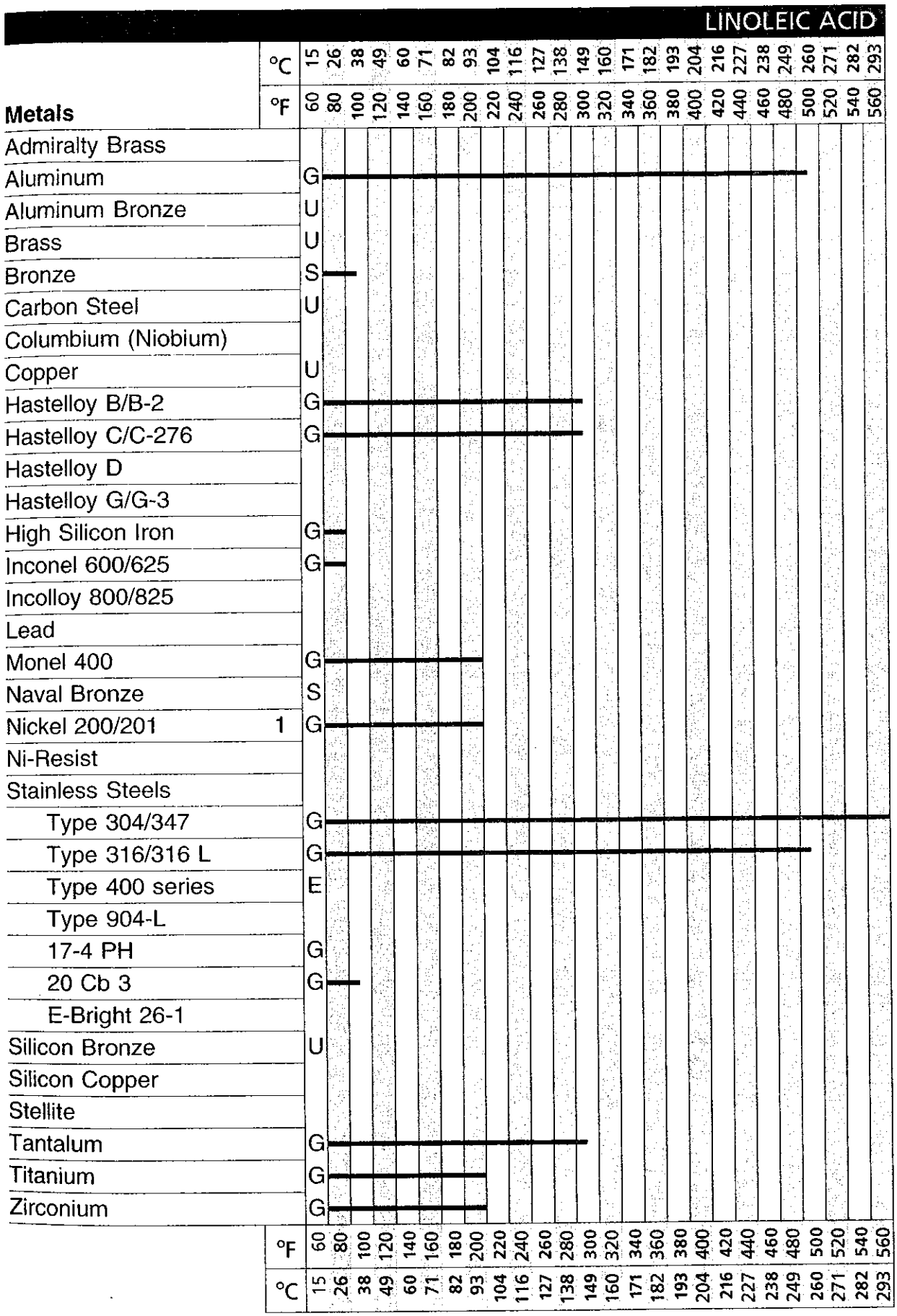


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R = Resistant

U = Unsatisfactory

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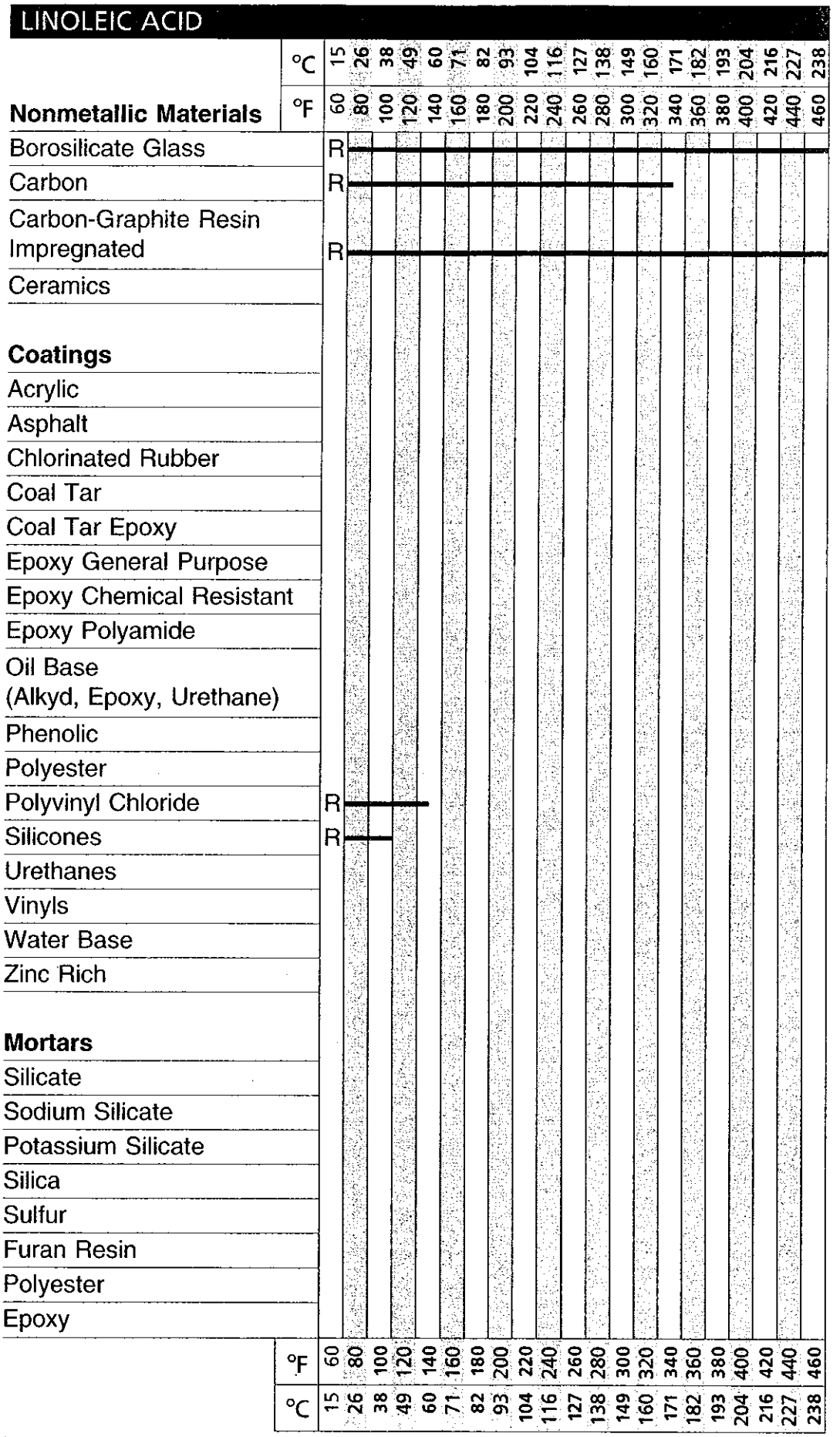
## LINOLEIC ACID



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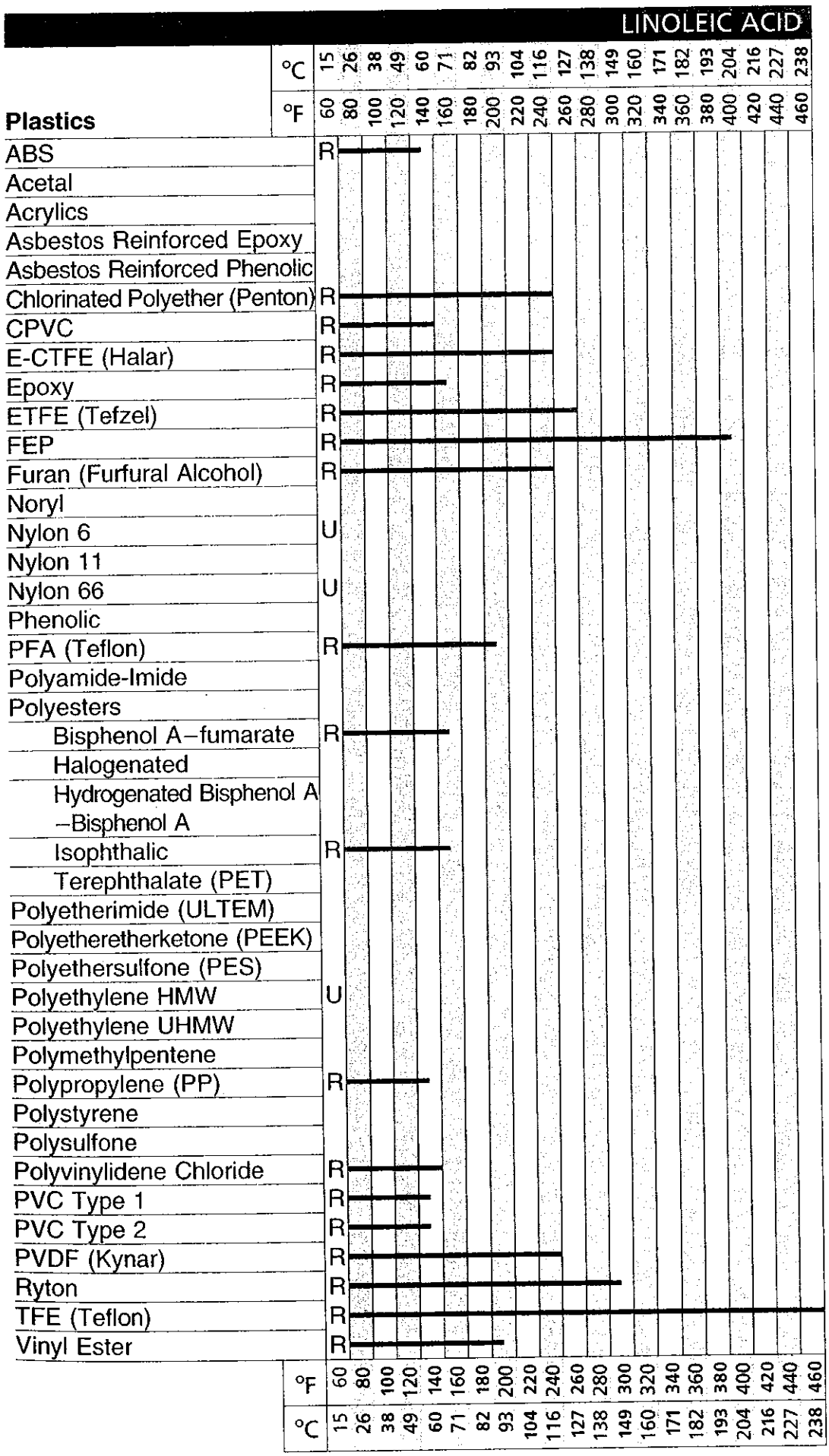



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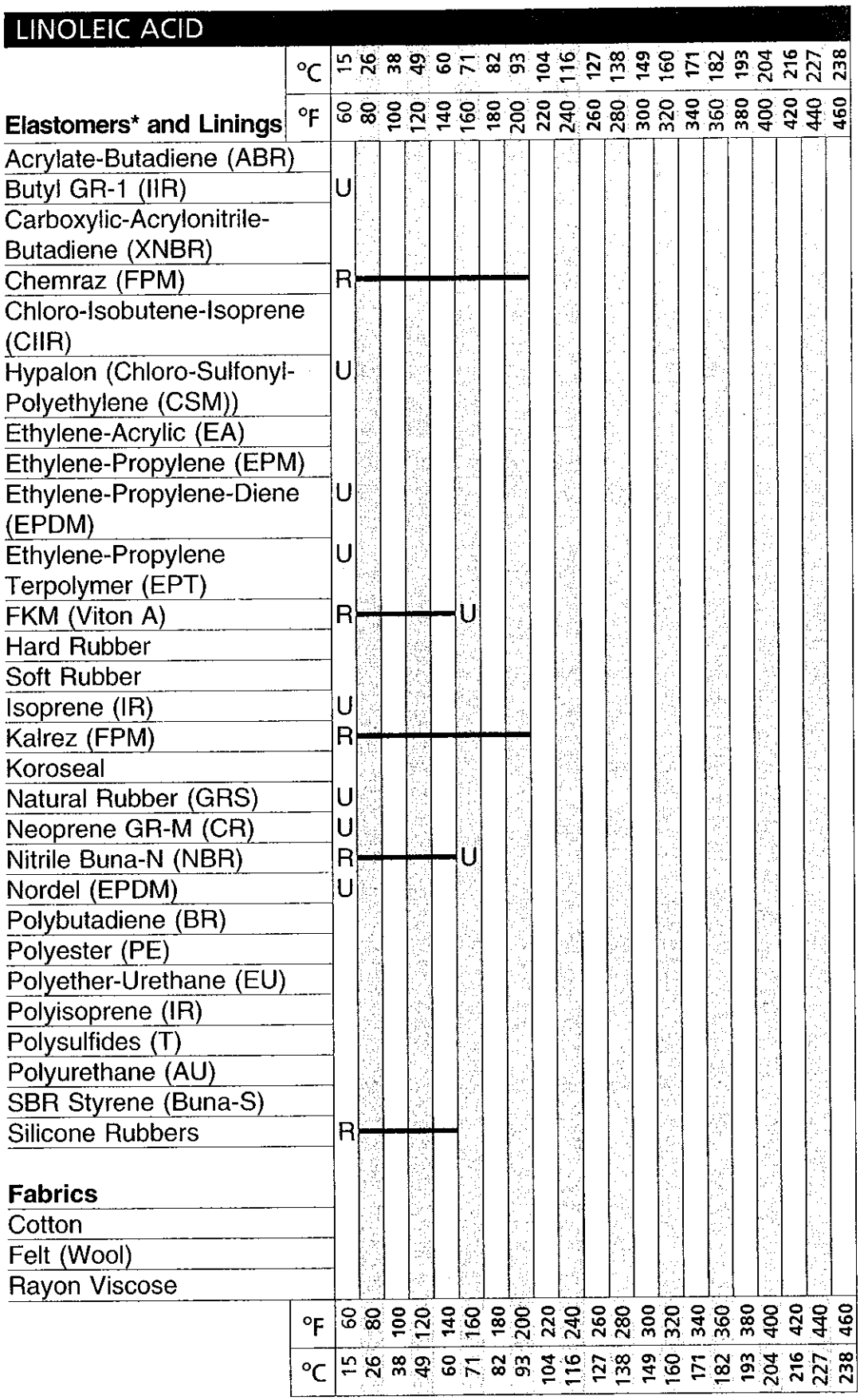


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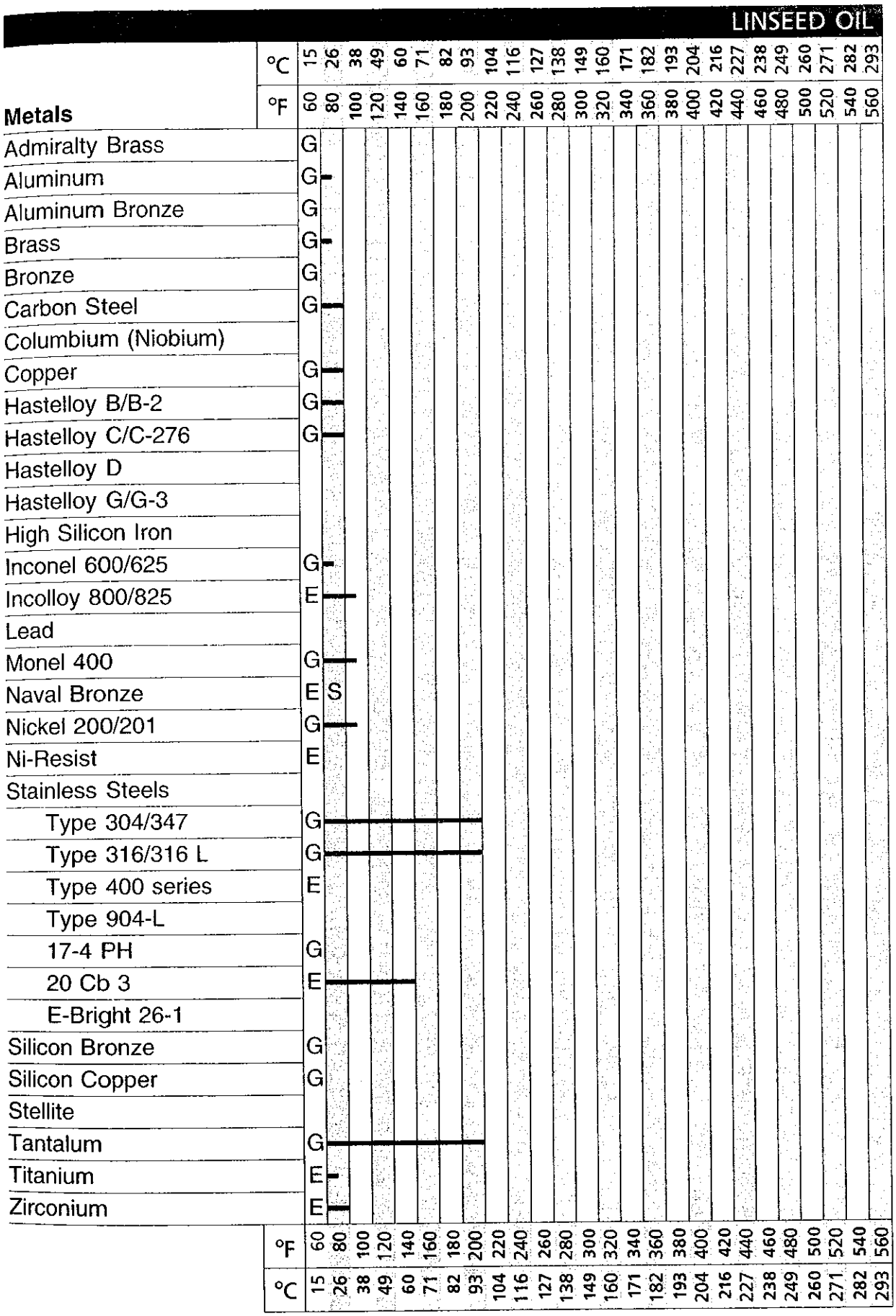


FOR METALS

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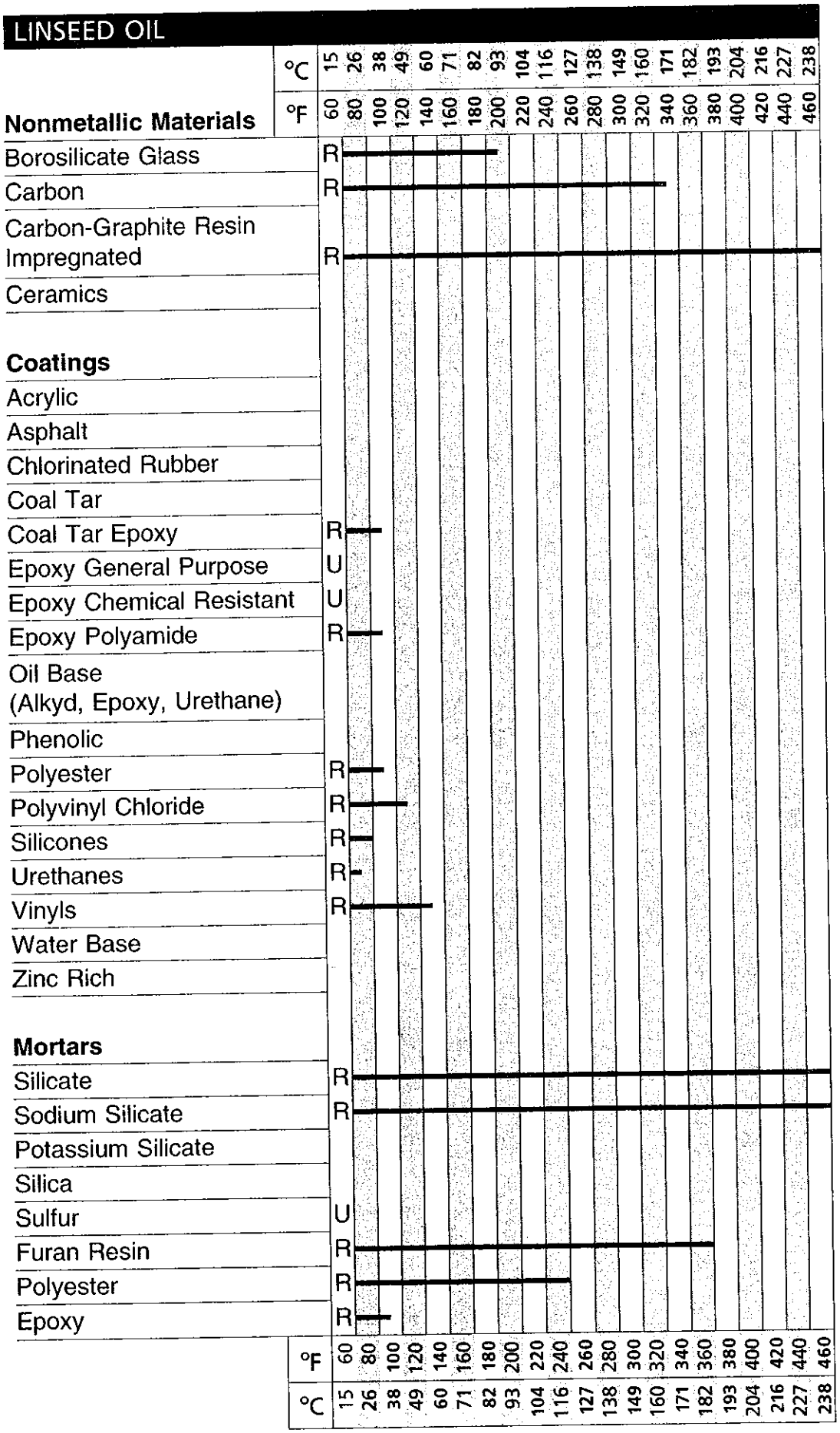
## LINSEED OIL



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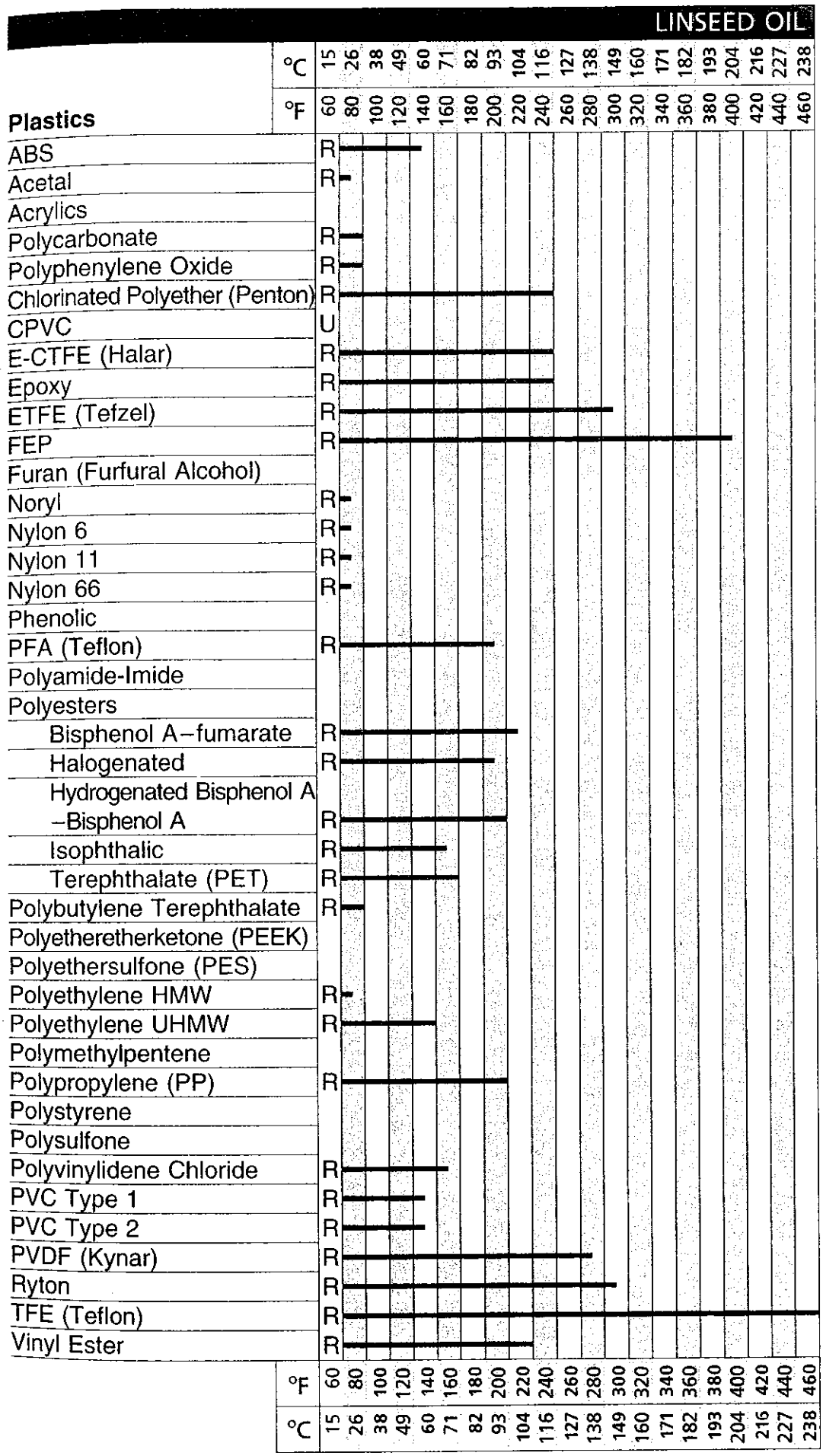



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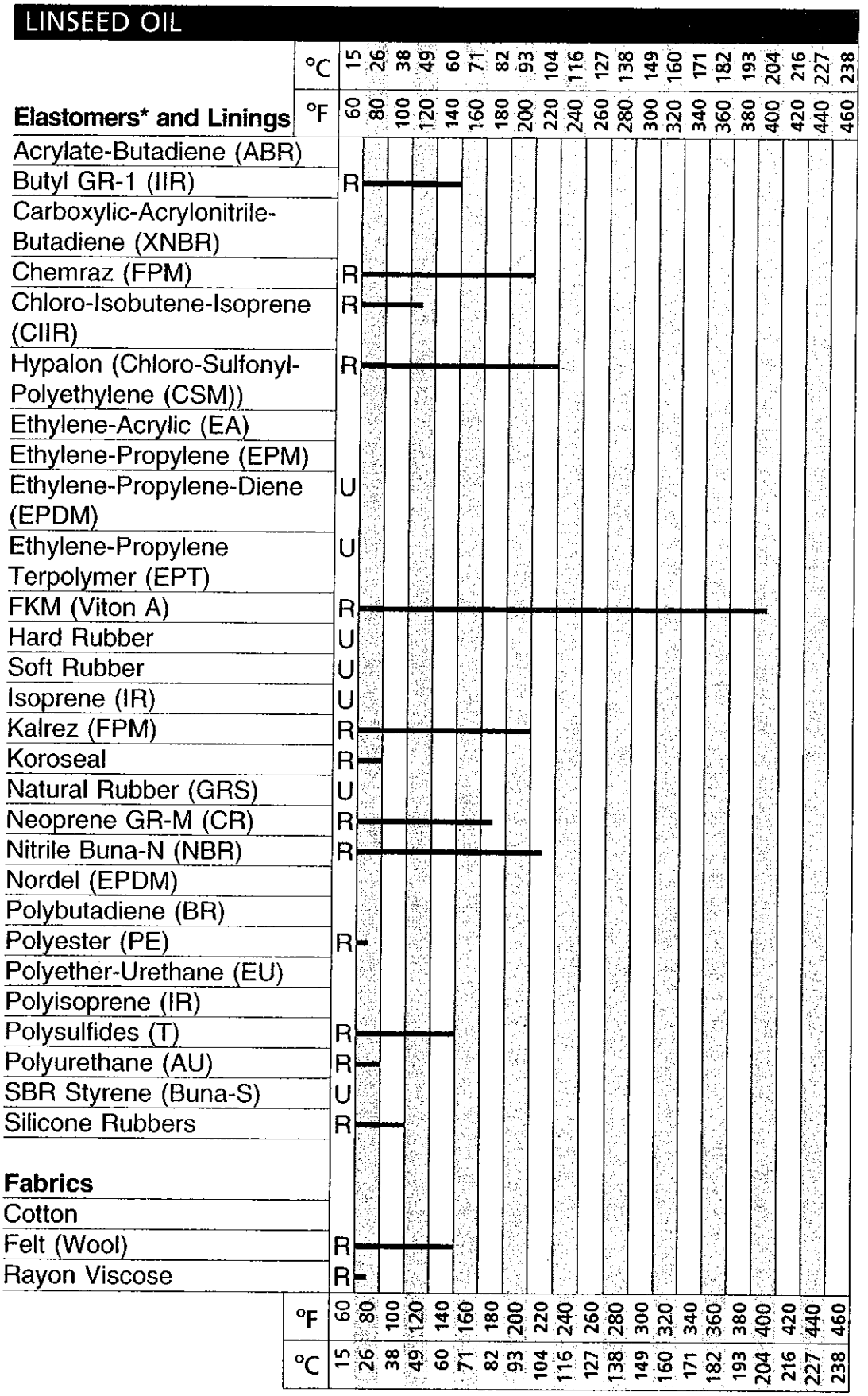


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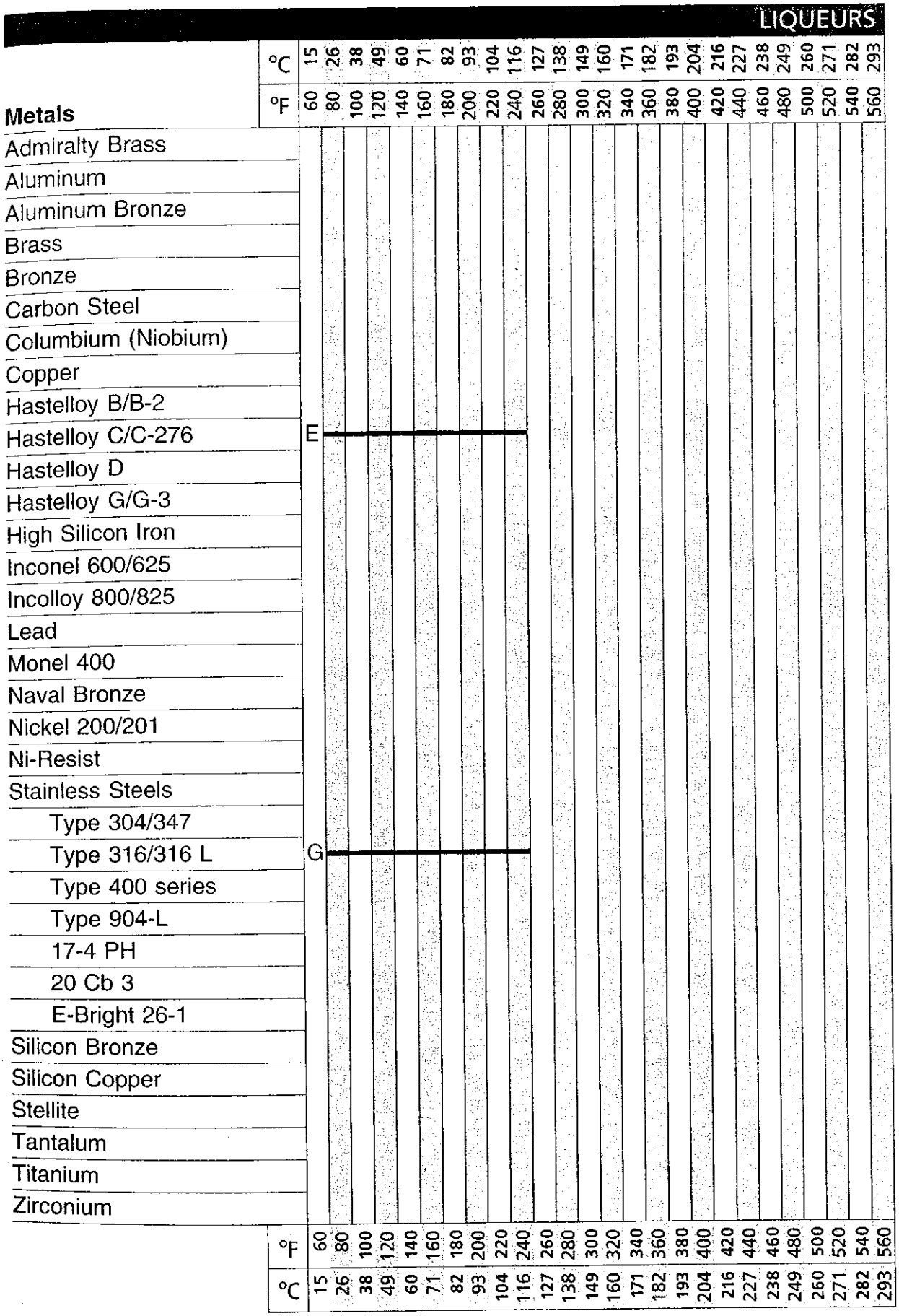


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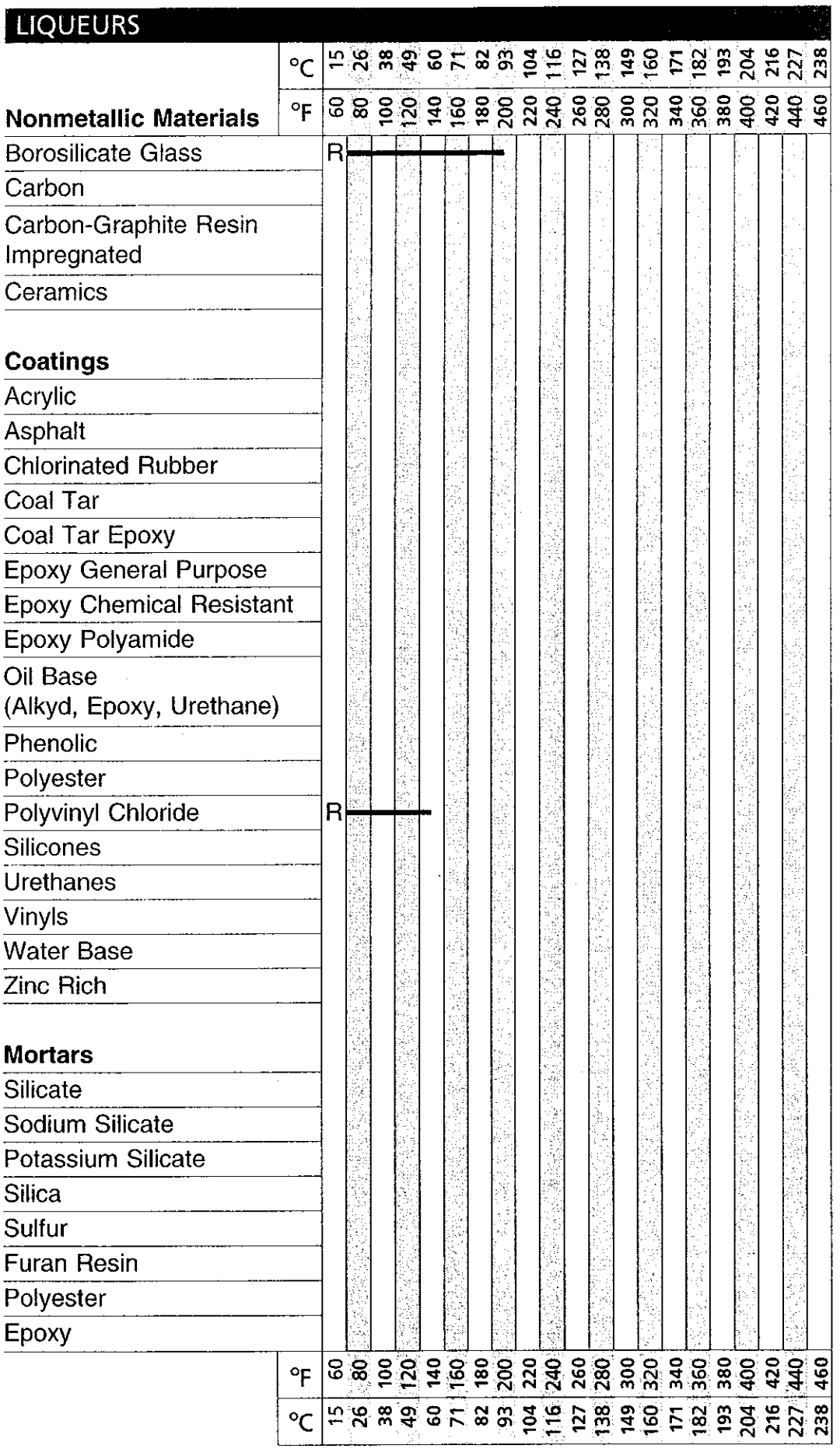
## LIQUEURS







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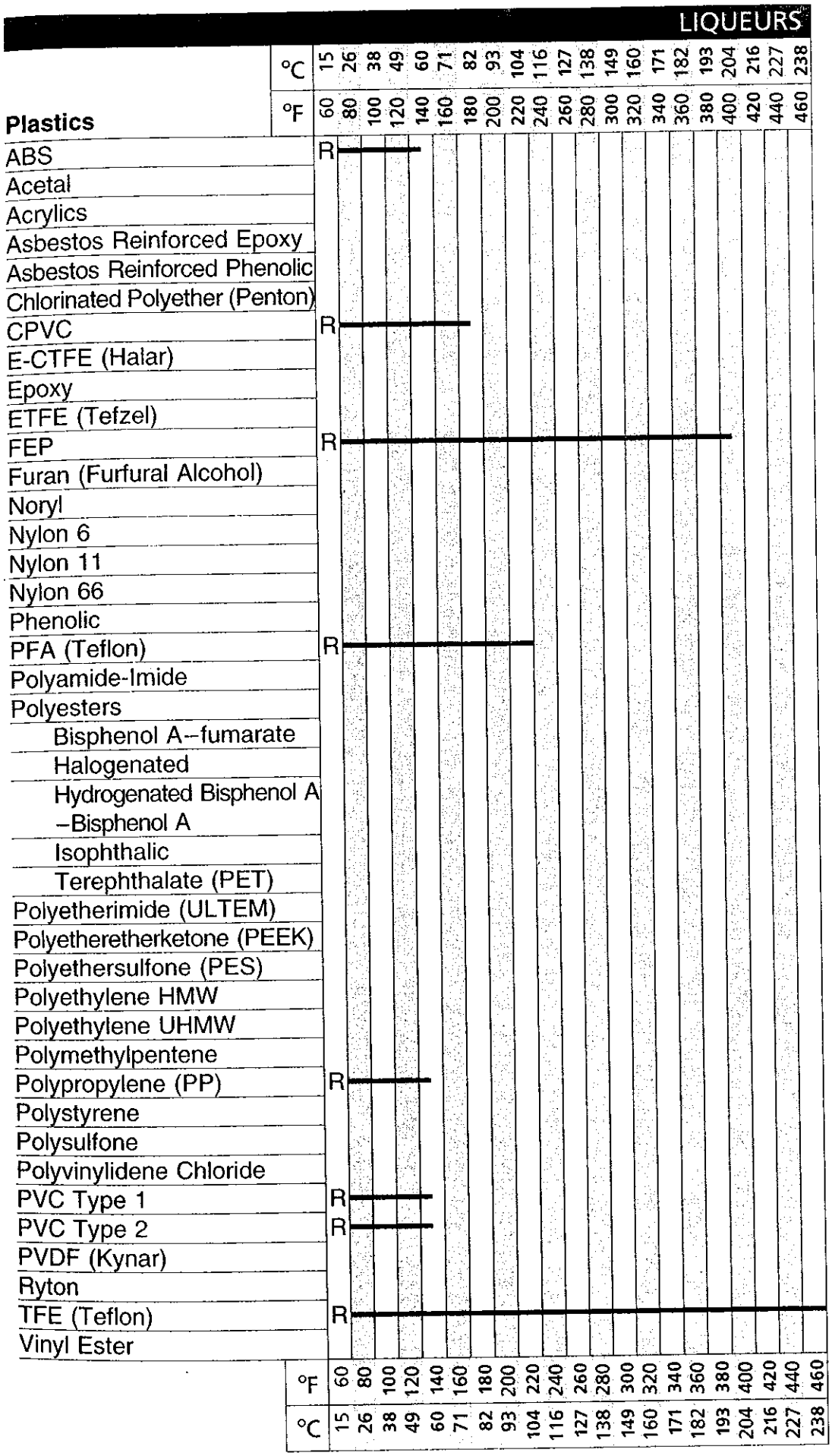


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## LIQUEURS

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | R | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | R | R | R | R | R | R | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | R | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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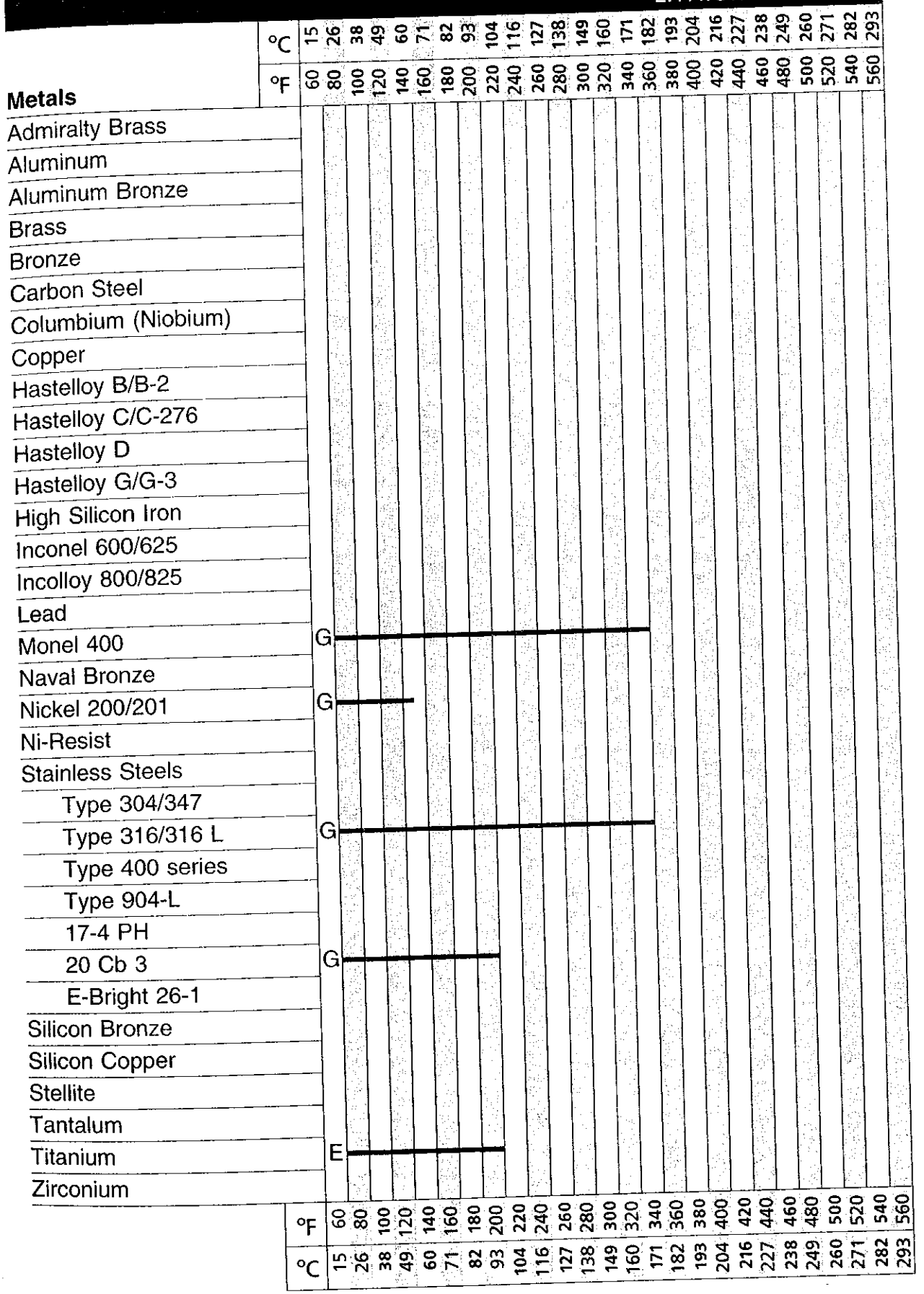


FOR METALS

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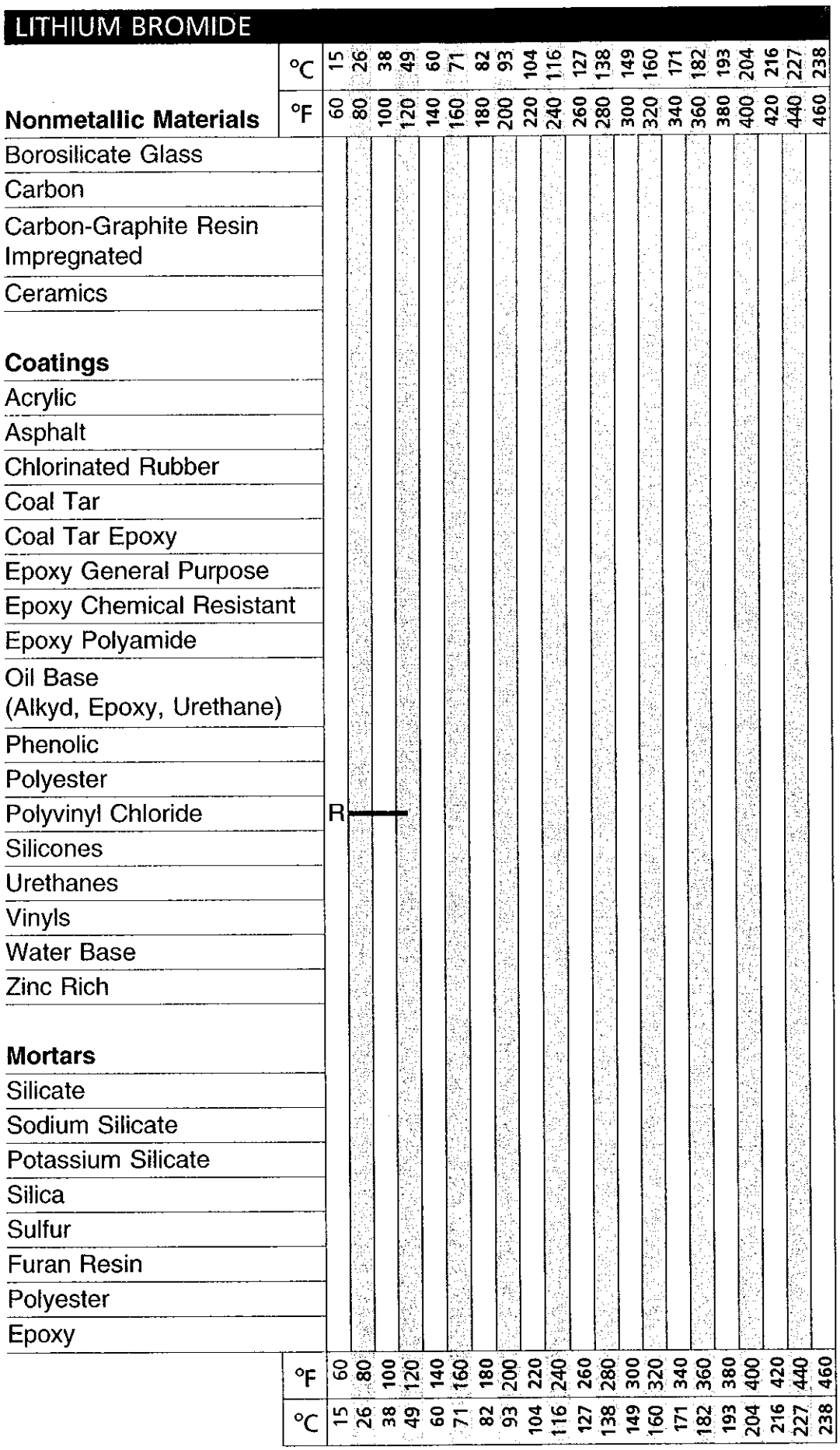




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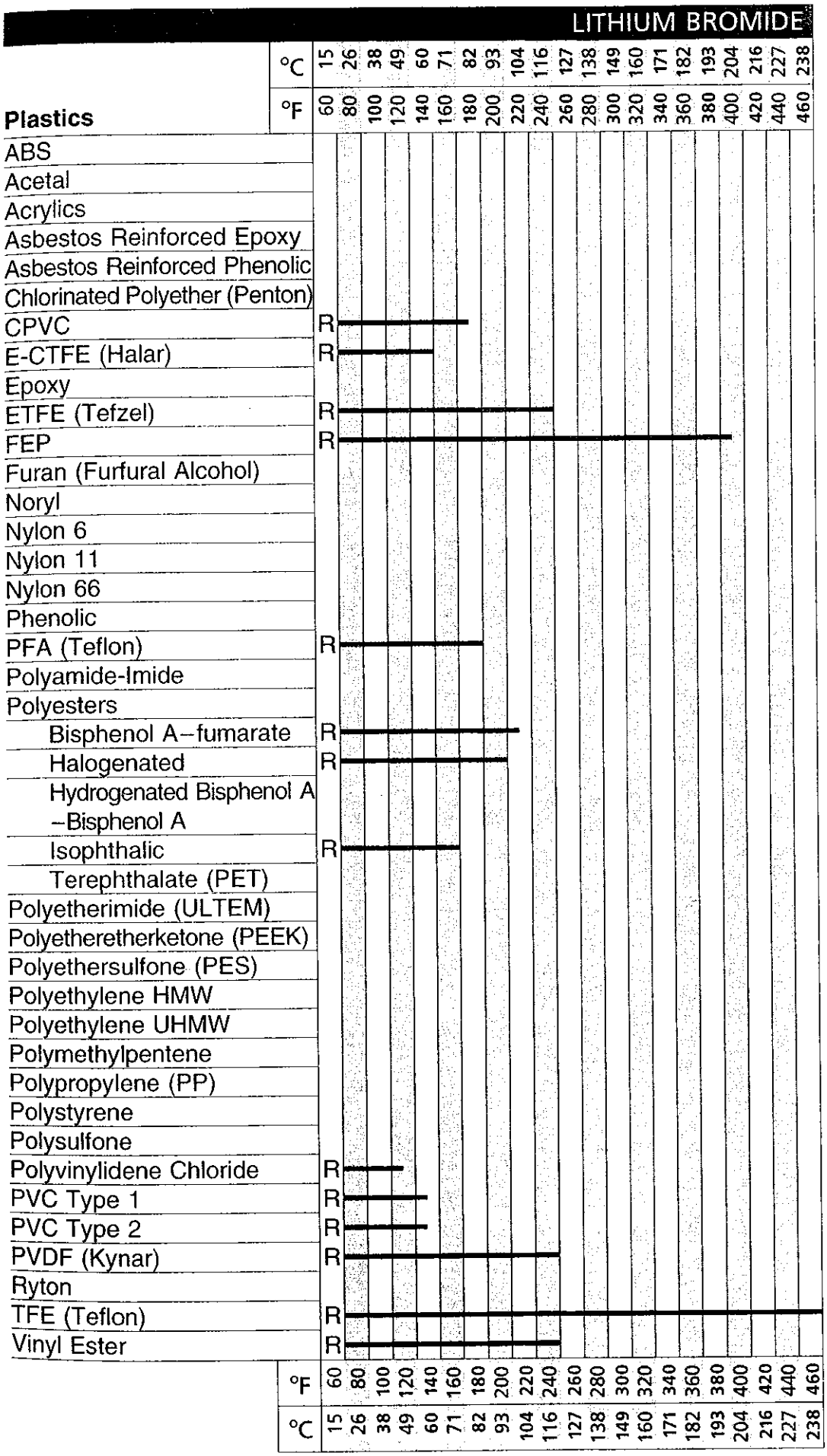



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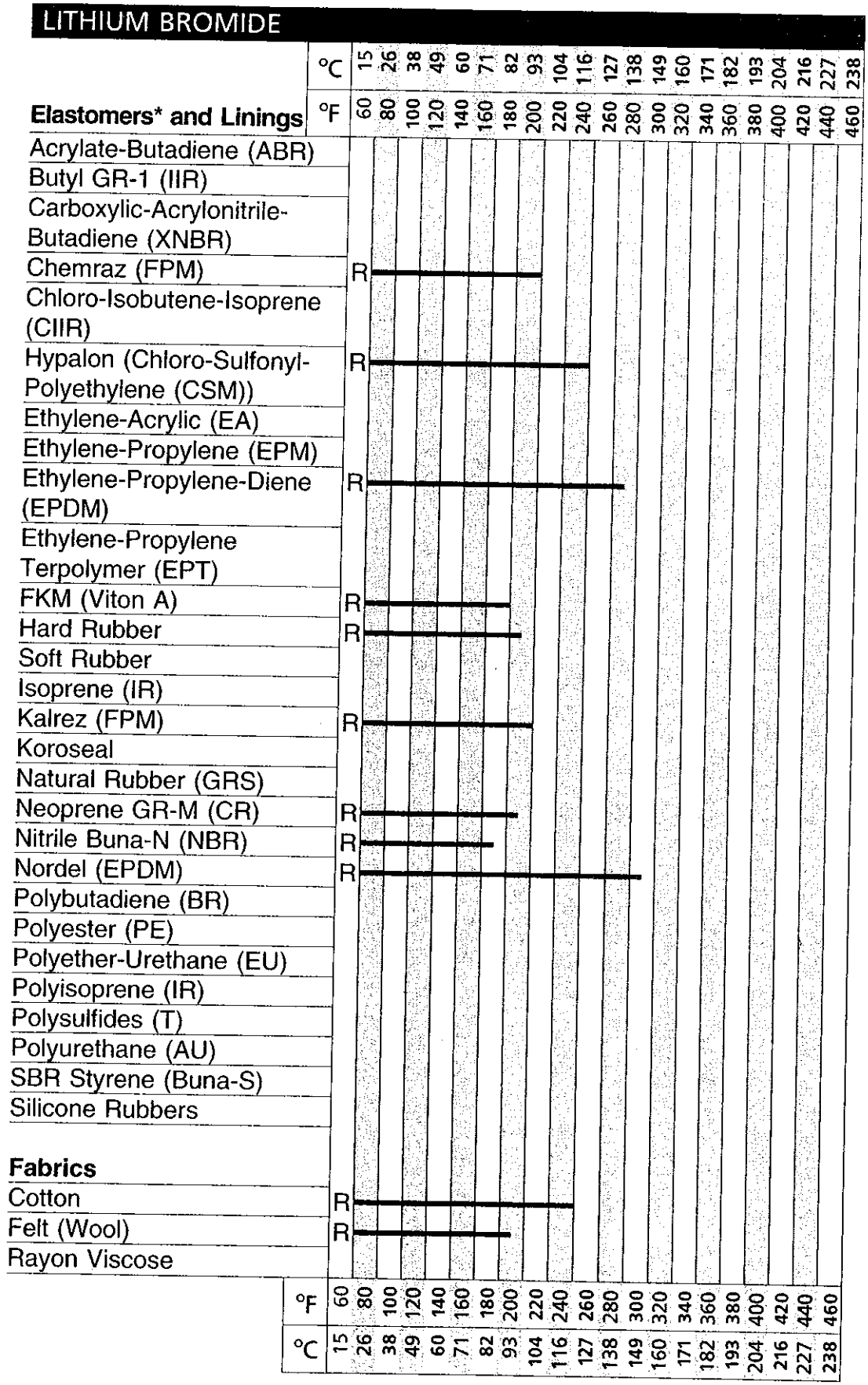


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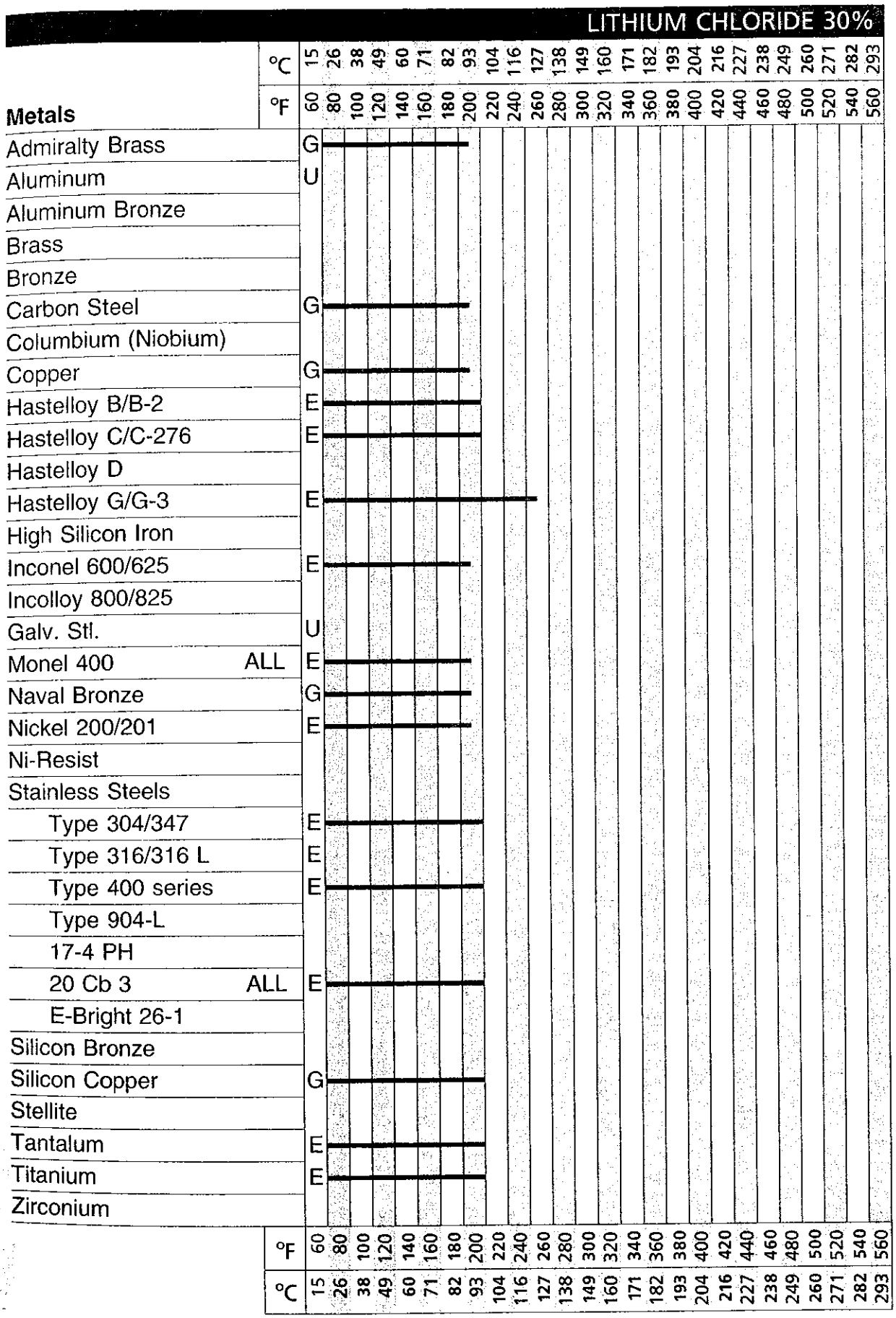


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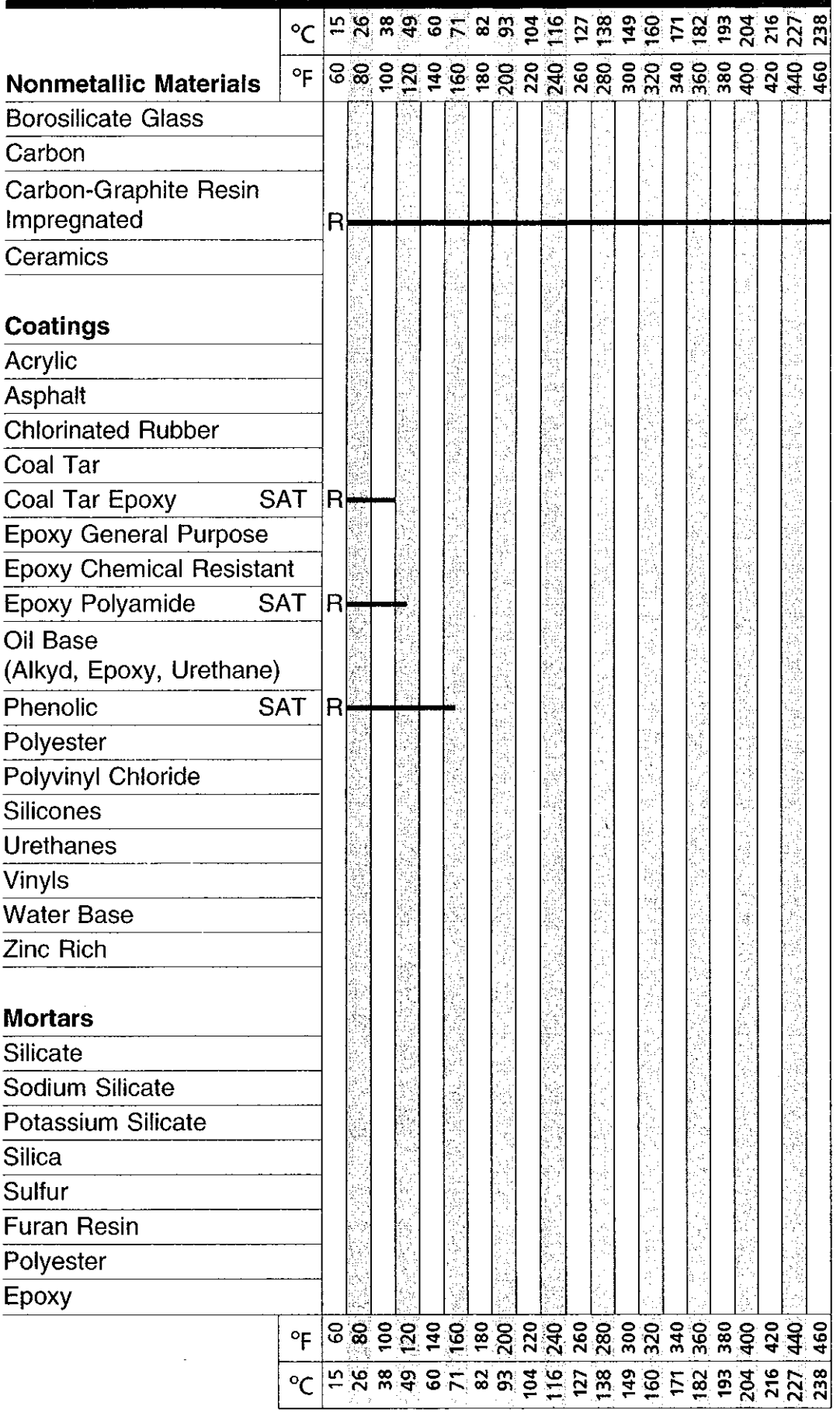




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## LITHIUM CHLORIDE 30%

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | R | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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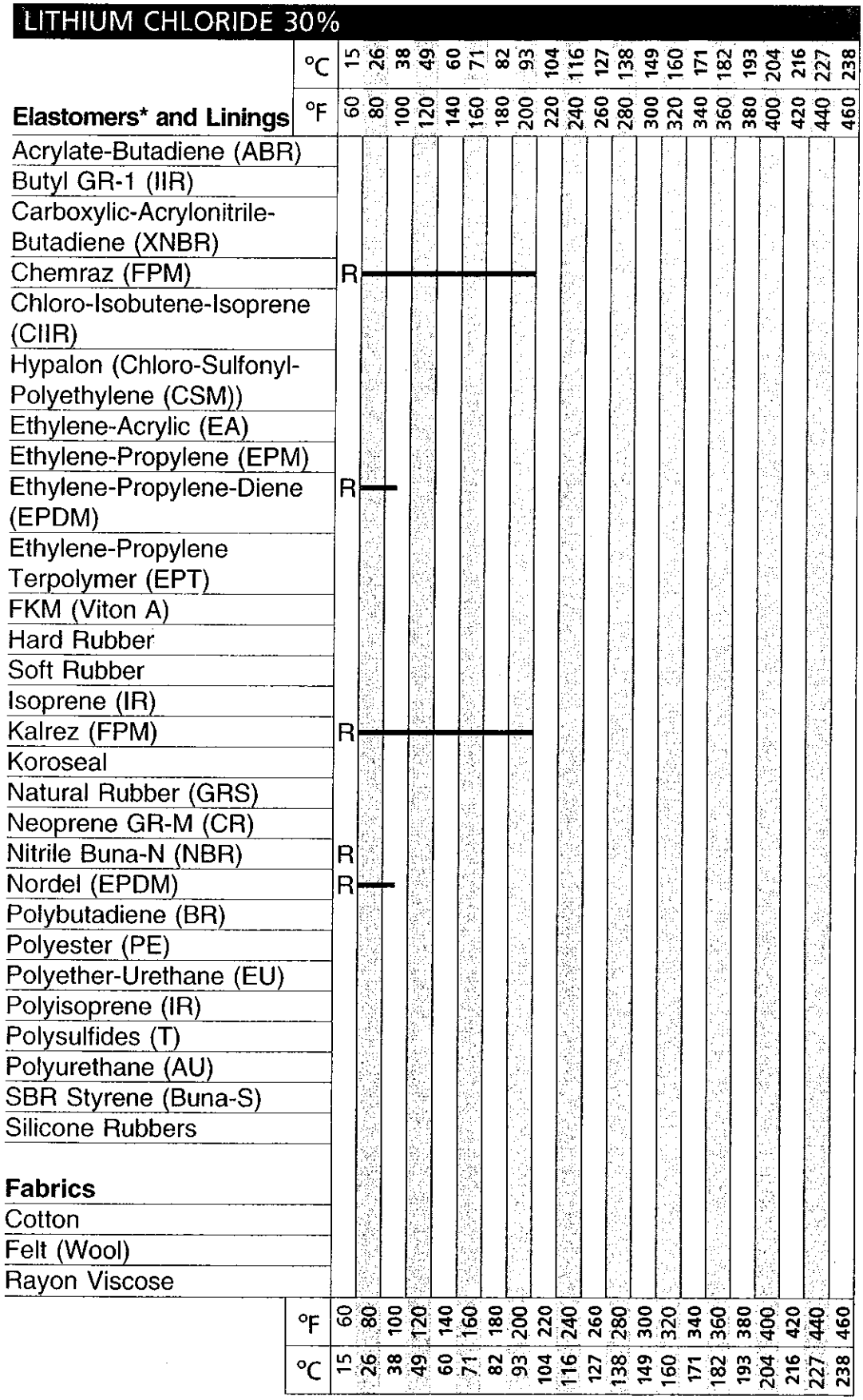


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## LITHIUM HYDROXIDE 10%

| Metals | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Galv. Stl. | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

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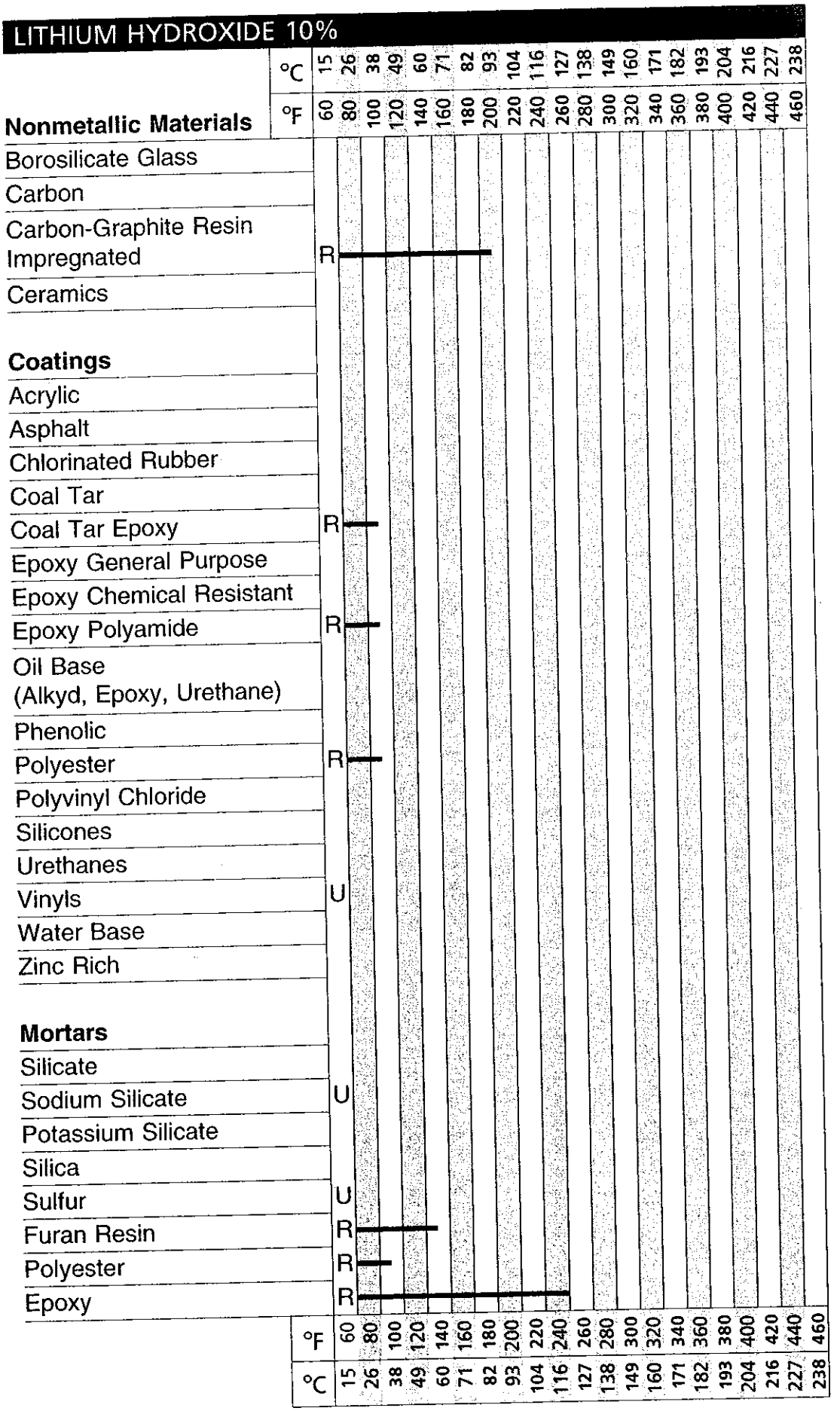






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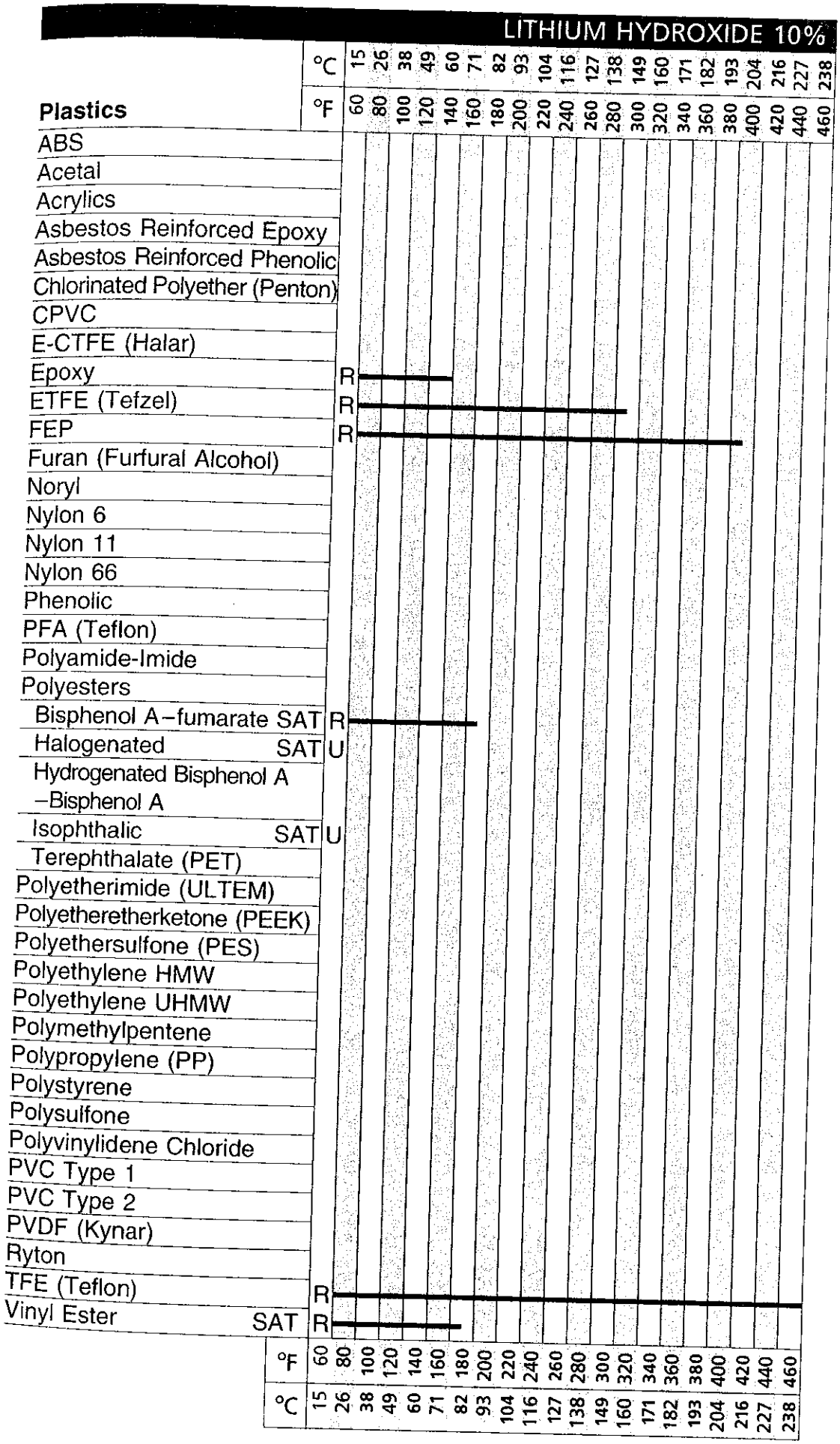



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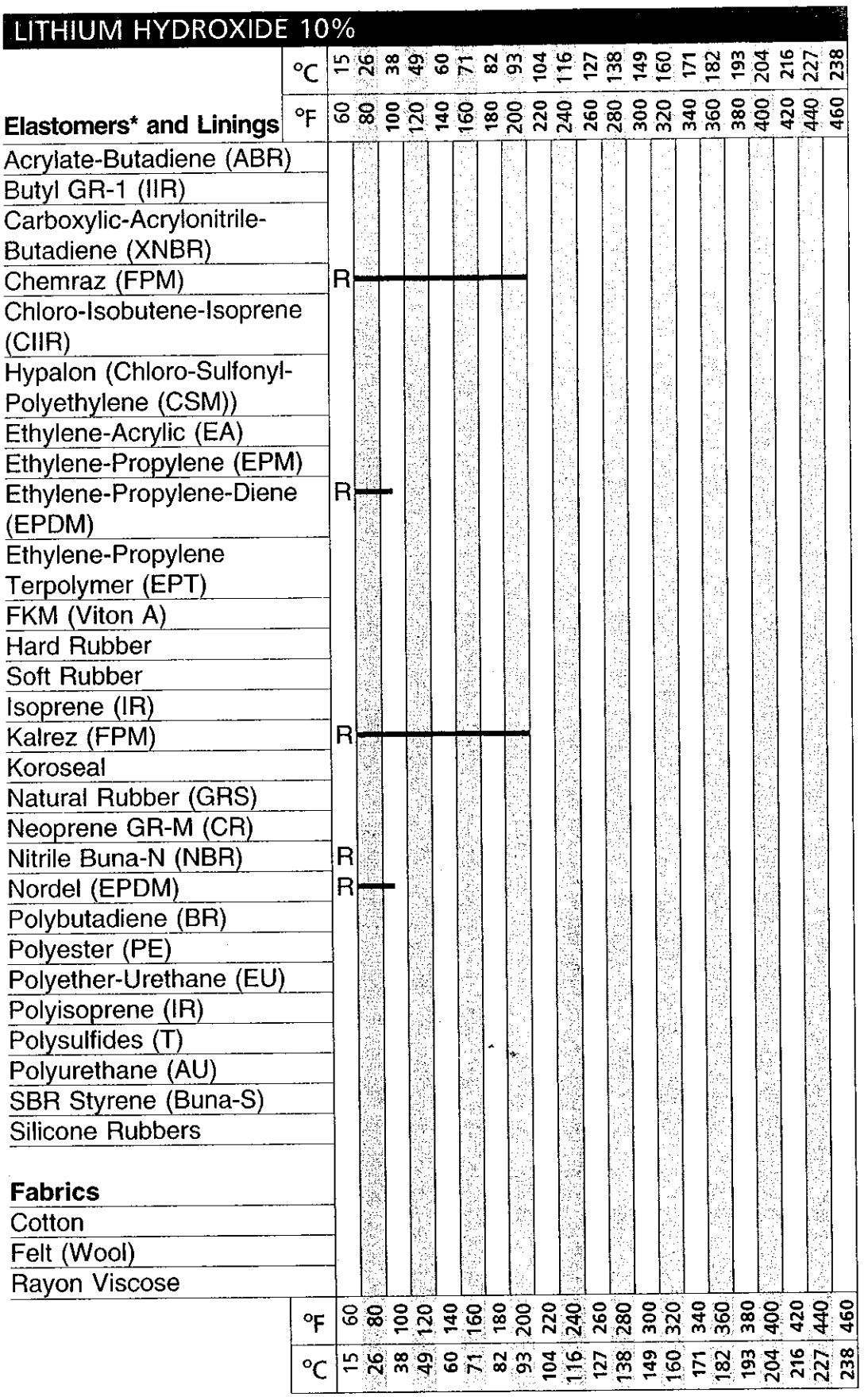


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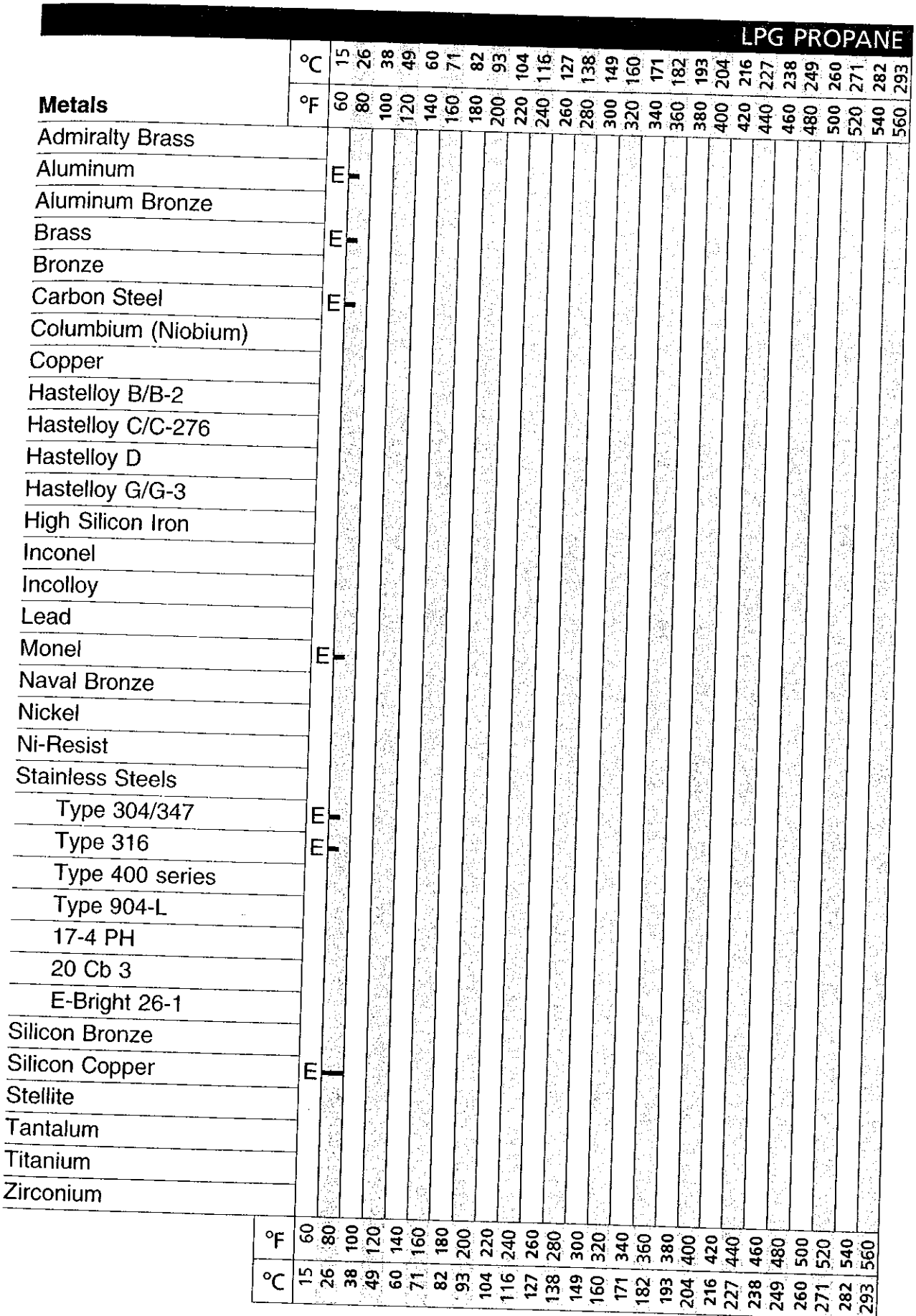


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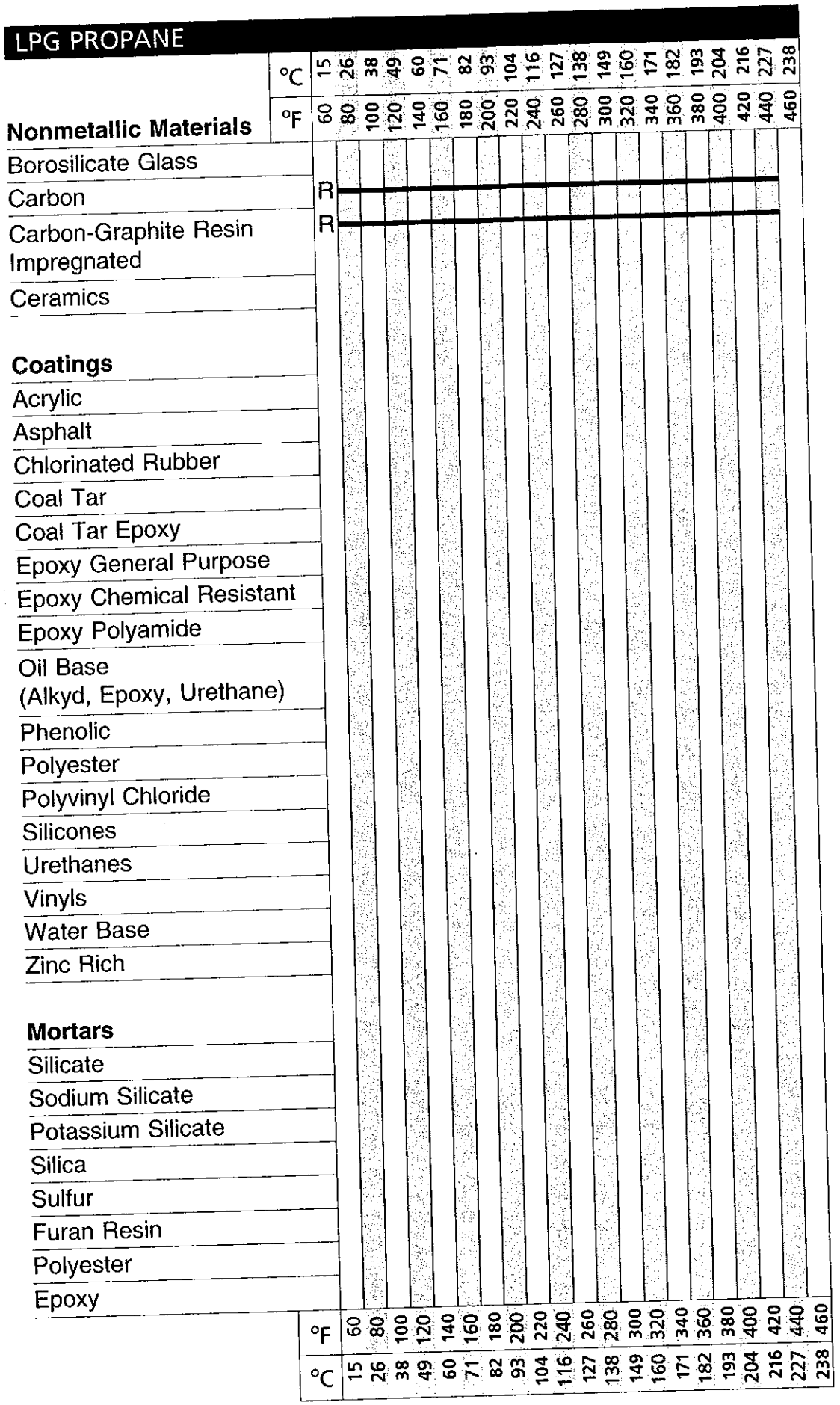
## LPG PROPANE



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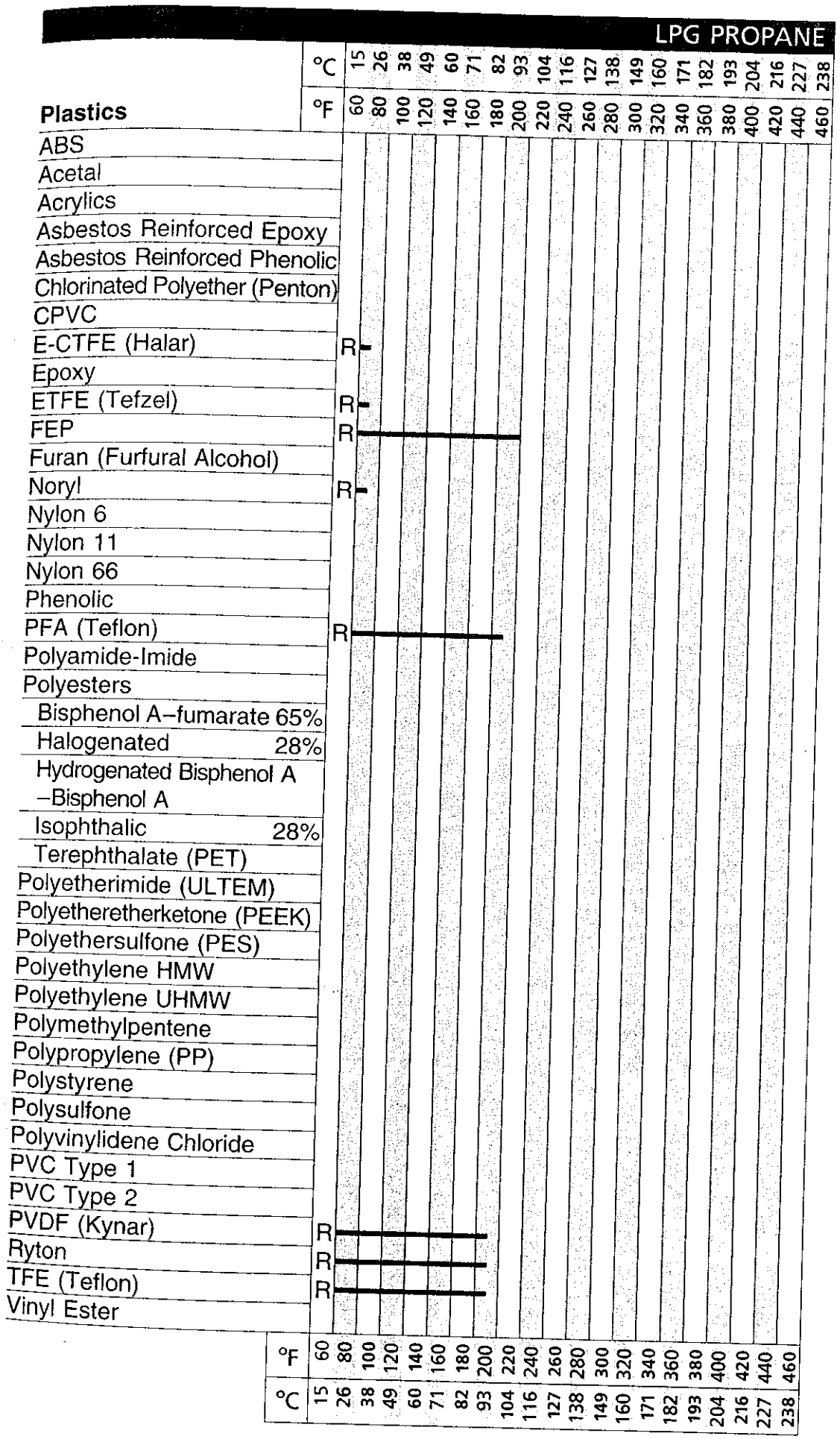


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## LPG PROPANE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | R | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | U | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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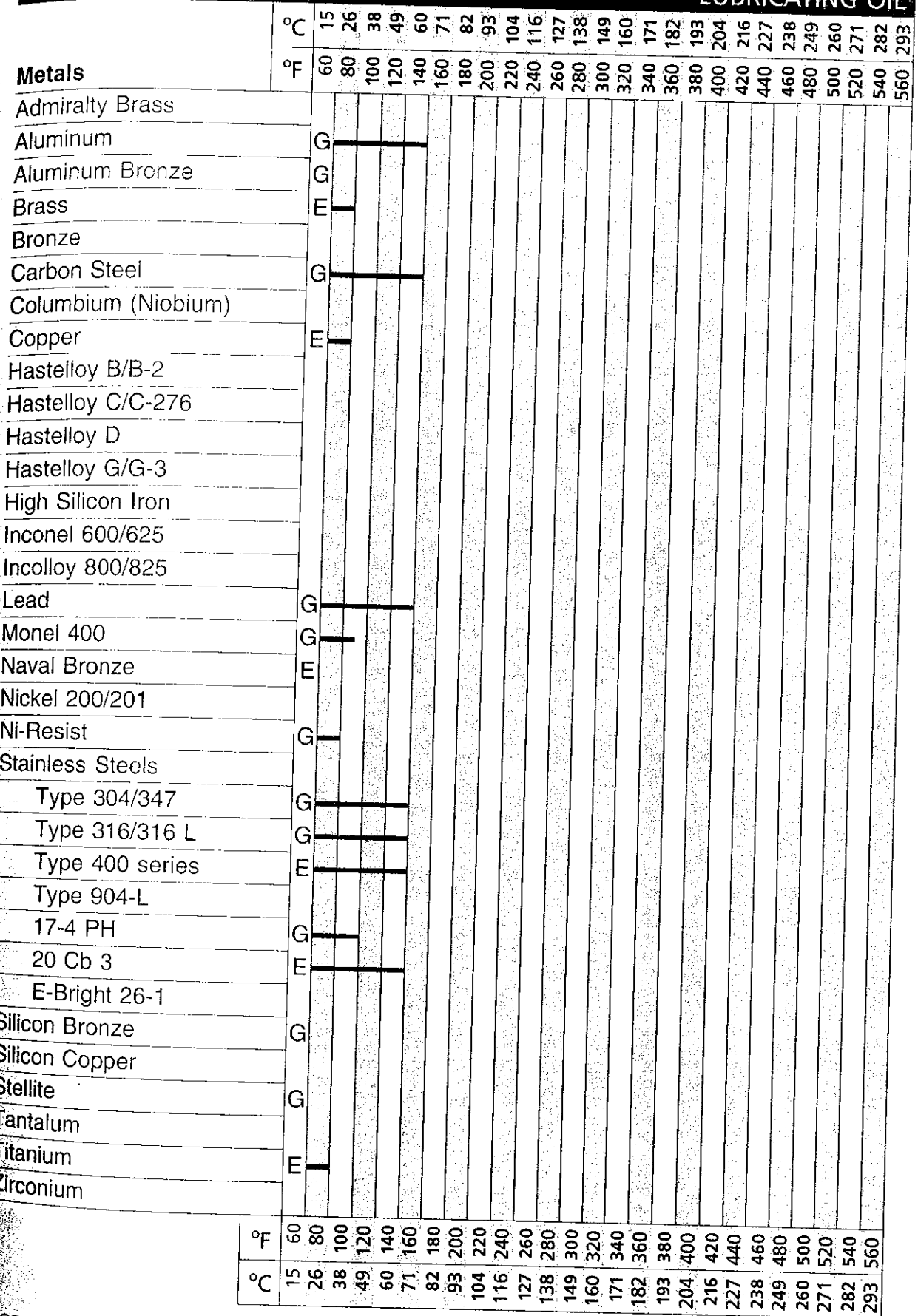


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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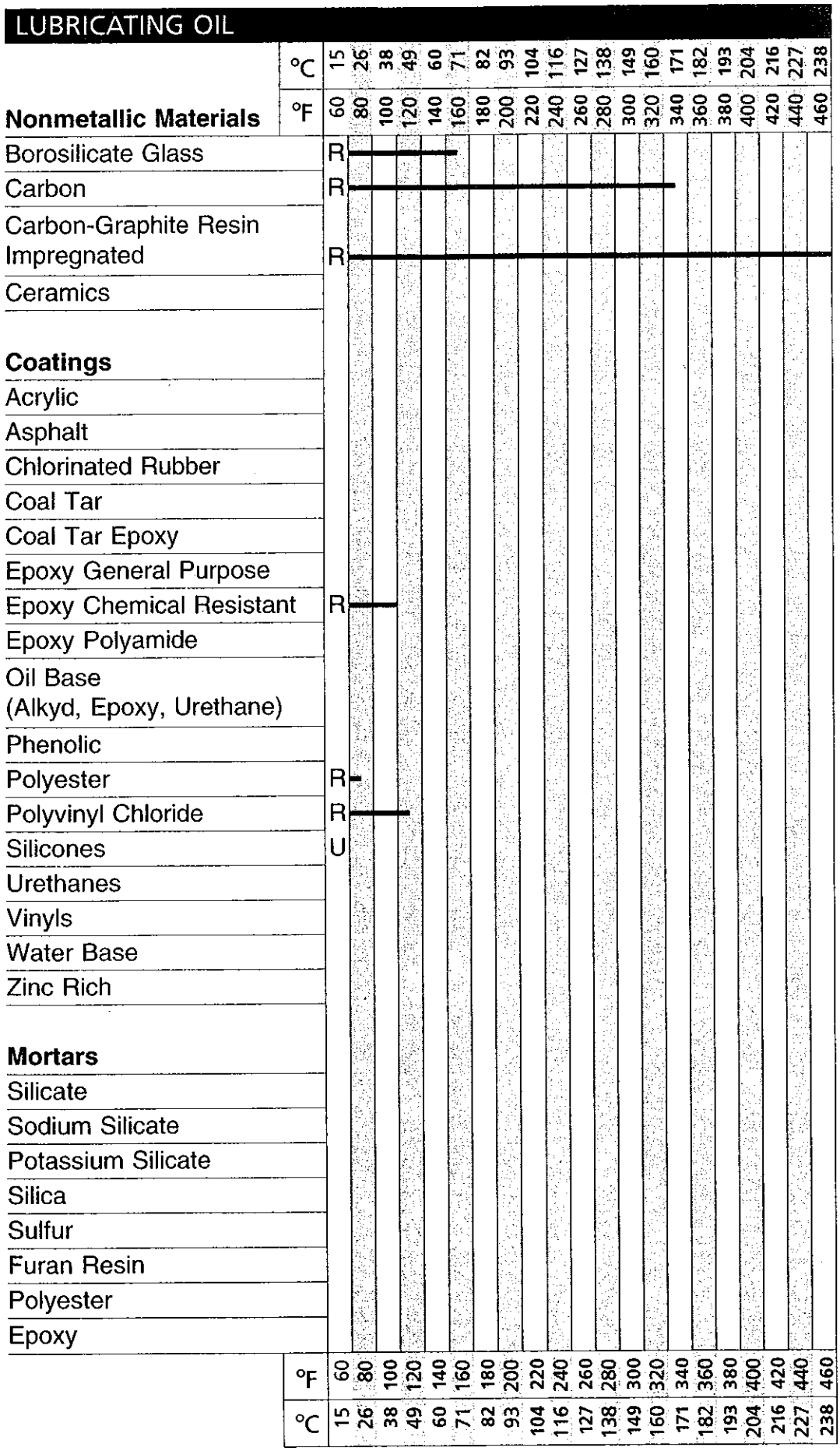






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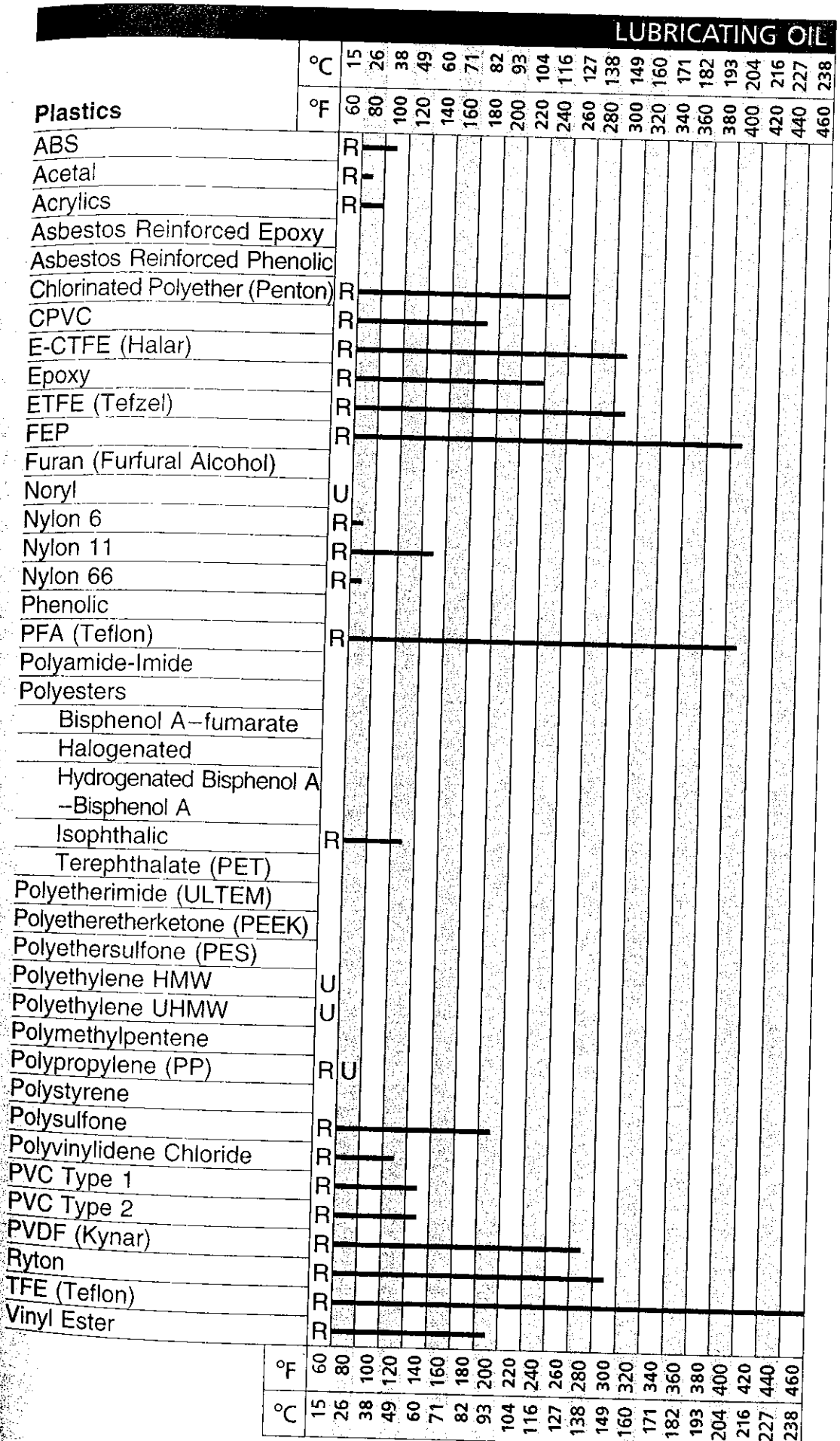


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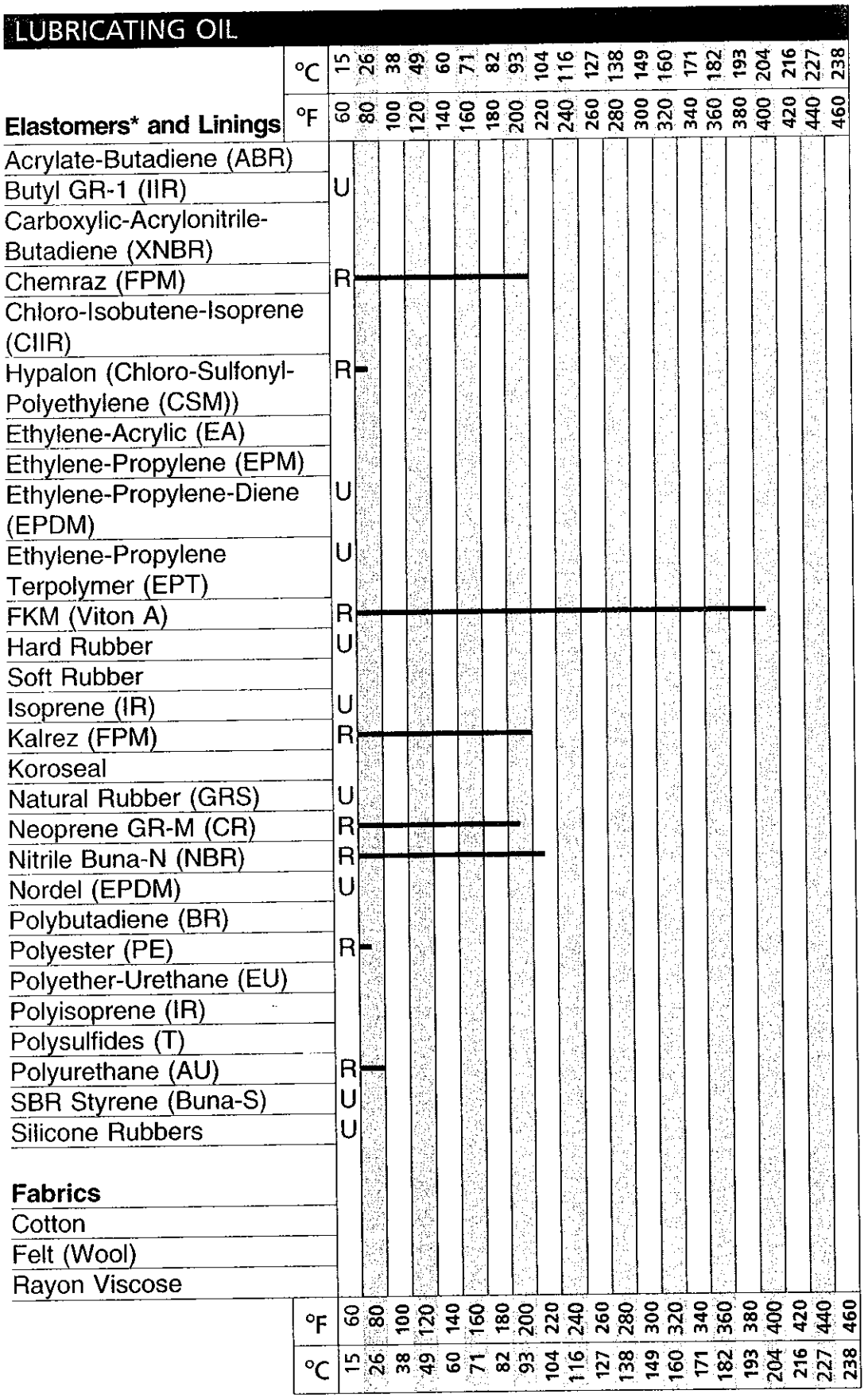


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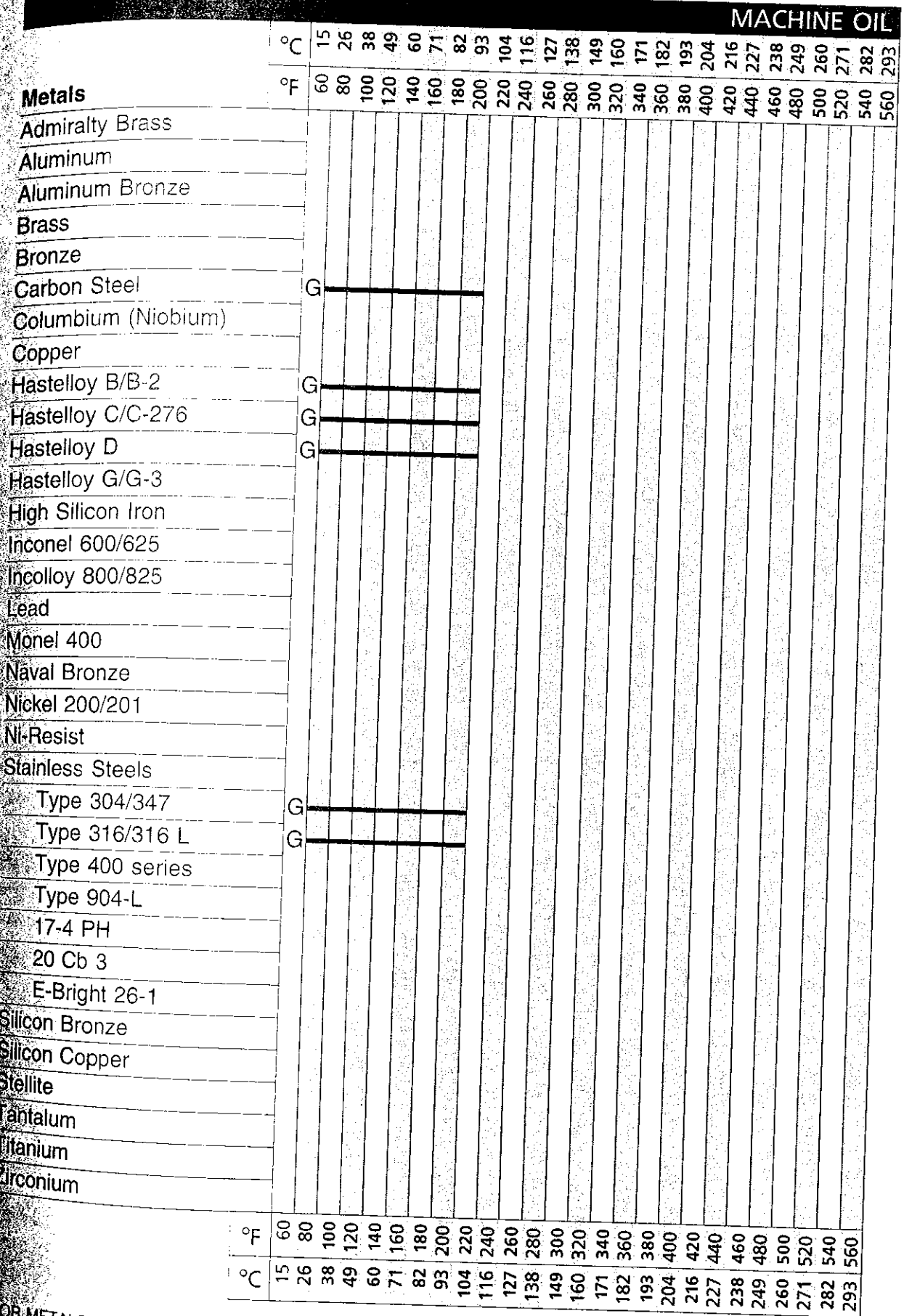


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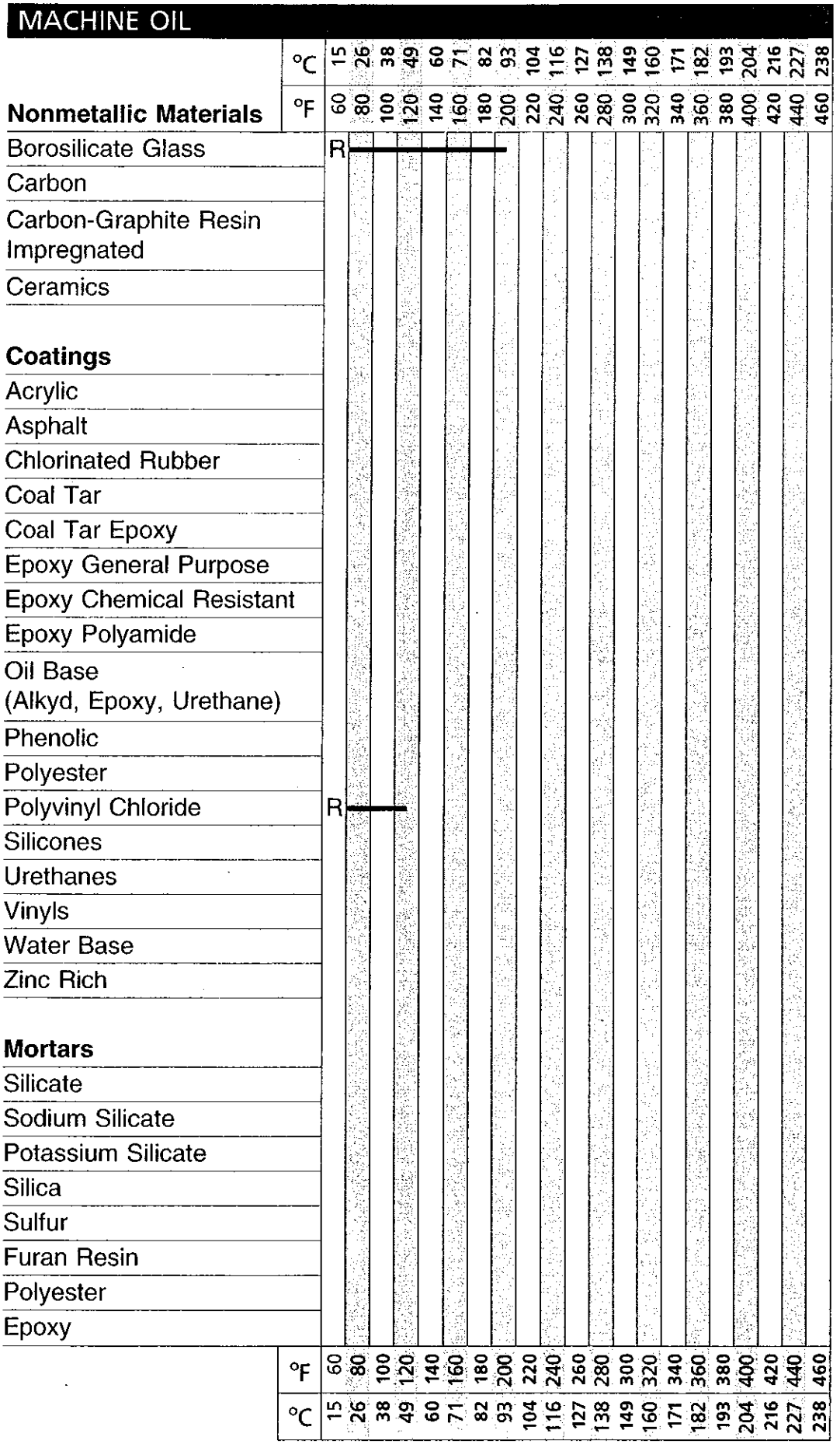




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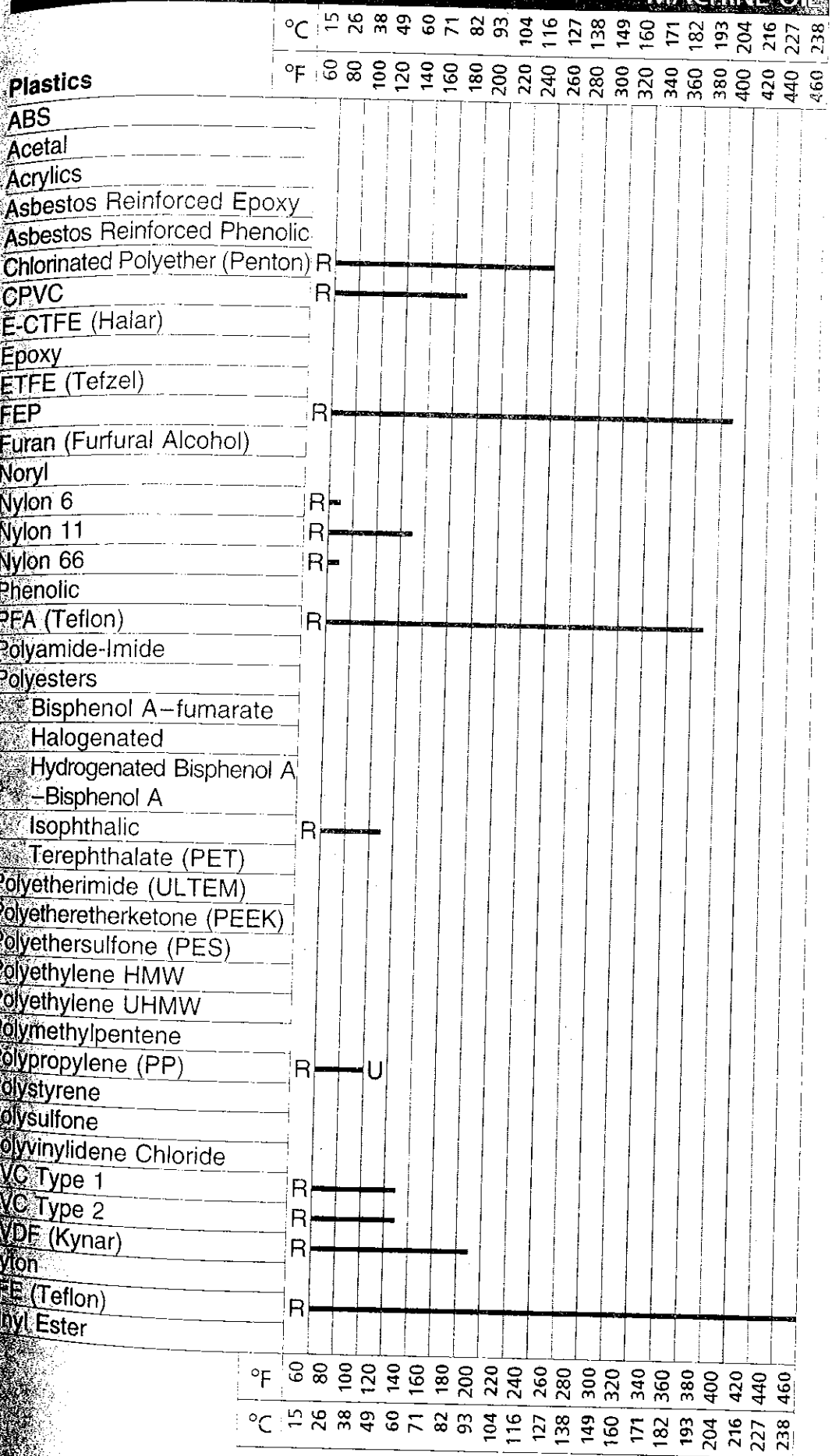



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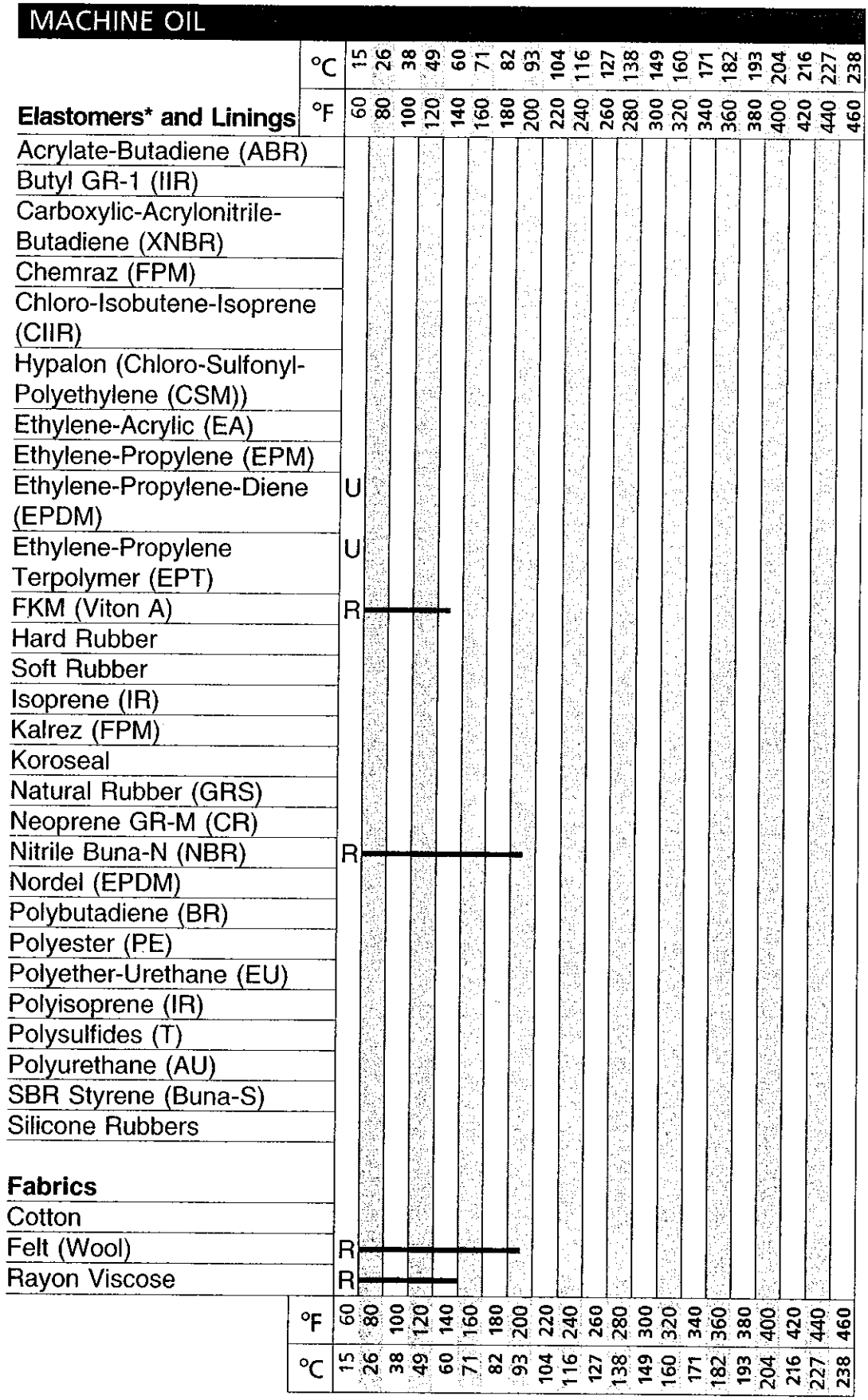


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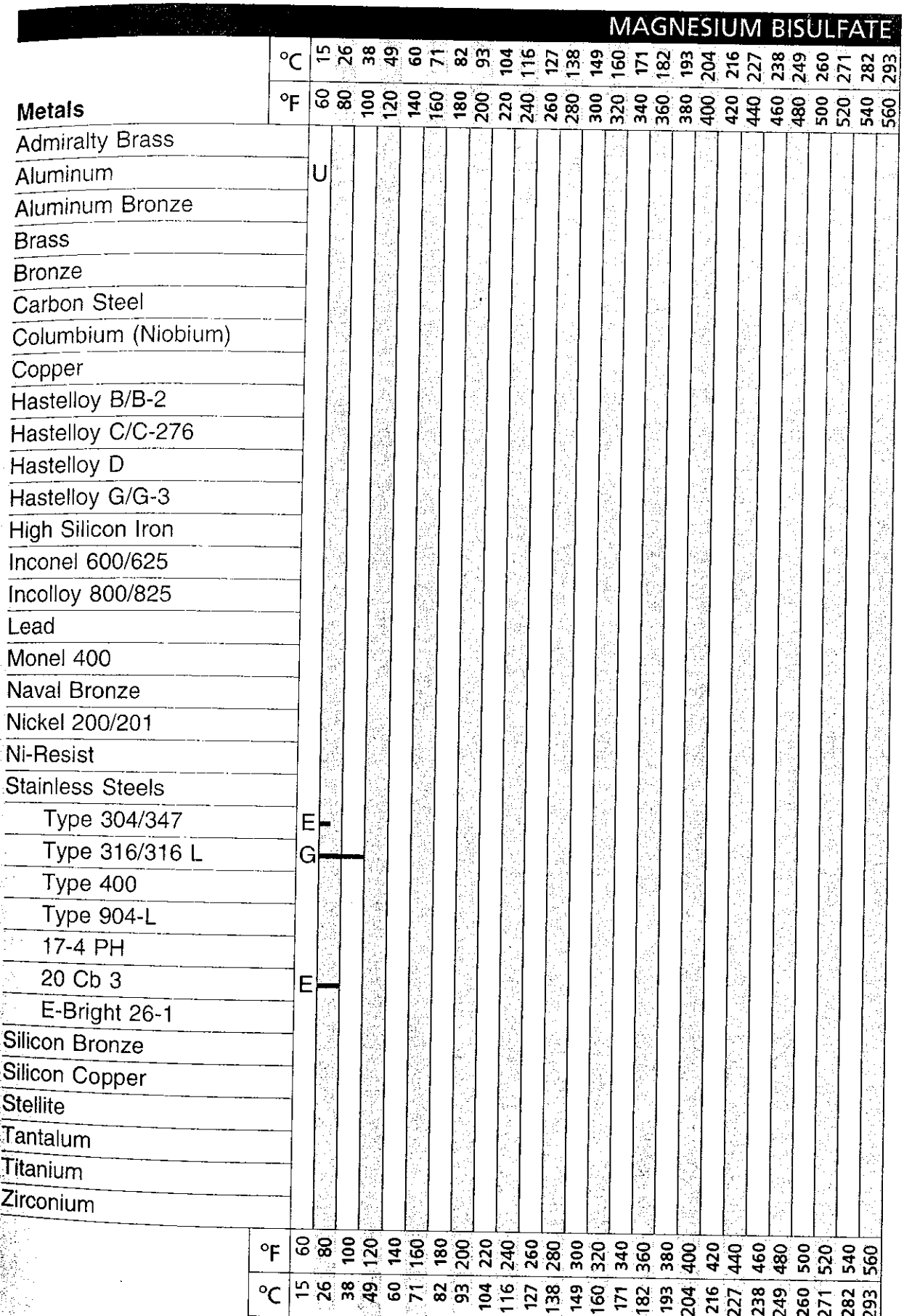


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## MAGNESIUM BISULFATE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | R | ▬ | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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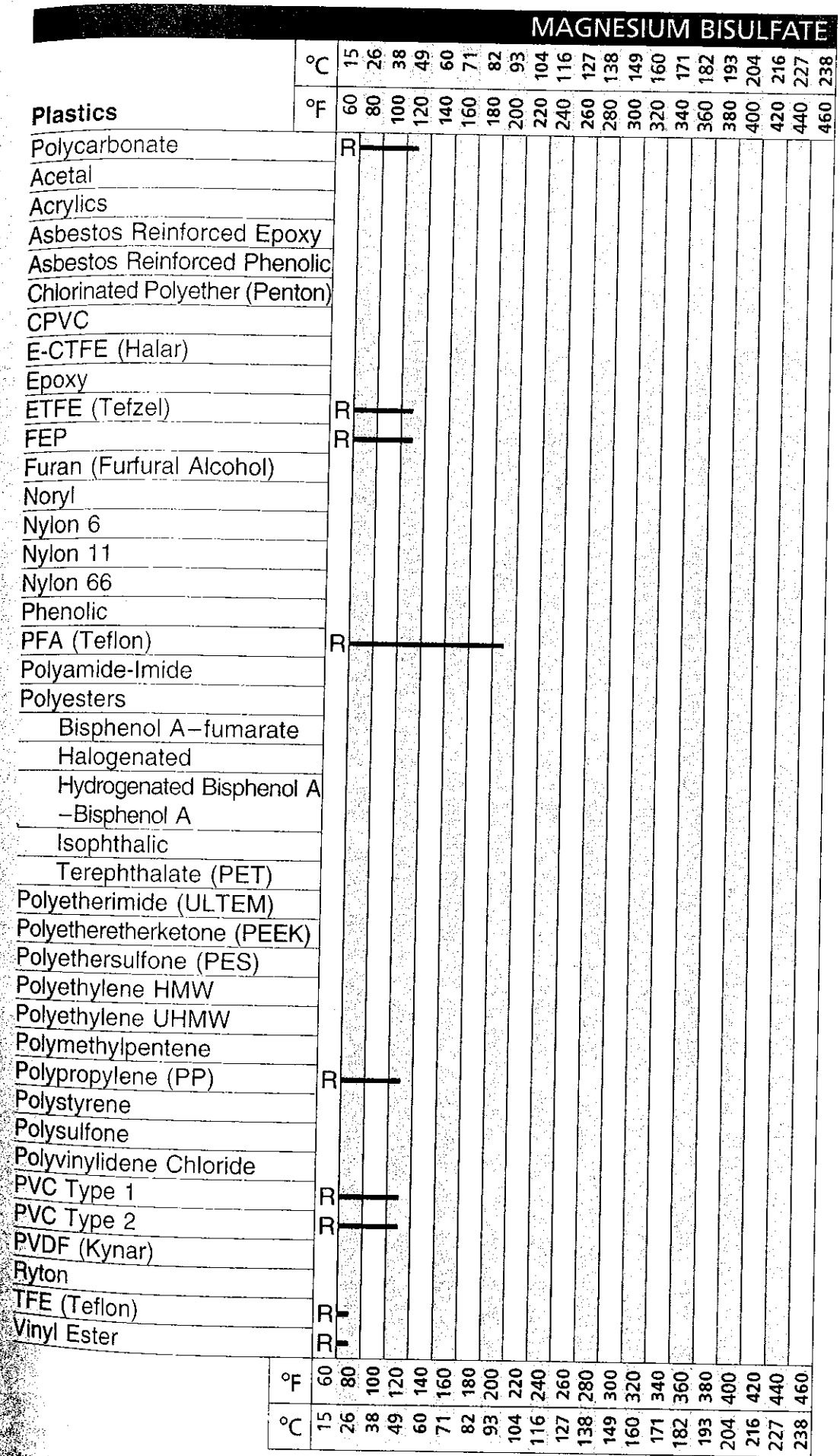


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## MAGNESIUM BISULFATE

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
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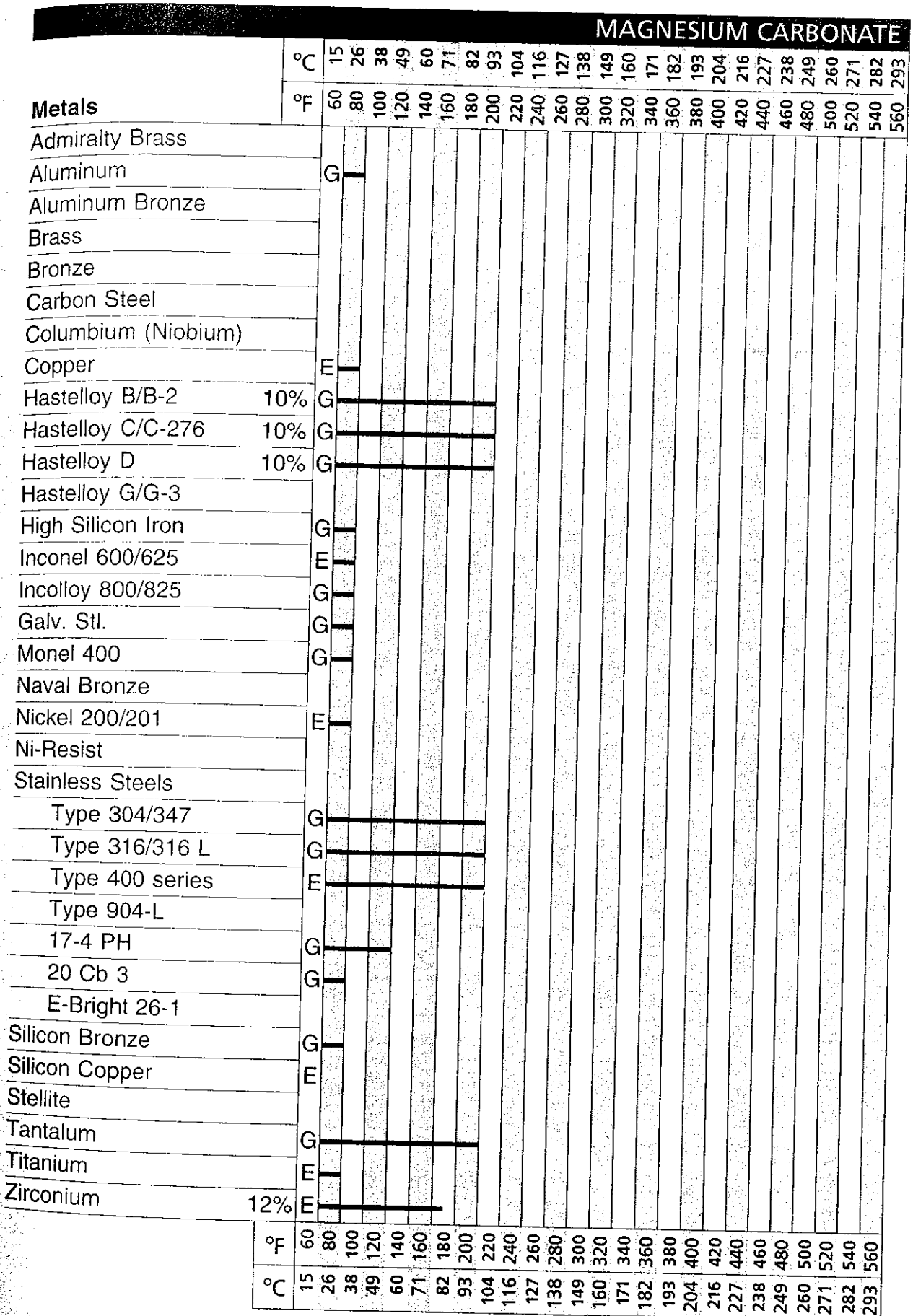


FOR METALS

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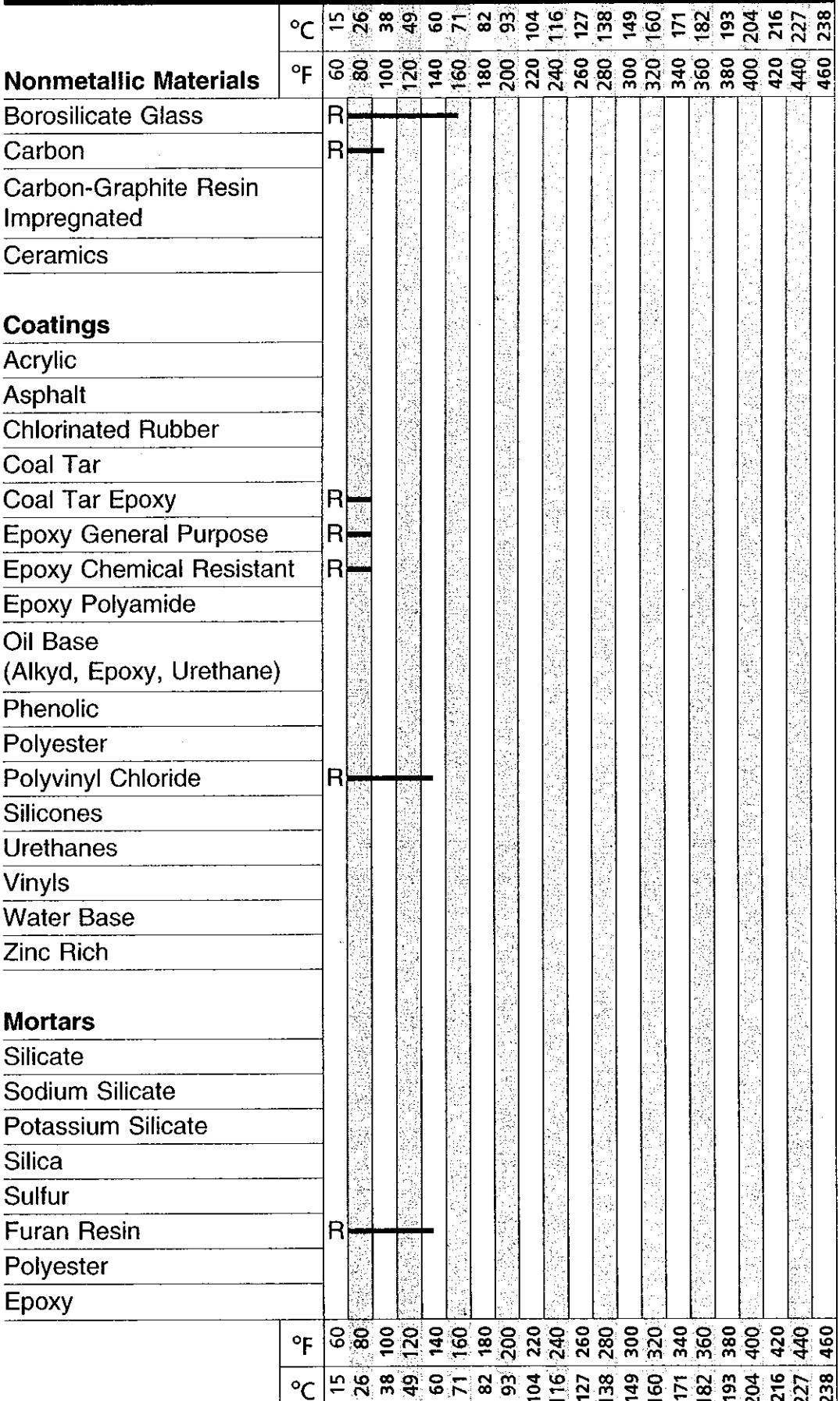




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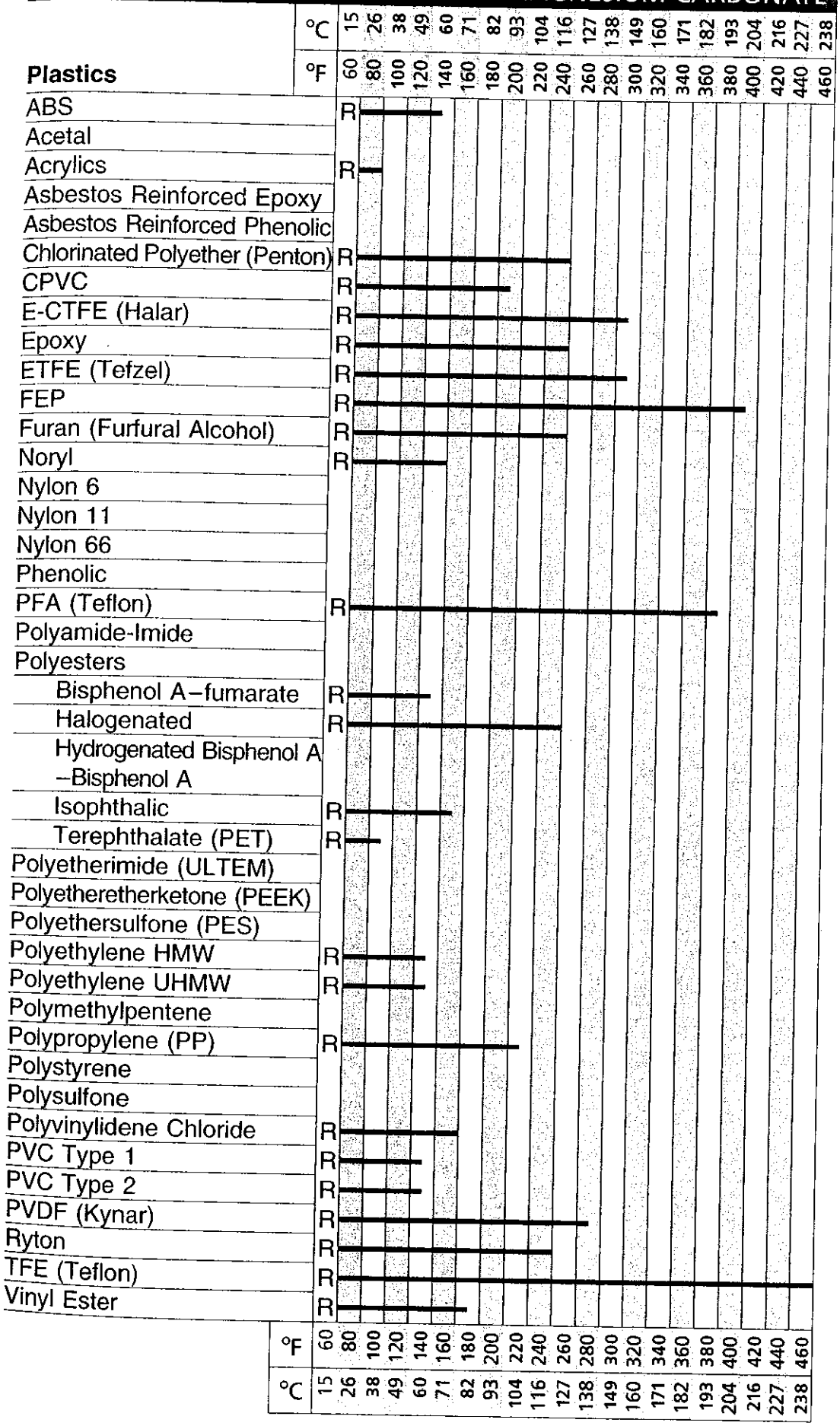


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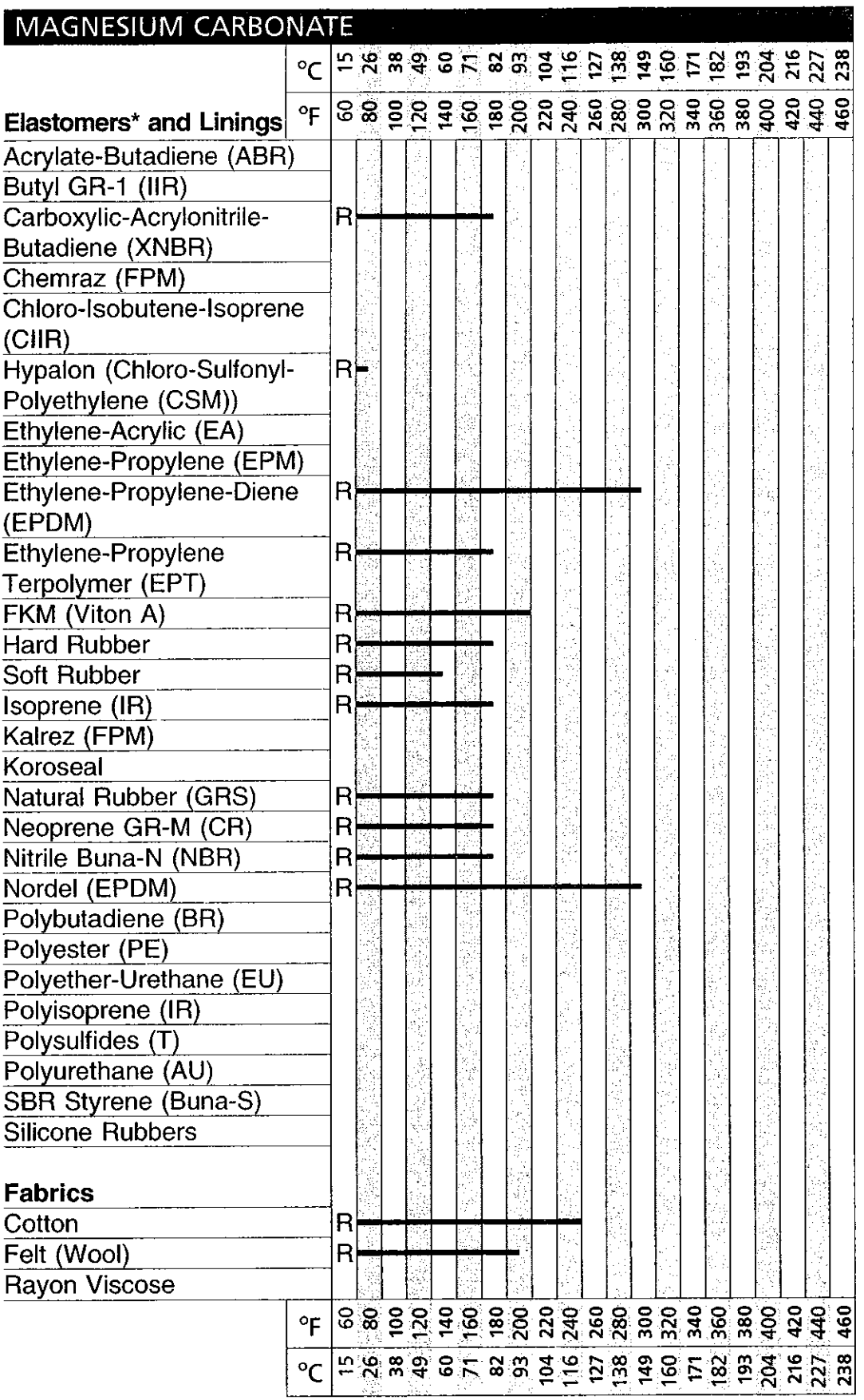


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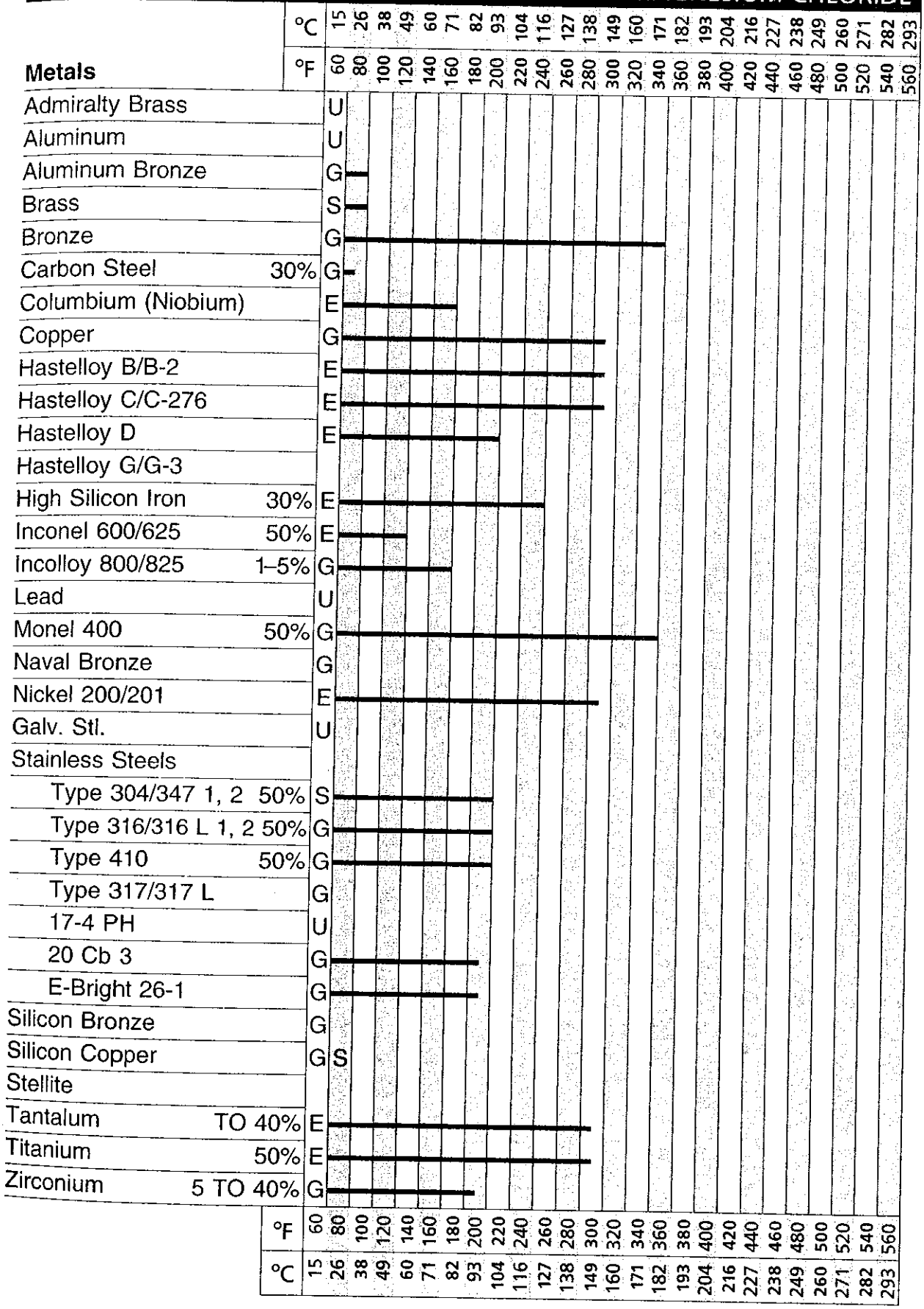
## MAGNESIUM CHLORIDE

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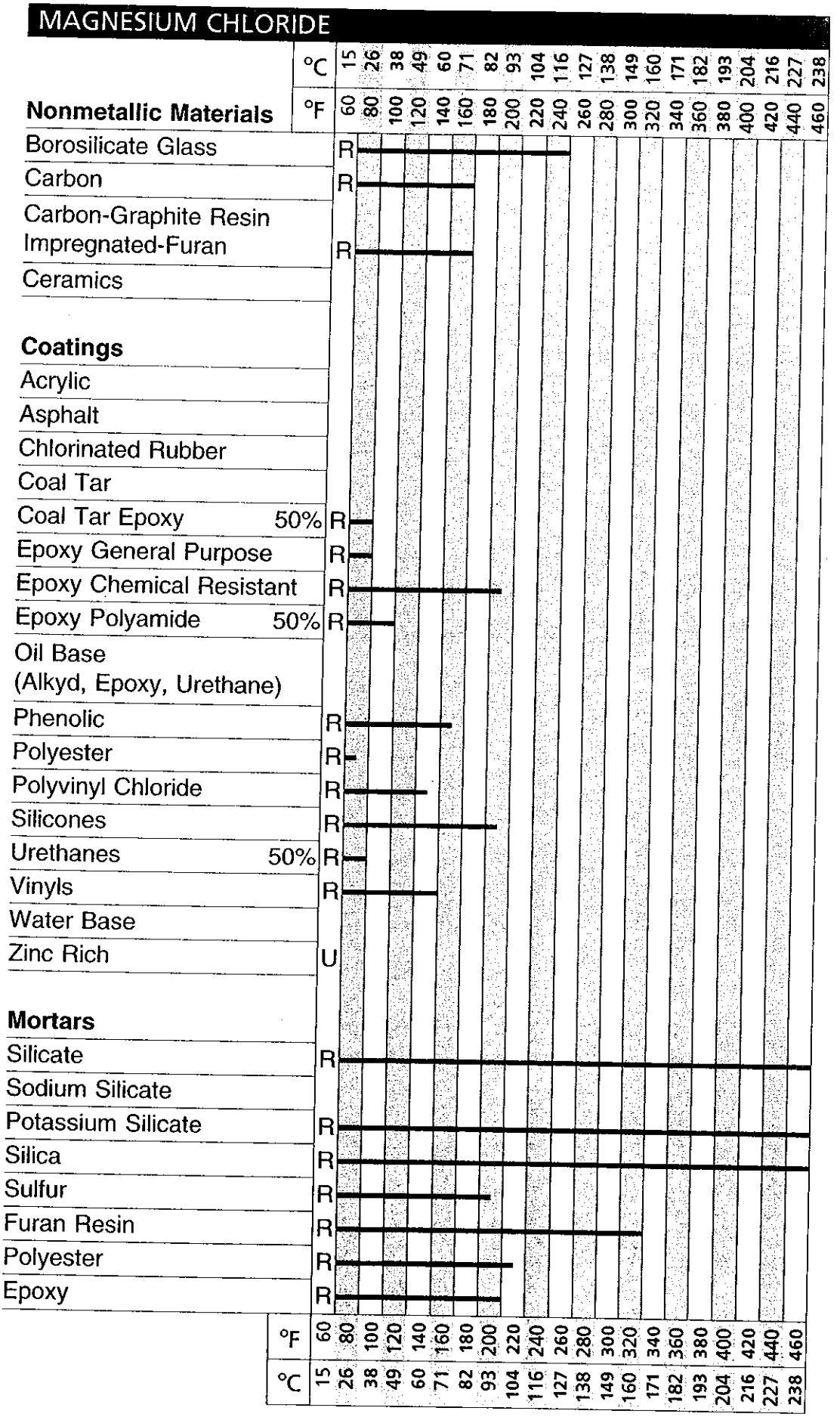




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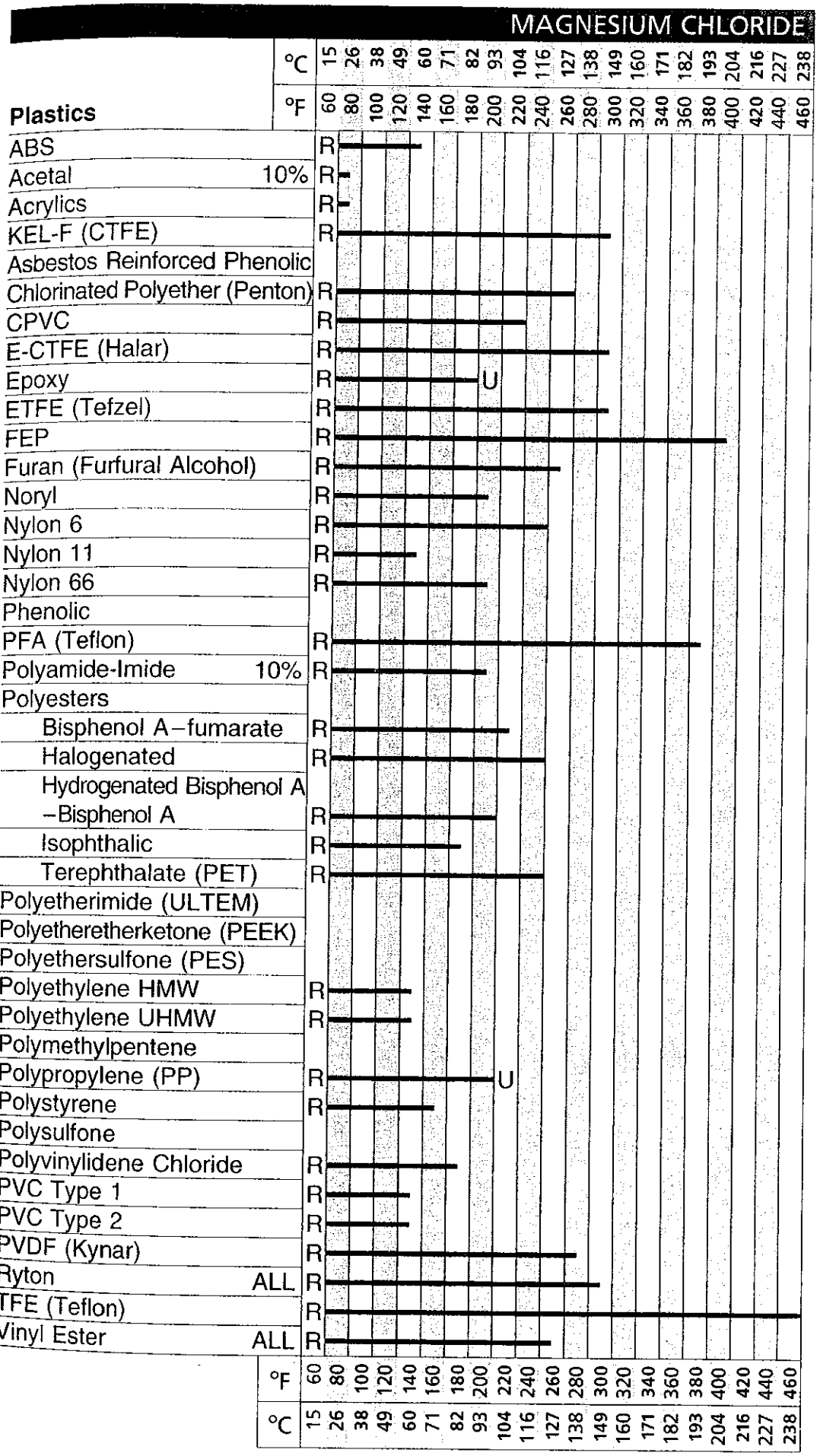


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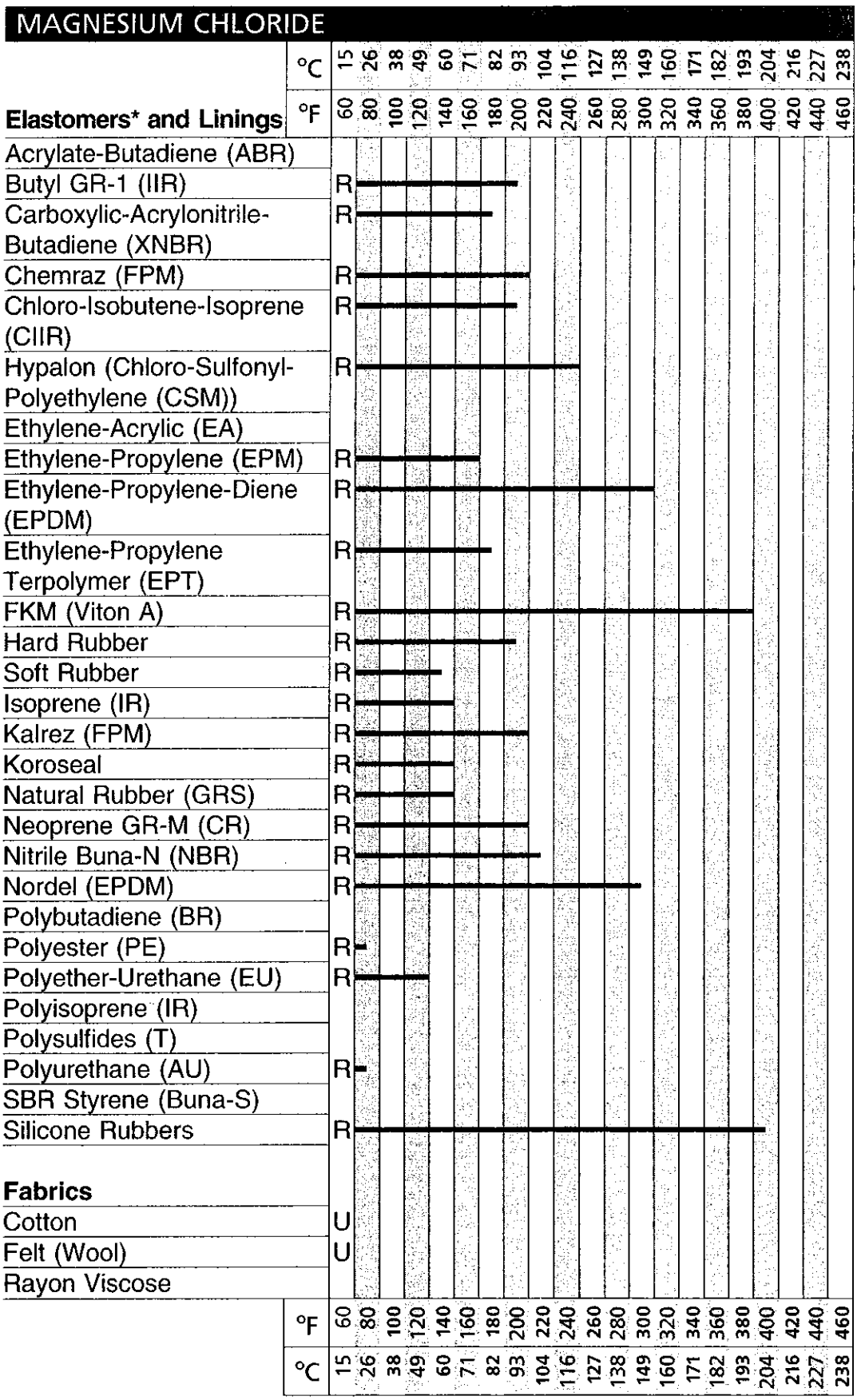
## MAGNESIUM CHLORIDE




*See also Nylon 11 under PLASTICS



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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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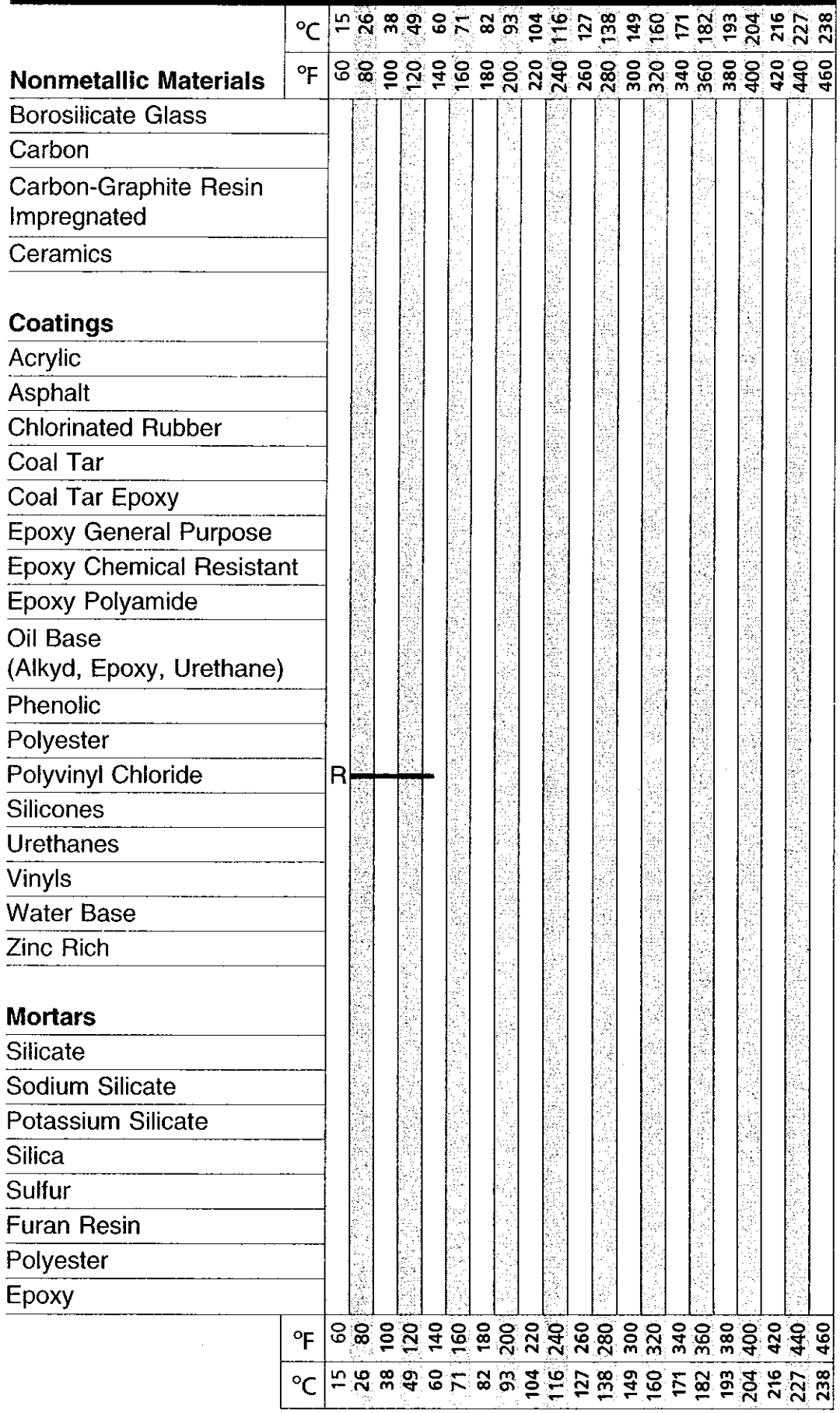




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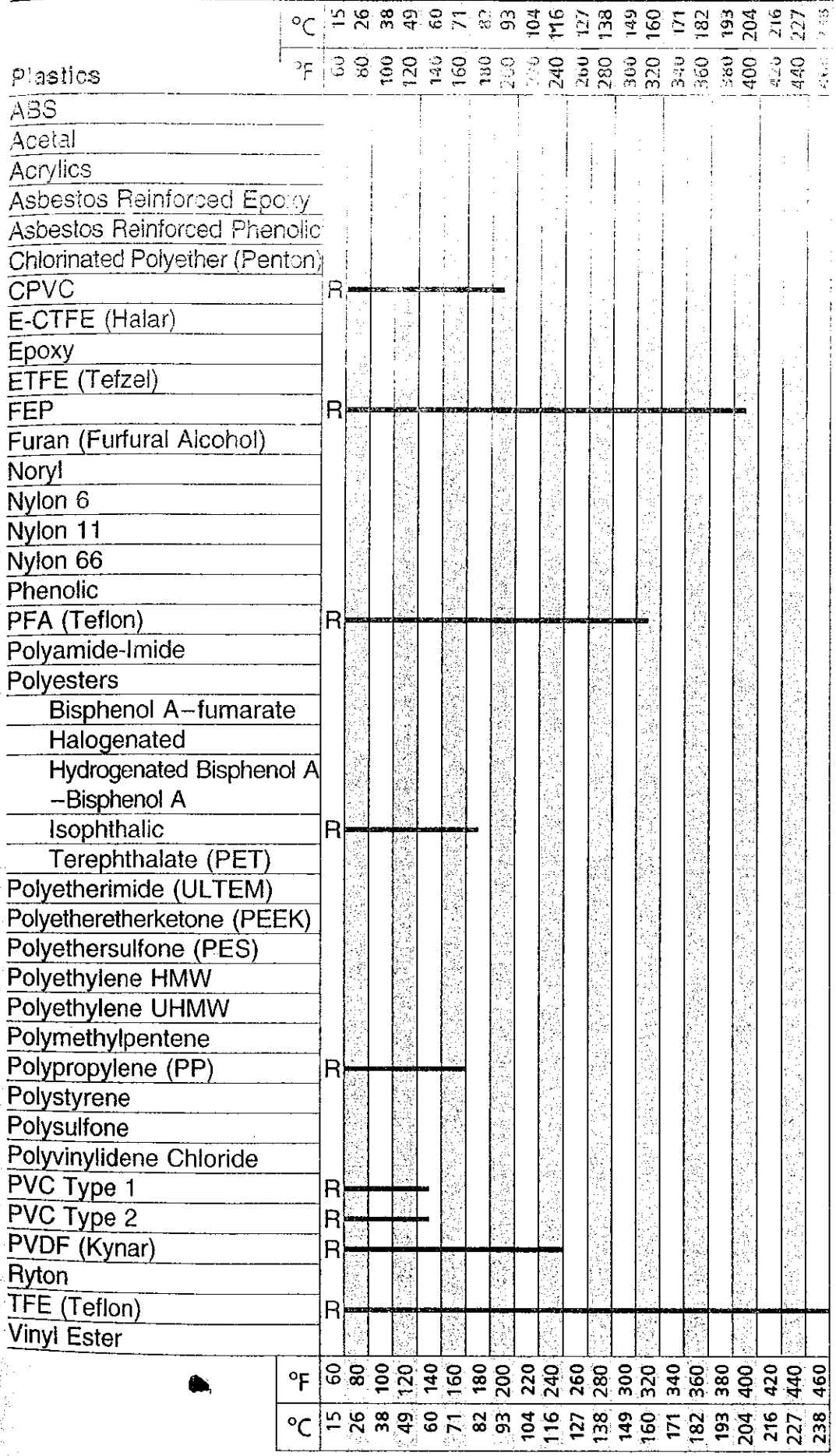


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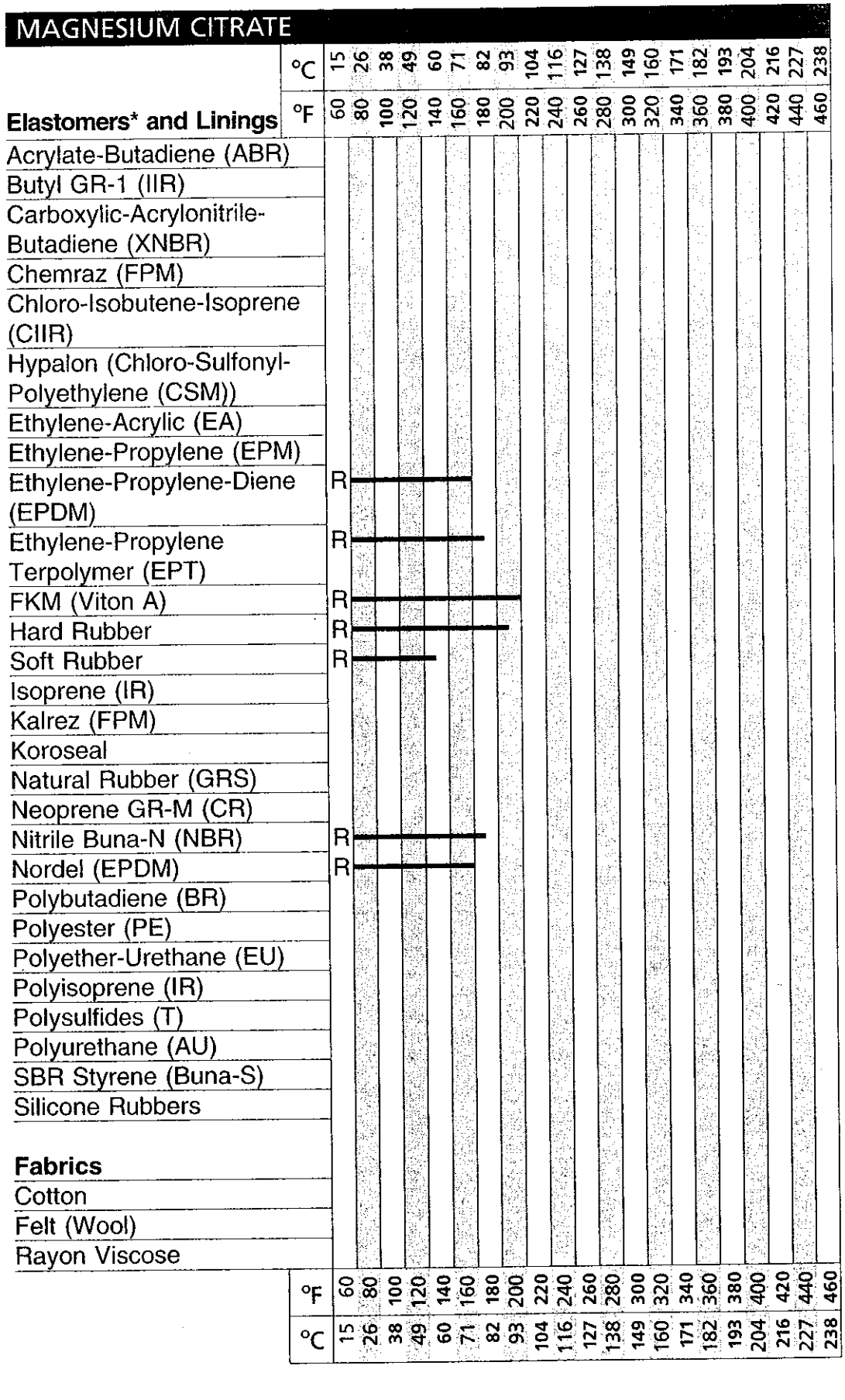


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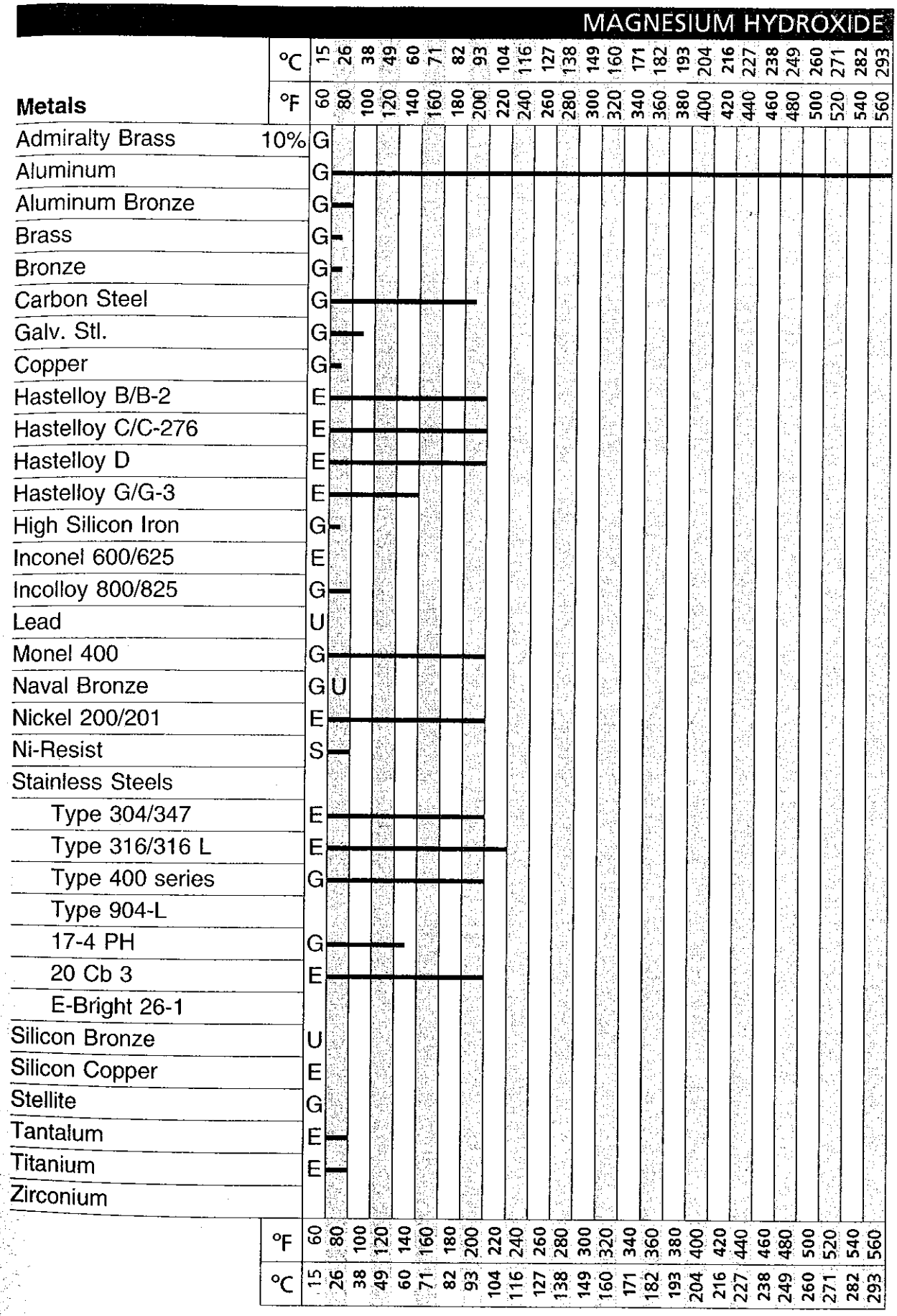


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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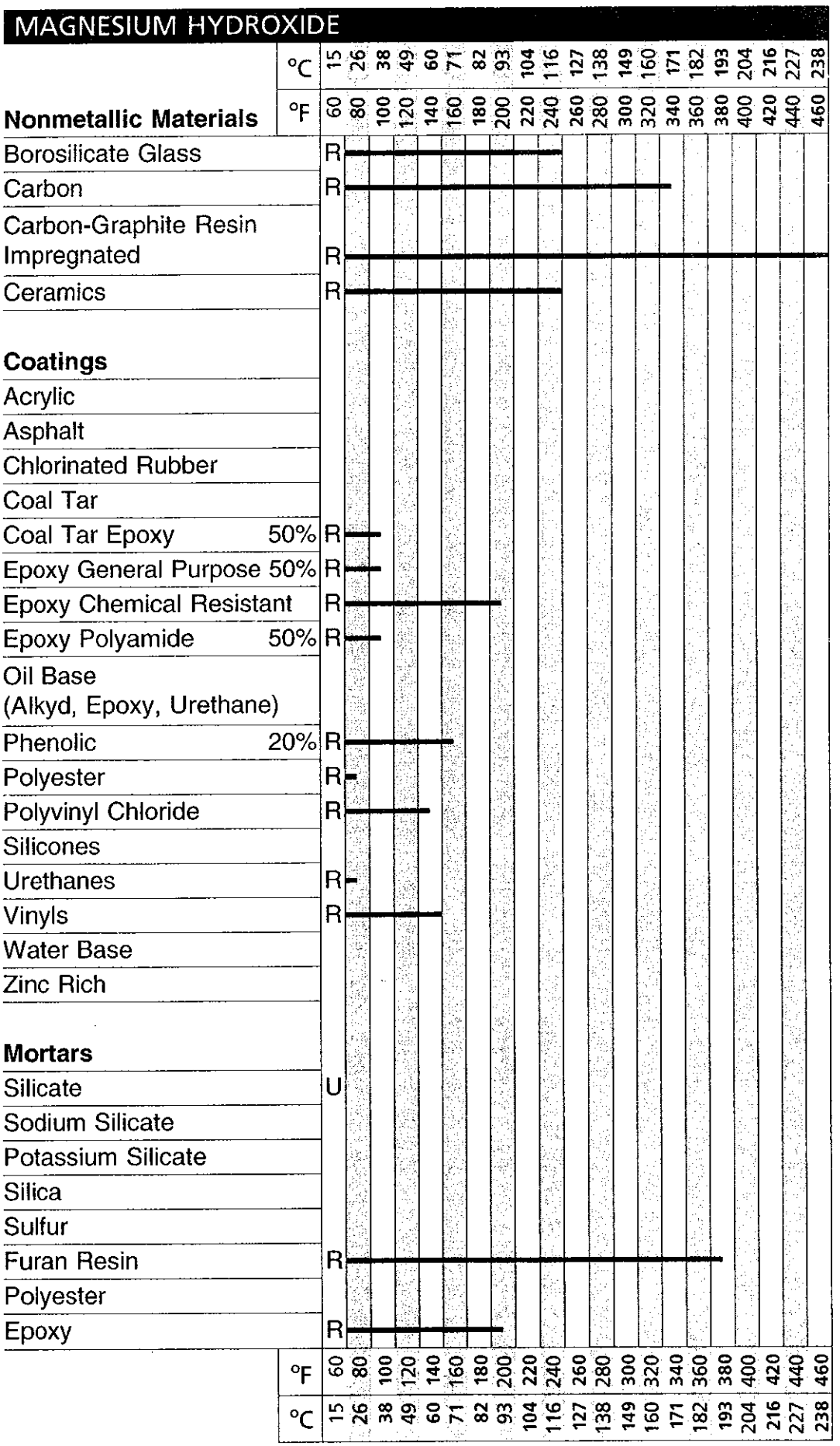




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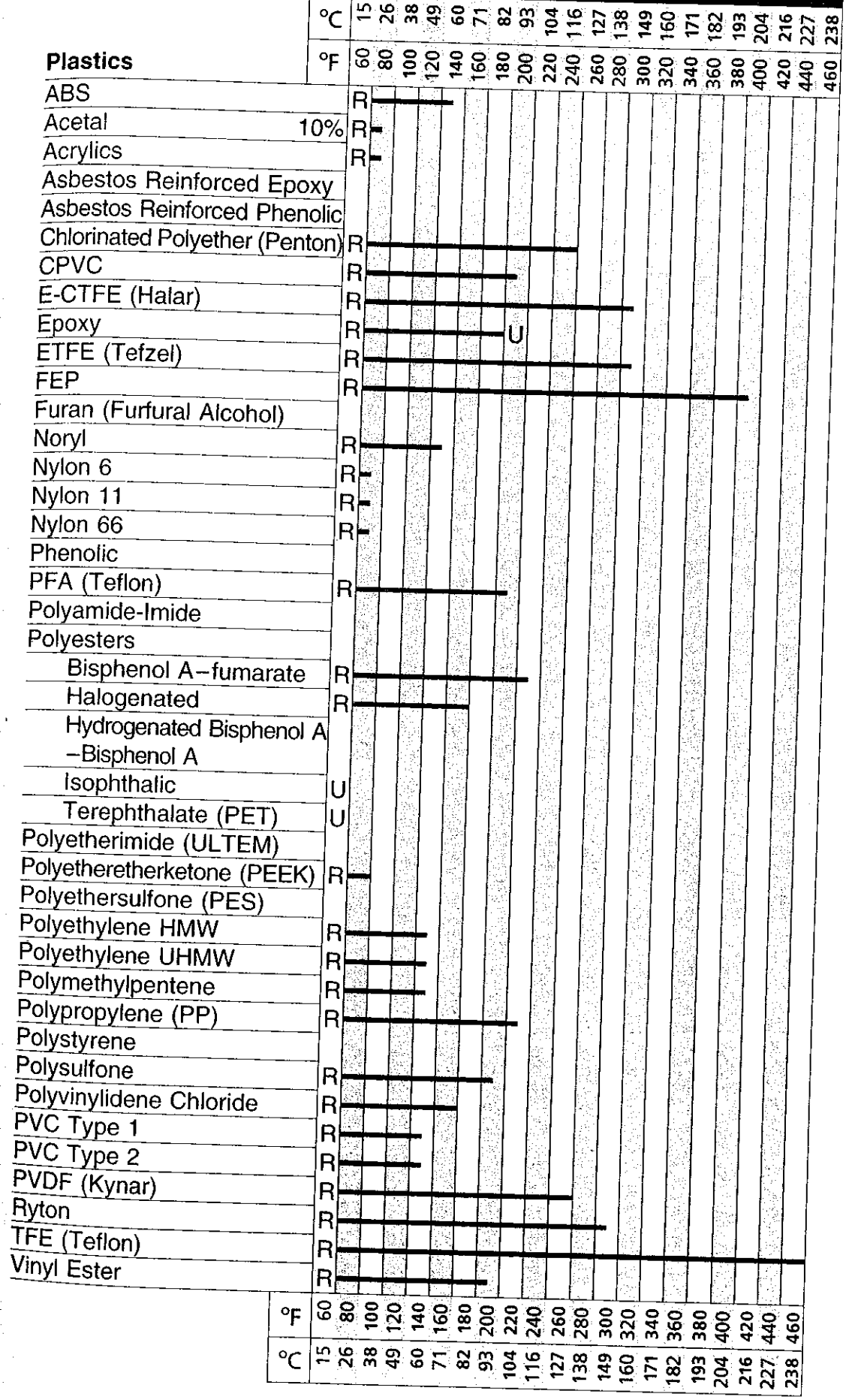


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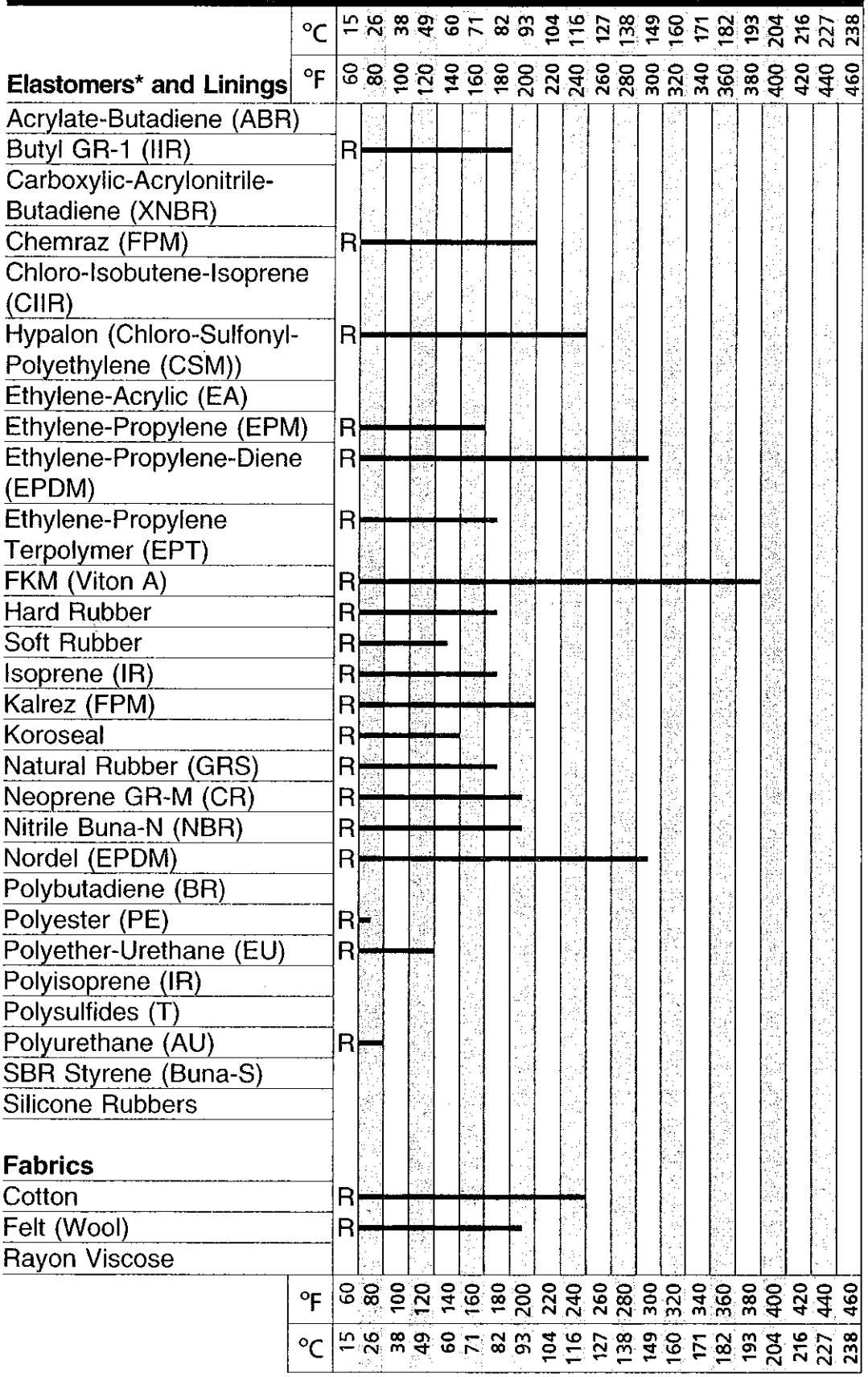


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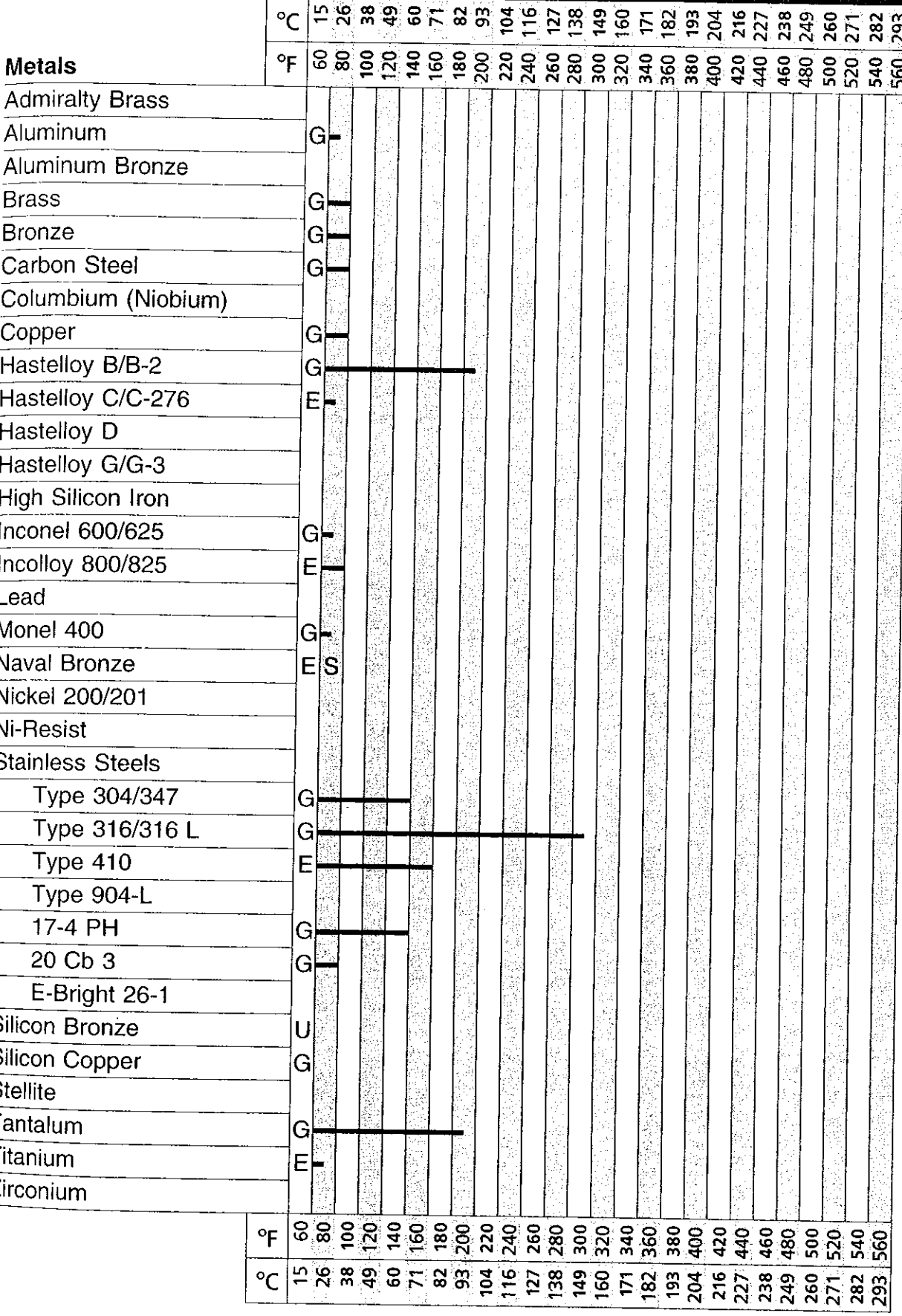


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

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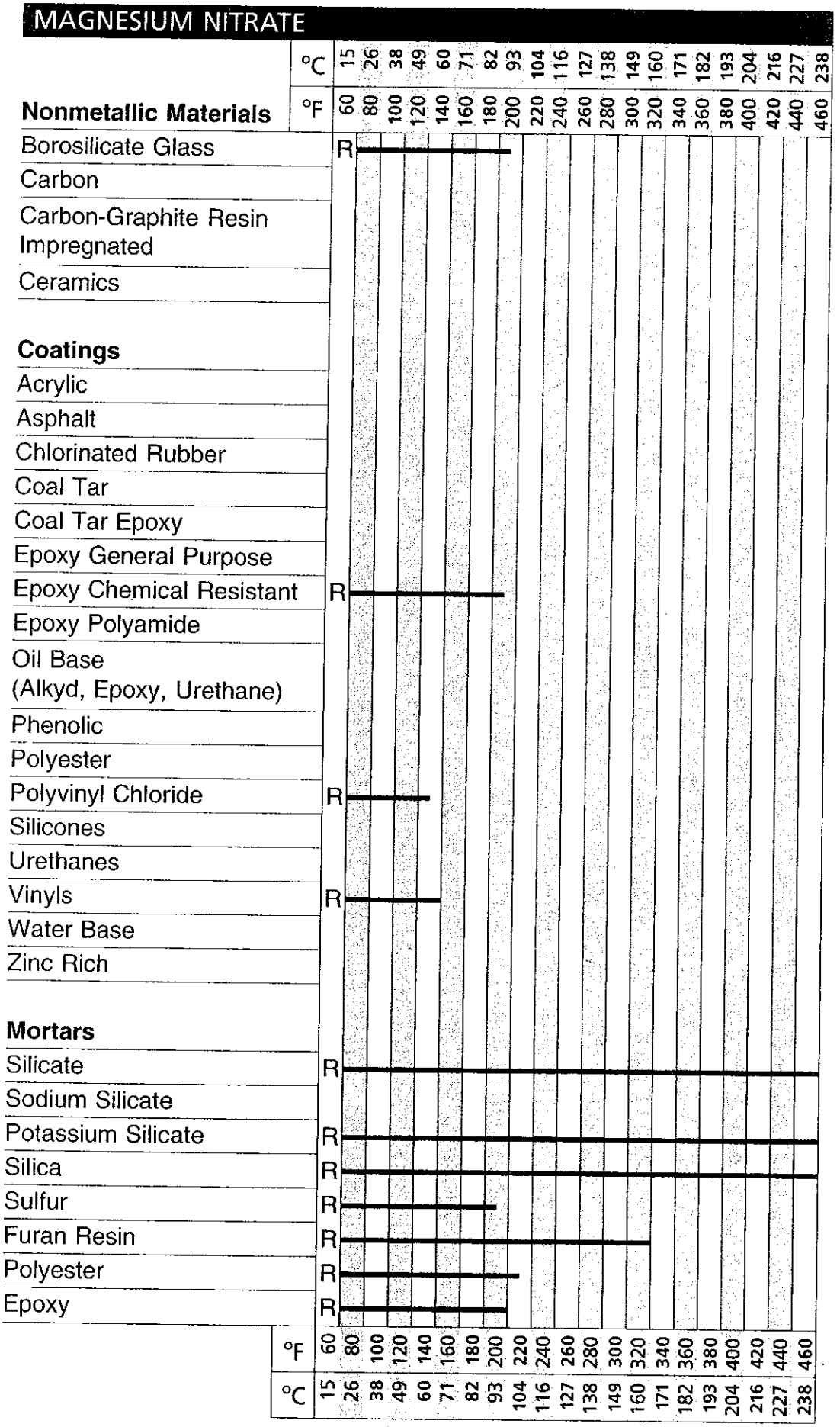




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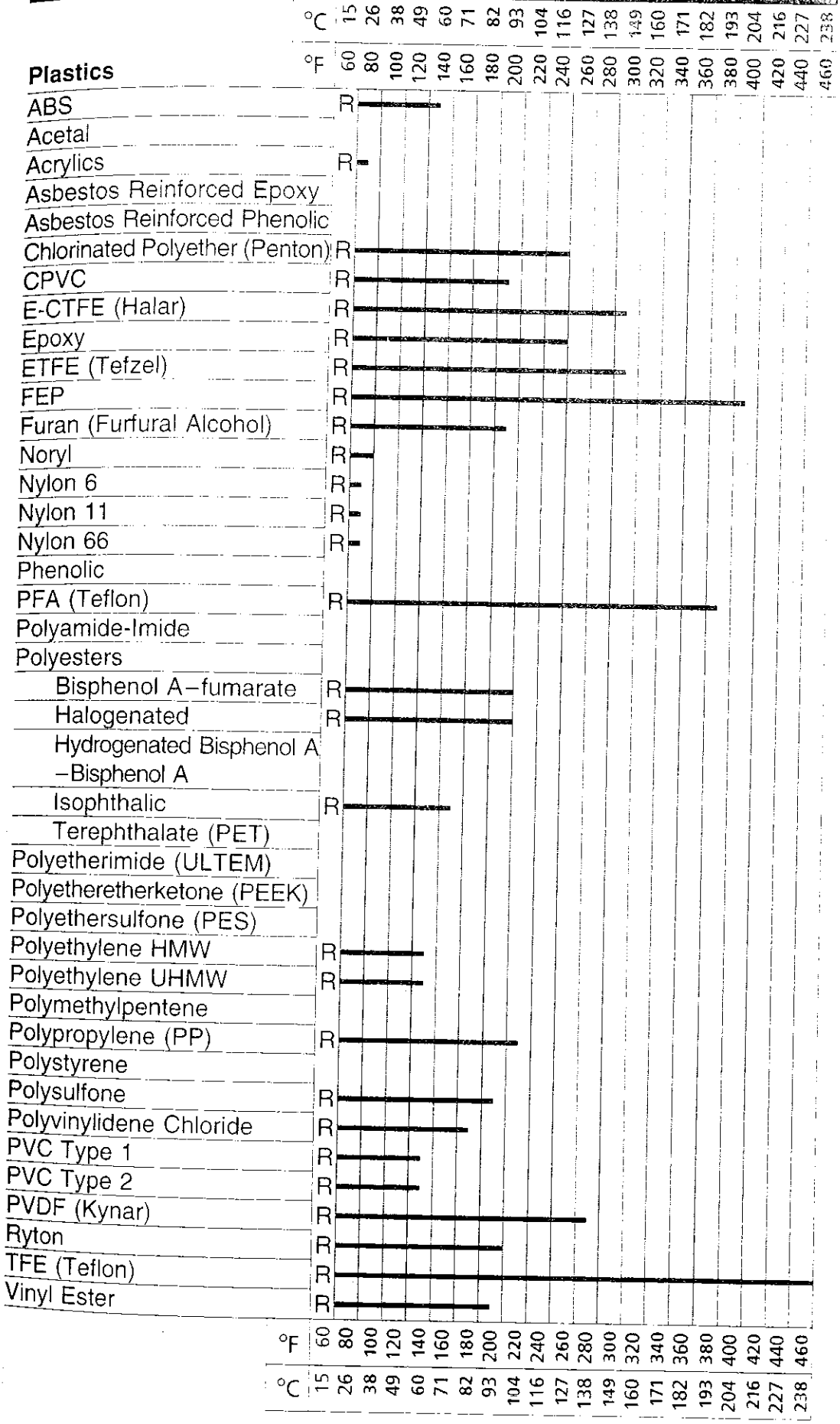


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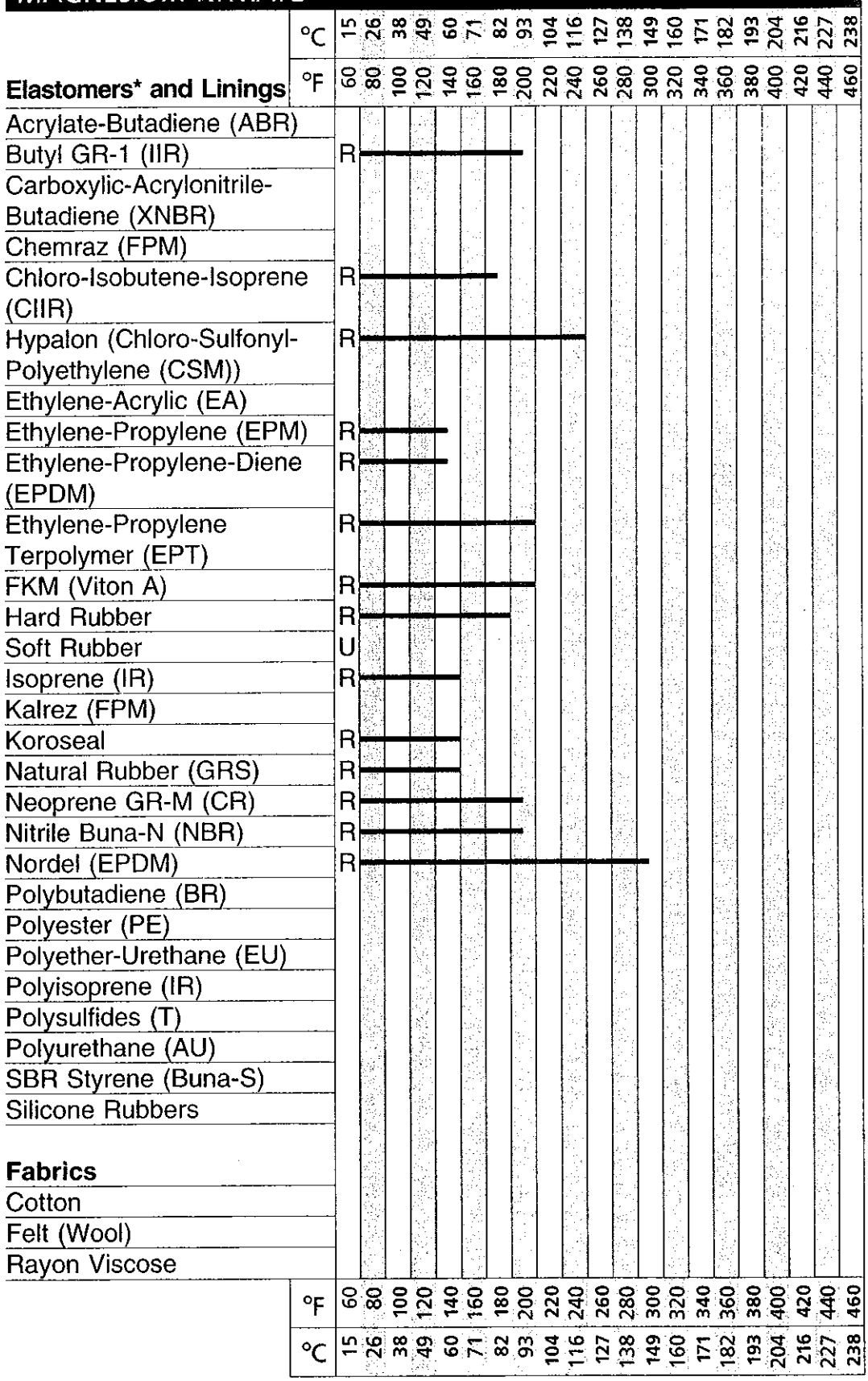


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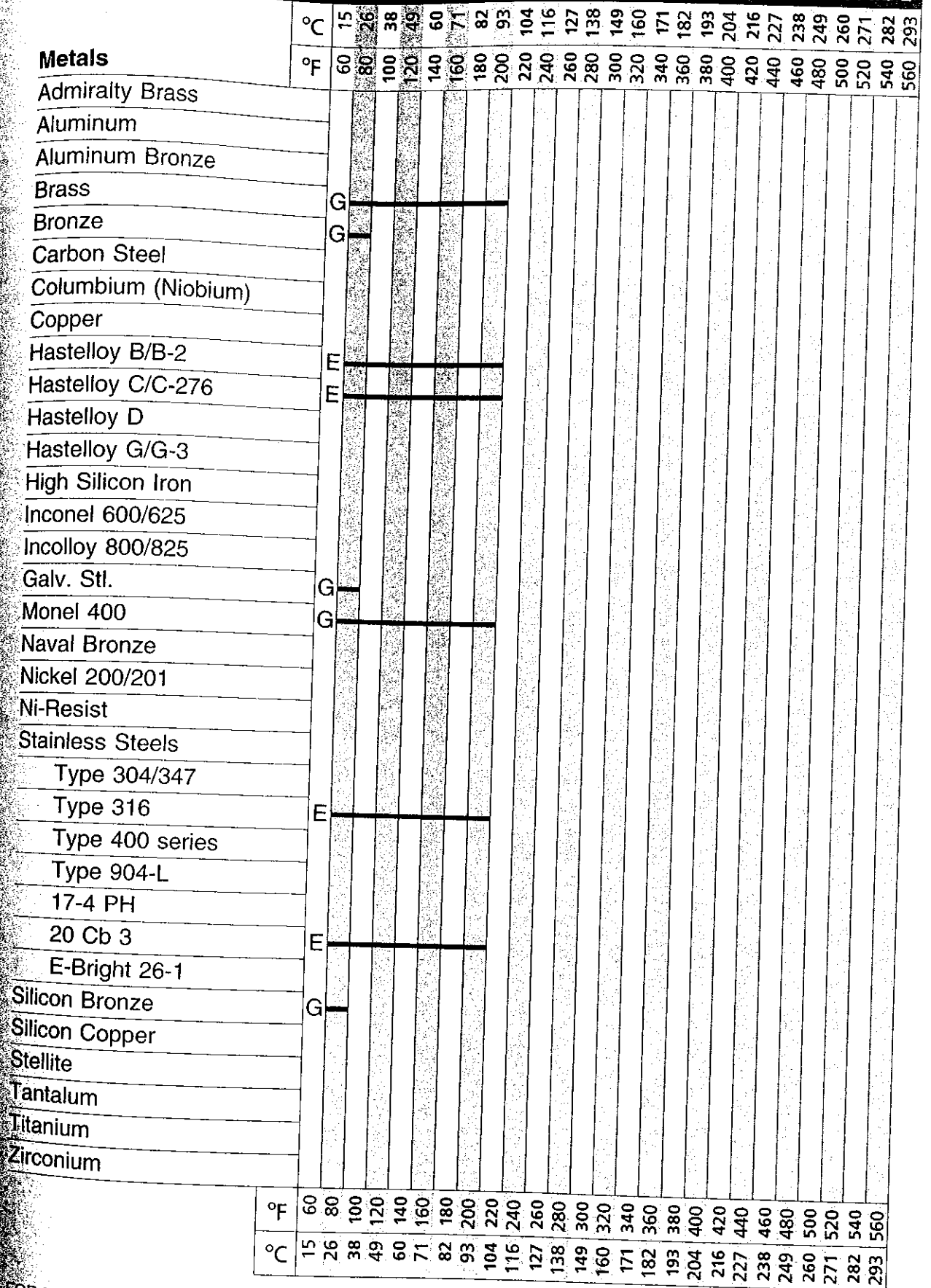


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## MAGNESIUM OXIDE

| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nonmetallic Materials** | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# MAGNESIUM OXIDE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | R | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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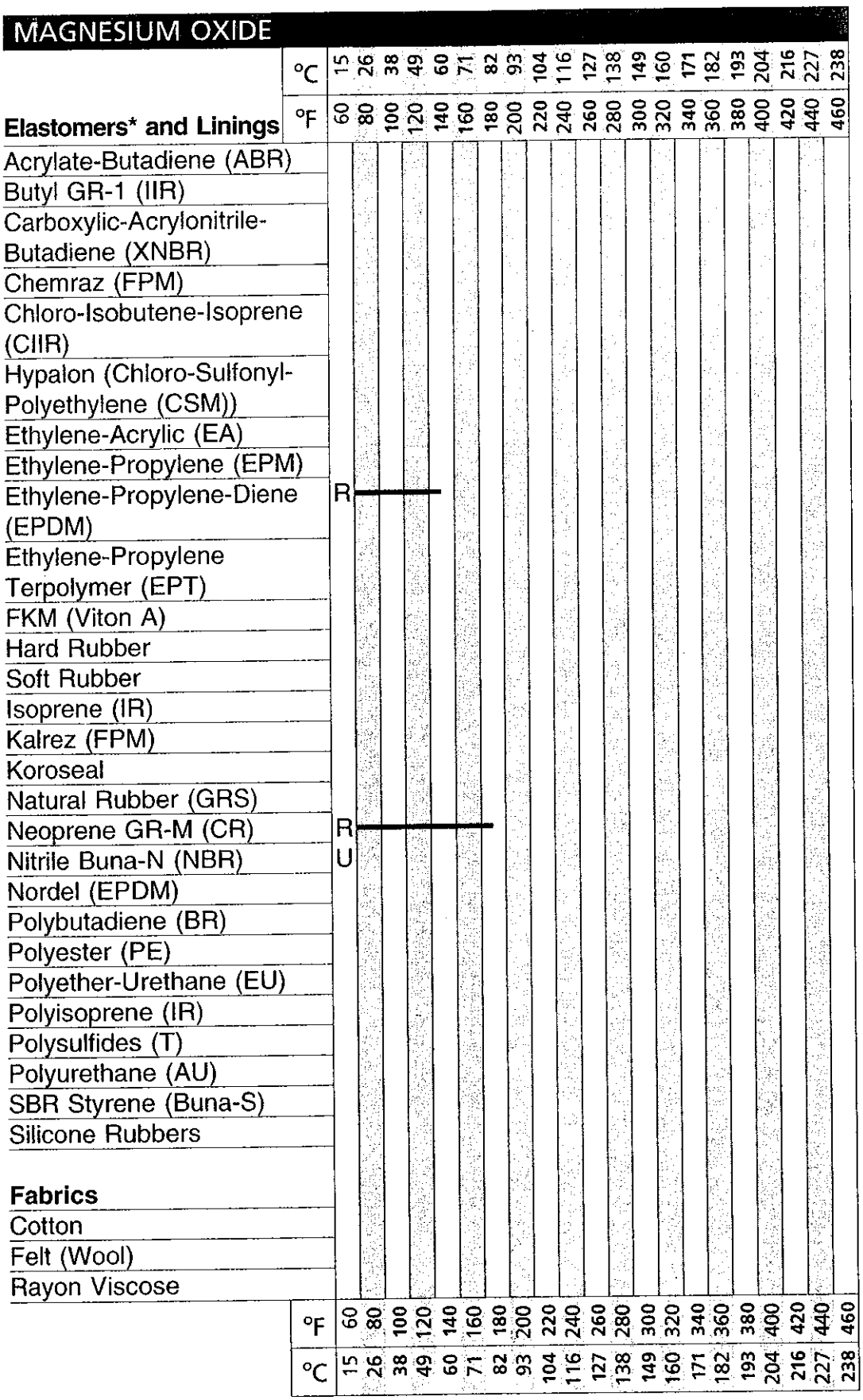


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# MAGNESIUM SULFATE

| Metals | | |
|---|---|---|
| Admiralty Brass | 30% | G |
| Aluminum | | G |
| Aluminum Bronze | | G |
| Brass | 30% | G |
| Bronze | | G |
| Carbon Steel | 30% | G |
| Columbium (Niobium) | | E |
| Copper | 30% | G |
| Hastelloy B/B-2 | 50% | E |
| Hastelloy C/C-276 | 50% | G |
| Hastelloy D | 50% | E |
| Hastelloy G/G-3 | | G |
| High Silicon Iron | | G |
| Inconel 600/625 | TO 60% | E |
| Incolloy 800/825 | 5% | G |
| Lead | | G |
| Monel 400 | | E |
| Naval Bronze | > 40% | G |
| Nickel 200/201 | TO 60% | E |
| Ni-Resist | | G |
| Stainless Steels | | |
| Type 304/347 | | G |
| Type 316/316 L | | G |
| Type 410 | | G |
| Type 904-L | | |
| 17-4 PH | | G |
| 20 Cb 3 | | G |
| E-Bright 26-1 | | |
| Silicon Bronze | | G |
| Silicon Copper | 30% | G |
| Stellite | | G |
| Tantalum | 30% | G |
| Titanium | | G |
| Zirconium | TO 50% | E |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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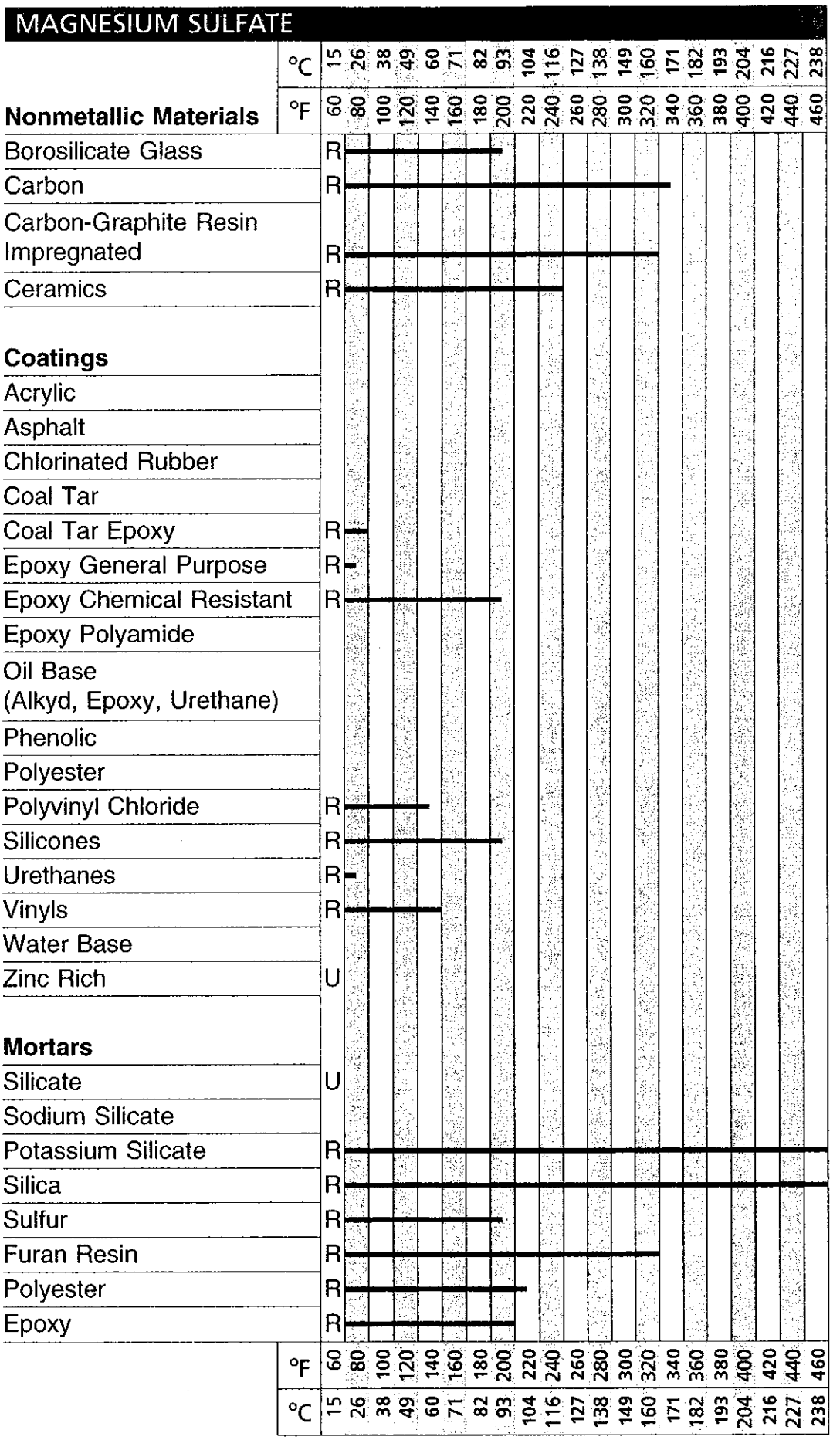




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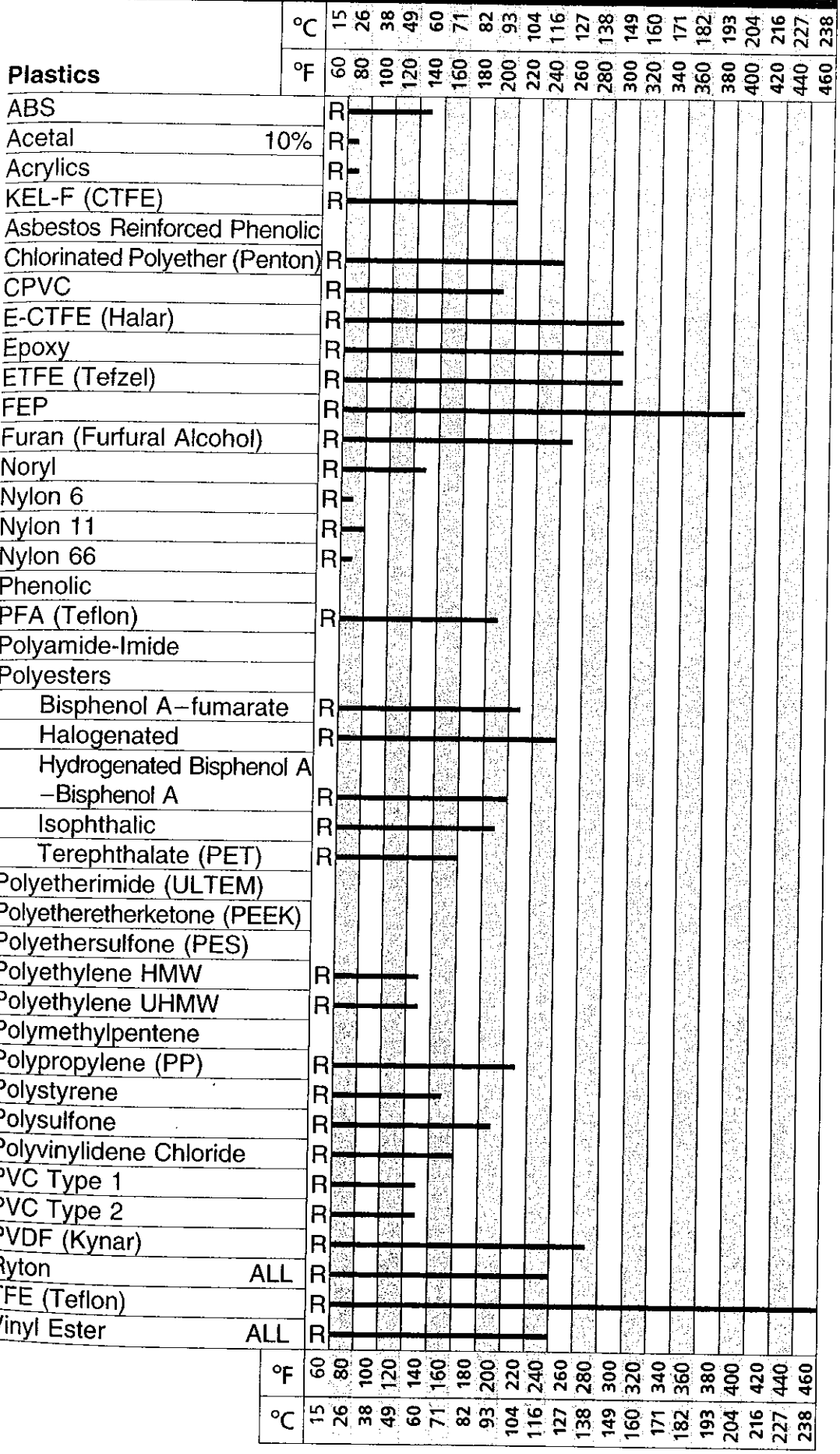


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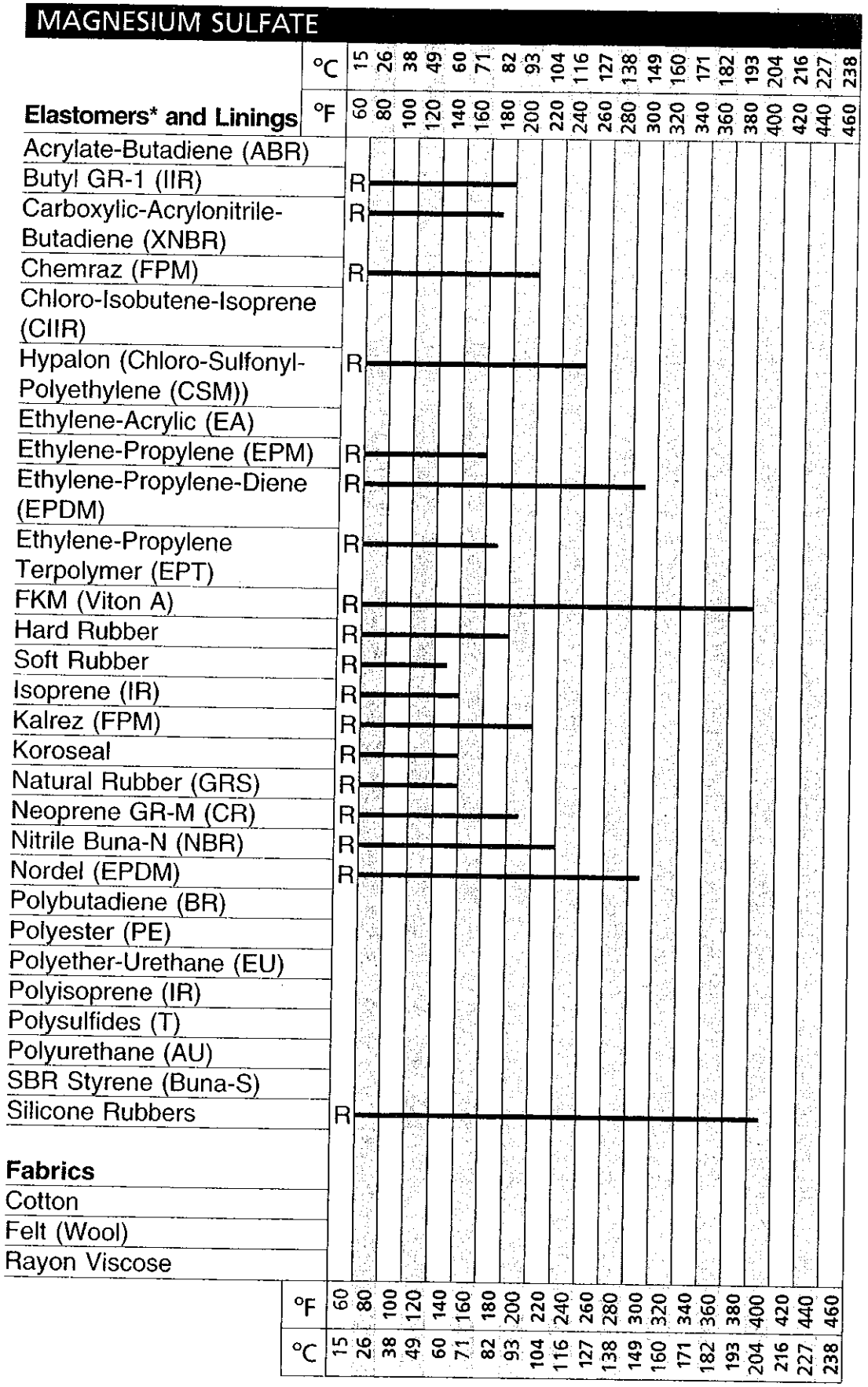


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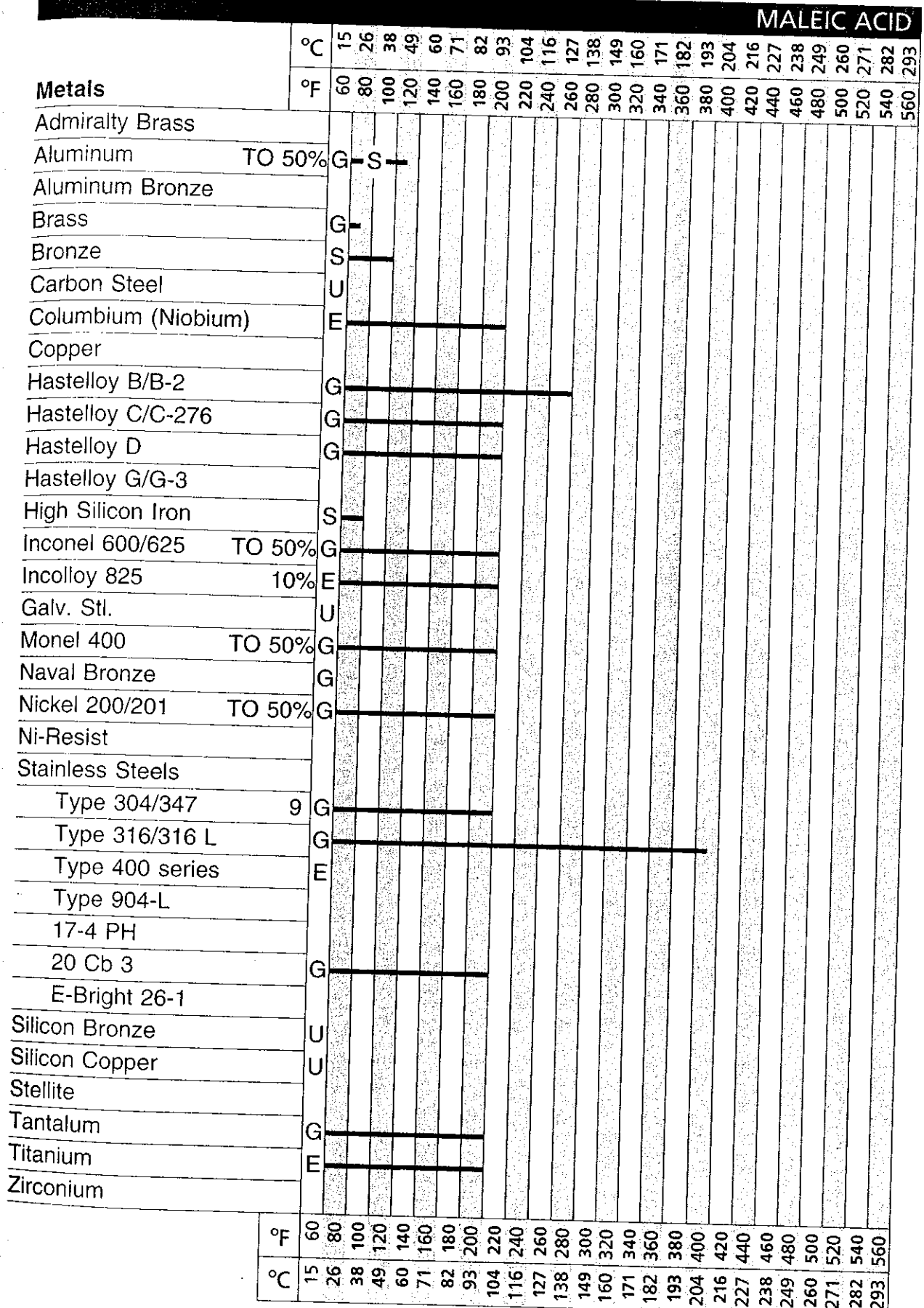
# MALEIC ACID




FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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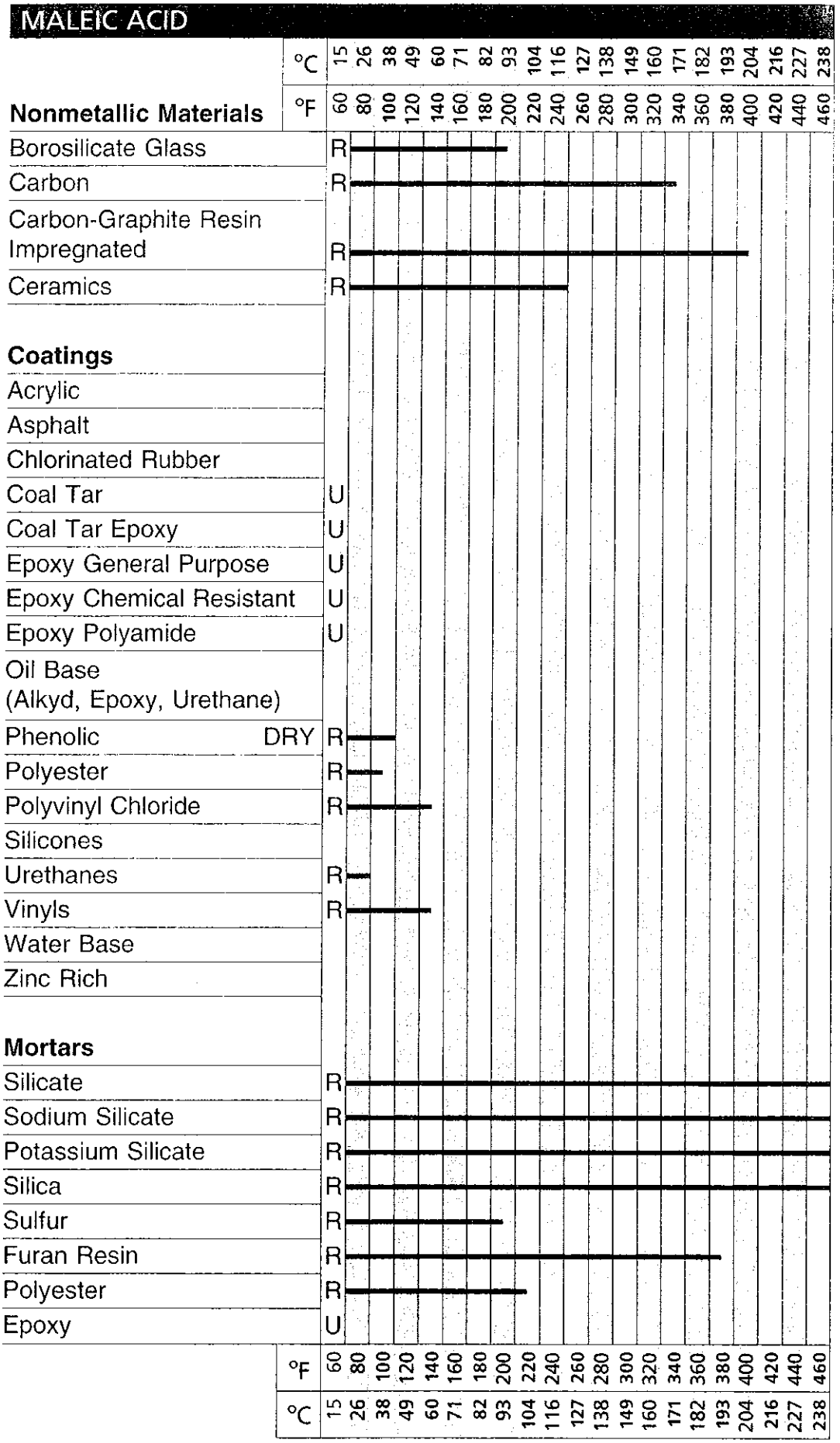




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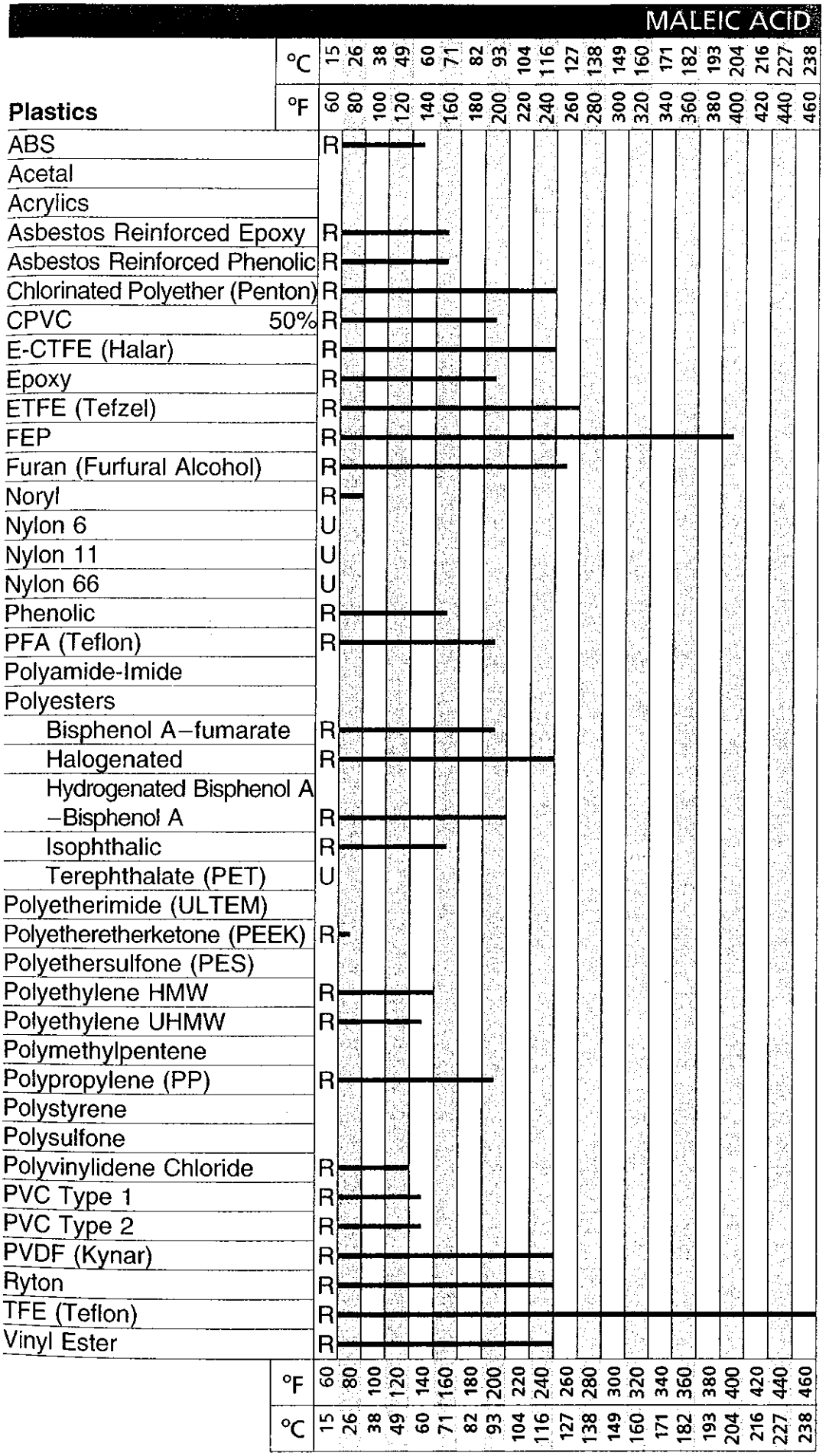


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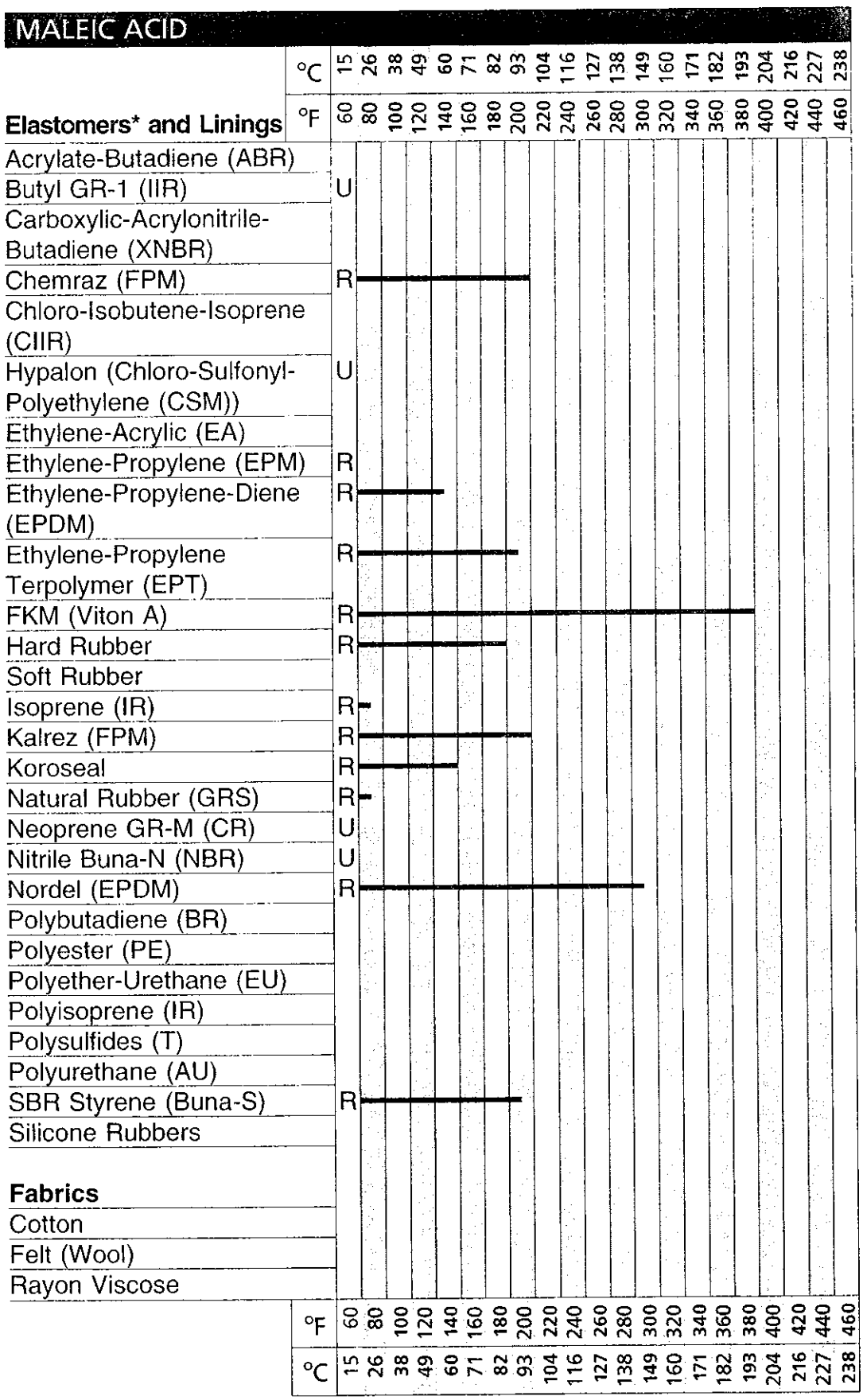
# MALEIC ACID




*See also Nylon 11 under PLASTICS



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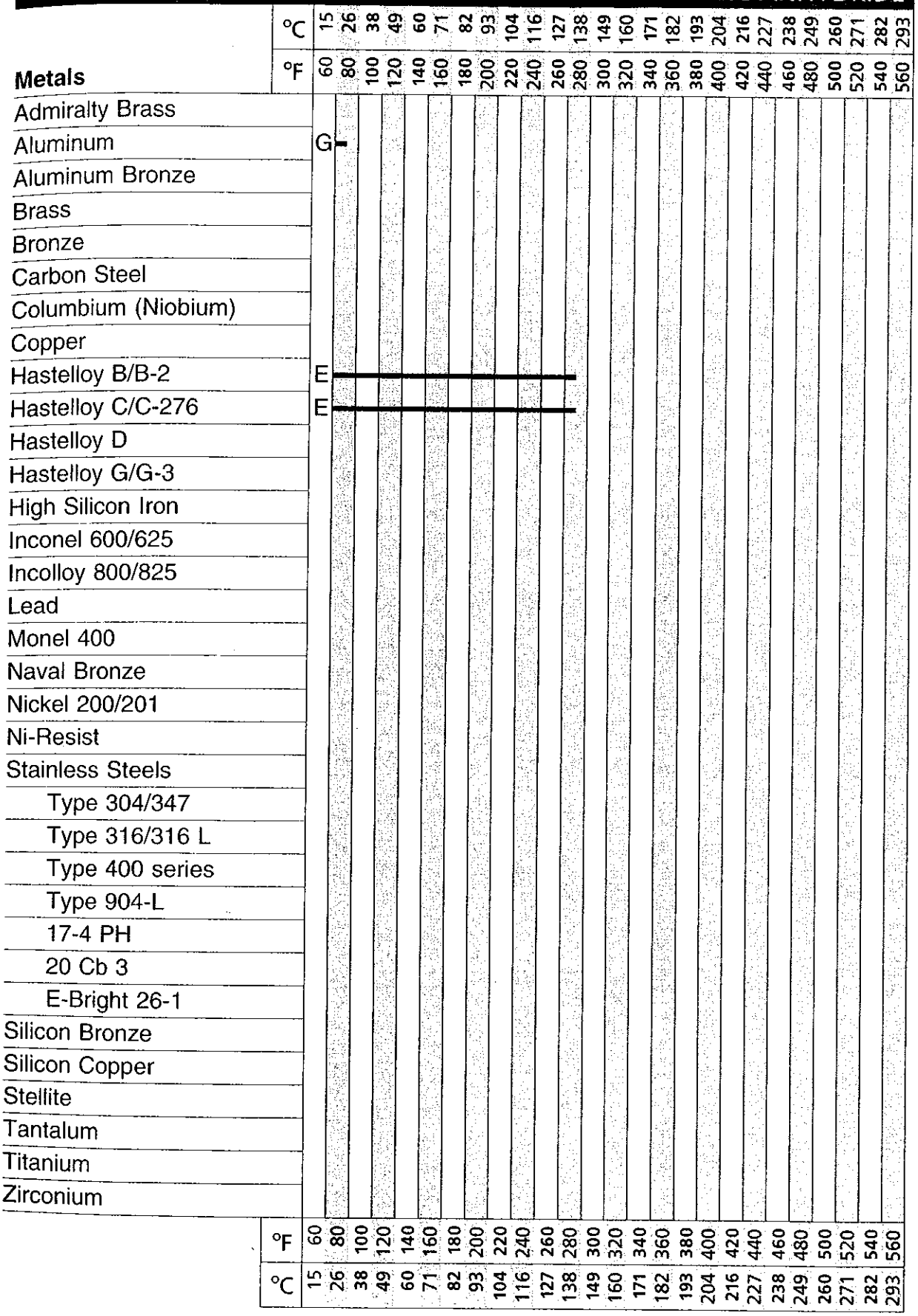


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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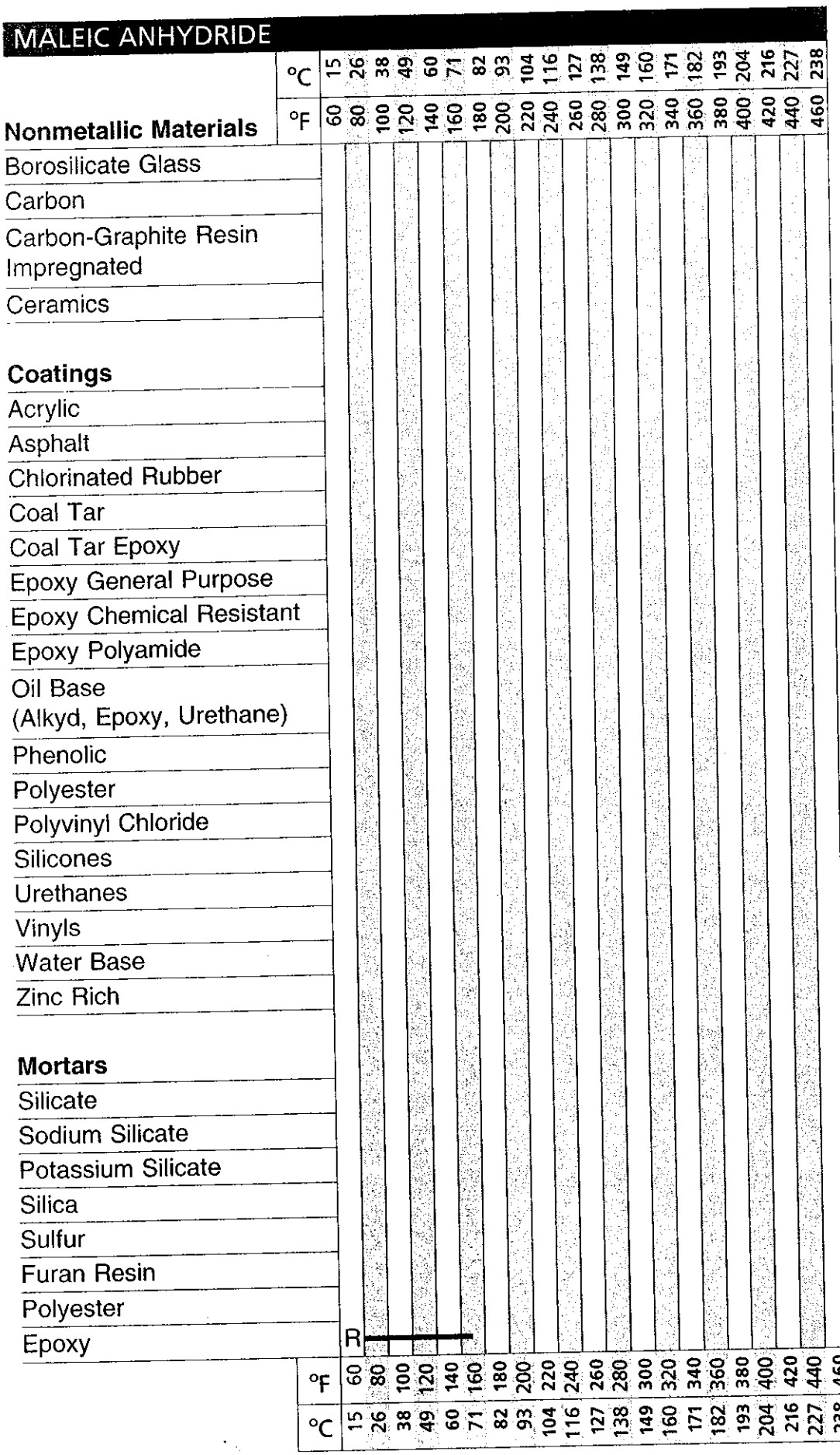
# MALEIC ANHYDRIDE



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# MALEIC ANHYDRIDE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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## MALEIC ANHYDRIDE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | R | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | U | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | U | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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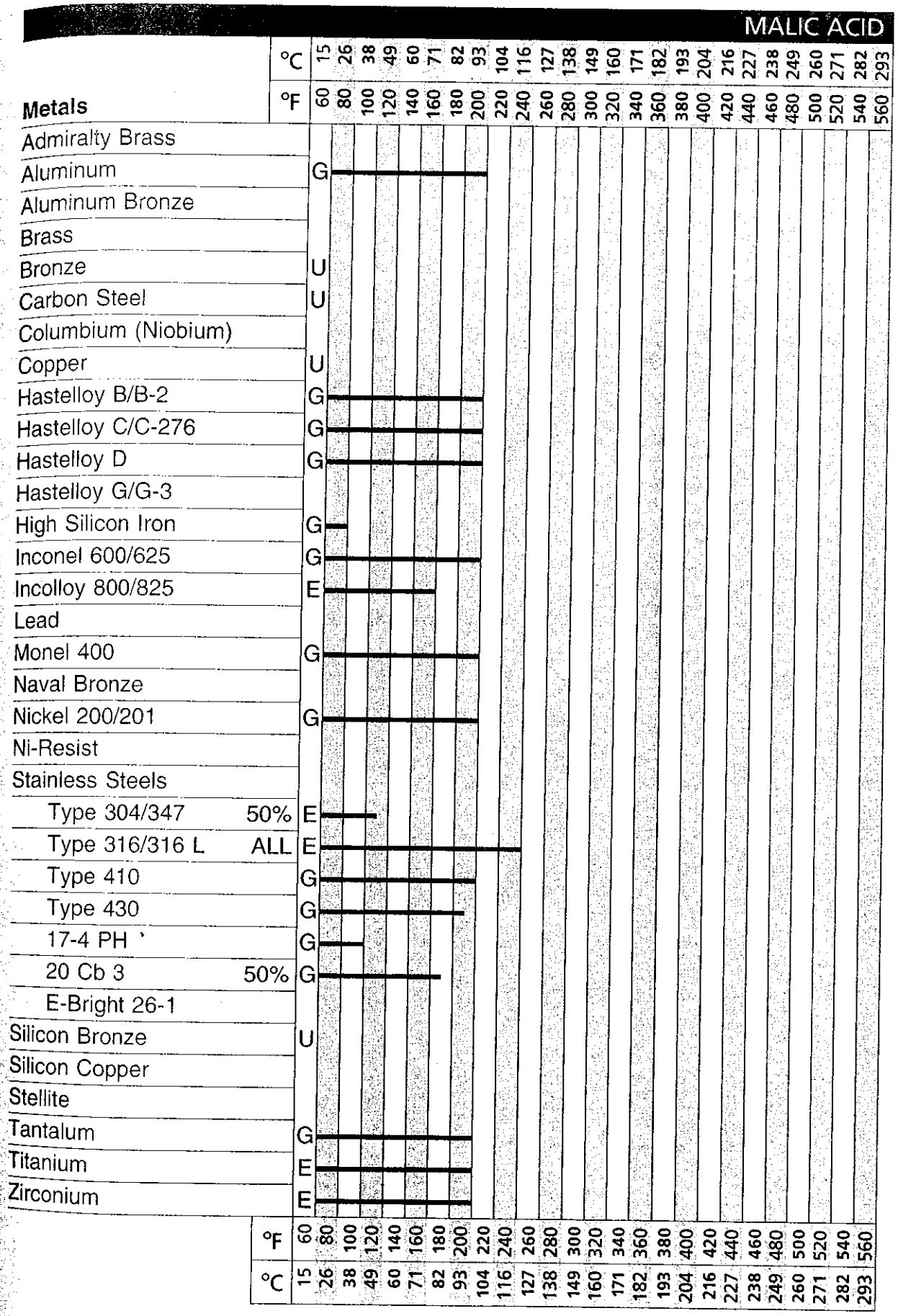


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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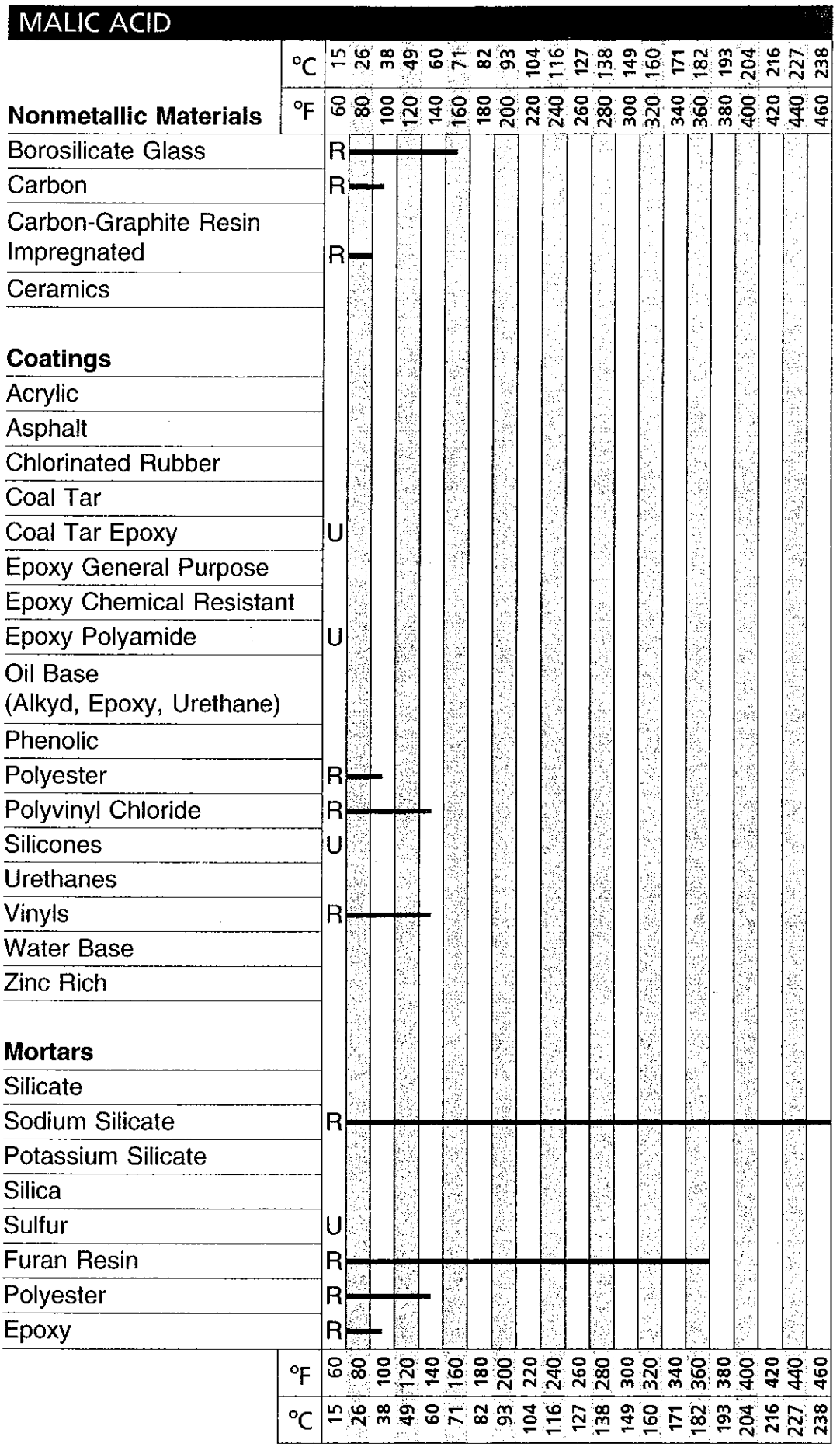
## MALIC ACID



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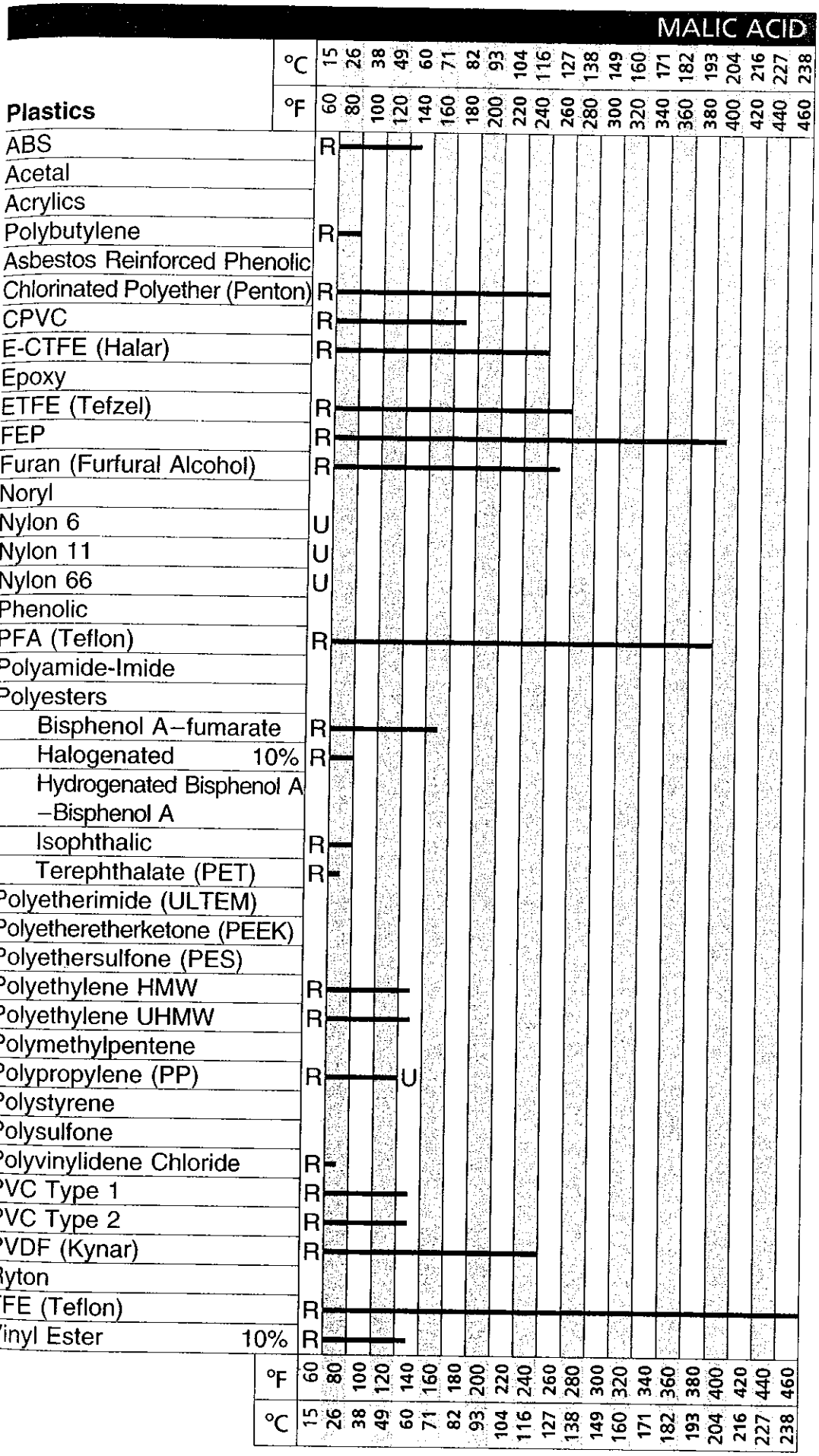


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## MALIC ACID

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | U | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | R | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | R | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | R | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | U | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | R | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | R | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | R | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | R | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | U | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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# MANGANESE CARBONATE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | E | G | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | E | G | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | E | G | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# MANGANESE CARBONATE

| Nonmetallic Materials | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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## MANGANESE CARBONATE

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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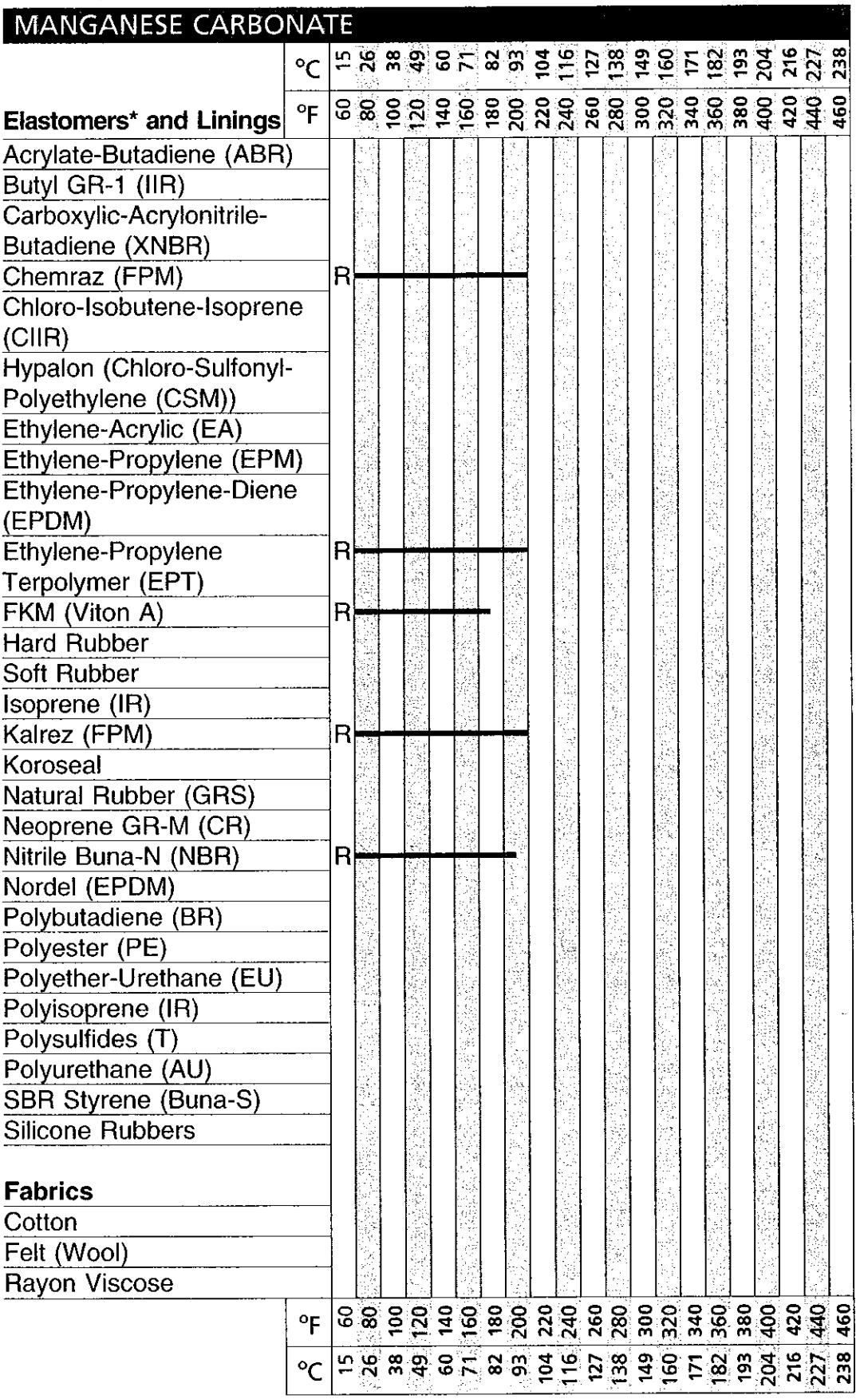
## MANGANESE CARBONATE




*See also Nylon 11 under PLASTICS



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# MANGANESE CHLORIDE

| Metals | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | 40% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | 40% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | 37% | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | 10%–50% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | 40% | | G | | U | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | 37% | | G | | U | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | 37% | | S | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | 30% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | 40% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | 5–20% | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | 5–20% | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | 5–20% | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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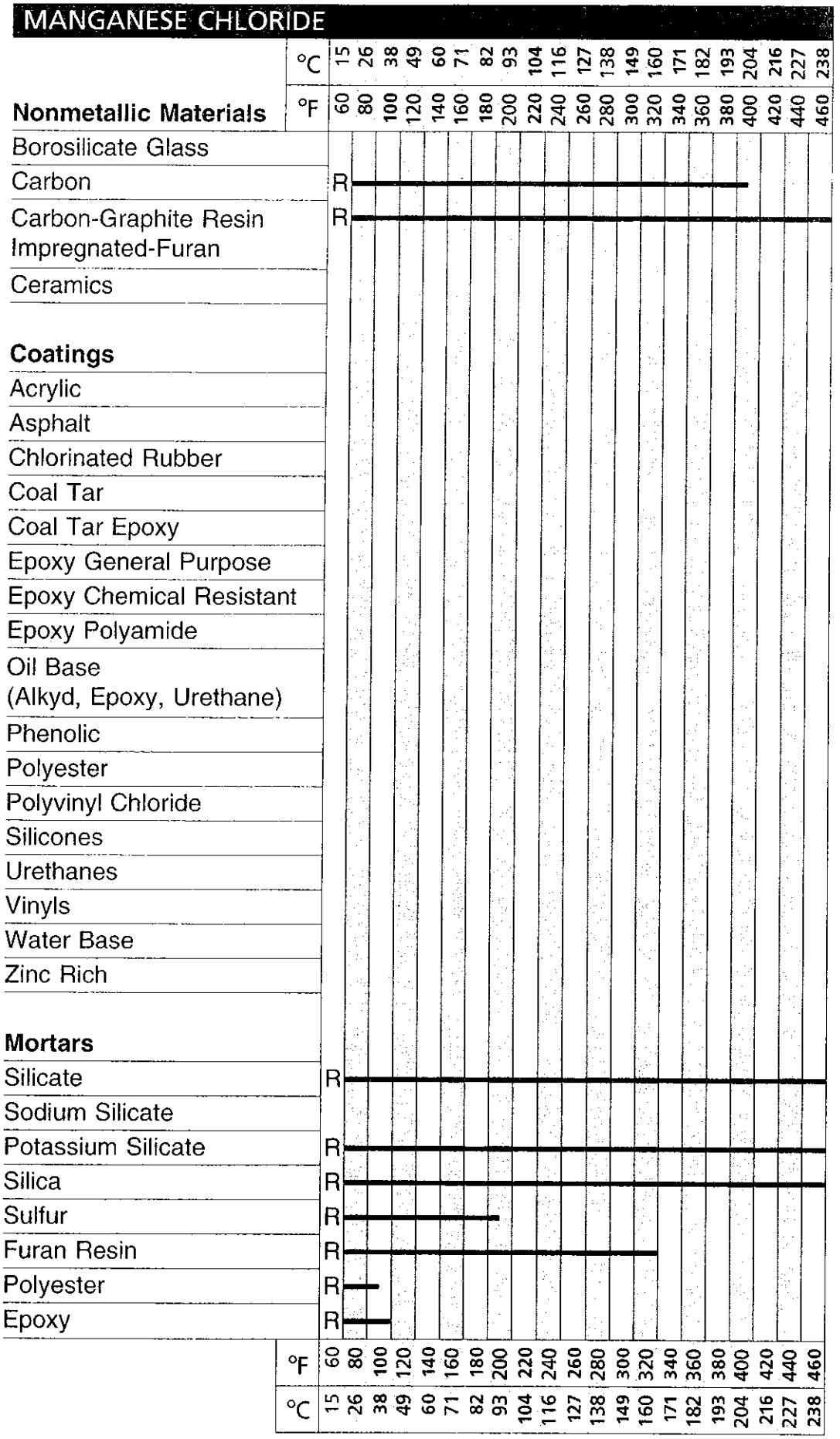




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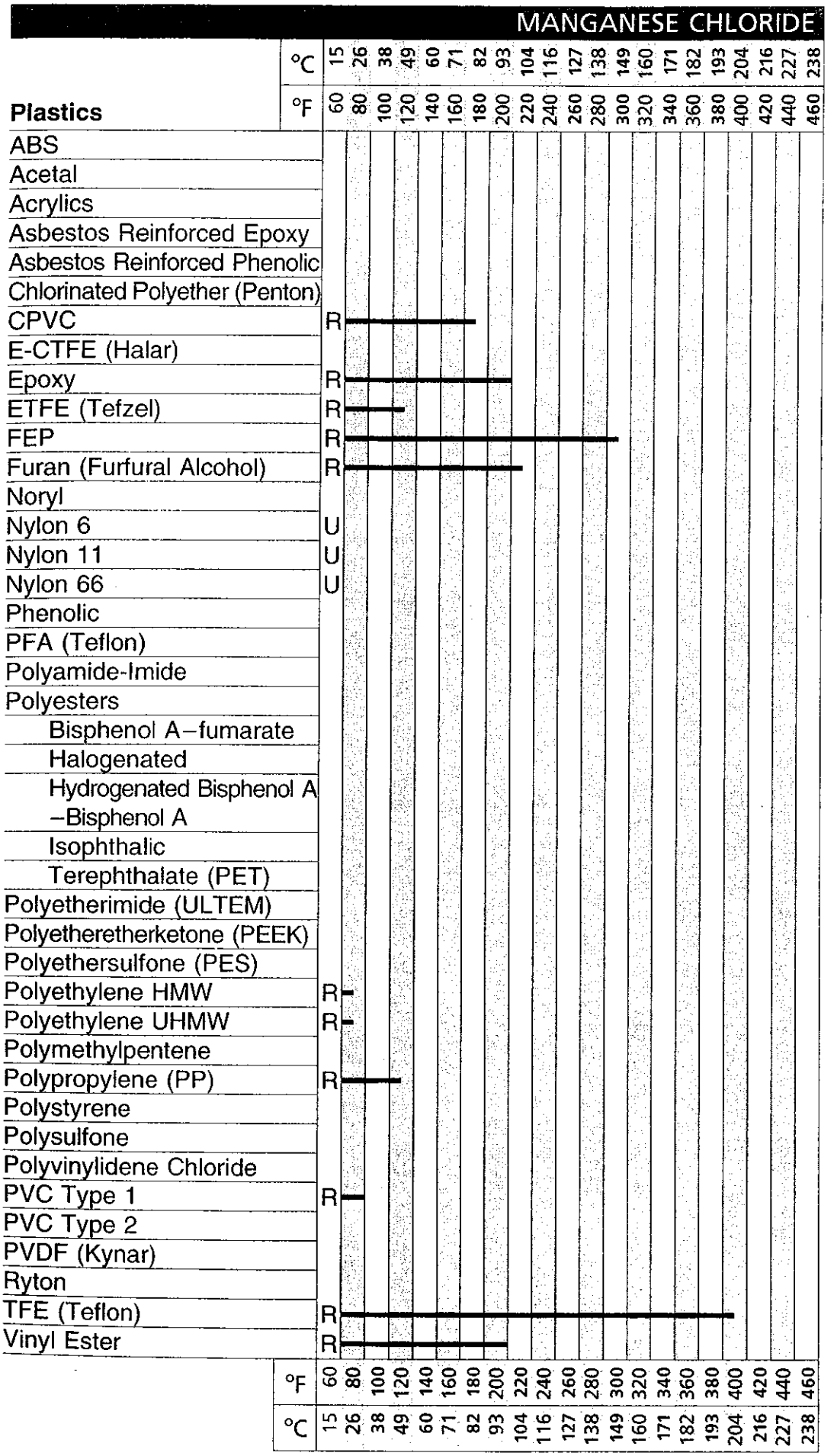
# MANGANESE CHLORIDE

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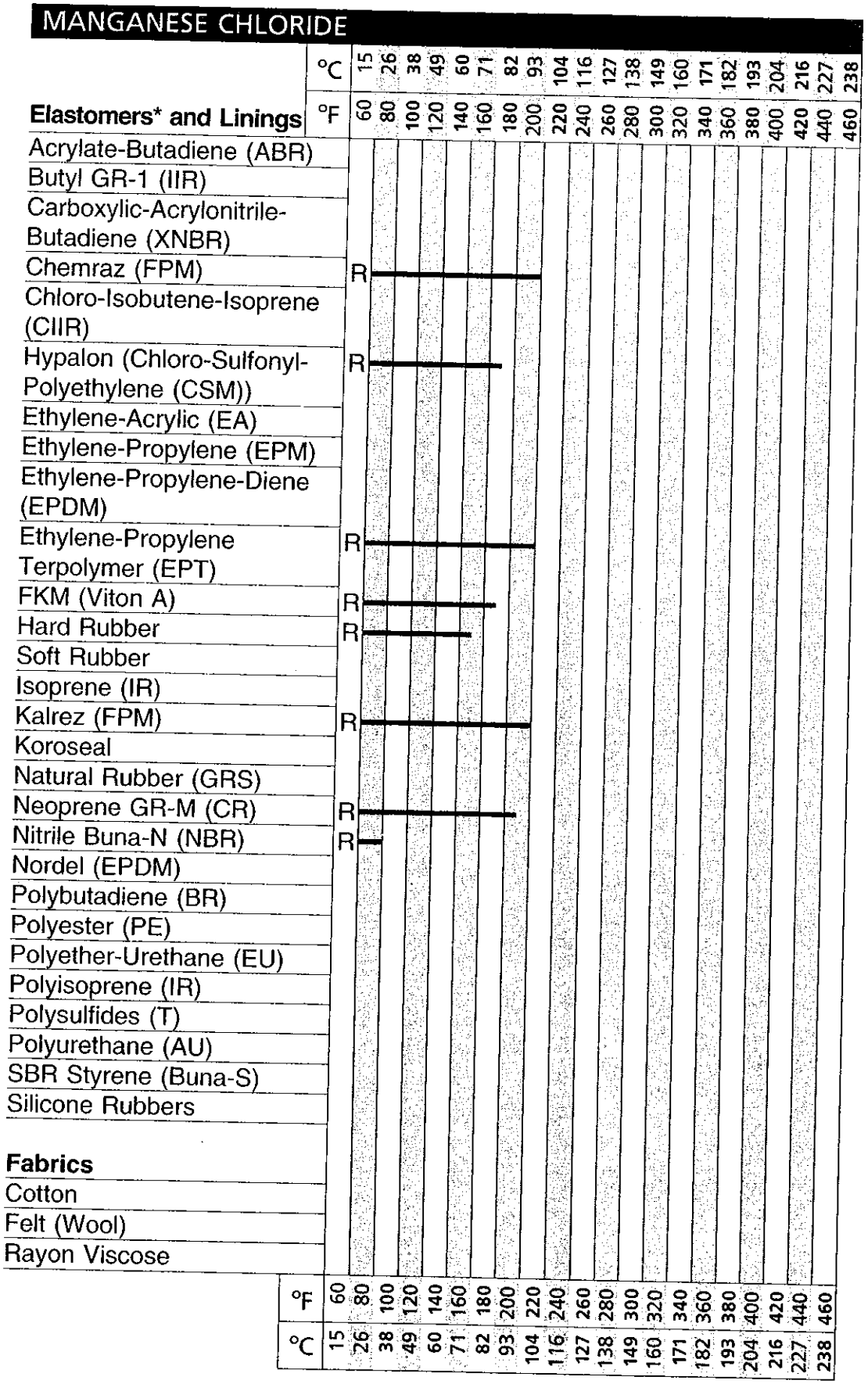


*See also Nylon 11 under PLASTICS



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# MANGANESE SULFATE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | U | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L 45% | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## MANGANESE SULFATE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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## MANGANESE SULFATE

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | R | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | R | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | R | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | R | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | R | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |


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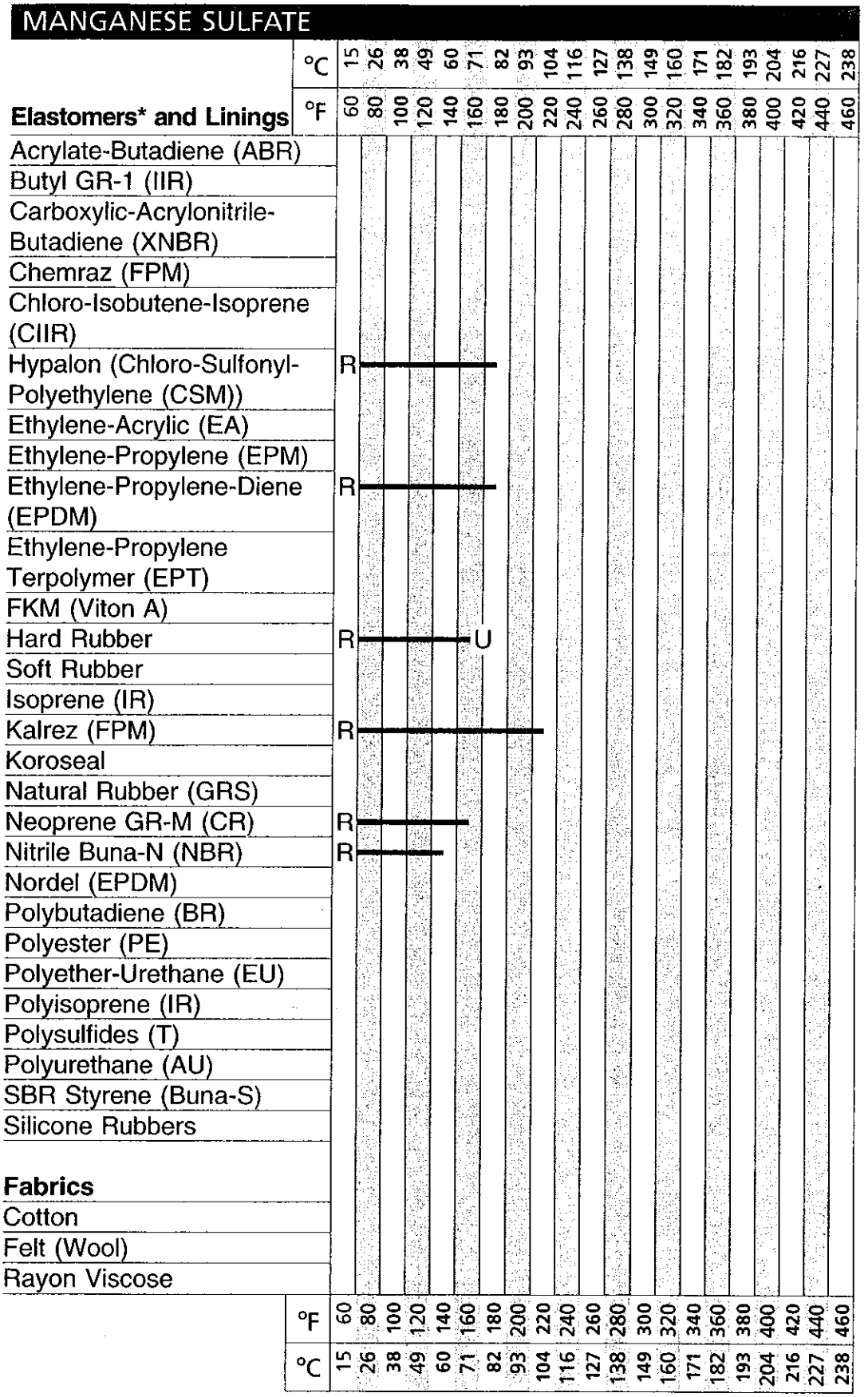
## MANGANESE SULFATE

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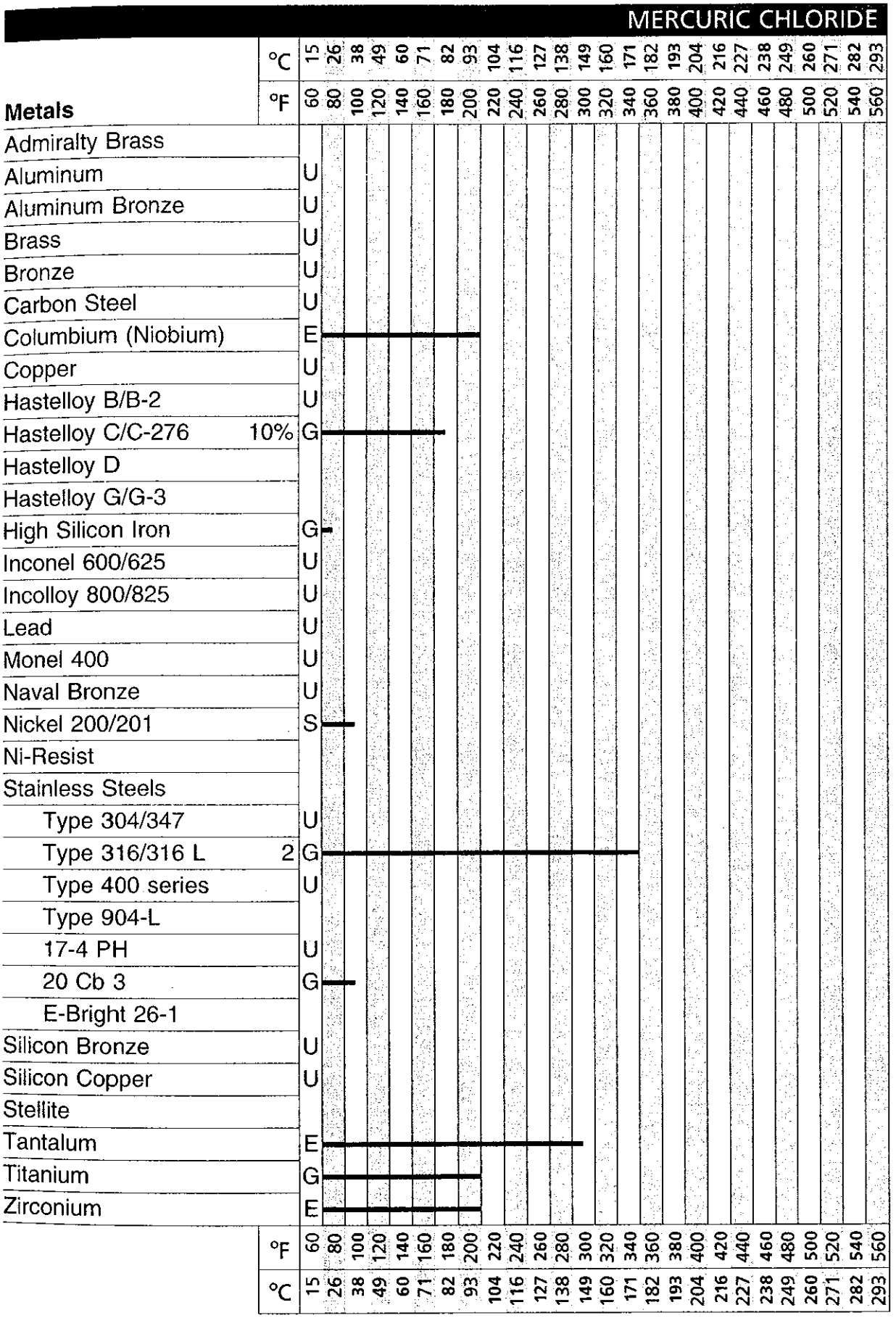
# MERCURIC CHLORIDE




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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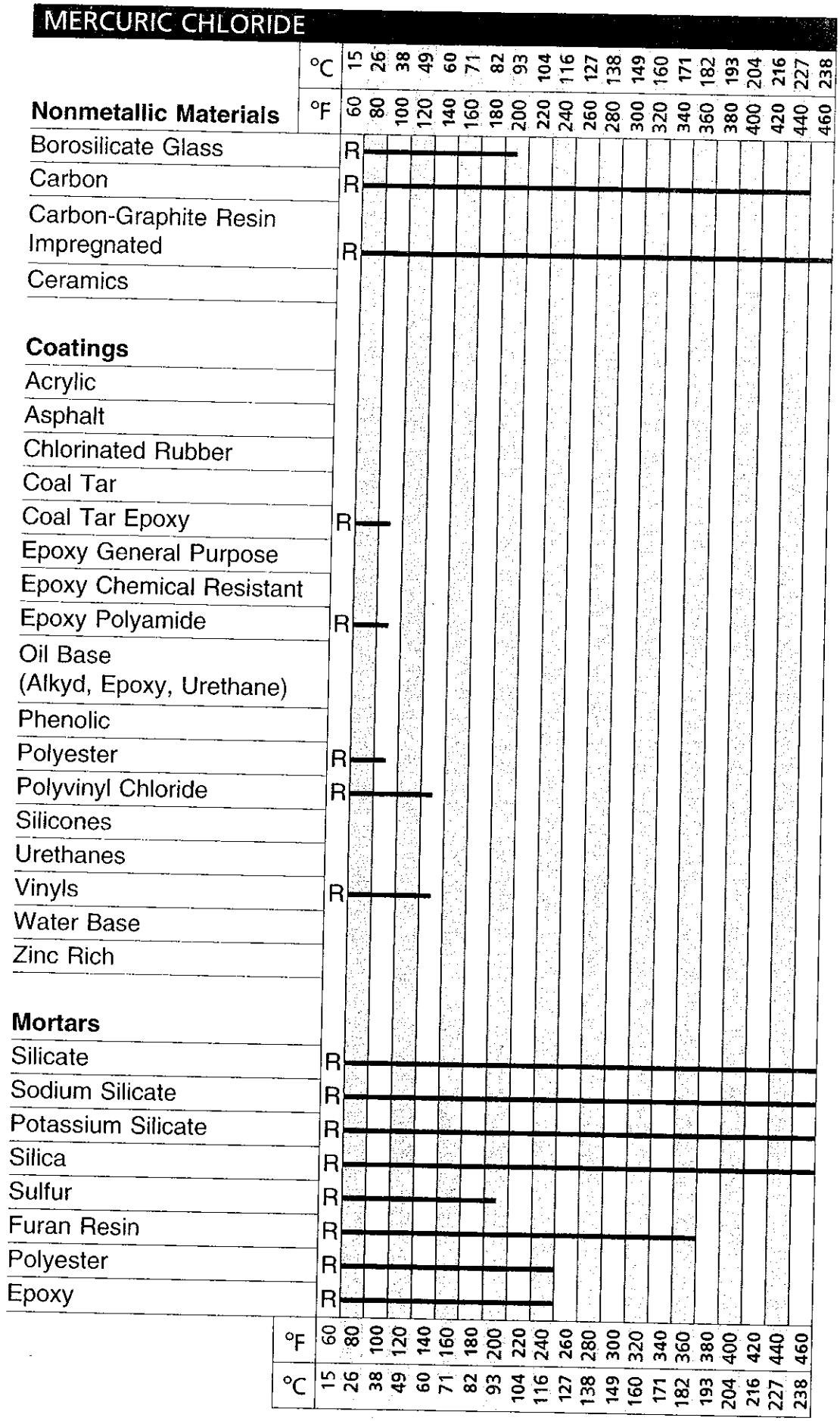




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## MERCURIC CHLORIDE

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | R | |
| Nylon 6 | U | |
| Nylon 11 | U | |
| Nylon 66 | U | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | R | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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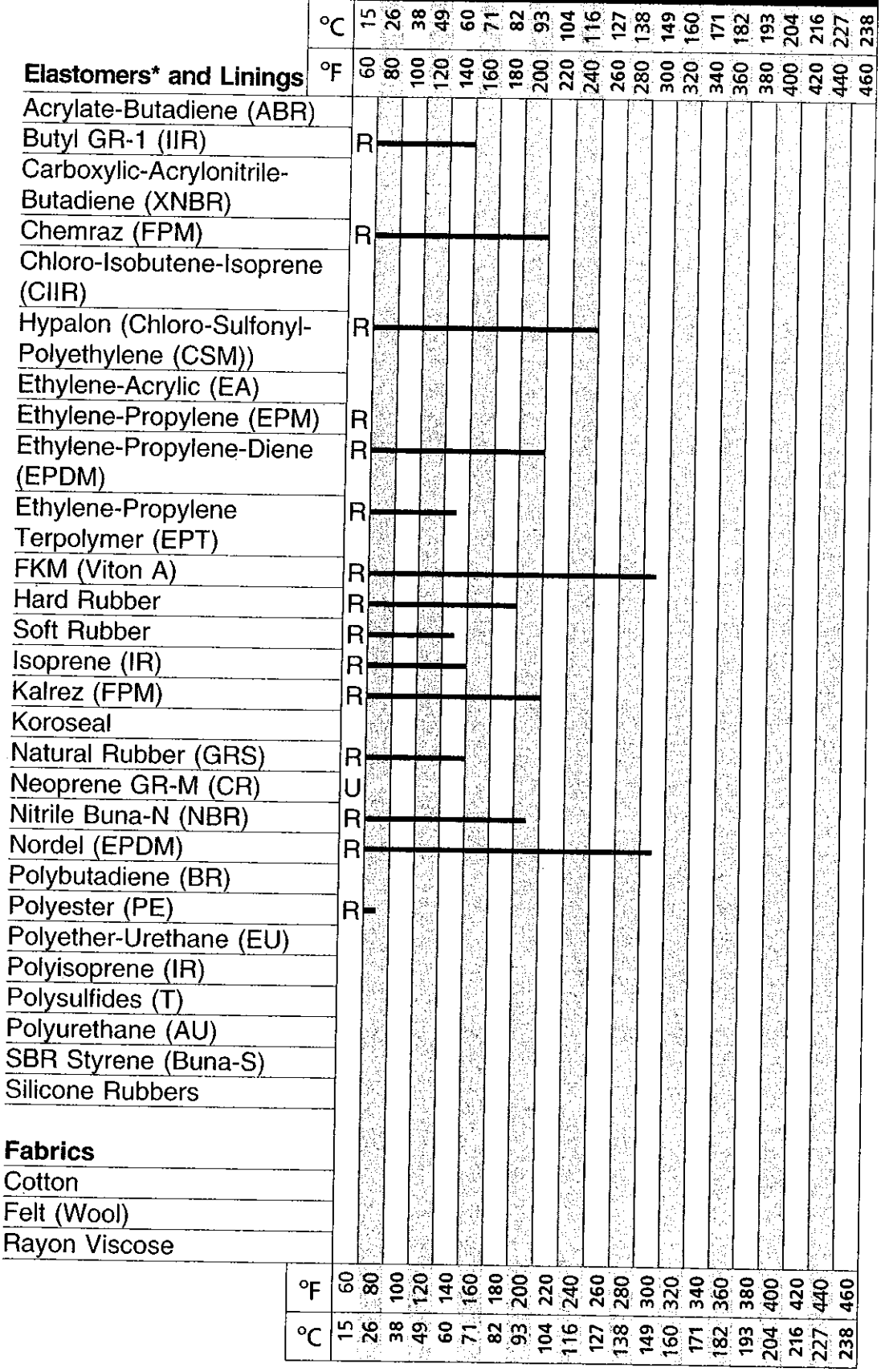
## MERCURIC CHLORIDE

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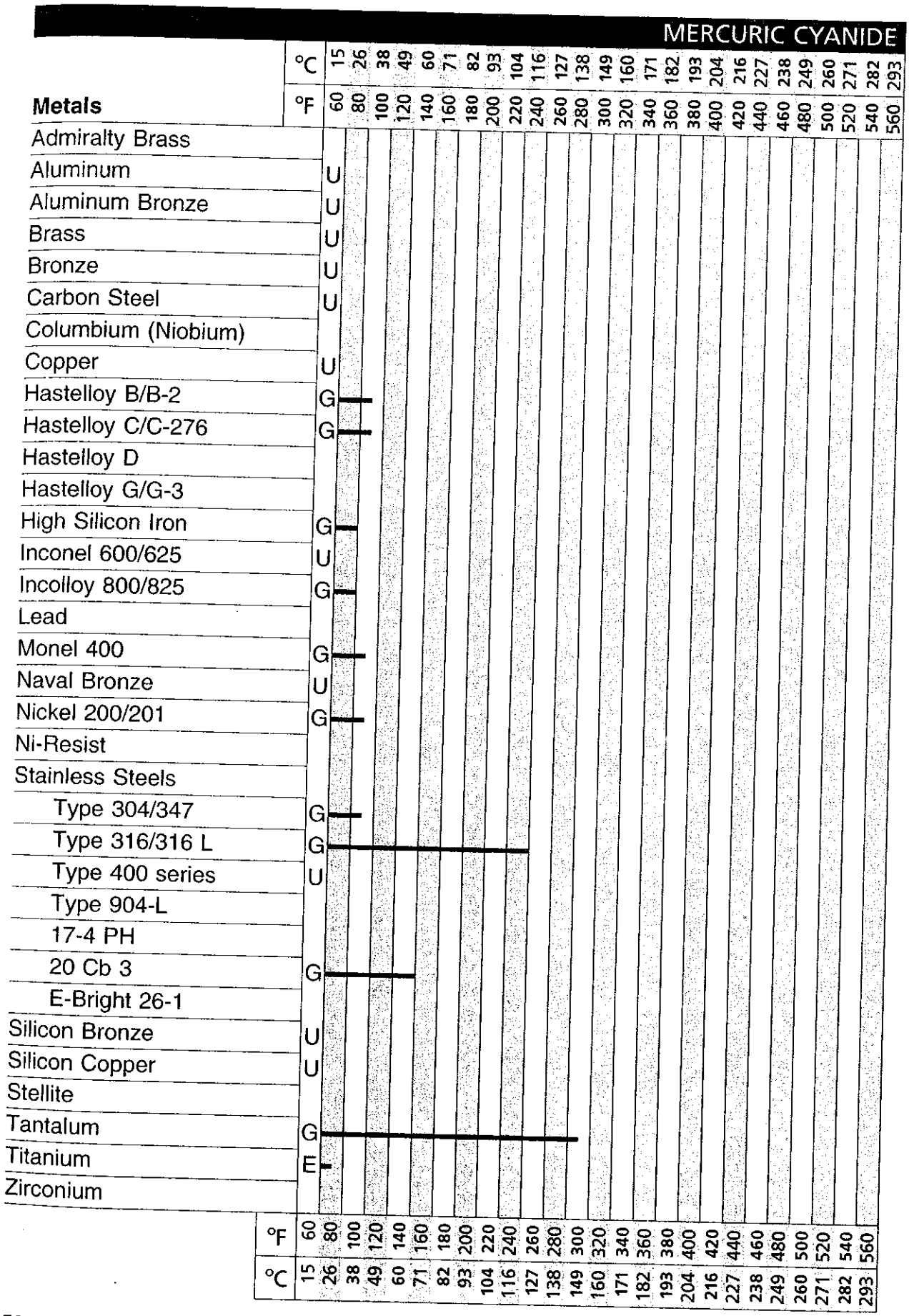
# MERCURIC CYANIDE




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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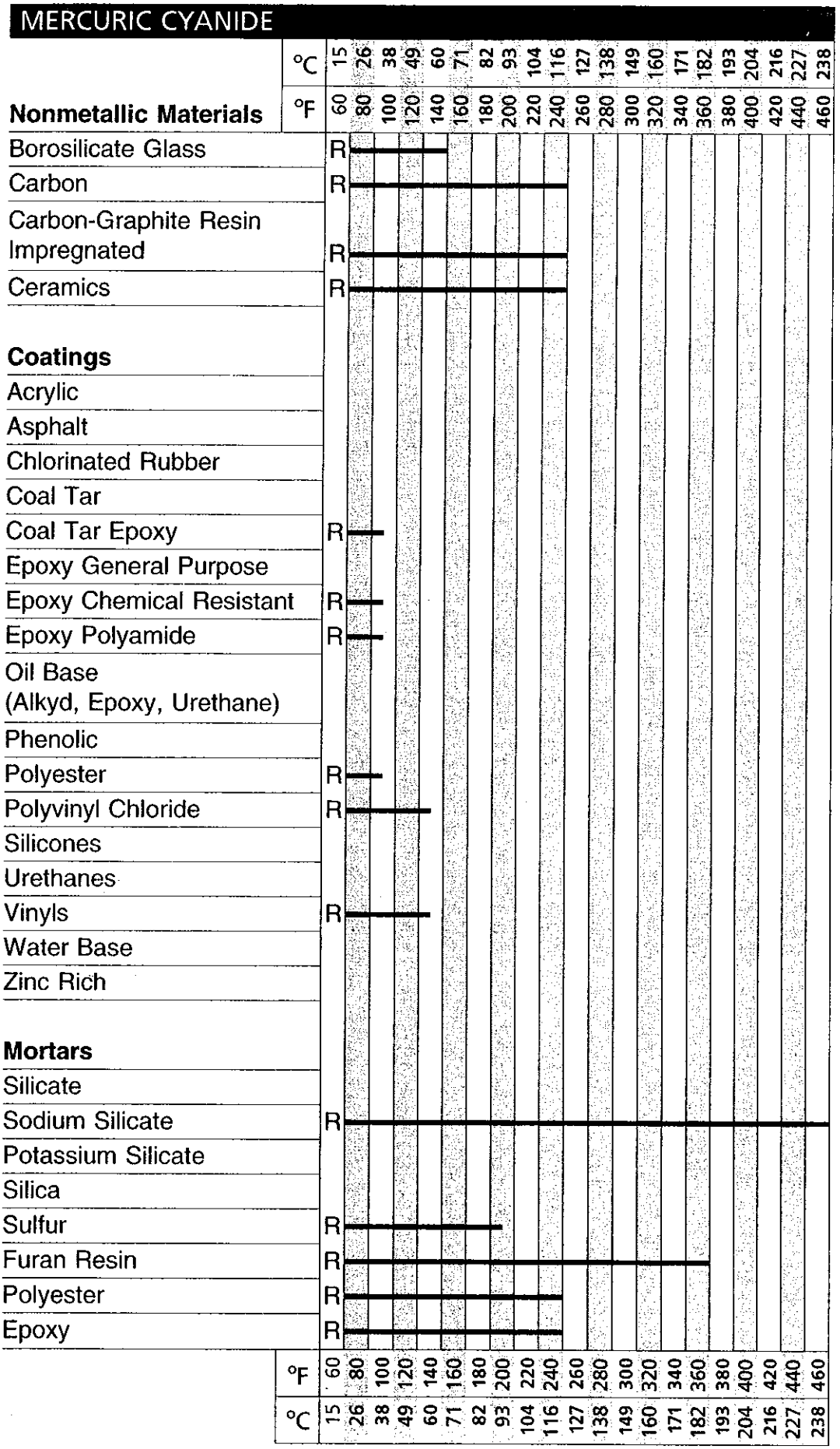




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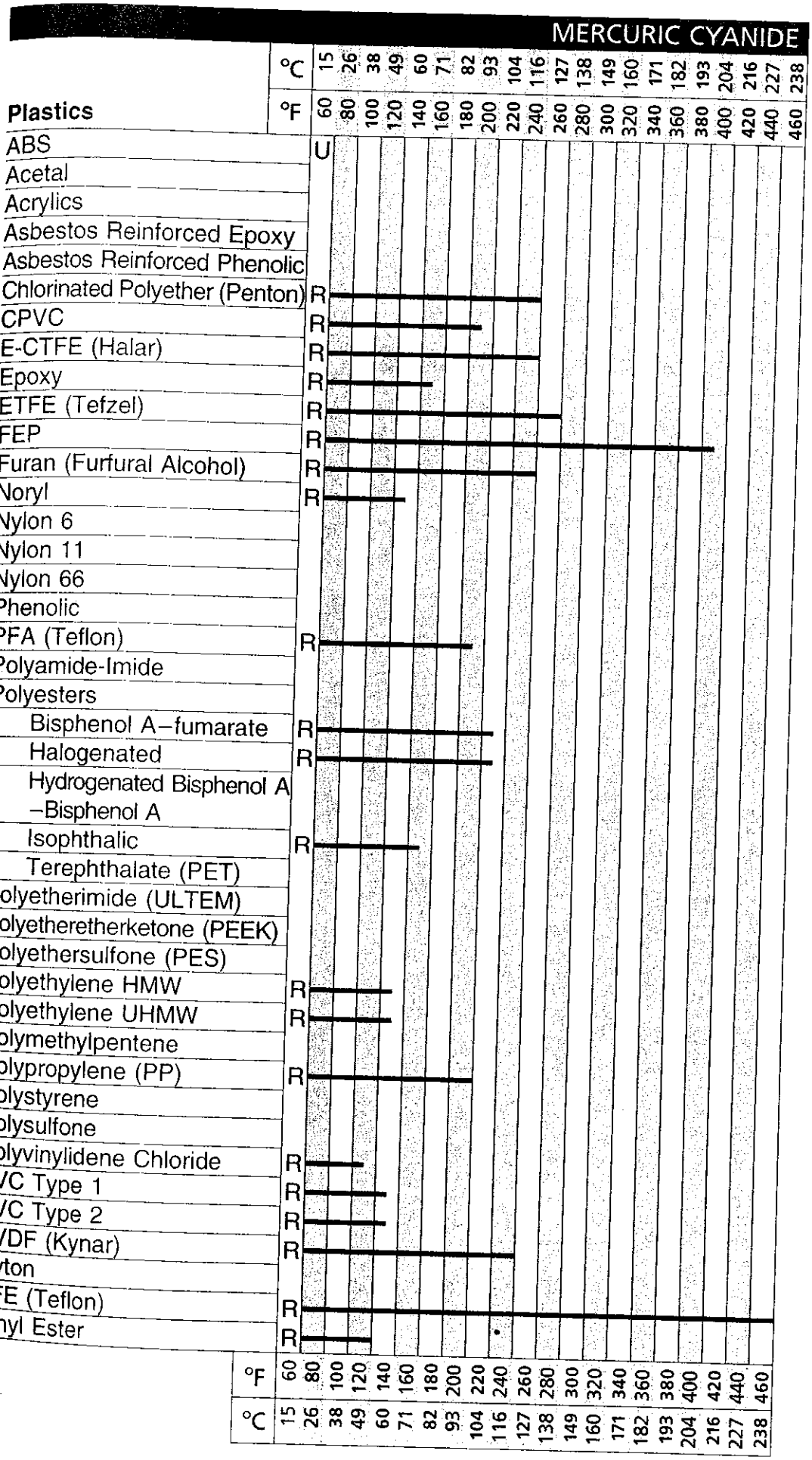


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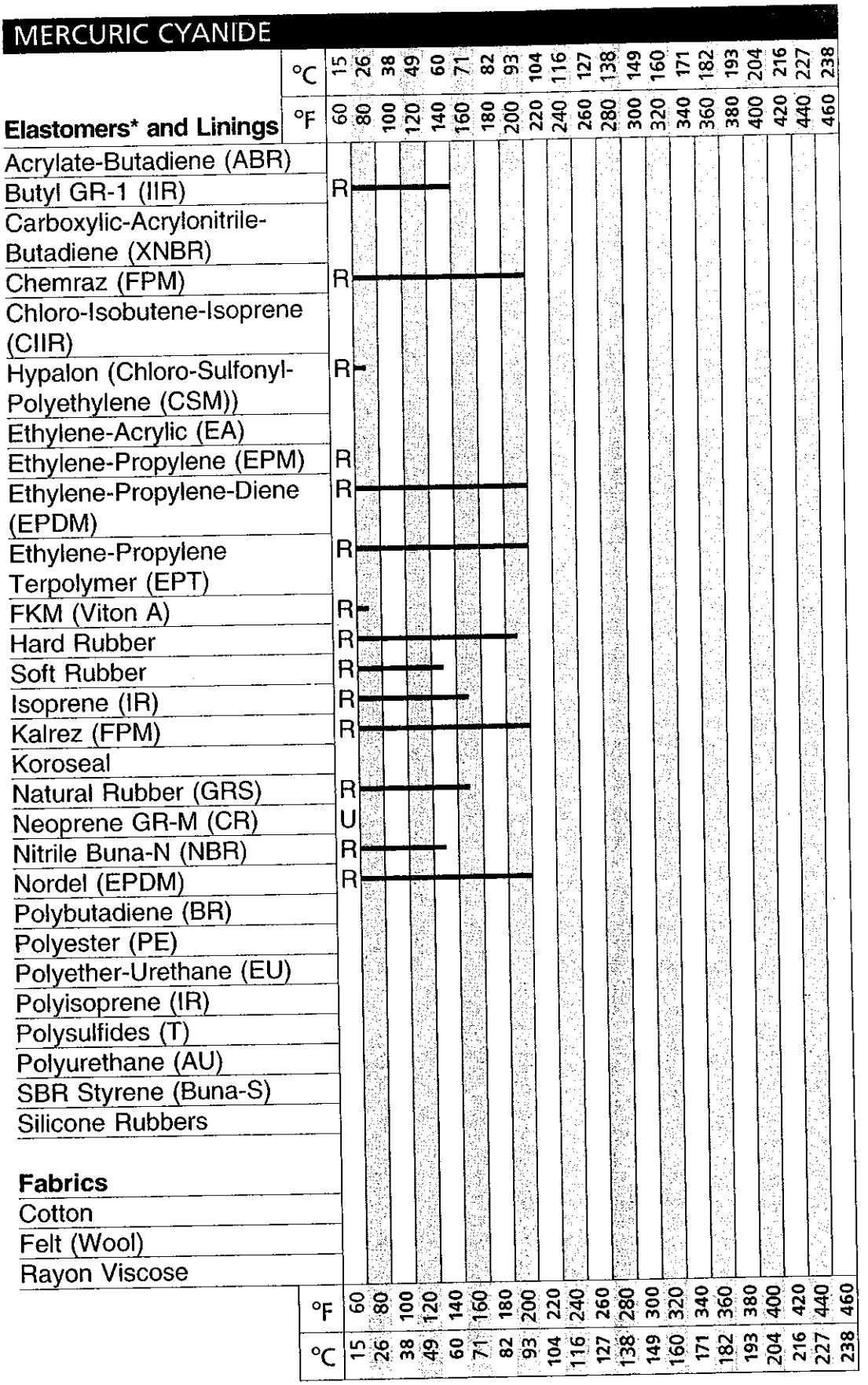


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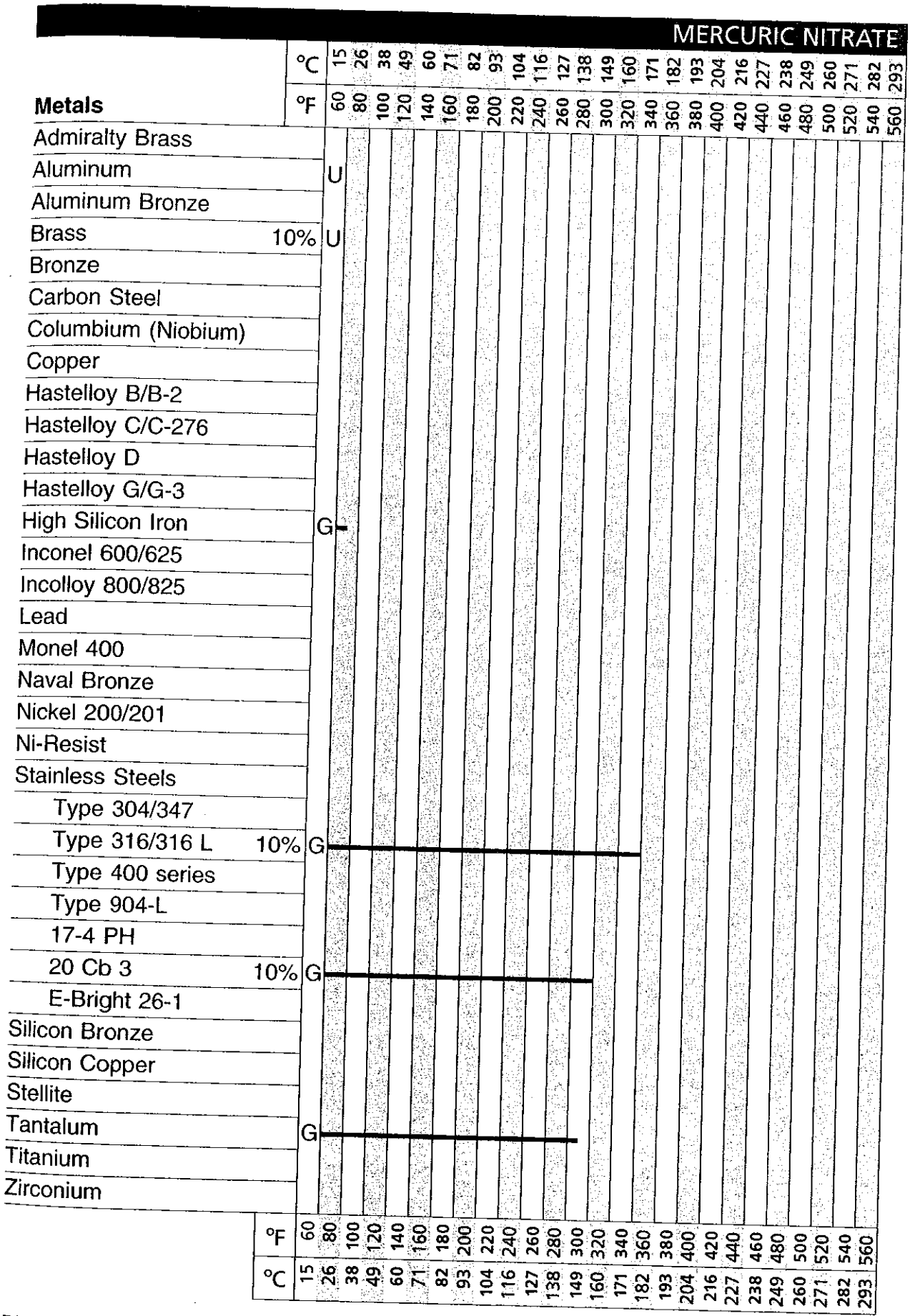


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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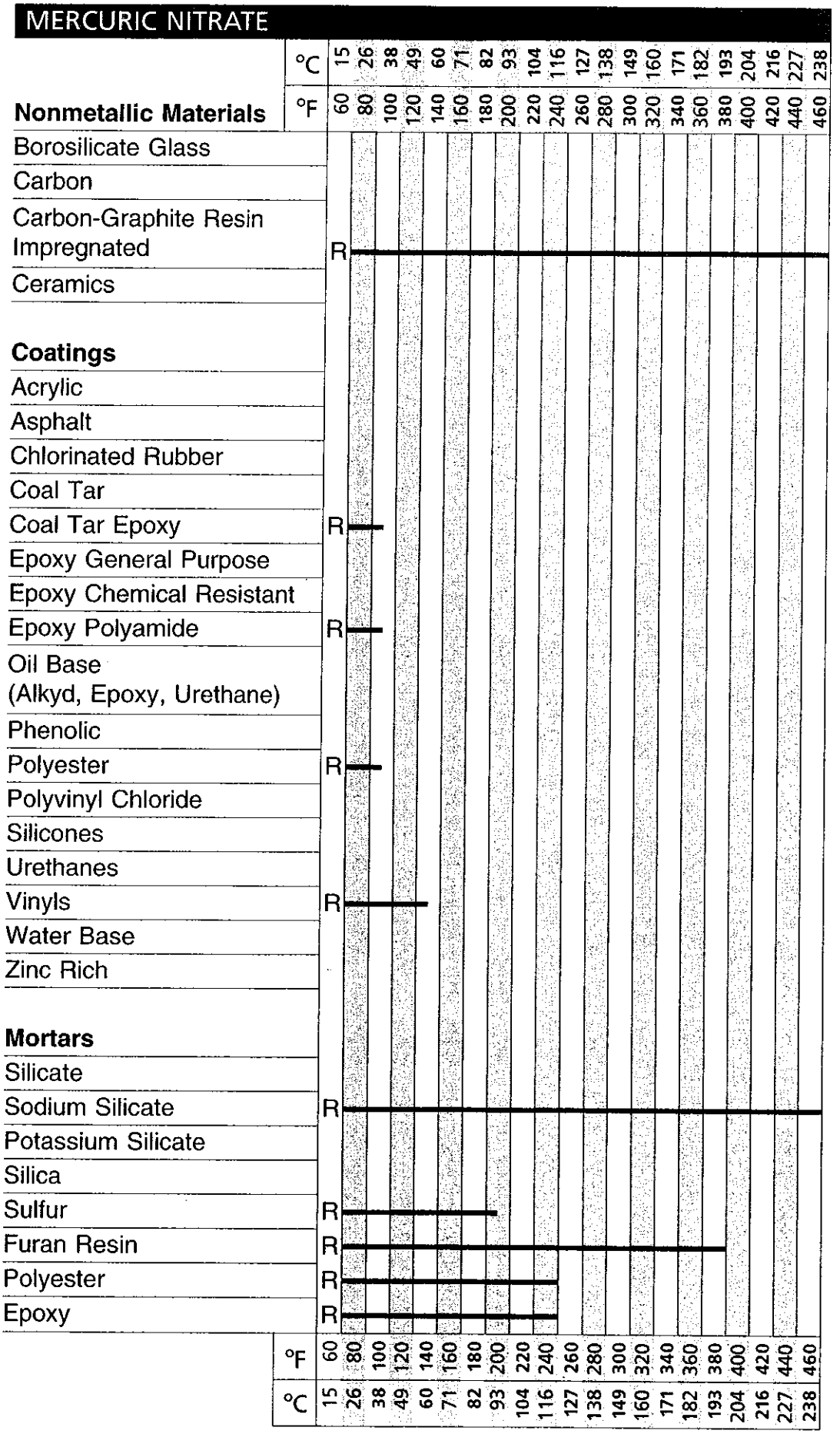




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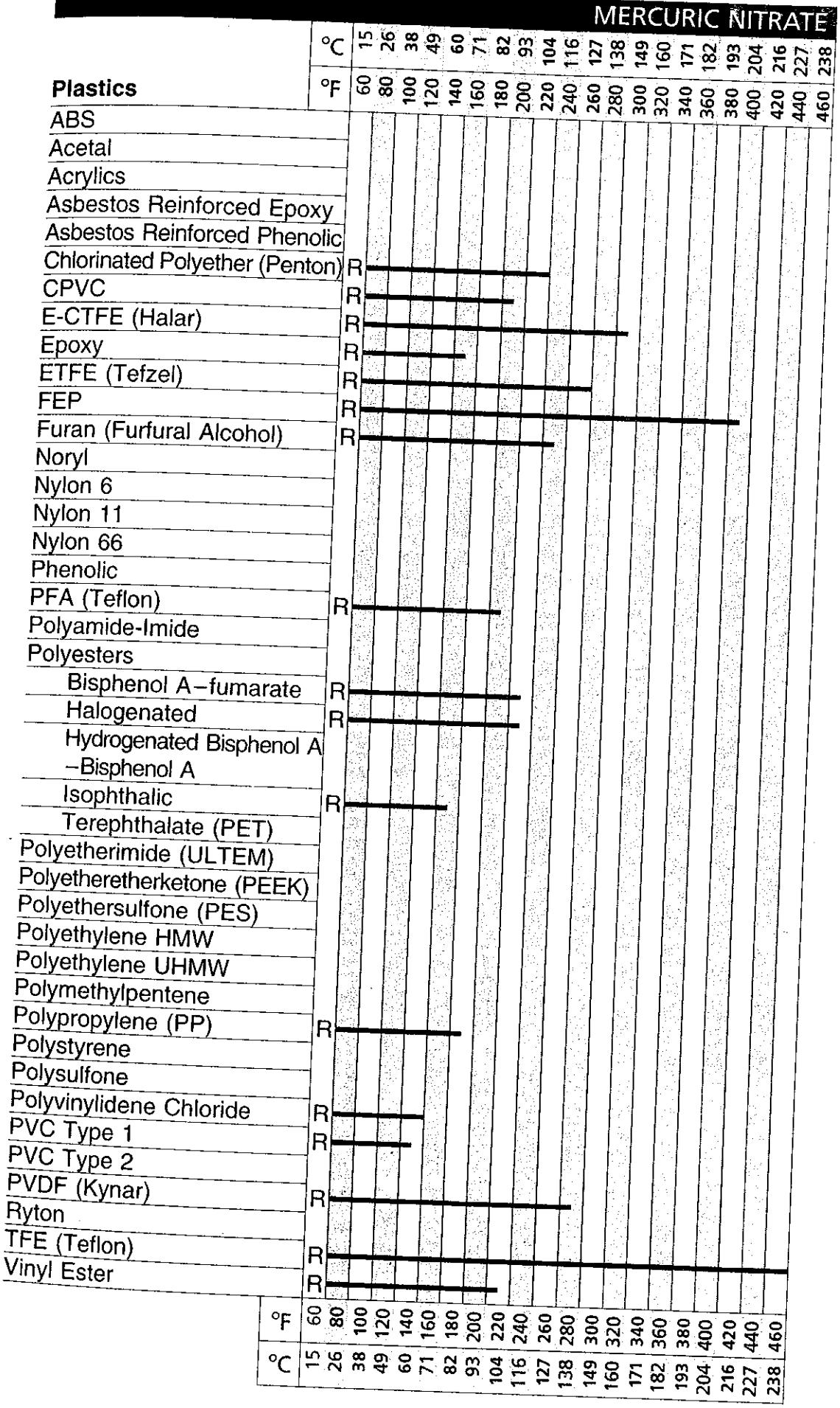


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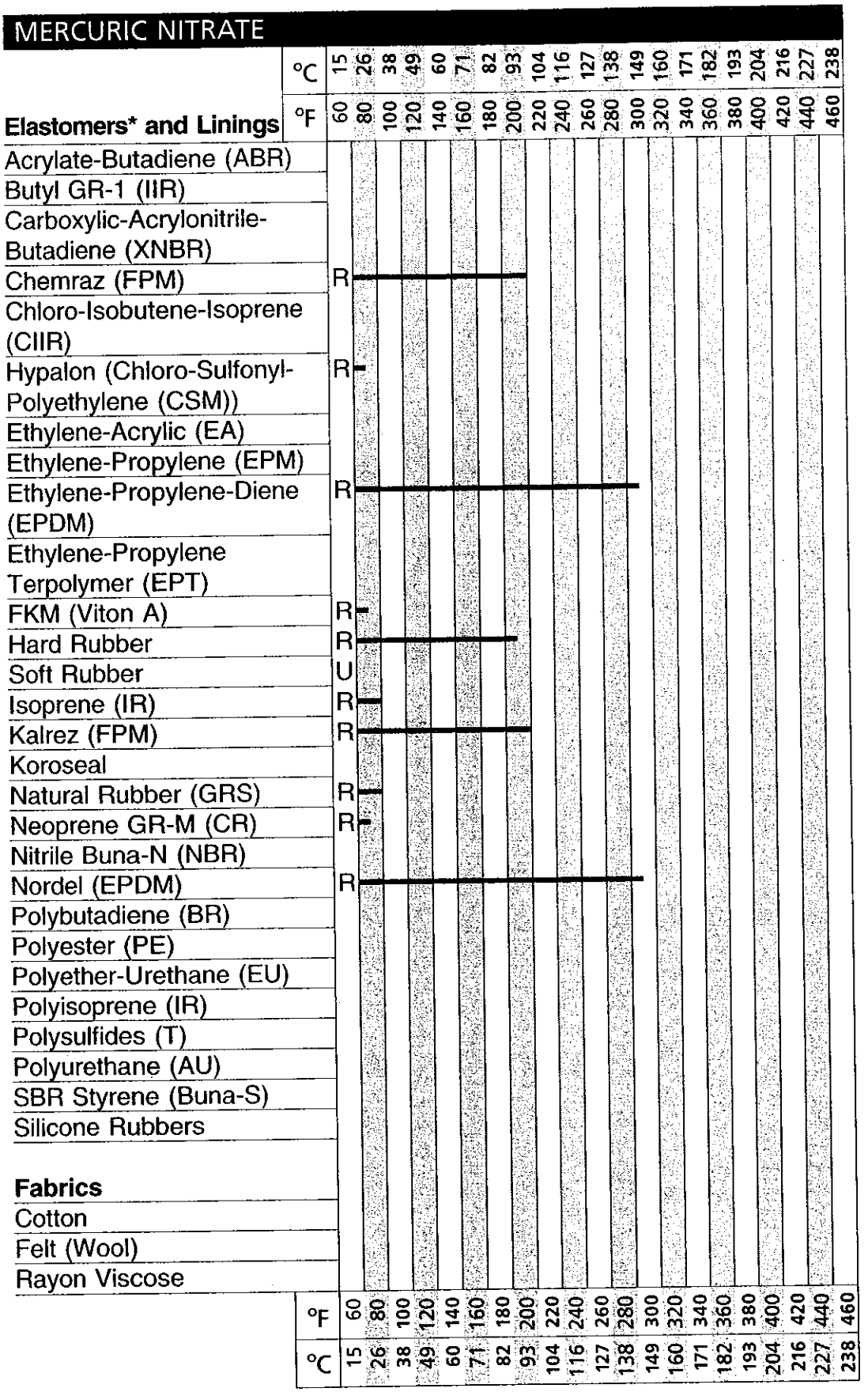


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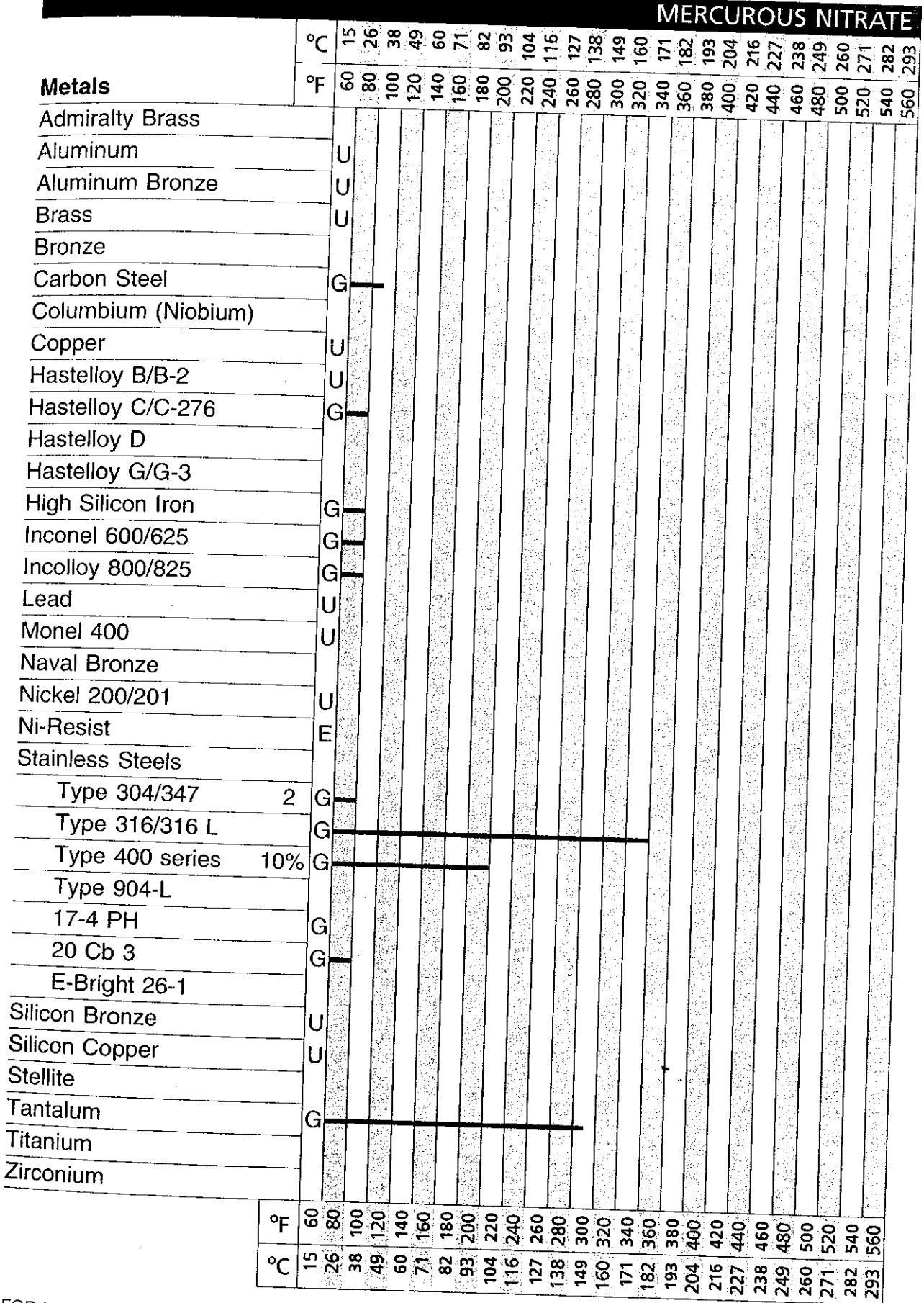


FOR METALS

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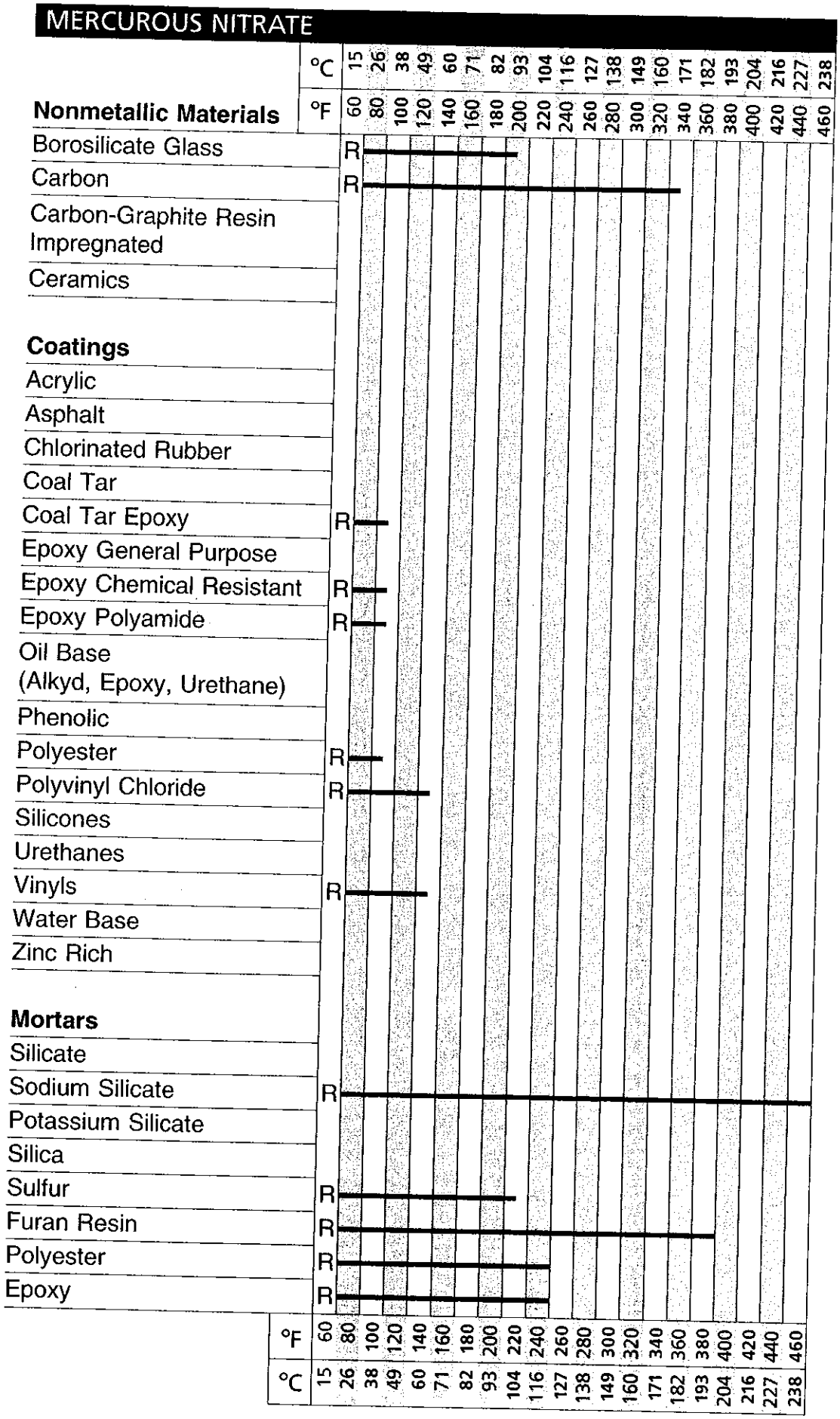




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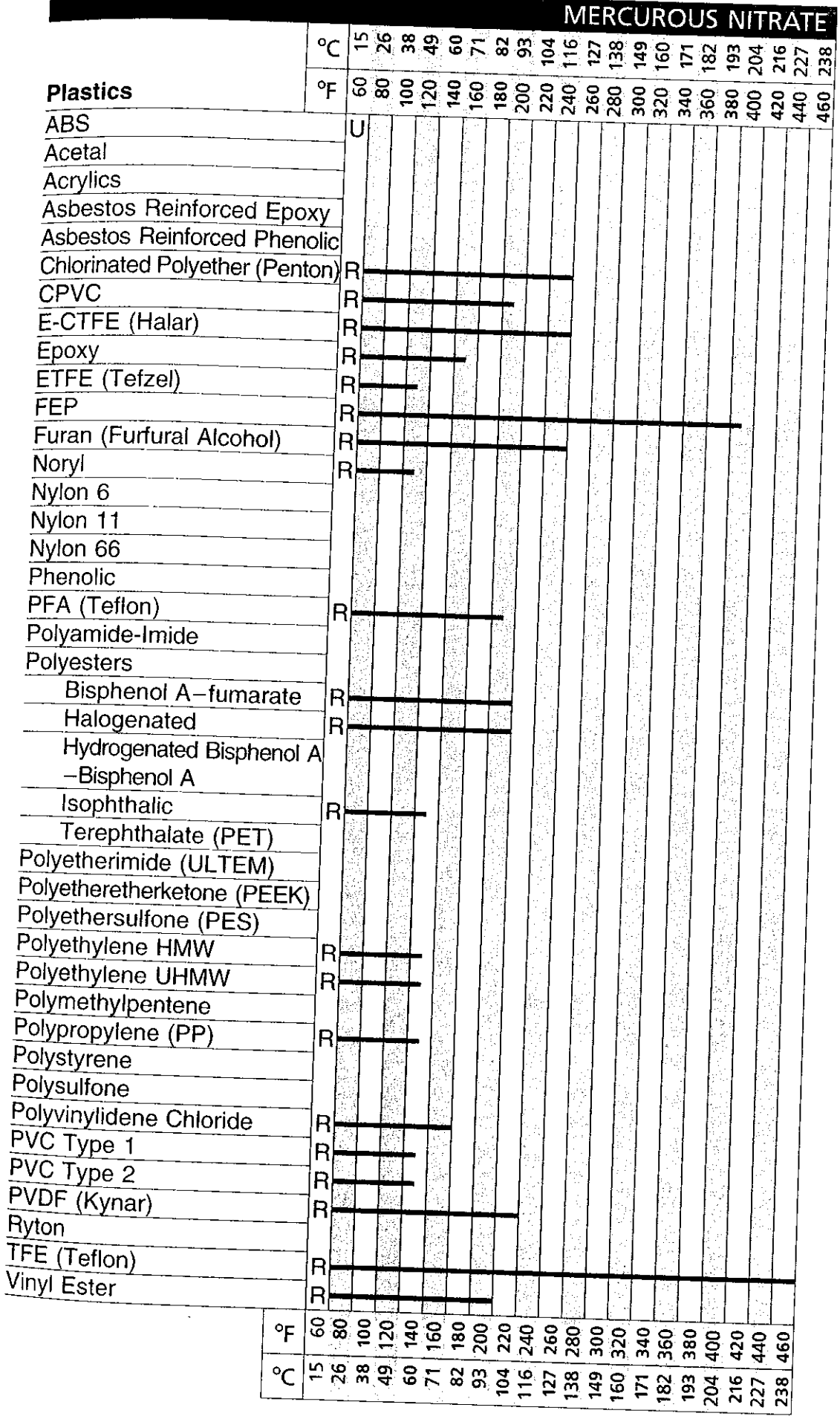


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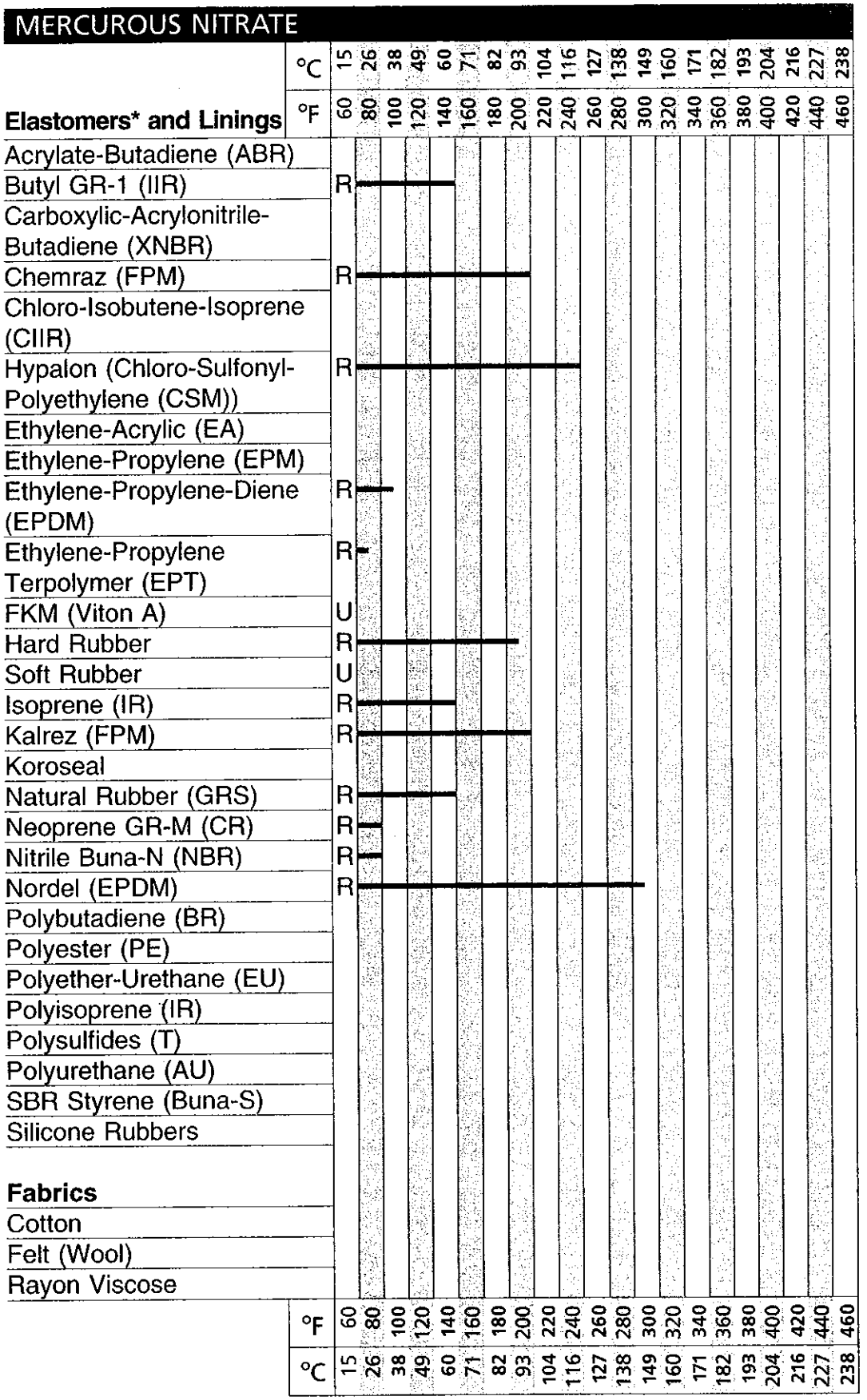


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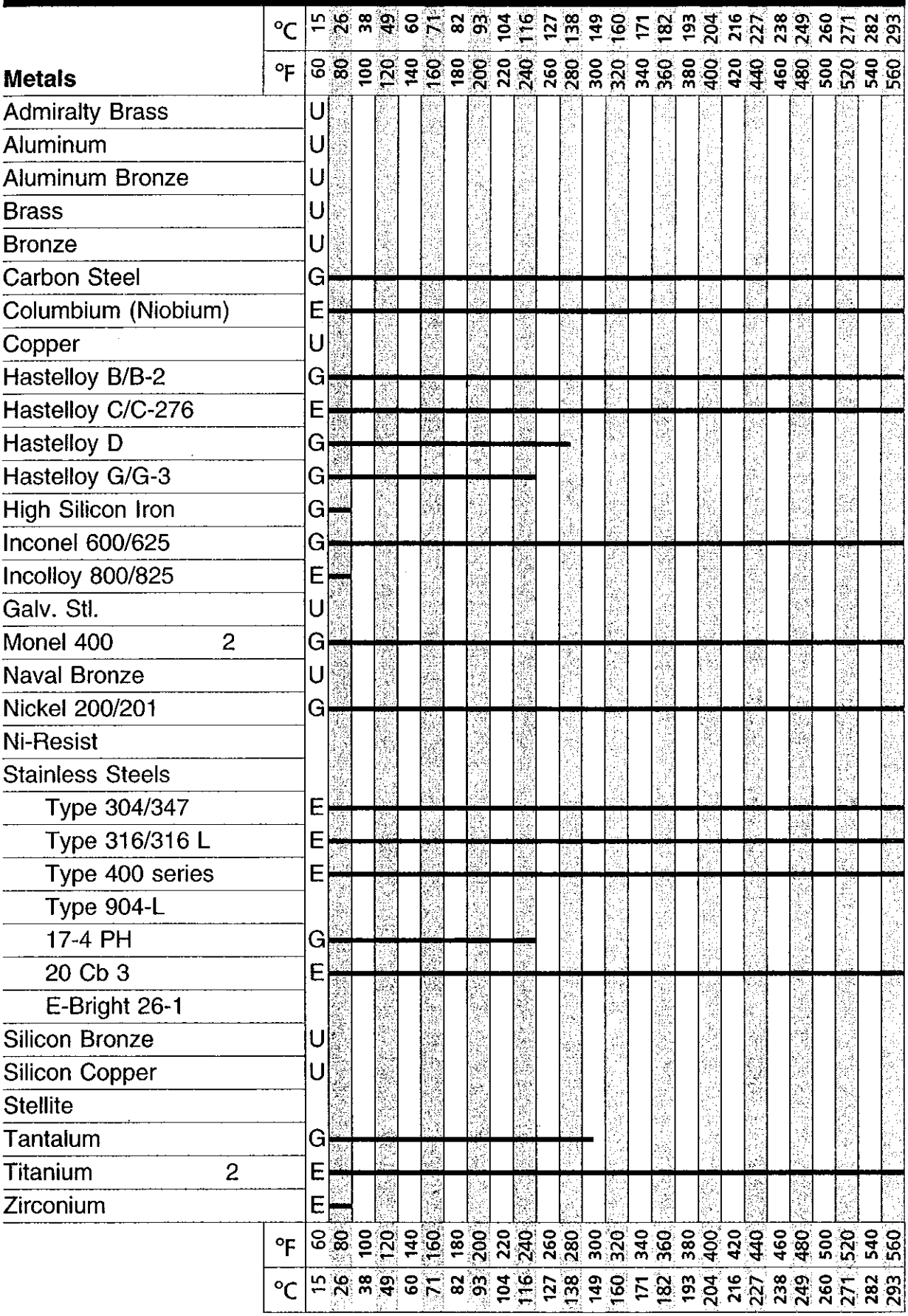


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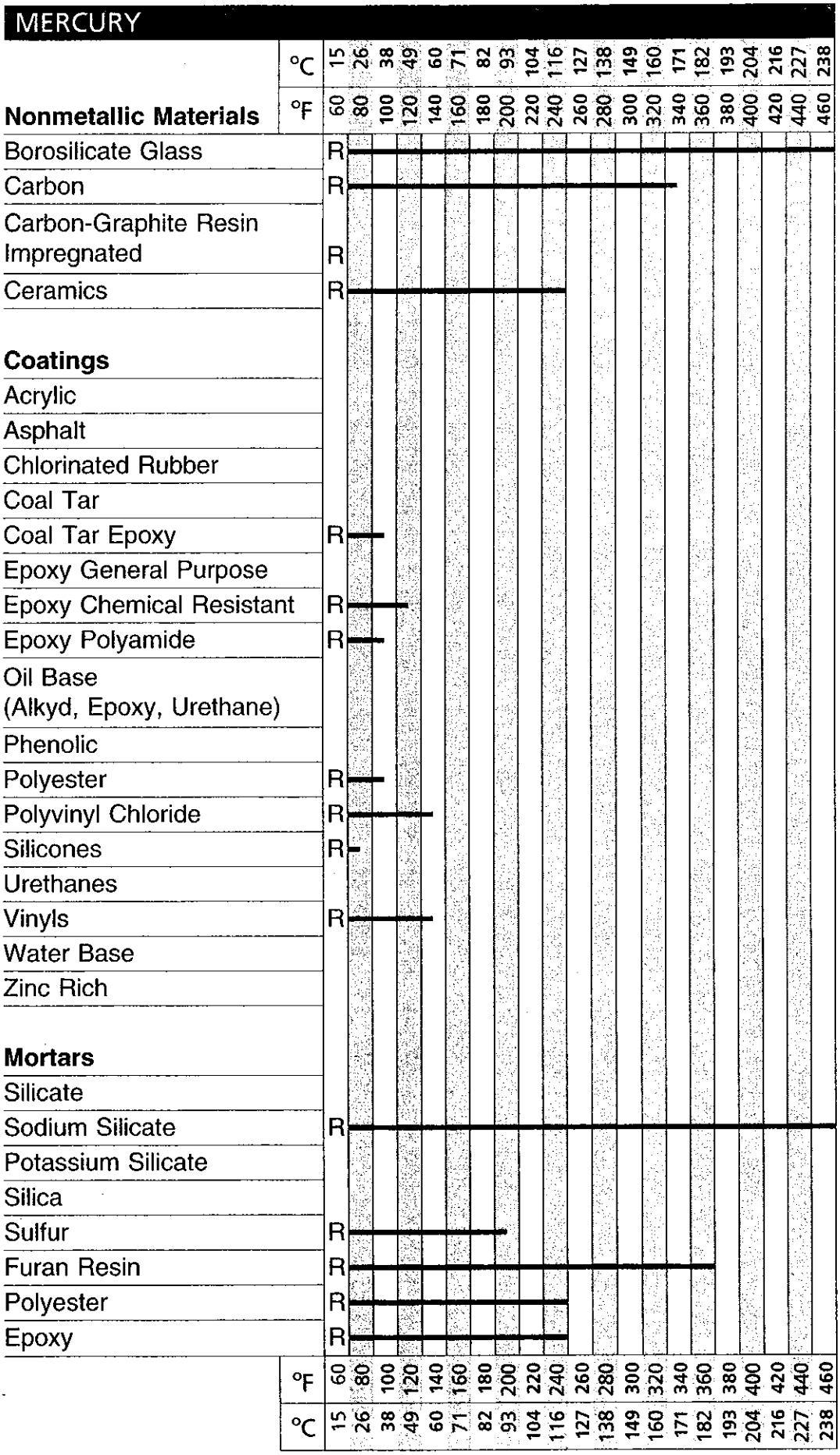






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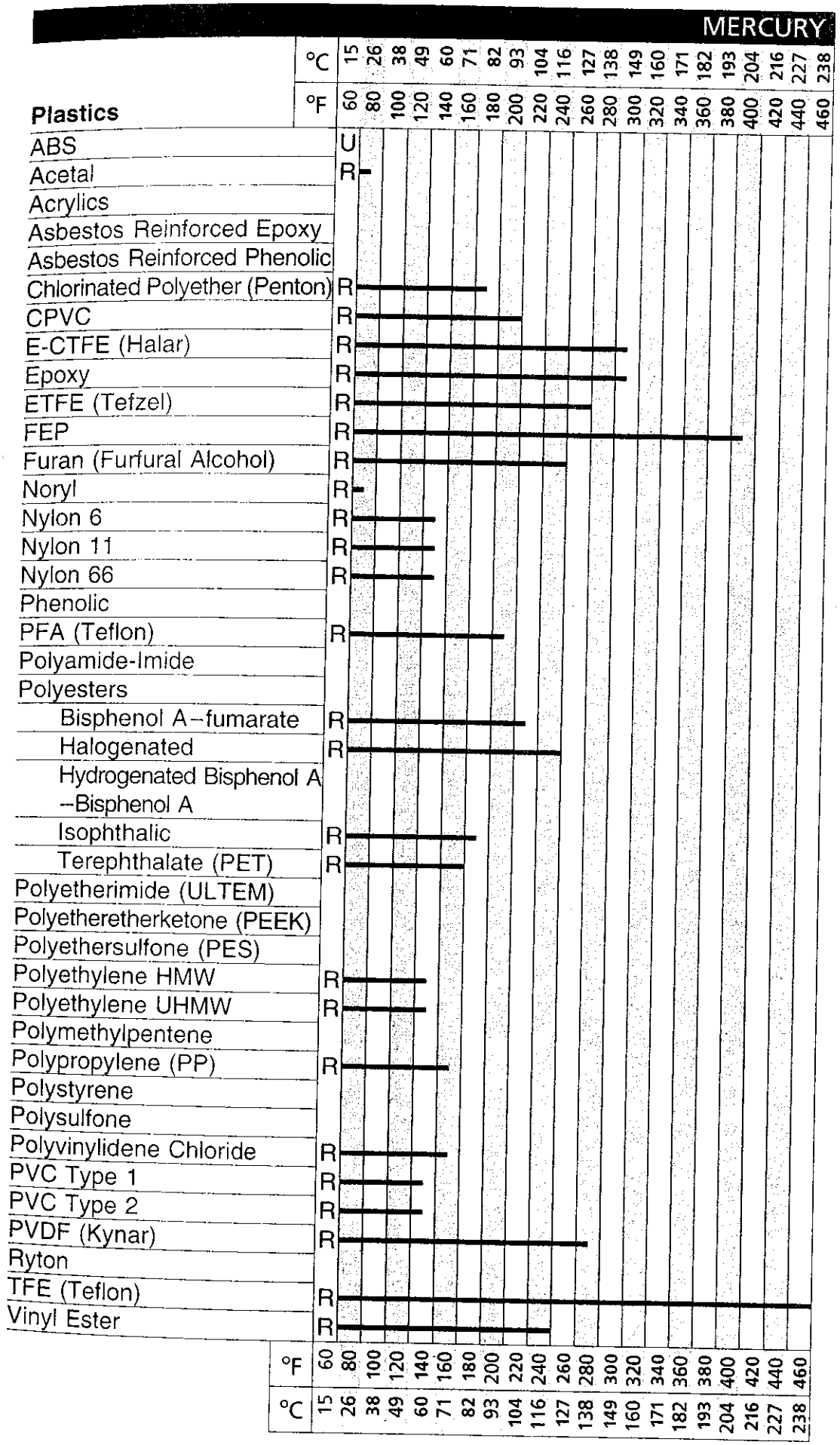


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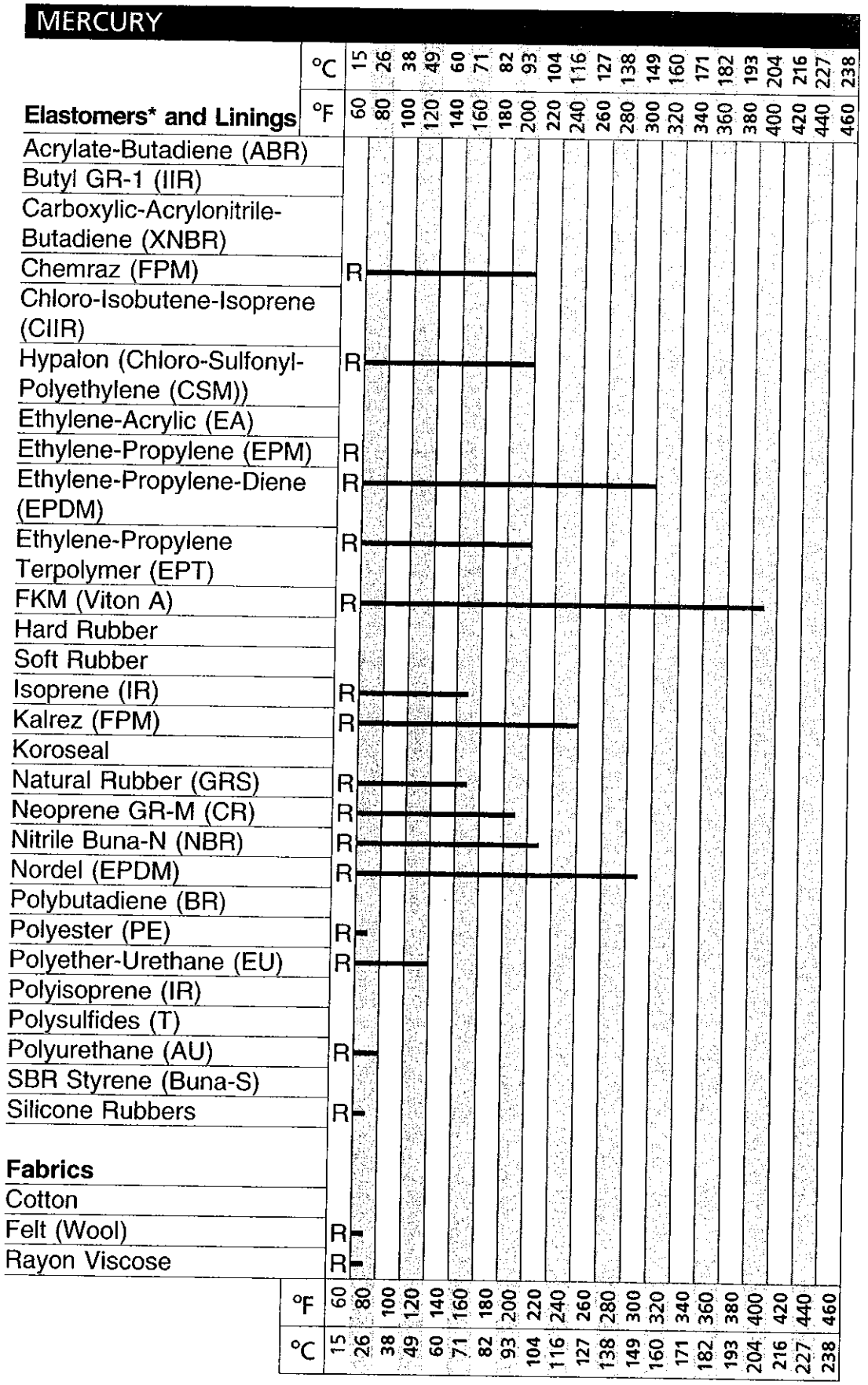


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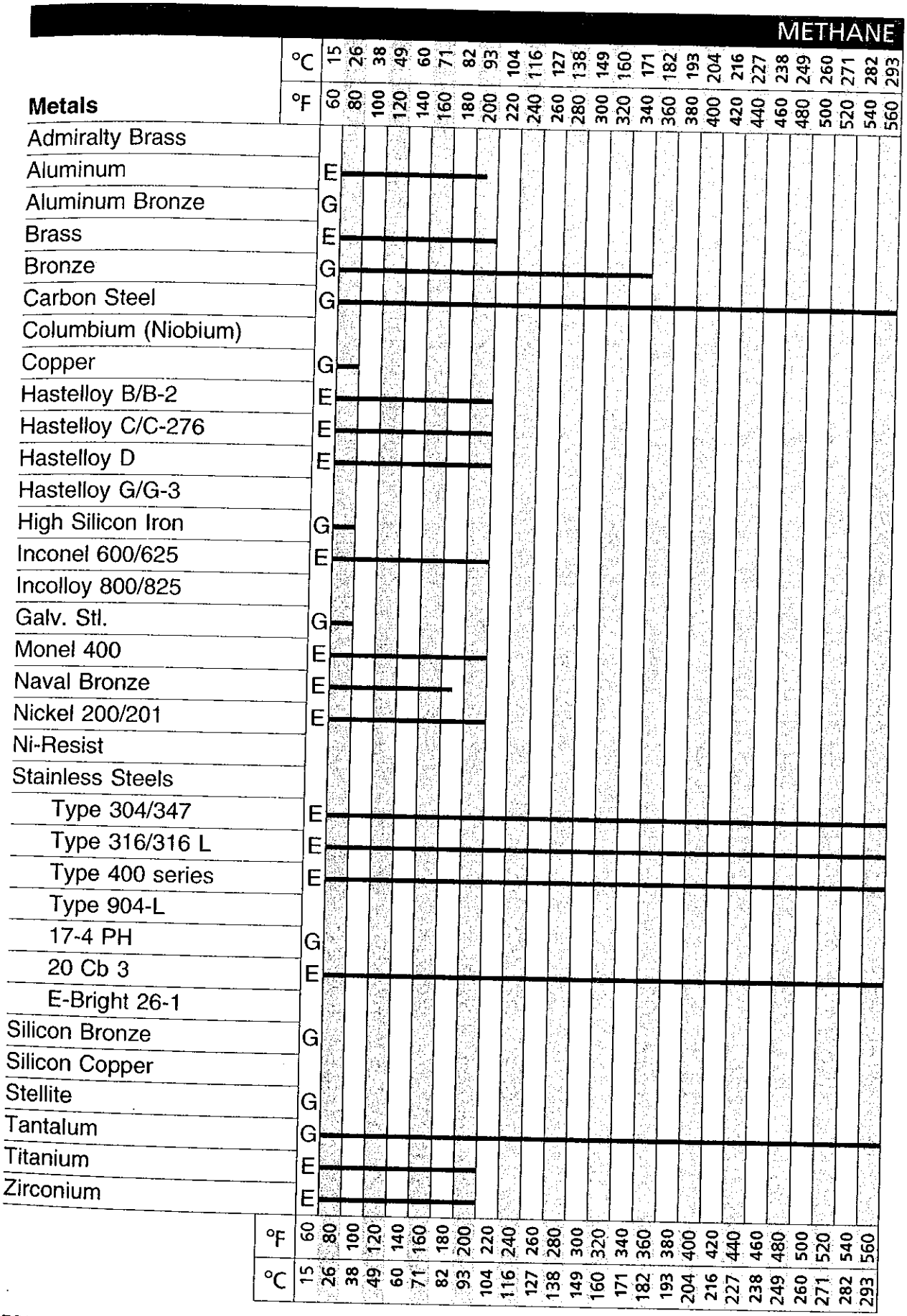
# METHANE




FOR METALS

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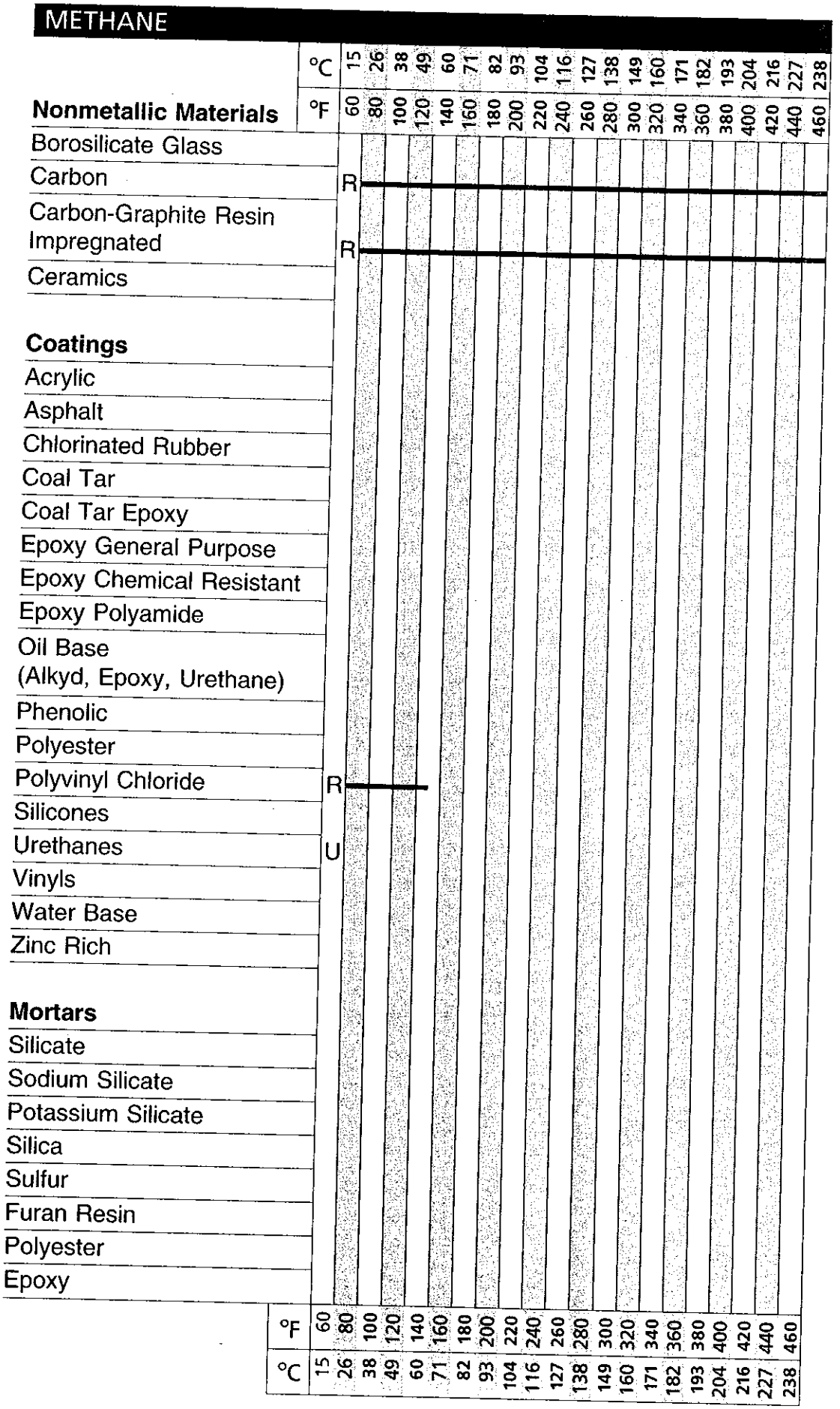
# METHANE



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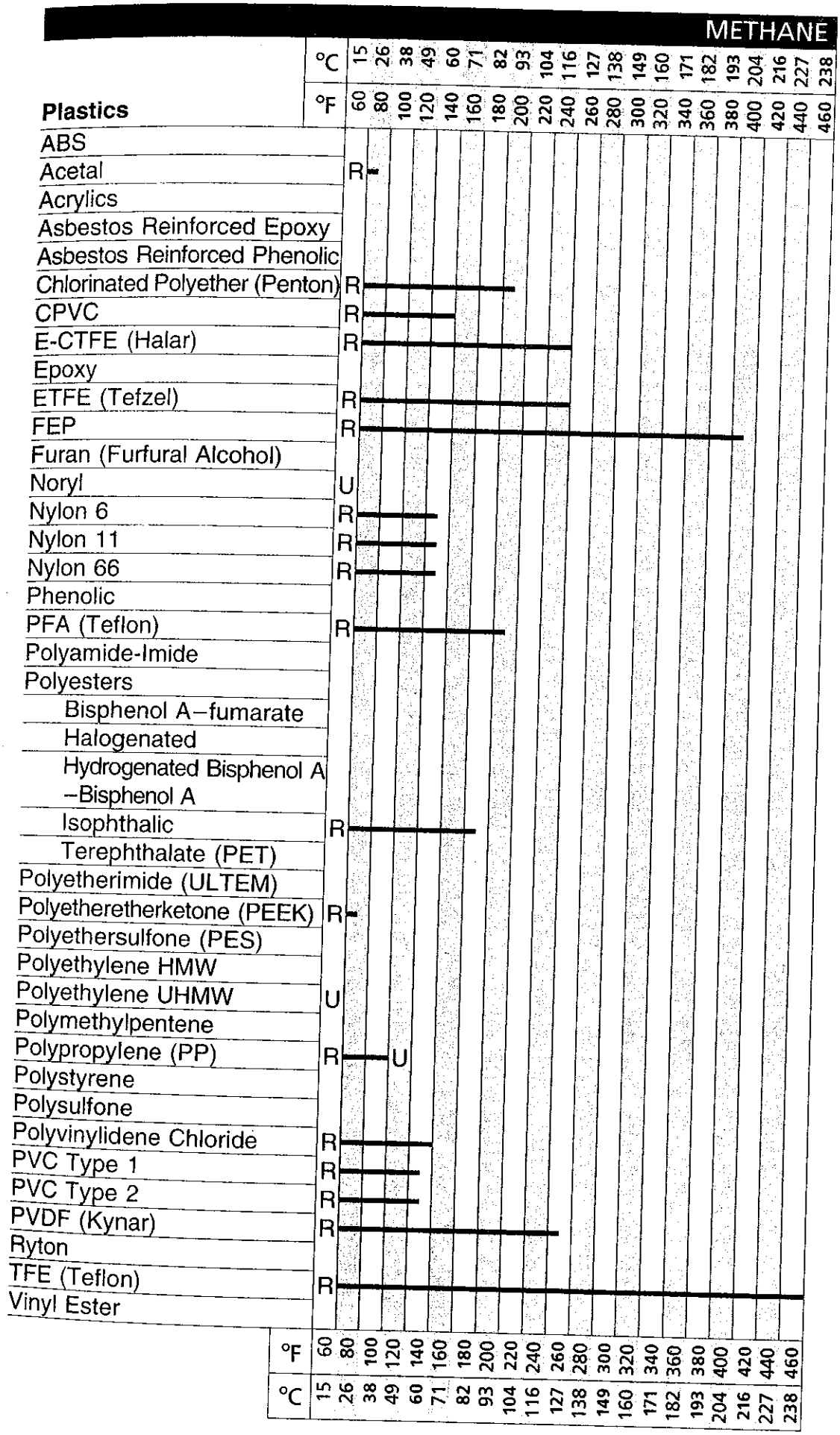


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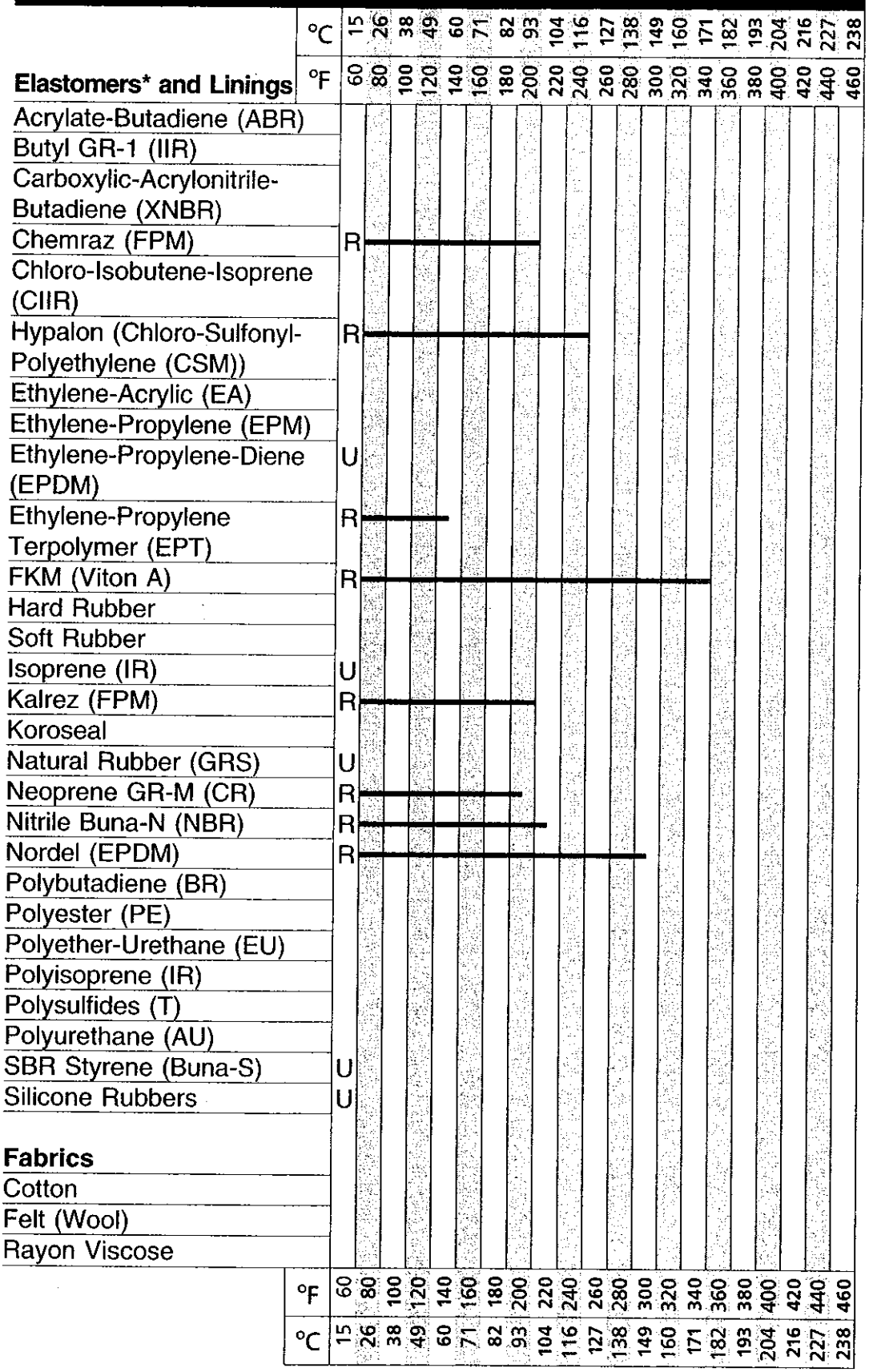
## METHANE

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# METHANE SULFONIC ACID 50%

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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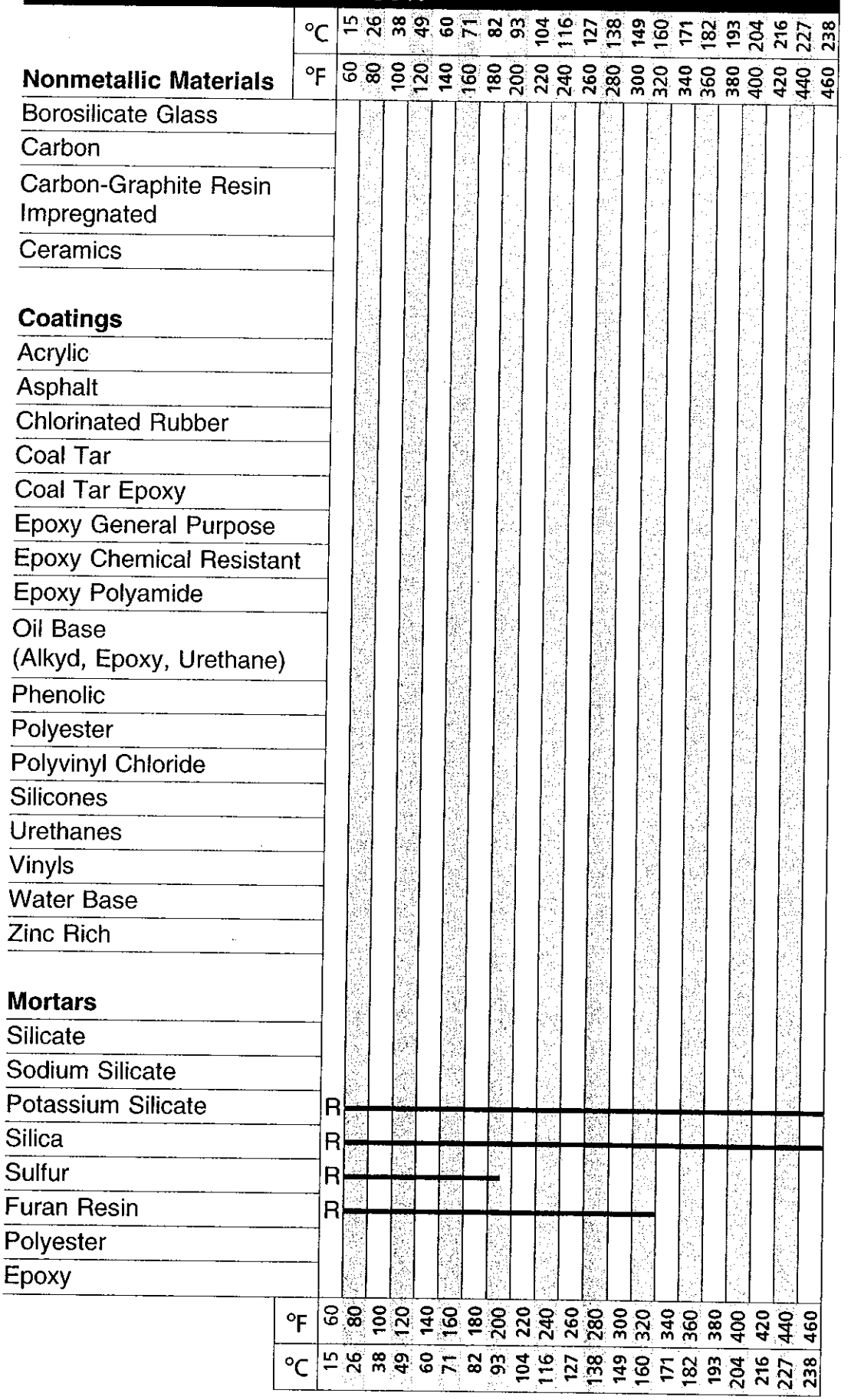
# METHANE SULFONIC ACID 50%



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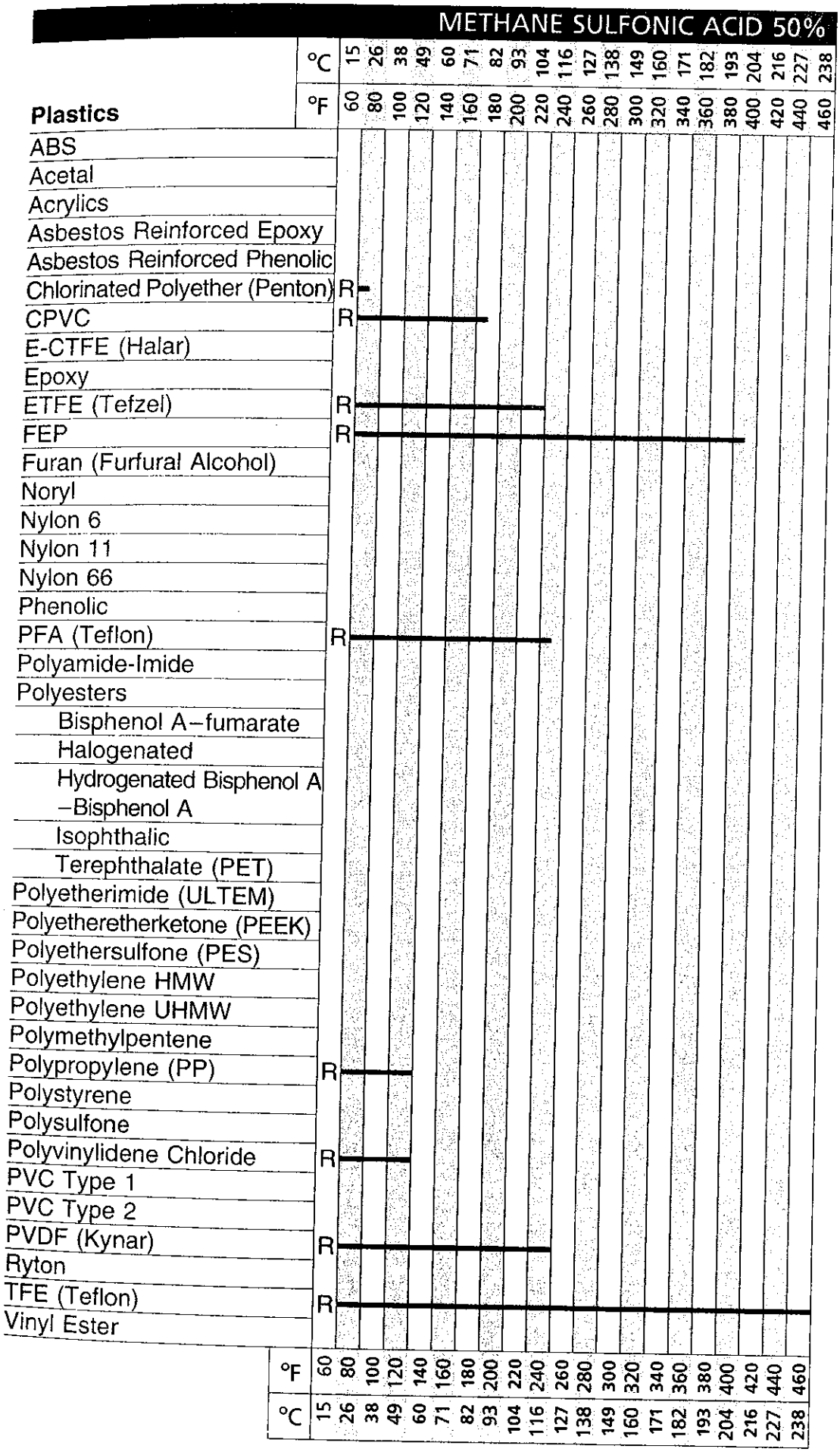


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## METHANE SULFONIC ACID 50%

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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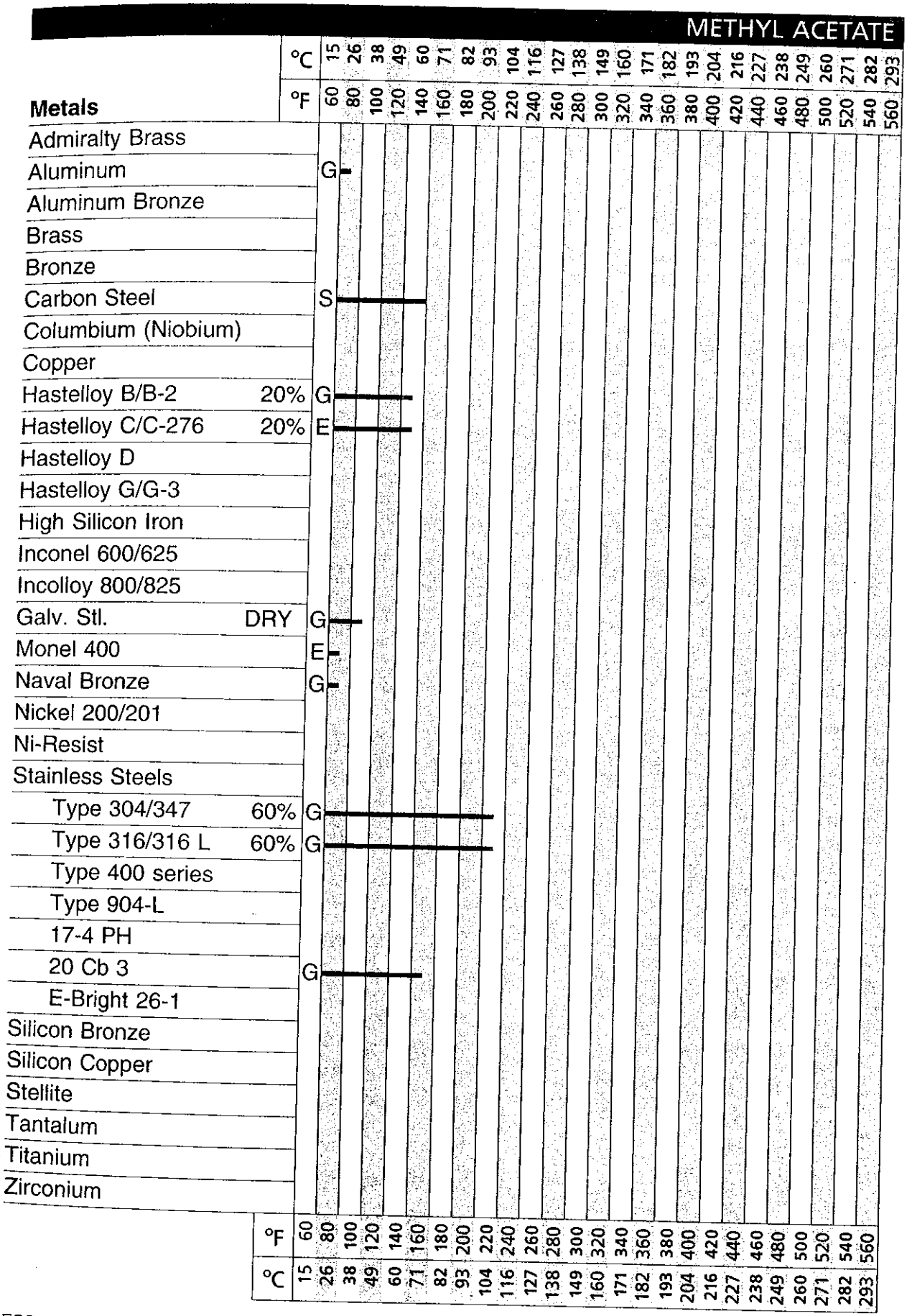
# METHYL ACETATE




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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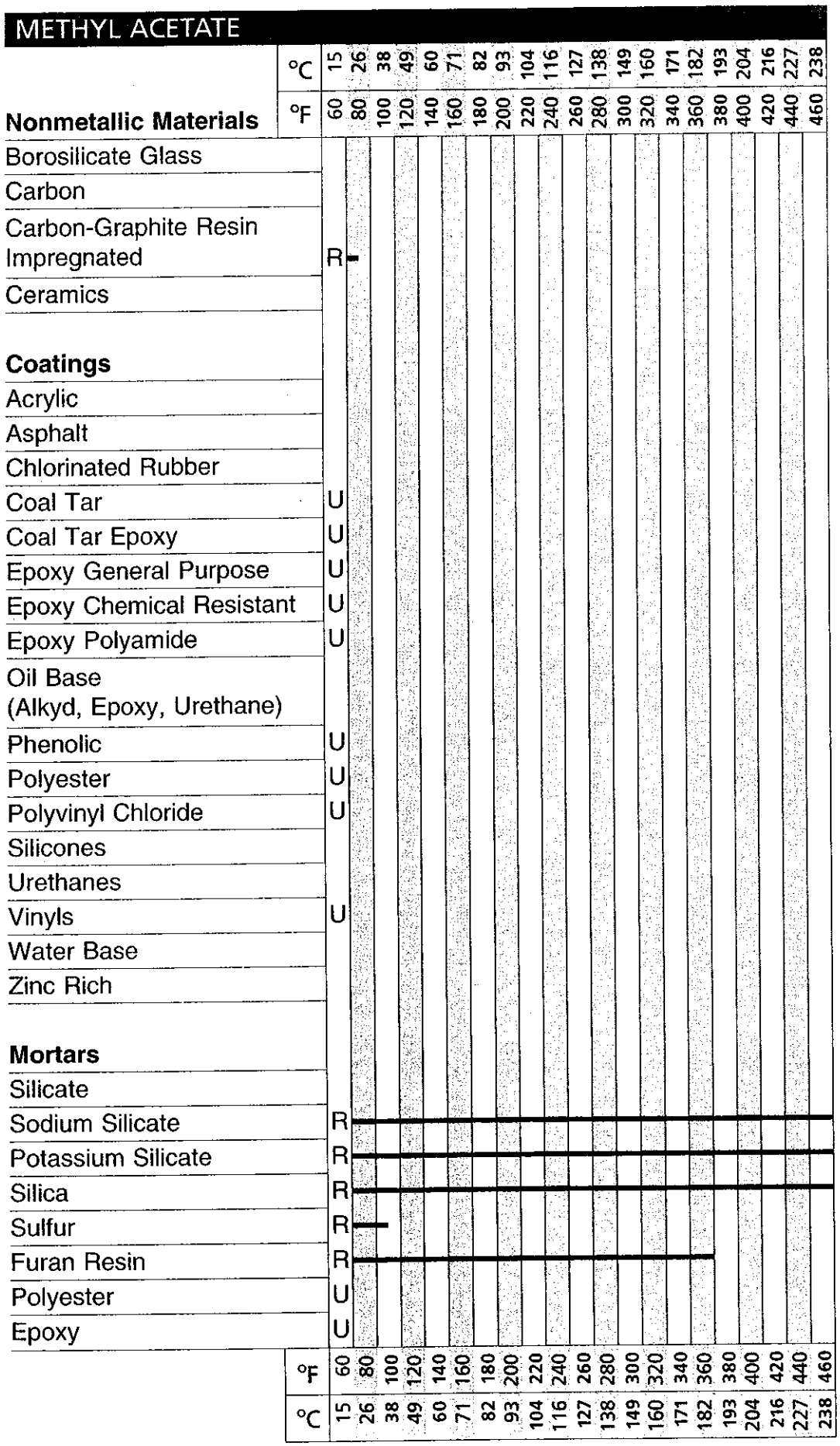
# METHYL ACETATE



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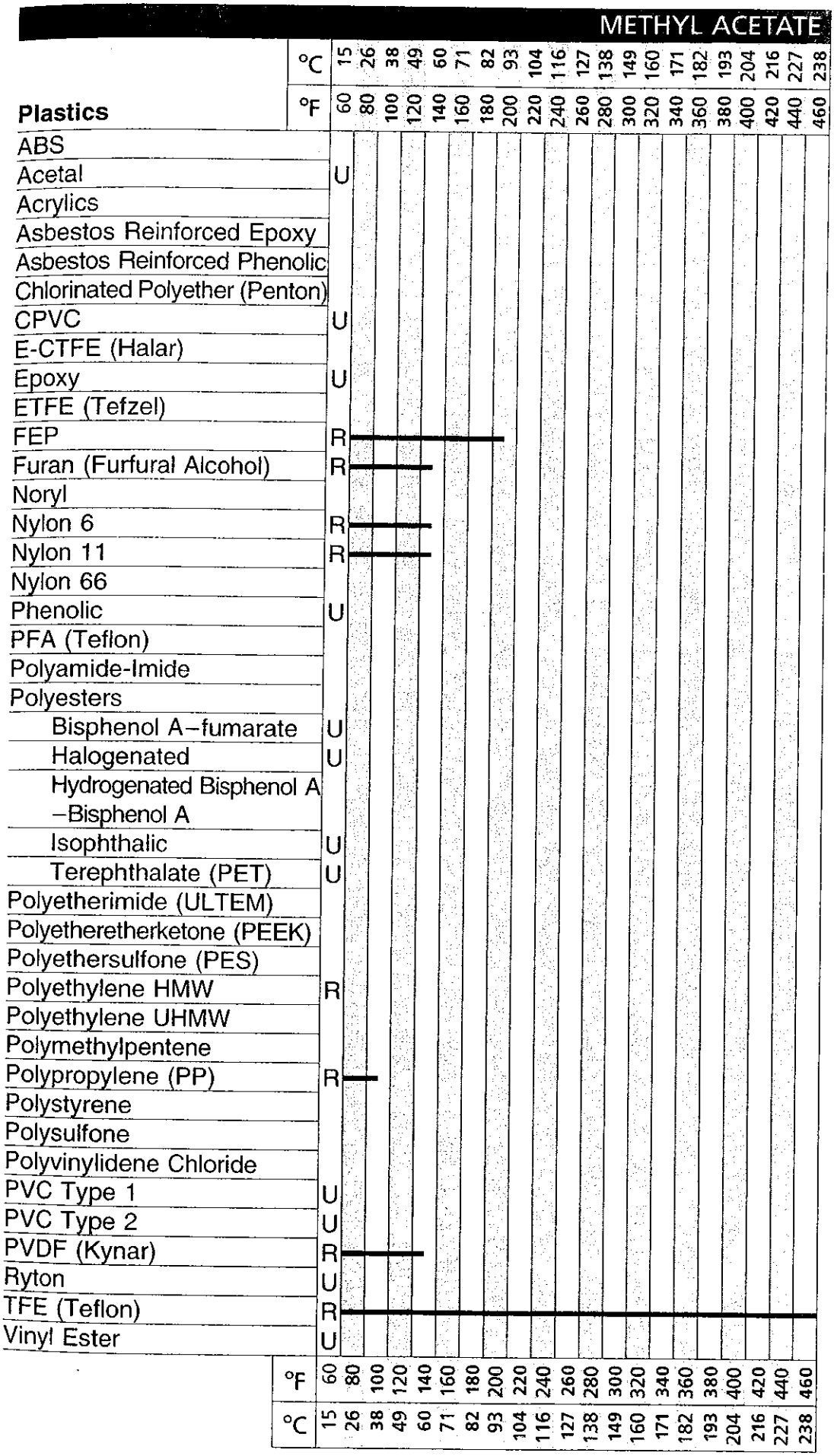


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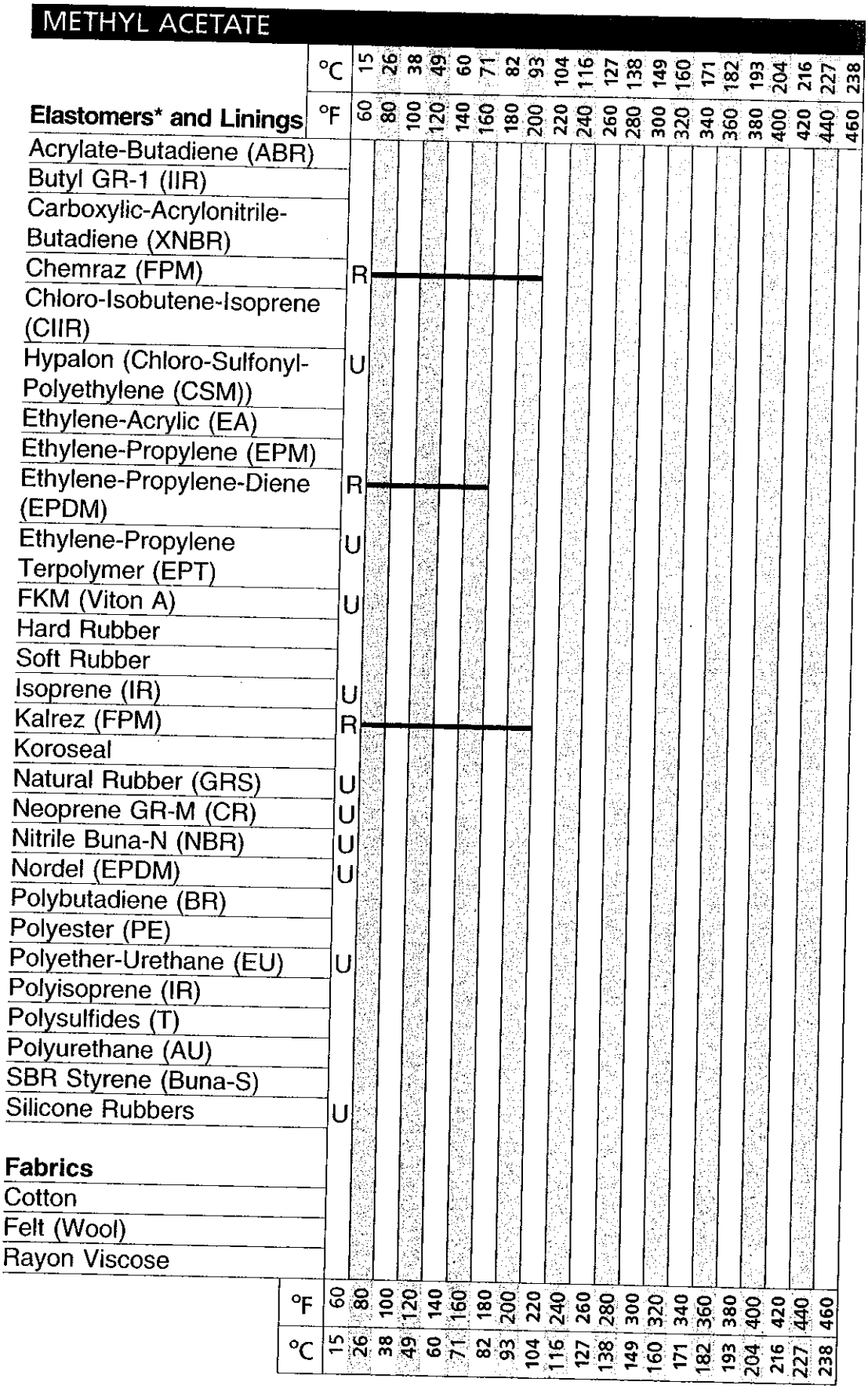
# METHYL ACETATE

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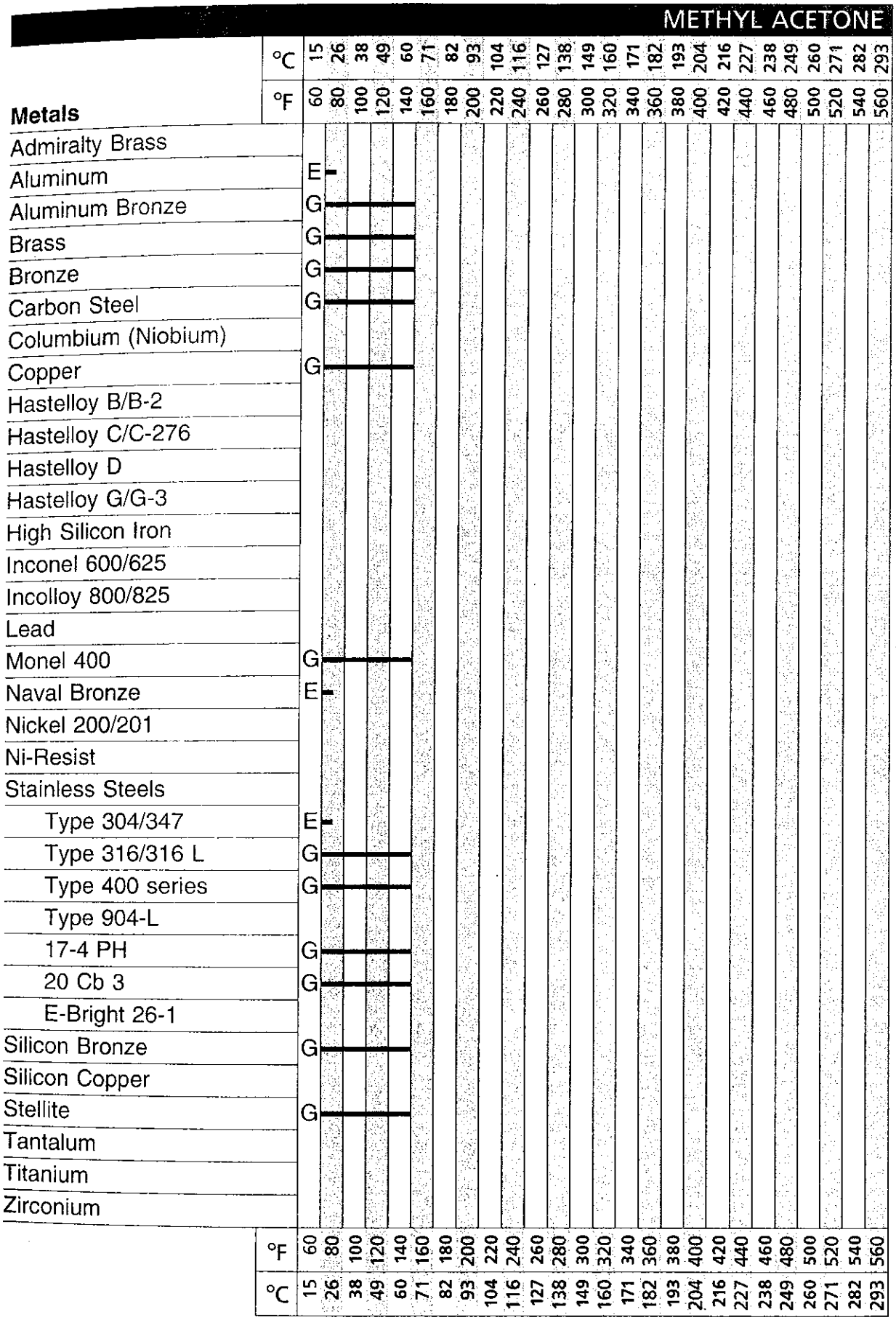


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

Schweitzer/*Corrosion Resistance Tables: Fifth Edition, Revised and Expanded* DOI: 10.1081/5672-X-120029581

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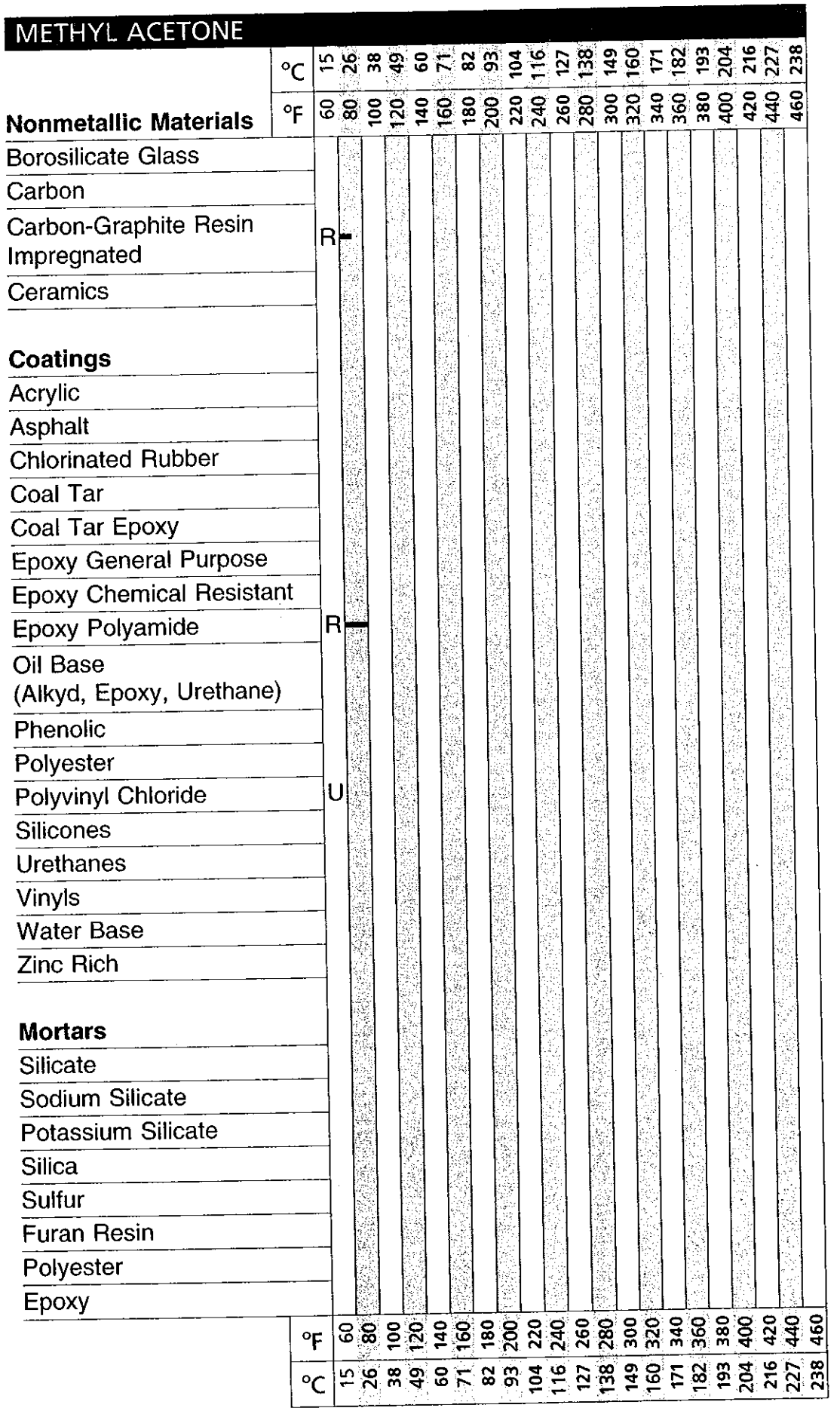
# METHYL ACETONE



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# METHYL ACETONE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | U | |
| ETFE (Tefzel) | | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | U | |
| PVC Type 2 | U | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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## METHYL ACETONE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | R | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | R | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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| Metals | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | |
| °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | |
| °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 | |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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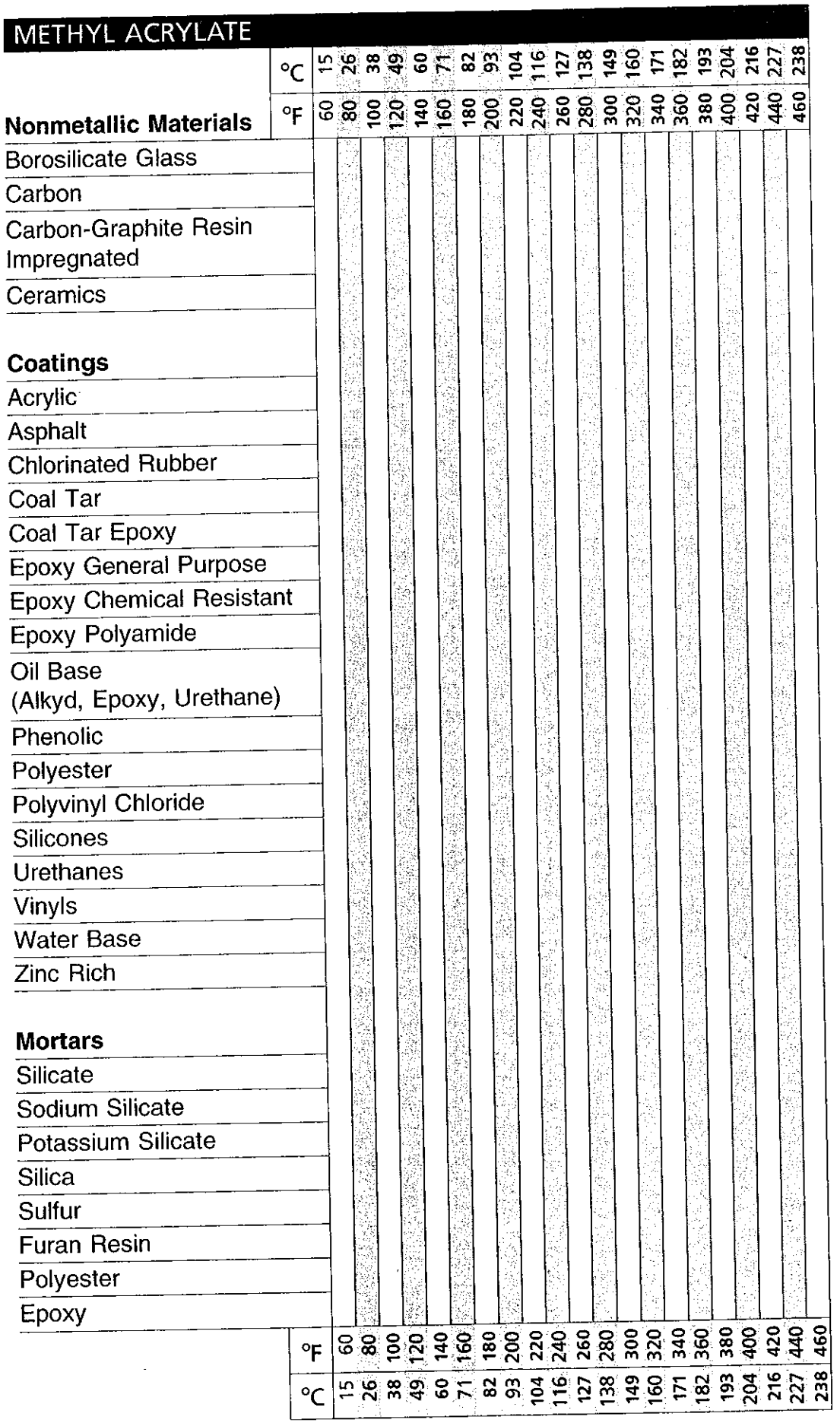
# METHYL ACRYLATE



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# METHYL ACRYLATE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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## METHYL ACRYLATE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | U | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | U | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | U | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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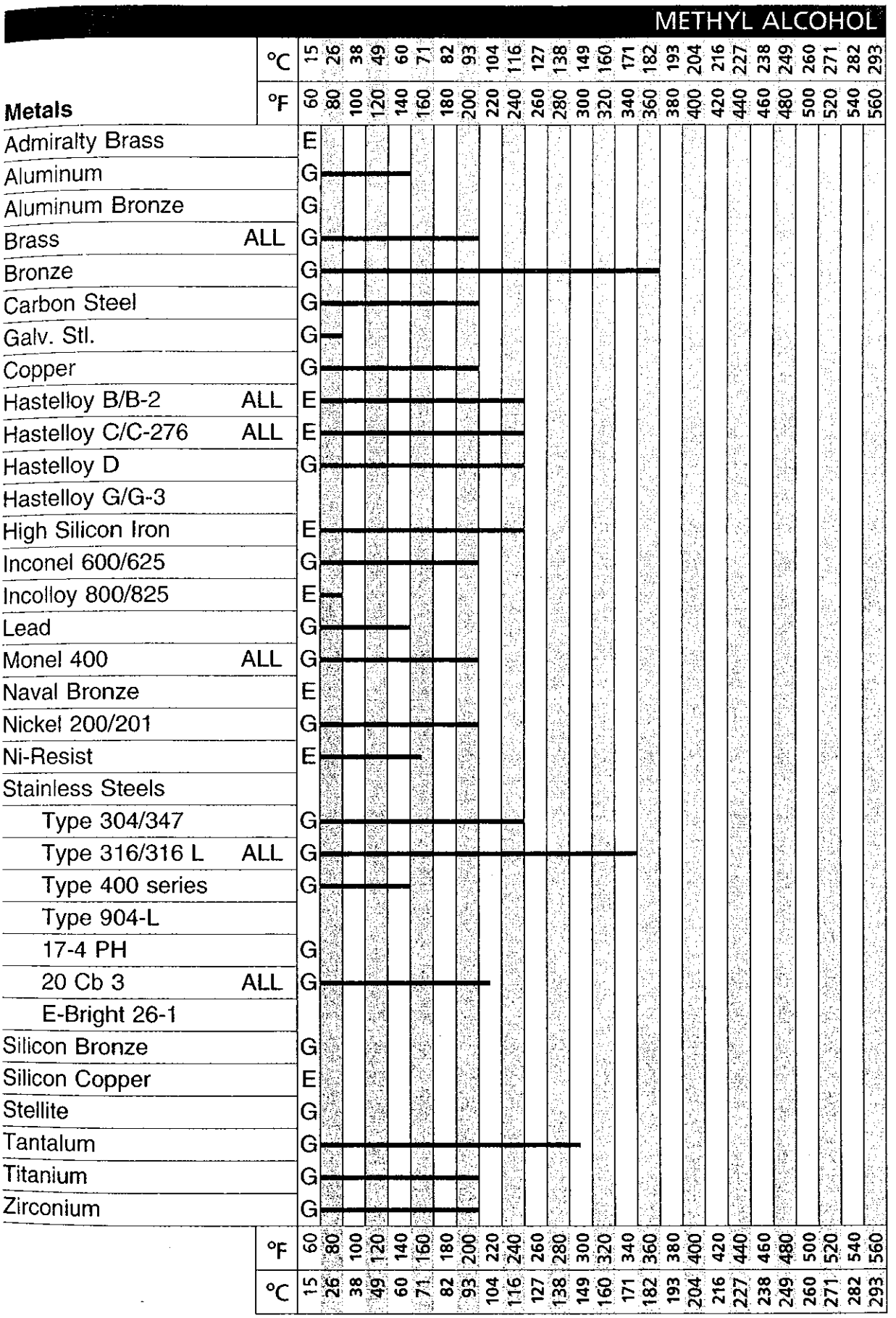
# METHYL ALCOHOL




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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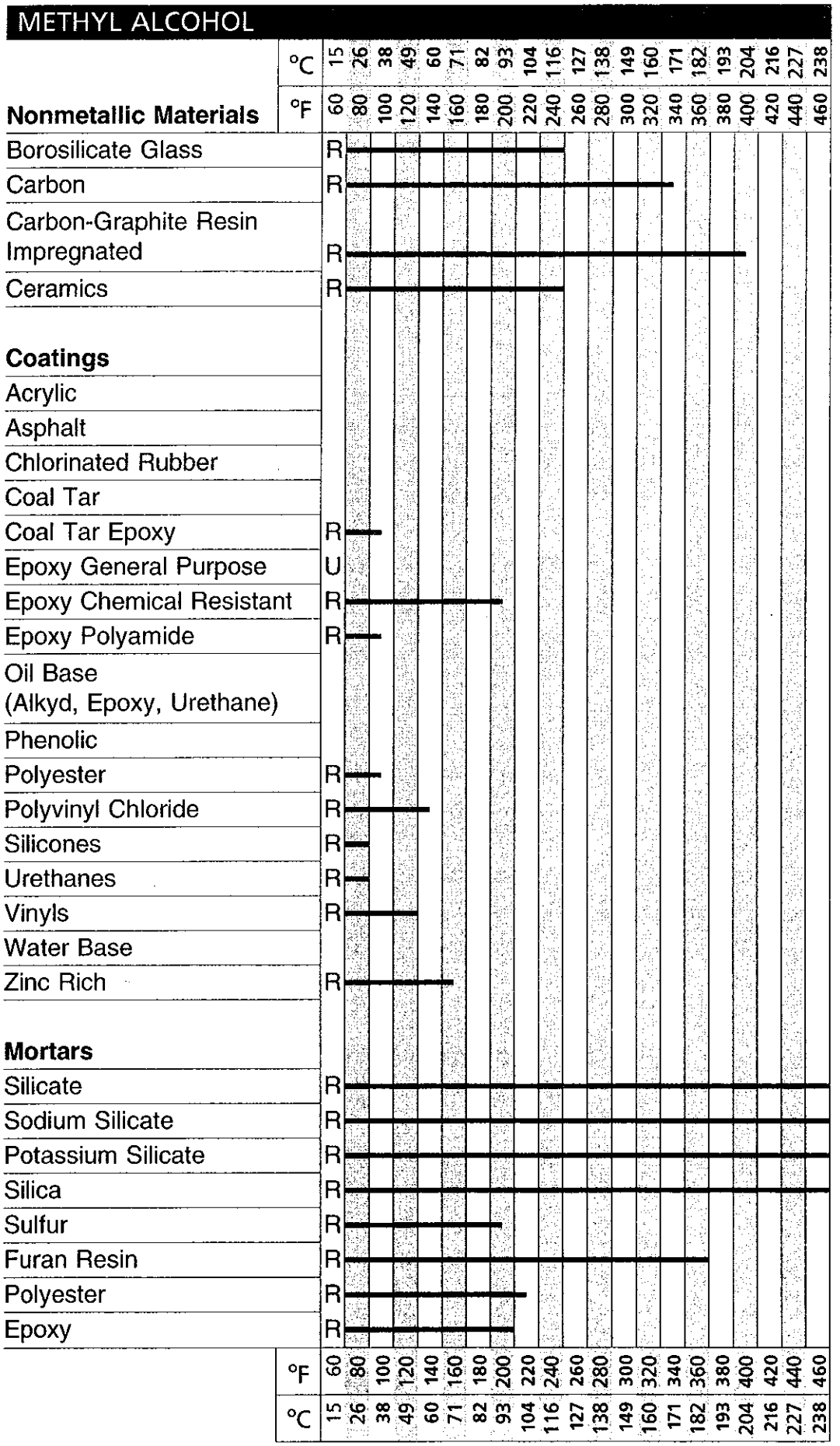




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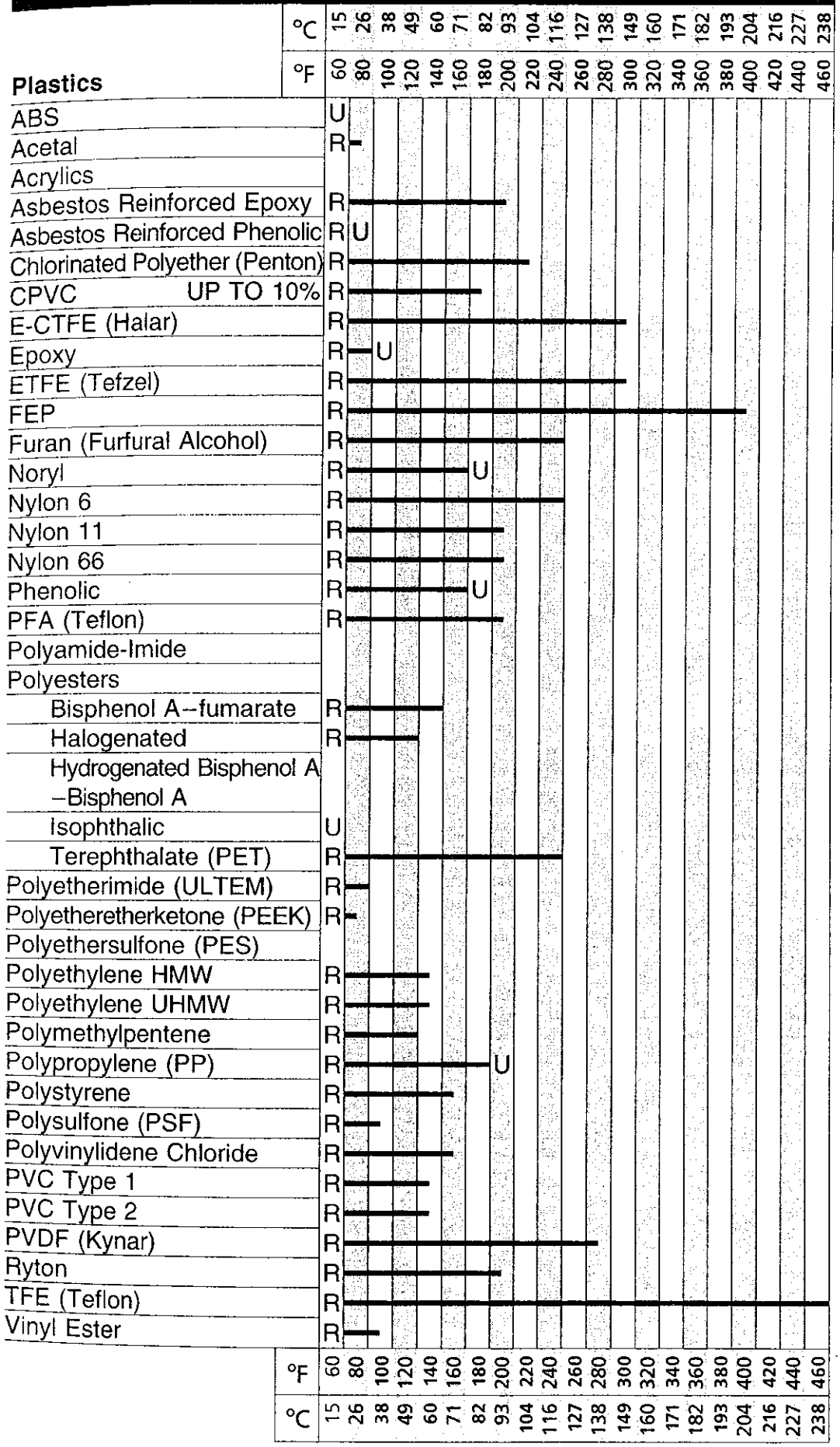


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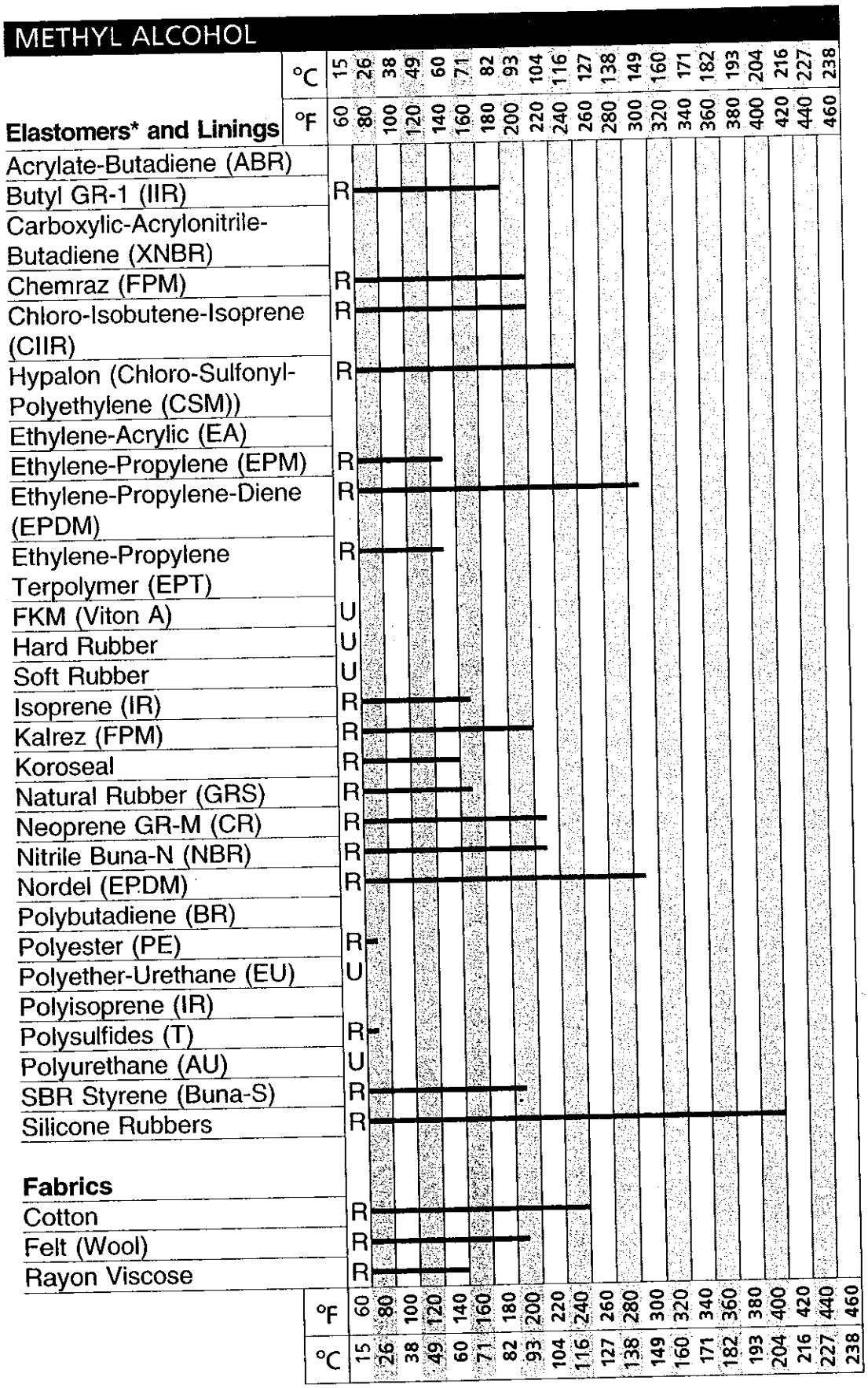


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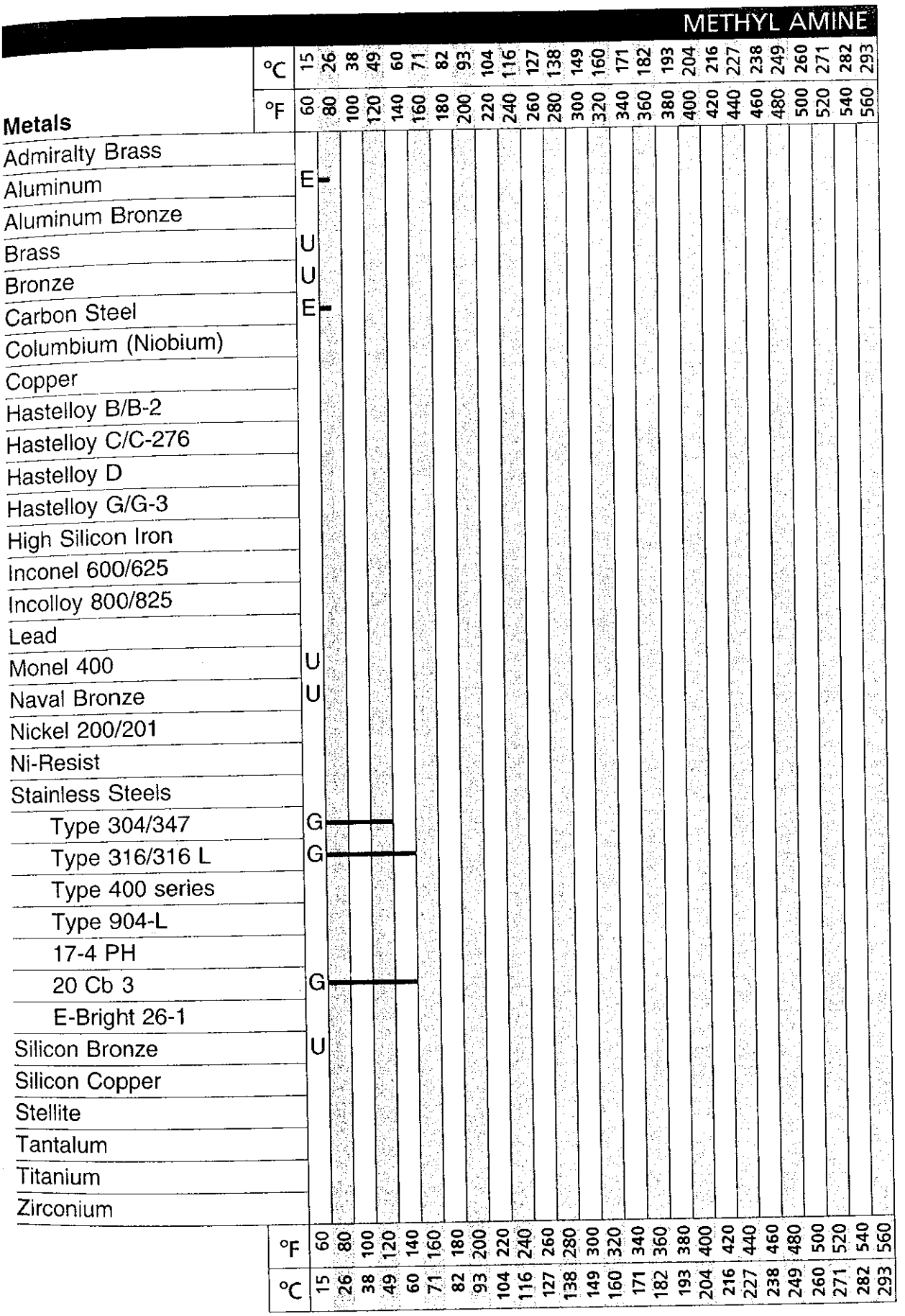


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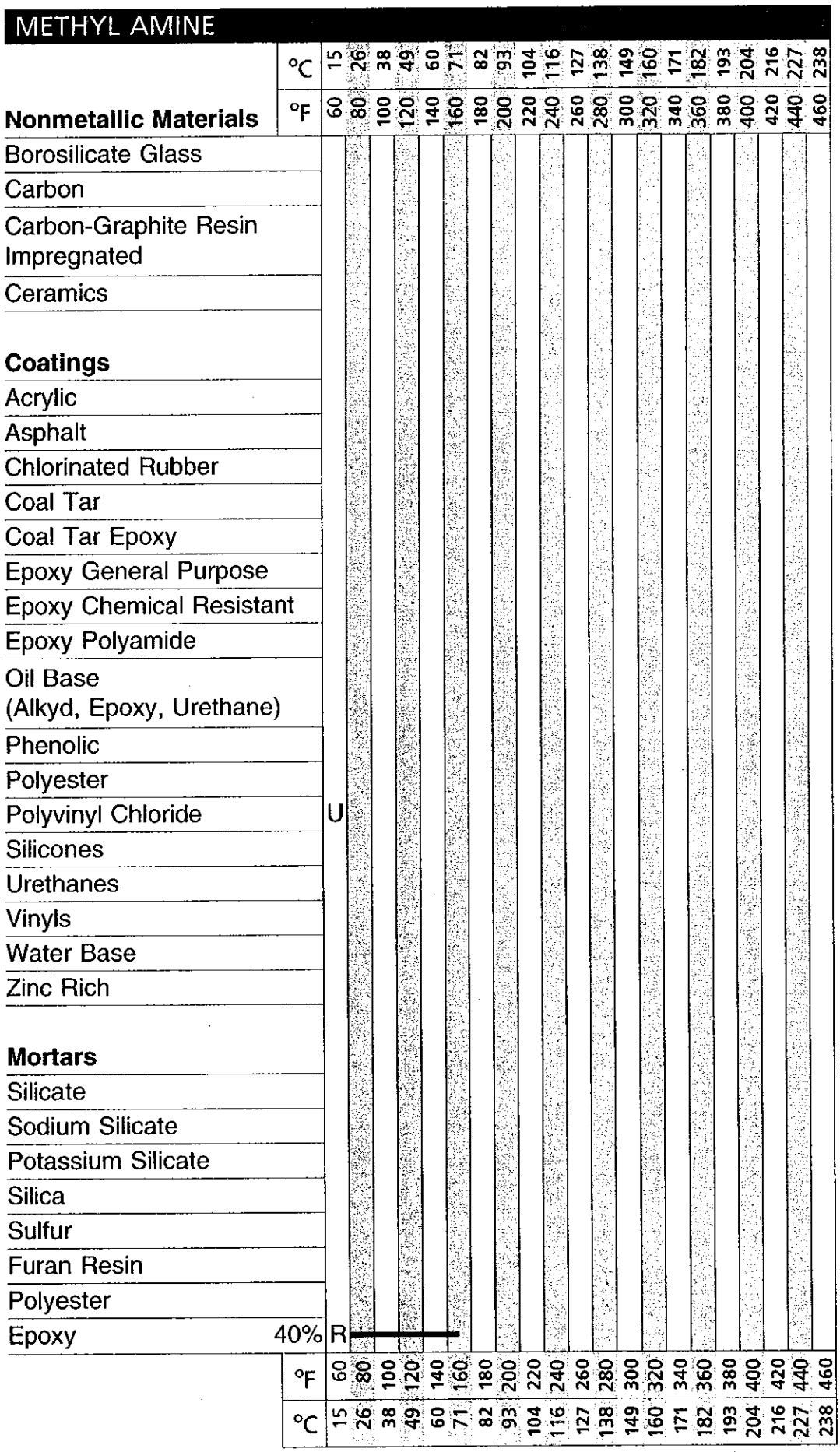




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# METHYL AMINE

| Plastics | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | U | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | R | — | — | U | | | | | | | | | | | | | | | | | | |
| Epoxy | R | — | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | R | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | R | — | — | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | U | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | U | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | U | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | U | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | — | — | — | — | — | — | — | — | — | — | — | — | — | | | | | | | | |
| Vinyl Ester | U | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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## METHYL AMINE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | R | — | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | R | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | — | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | — | — | — | — | — | — | — | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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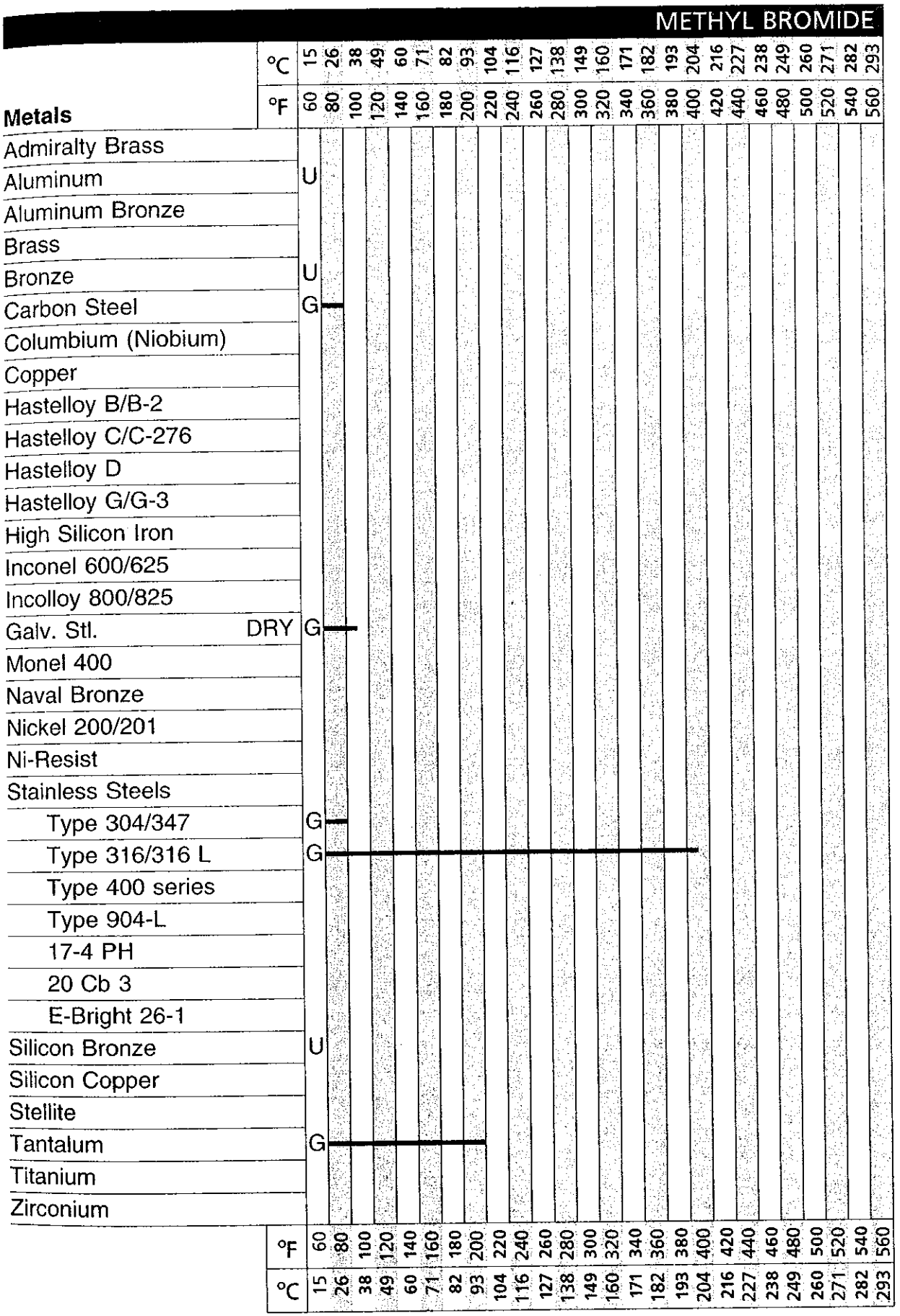
# METHYL BROMIDE




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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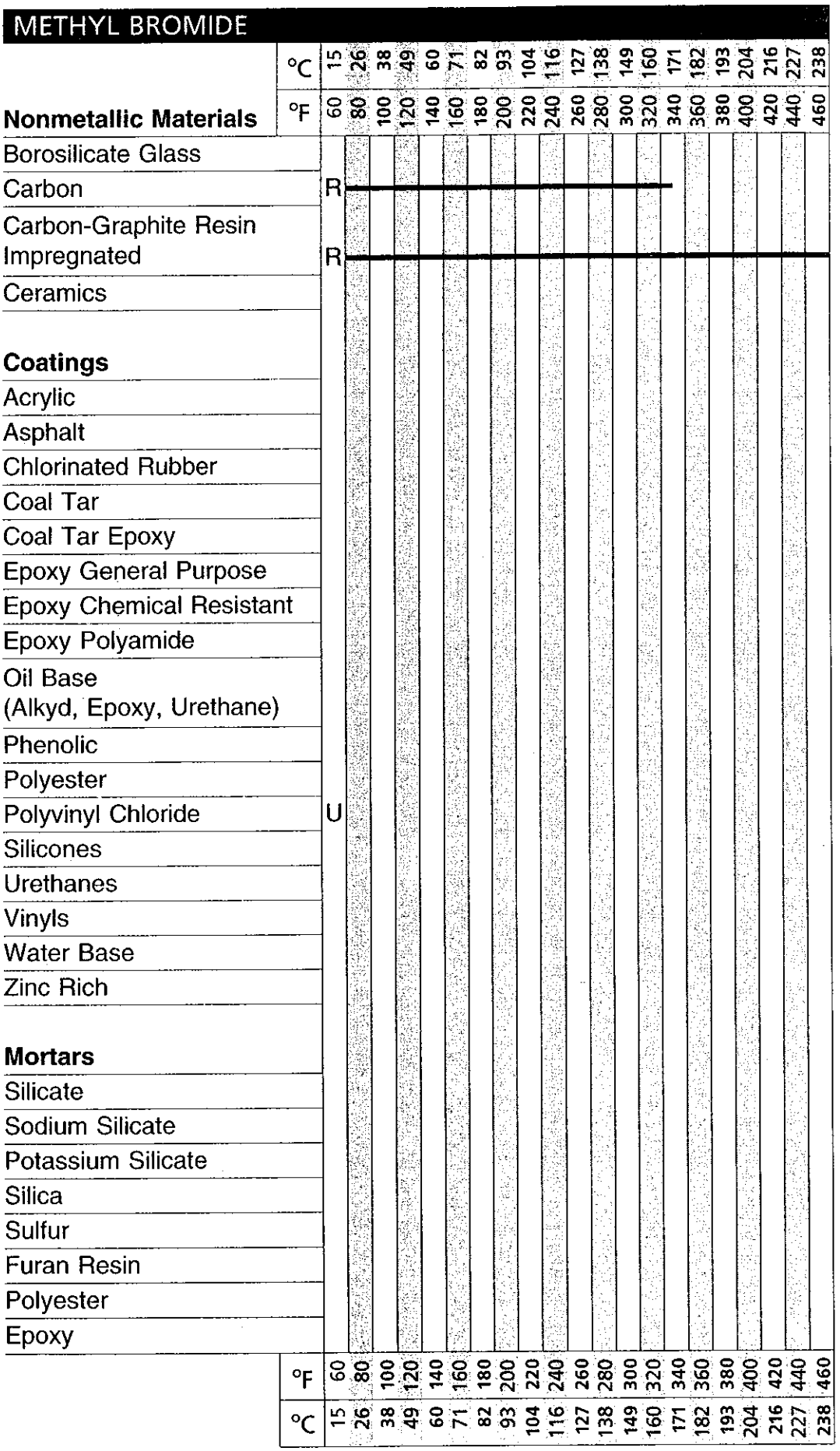




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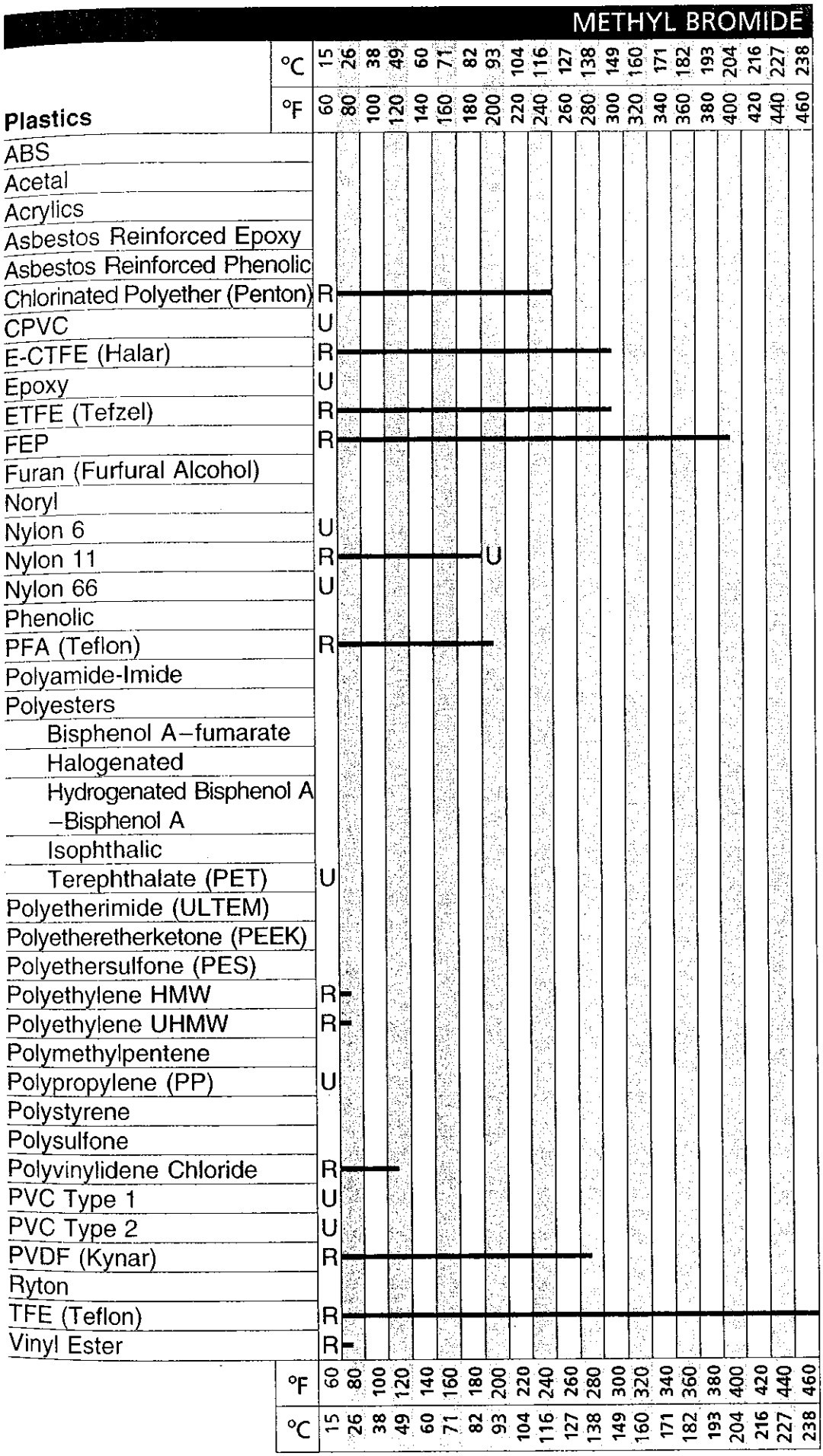



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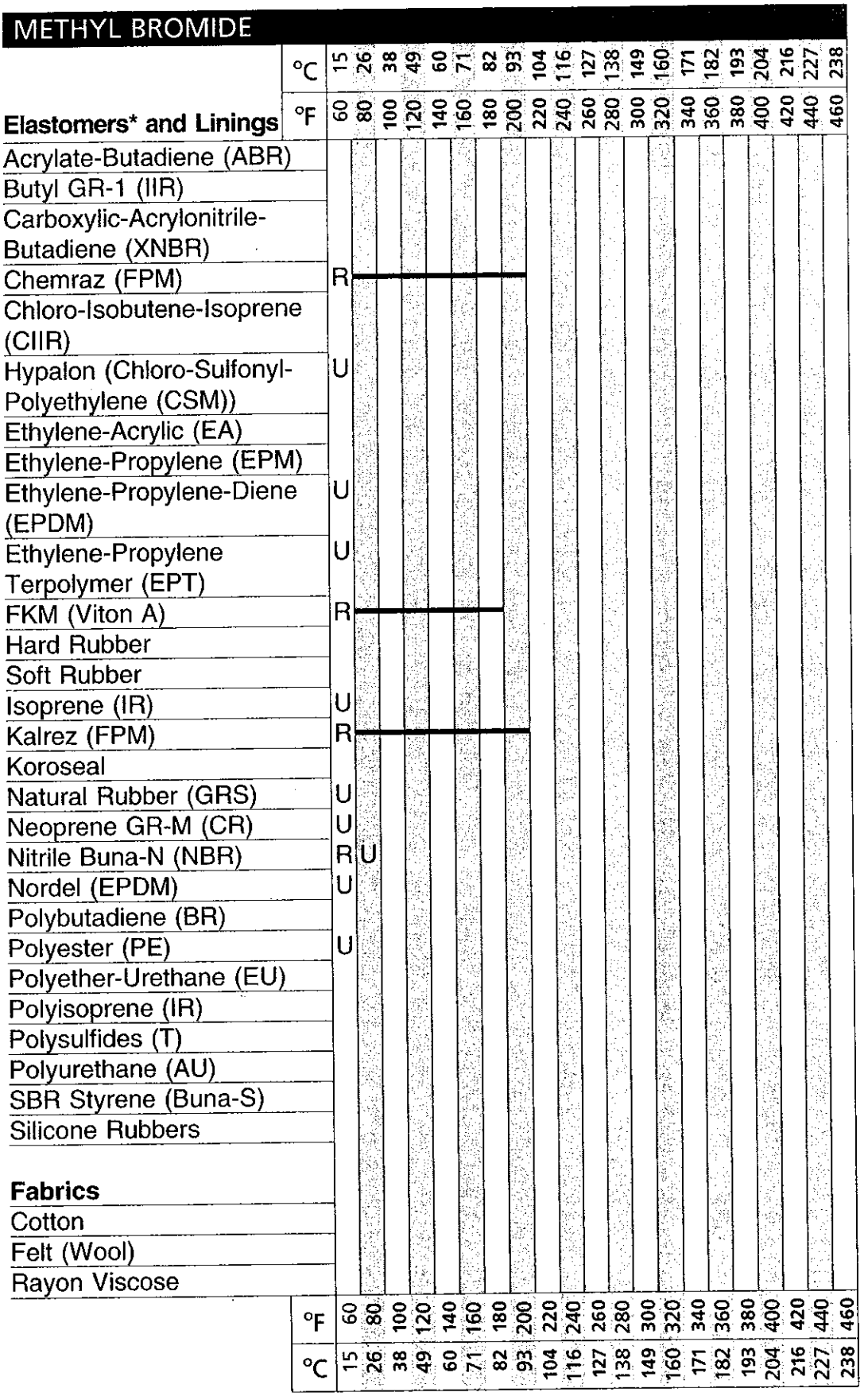


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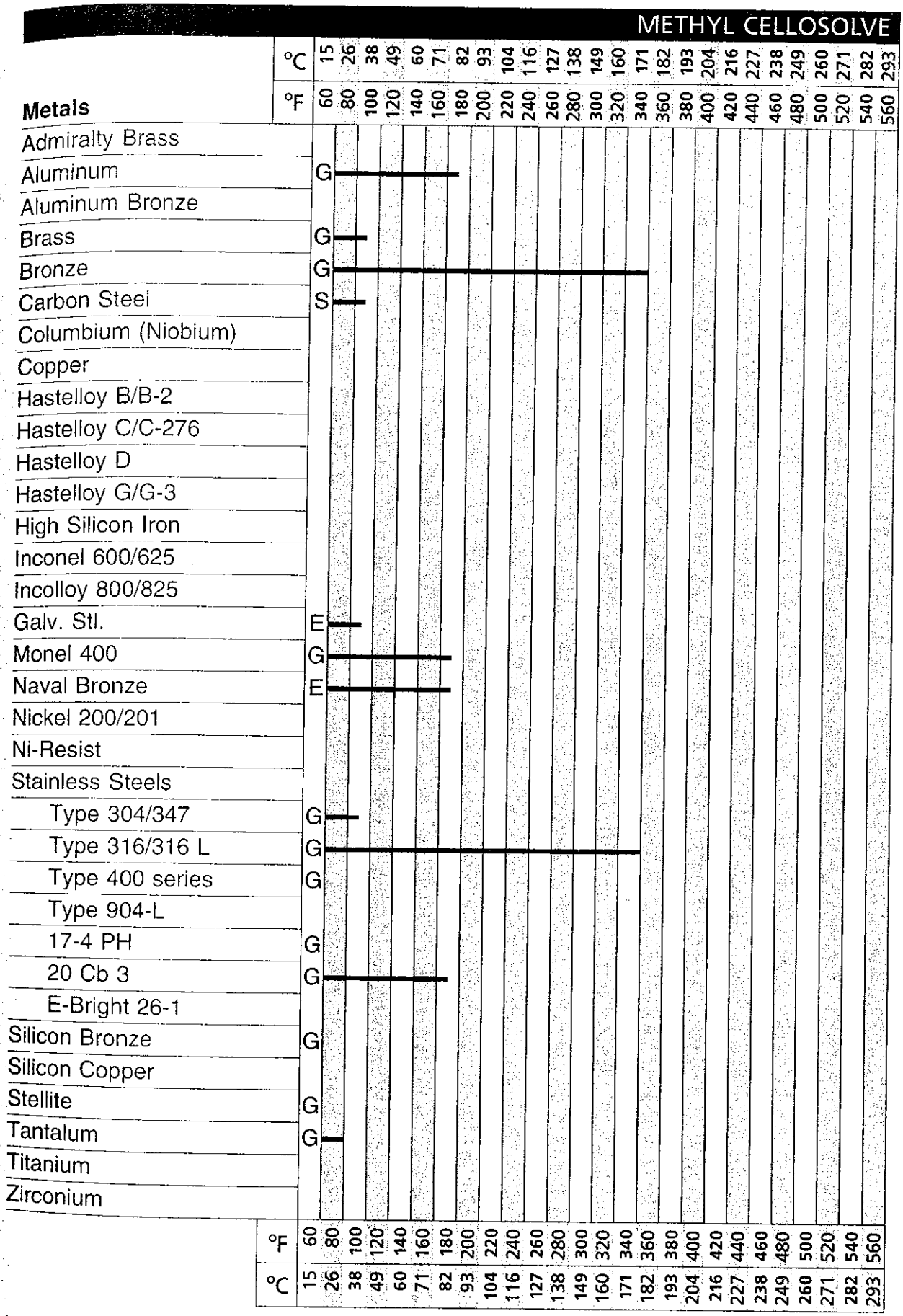


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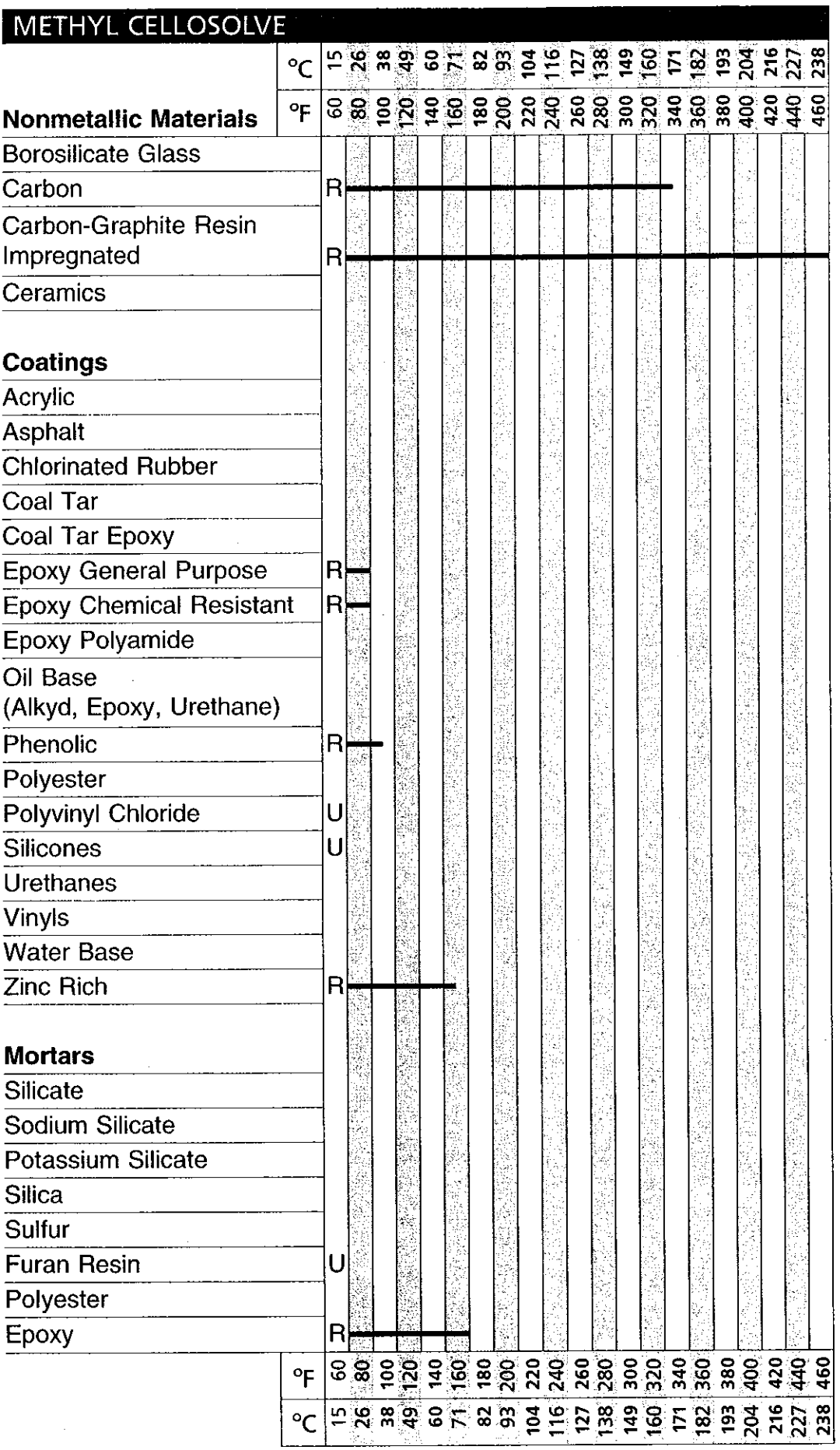




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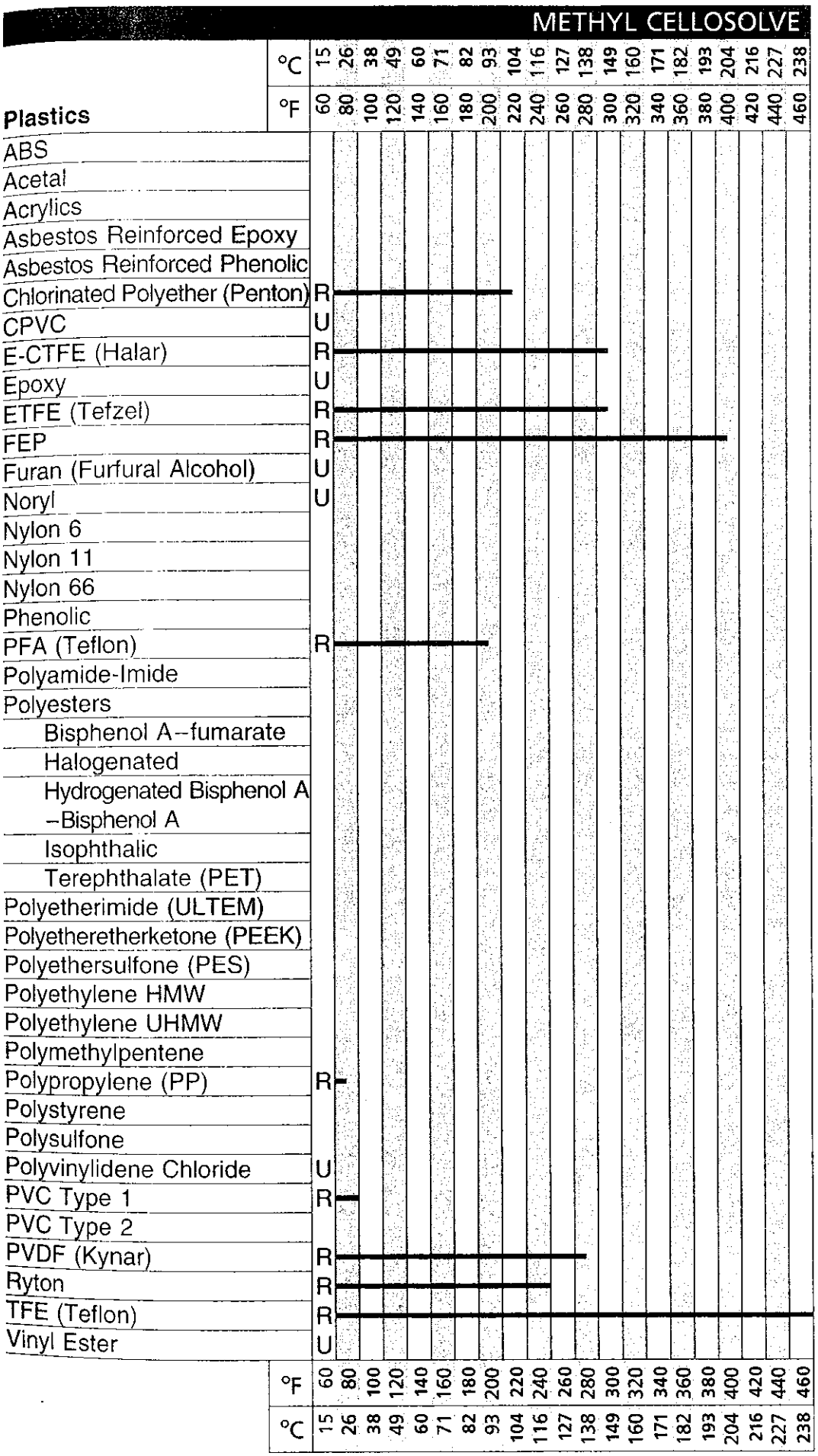


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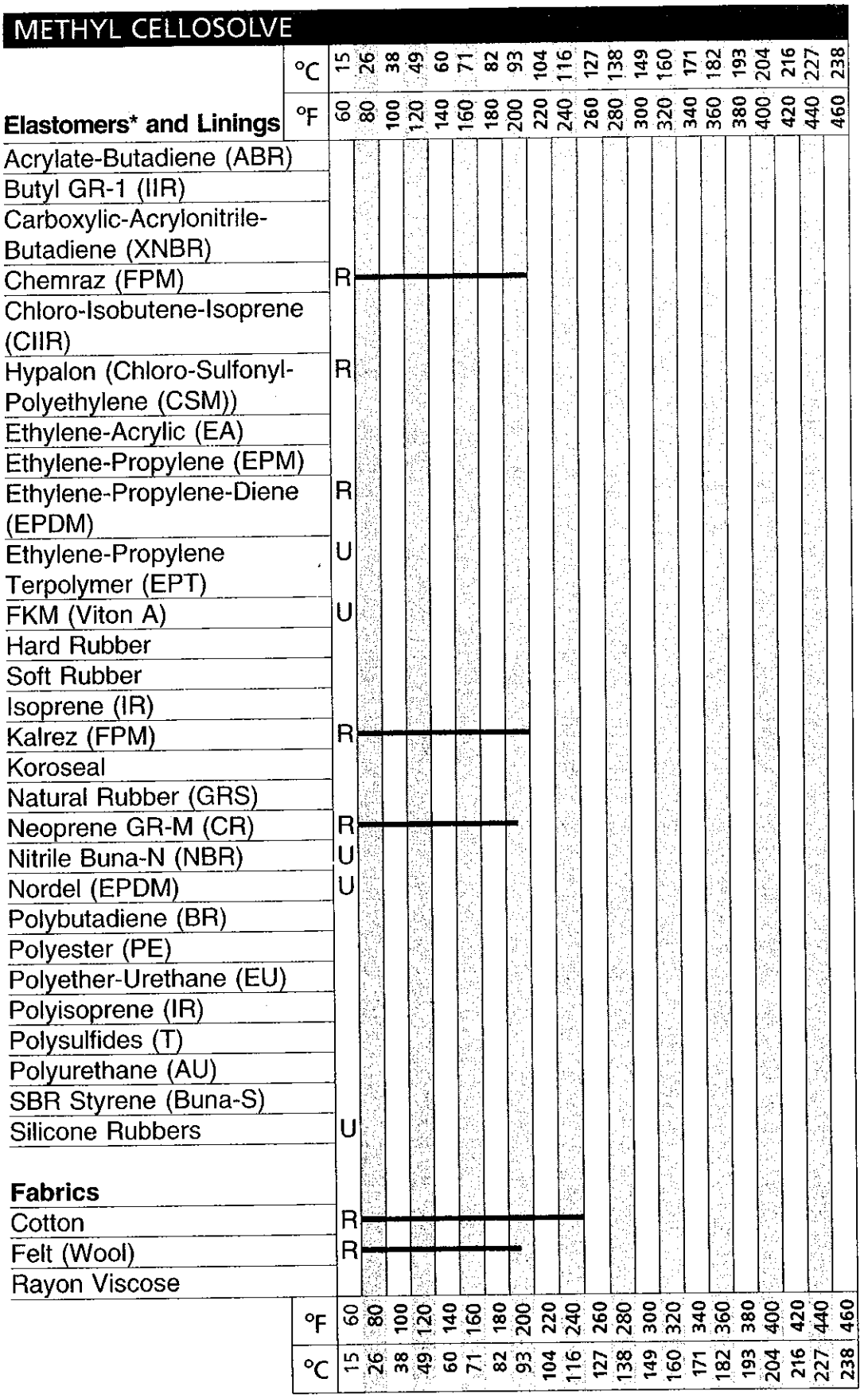


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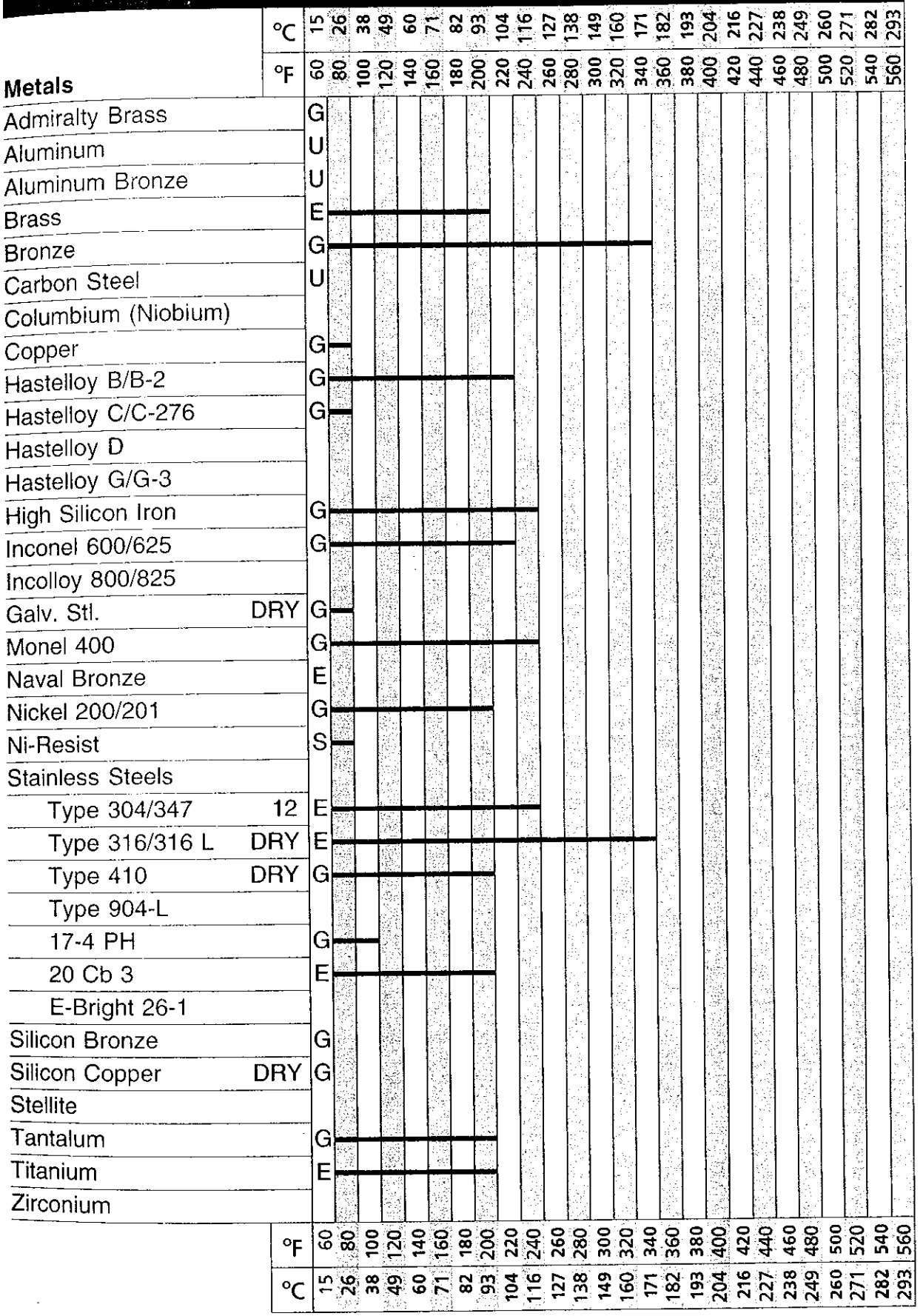


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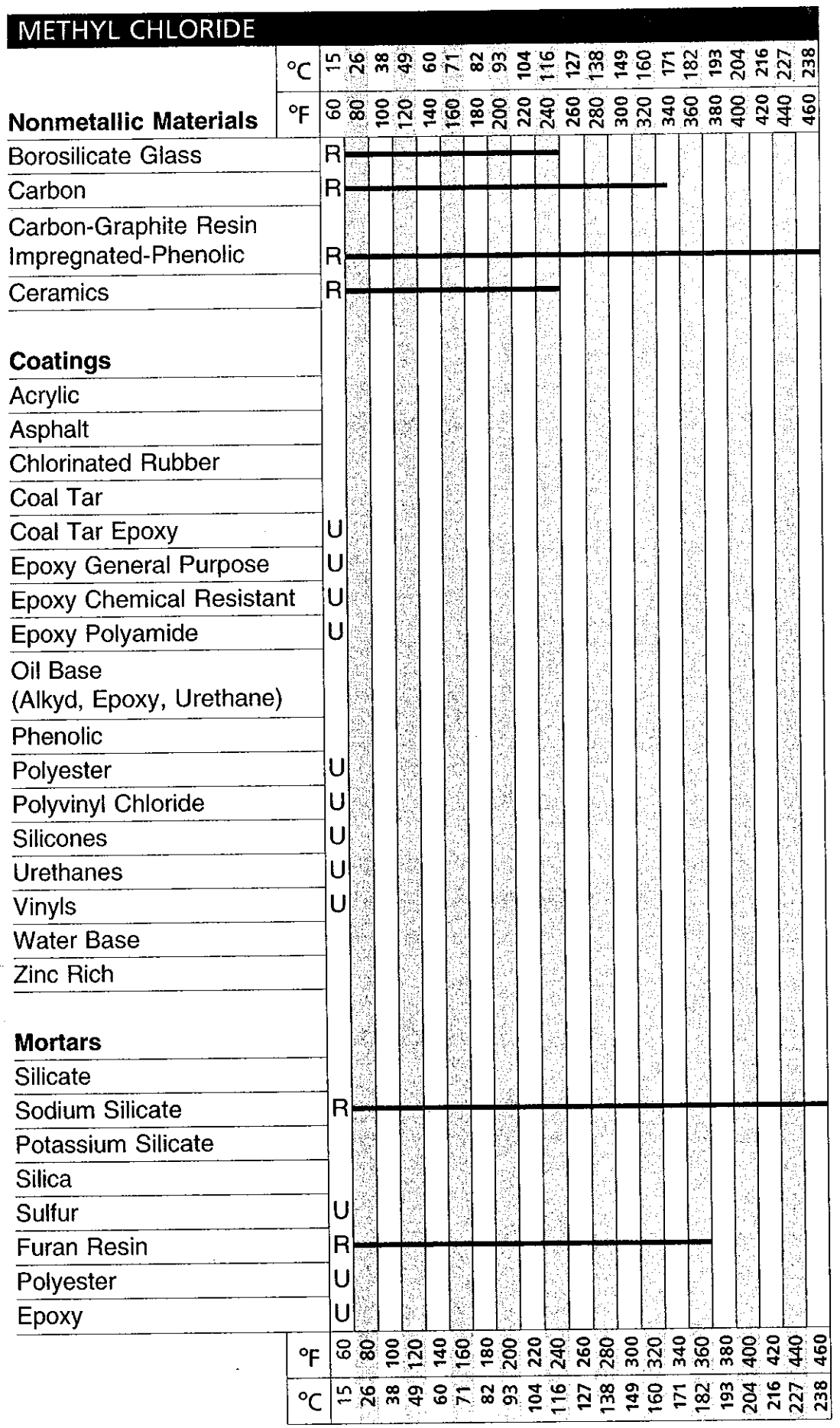






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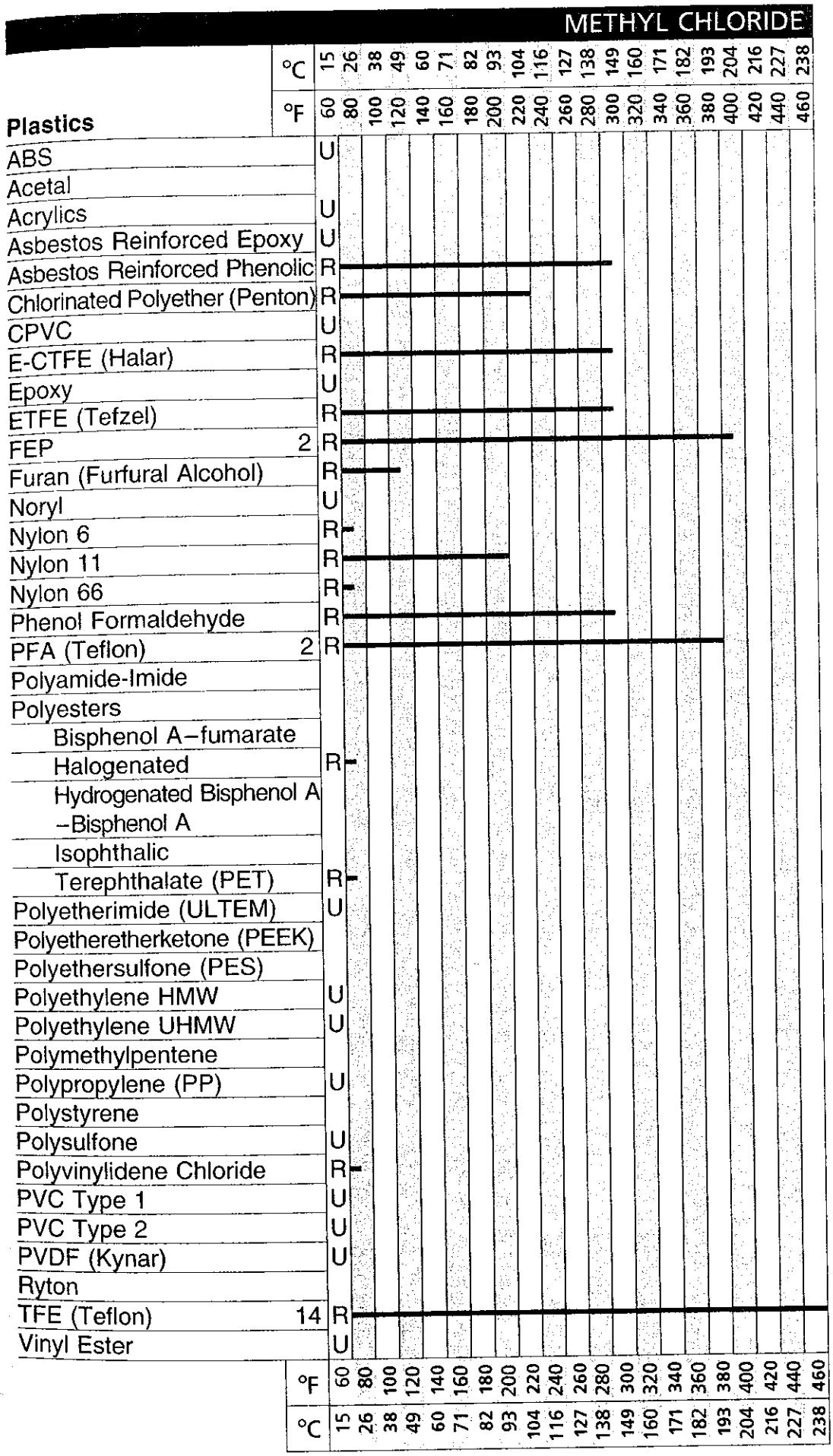



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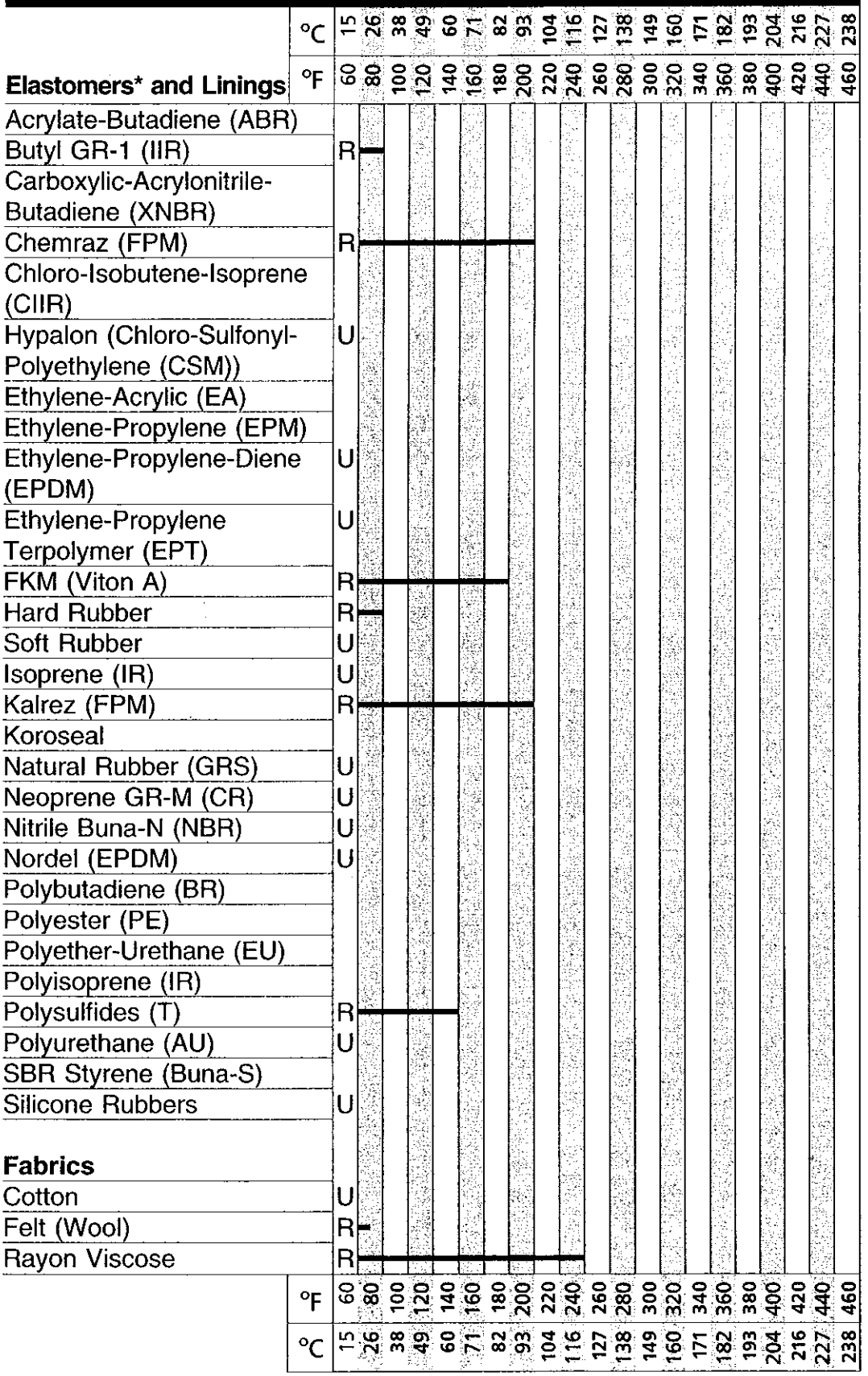


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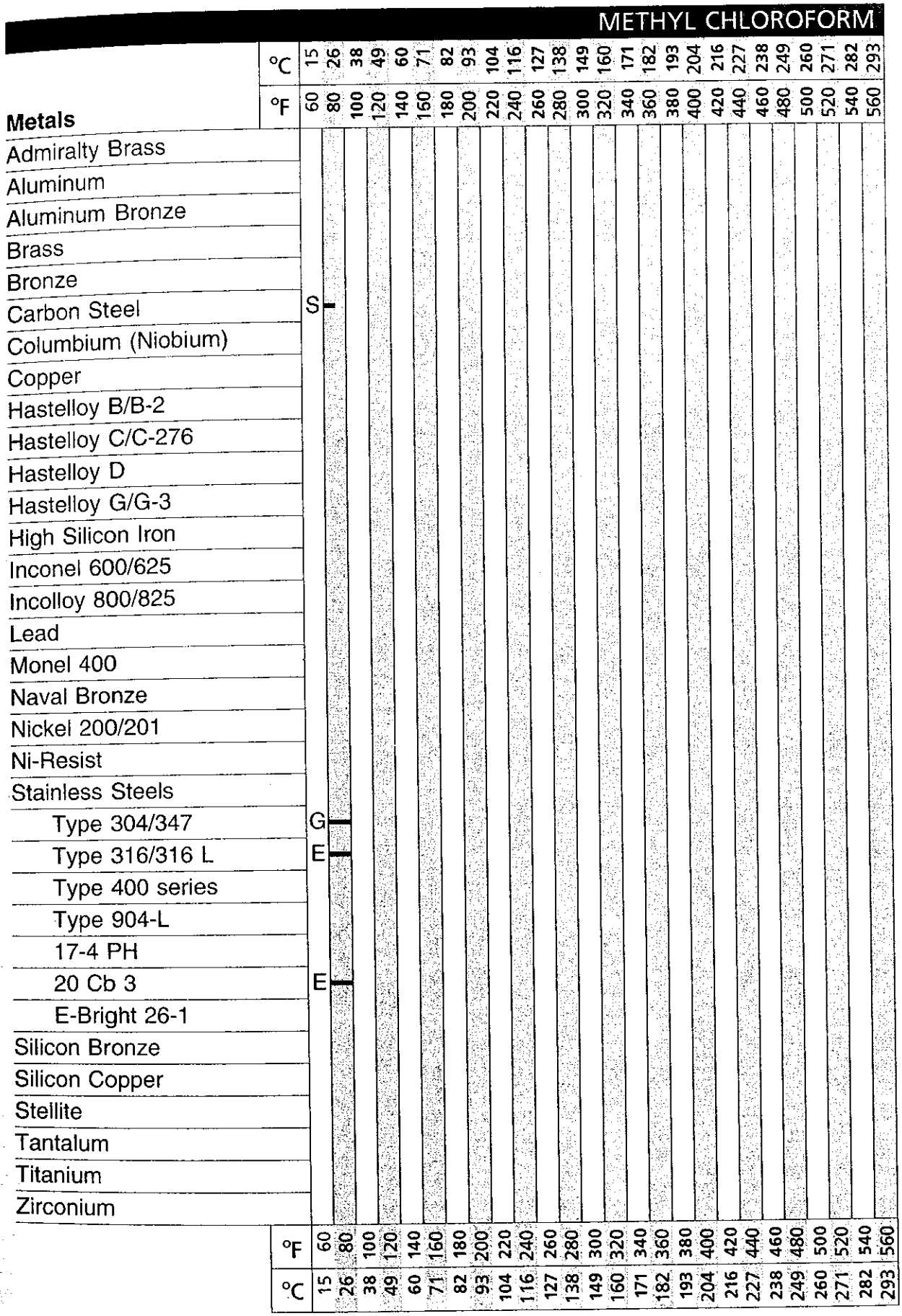


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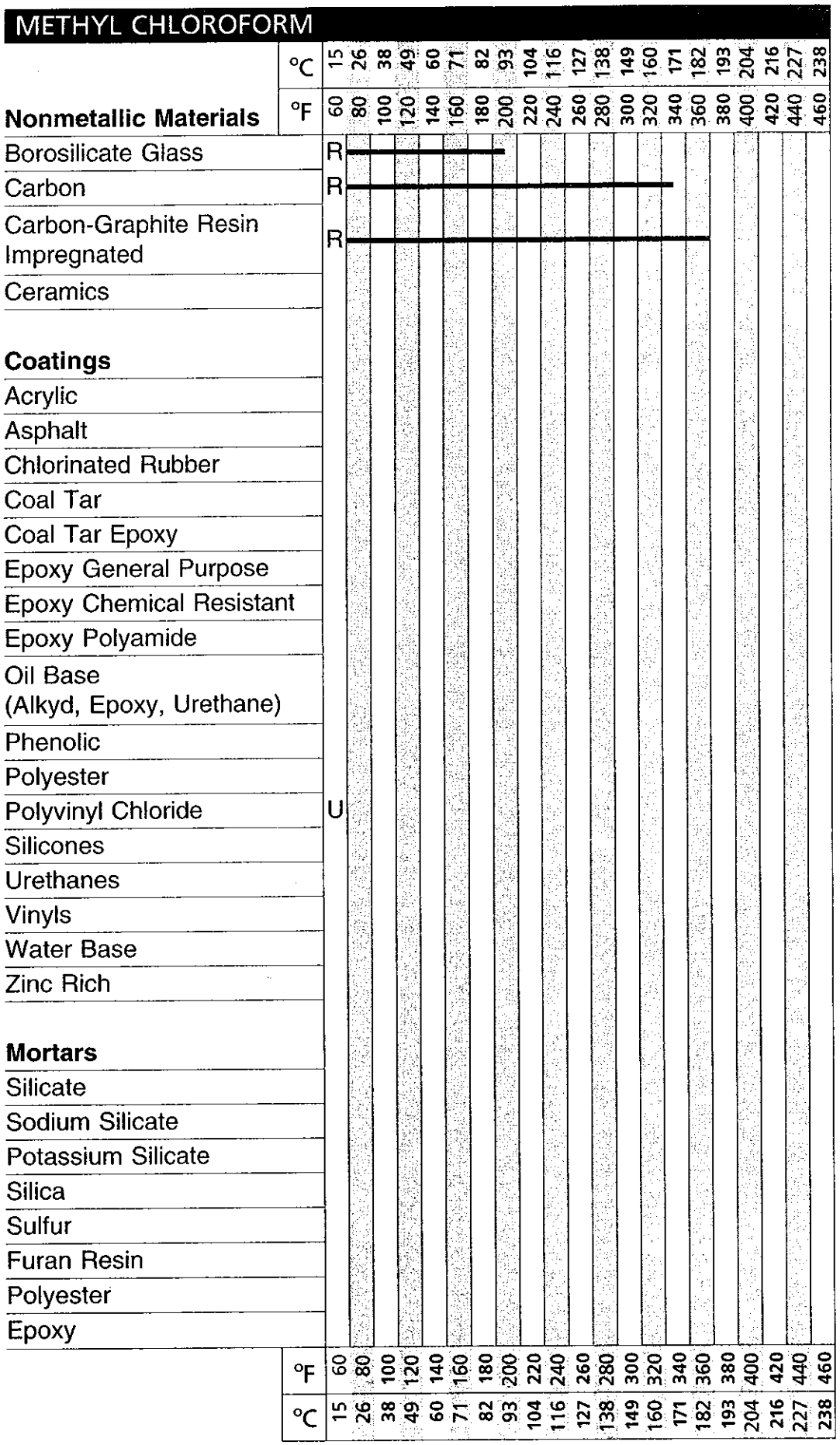




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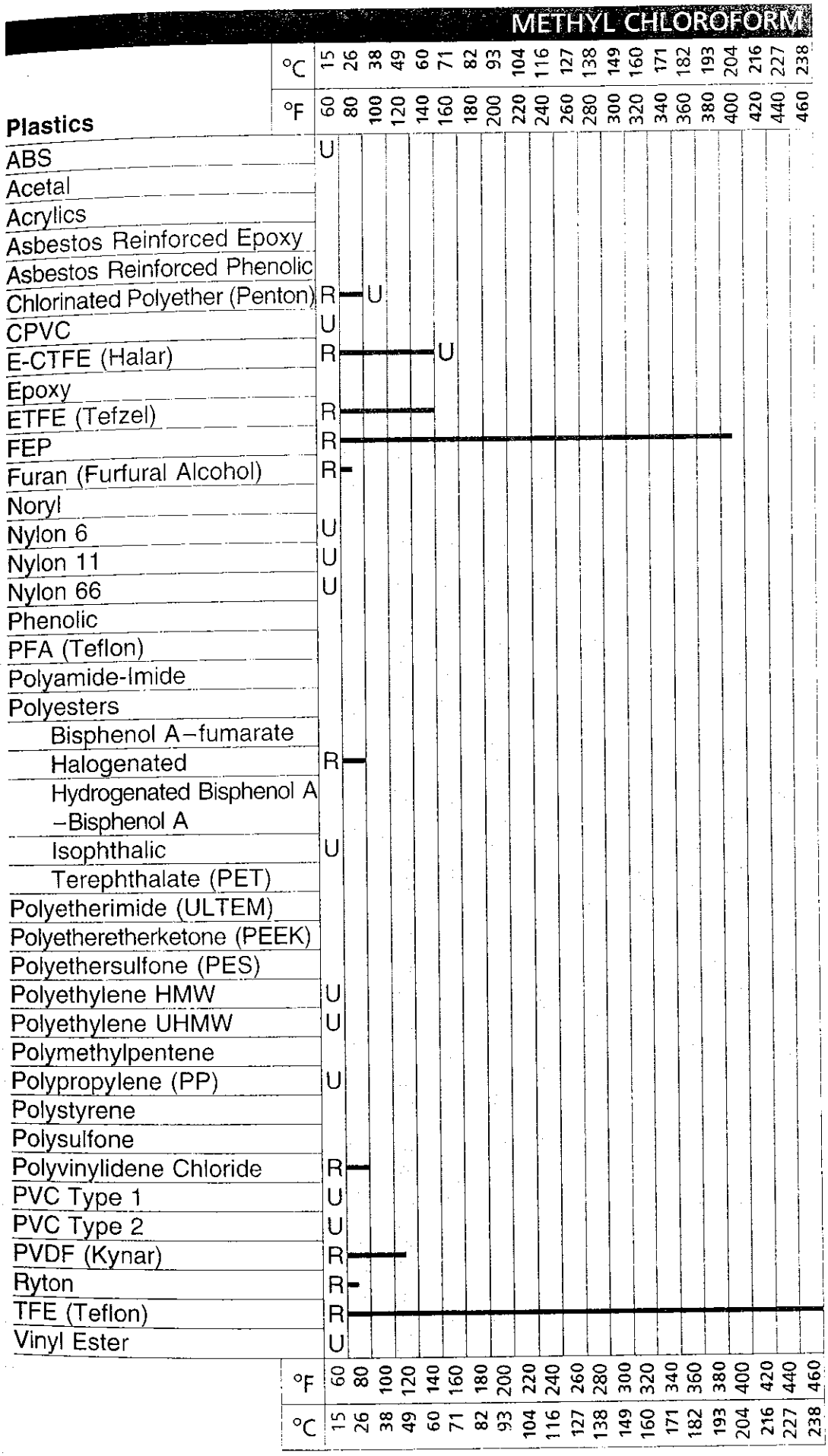


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## METHYL CHLOROFORM

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | R | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | U | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | U | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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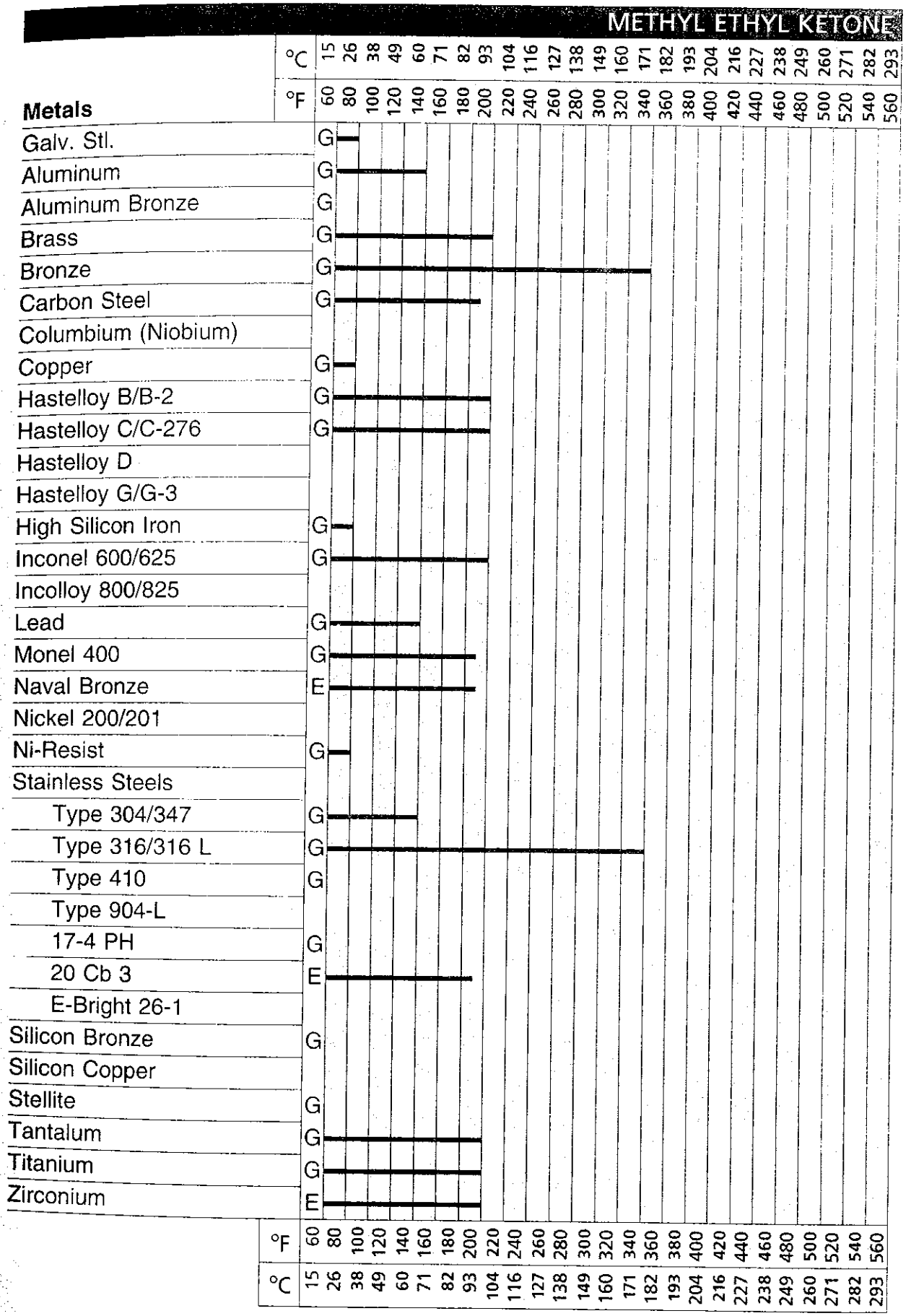


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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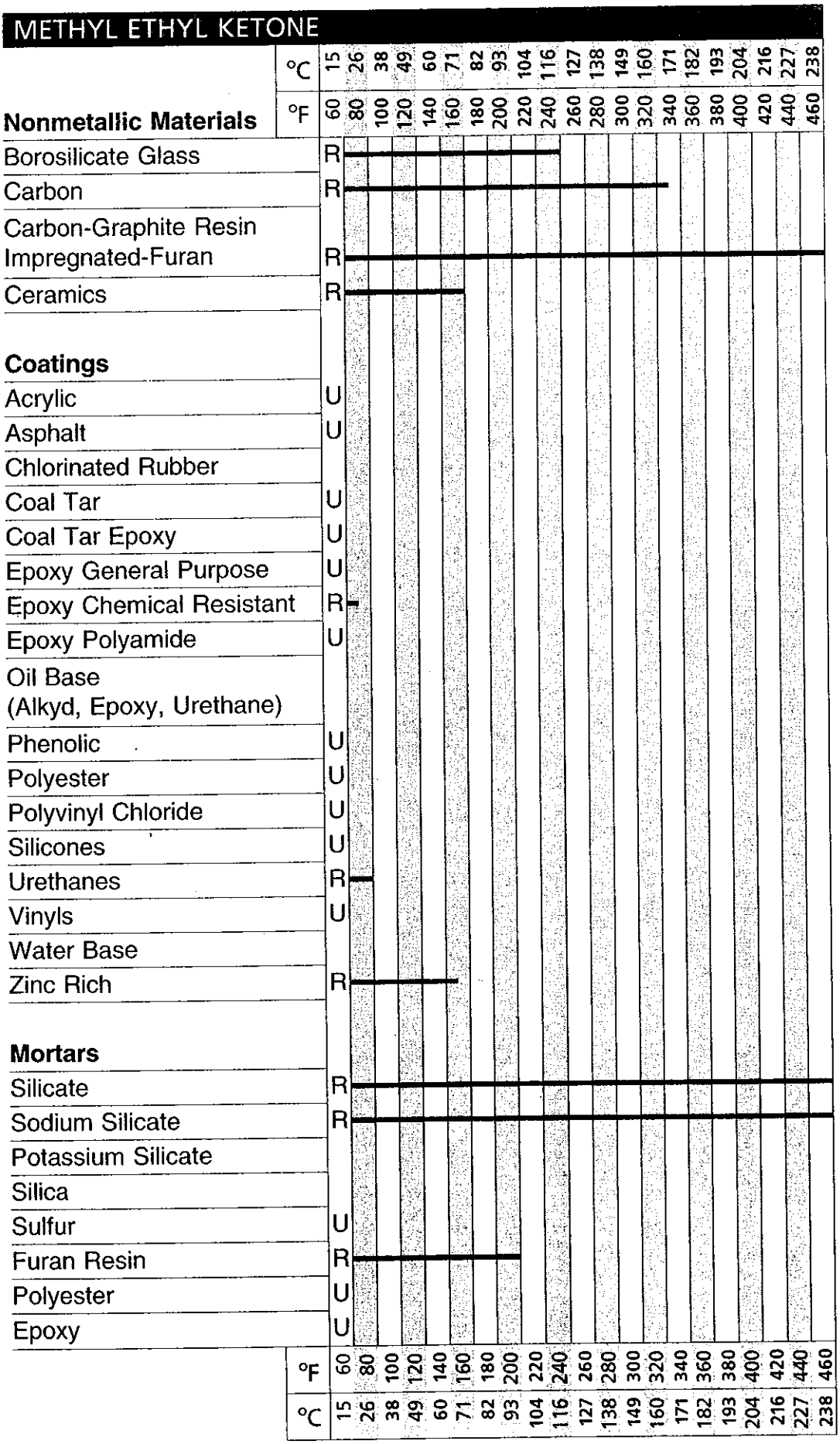
# METHYL ETHYL KETONE



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# METHYL ETHYL KETONE

| Plastics | | |
|---|---|---|
| ABS | | U |
| Acetal | | U |
| Acrylics | | U |
| Asbestos Reinforced Epoxy | | R |
| Asbestos Reinforced Phenolic | | R |
| Chlorinated Polyether (Penton) | | R |
| CPVC | | U |
| E-CTFE (Halar) | | R |
| Epoxy | | R |
| ETFE (Tefzel) | | R |
| FEP | 14 | R |
| Furan (Furfural Alcohol) | | R |
| Noryl | | U |
| Nylon 6 | | R |
| Nylon 11 | | R |
| Nylon 66 | | R |
| Phenolic | | U |
| PFA (Teflon) | 14 | R |
| Polyamide-Imide | | R |
| Polyesters | | |
| Bisphenol A–fumarate | | U |
| Halogenated | | U |
| Hydrogenated Bisphenol A –Bisphenol A | | U |
| Isophthalic | | U |
| Terephthalate (PET) | | R |
| Polyetherimide (ULTEM) | | U |
| Polyetheretherketone (PEEK) | | R |
| Polyethersulfone (PES) | | U |
| Polyethylene HMW | | U |
| Polyethylene UHMW | | U |
| Polymethylpentene | | U |
| Polypropylene (PP) | | R |
| Polystyrene | | U |
| Polysulfone | | U |
| Polyvinylidene Chloride | | U |
| PVC Type 1 | | U |
| PVC Type 2 | | U |
| PVDF (Kynar) | | U |
| Ryton | | R |
| TFE (Teflon) | 14 | R |
| Vinyl Ester | | U |

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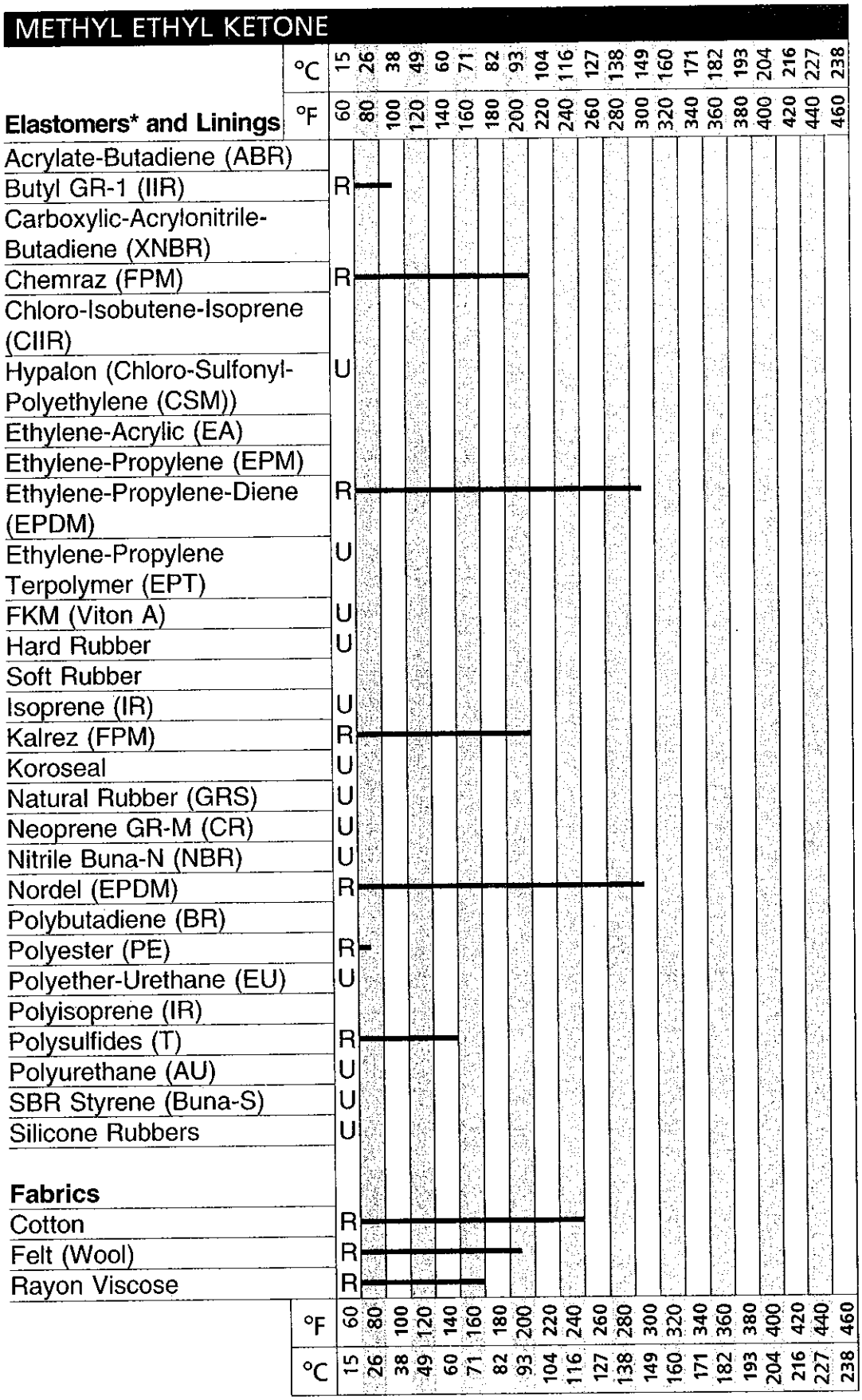


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# METHYL FORMATE

| Metals | °F | °C |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | G | |
| Brass | | |
| Bronze | G | |
| Carbon Steel | U | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | G | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | G | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | | |
| Type 316/316 L | G | |
| Type 400 series | G | |
| Type 904-L | | |
| 17-4 PH | G | |
| 20 Cb 3 | G | |
| E-Bright 26-1 | | |
| Silicon Bronze | G | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# METHYL FORMATE

| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| **Nonmetallic Materials** | | | | | | | | | | | | | | | | | | | | | | |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# METHYL FORMATE

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | R | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | U | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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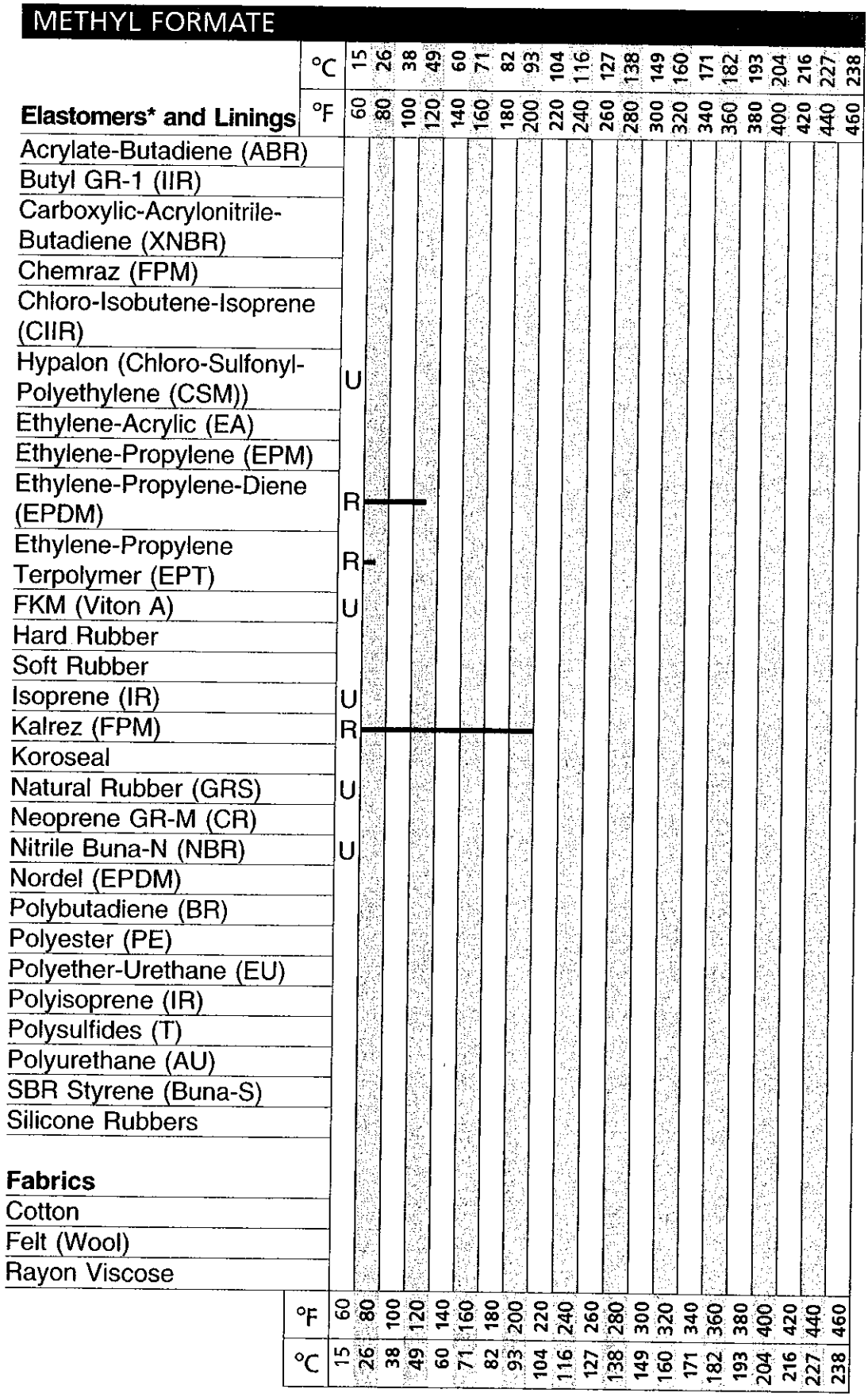


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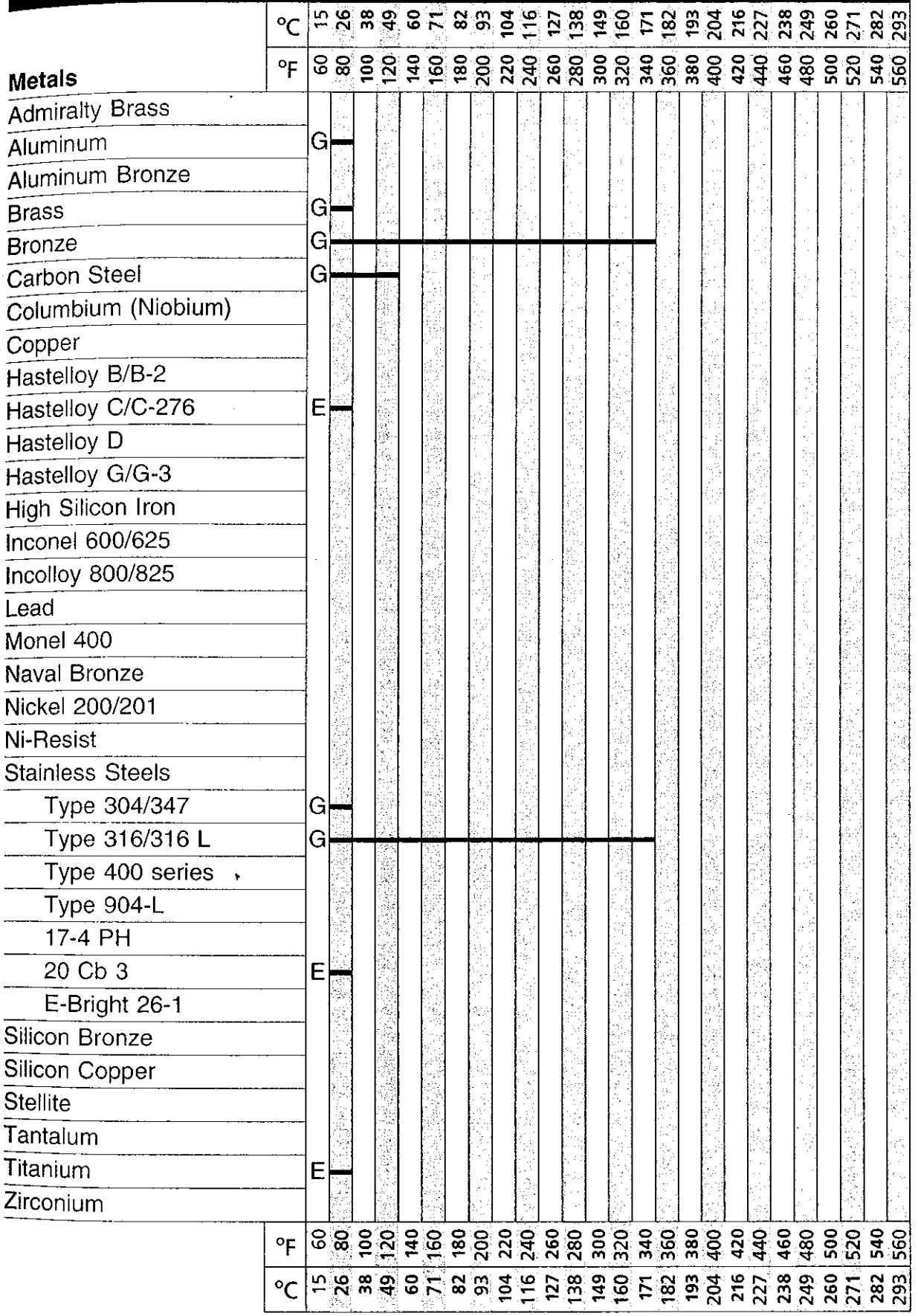


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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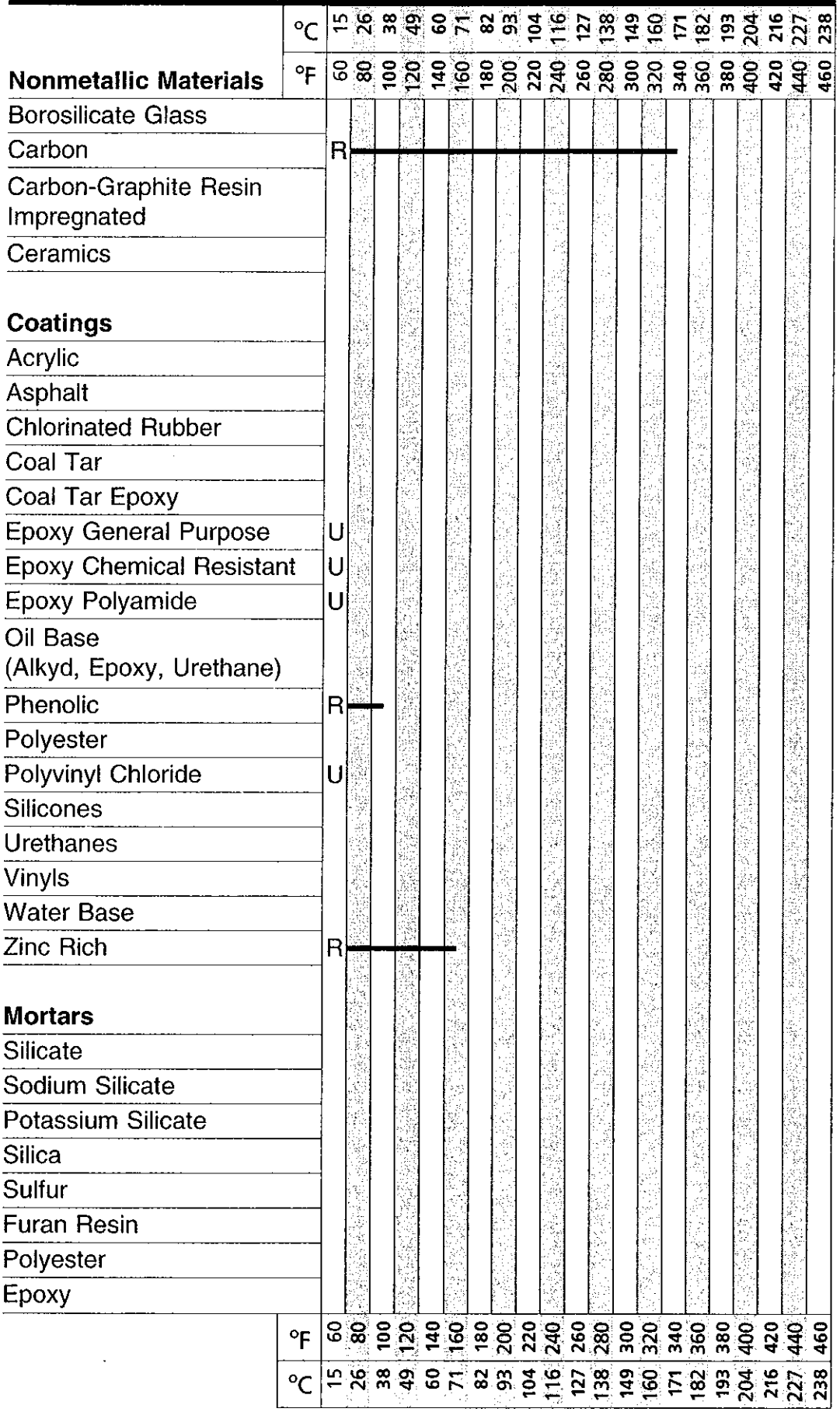





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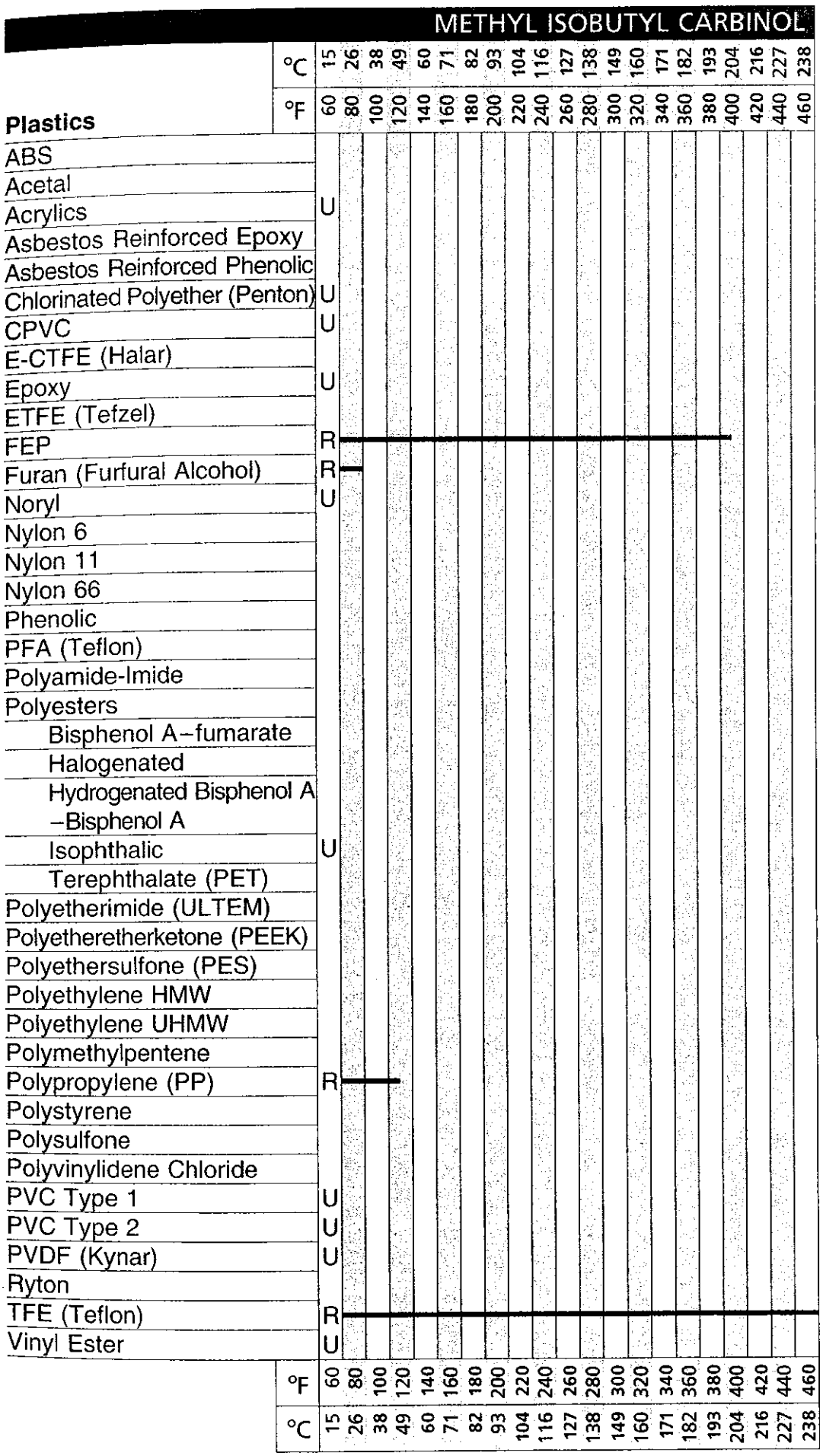


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## METHYL ISOBUTYL CARBINOL

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | R | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | R | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | R | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | R | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | R | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | R | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | R | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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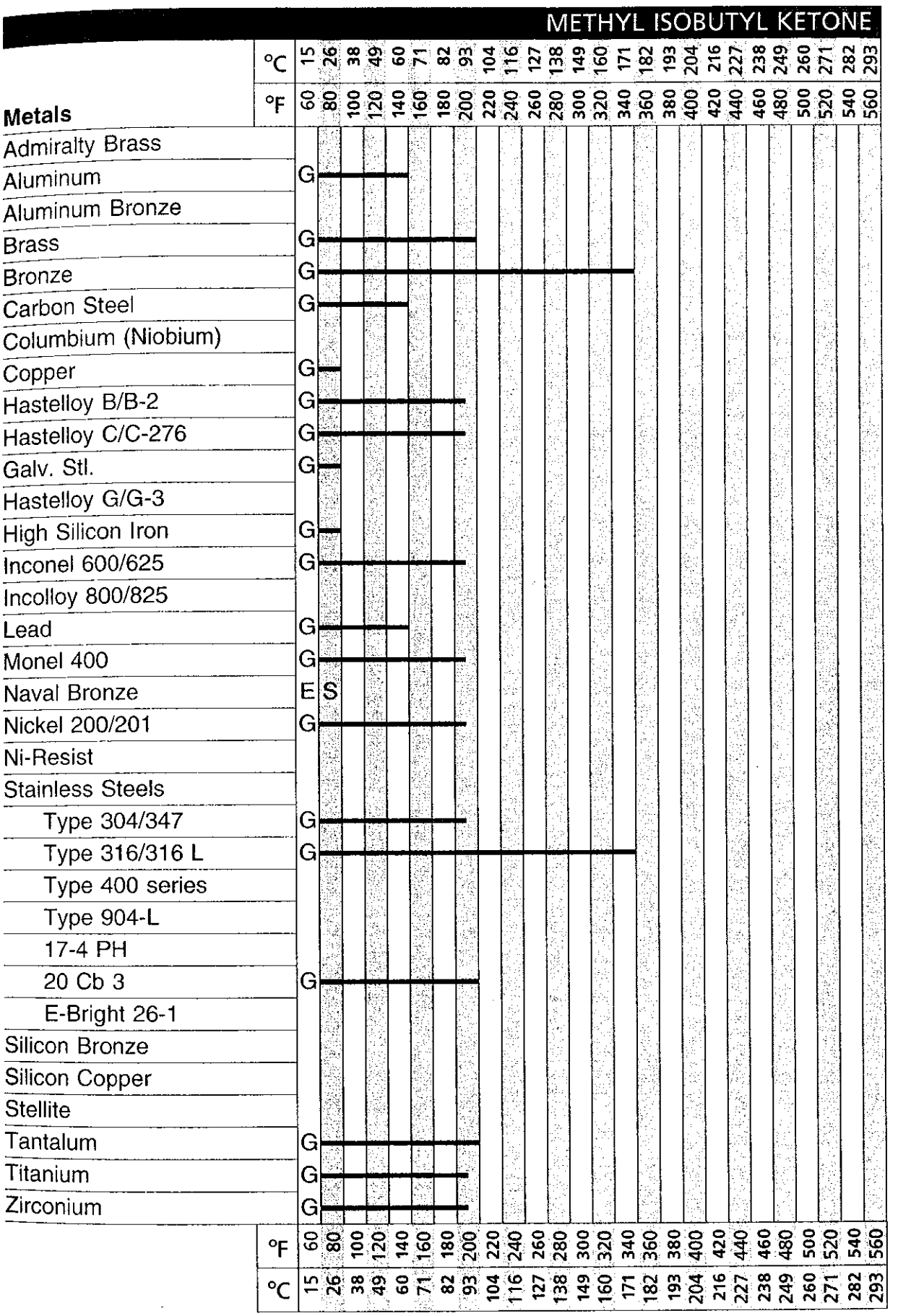


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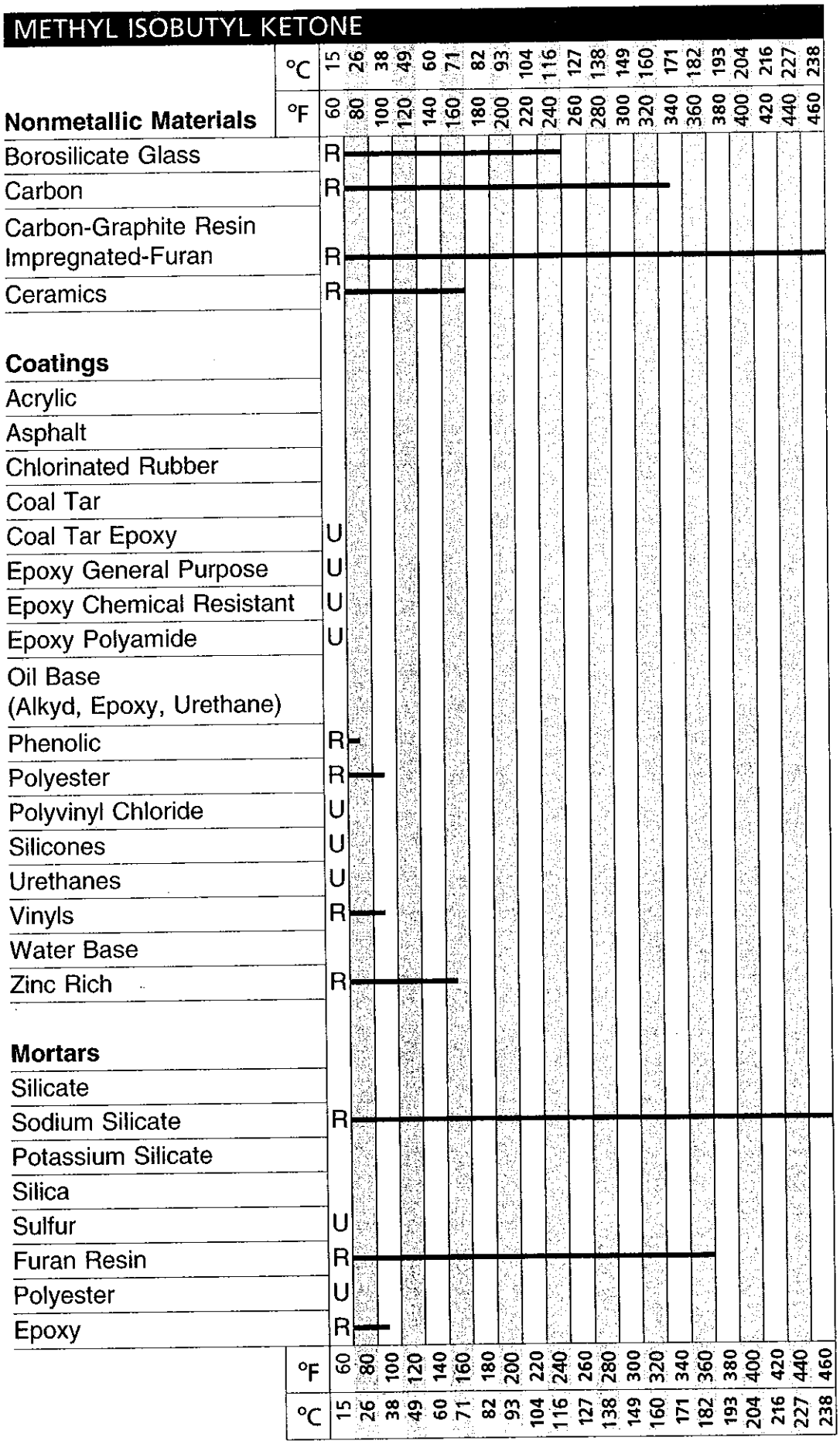
# METHYL ISOBUTYL KETONE



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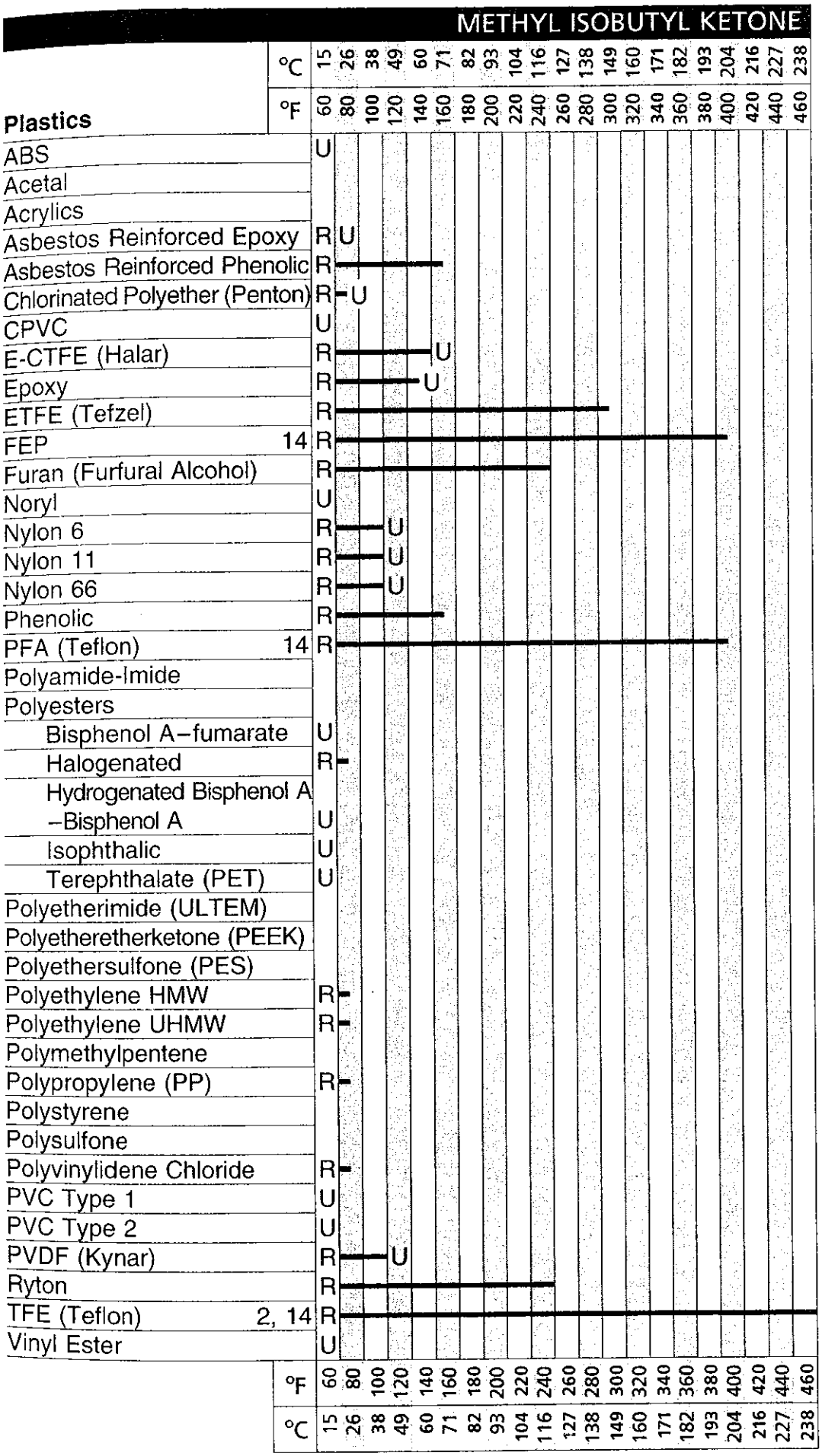



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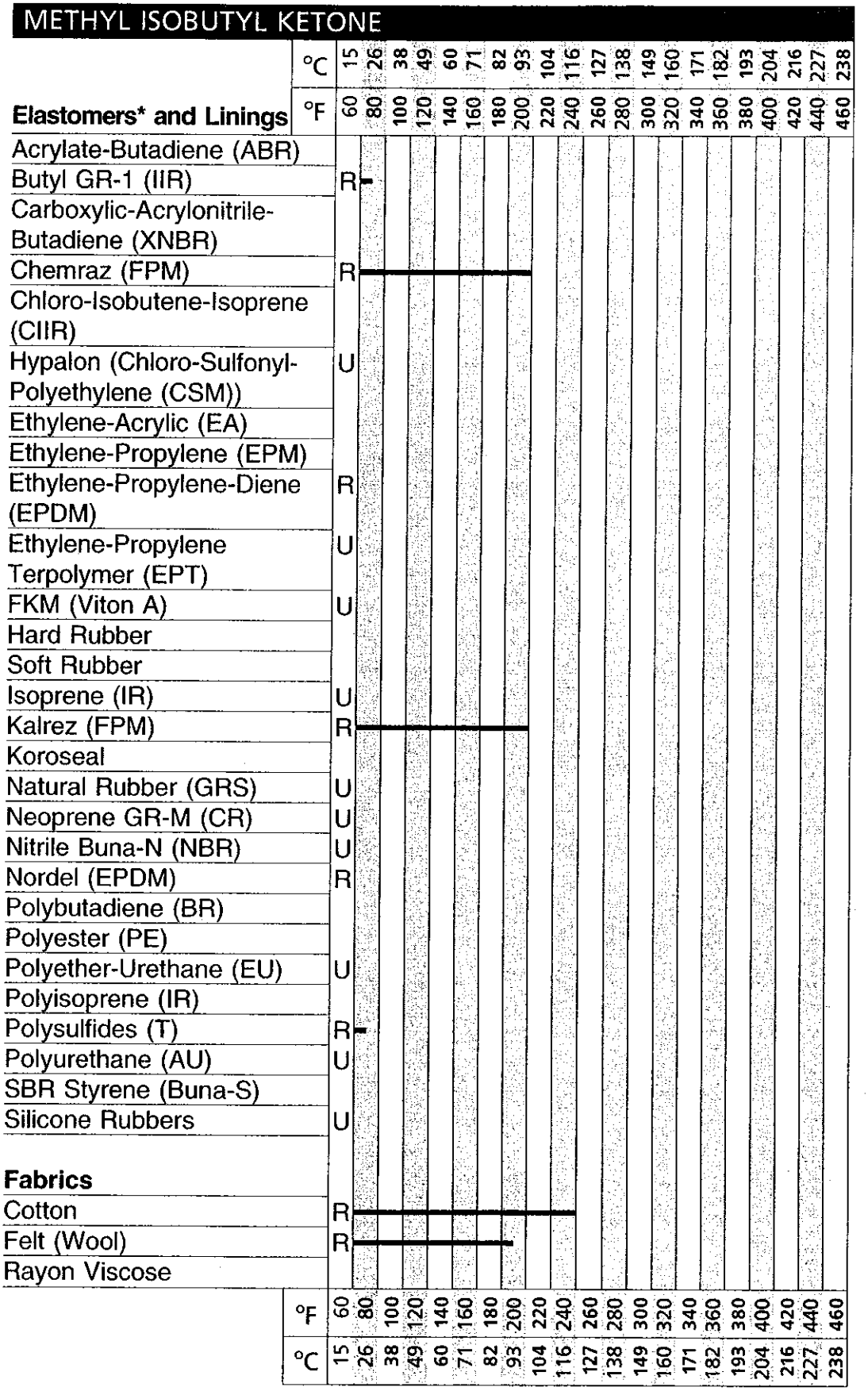


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# METHYL METHACRYLATE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | — | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | — | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | — | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | G | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | G | — | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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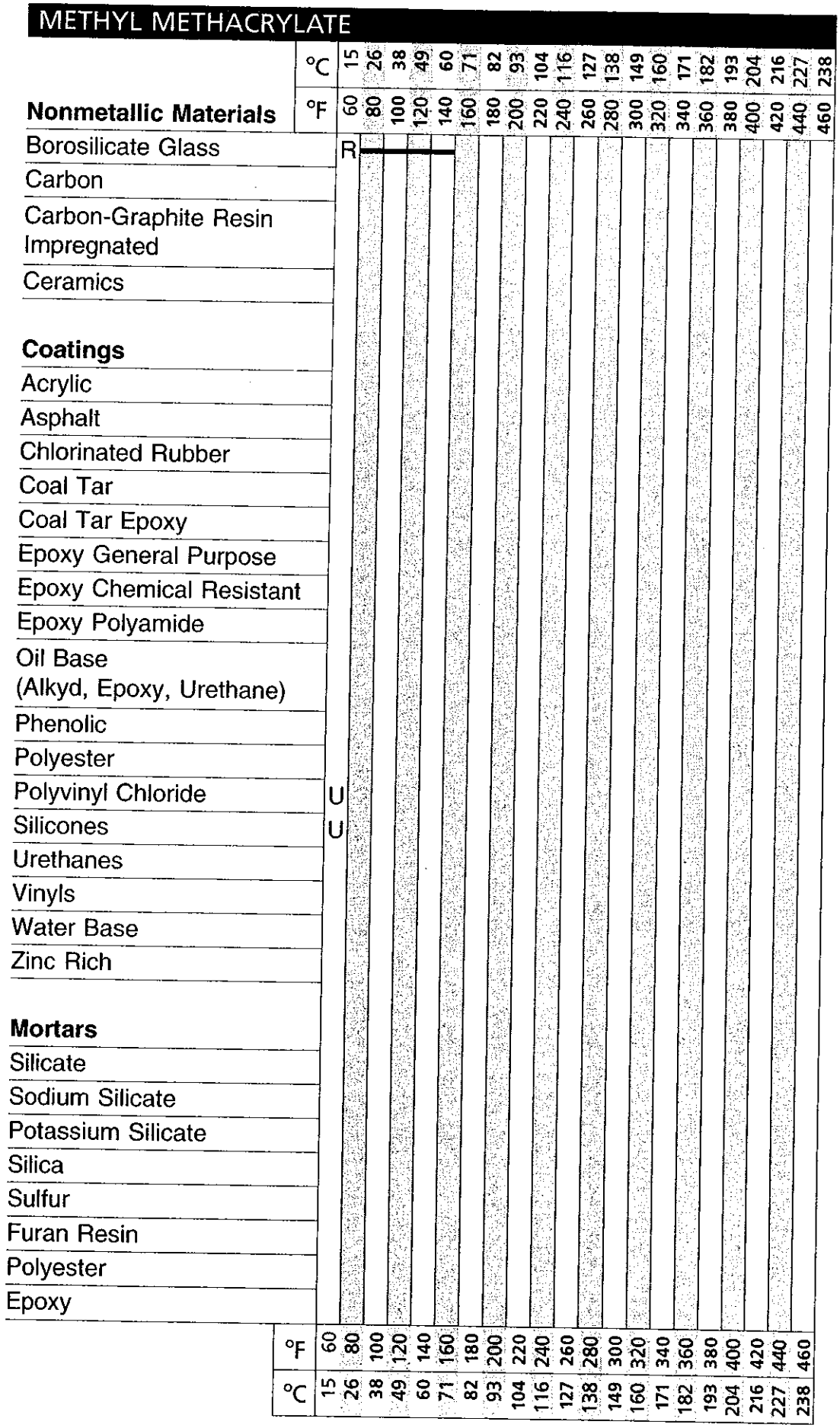




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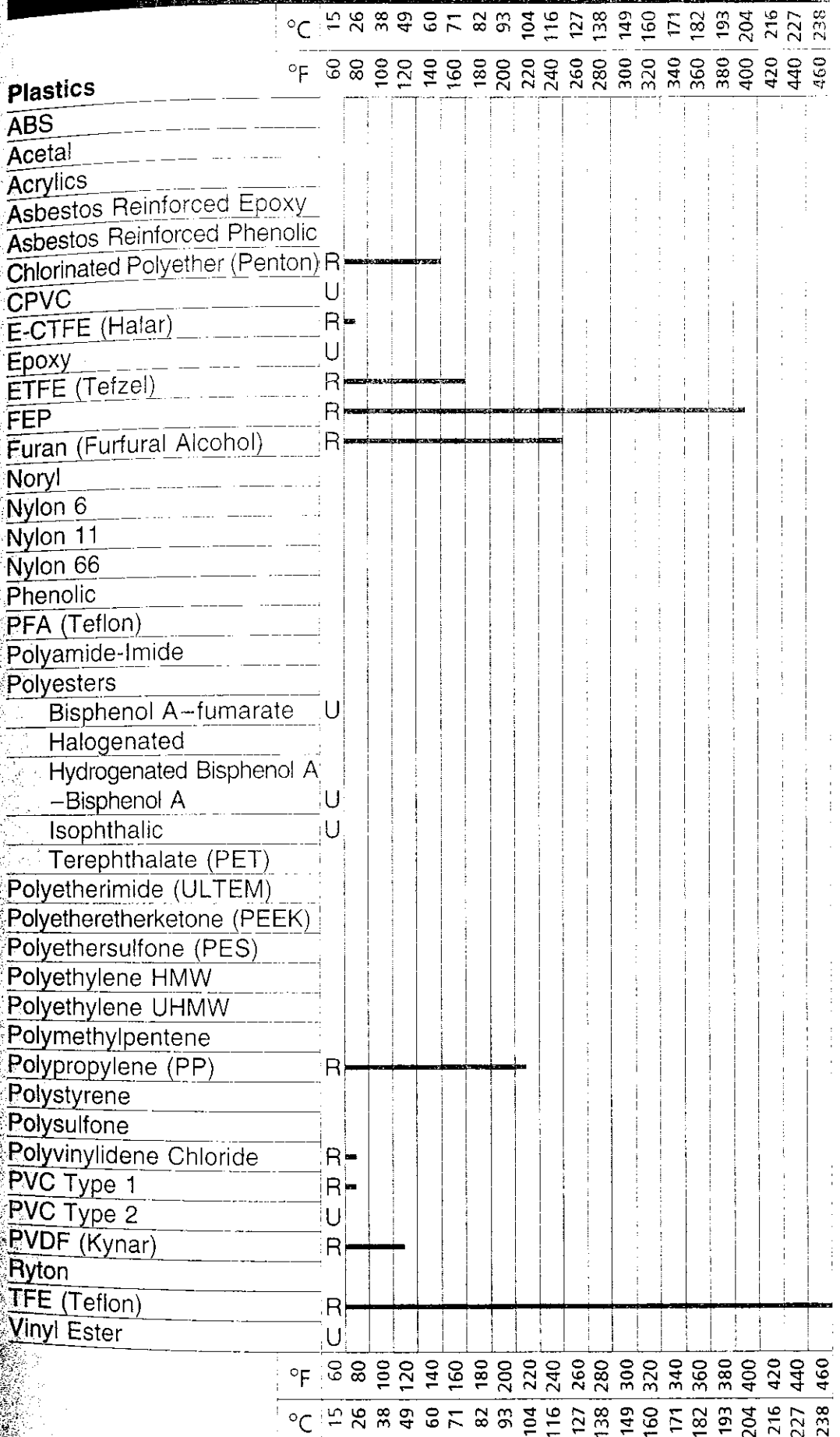


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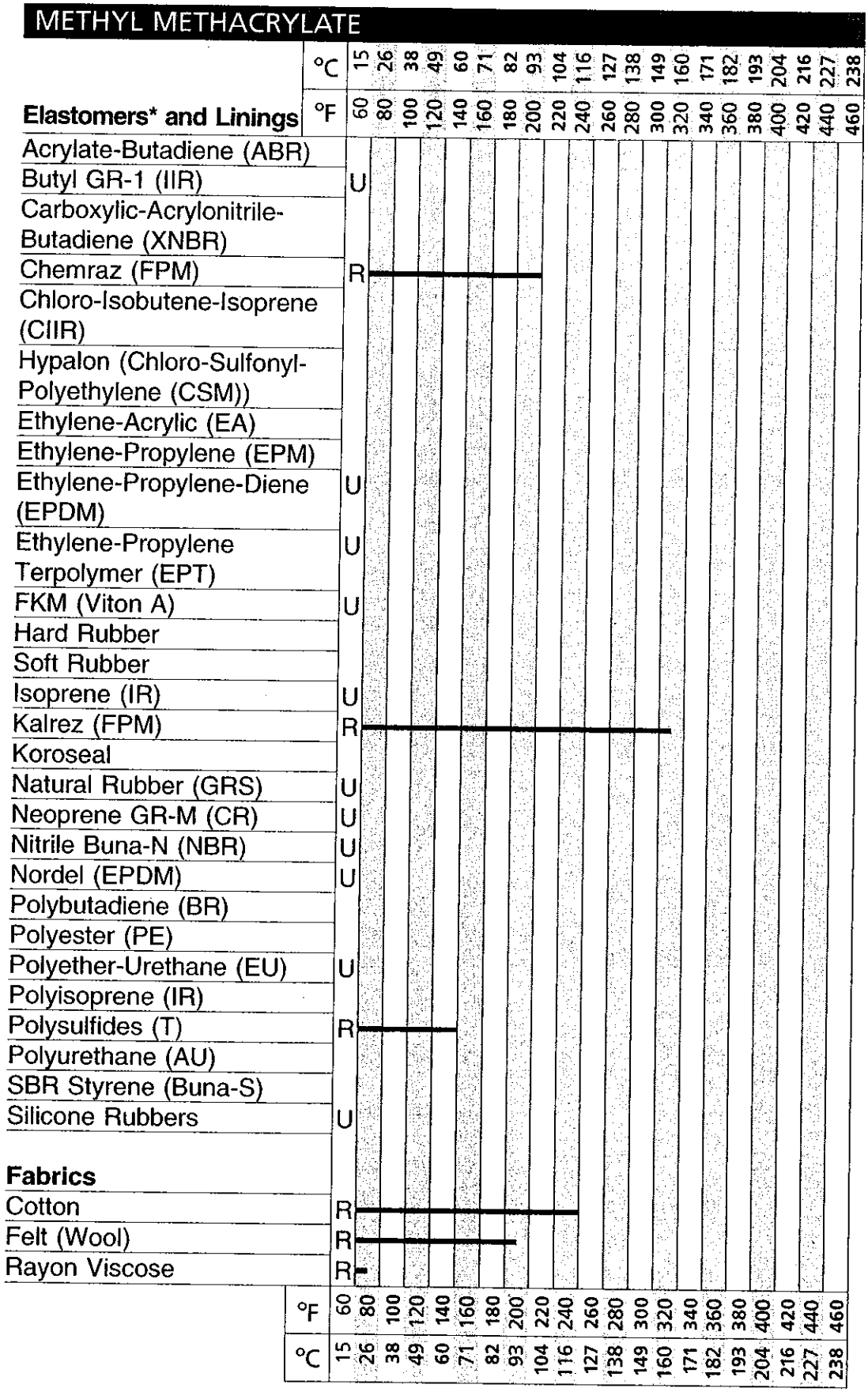


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# METHYL SALICYLATE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

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R = Resistant

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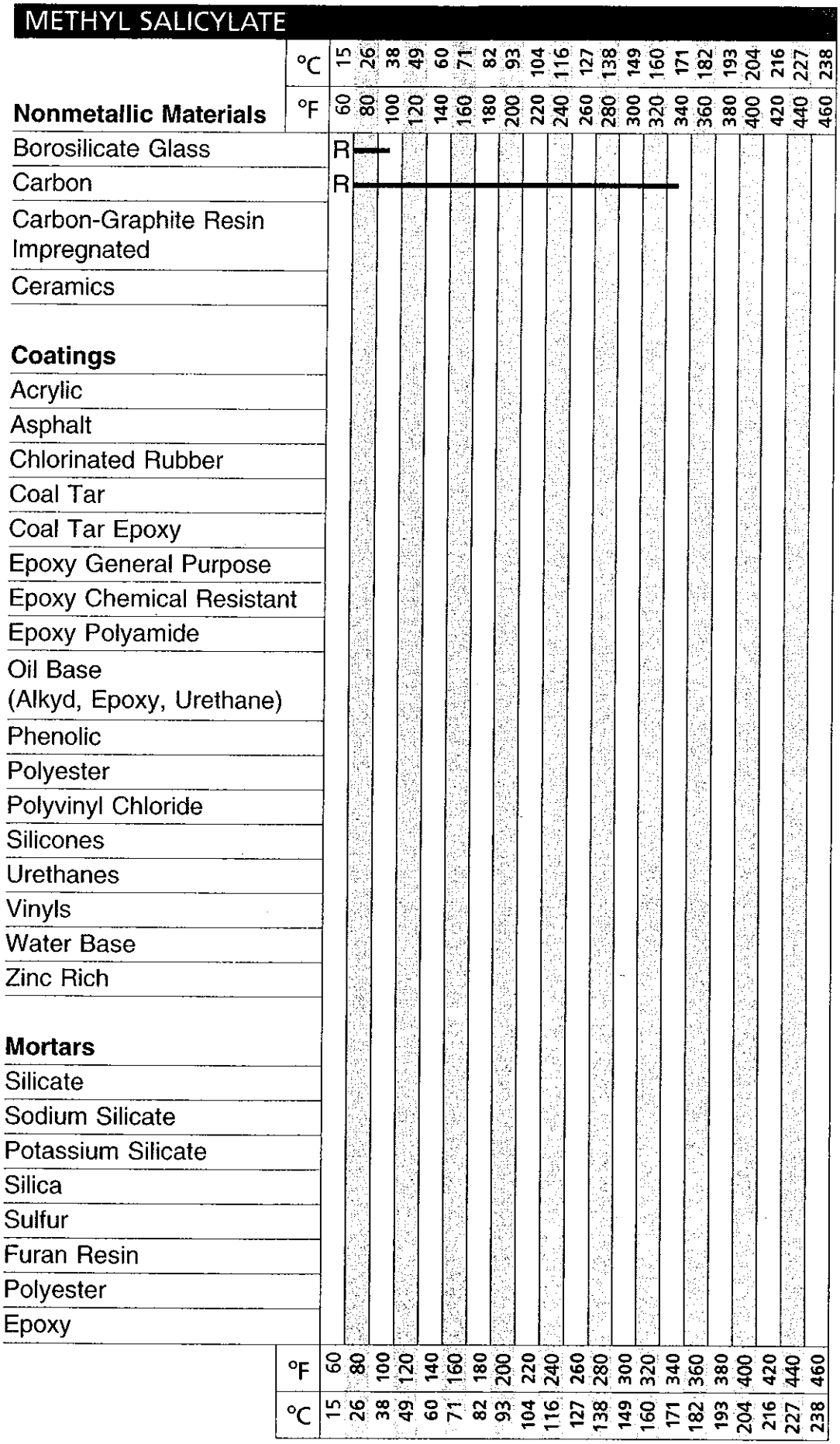
## METHYL SALICYLATE







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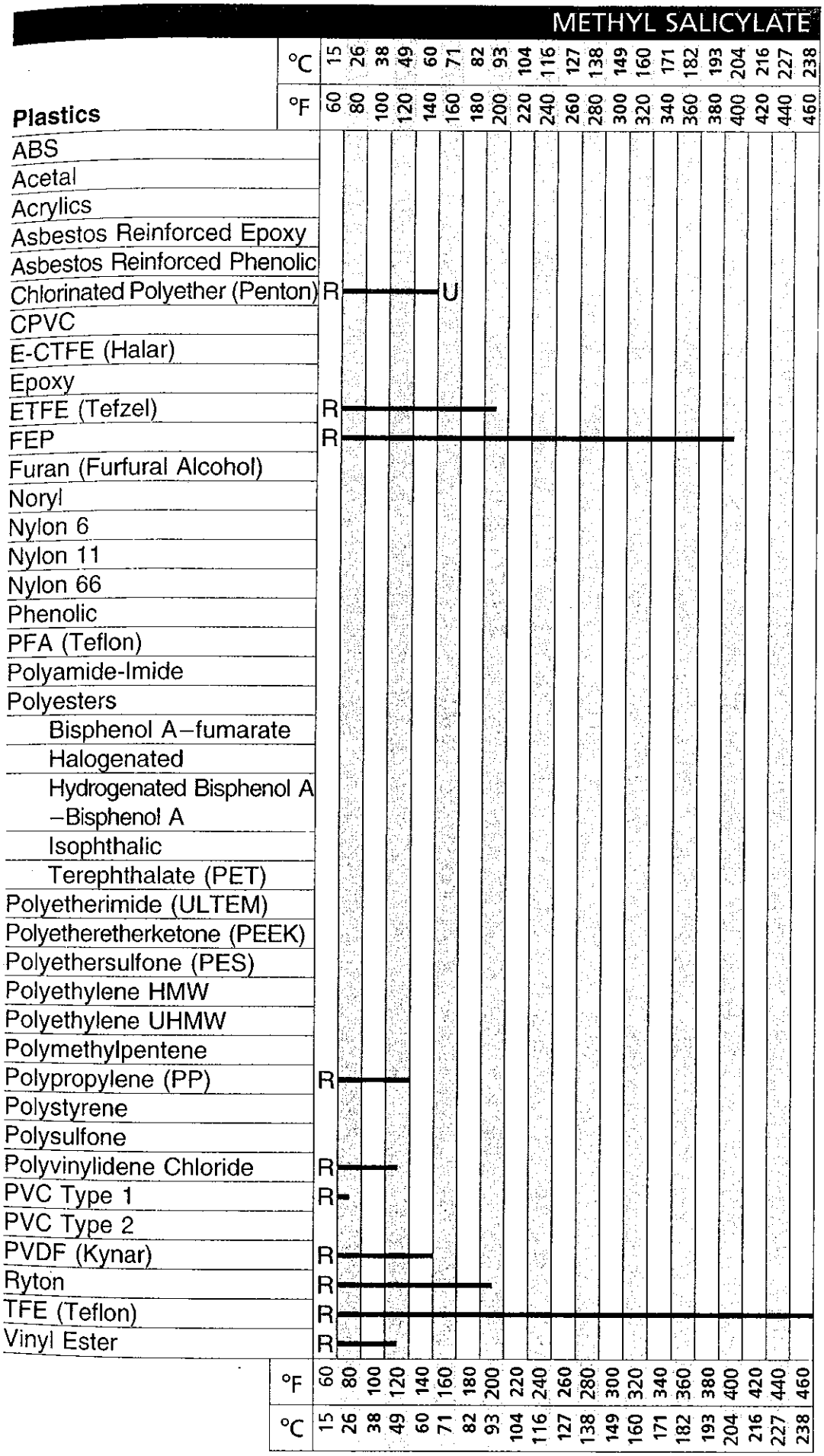


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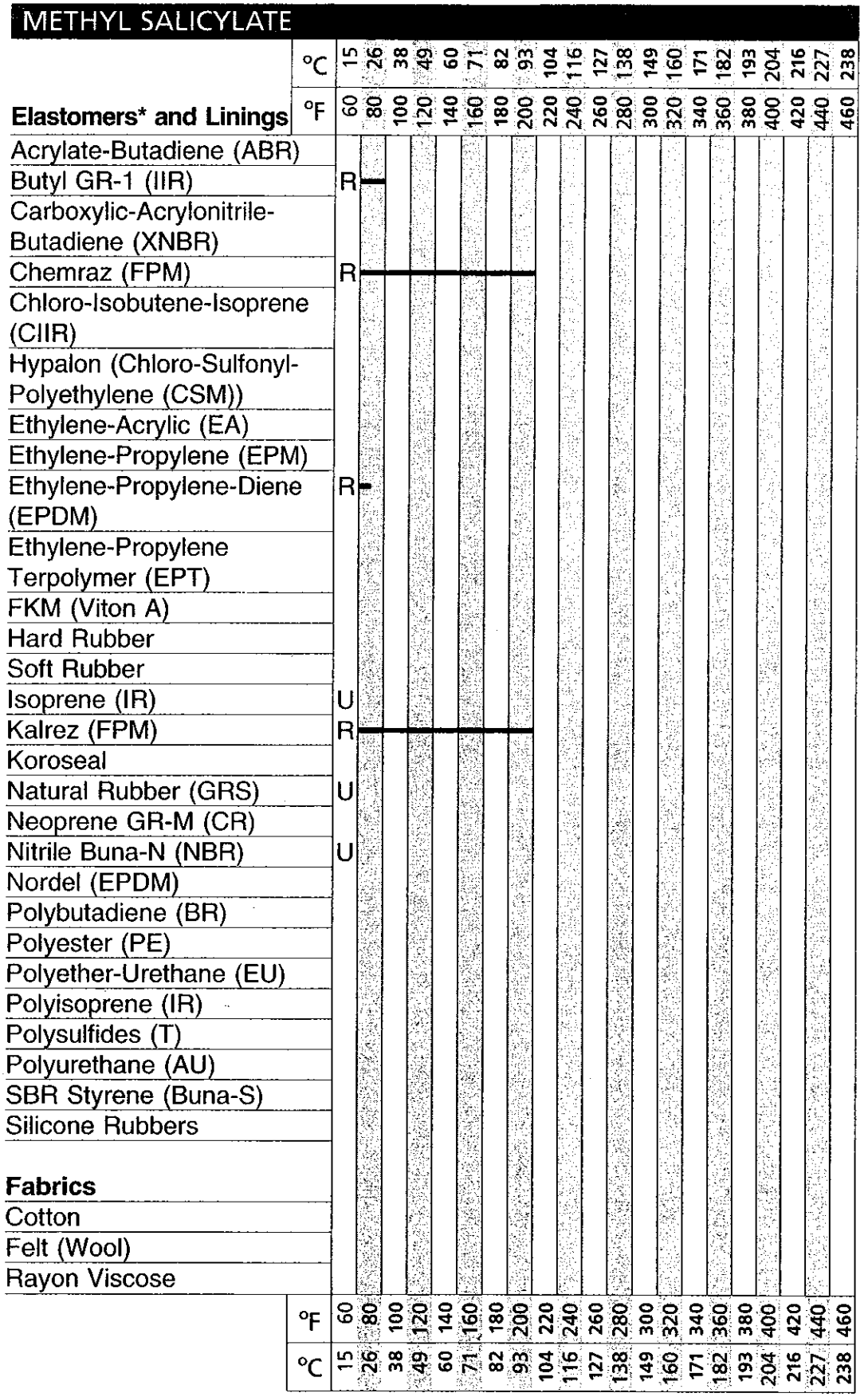


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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

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## METHYL SULFATE

| Nonmetallic Materials | |
|---|---|
| Borosilicate Glass | |
| Carbon | |
| Carbon-Graphite Resin Impregnated | |
| Ceramics | |
| **Coatings** | |
| Acrylic | |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | U |
| Coal Tar Epoxy | U |
| Epoxy General Purpose | U |
| Epoxy Chemical Resistant | U |
| Epoxy Polyamide | U |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | U |
| Polyvinyl Chloride | U |
| Silicones | |
| Urethanes | |
| Vinyls | U |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | R |
| Sodium Silicate | R |
| Potassium Silicate | R |
| Silica | R |
| Sulfur | U |
| Furan Resin | R |
| Polyester | U |
| Epoxy | U |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |



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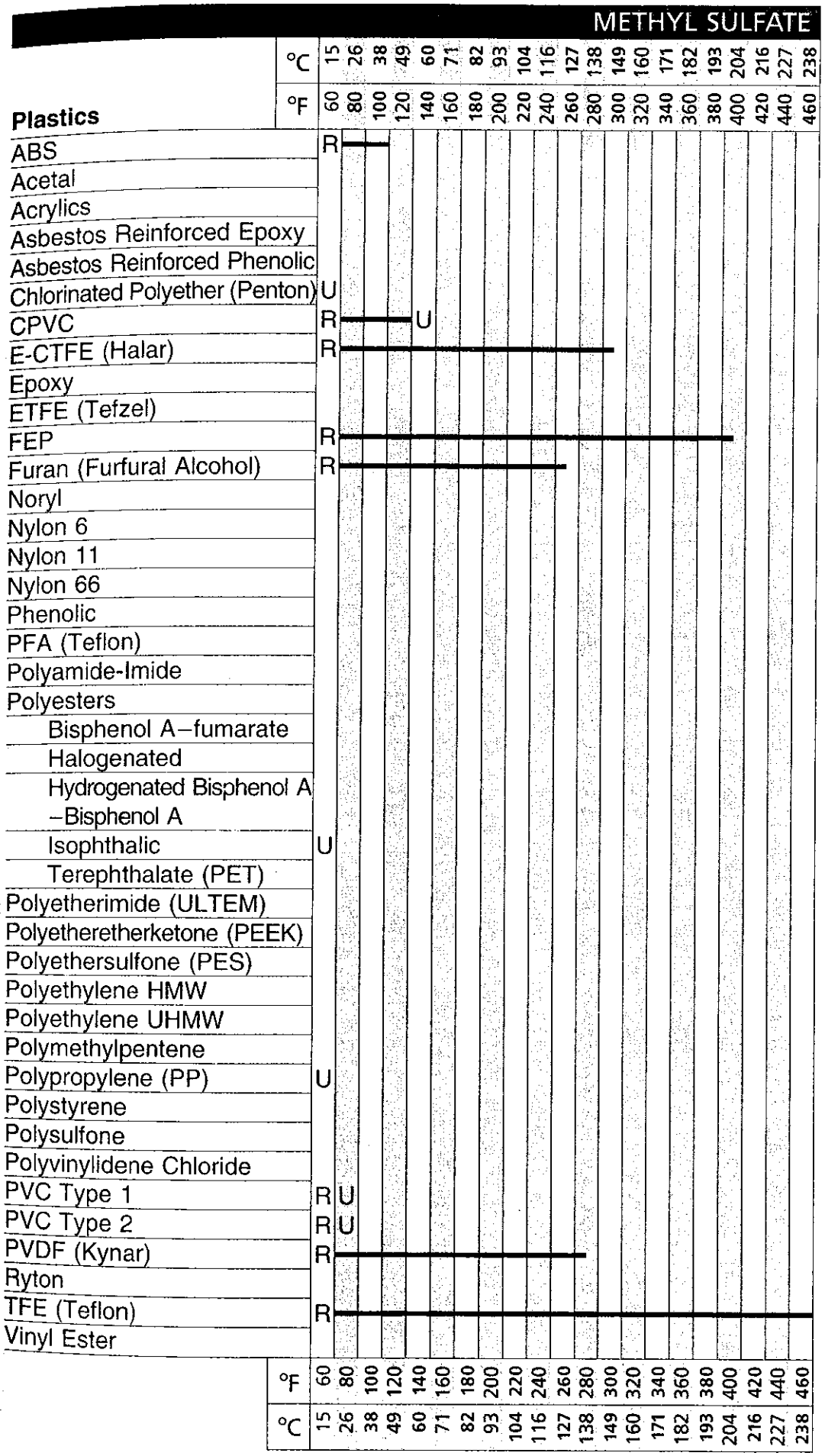


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## METHYL SULFATE

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | U | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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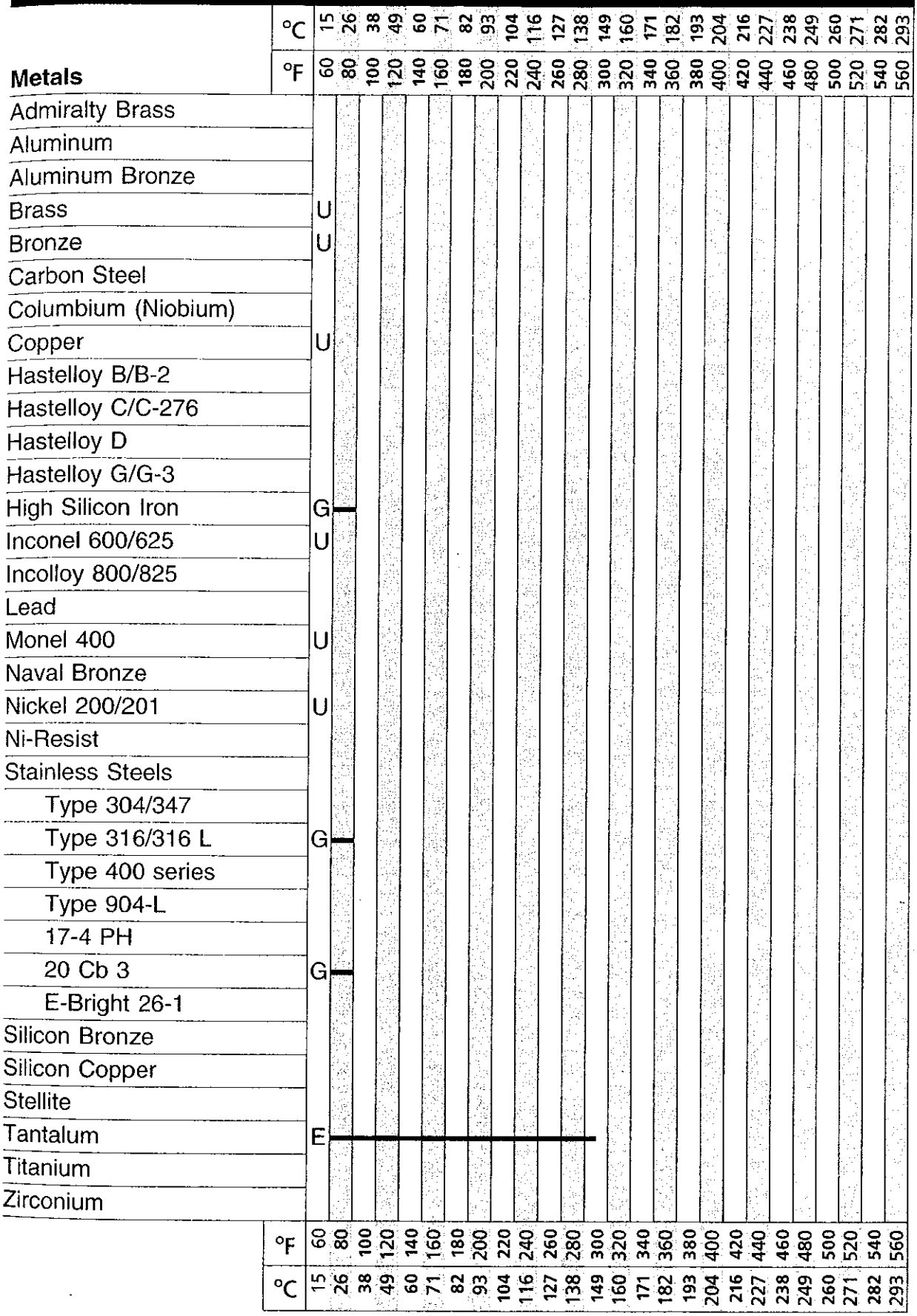
# METHYL SULFURIC ACID




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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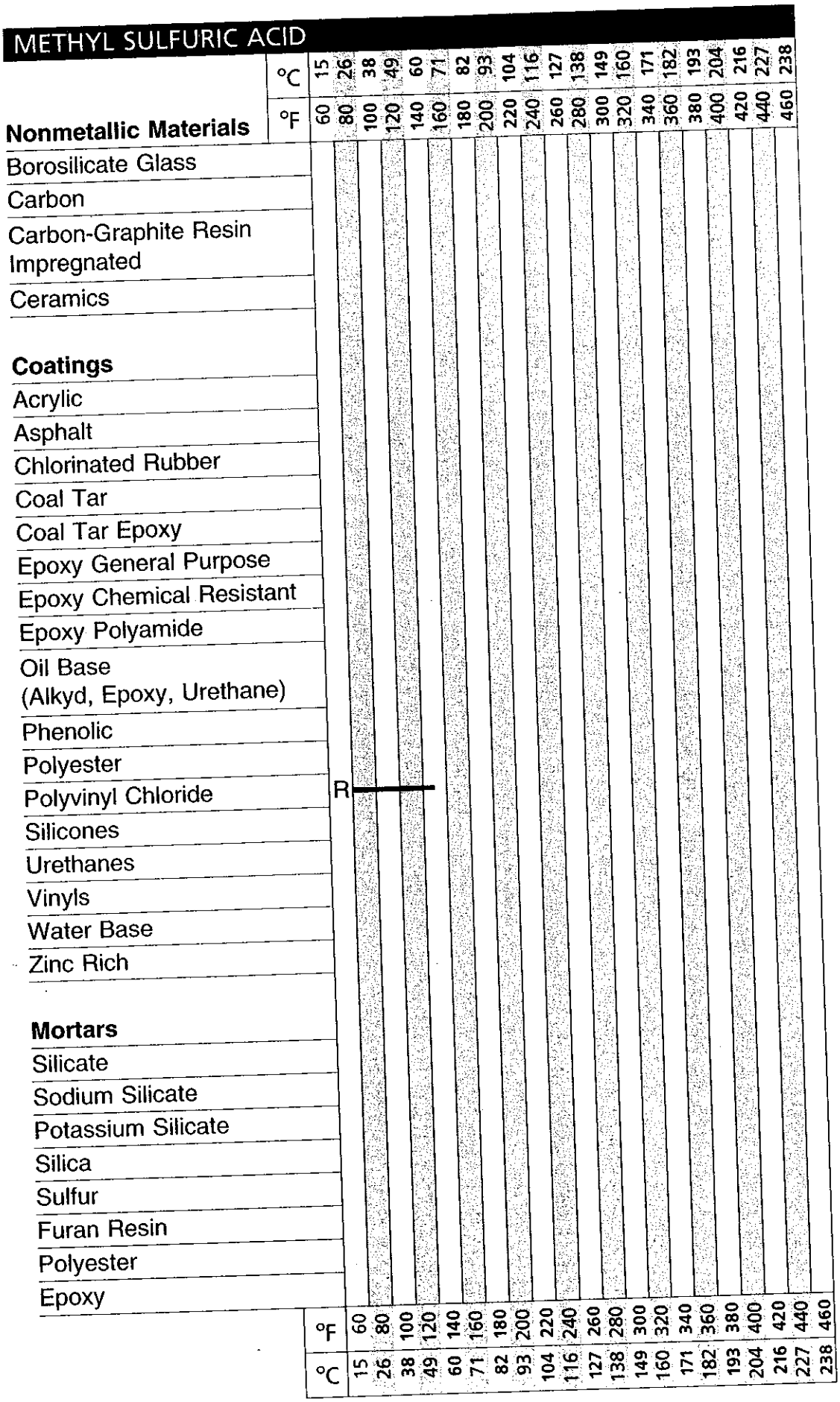




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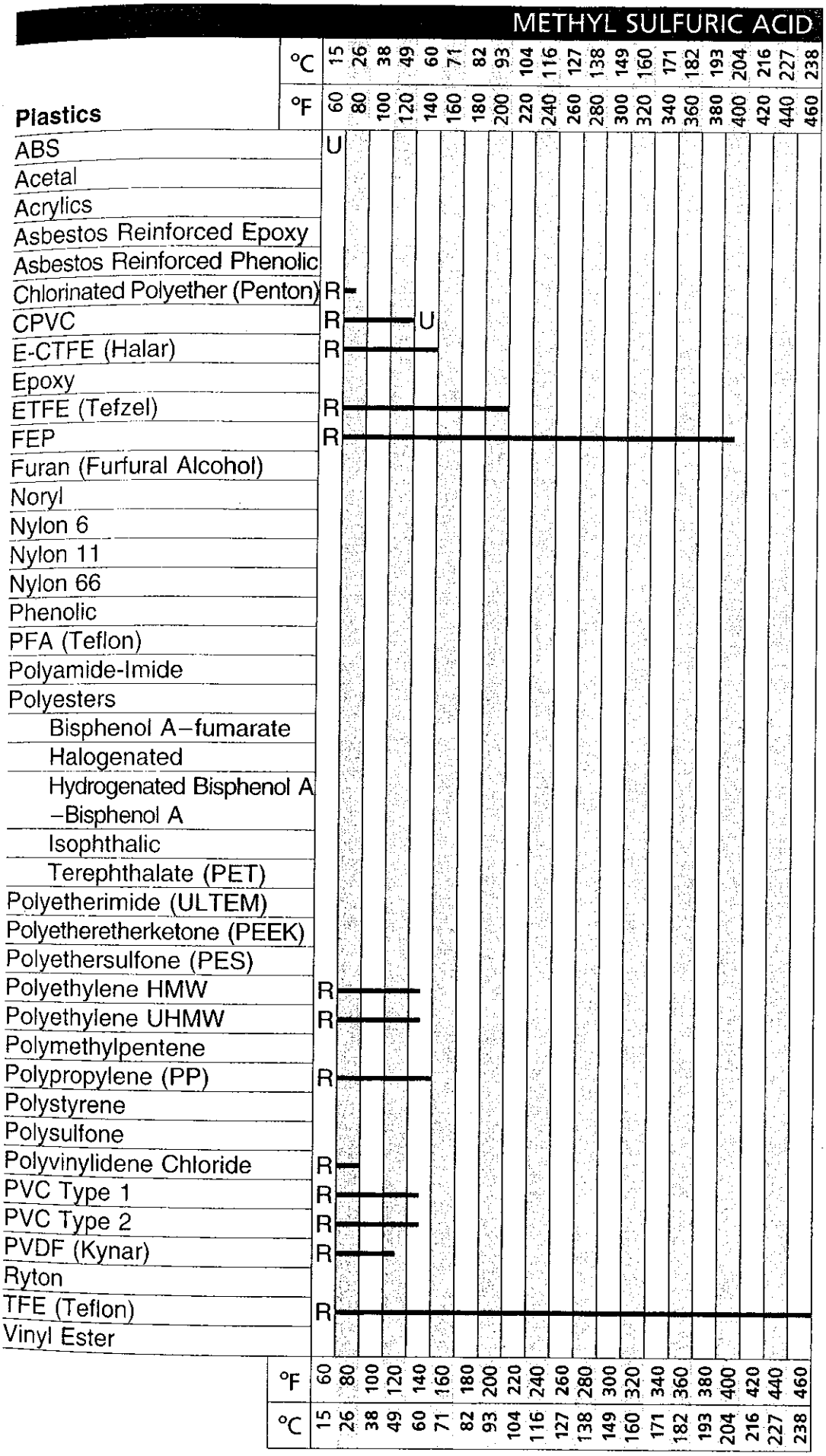


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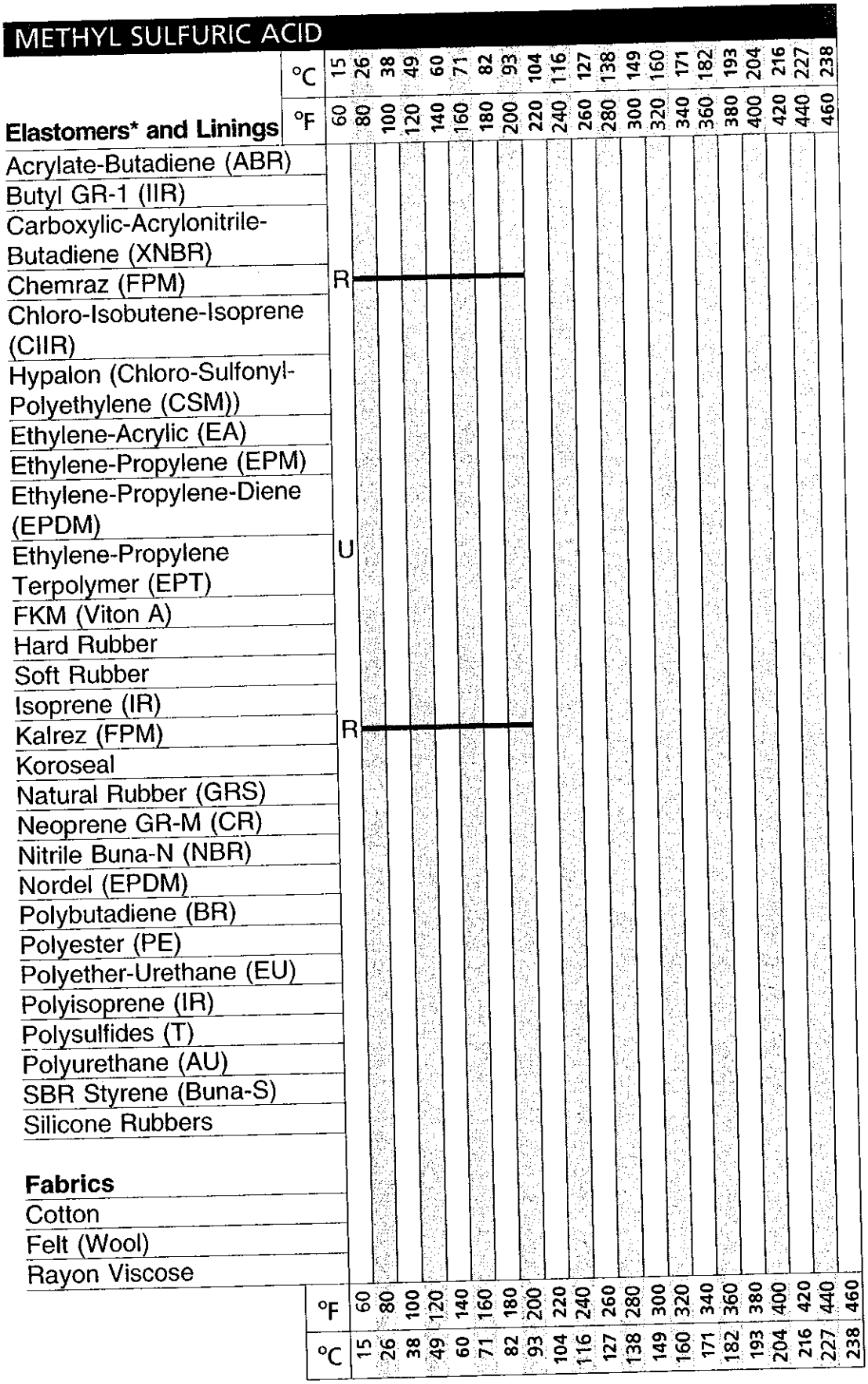


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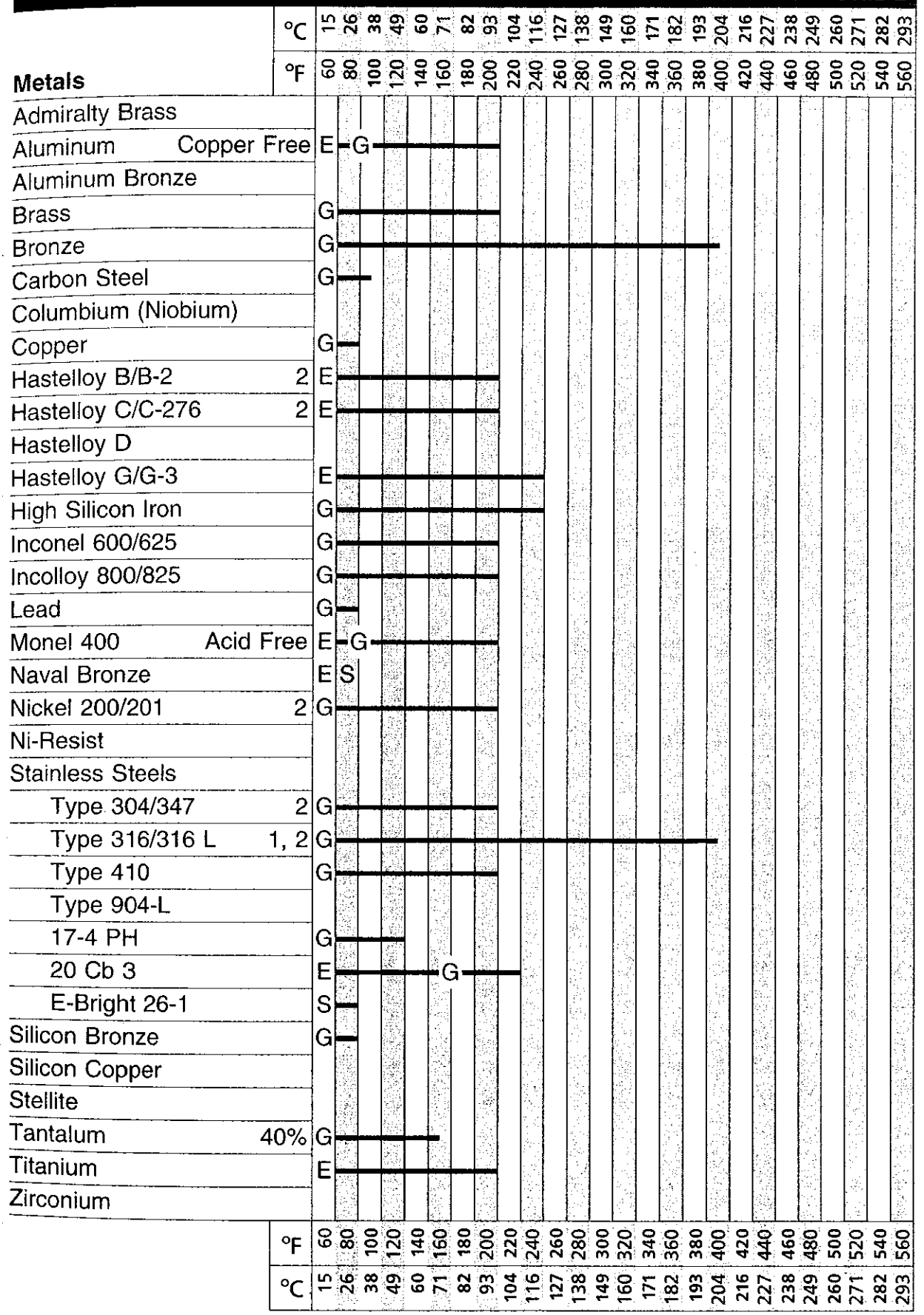


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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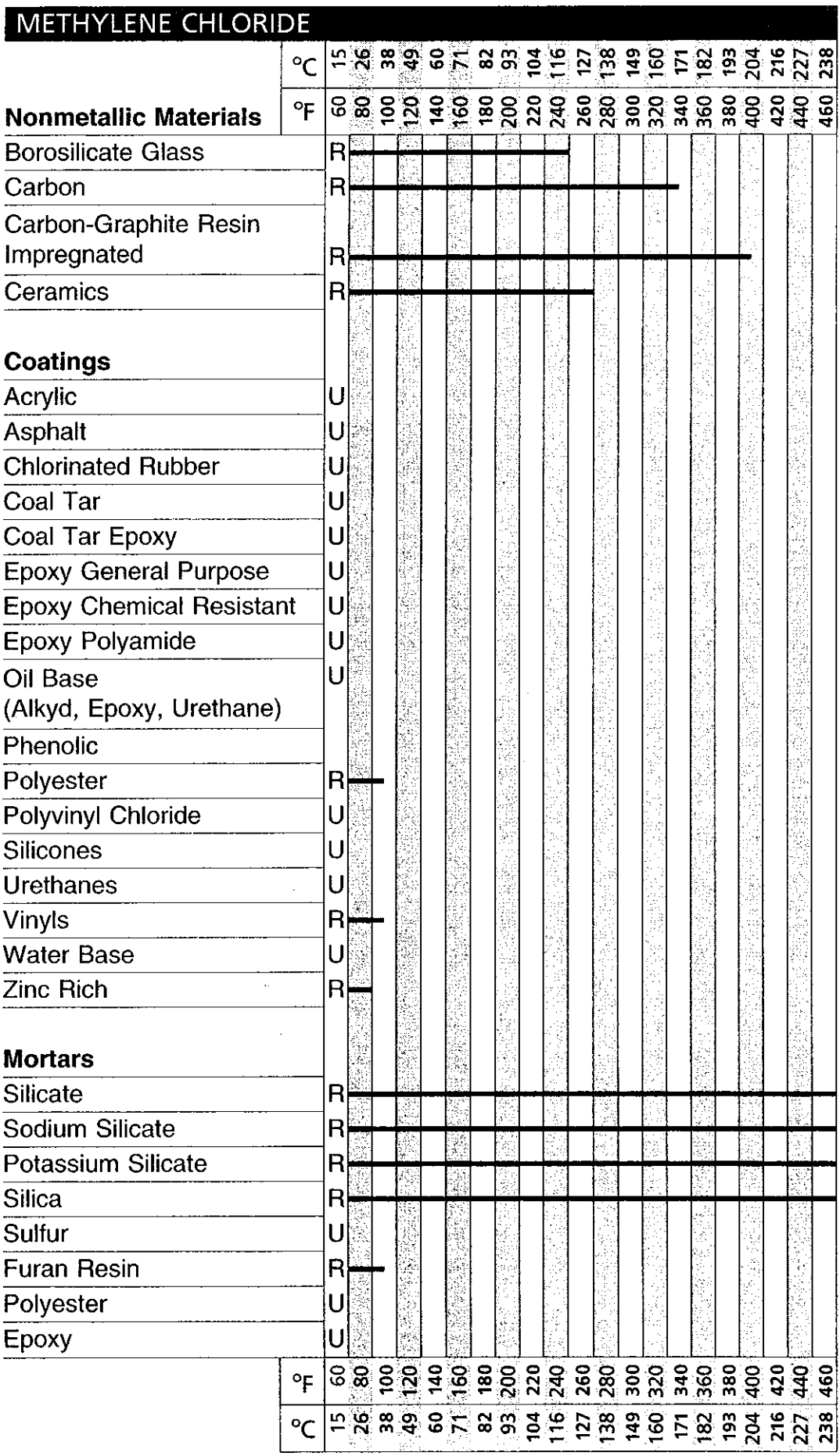
## METHYLENE CHLORIDE



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# METHYLENE CHLORIDE

| Plastics | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | R | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | U | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | U | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | U | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | R | U | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | R | U | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | R | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | U | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | U | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | U | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | U | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | U | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | U | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | R | U | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | U | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | R | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | 2, 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | U | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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## METHYLENE CHLORIDE

| Elastomers* and Linings | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | U | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | U | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | U | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | U | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | U | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | U | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | U | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | U | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | U | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | U | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | U | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | | |
| Type 316/316 L | G | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | G | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## METHYLENE CHLOROBROMIDE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | U | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# METHYLENE CHLOROBROMIDE

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | U | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | U | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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## METHYLENE CHLOROBROMIDE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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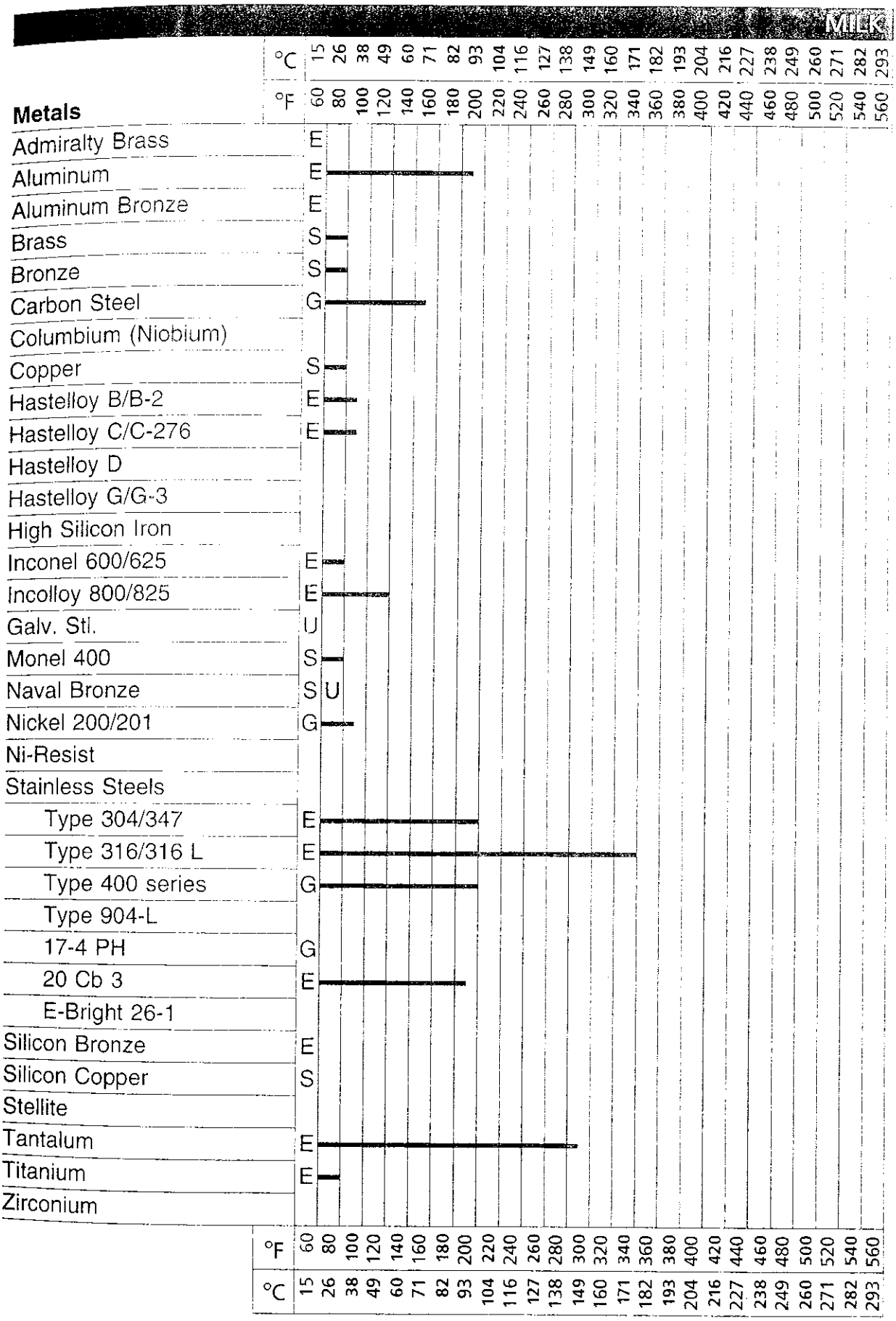


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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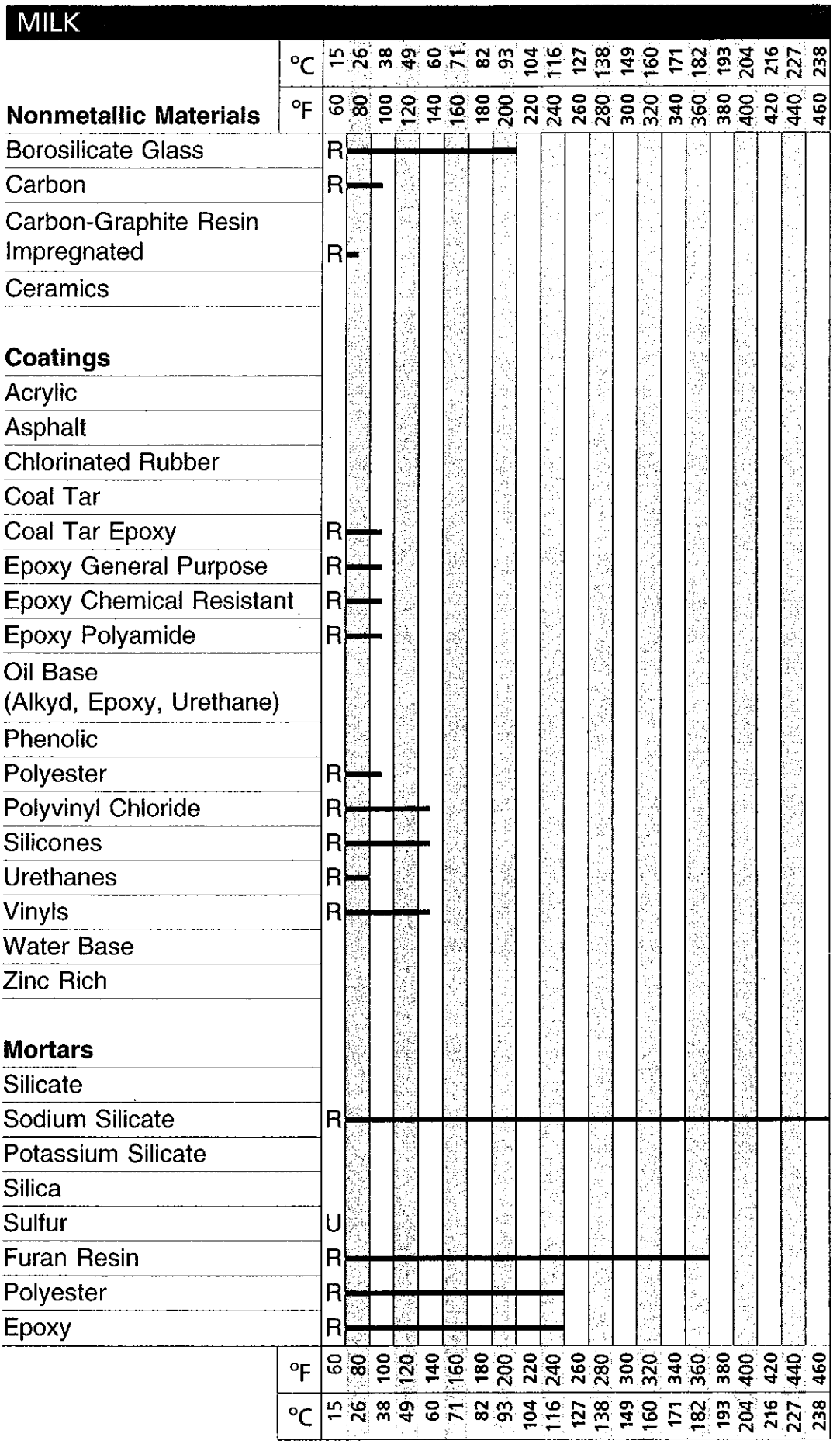
## MILK







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## MILK

| Plastics | °C | °F |
|---|---|---|
| ABS | R | |
| Acetal | R | |
| Acrylics | R | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | R | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A–Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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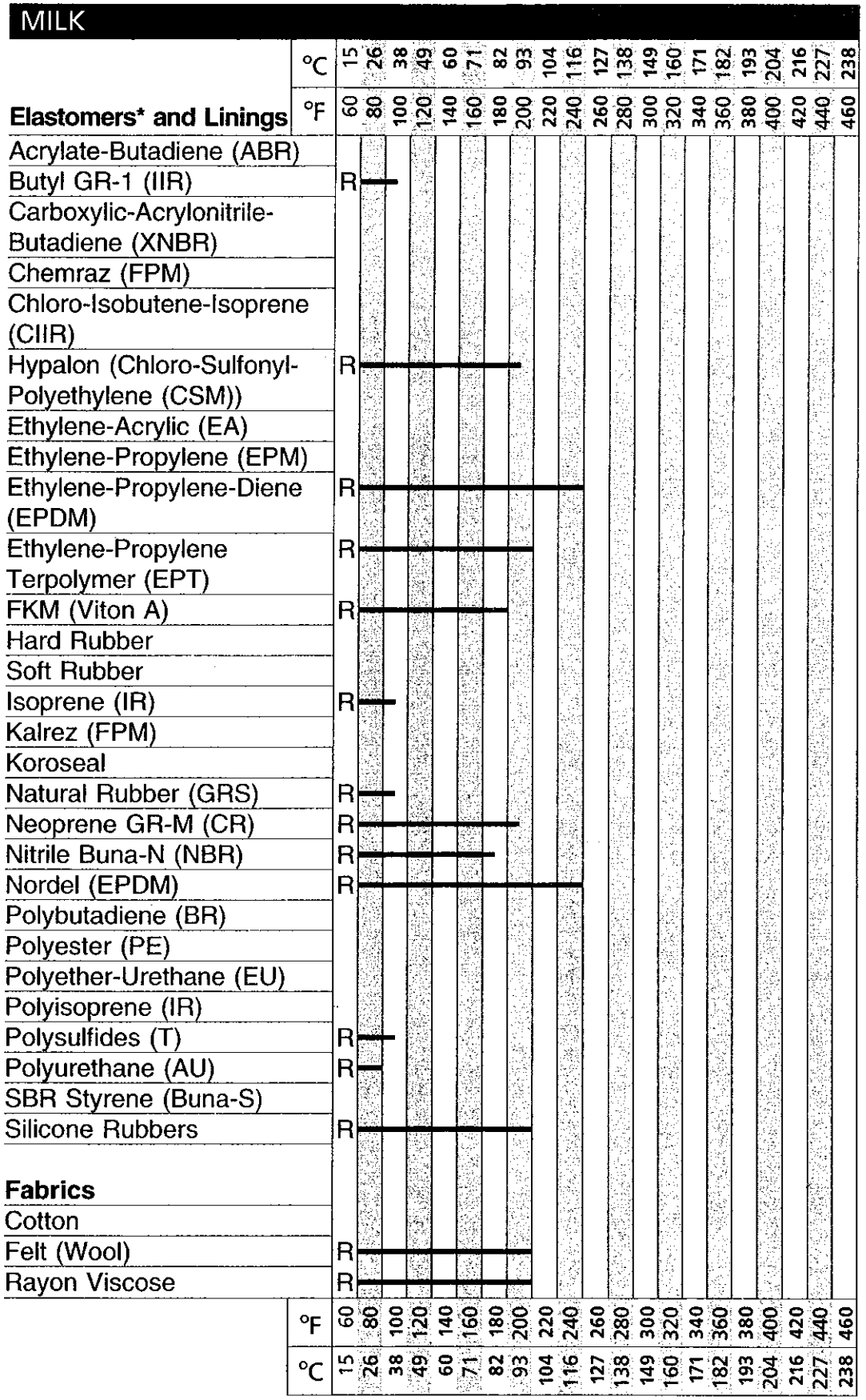
## MILK

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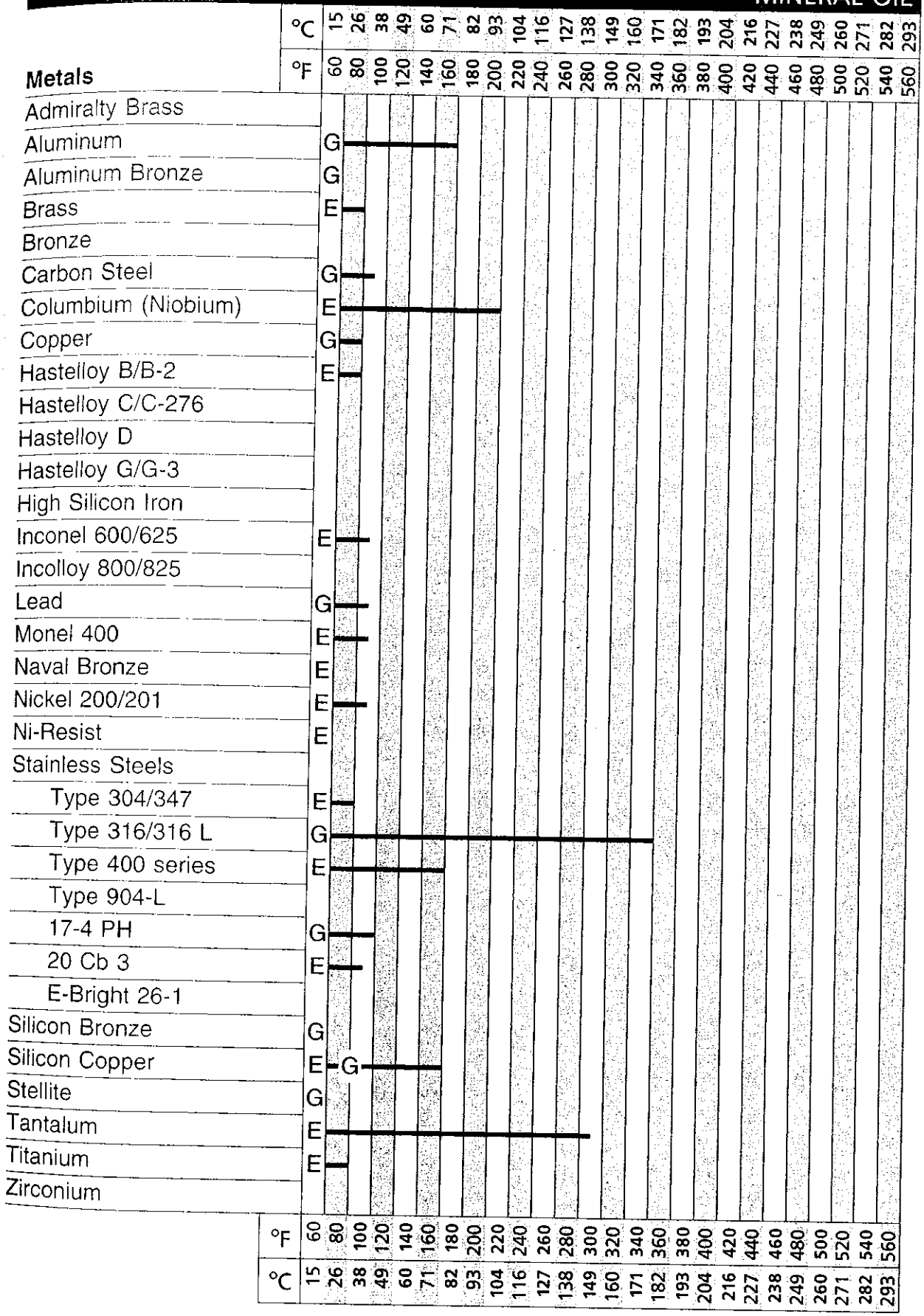
## MINERAL OIL




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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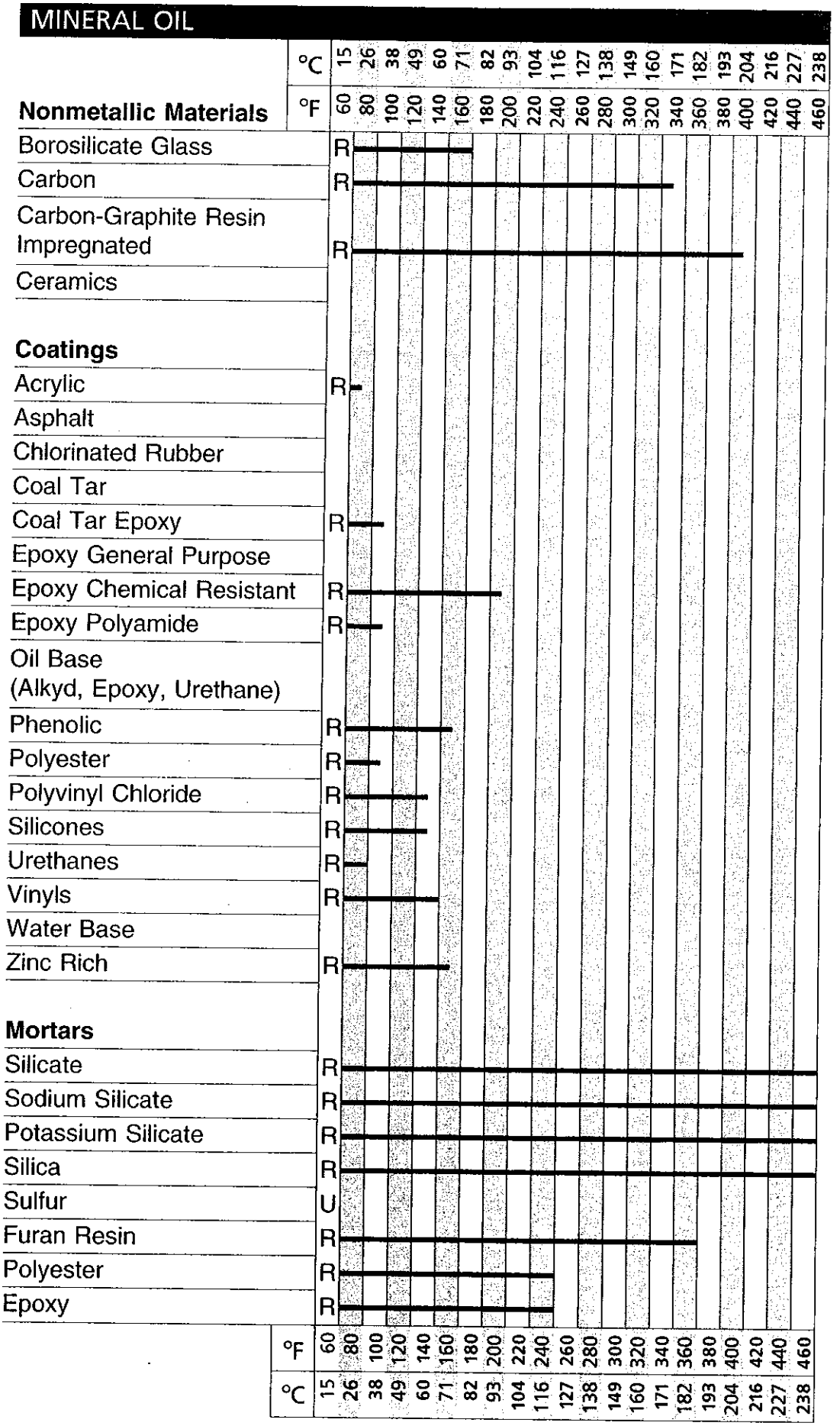




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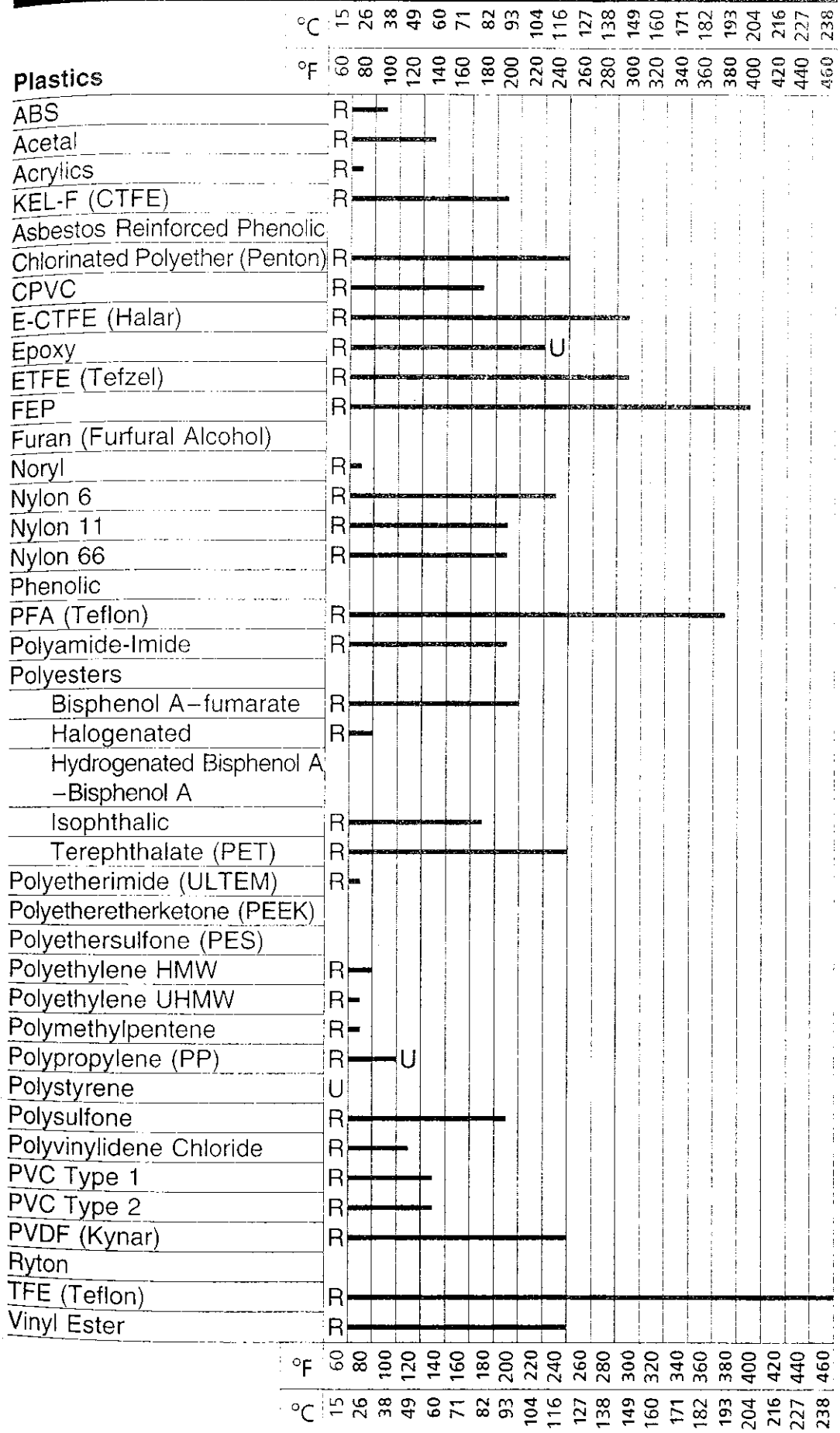


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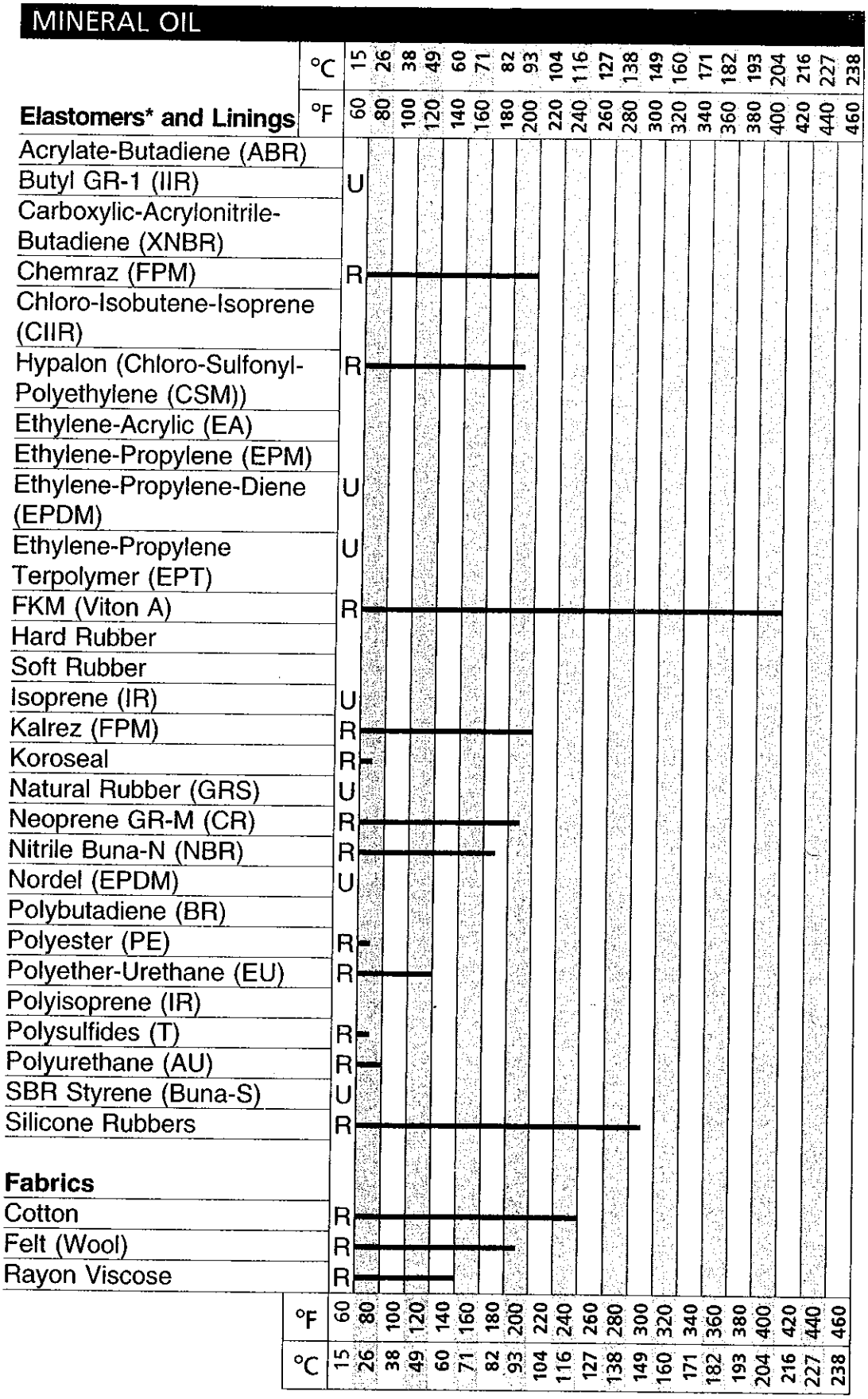


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## MINERAL SPIRITS

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316 | | G | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 317/317 L | | G | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## MINERAL SPIRITS

| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nonmetallic Materials** | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | R | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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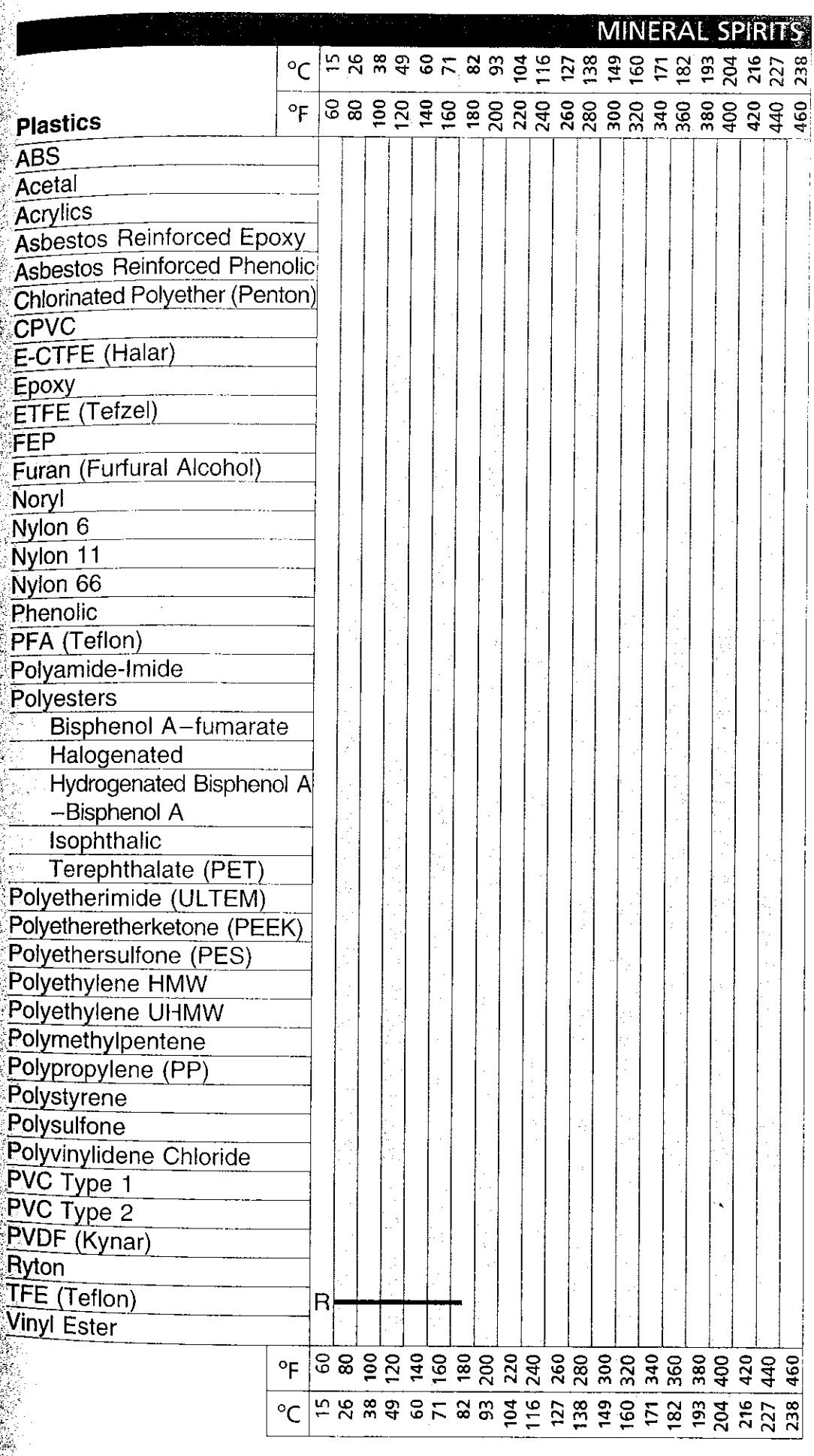


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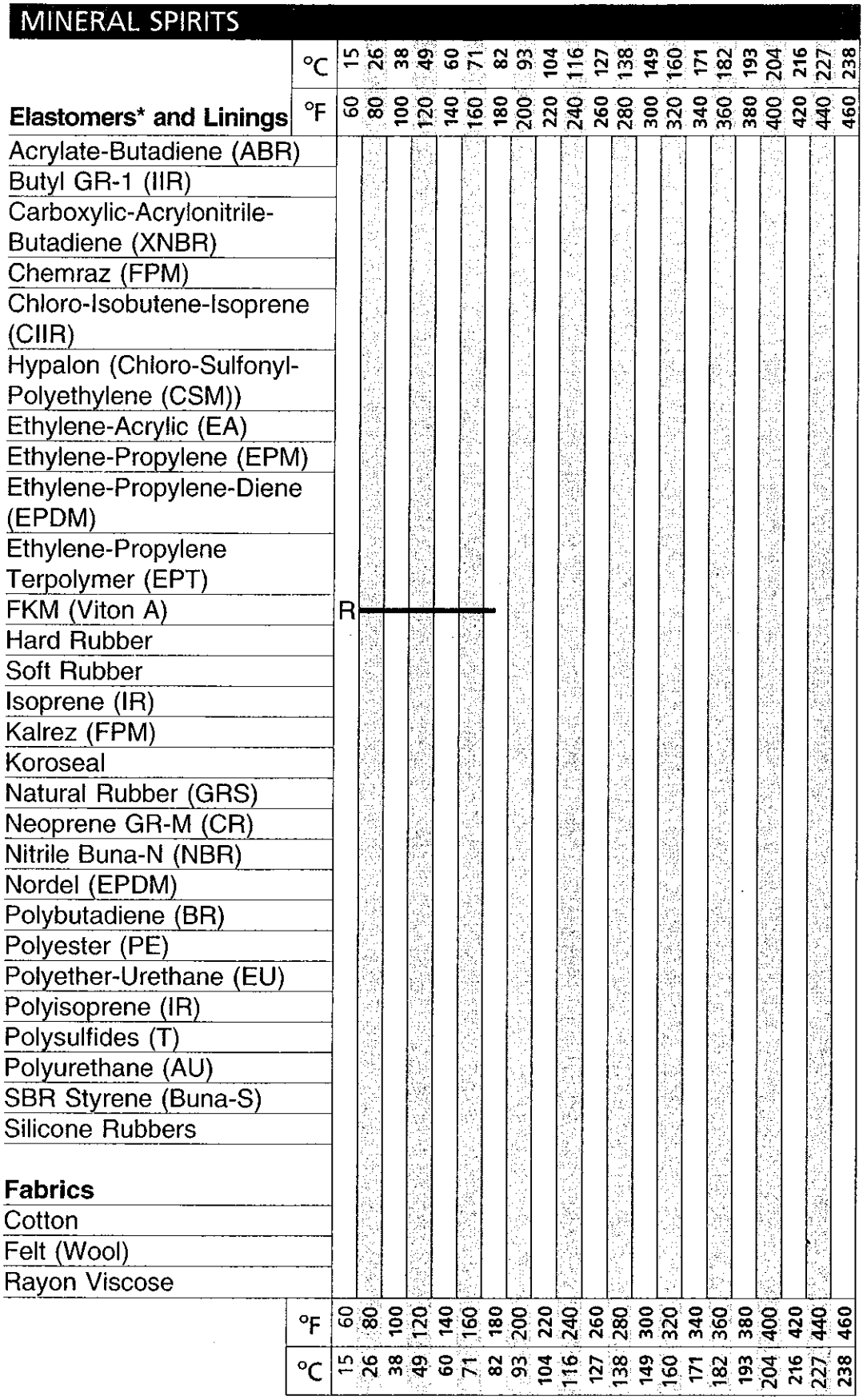
## MINERAL SPIRITS

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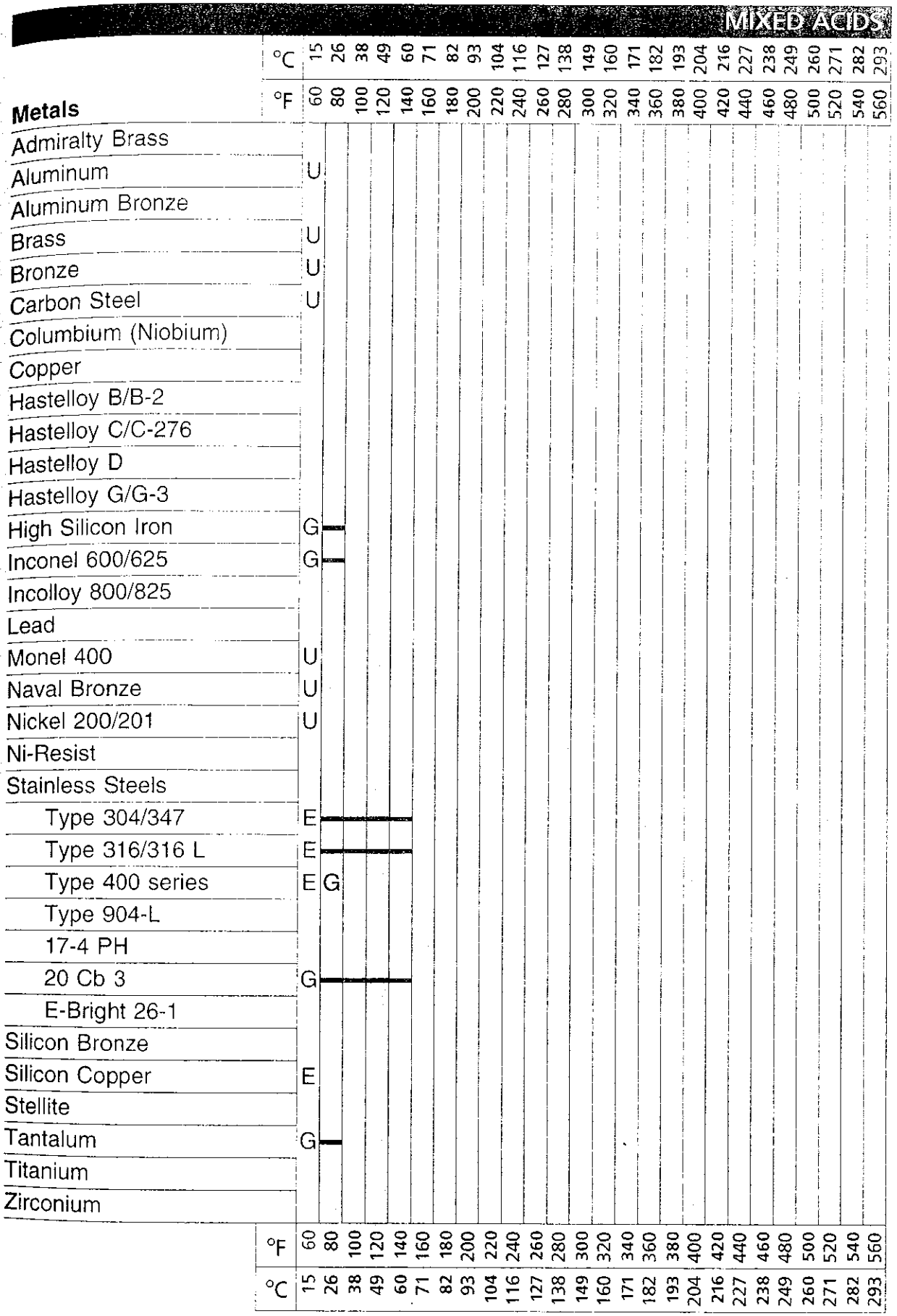


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## MIXED ACIDS

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | U | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | U | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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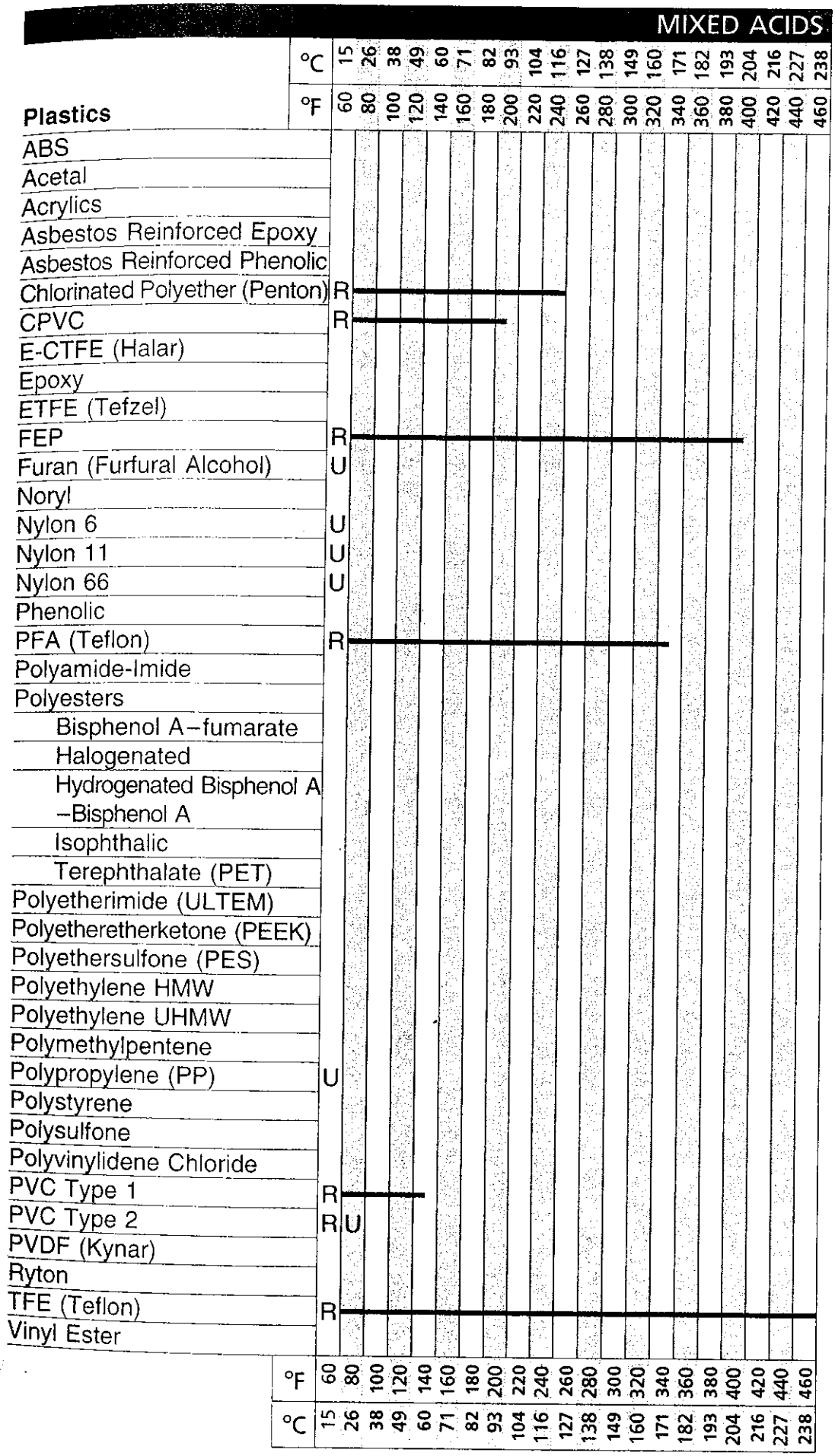


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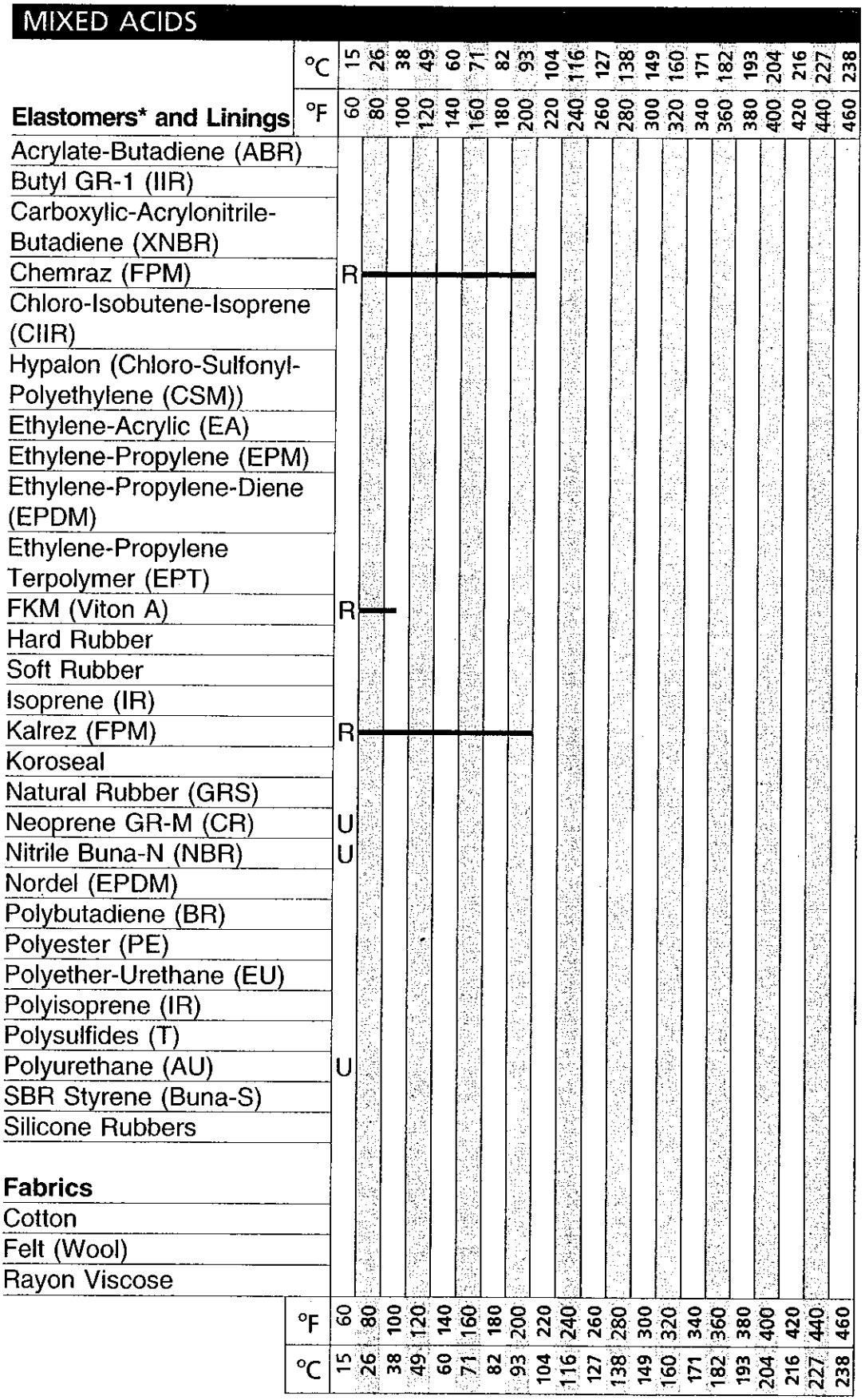


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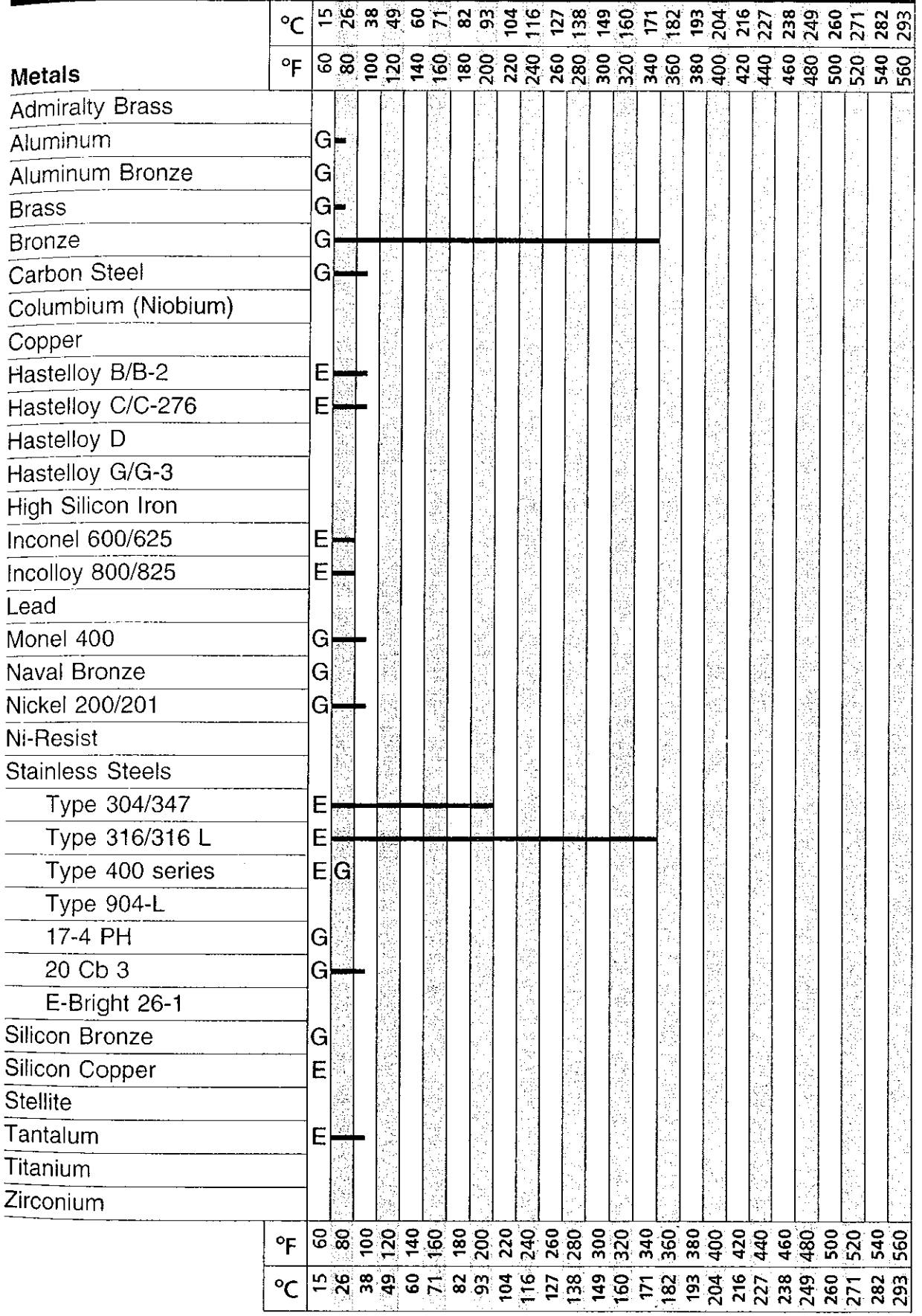


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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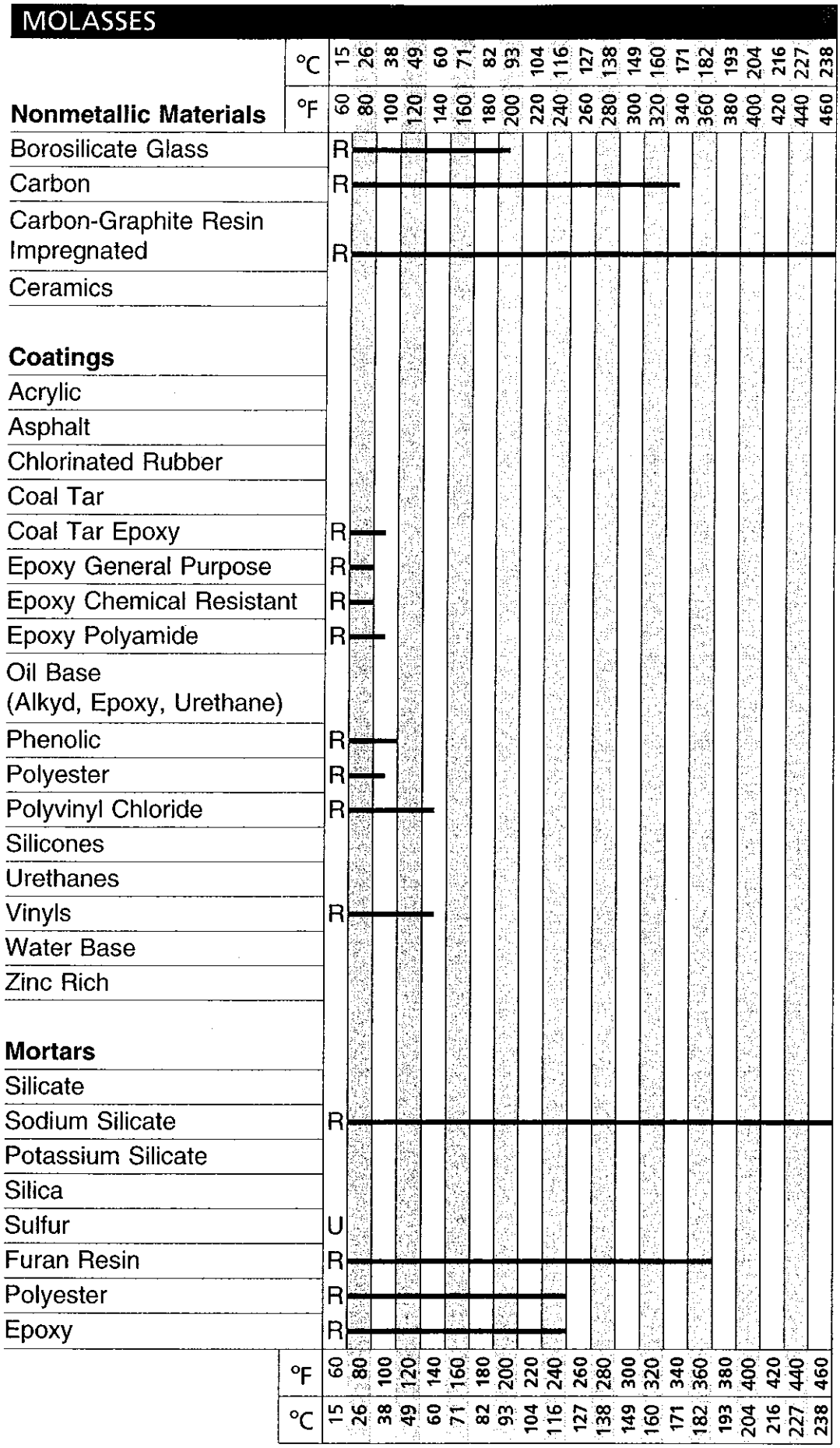




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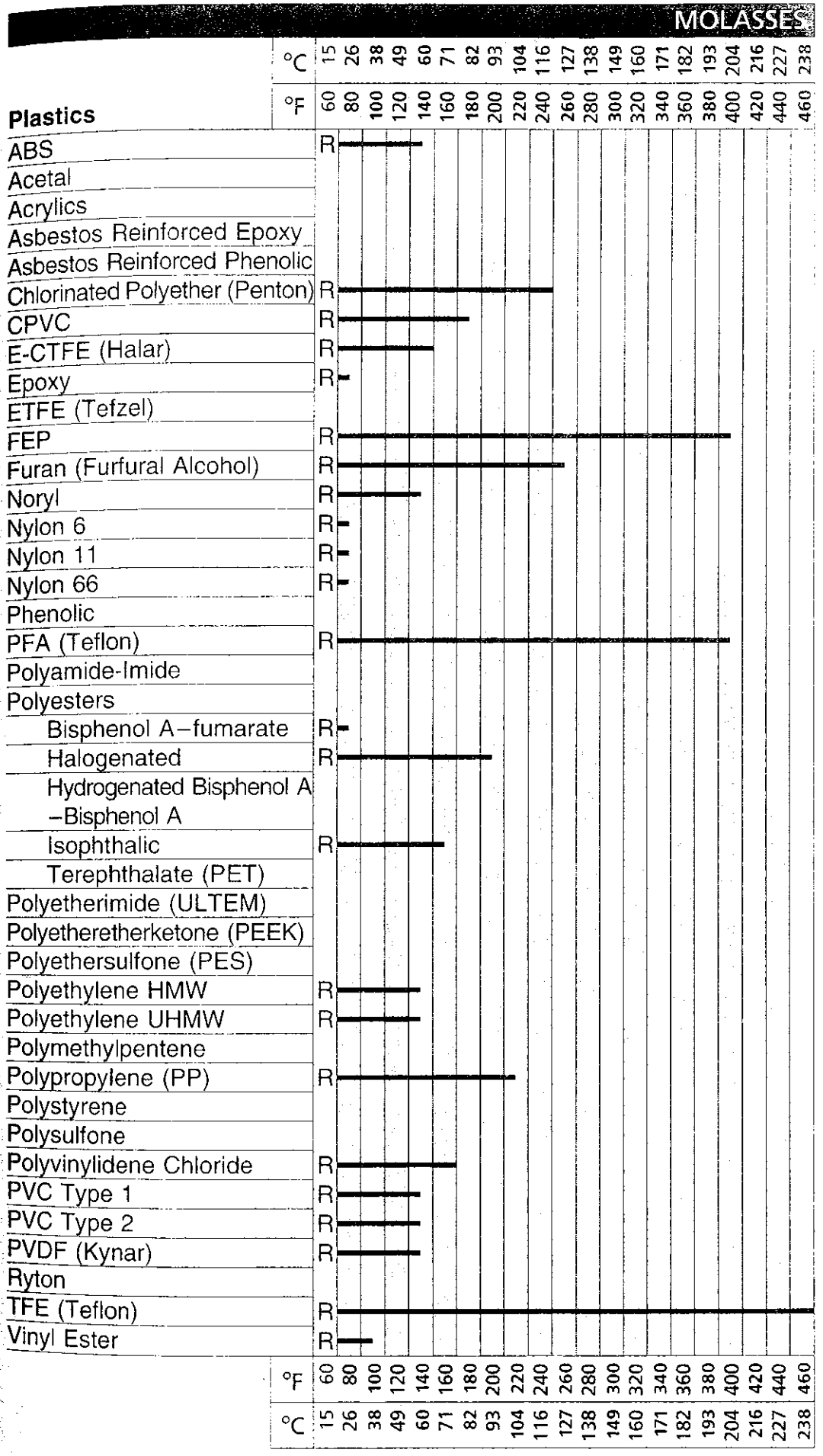


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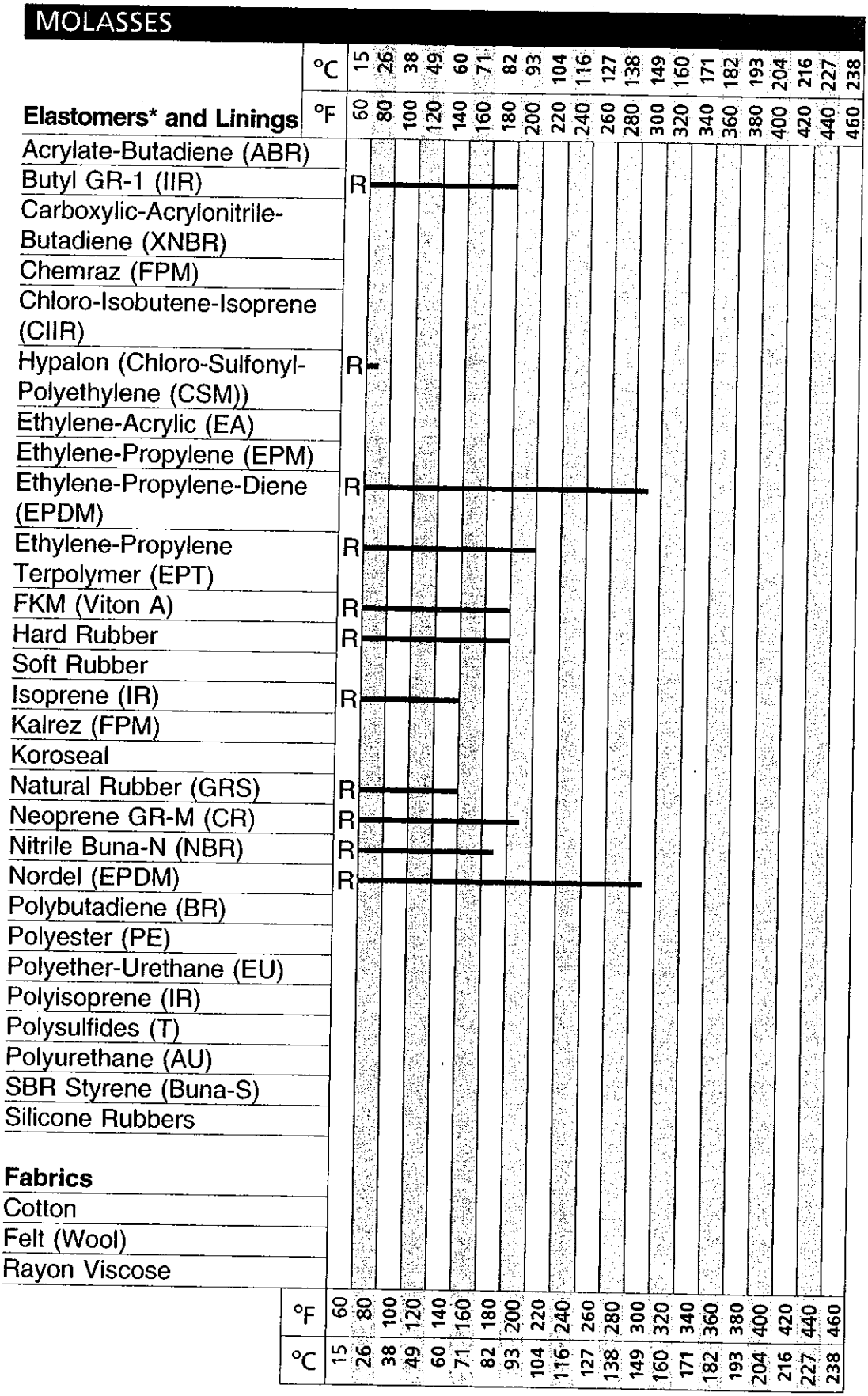
## MOLASSES

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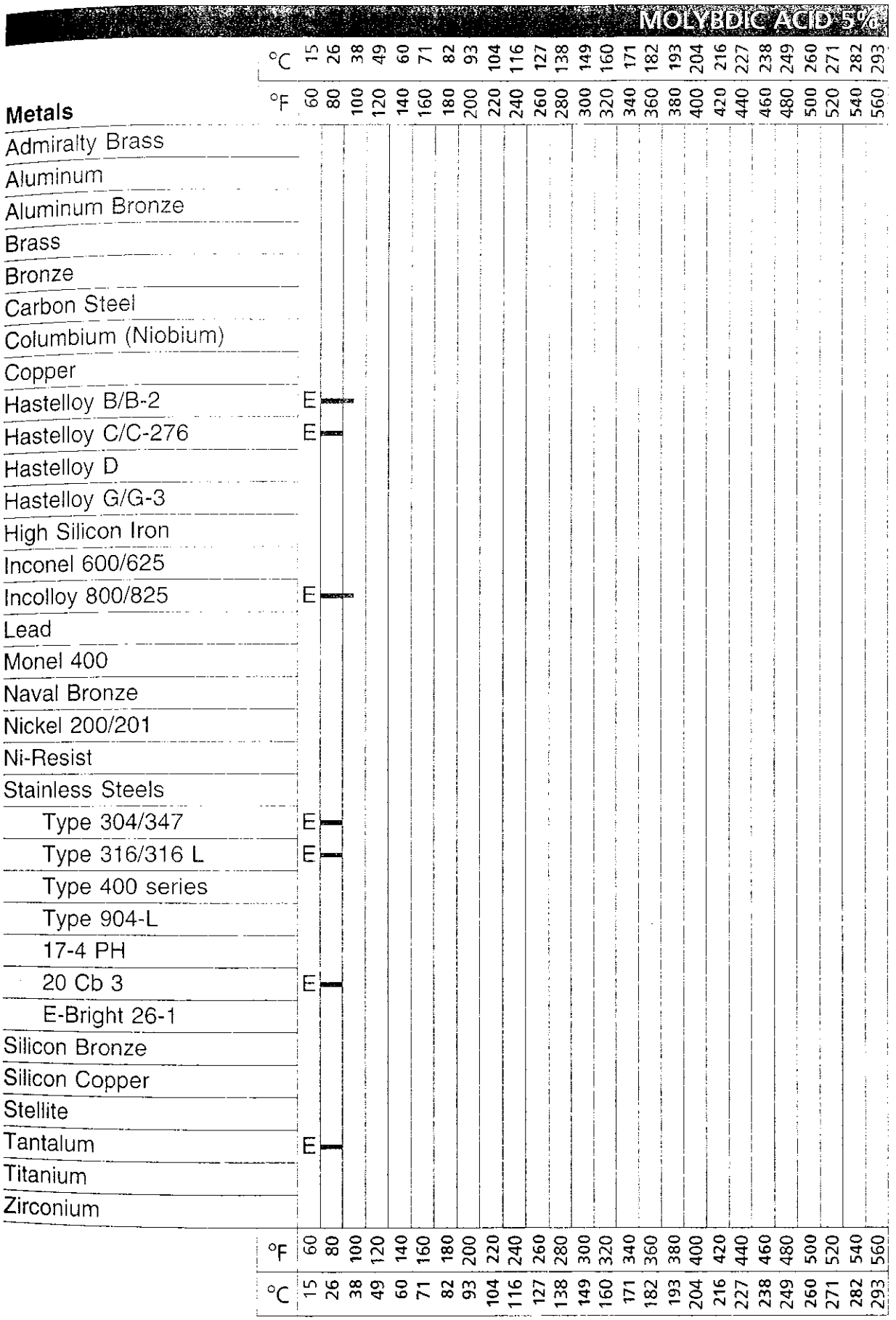


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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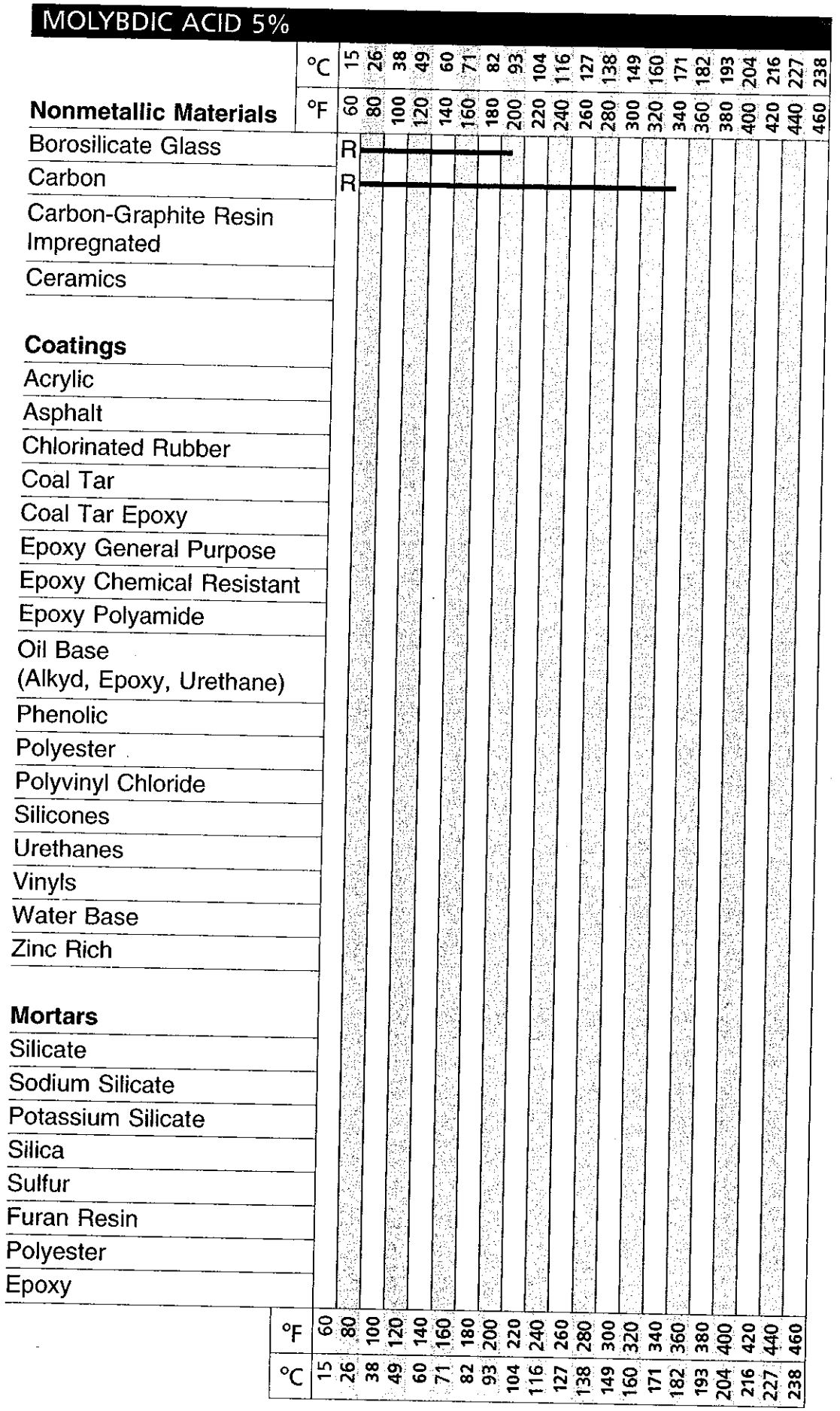





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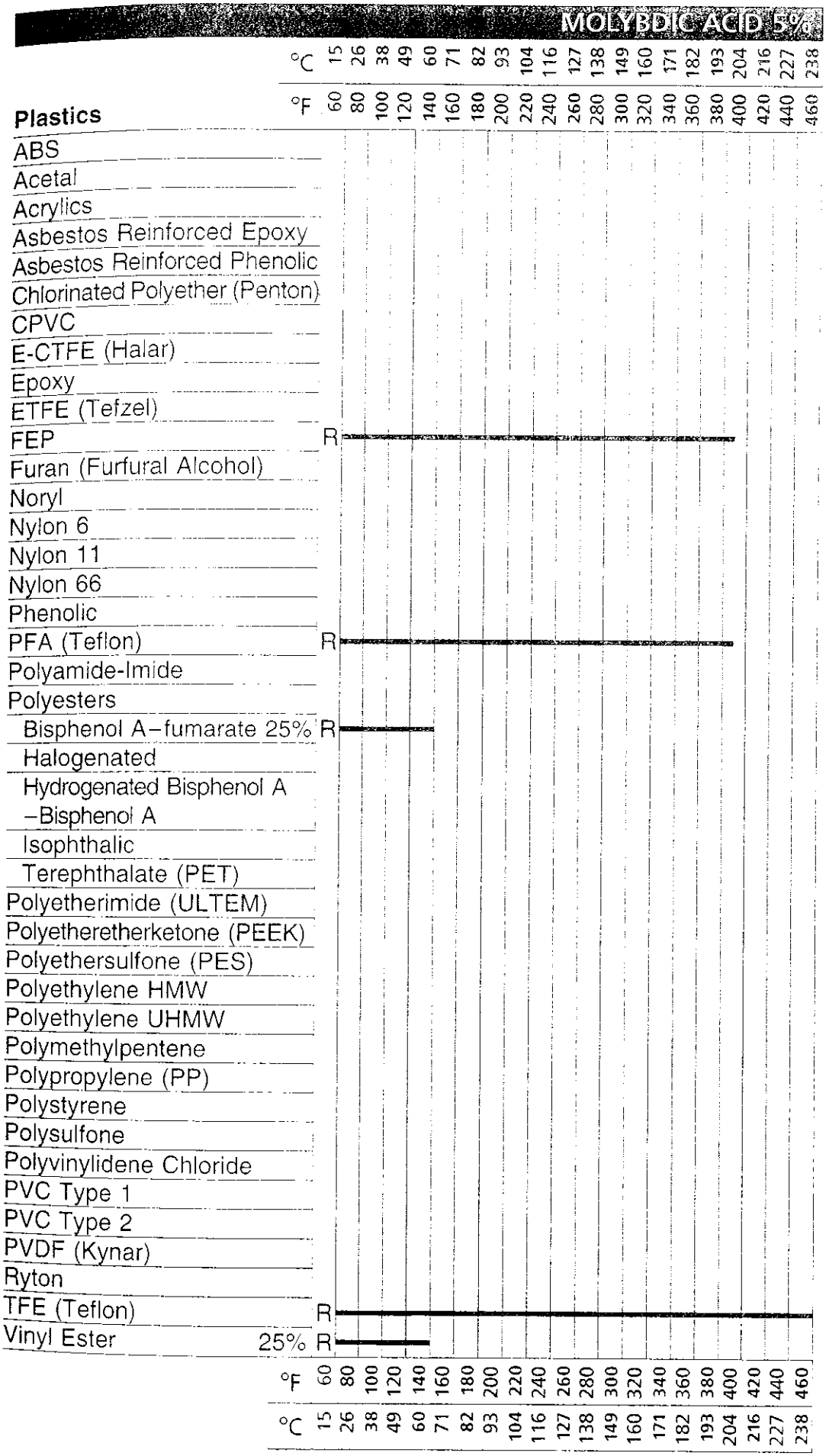


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## MOLYBDIC ACID 5%

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | R | R | R | R | R | R | R | R | R | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | R | R | R | R | R | R | R | R | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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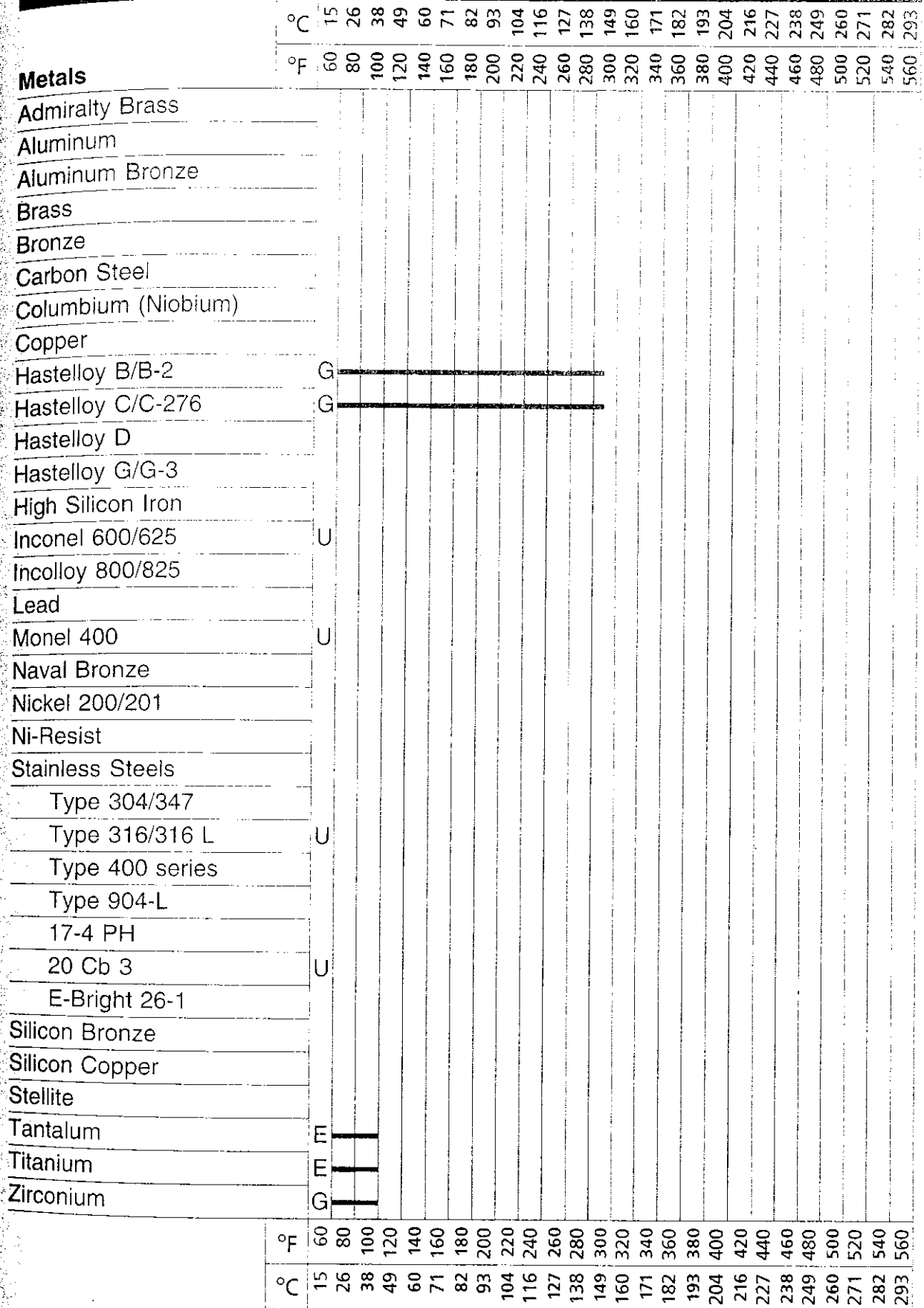


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# MONOCHLOROACETIC ACID

| Nonmetallic Materials | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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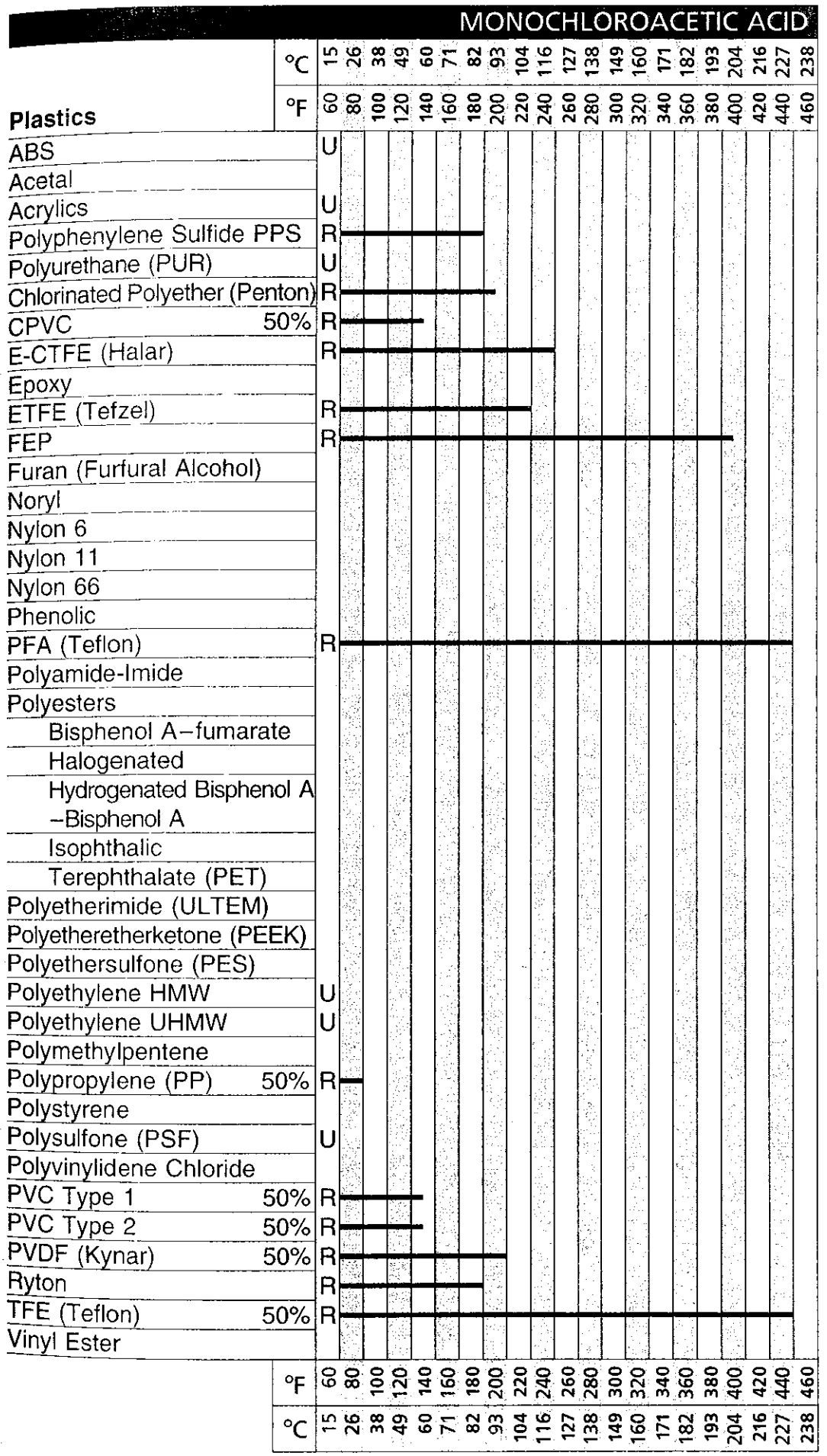


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## MONOCHLOROACETIC ACID

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) 50% | U | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) 50% | R | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | U | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) 50% | U | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) 50% | R | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | U | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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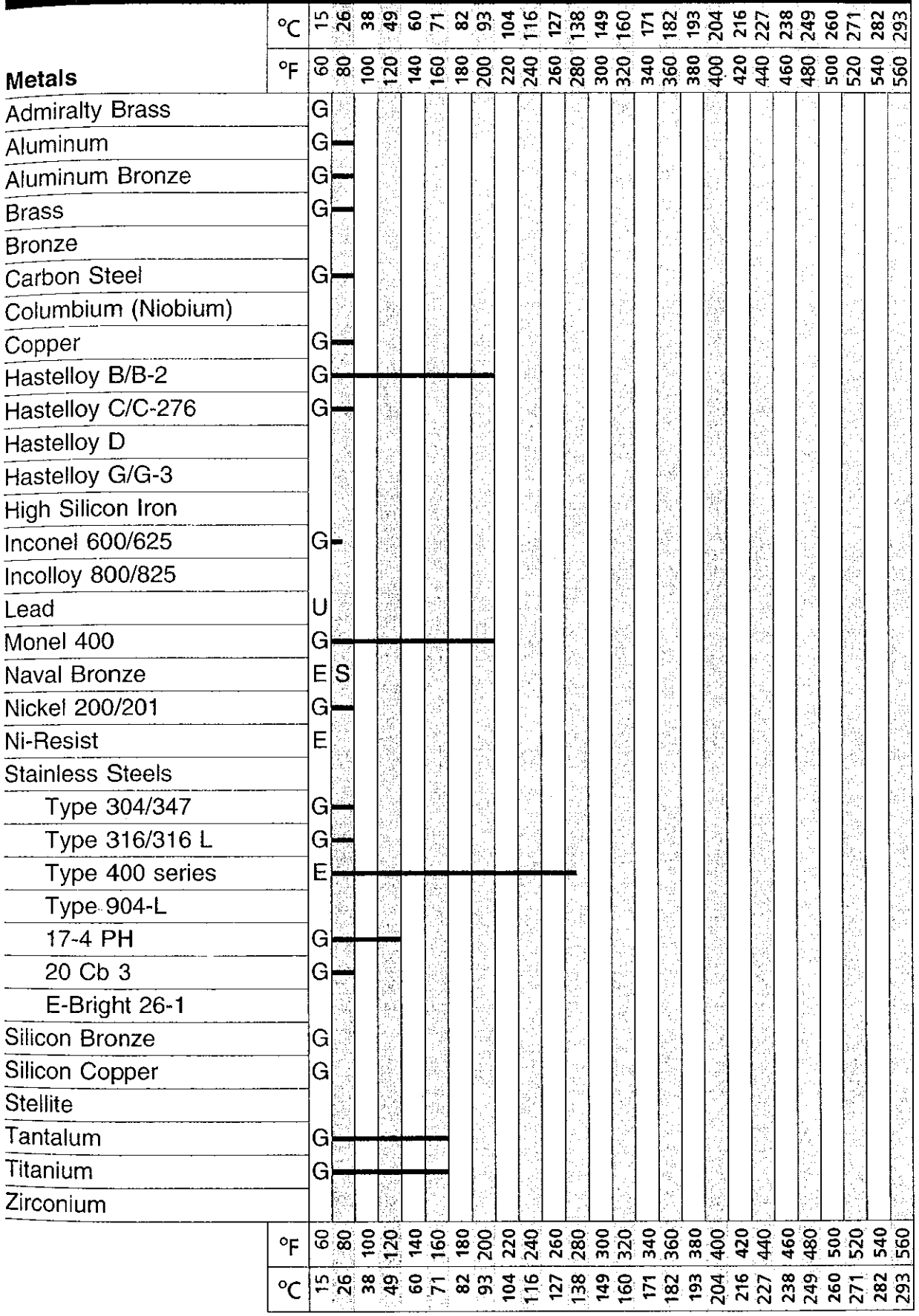


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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

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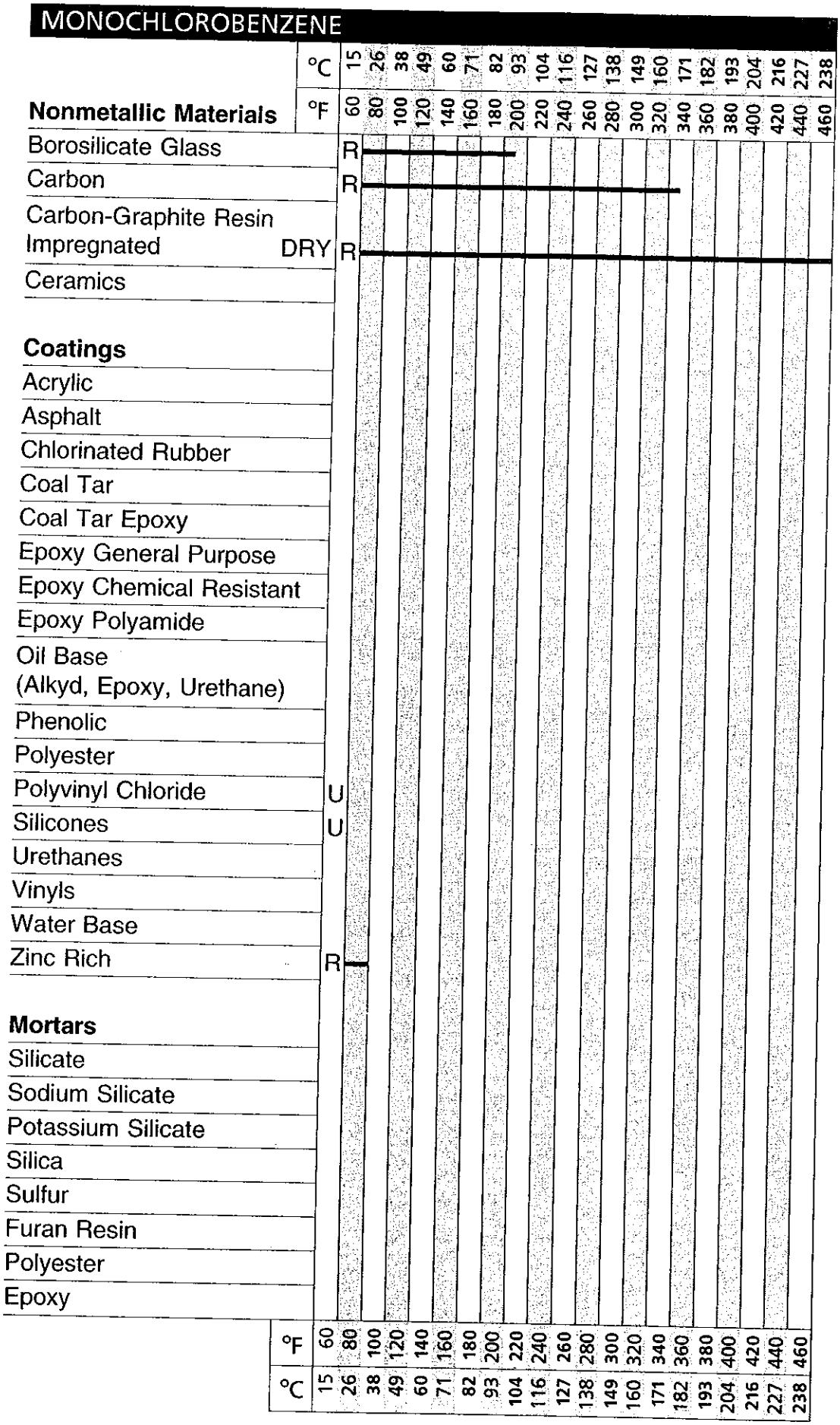




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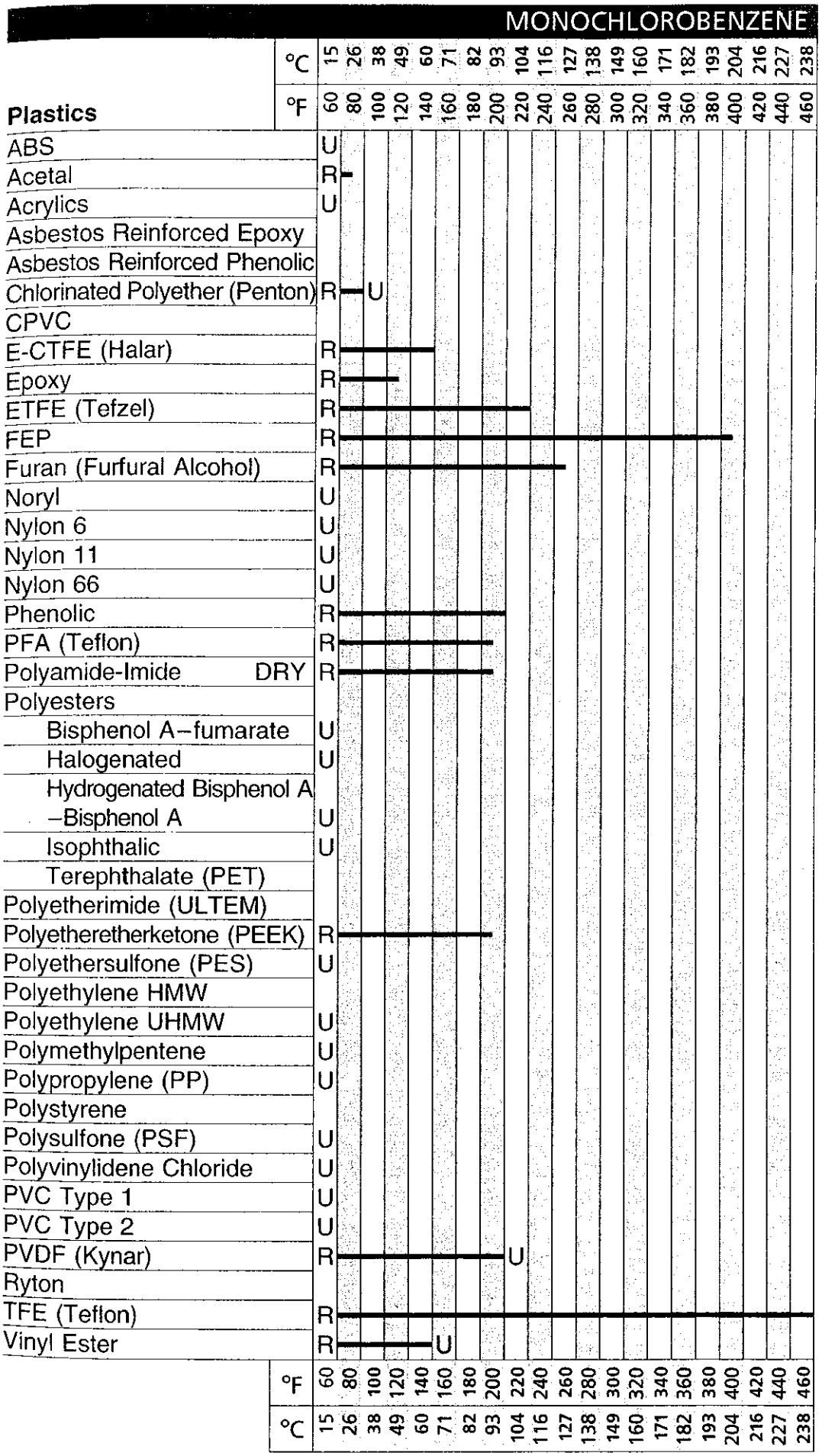



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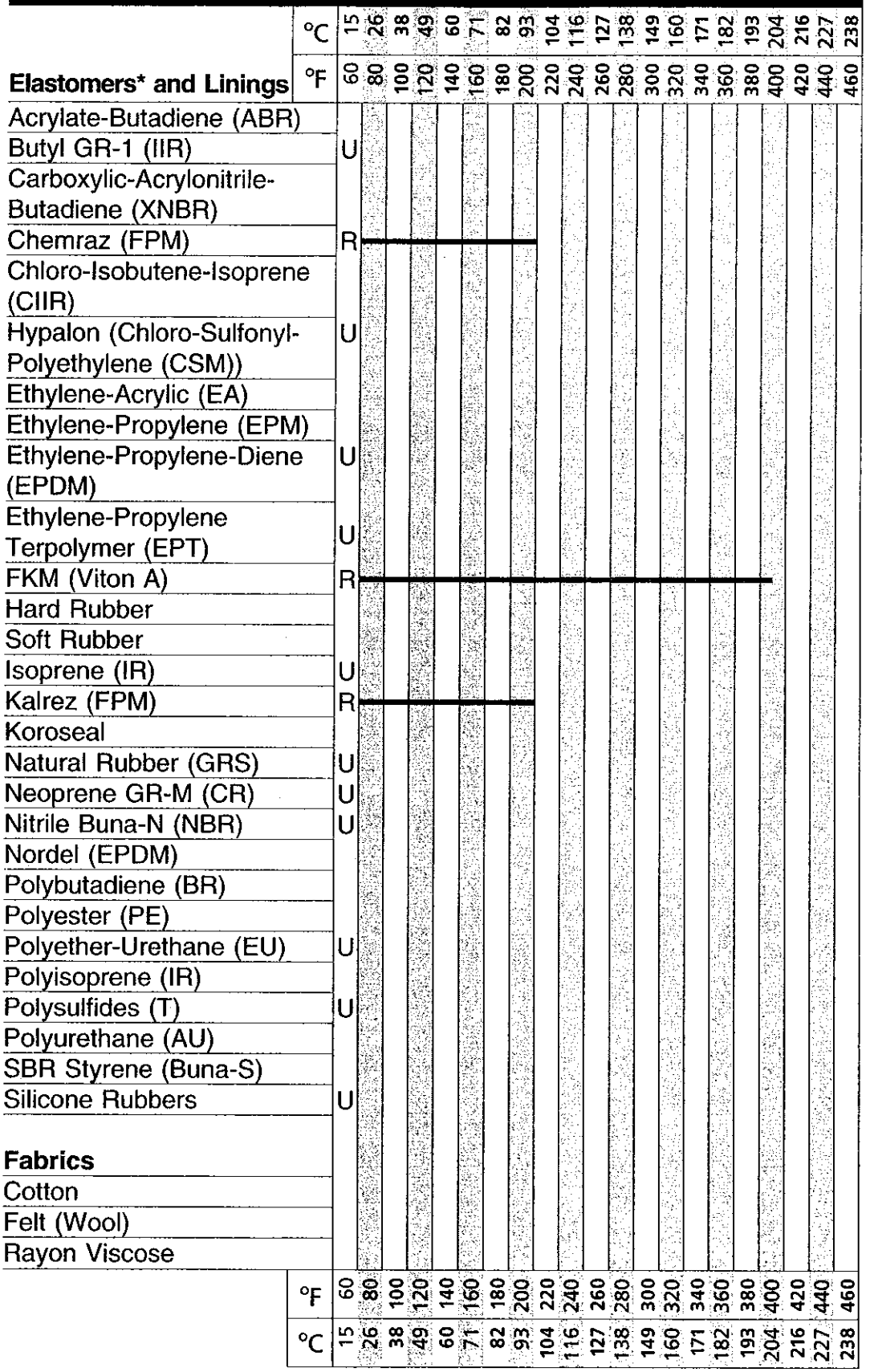


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# MONOCHLORODIFLUOROMETHANE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | 90% | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# MONOCHLORODIFLUOROMETHANE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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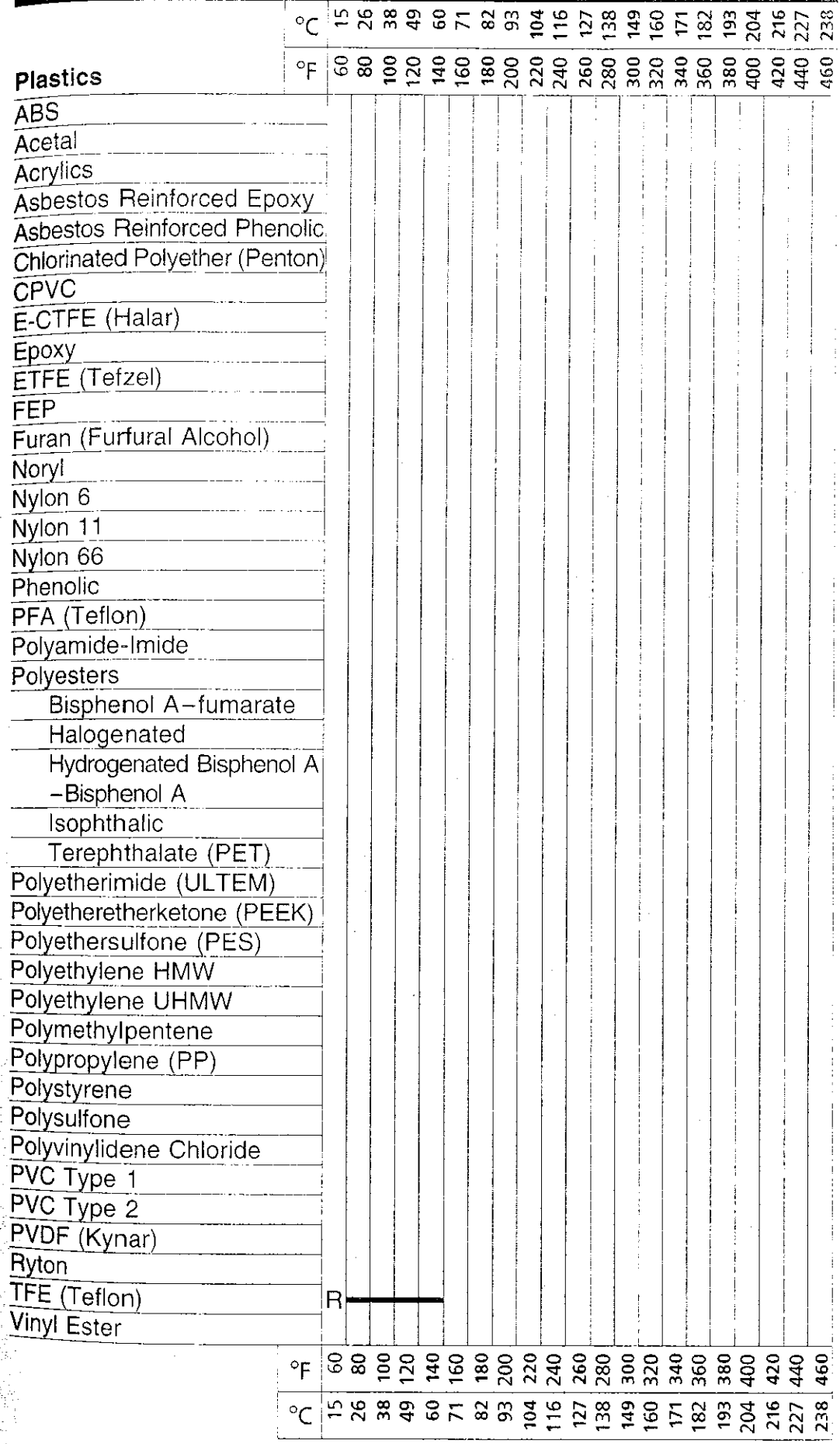


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## MONOCHLORODIFLUOROMETHANE

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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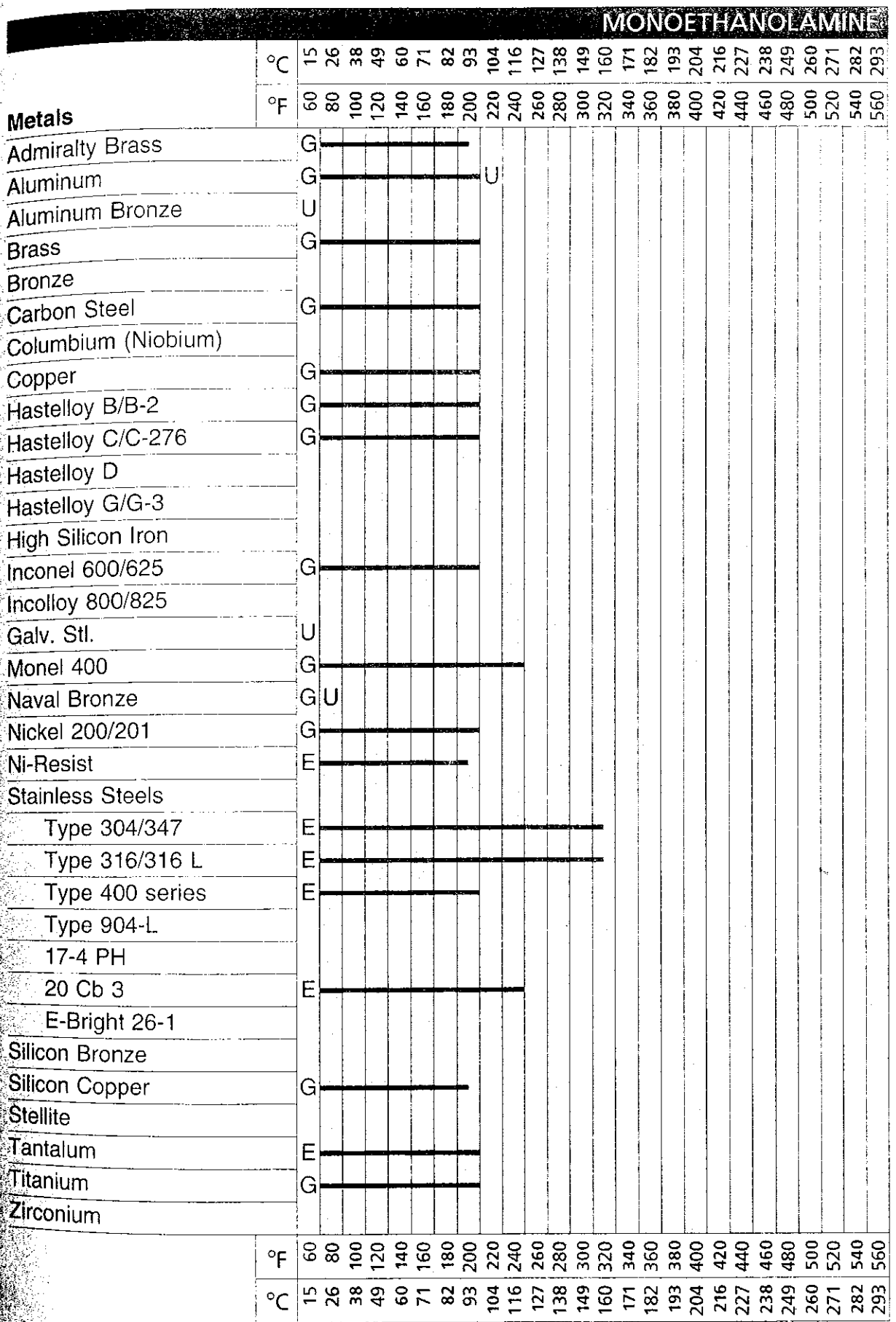


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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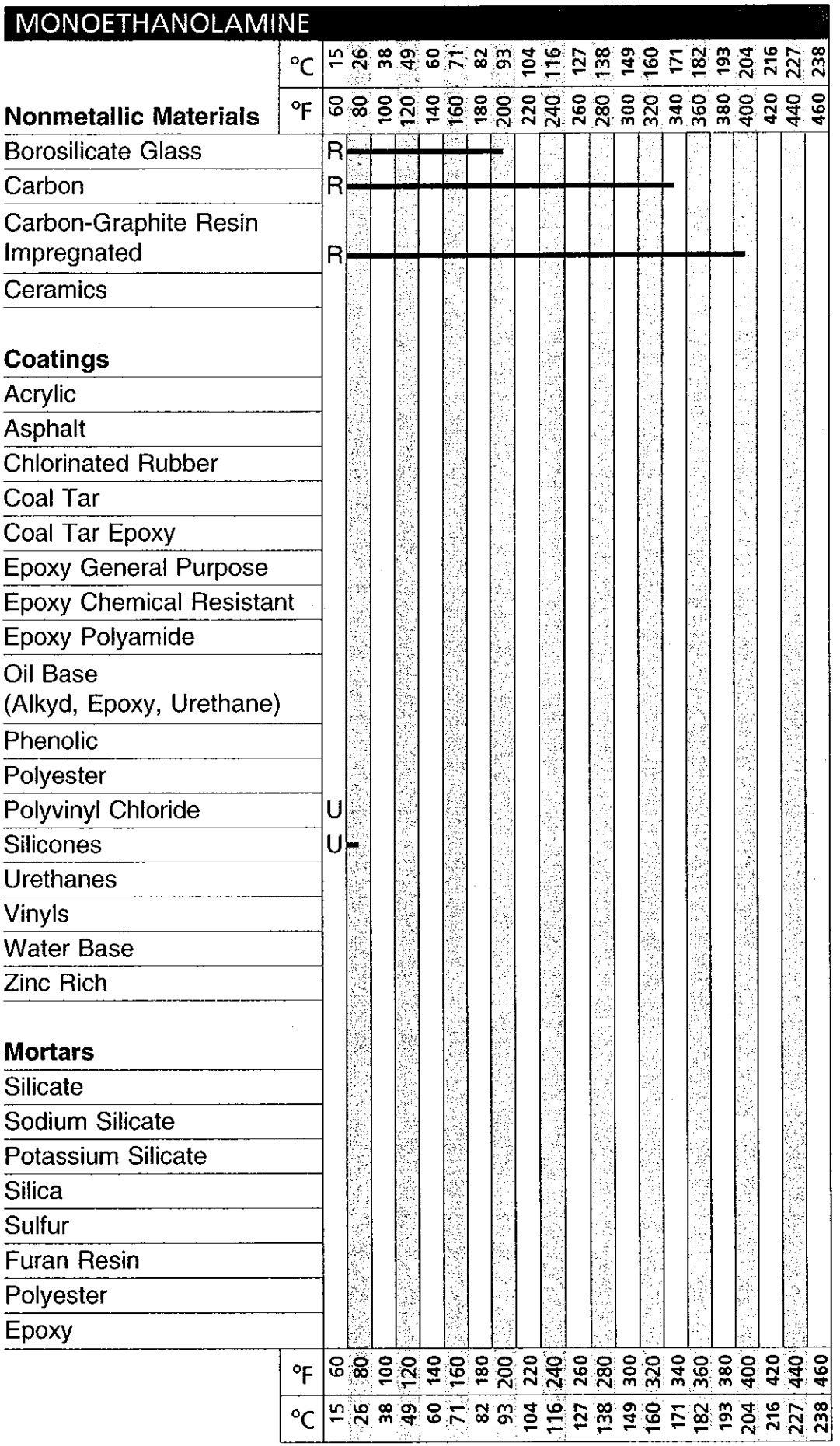




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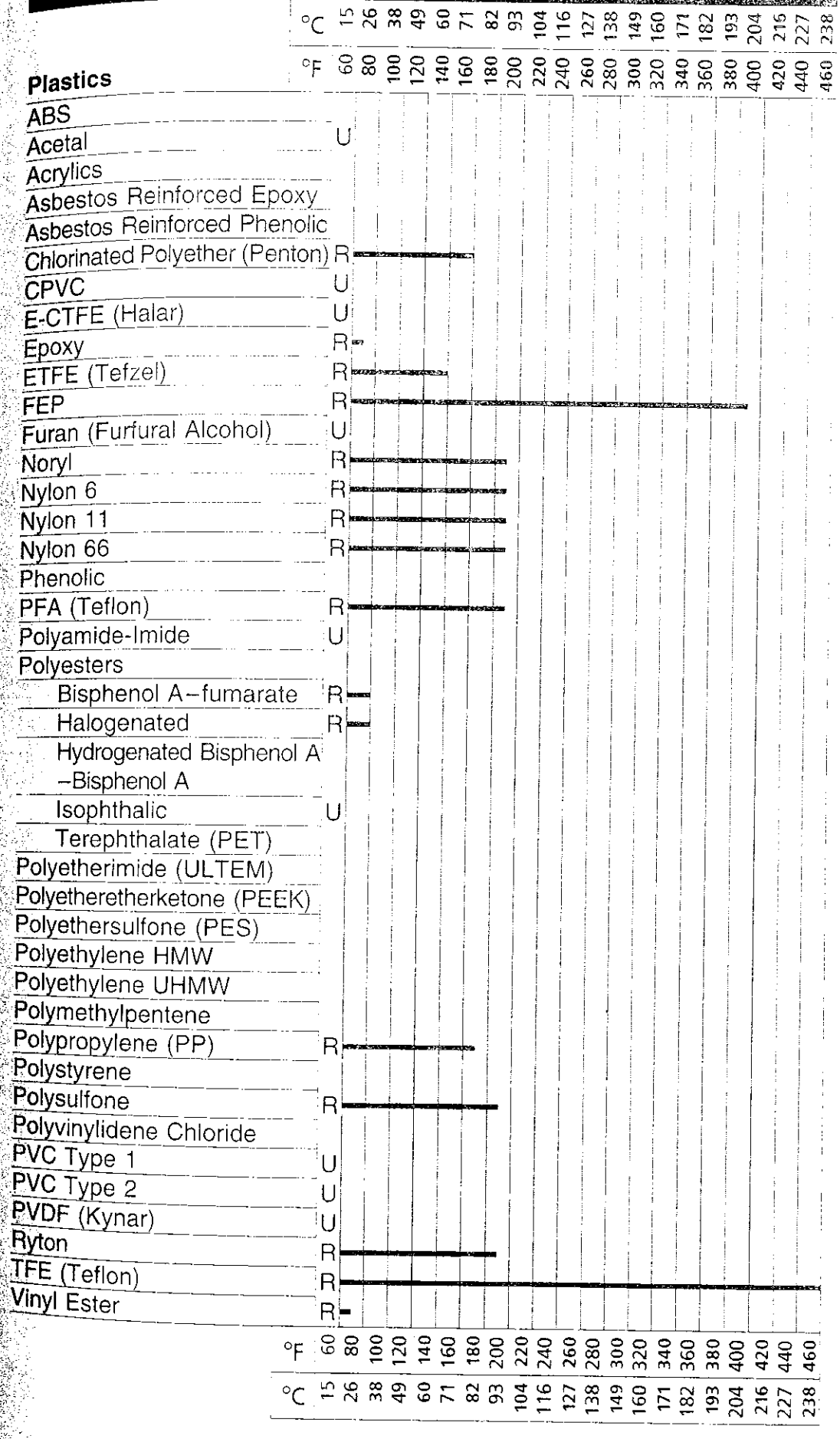


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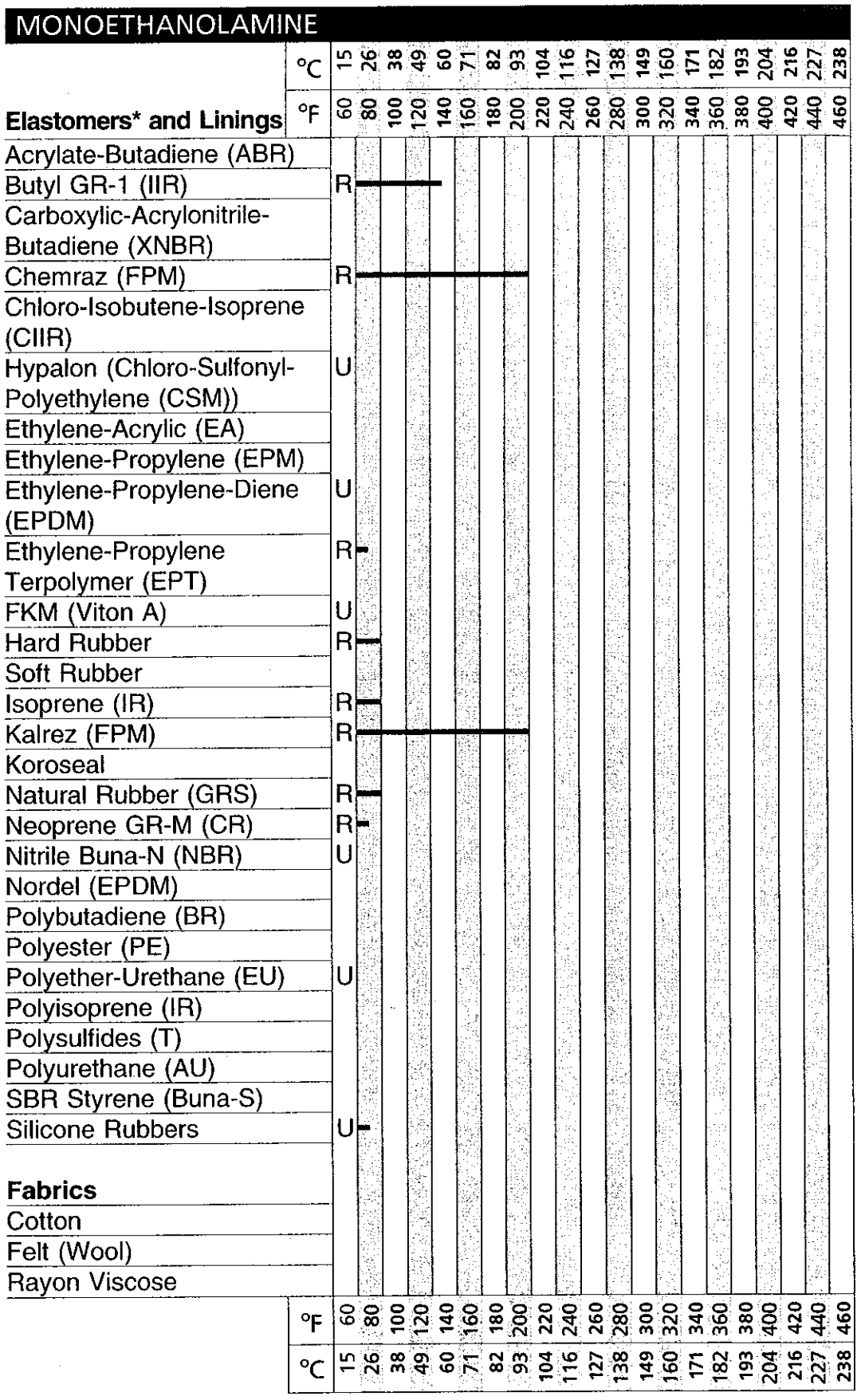


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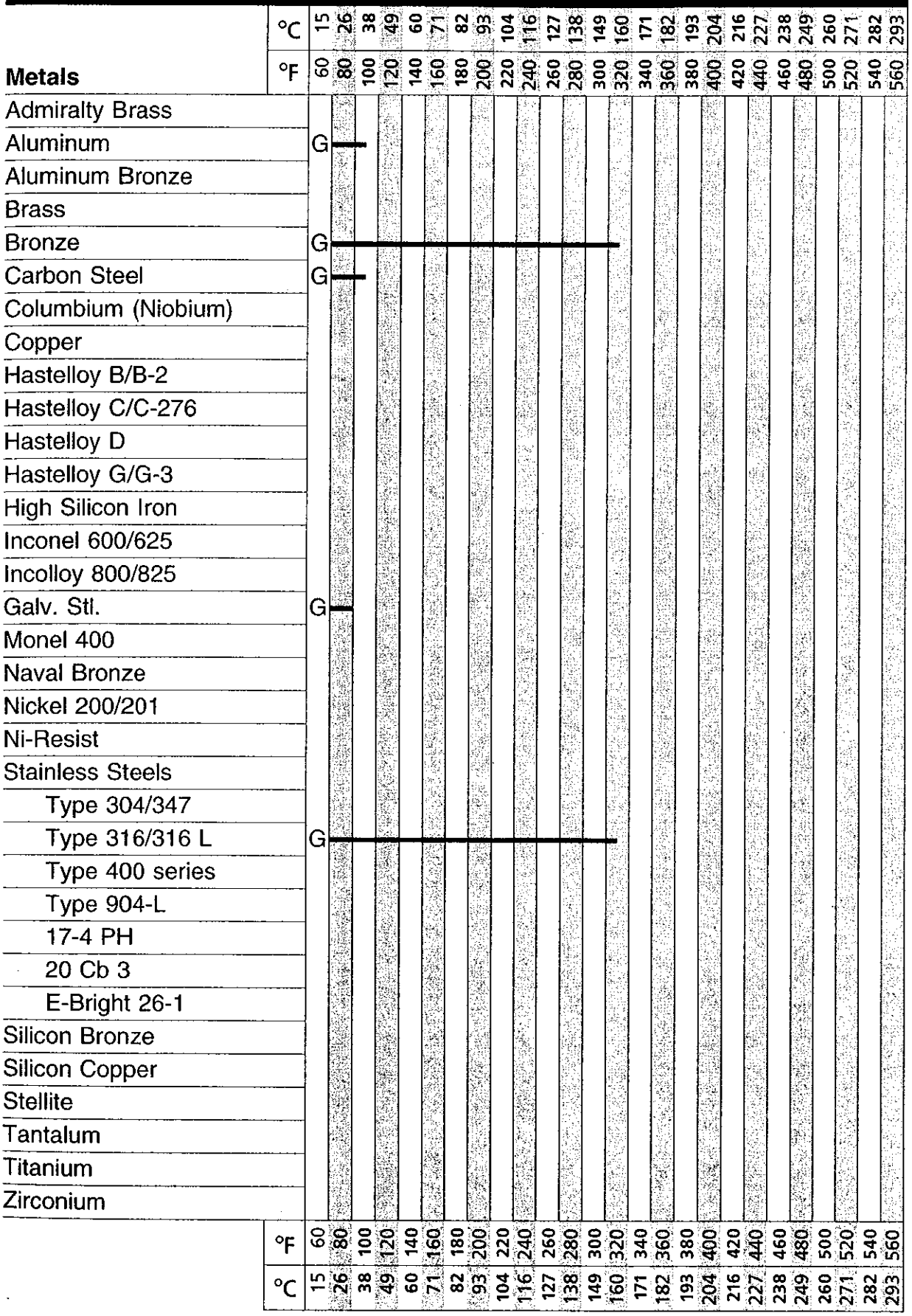


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# MORPHOLINE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | R | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | R | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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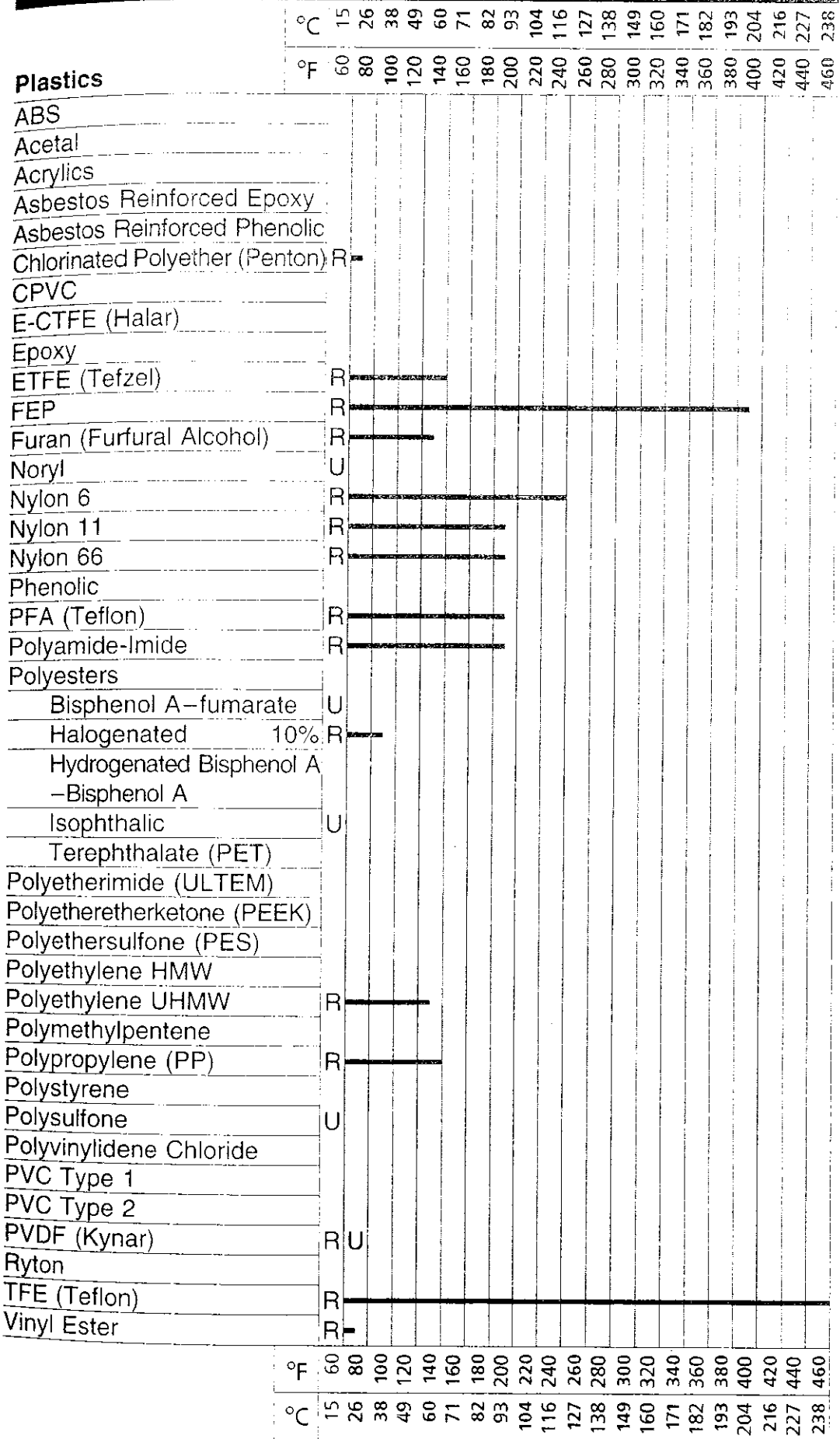


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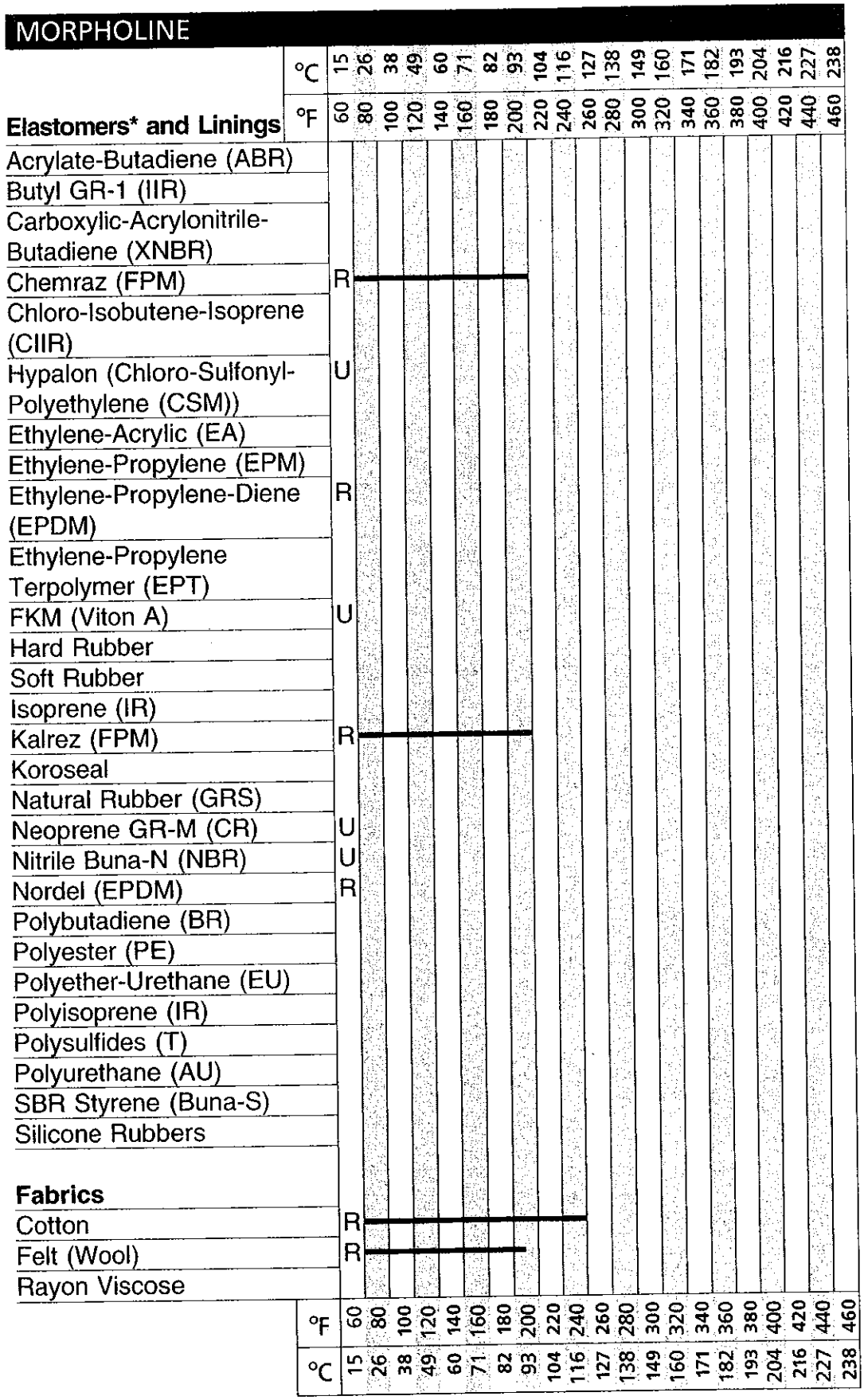
## MORPHOLINE

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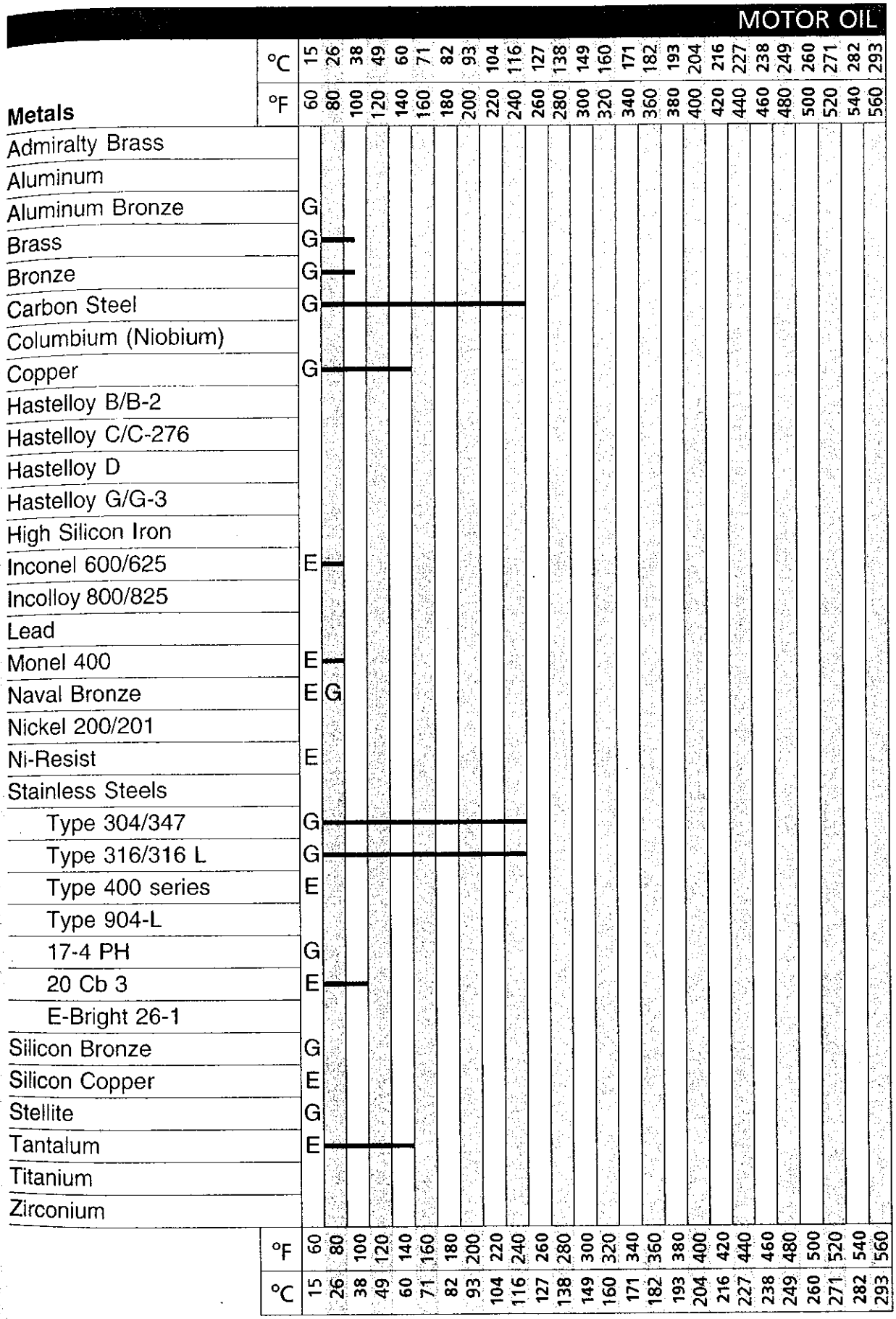


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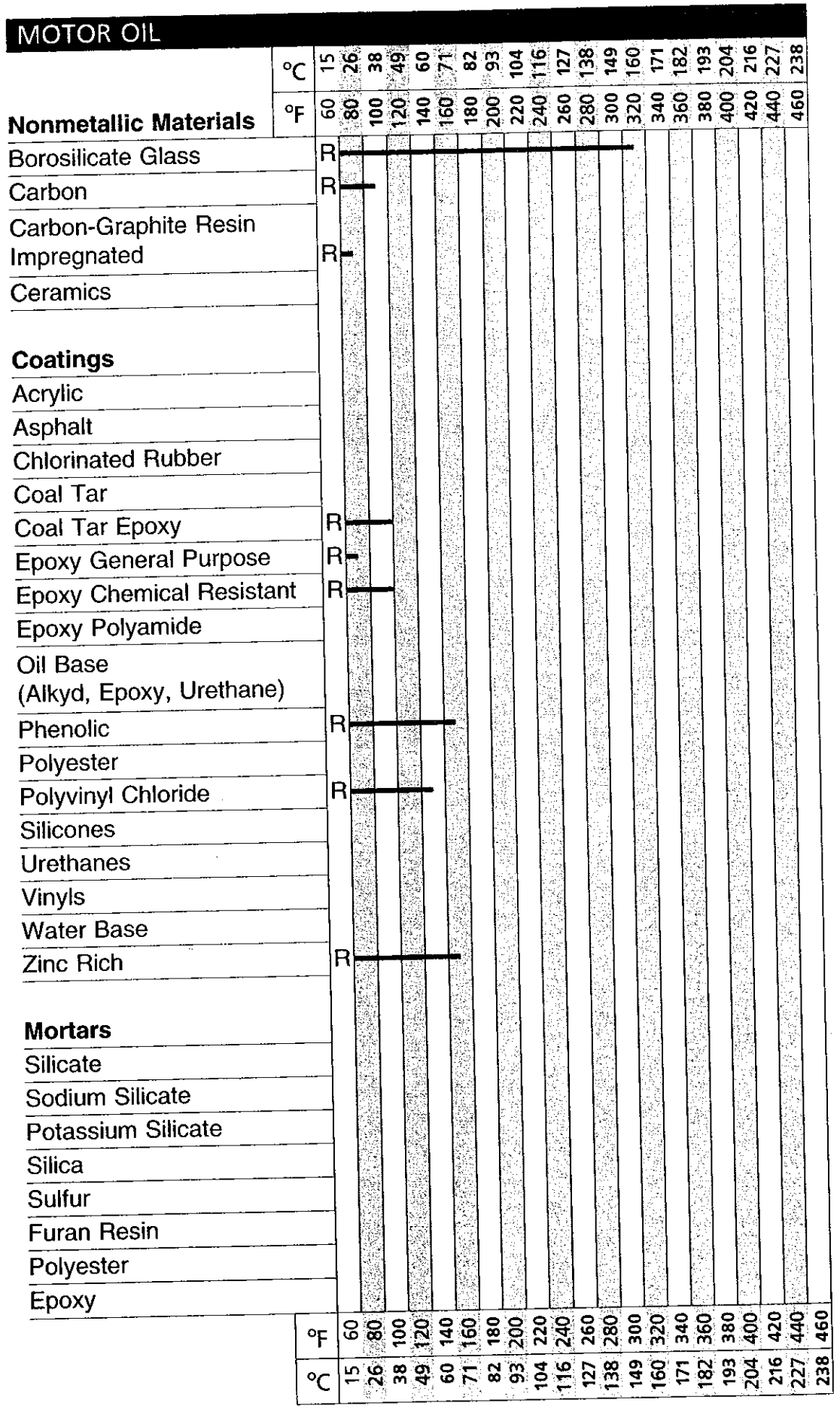
## MOTOR OIL



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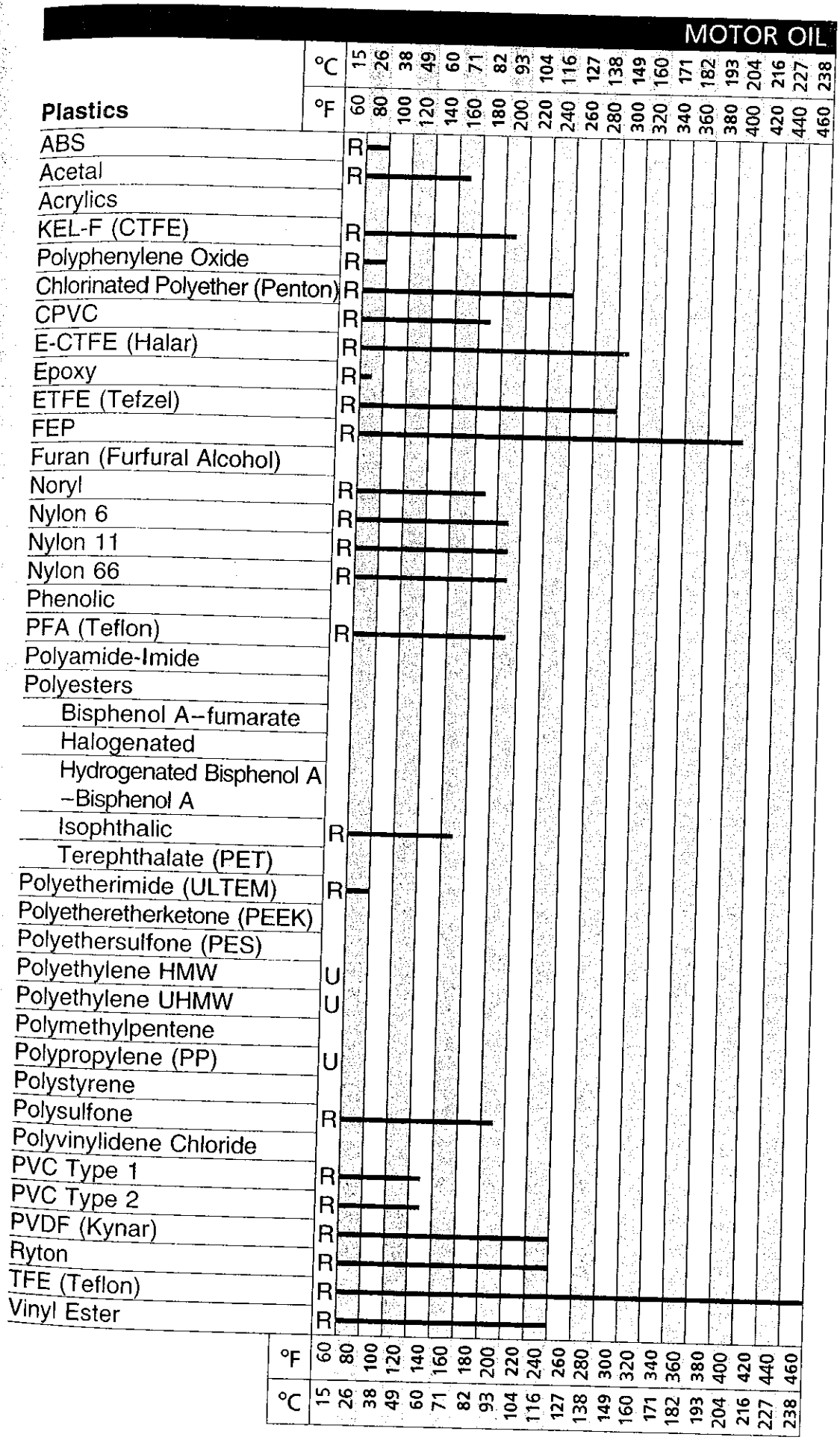


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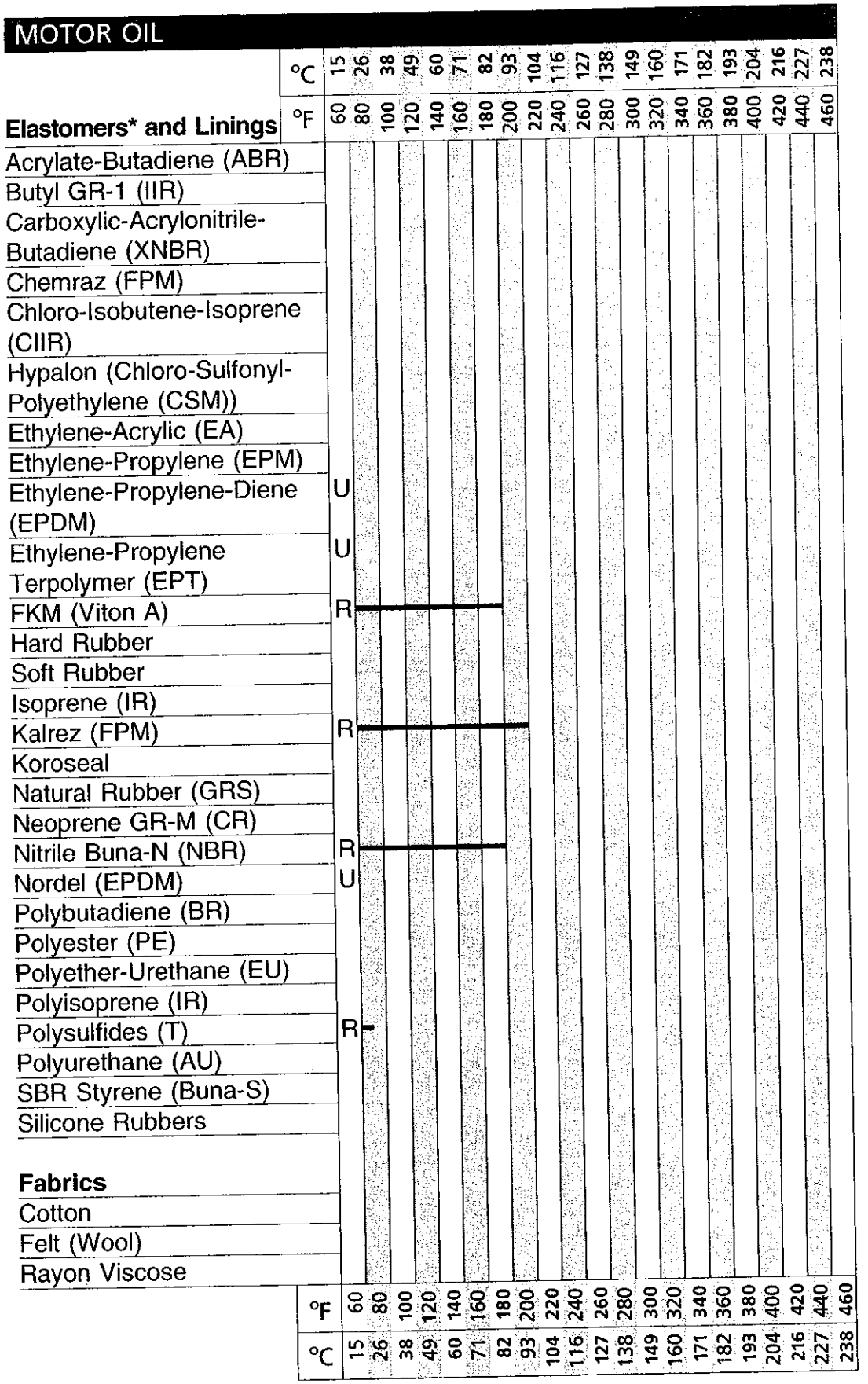
## MOTOR OIL

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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 825 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Galv. Stl. | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 317/317 L | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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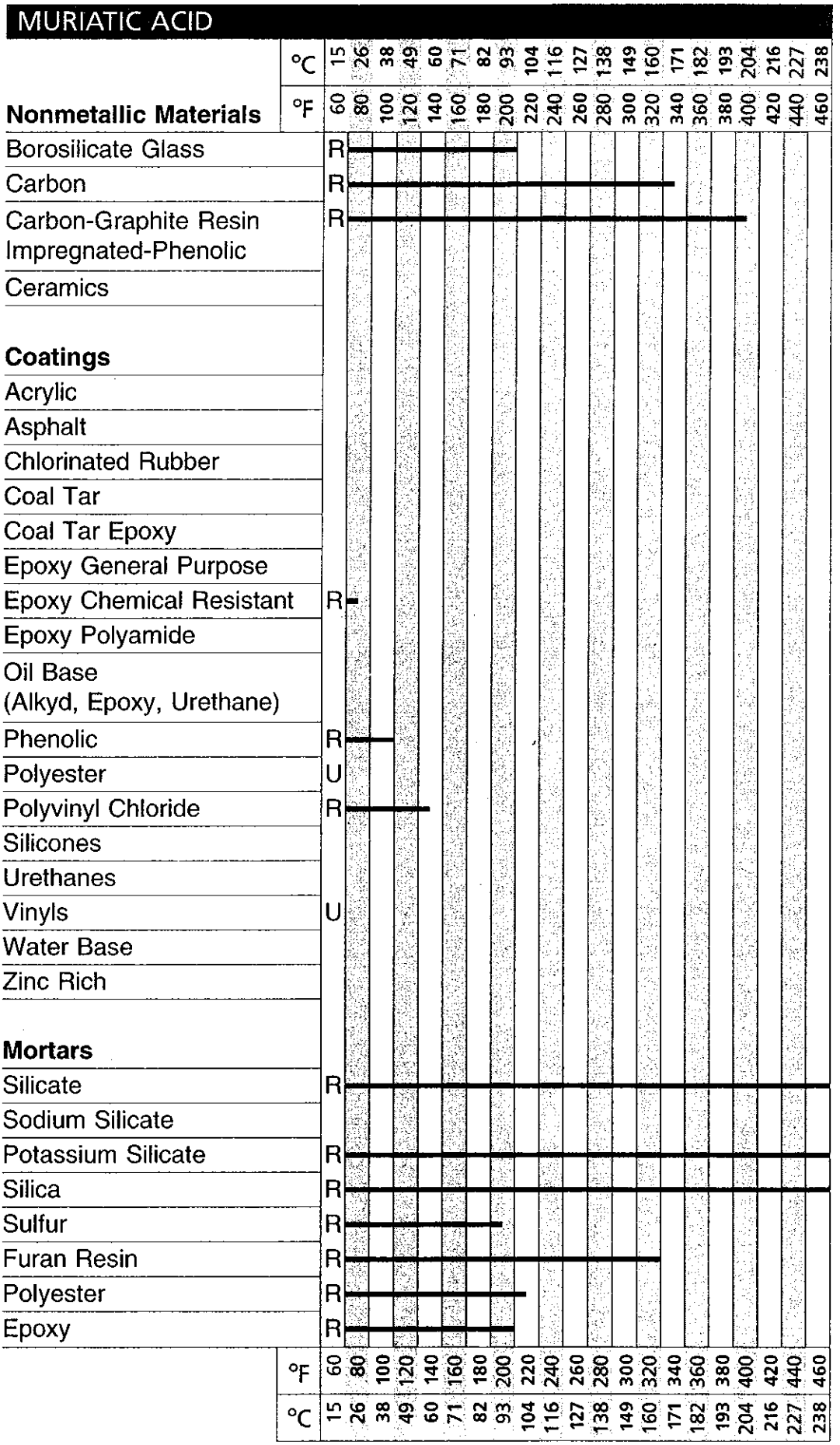




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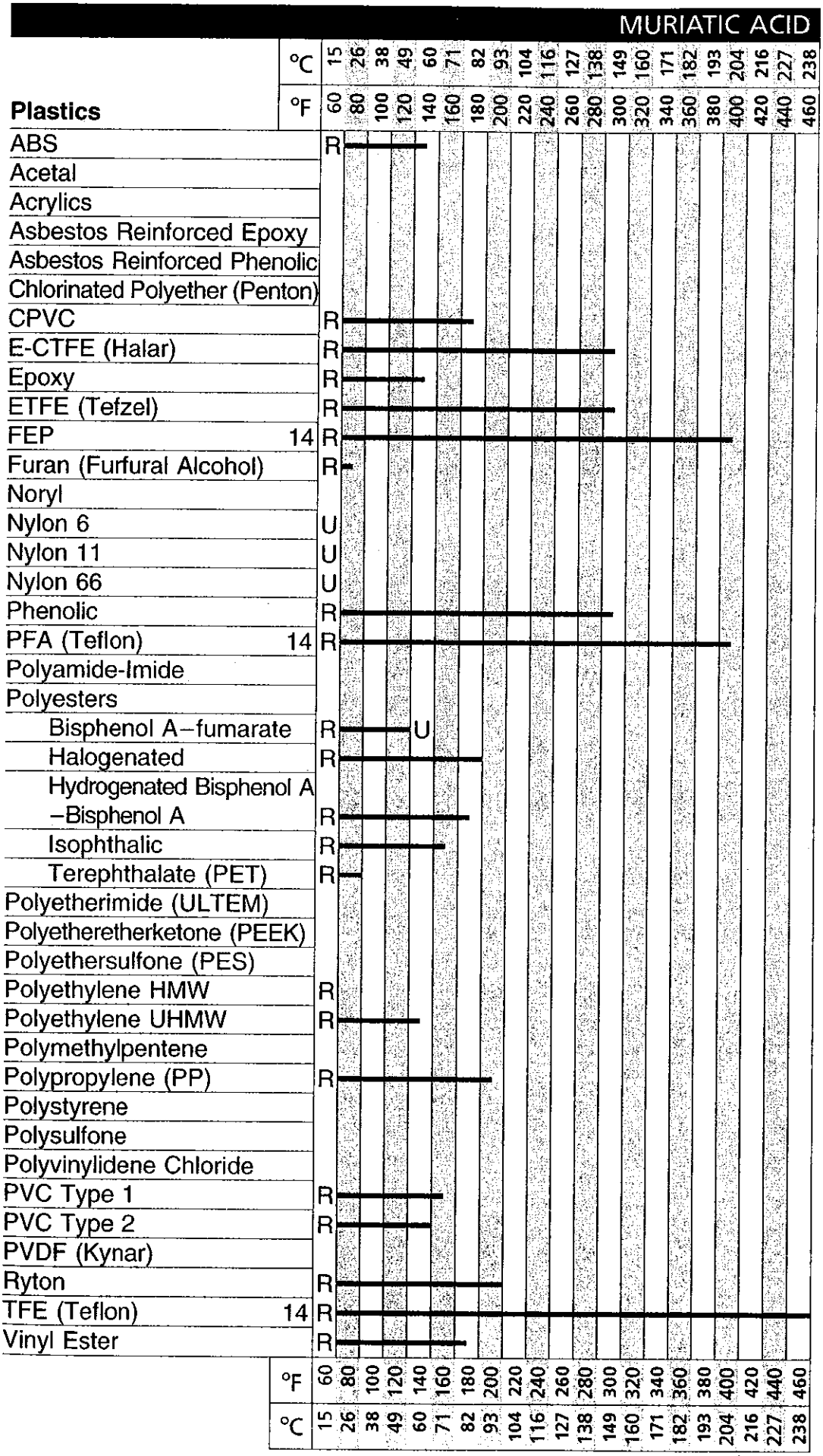



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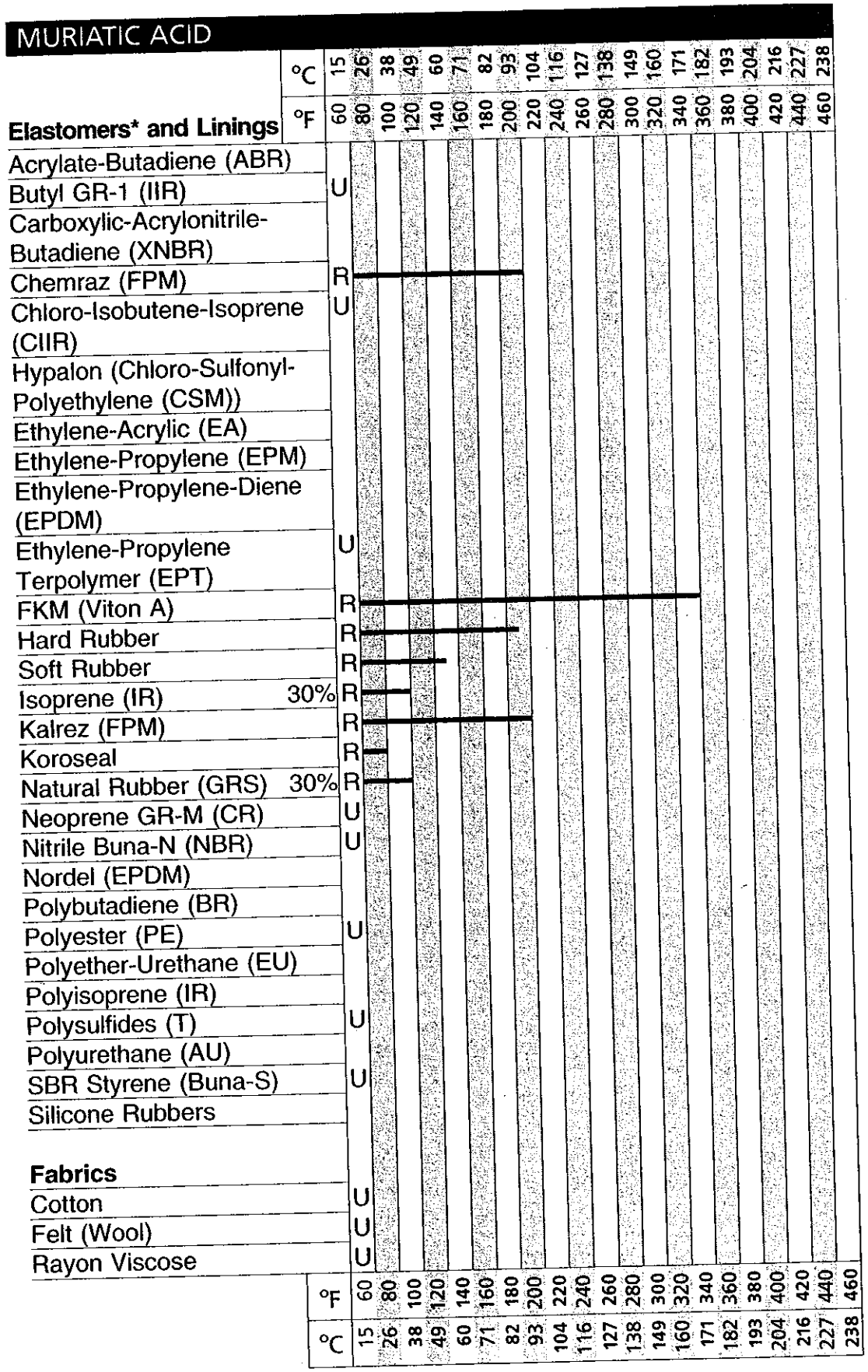


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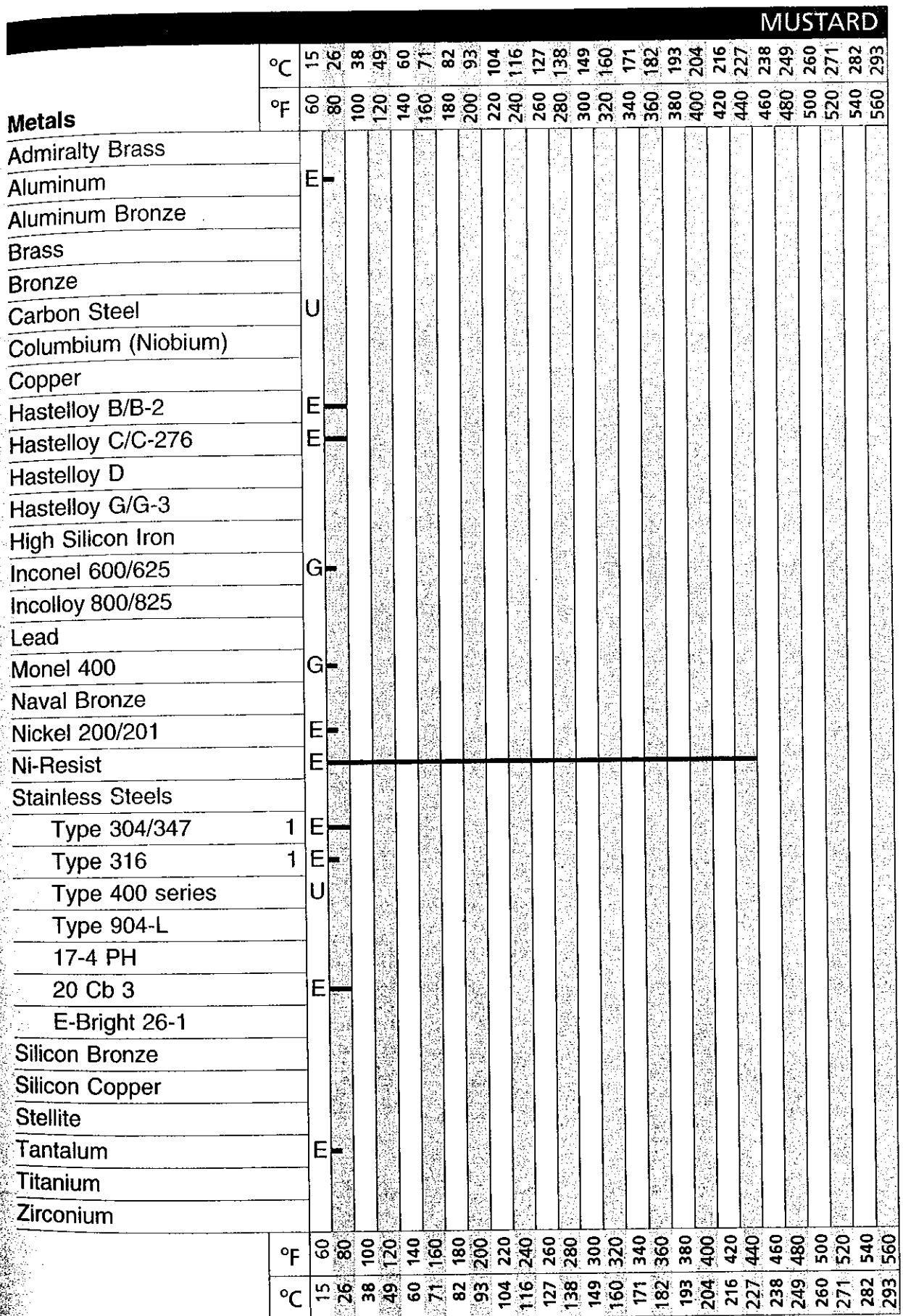


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## MUSTARD

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | R | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | R | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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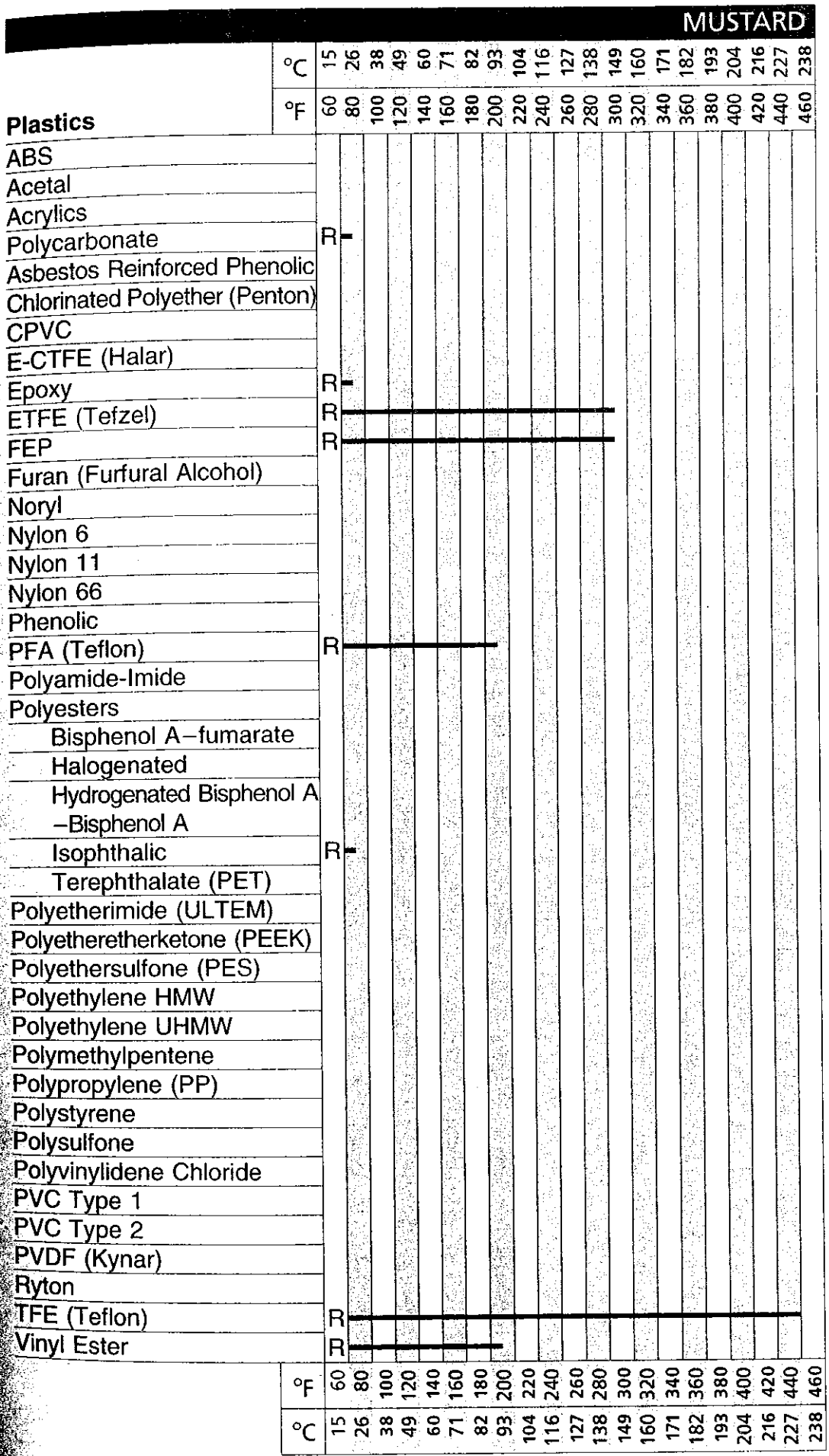


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## MUSTARD

| Elastomers* and Linings | °C | °F |
|---|---|---|
| Acrylate-Butadiene (ABR) | 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 | 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| Butyl GR-1 (IIR) | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | | |
| Chloro-Isobutene-Isoprene (CIIR) | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | | |
| Ethylene-Propylene-Diene (EPDM) | | |
| Ethylene-Propylene Terpolymer (EPT) | | |
| FKM (Viton A) | | |
| Hard Rubber | | |
| Soft Rubber | | |
| Isoprene (IR) | | |
| Kalrez (FPM) | | |
| Koroseal | | |
| Natural Rubber (GRS) | | |
| Neoprene GR-M (CR) | | |
| Nitrile Buna-N (NBR) | | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | | |
| Polyester (PE) | | |
| Polyether-Urethane (EU) | | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | | |
| Polyurethane (AU) | | |
| SBR Styrene (Buna-S) | | |
| Silicone Rubbers | | |
| **Fabrics** | | |
| Cotton | | |
| Felt (Wool) | | |
| Rayon Viscose | | |
| | °F | 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| | °C | 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |

*See also Nylon 11 under PLASTICS



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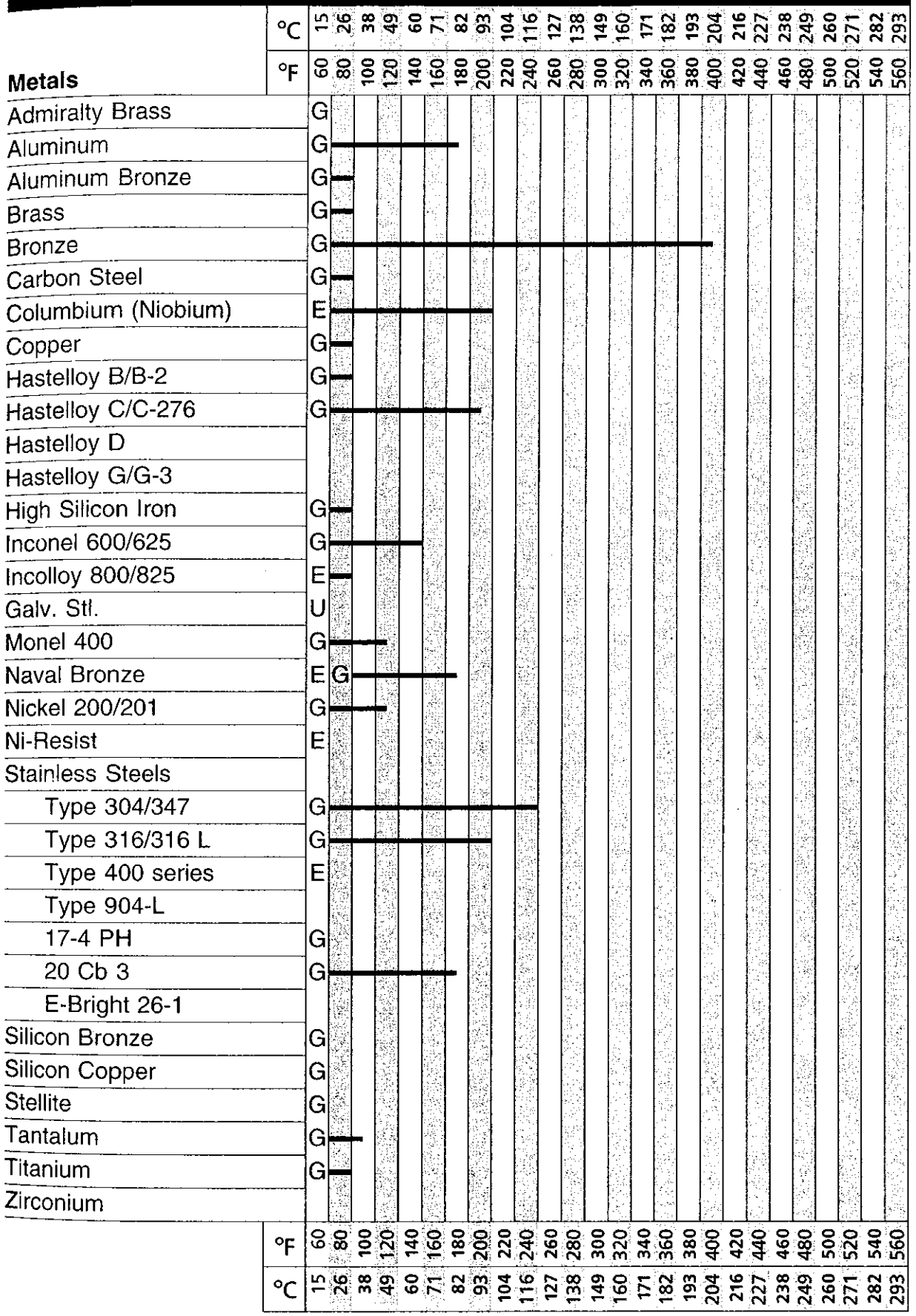


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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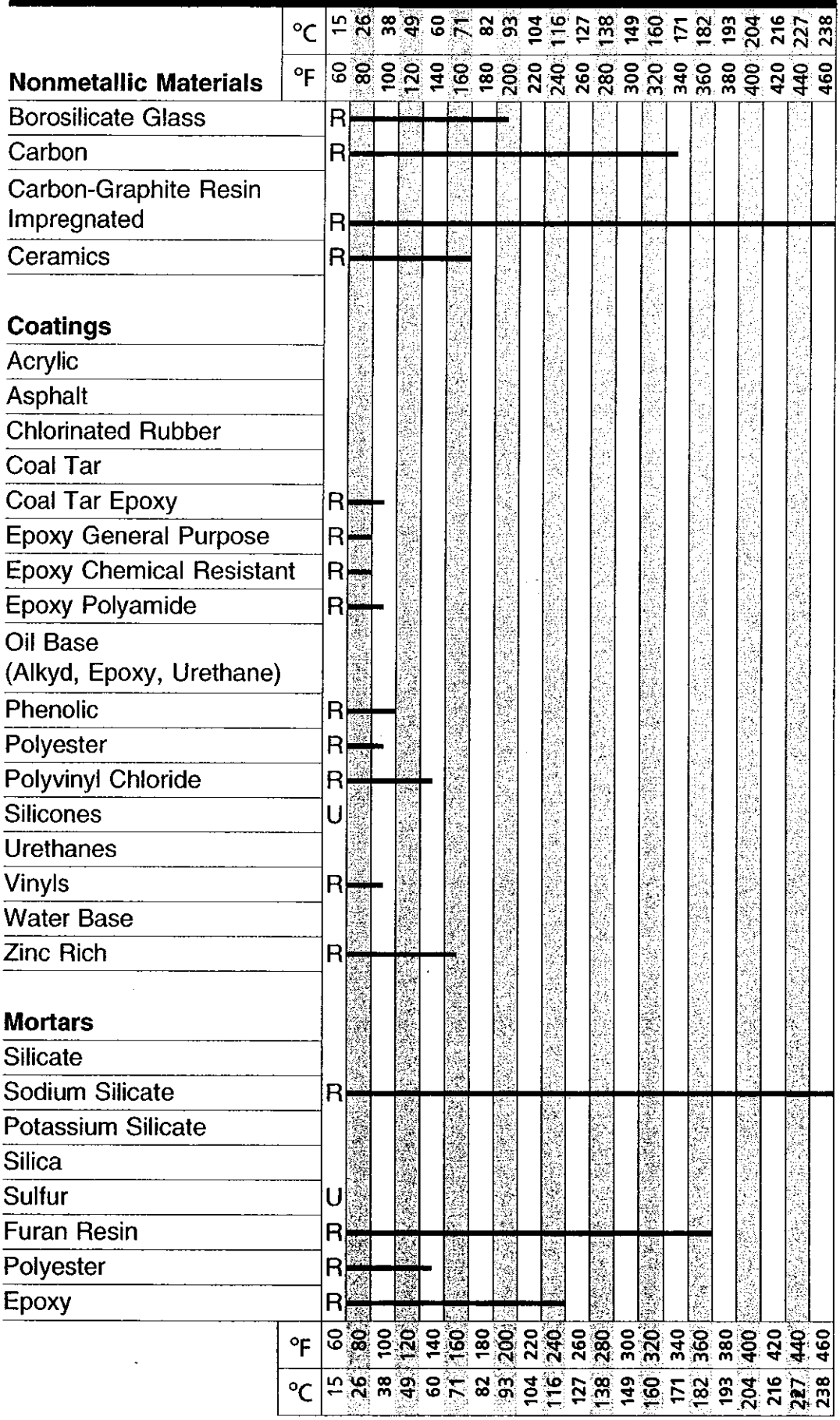
## NAPHTHA







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## NAPHTHA

| Plastics | °C | °F |
|---|---|---|
| ABS | R | |
| Acetal | R | |
| Acrylics | R | U |
| KEL-F (CTFE) | R | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | U |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | U | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | R | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | R | |
| Polyetheretherketone (PEEK) | R | |
| Polyethersulfone (PES) | R | |
| Polyethylene HMW | U | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | U |
| Polystyrene | U | |
| Polysulfone | U | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460



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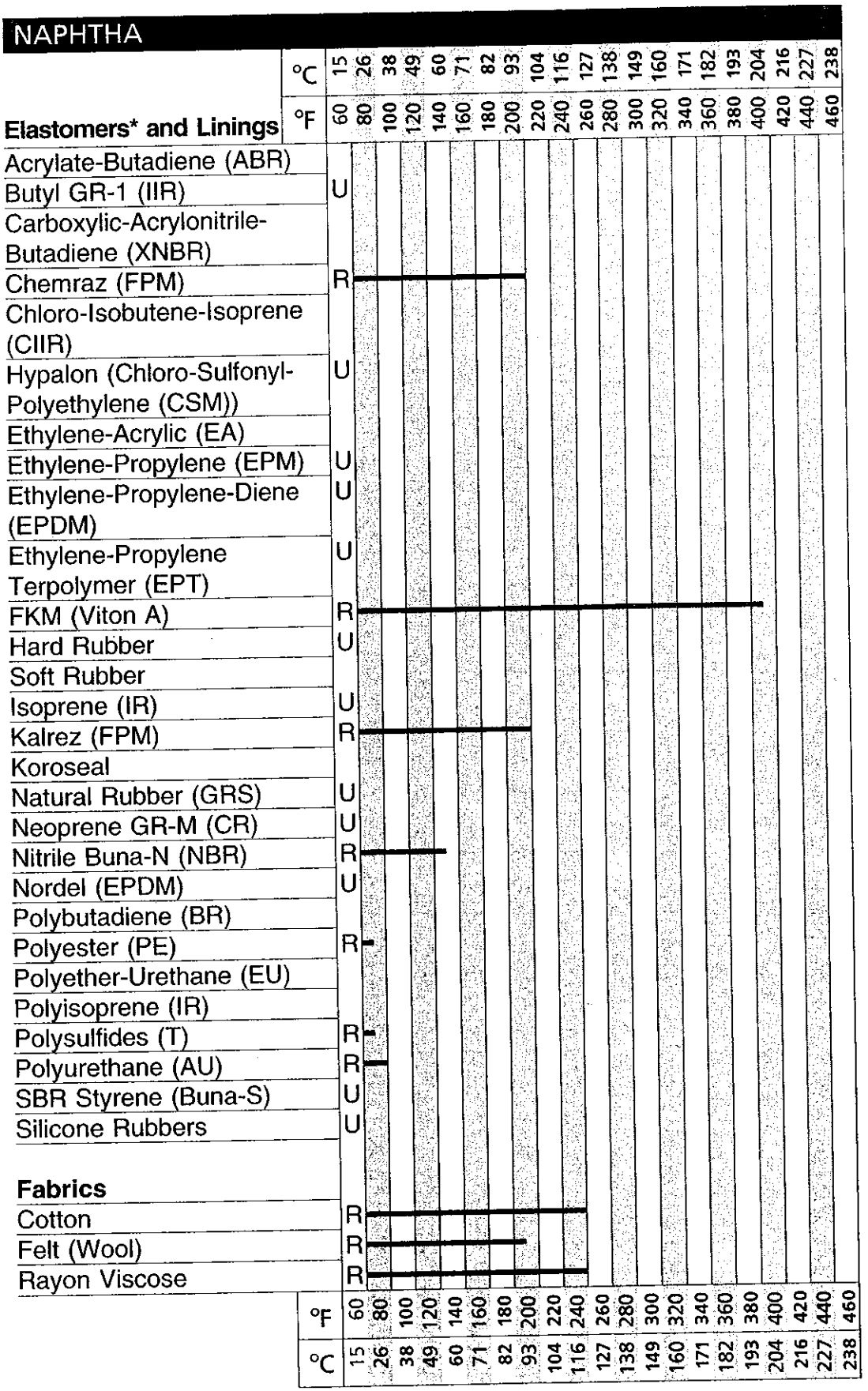


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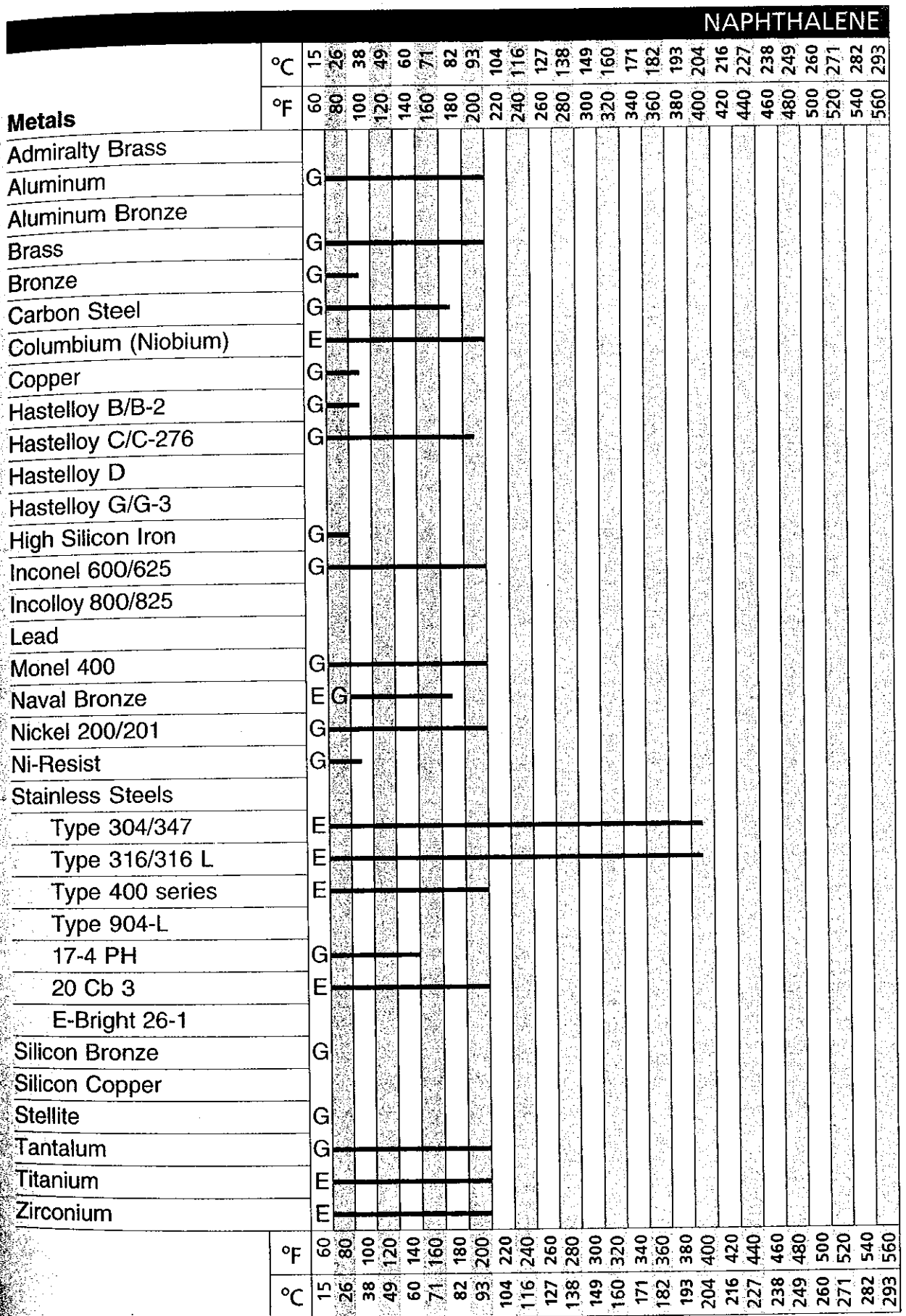


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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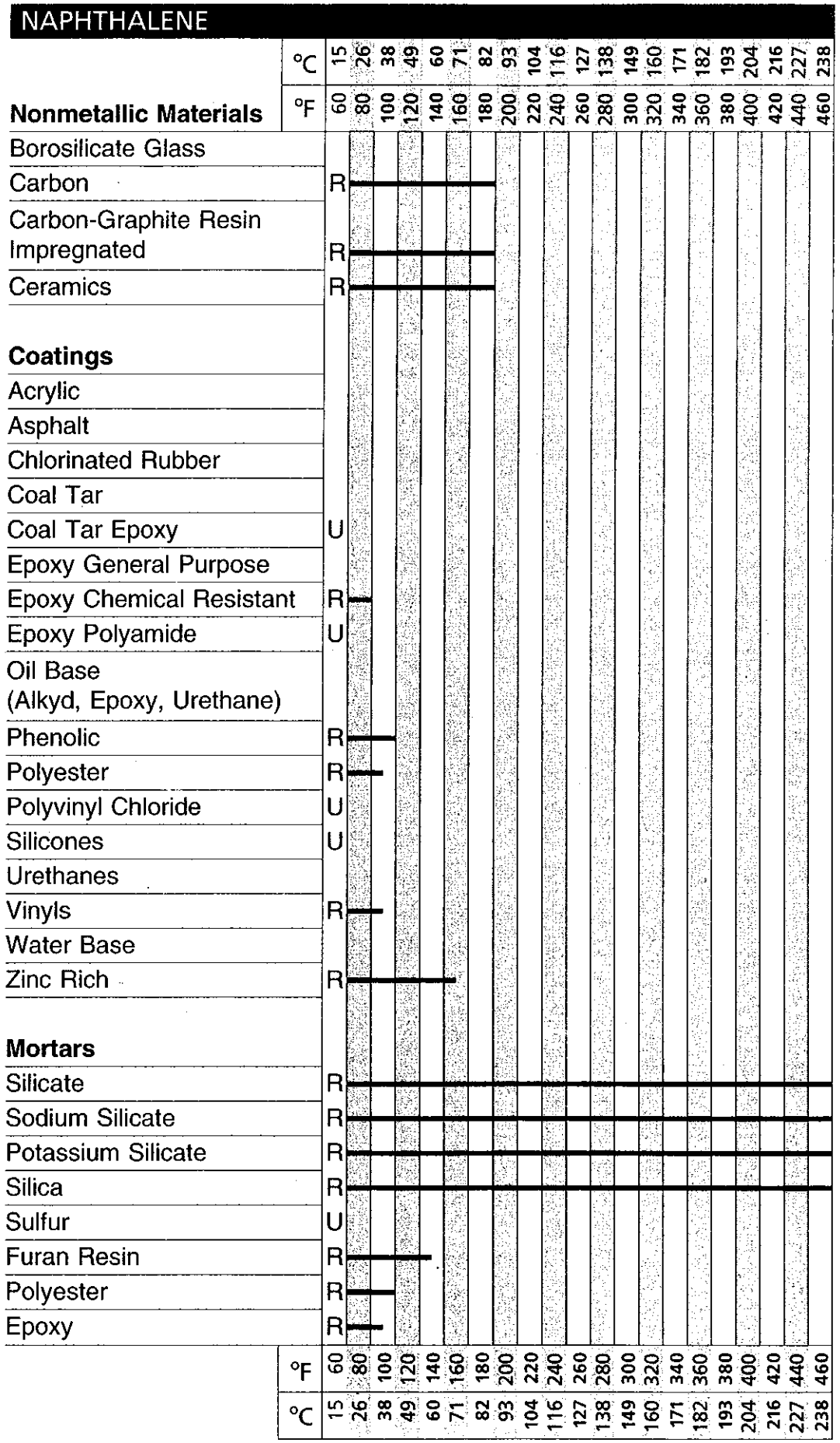
## NAPHTHALENE



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# NAPHTHALENE

| Plastics | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | U | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | R | | ■ | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | | |
| KEL-F (CTFE) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | |
| CPVC | U | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | R | | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | |
| Epoxy | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| ETFE (Tefzel) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | |
| FEP | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| Furan (Furfural Alcohol) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | |
| Noryl | U | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | R | | ■ | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | R | | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | R | | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| Phenolic | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | |
| PFA (Teflon) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | R | | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | |
| Halogenated | R | | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| Isophthalic | R | | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | |
| Terephthalate (PET) | R | | ■ | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | R | | ■ | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | U | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | R | | ■ | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| Polystyrene | U | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | U | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | U | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | U | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | |
| Ryton | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| TFE (Teflon) 14 | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Vinyl Ester | R | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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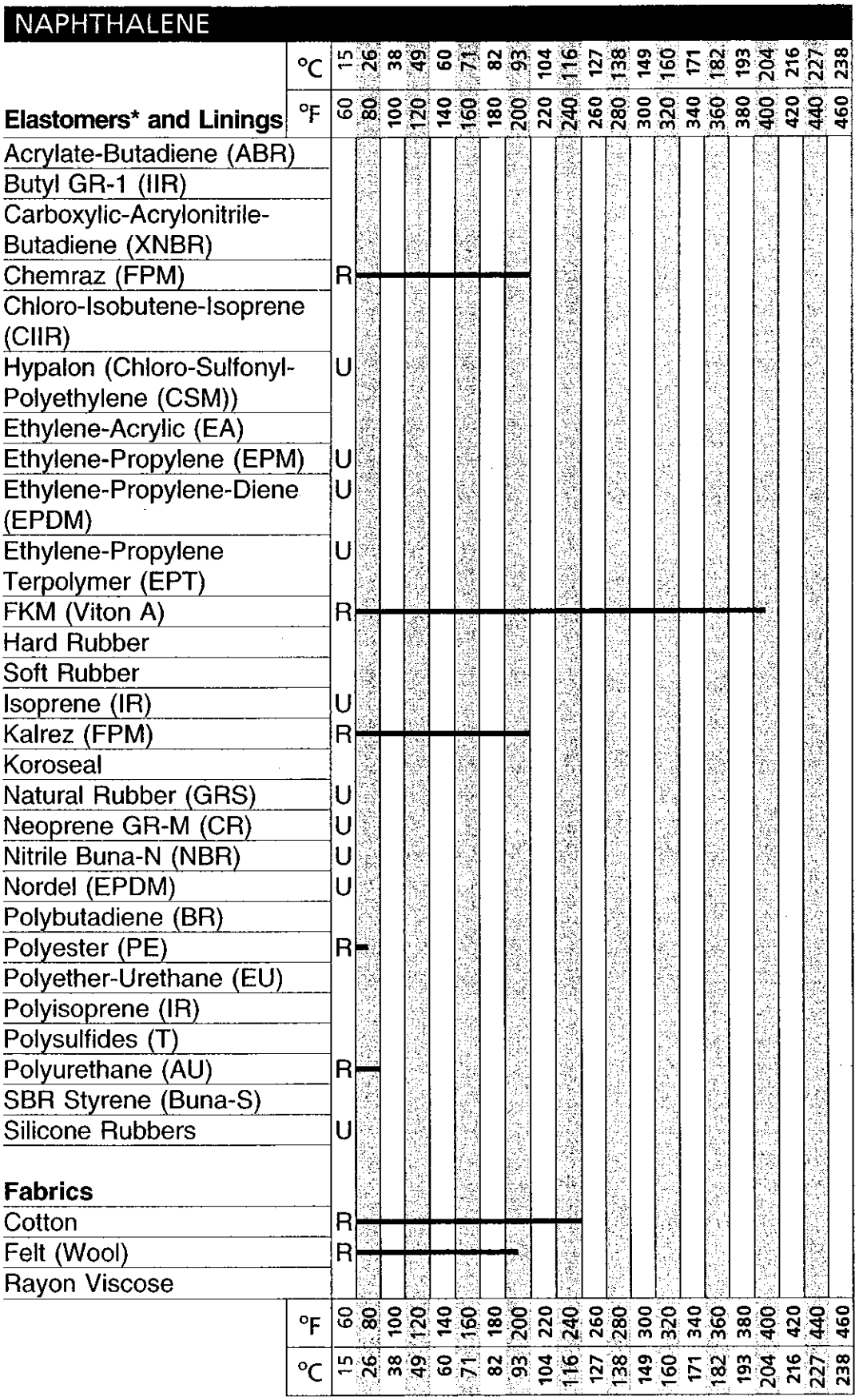


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# NAPHTHALENIC ACID

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | E | | | | | | | | | | | | | | | | | | | | | G | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# NAPHTHALENIC ACID

| Nonmetallic Materials | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | |
| Silicones | U | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# NAPHTHALENIC ACID

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | R | R | R | R | R | R | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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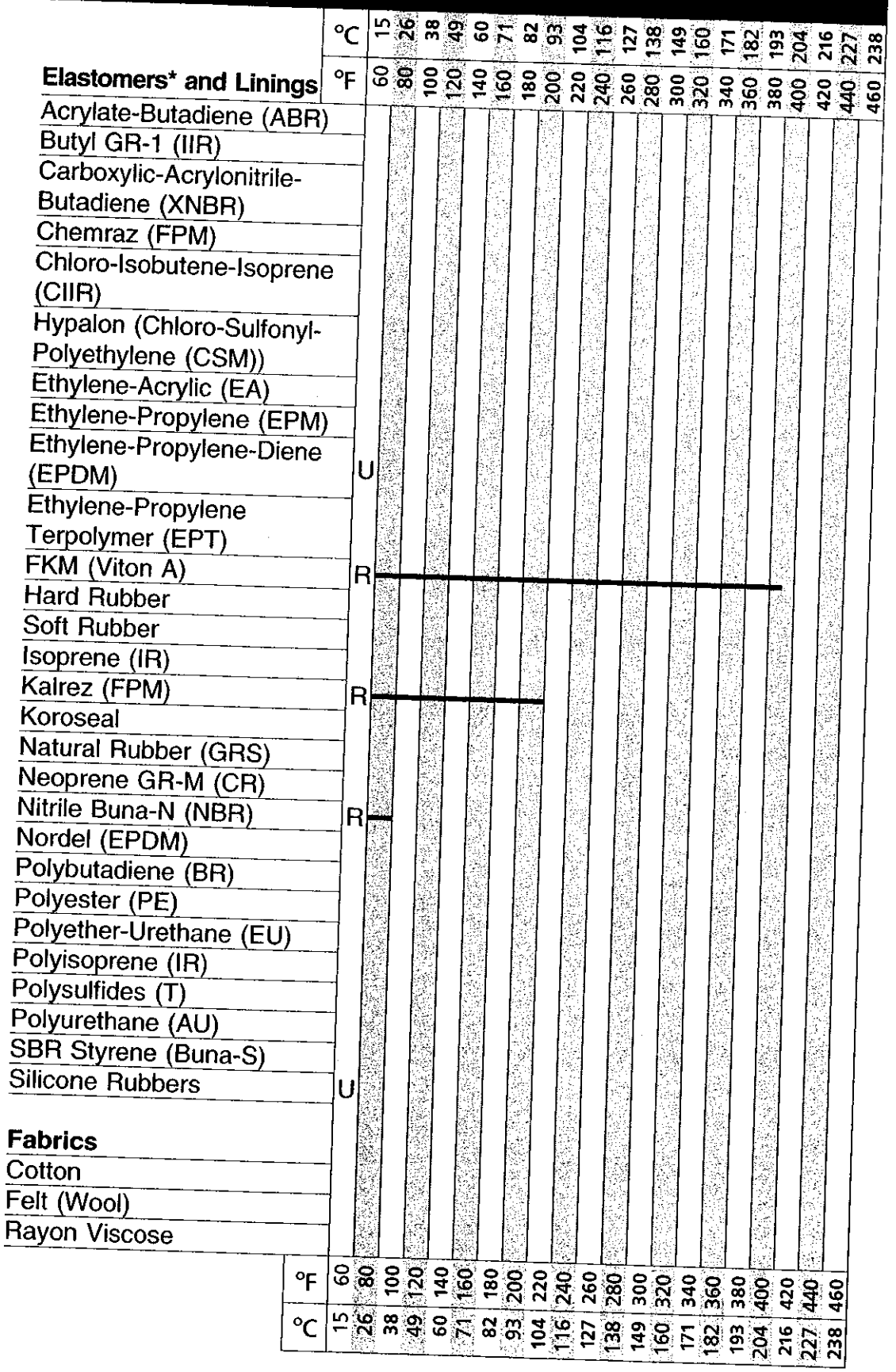
## NAPHTHALENIC ACID




*See also Nylon 11 under PLASTICS



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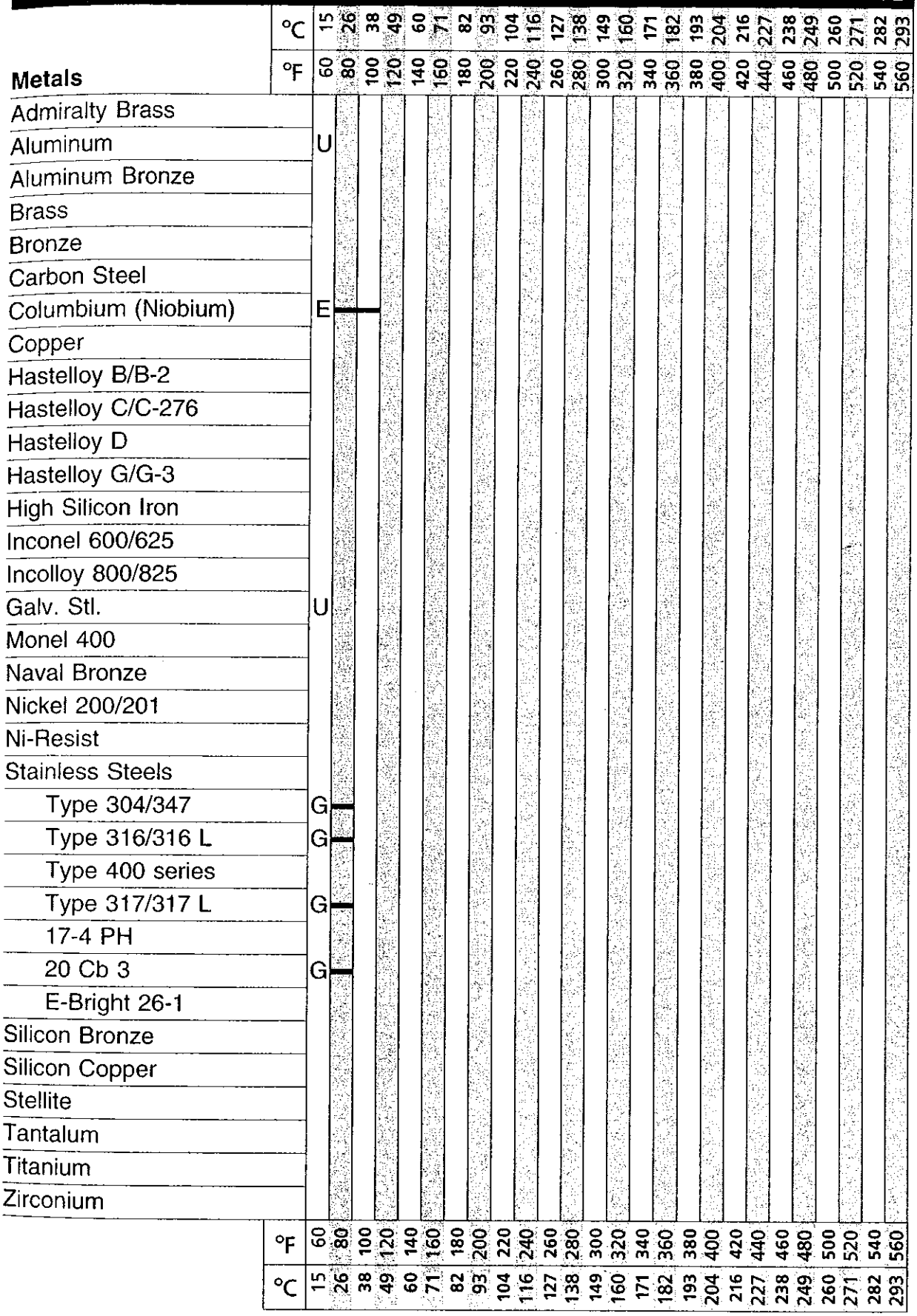


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## NICKEL ACETATE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | U | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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## NICKEL ACETATE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | R | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | R | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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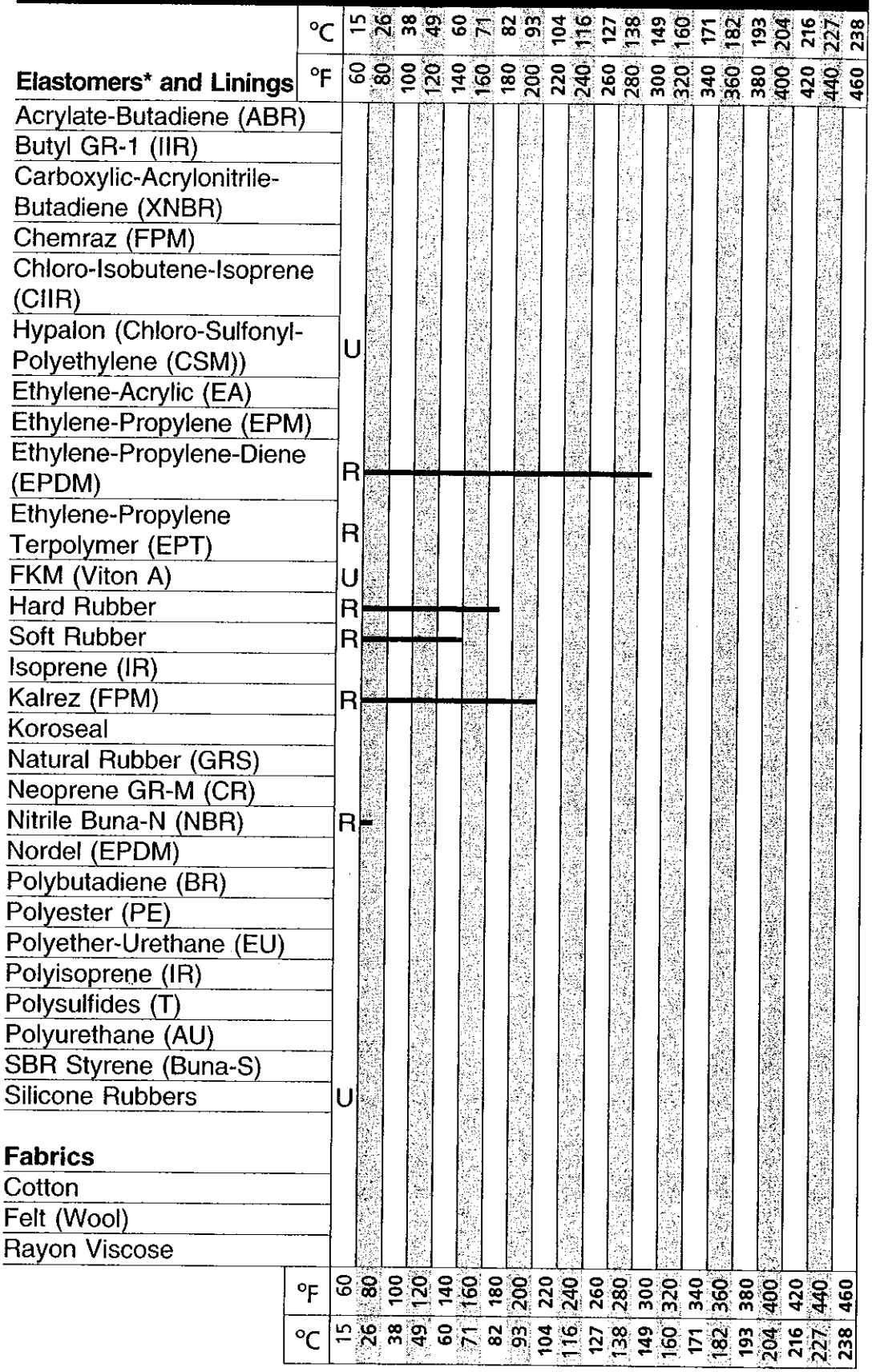
## NICKEL ACETATE

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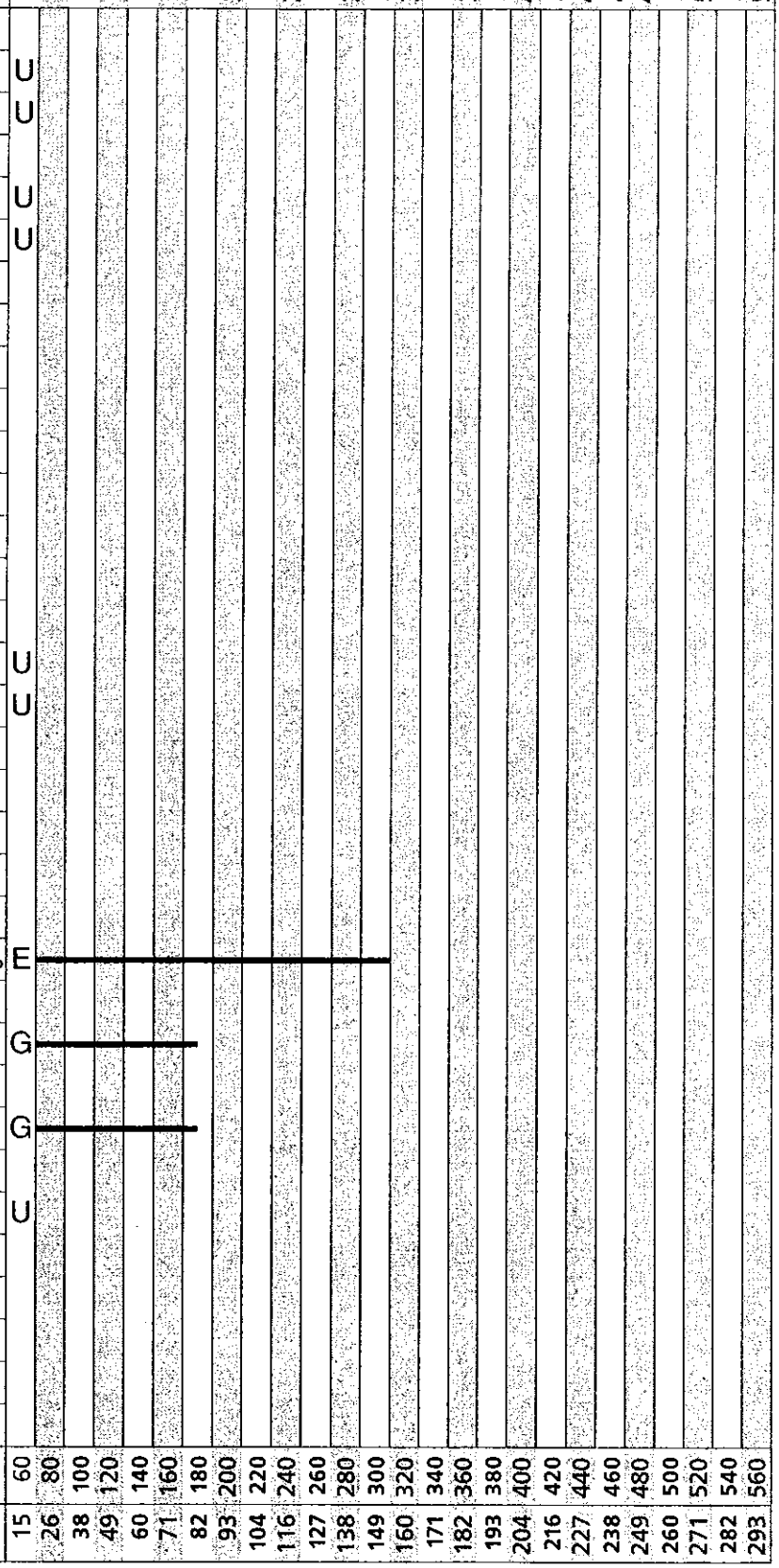
# NICKEL AMMONIUM SULFATE

| Metals | |
|---|---|
| Admiralty Brass | |
| Aluminum | U |
| Aluminum Bronze | U |
| Brass | |
| Bronze | U |
| Carbon Steel | U |
| Columbium (Niobium) | |
| Copper | |
| Hastelloy B/B-2 | |
| Hastelloy C/C-276 | |
| Hastelloy D | |
| Hastelloy G/G-3 | |
| High Silicon Iron | |
| Inconel 600/625 | |
| Incolloy 800/825 | |
| Galv. Stl. | U |
| Monel 400 | U |
| Naval Bronze | |
| Nickel 200/201 | |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 | |
| Type 316 20% | E |
| Type 400 series | |
| Type 317/317 L | G |
| 17-4 PH | |
| 20 Cb 3 | G |
| E-Bright 26-1 | |
| Silicon Bronze | U |
| Silicon Copper | |
| Stellite | |
| Tantalum | |
| Titanium | |
| Zirconium | |




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# NICKEL AMMONIUM SULFATE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# NICKEL AMMONIUM SULFATE

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | R | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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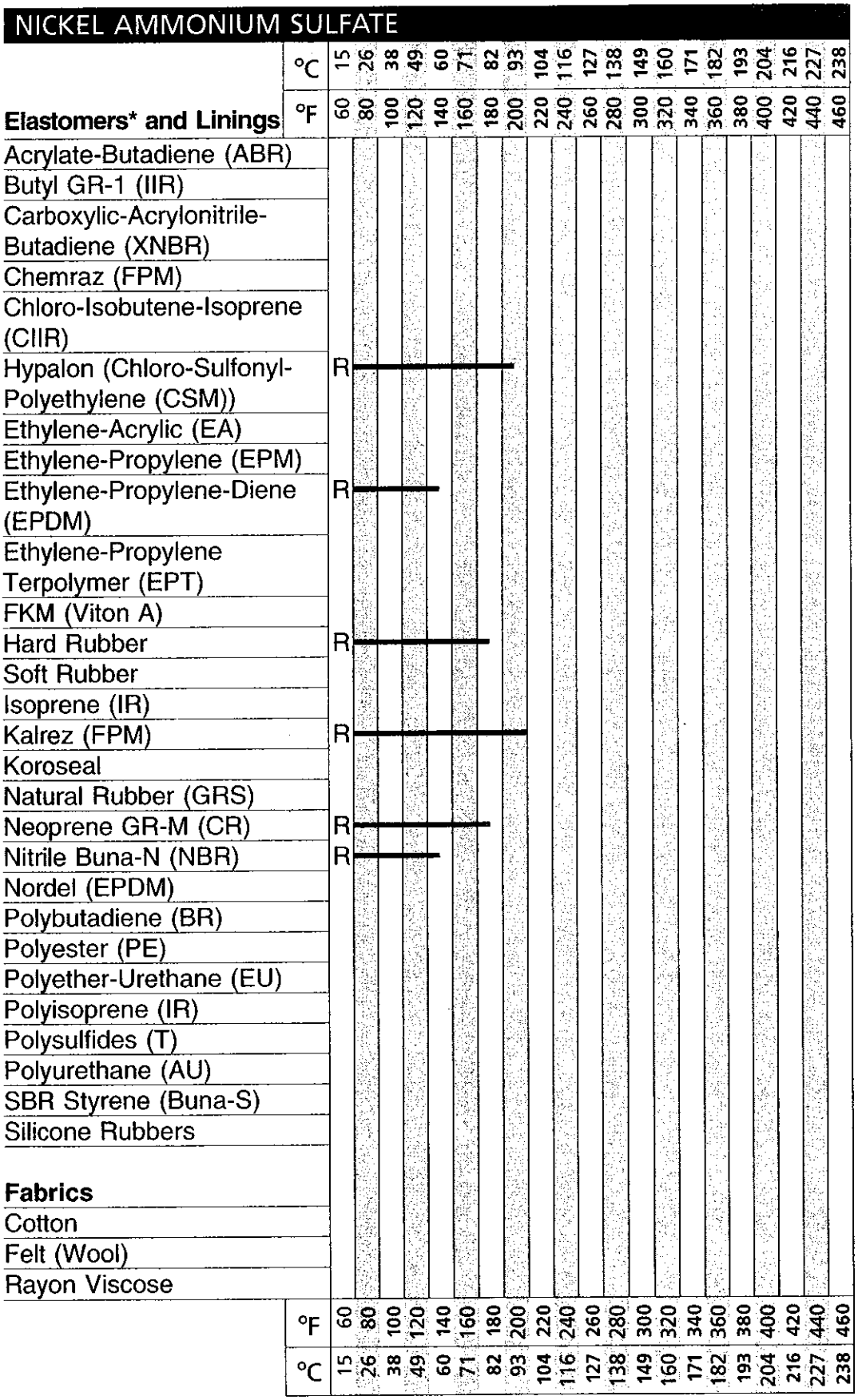


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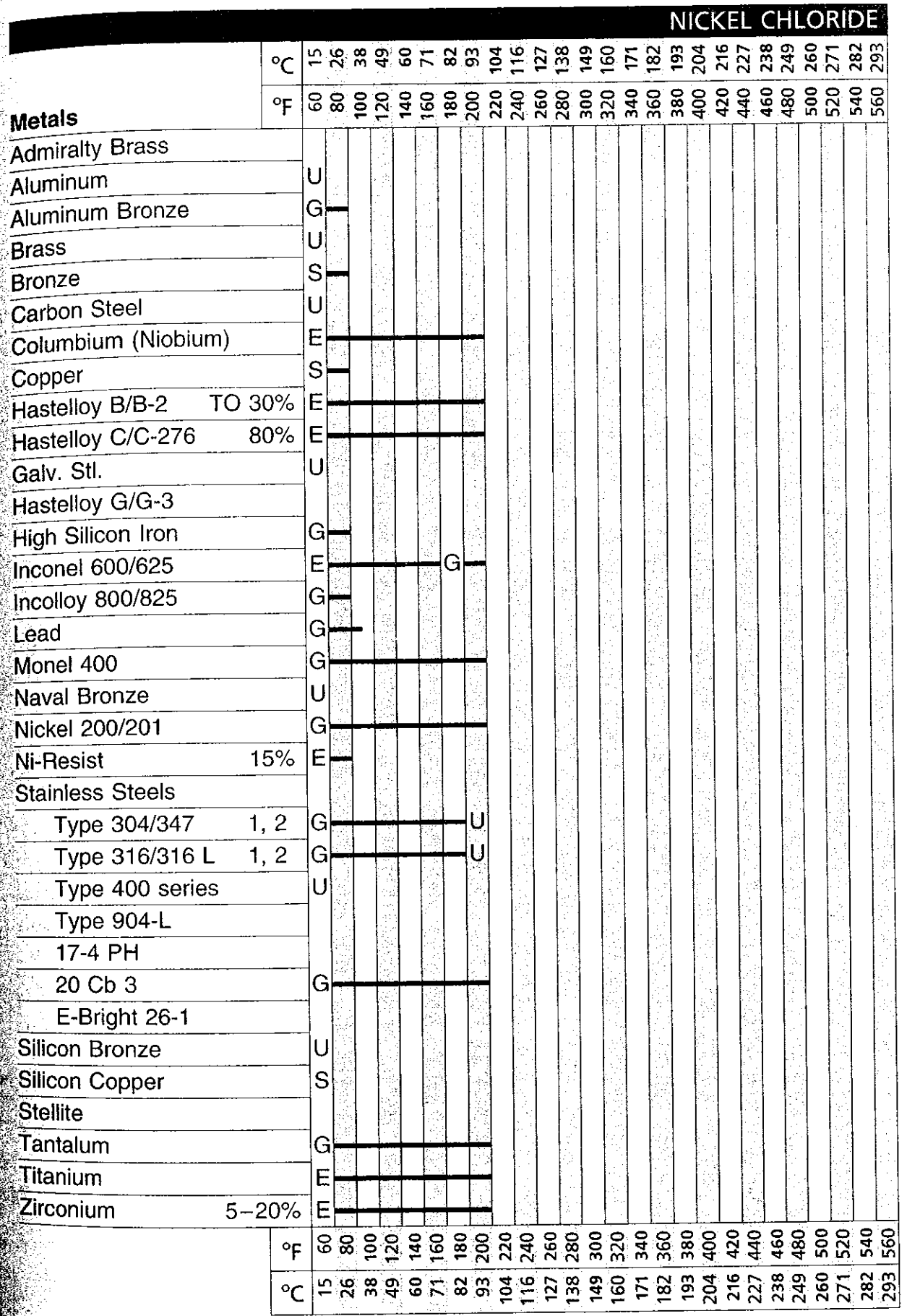


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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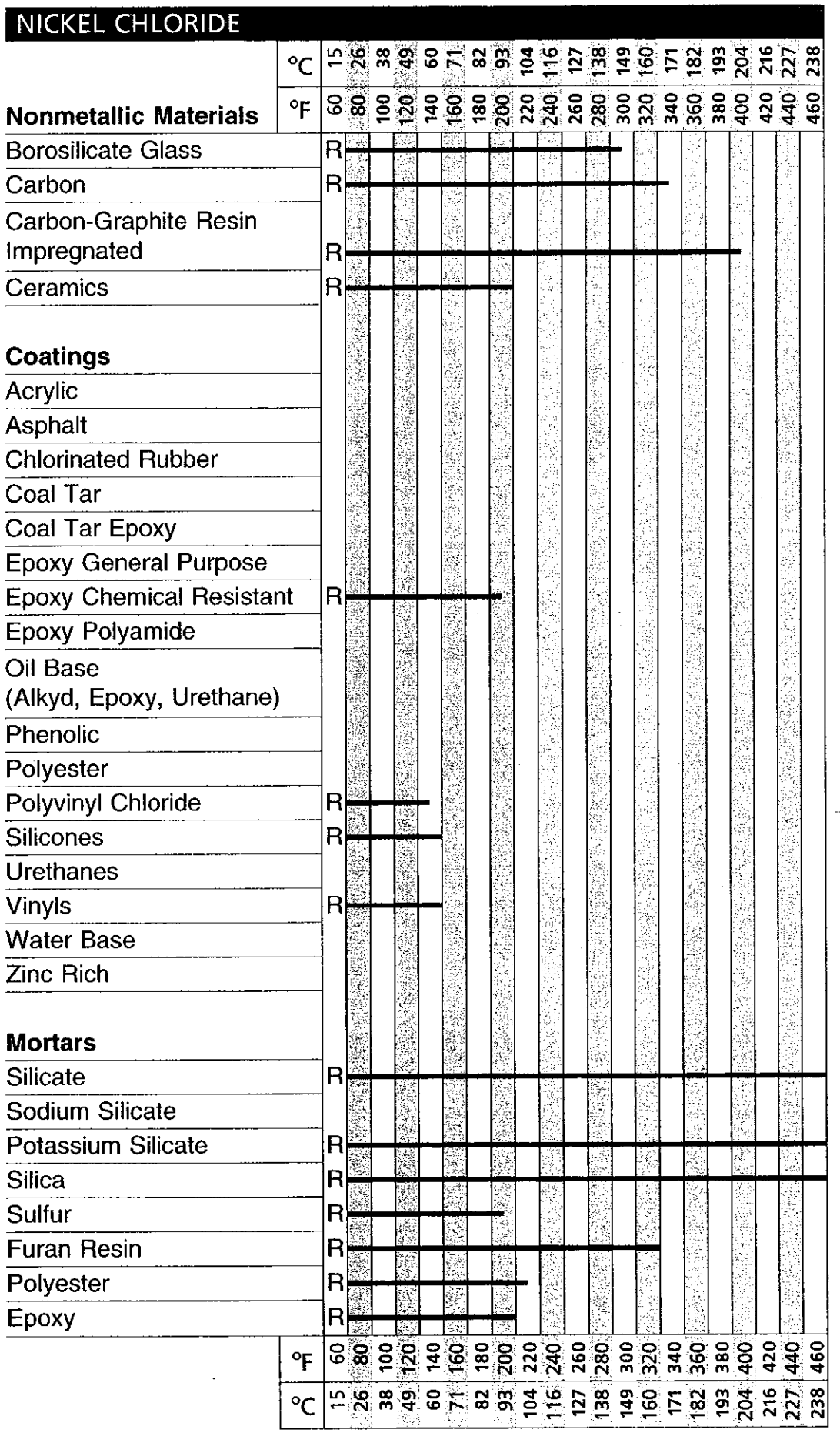
## NICKEL CHLORIDE



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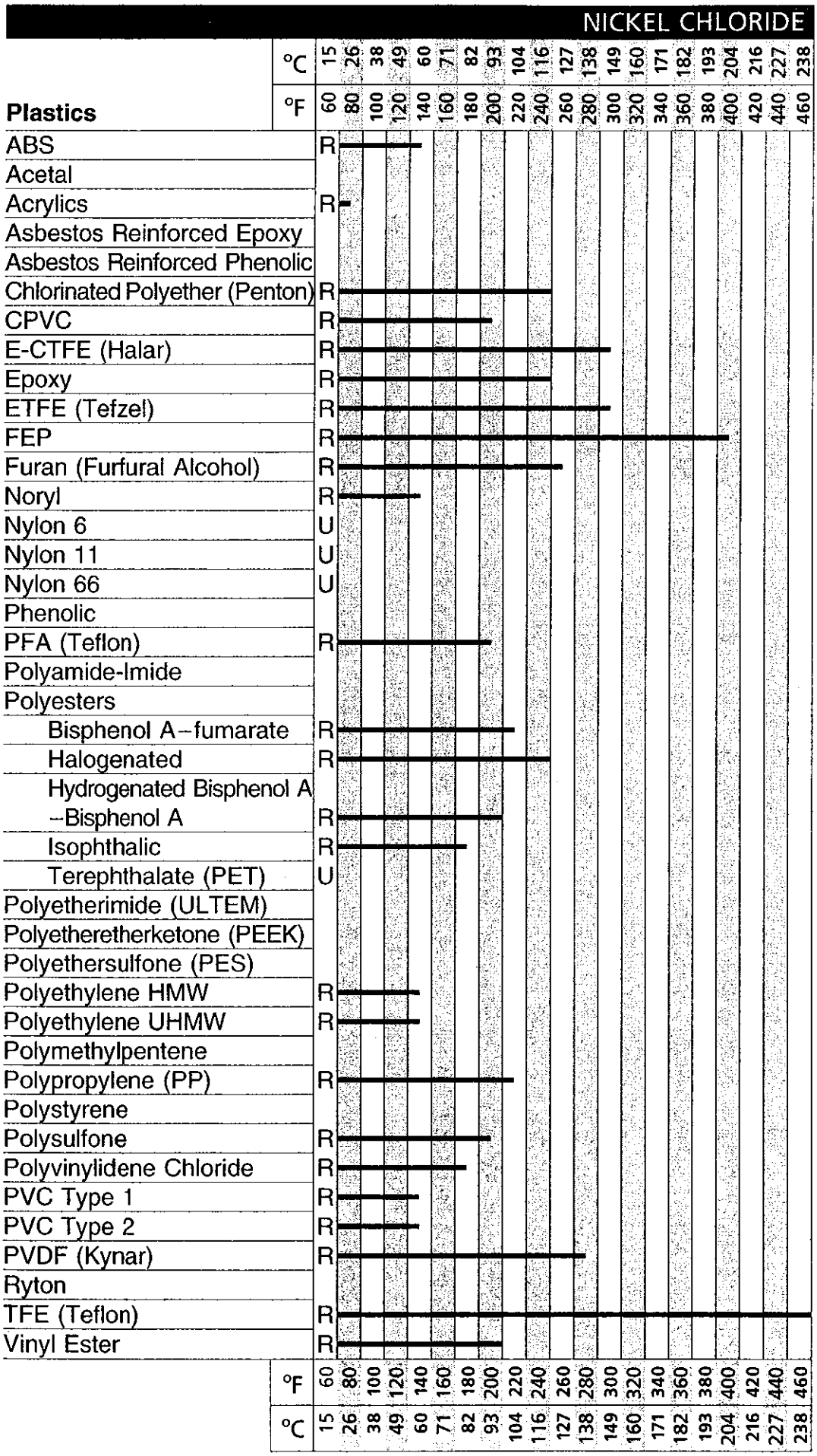
## NICKEL CHLORIDE





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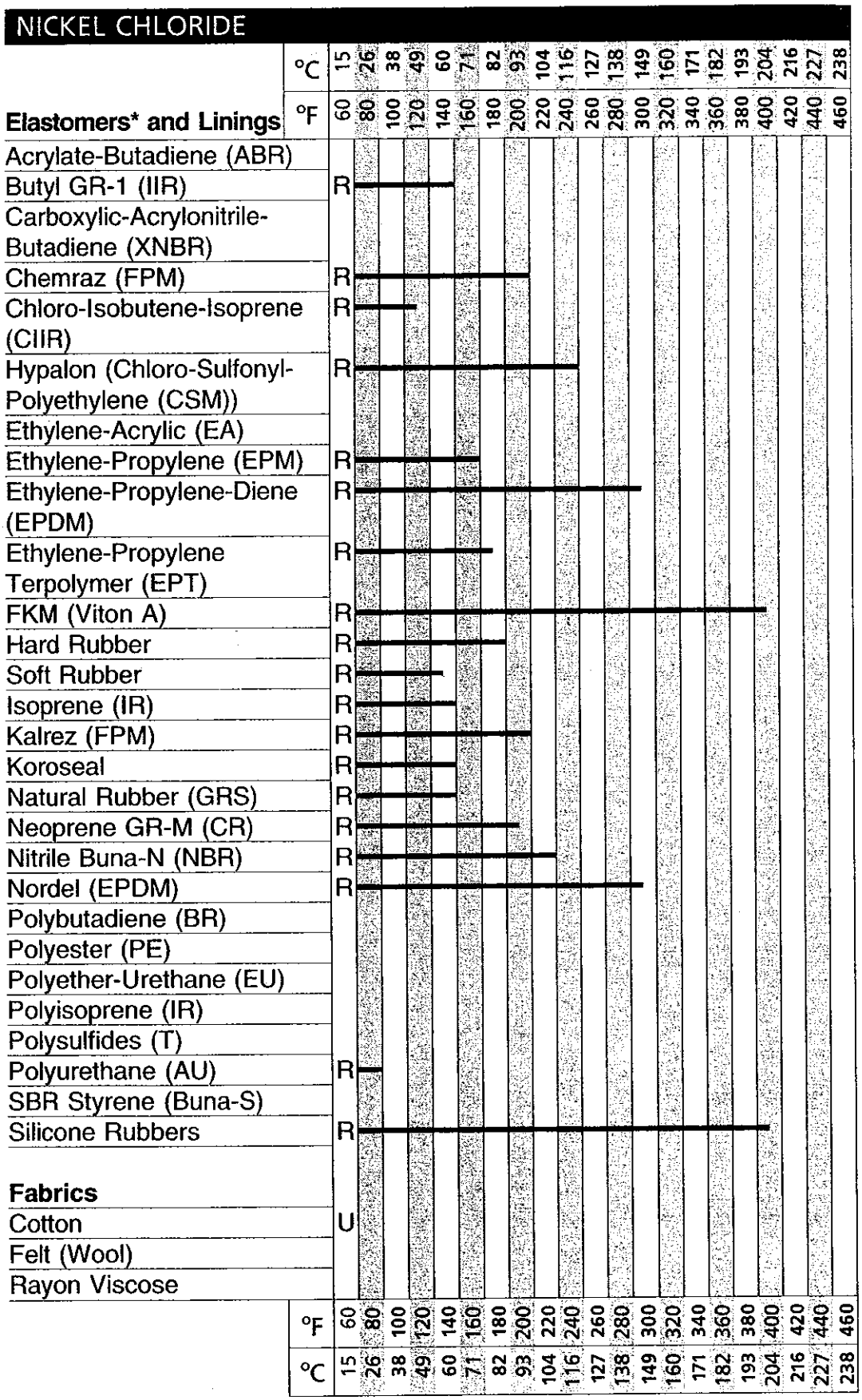
## NICKEL CHLORIDE




*See also Nylon 11 under PLASTICS

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| Metals | | °C | °F |
|---|---|---|---|
| Admiralty Brass | | U | |
| Aluminum | | U | |
| Aluminum Bronze | | U | |
| Brass | | U | |
| Bronze | | G | |
| Carbon Steel | | E | |
| Columbium (Niobium) | | G | |
| Copper | | G | |
| Hastelloy B/B-2 | | E | |
| Hastelloy C/C-276 | | G | |
| Hastelloy D | | G | |
| Hastelloy G/G-3 | | G | |
| High Silicon Iron | | G | |
| Inconel 600/625 | DRY | G | |
| Incolloy 800/825 | 10% | G | |
| Lead | | G | |
| Monel 400 | DRY | U | |
| Naval Bronze | | G | |
| Nickel 200/201 | DRY | | |
| Ni-Resist | | | |
| Stainless Steels | | | |
| Type 304/347 | | E | |
| Type 316/316 L | | E | |
| Type 400 series | | G | |
| Type 904-L | | G | |
| 17-4 PH | | E | |
| 20 Cb 3 | | U | |
| E-Bright 26-1 | | G | |
| Silicon Bronze | | G | |
| Silicon Copper | 10% | G | |
| Stellite | | E | |
| Tantalum | | | |
| Titanium | | | |
| Zirconium | | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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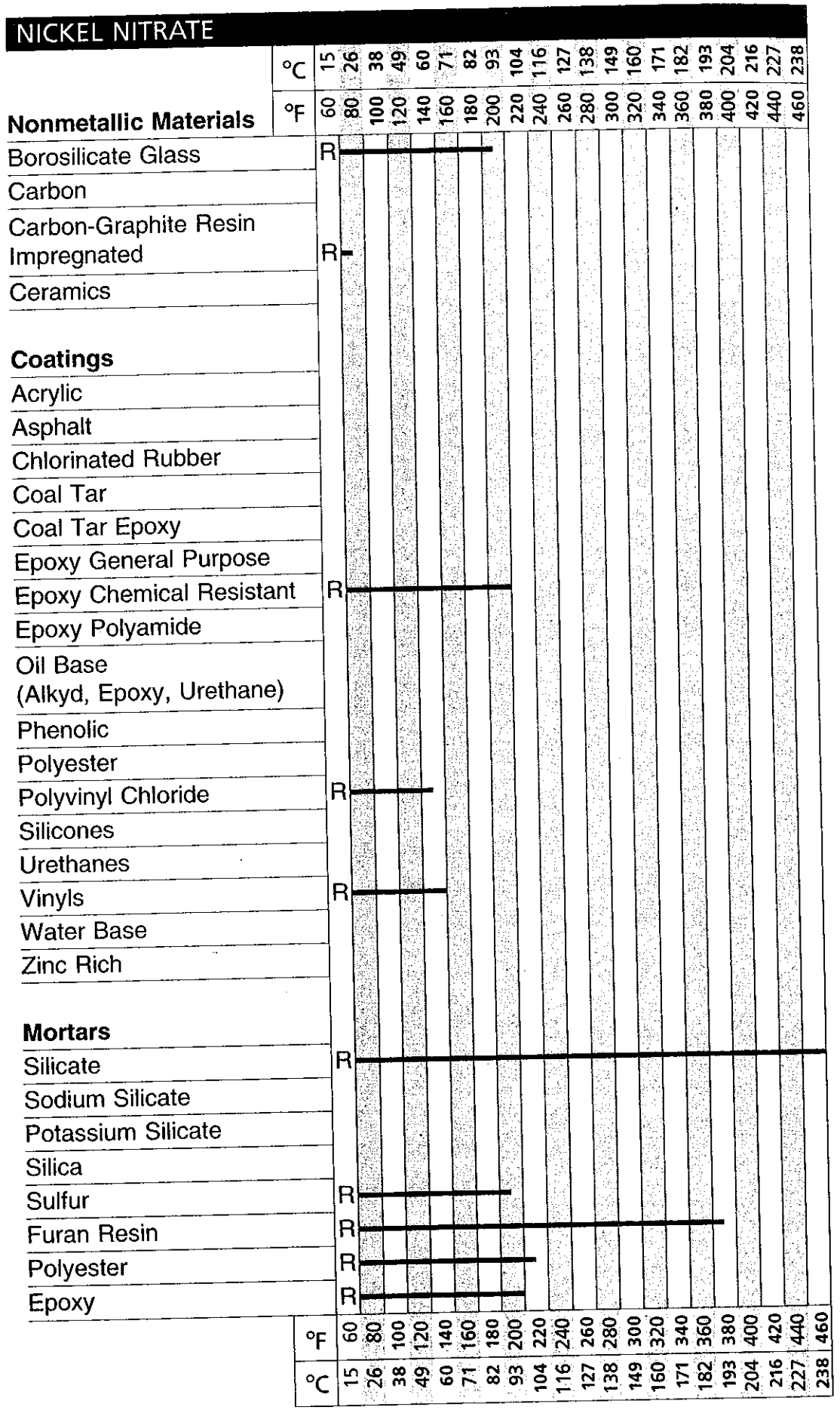
# NICKEL NITRATE



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## NICKEL NITRATE

| Plastics | °C | °F |
|---|---|---|
| ABS | R | R |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | R |
| CPVC | R | R |
| E-CTFE (Halar) | R | R |
| Epoxy | R | R |
| ETFE (Tefzel) | R | R |
| FEP | R | R |
| Furan (Furfural Alcohol) | R | R |
| Noryl | R | R |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | R | R |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | R |
| Halogenated | R | R |
| Hydrogenated Bisphenol A –Bisphenol A | R | R |
| Isophthalic | R | R |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | R |
| Polyethylene UHMW | R | R |
| Polymethylpentene | | |
| Polypropylene (PP) | R | R |
| Polystyrene | R | R |
| Polysulfone | | |
| Polyvinylidene Chloride | R | R |
| PVC Type 1 | R | R |
| PVC Type 2 | R | R |
| PVDF (Kynar) | R | R |
| Ryton | | |
| TFE (Teflon) | R | R |
| Vinyl Ester | R | R |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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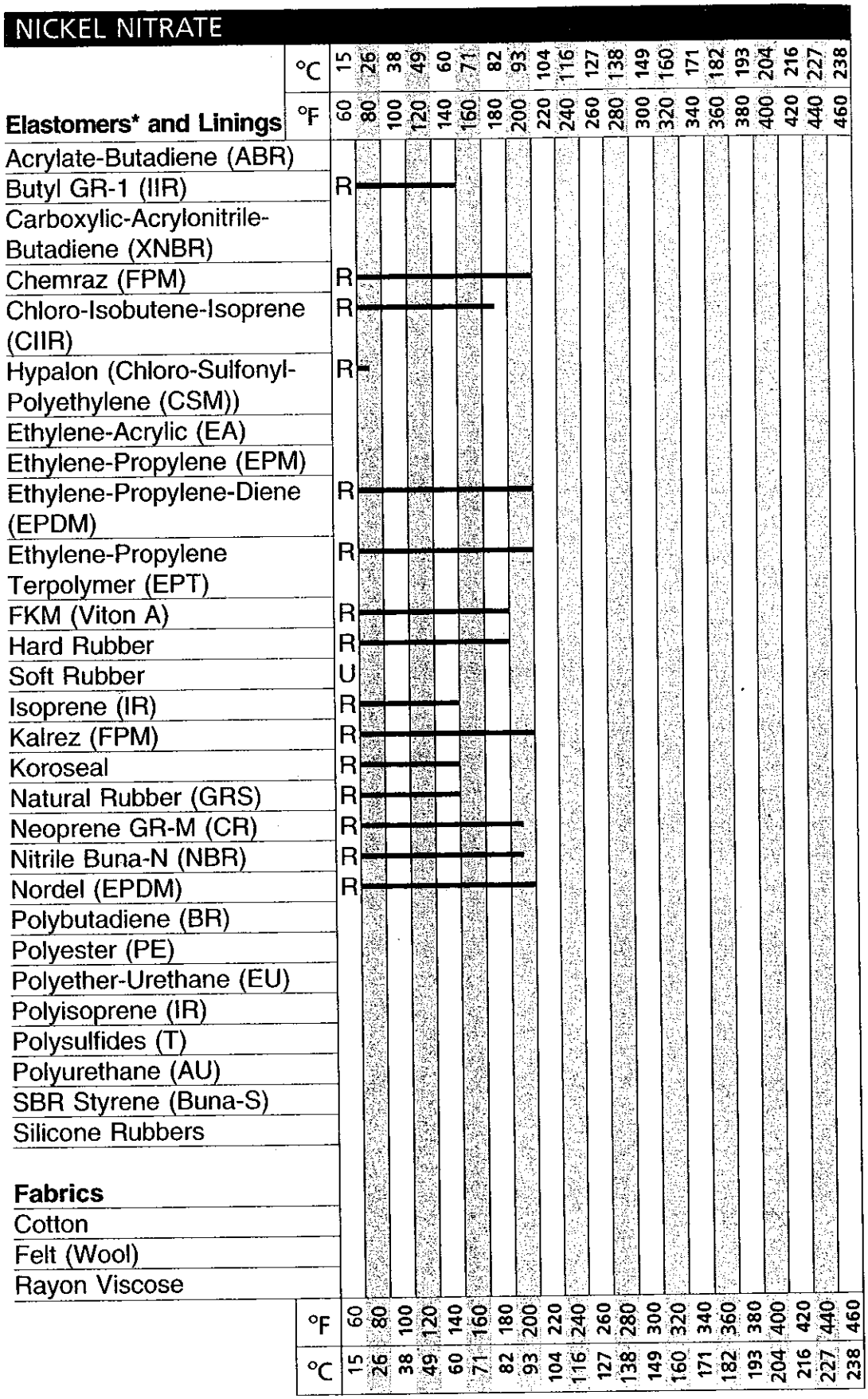
## NICKEL NITRATE

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# NICKEL SALT

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | U | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | U | |
| Columbium (Niobium) | G | |
| Copper | | |
| Hastelloy B/B-2 | G | |
| Hastelloy C/C-276 | G | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | G | |
| Monel 400 | | |
| Naval Bronze | U | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | | |
| Type 316/316 L | G | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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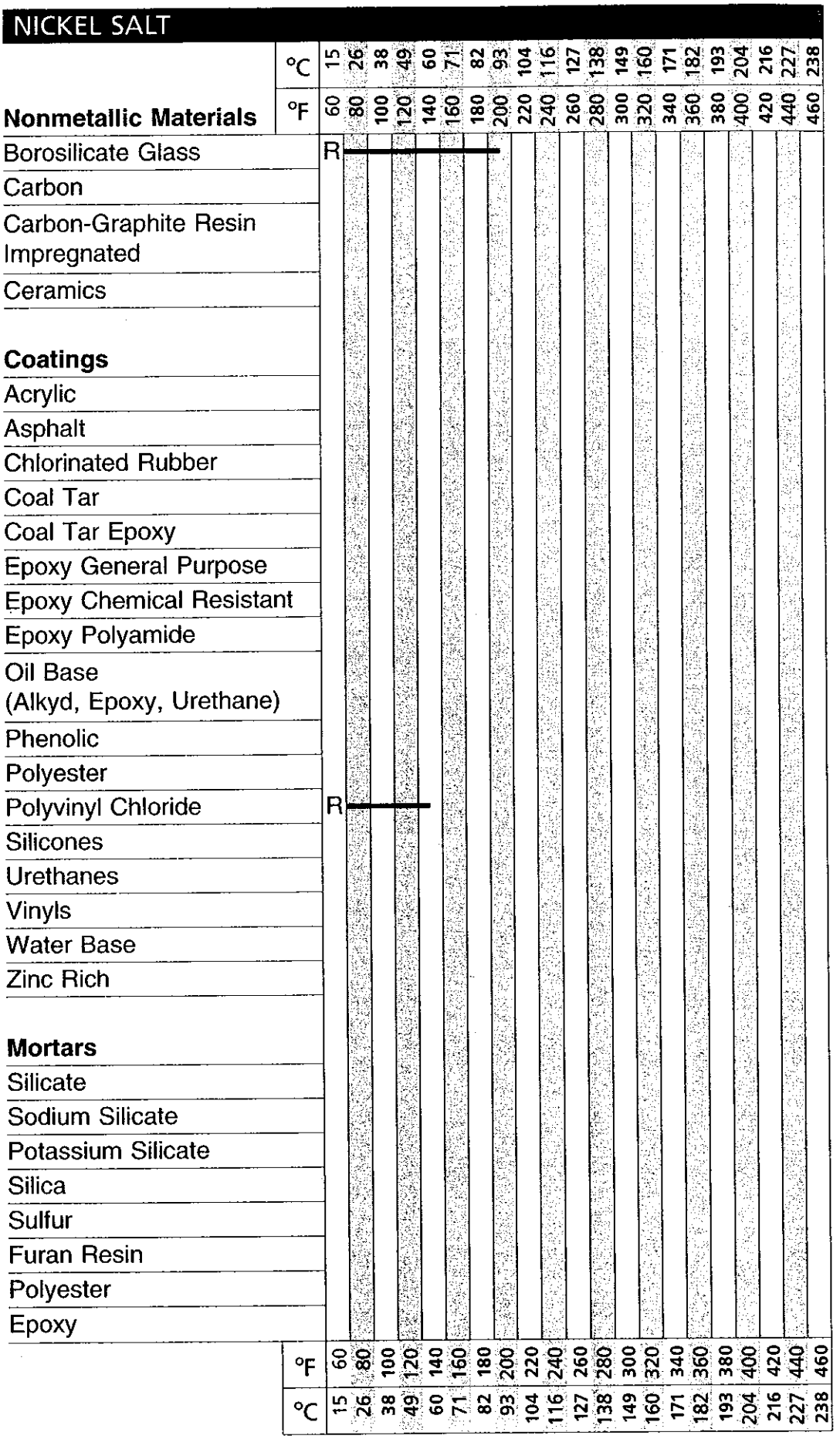
# NICKEL SALT



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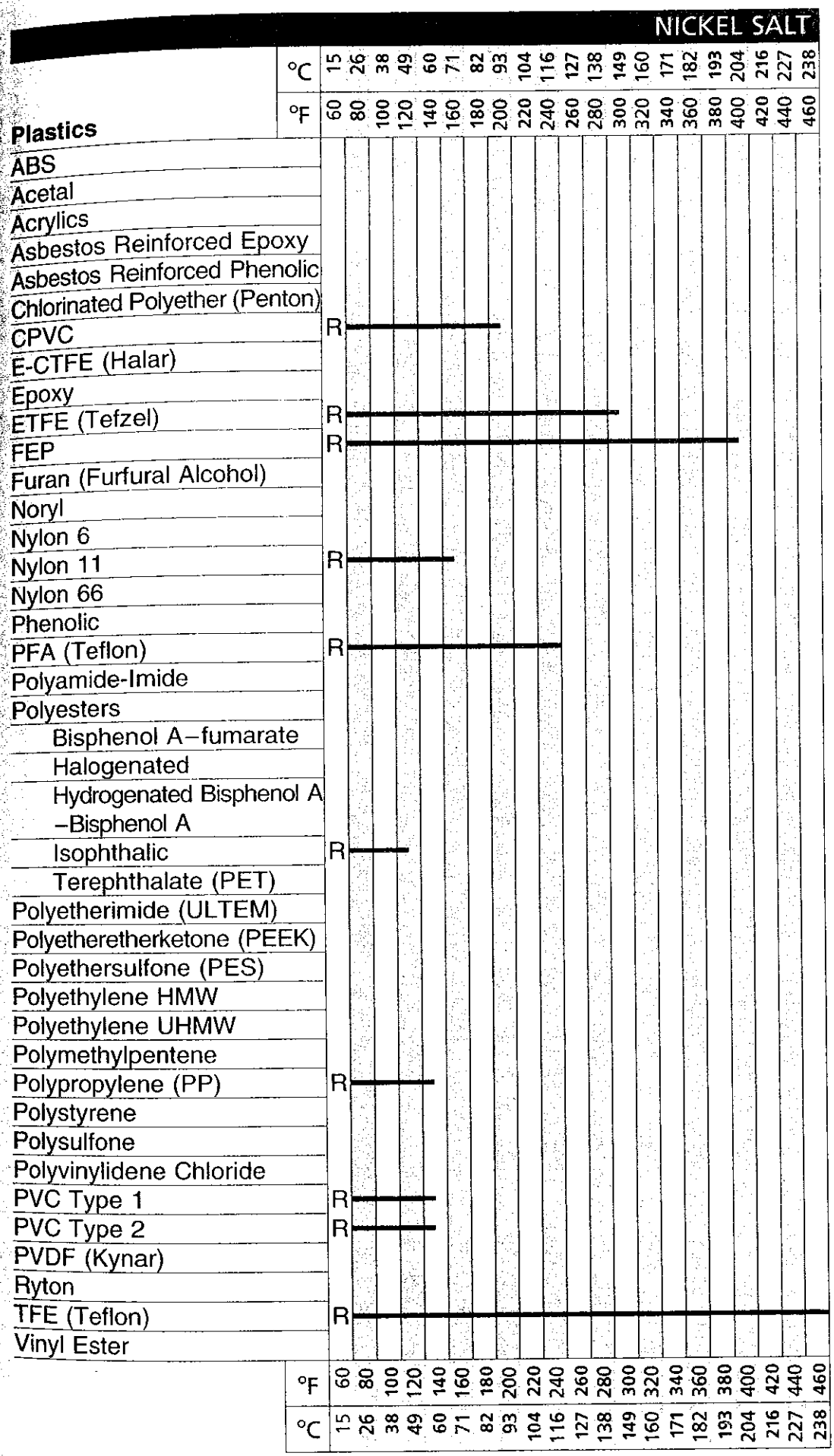


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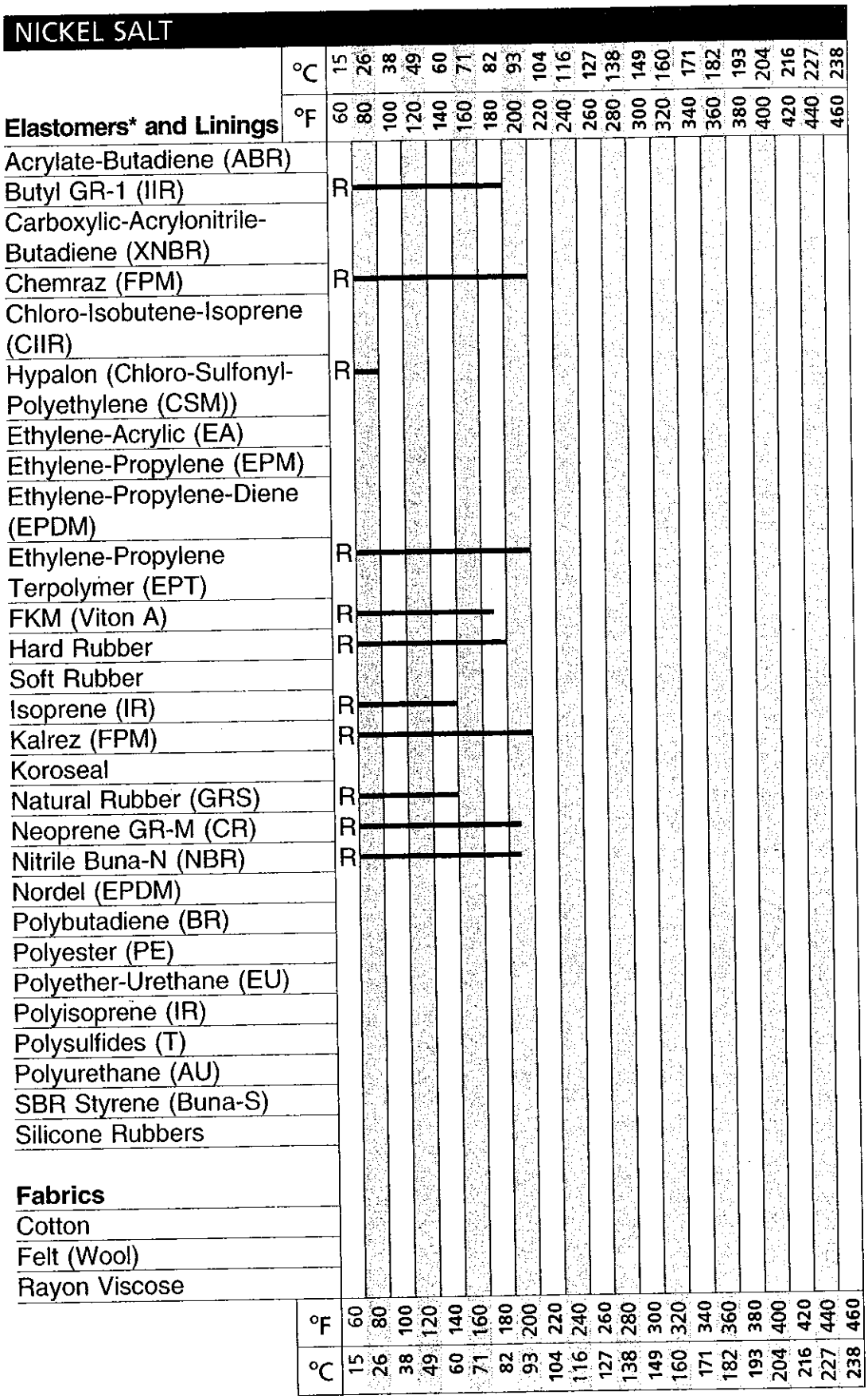


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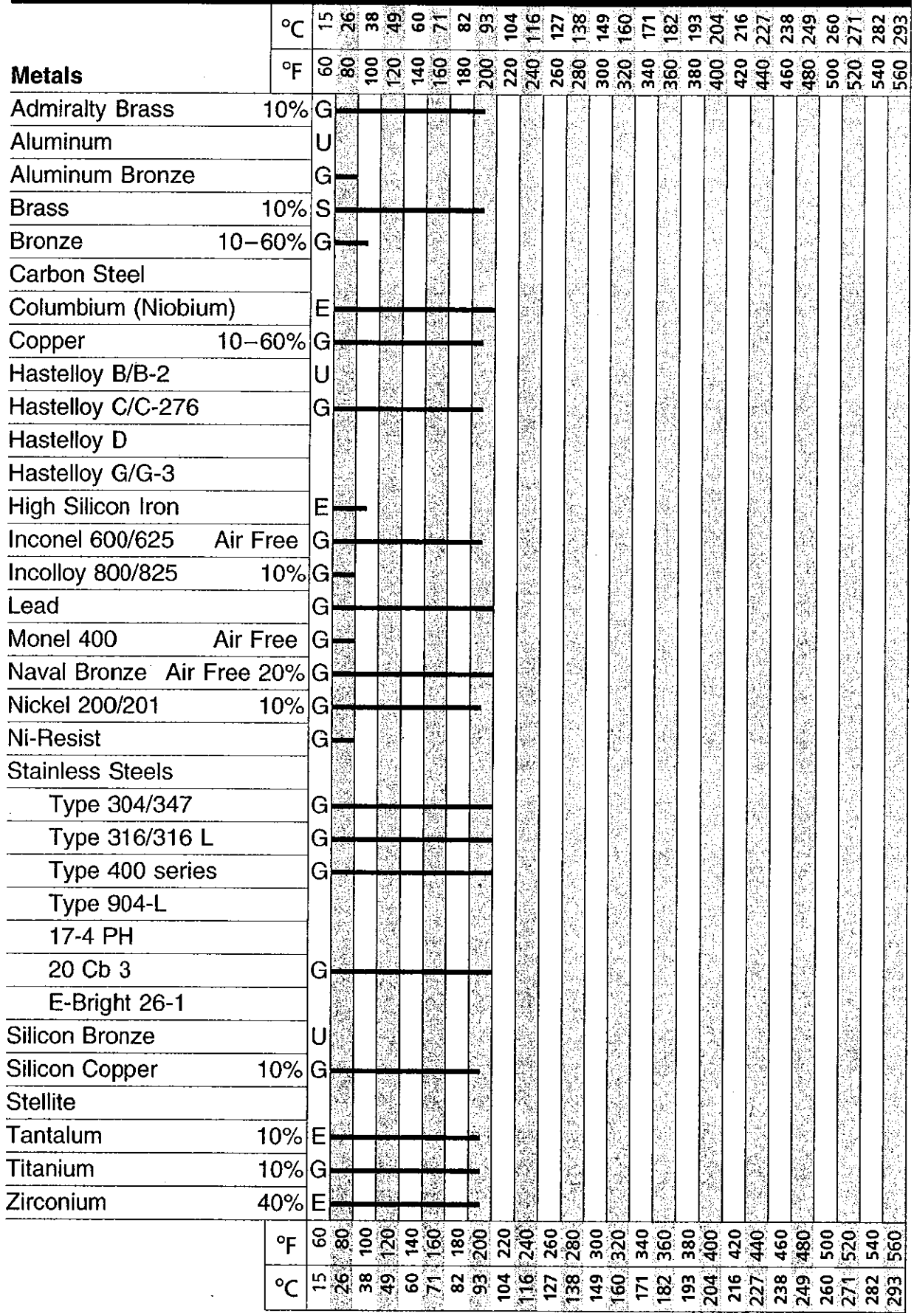


FOR METALS

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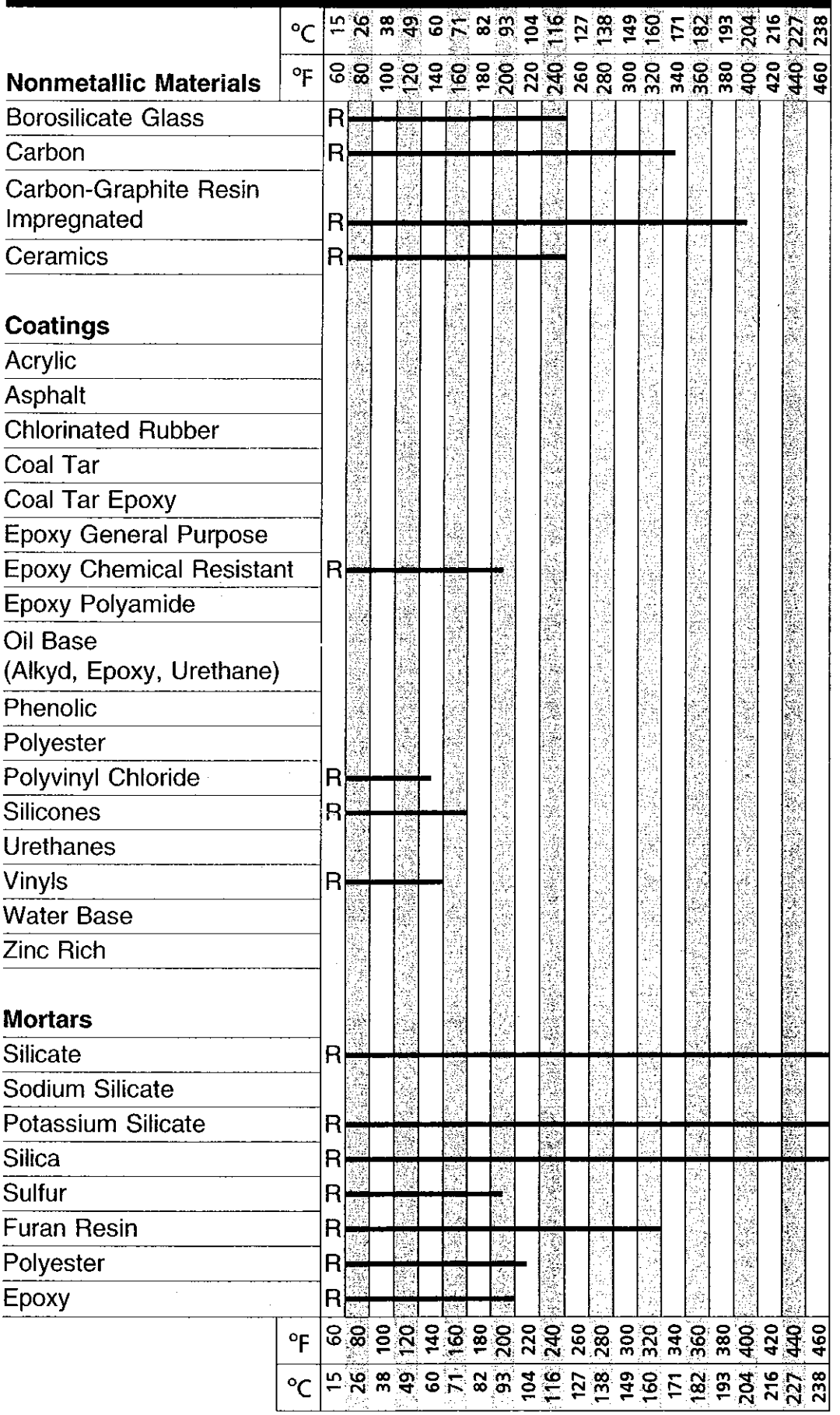
## NICKEL SULFATE







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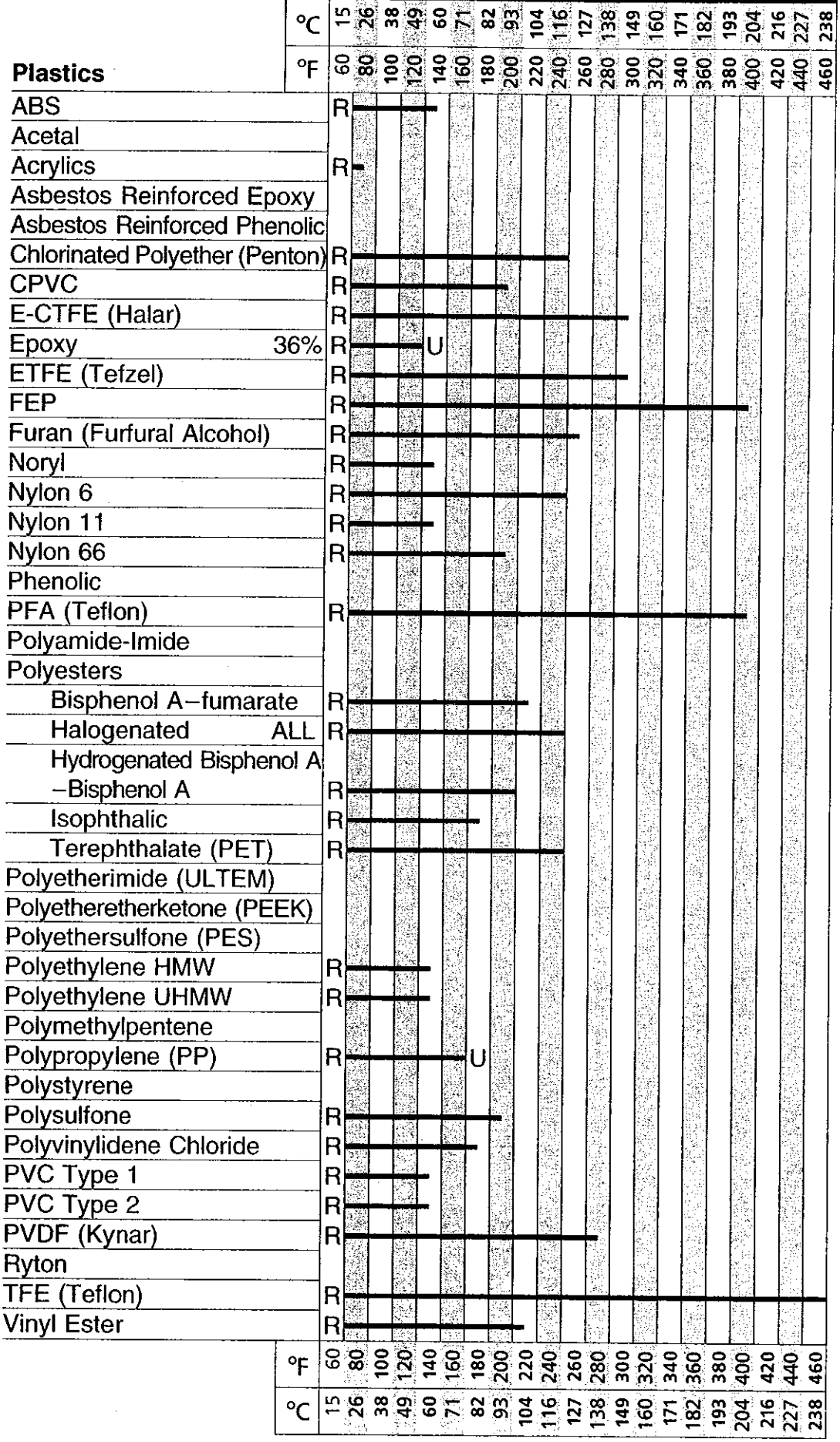



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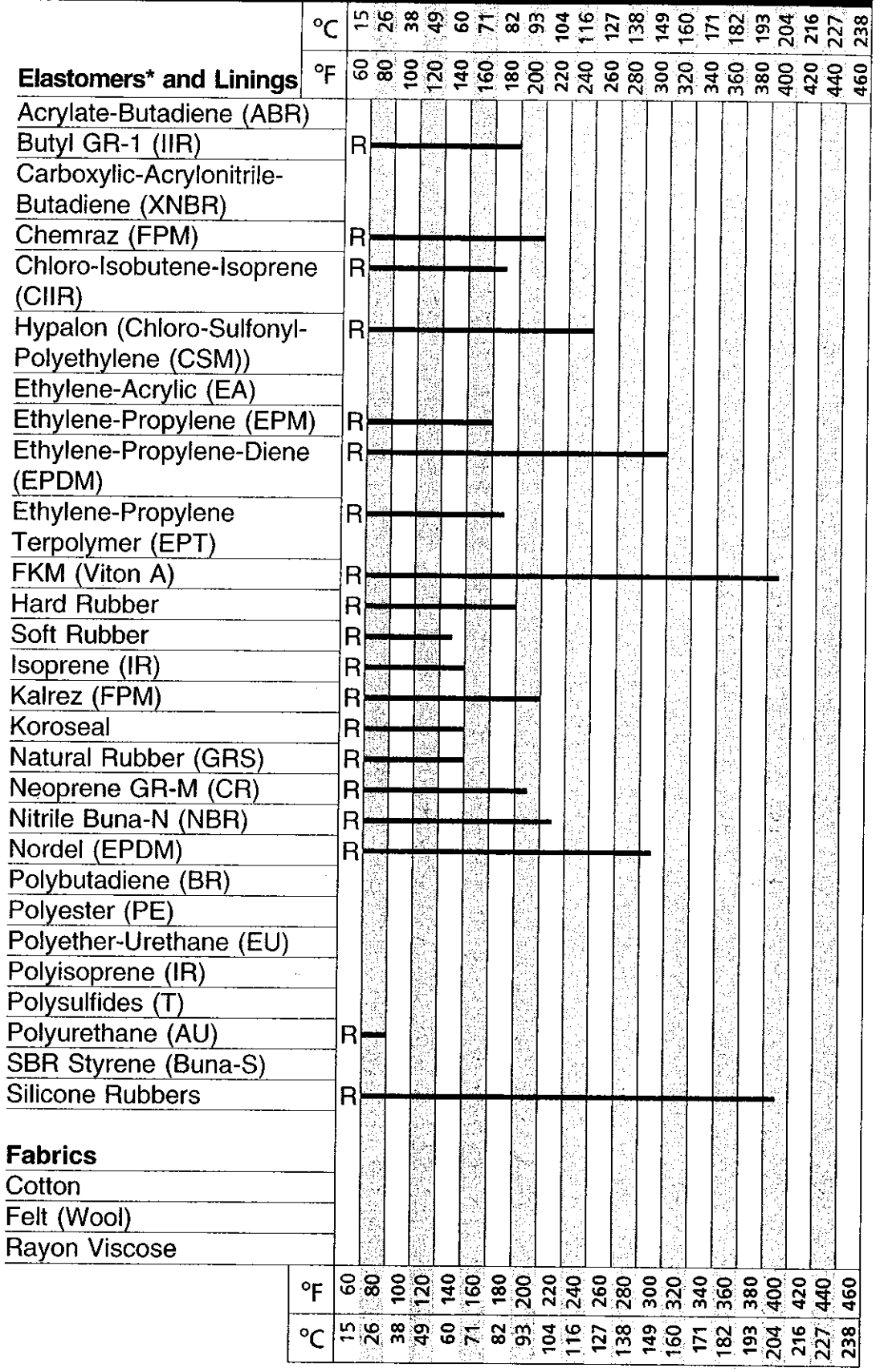
## NICKEL SULFATE

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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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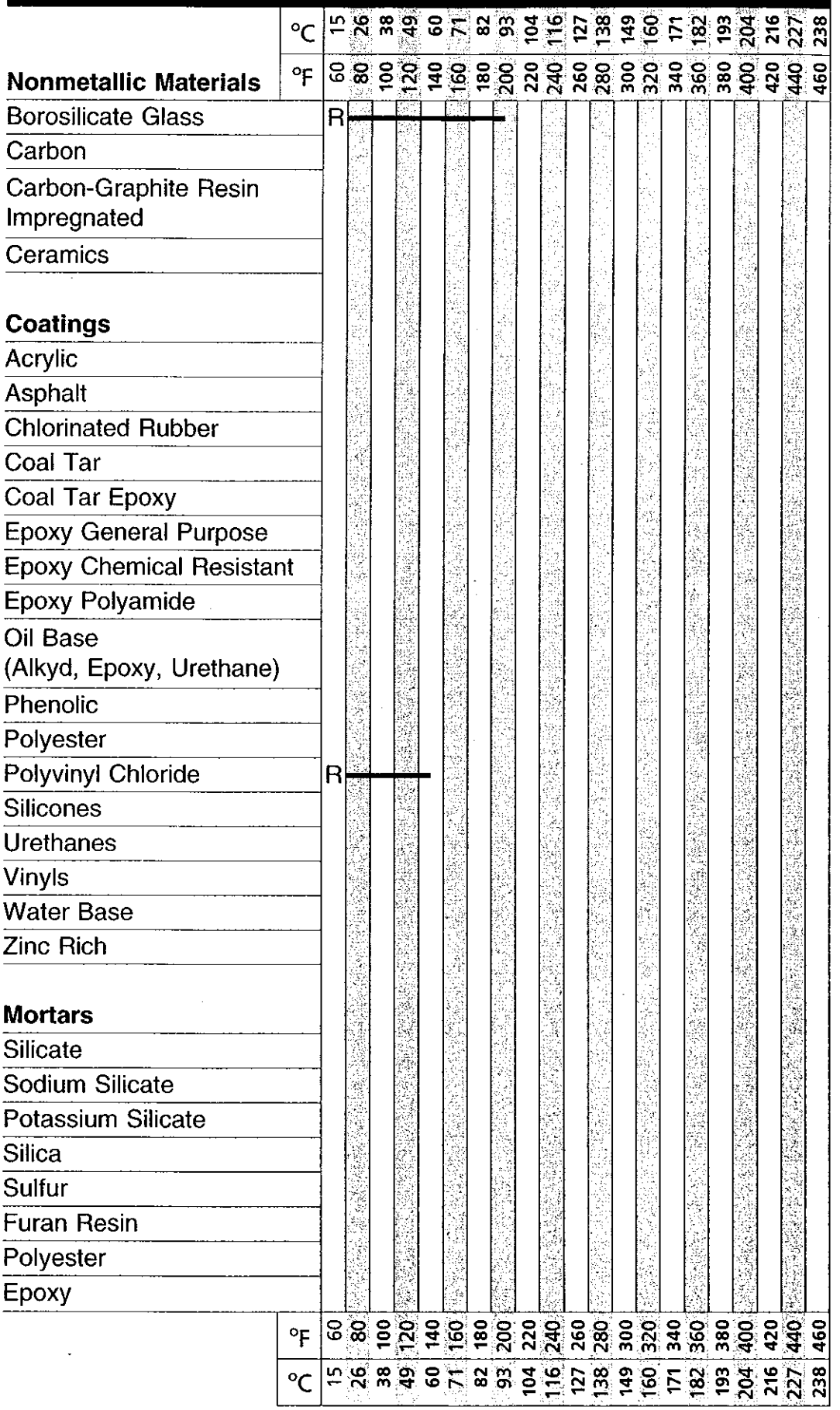




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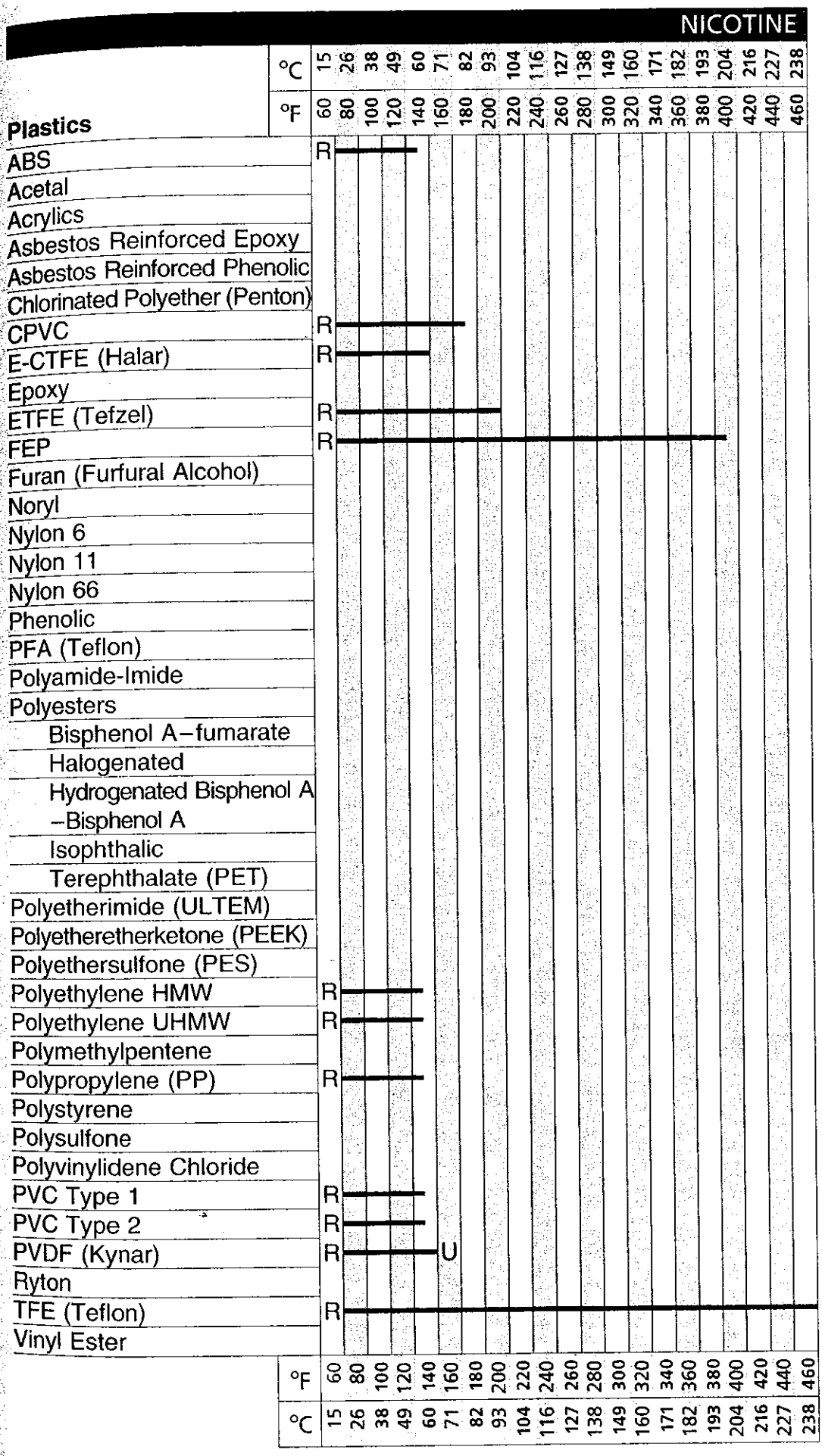


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## NICOTINE

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | R | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | U | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS





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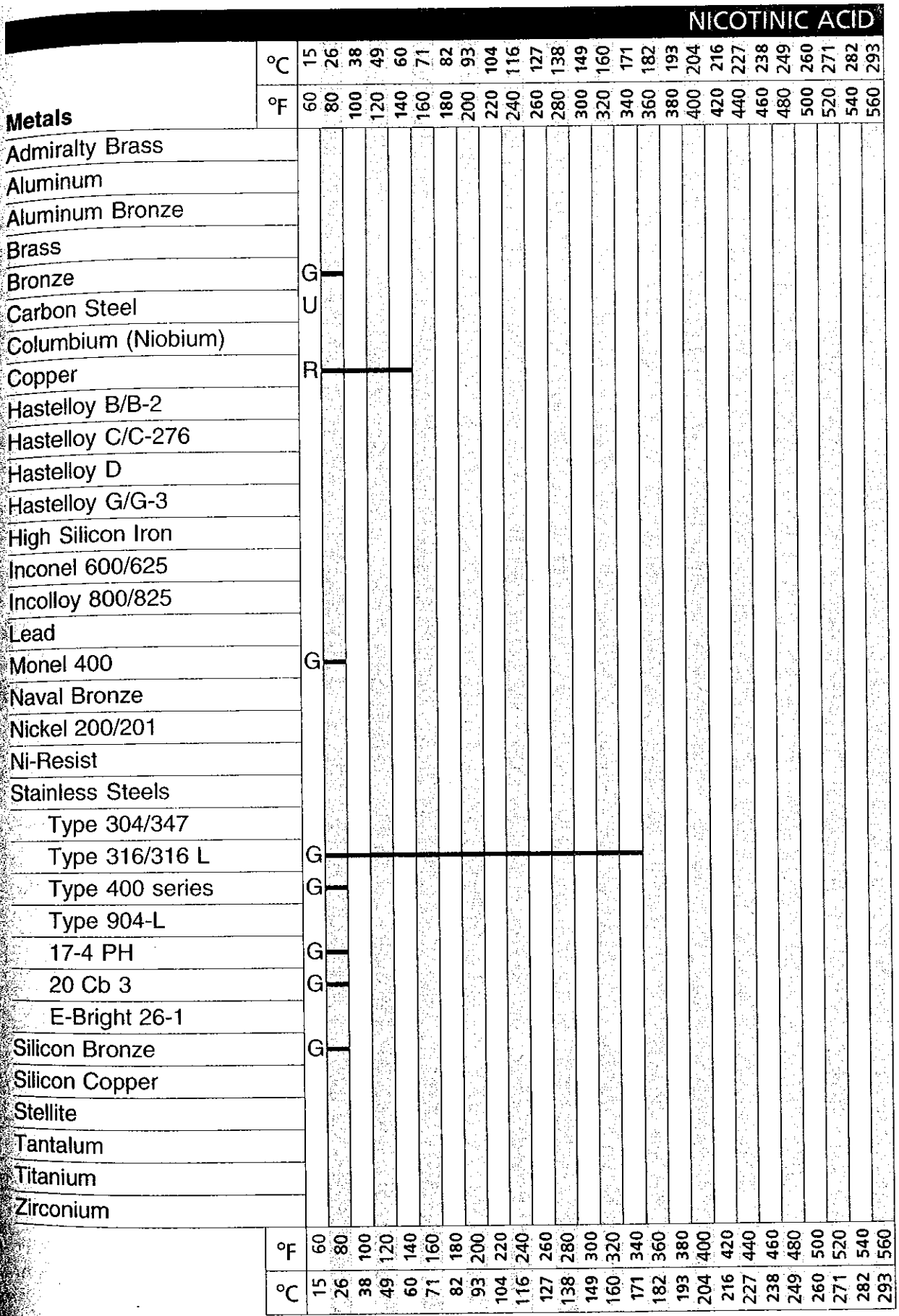


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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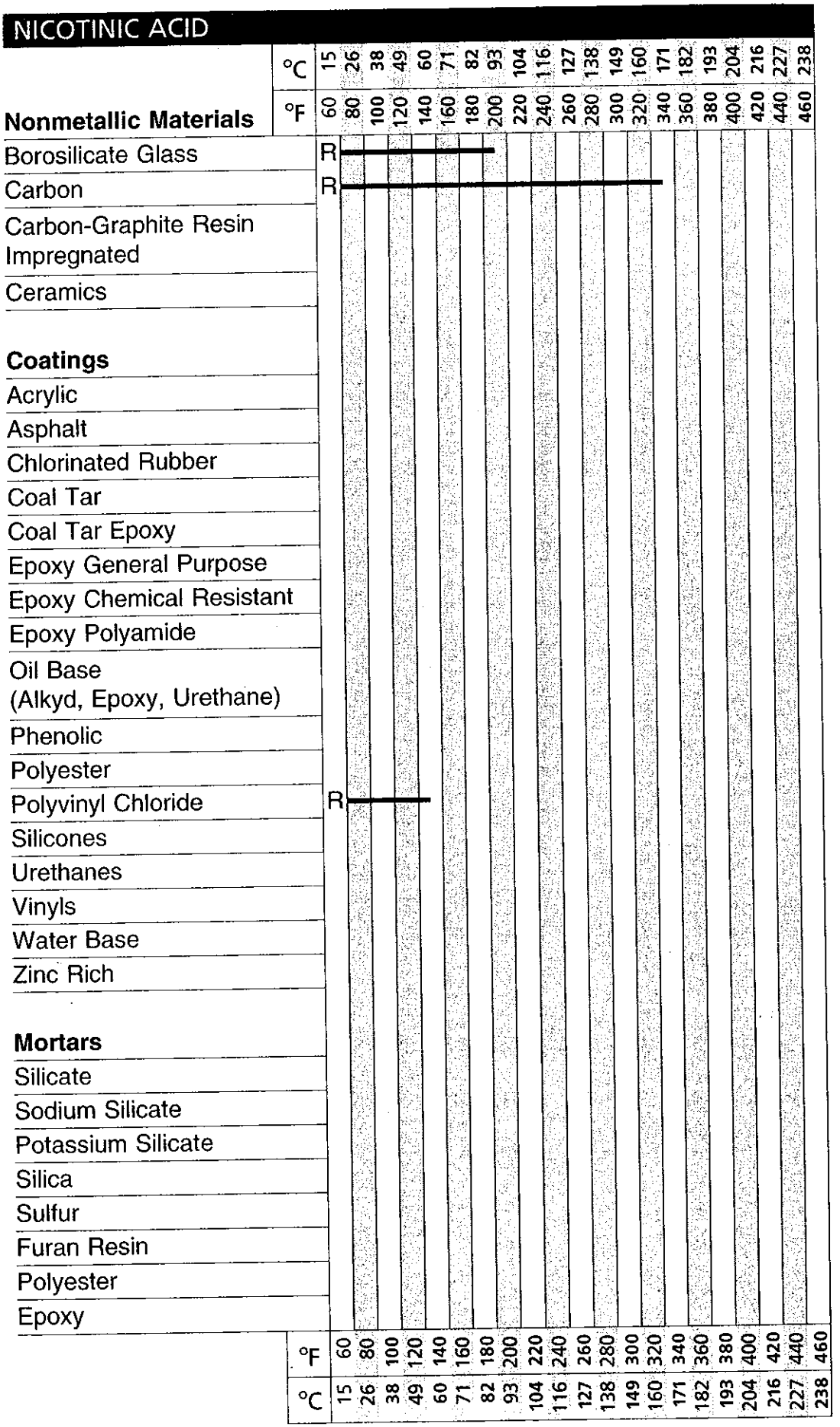




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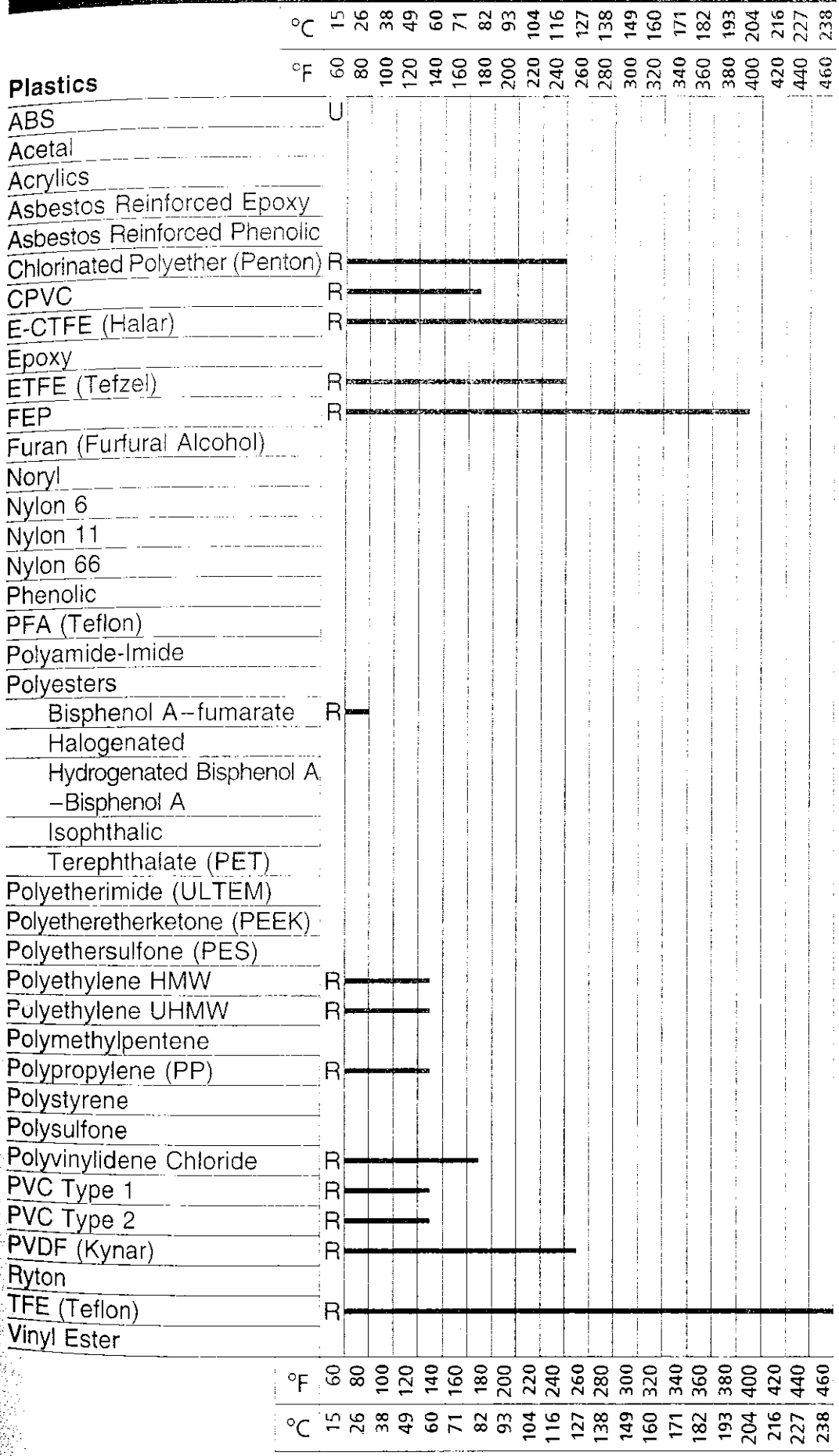


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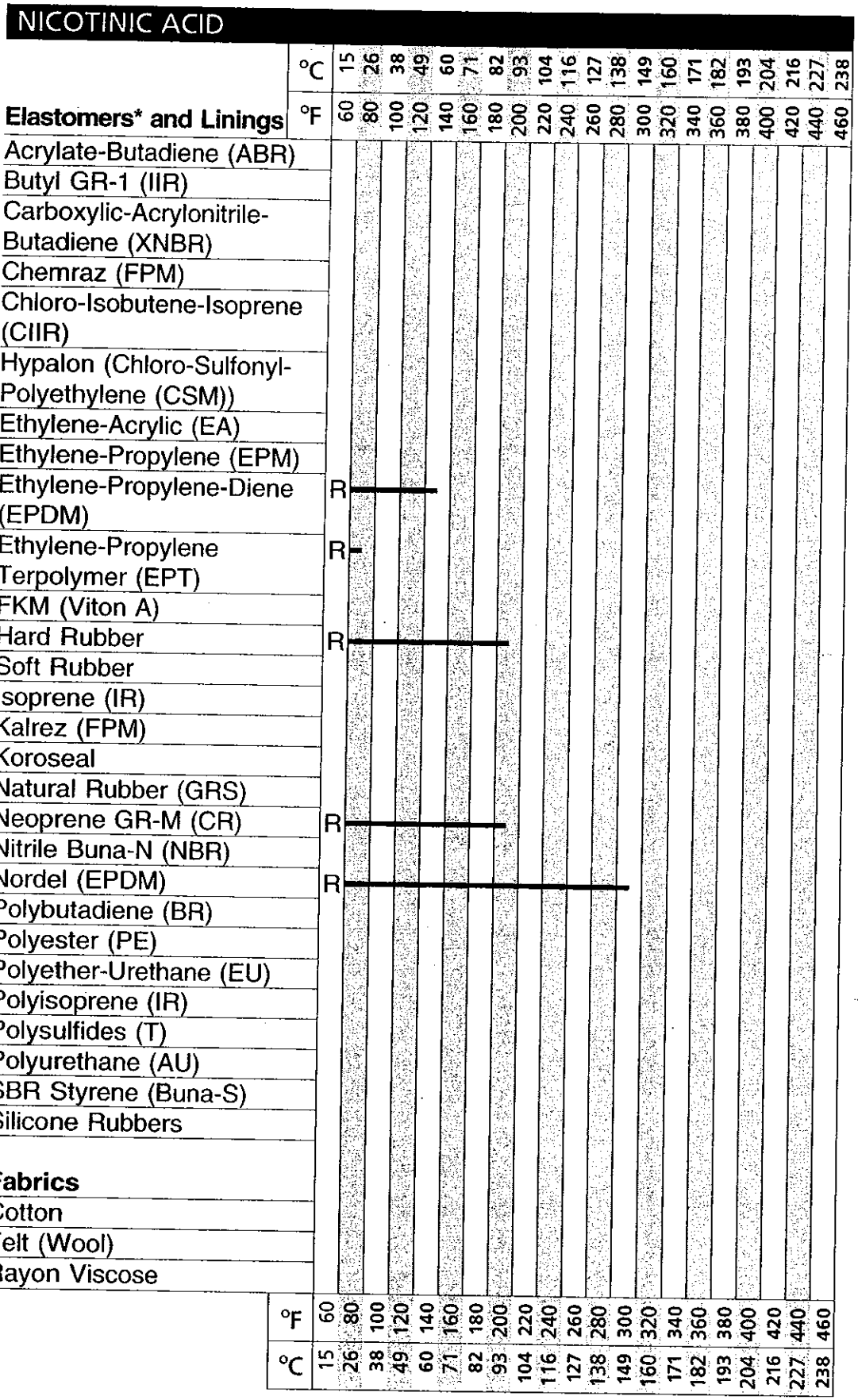


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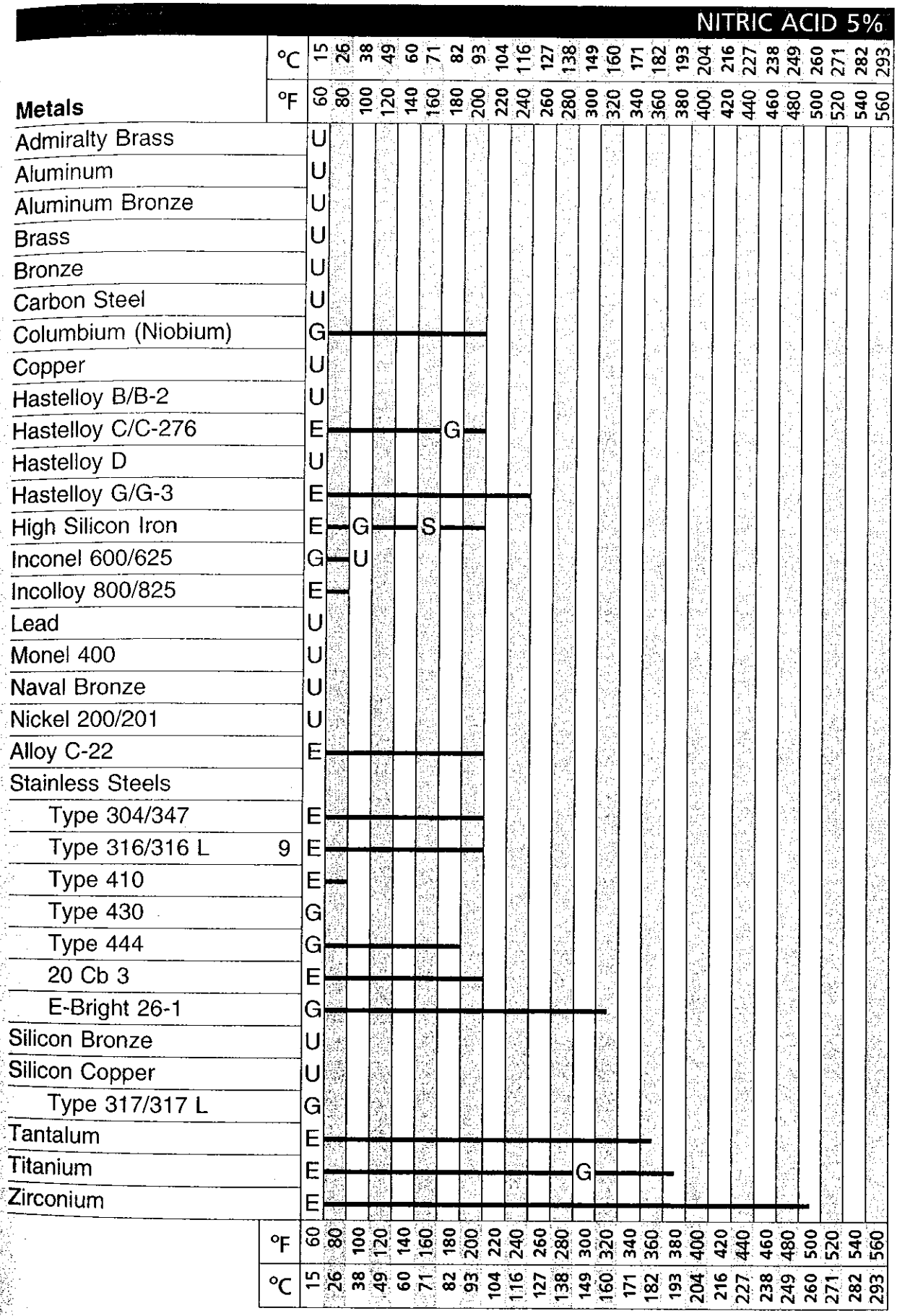


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FOR NONMETALLICS

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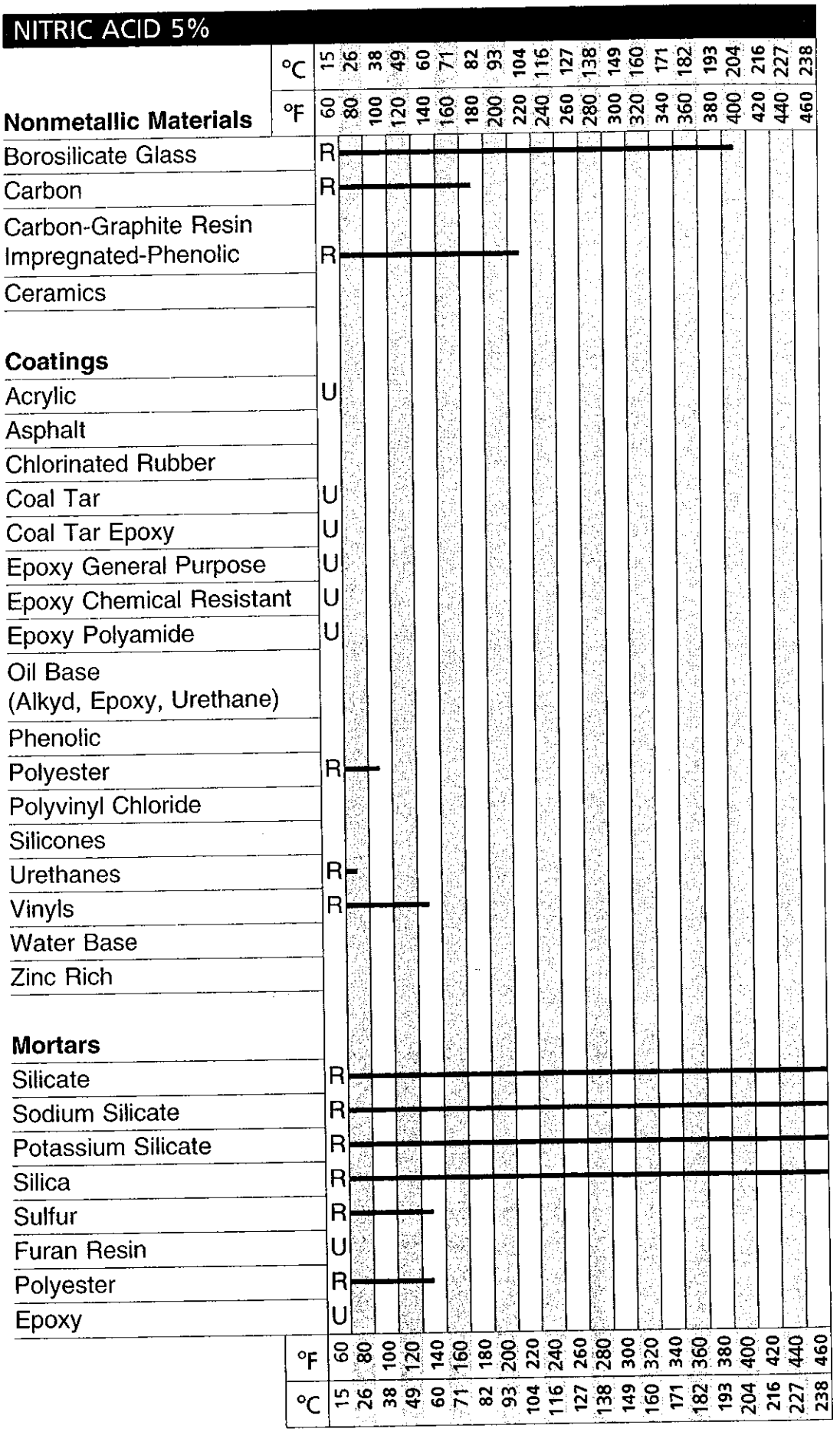






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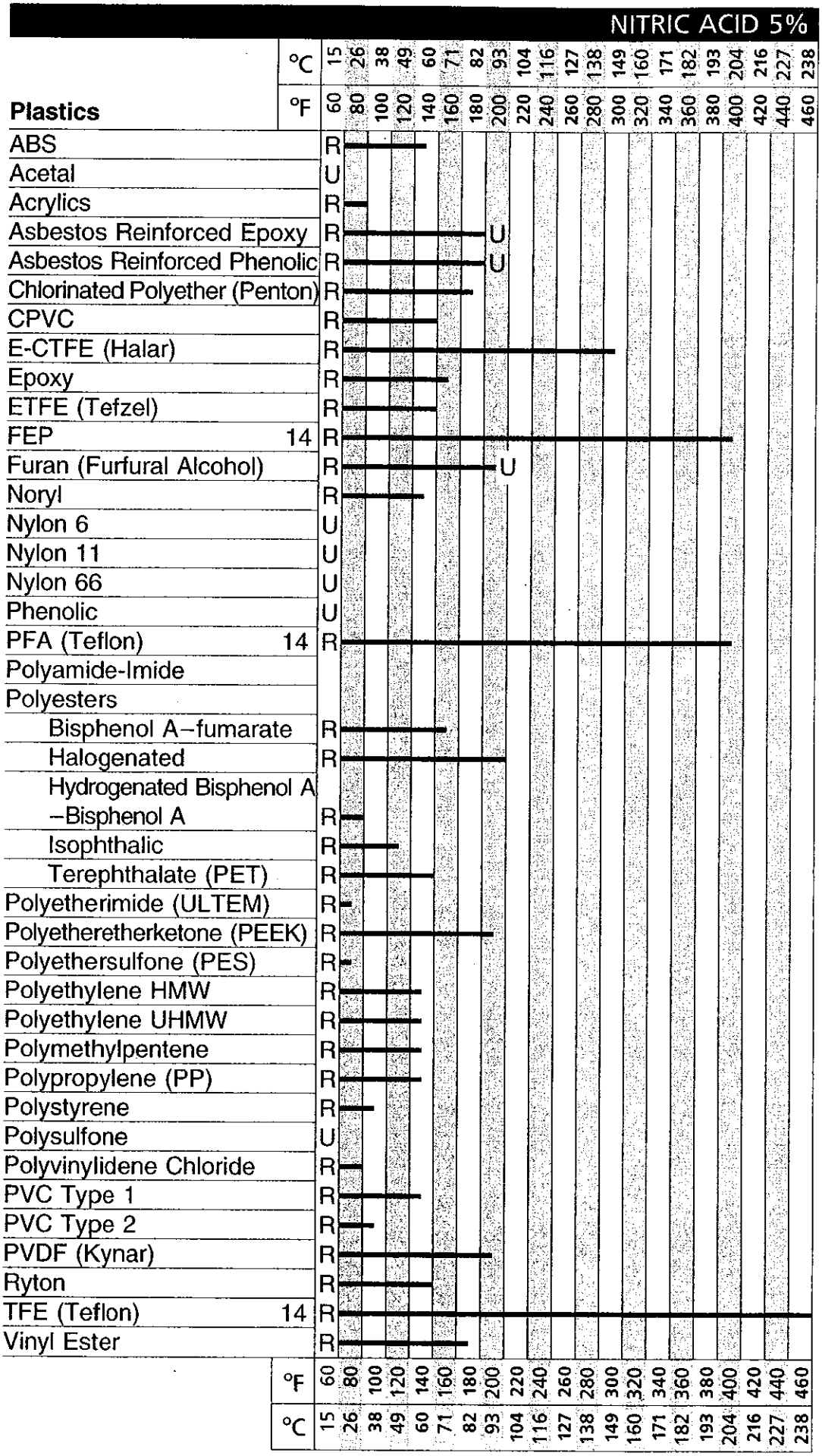



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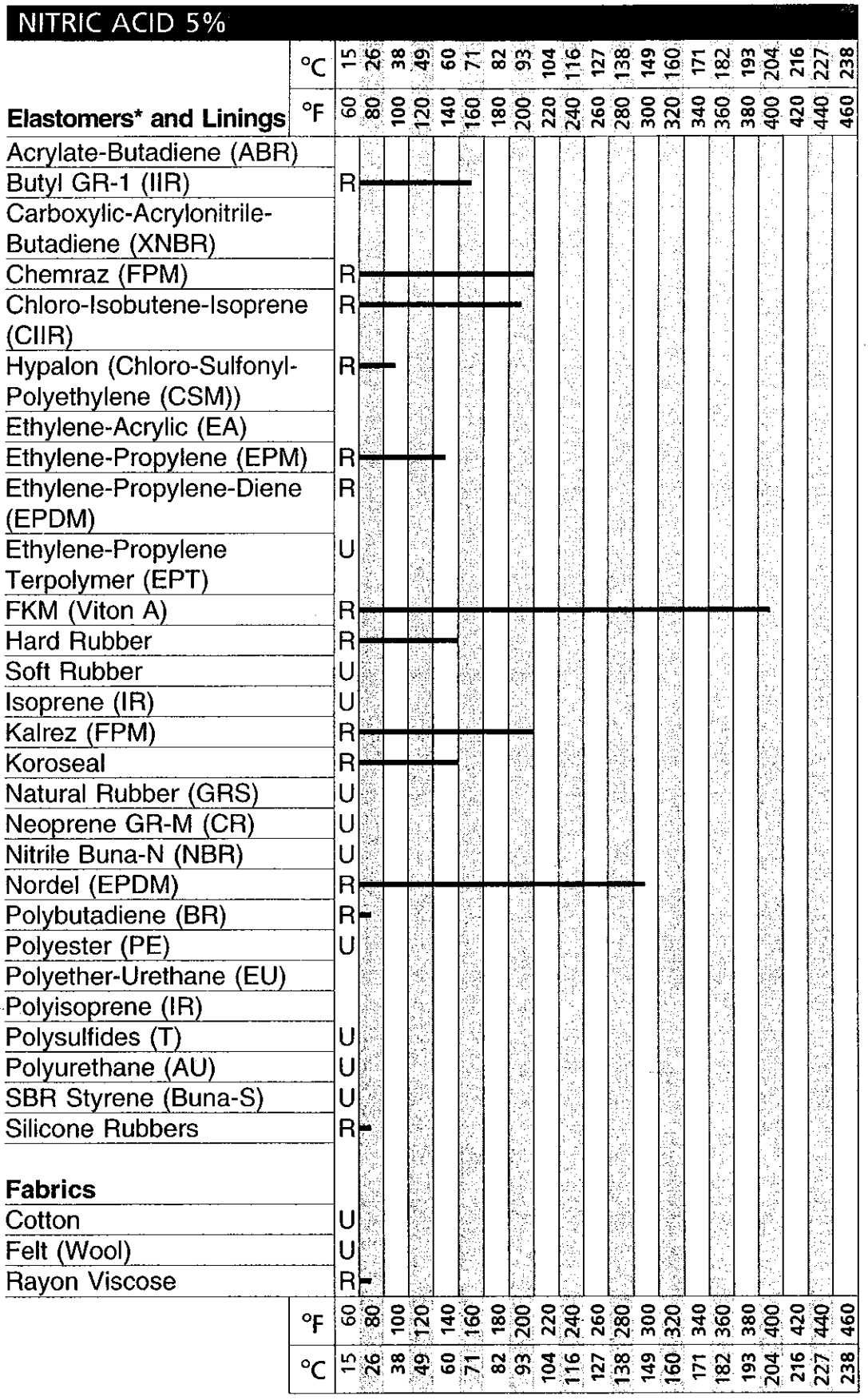


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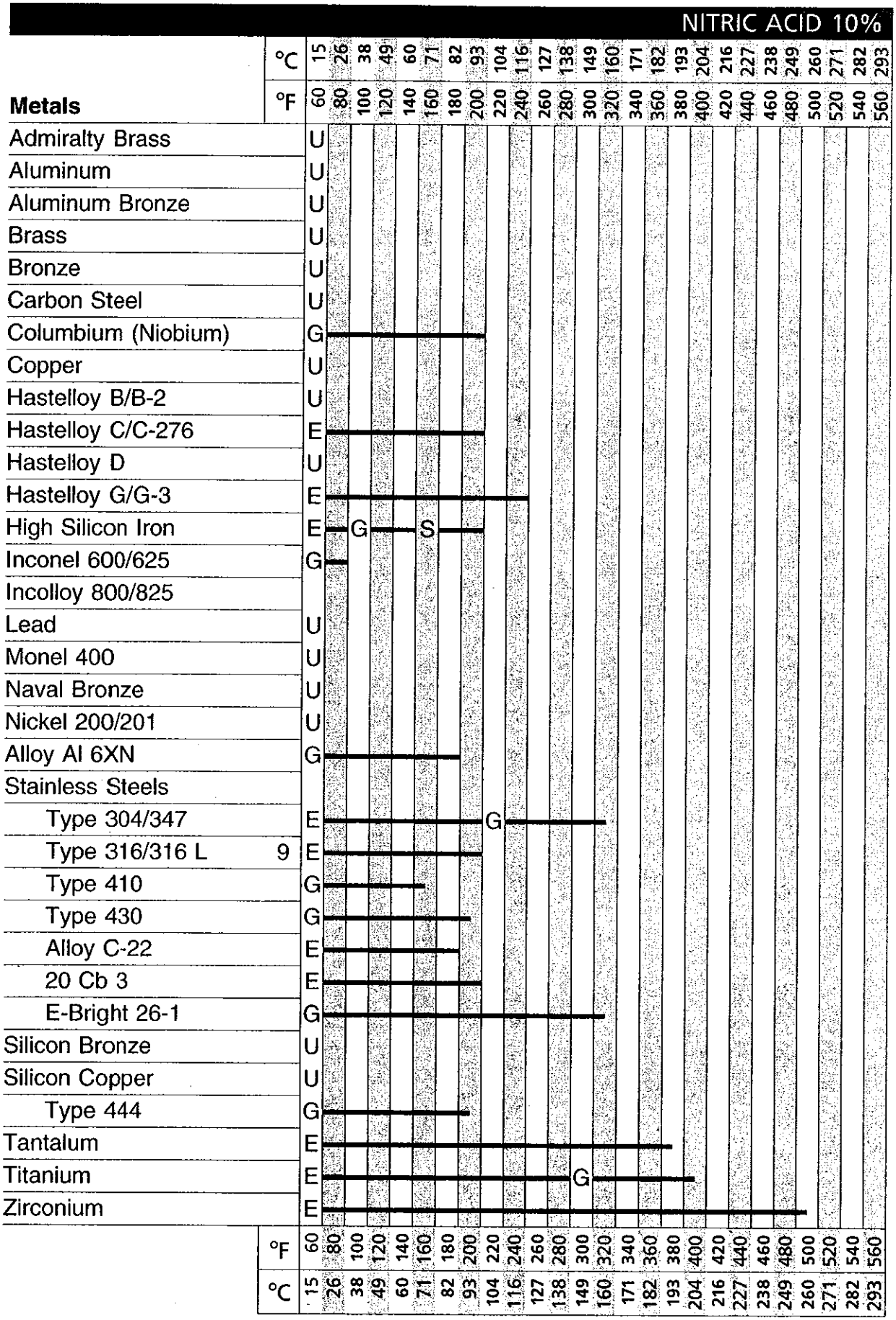


FOR METALS

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FOR NONMETALLICS

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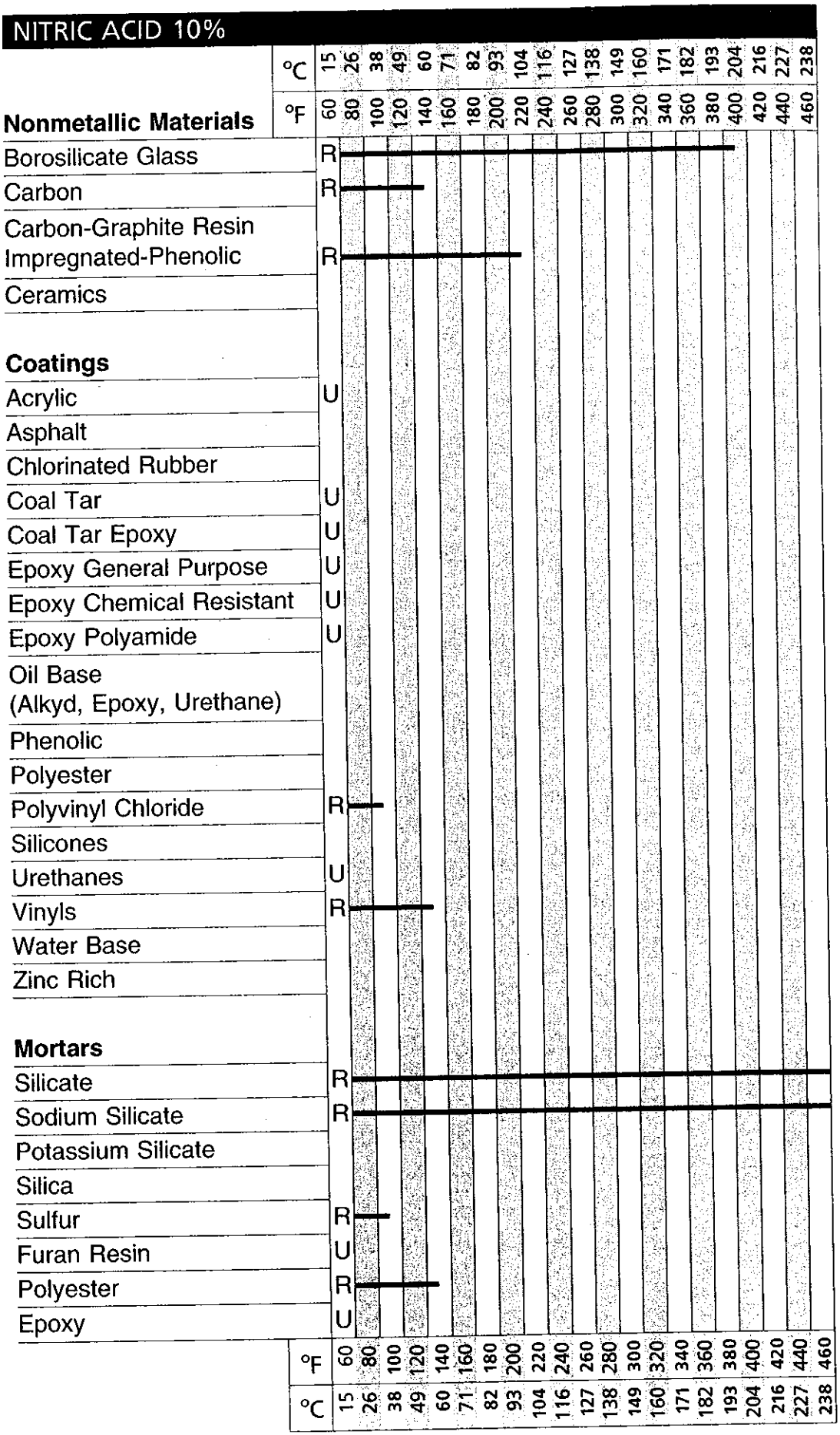






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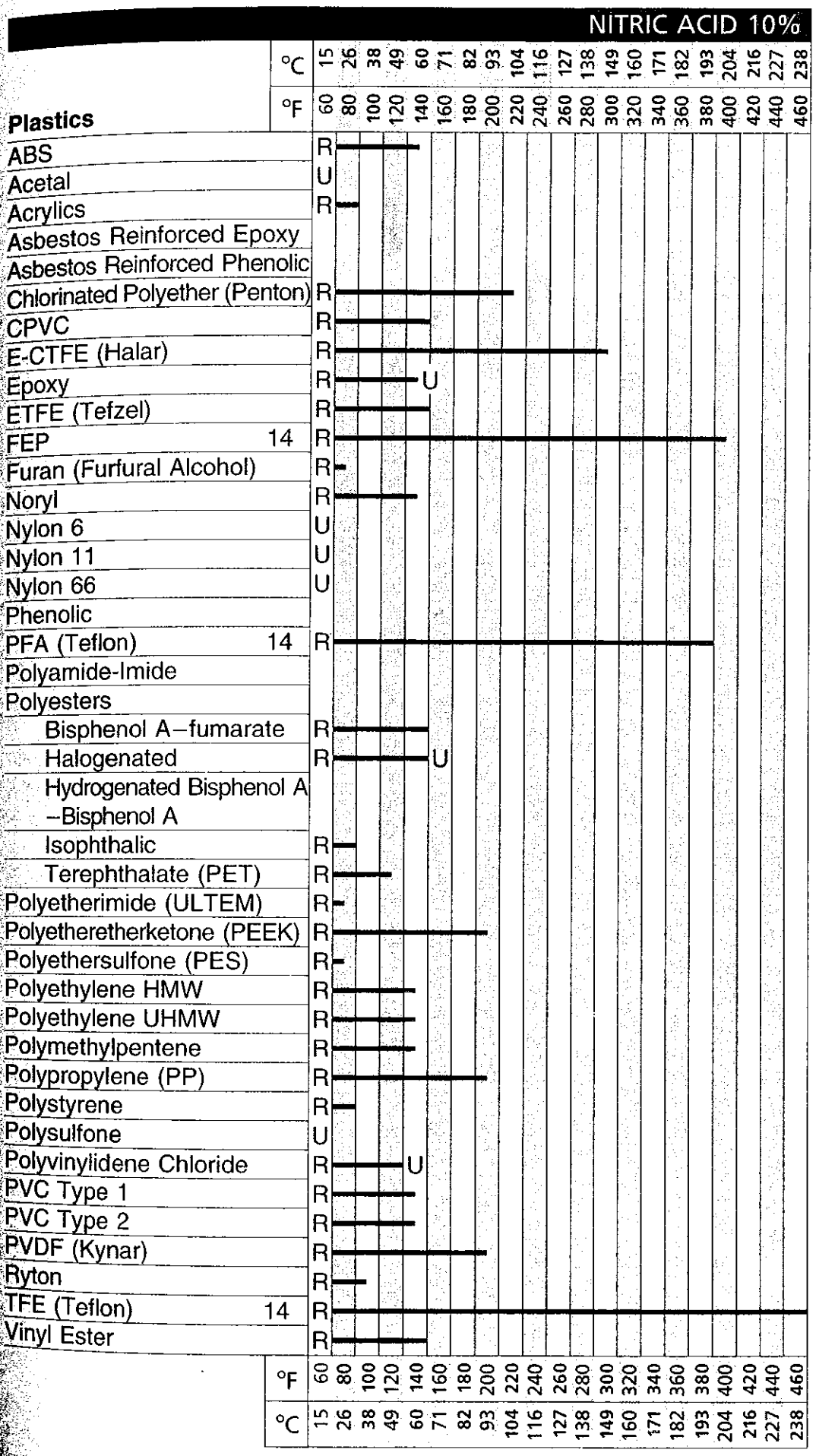


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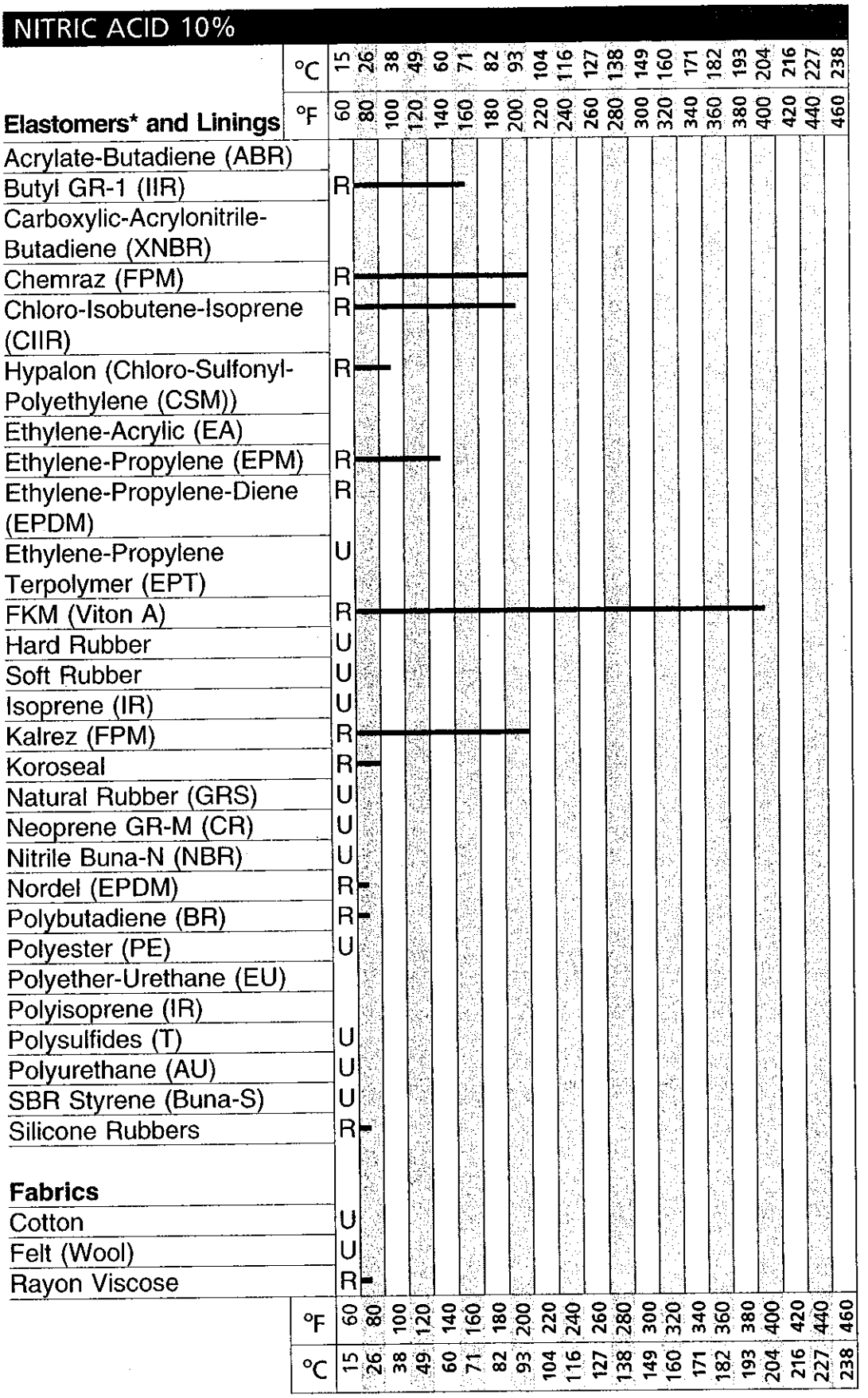


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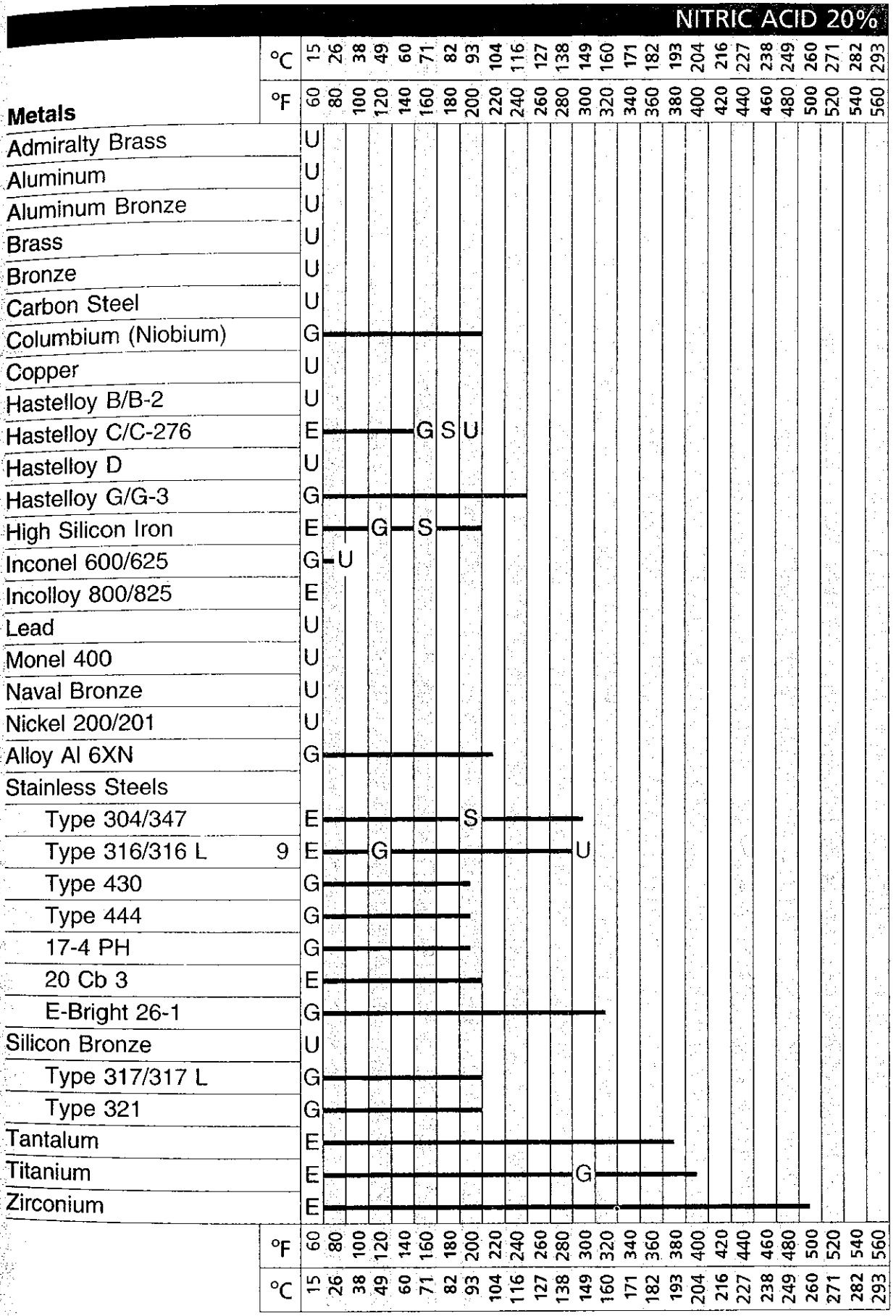


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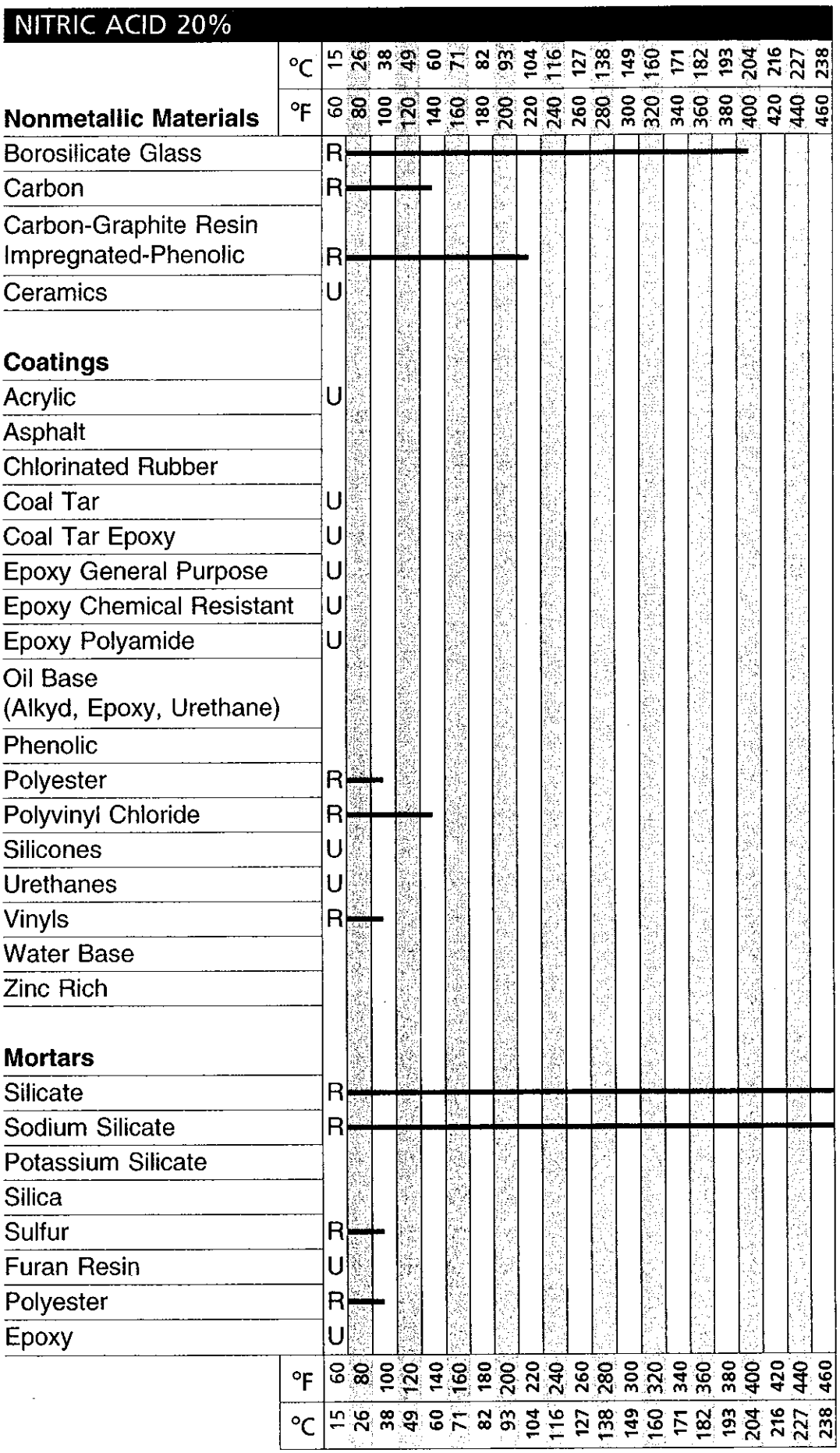




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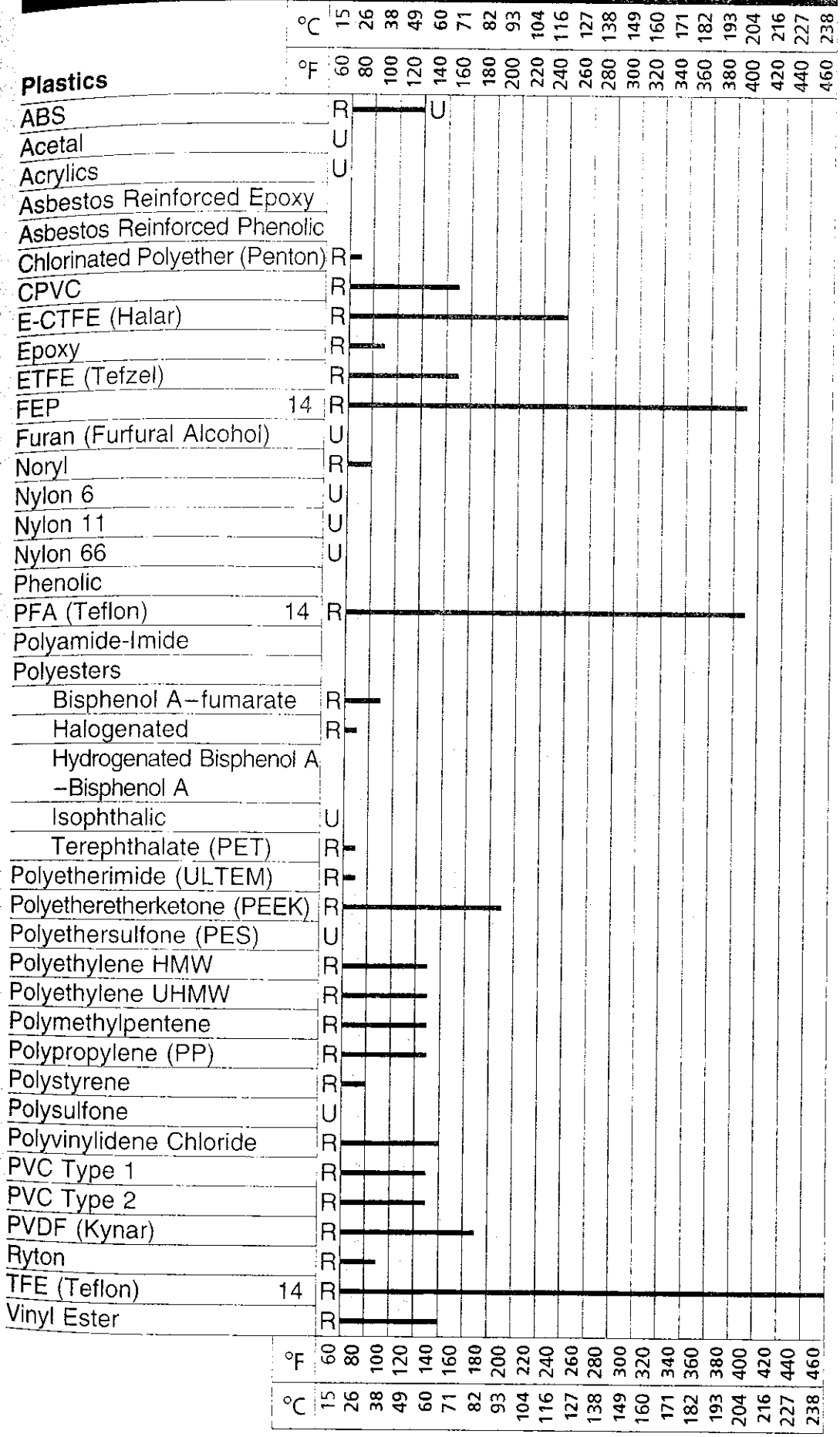


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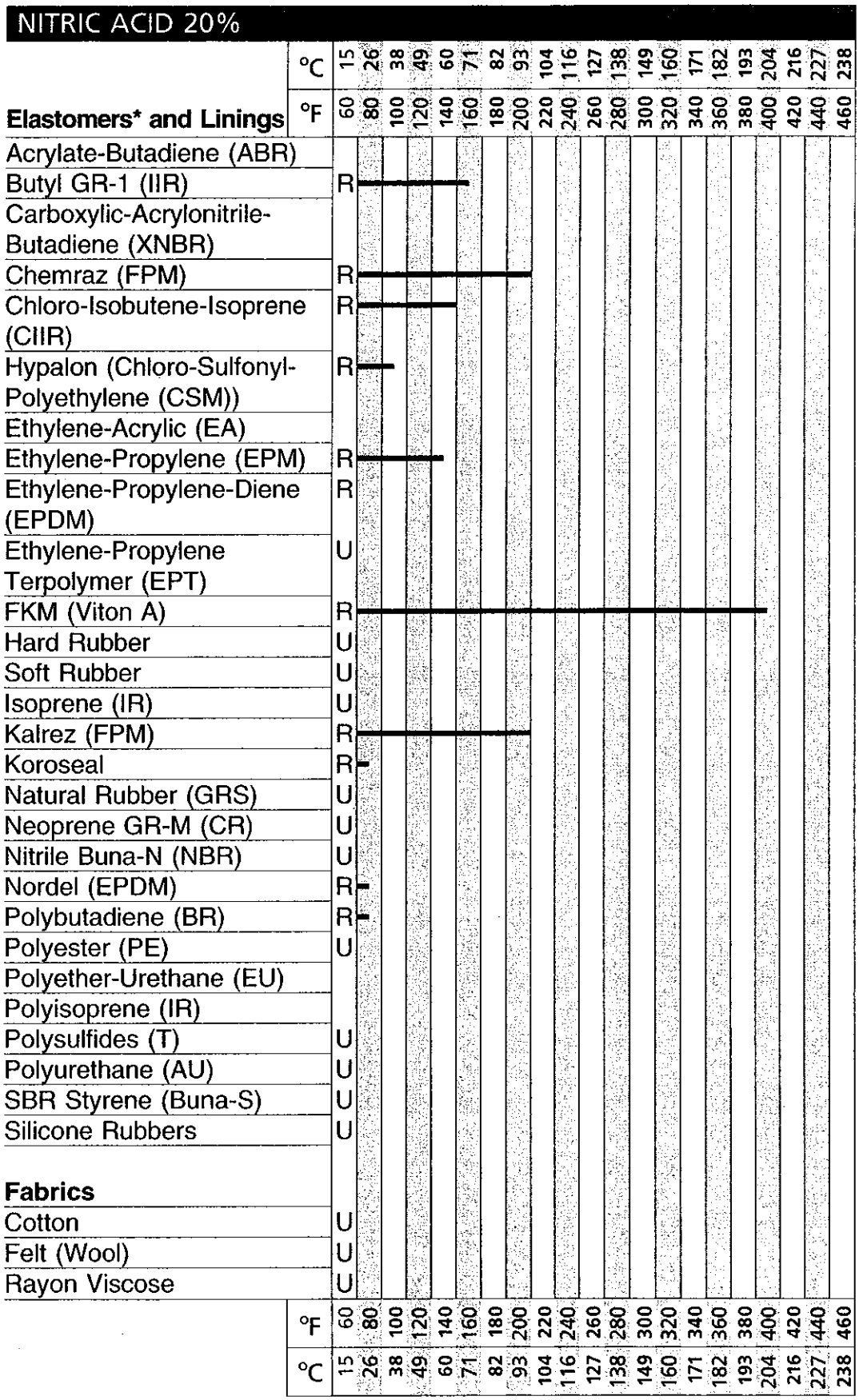


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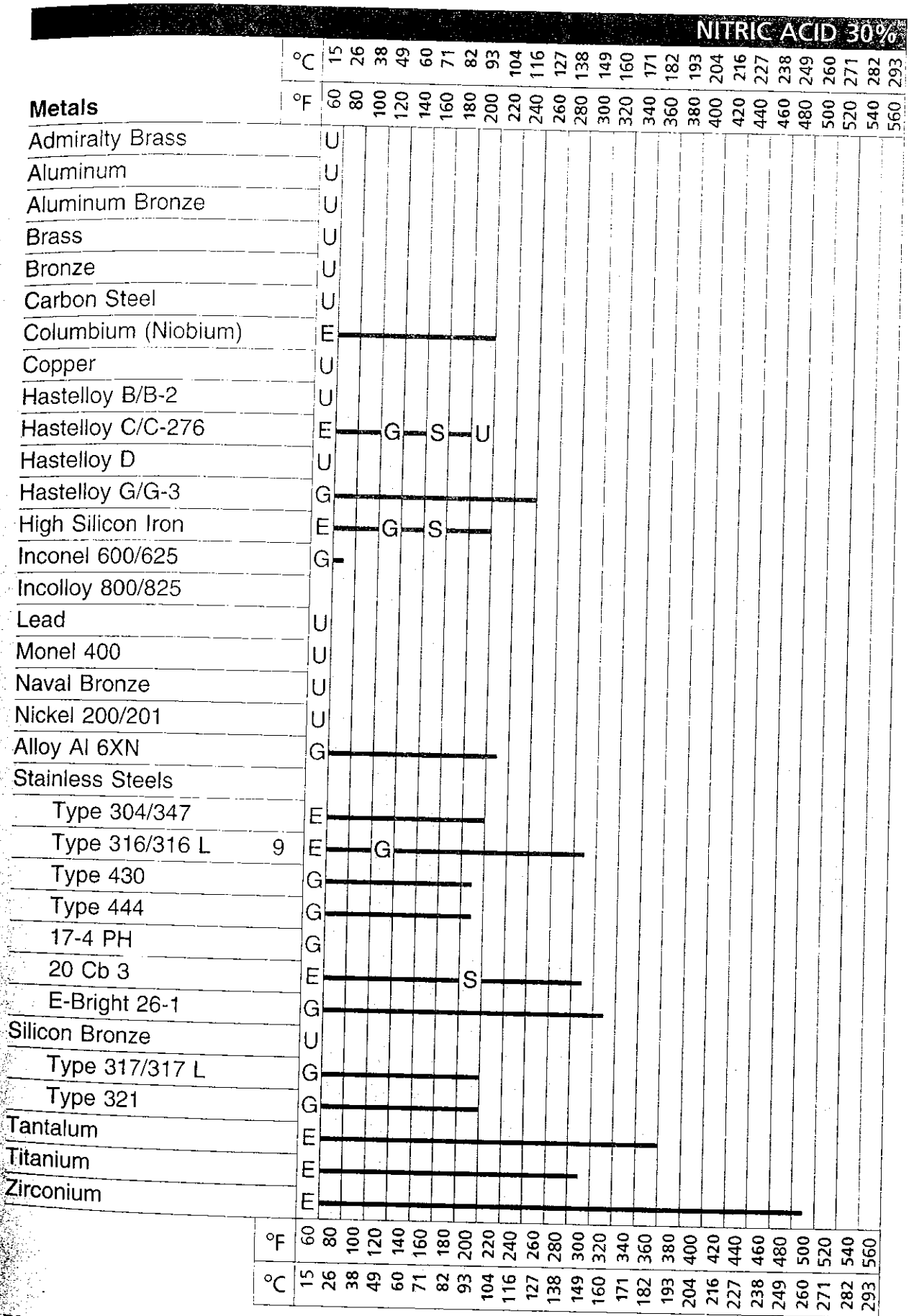


FOR METALS

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FOR NONMETALLICS

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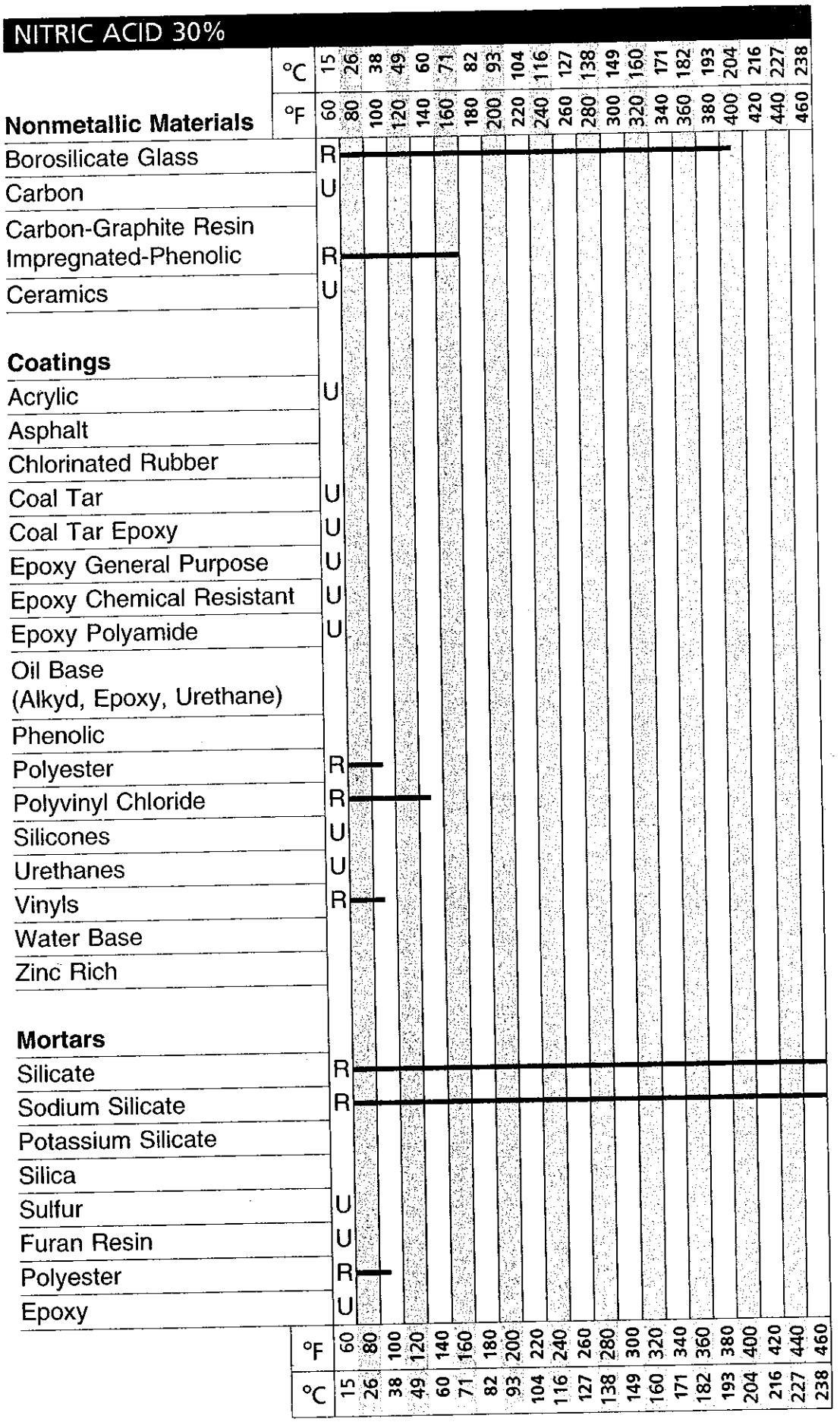




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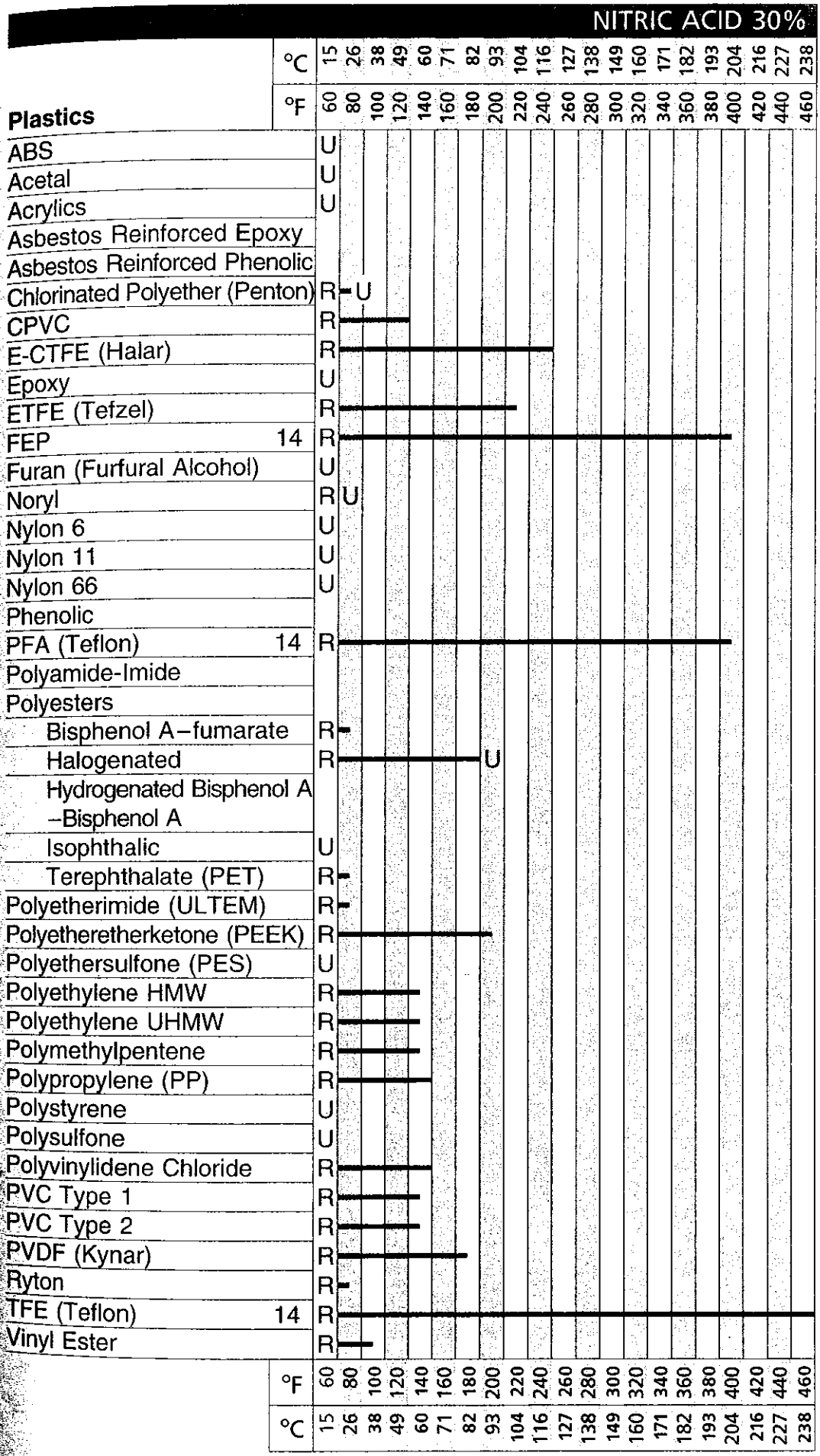


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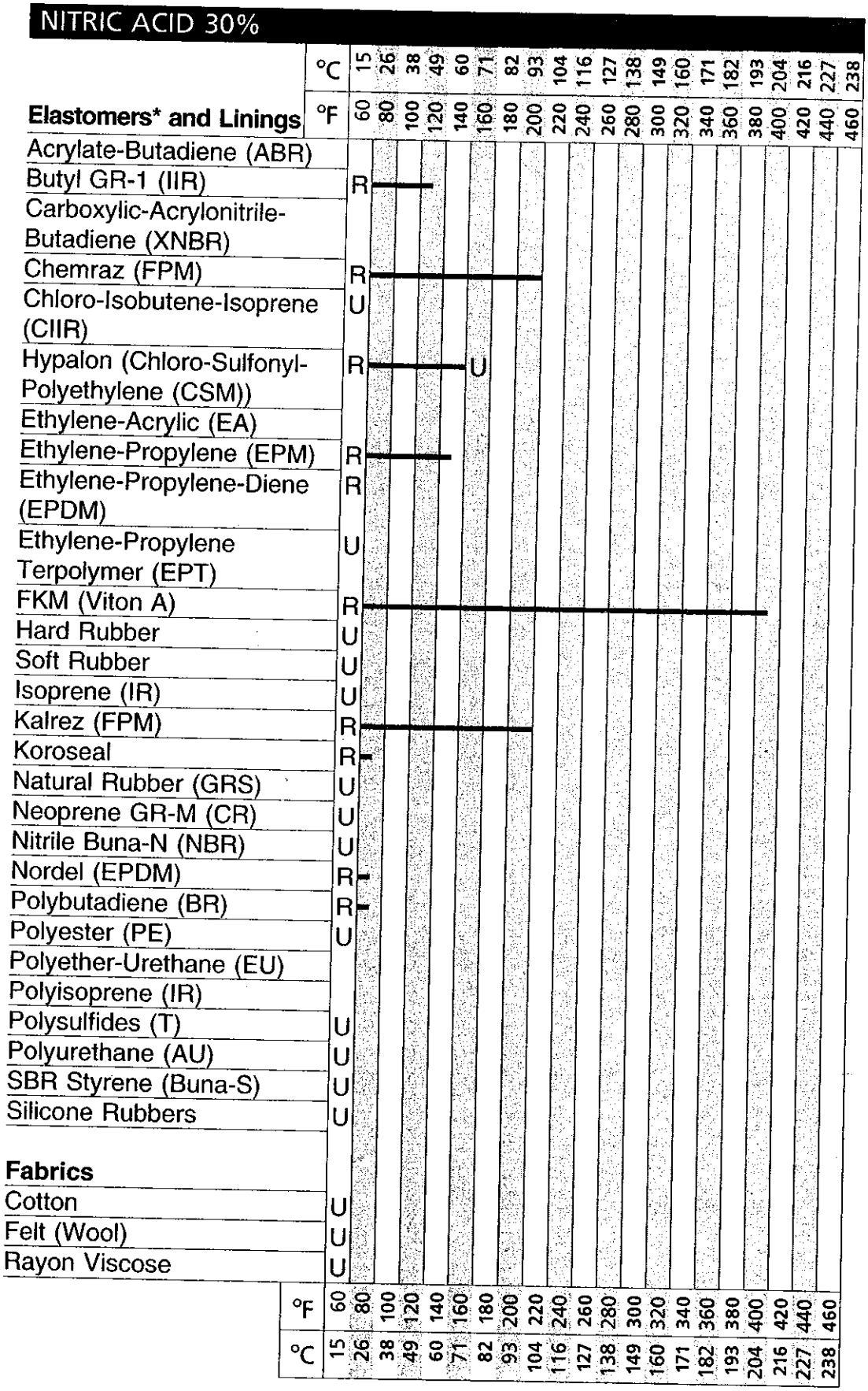


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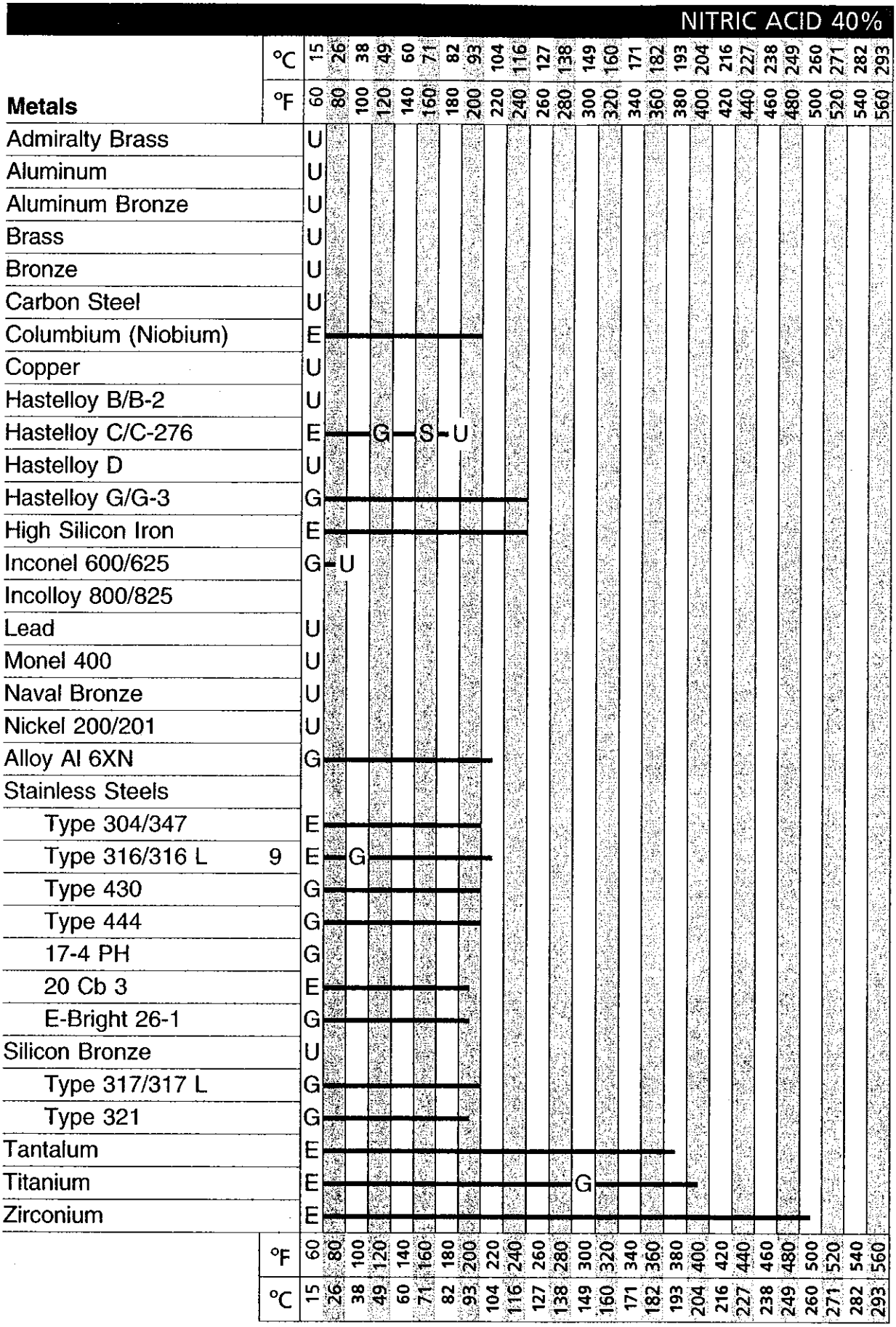


FOR METALS

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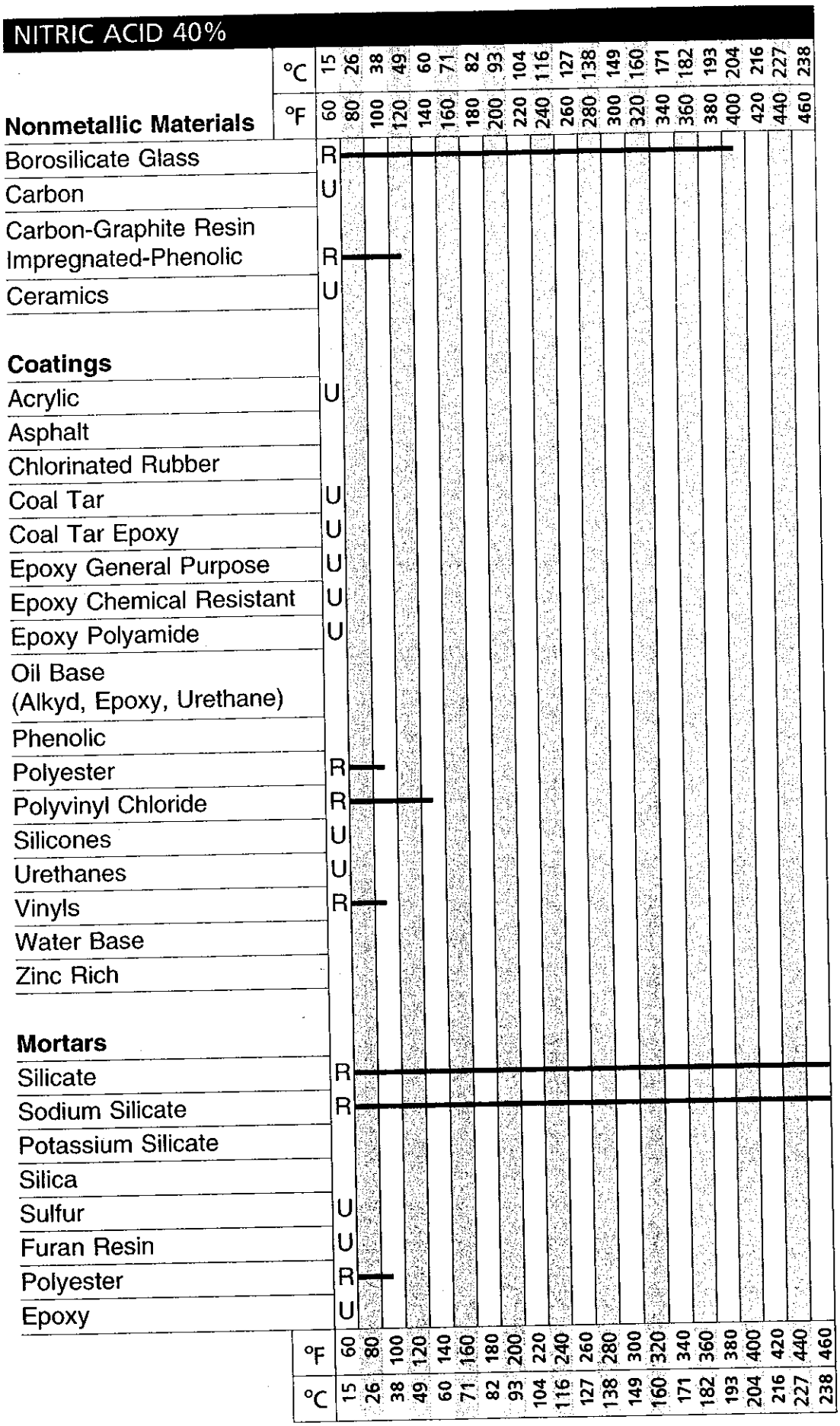




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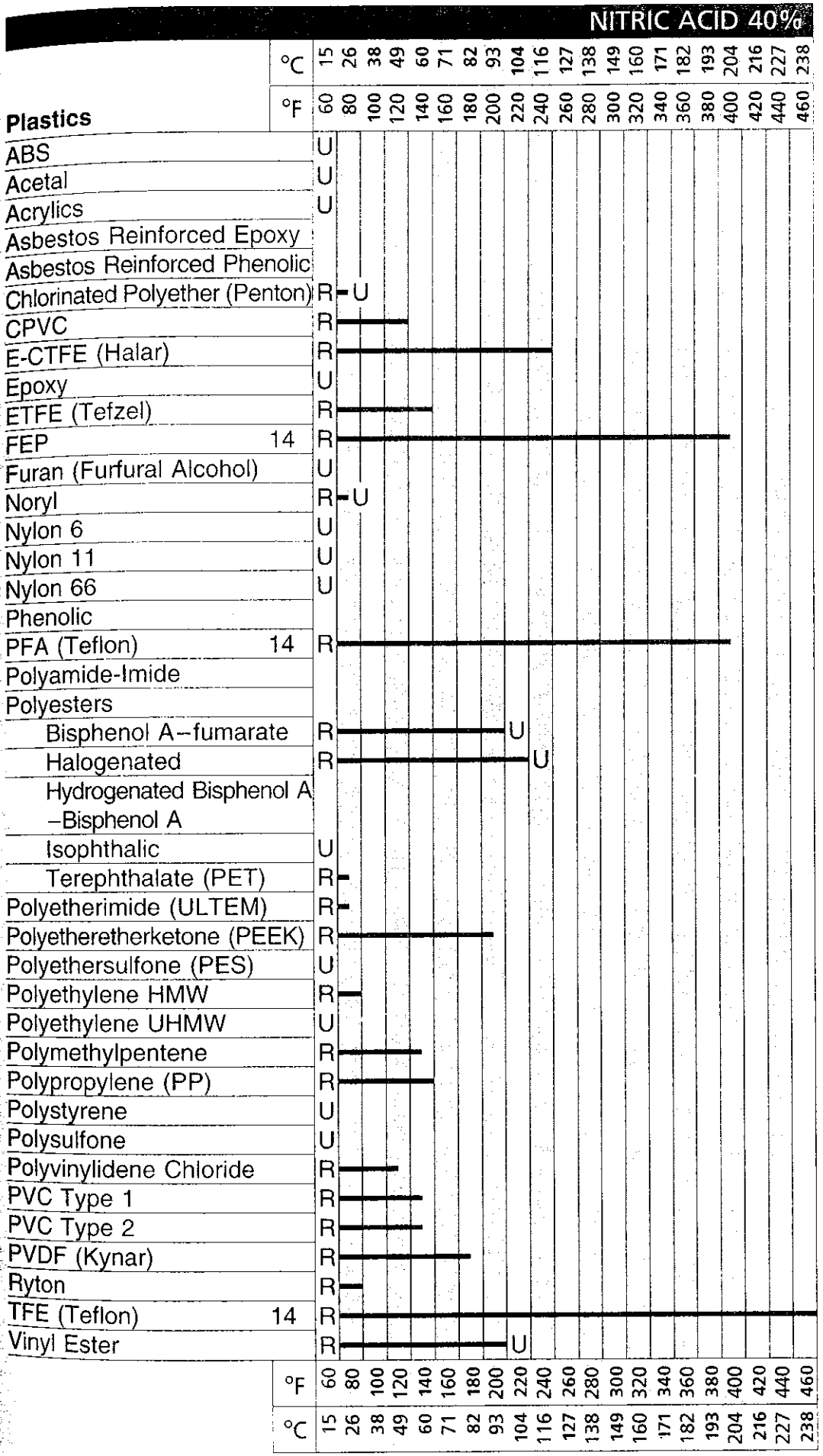


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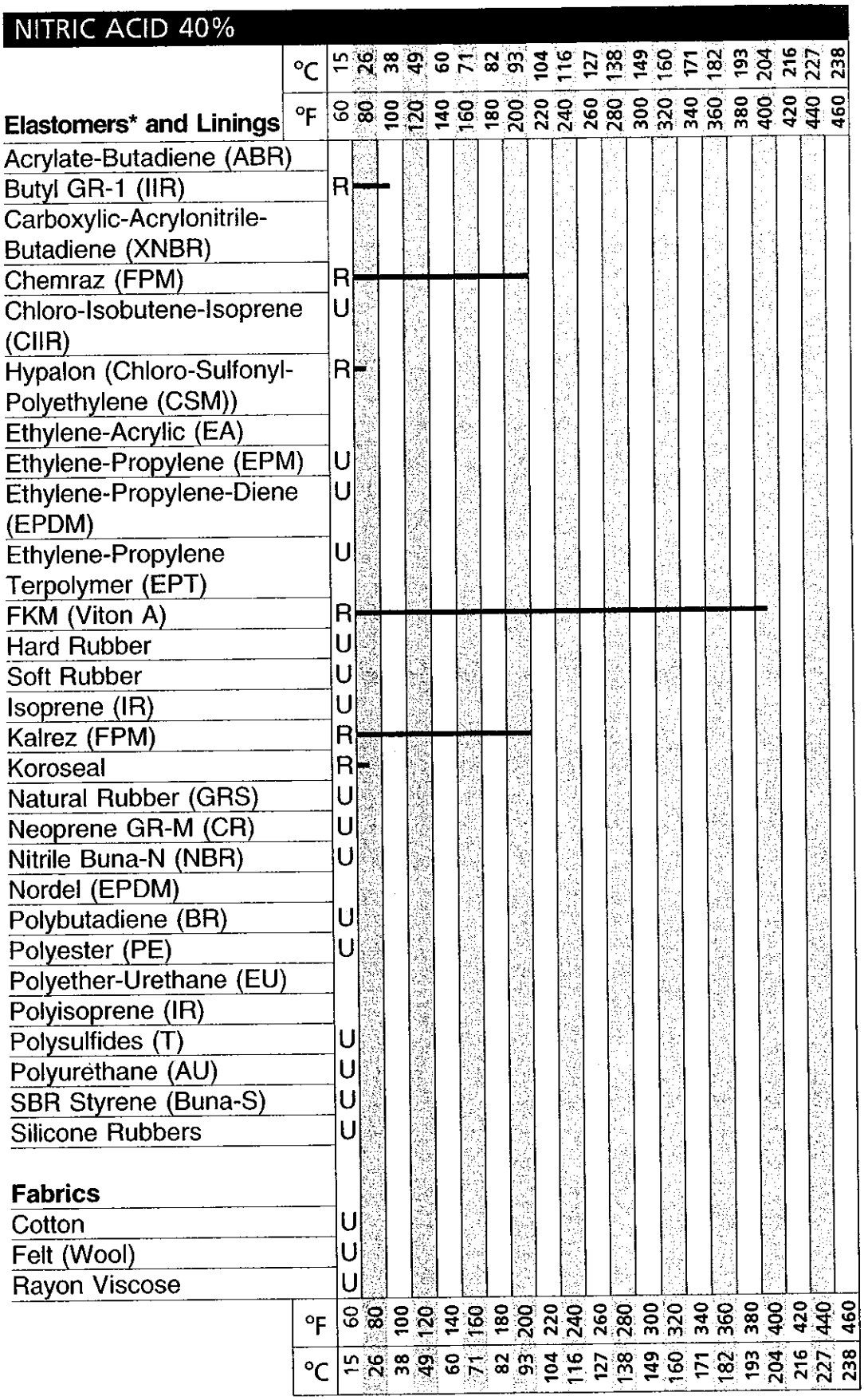


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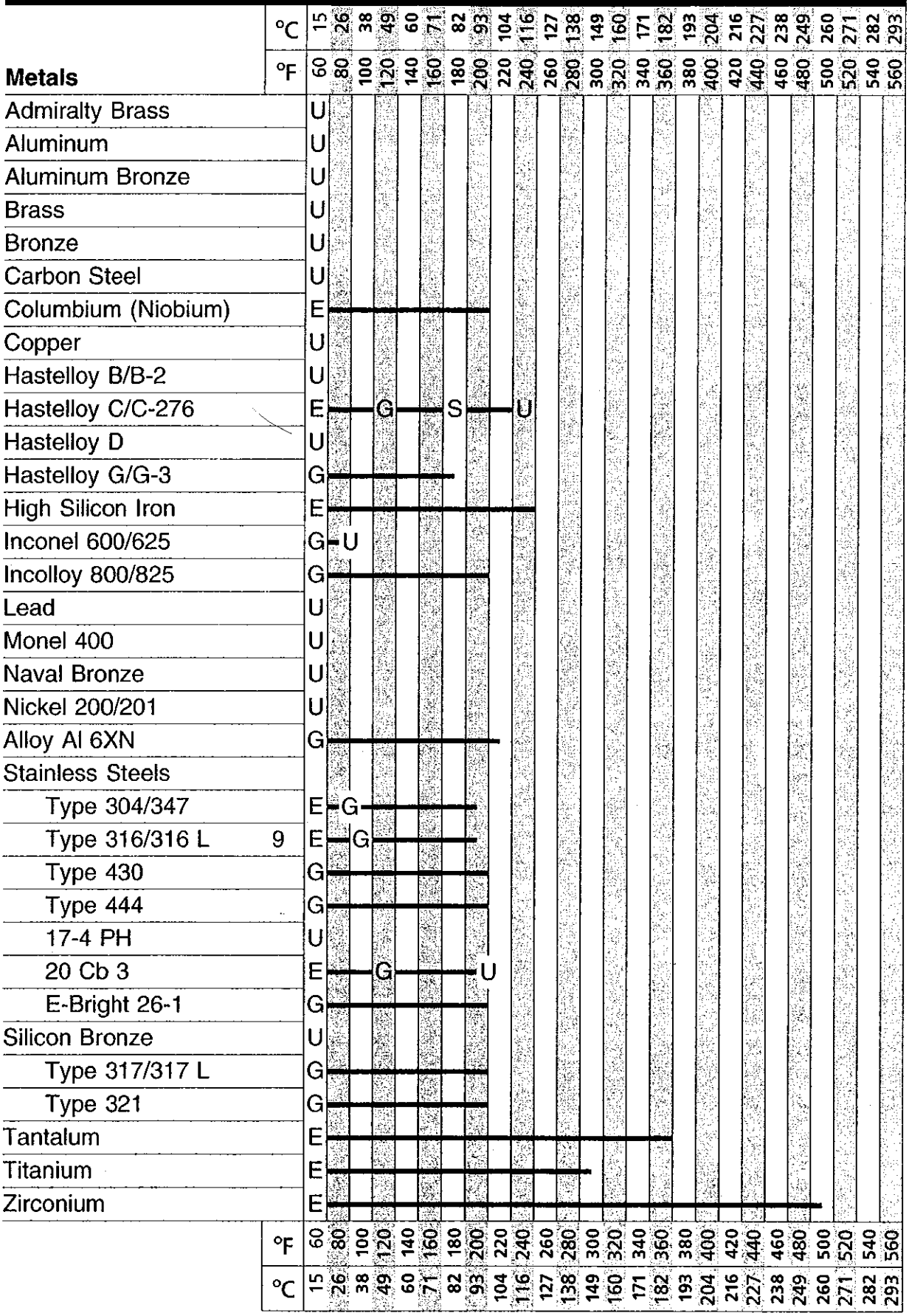


FOR METALS

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FOR NONMETALLICS

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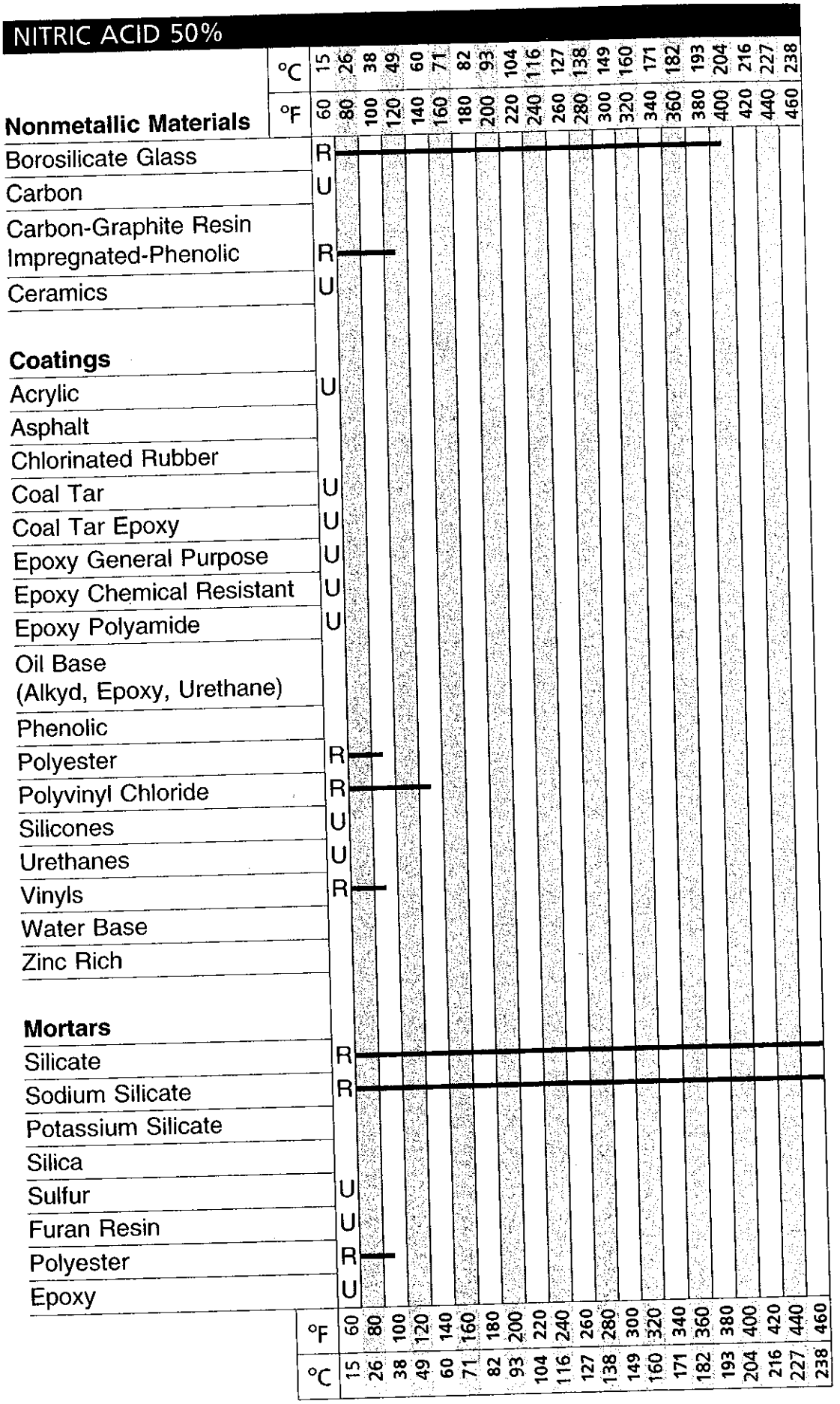






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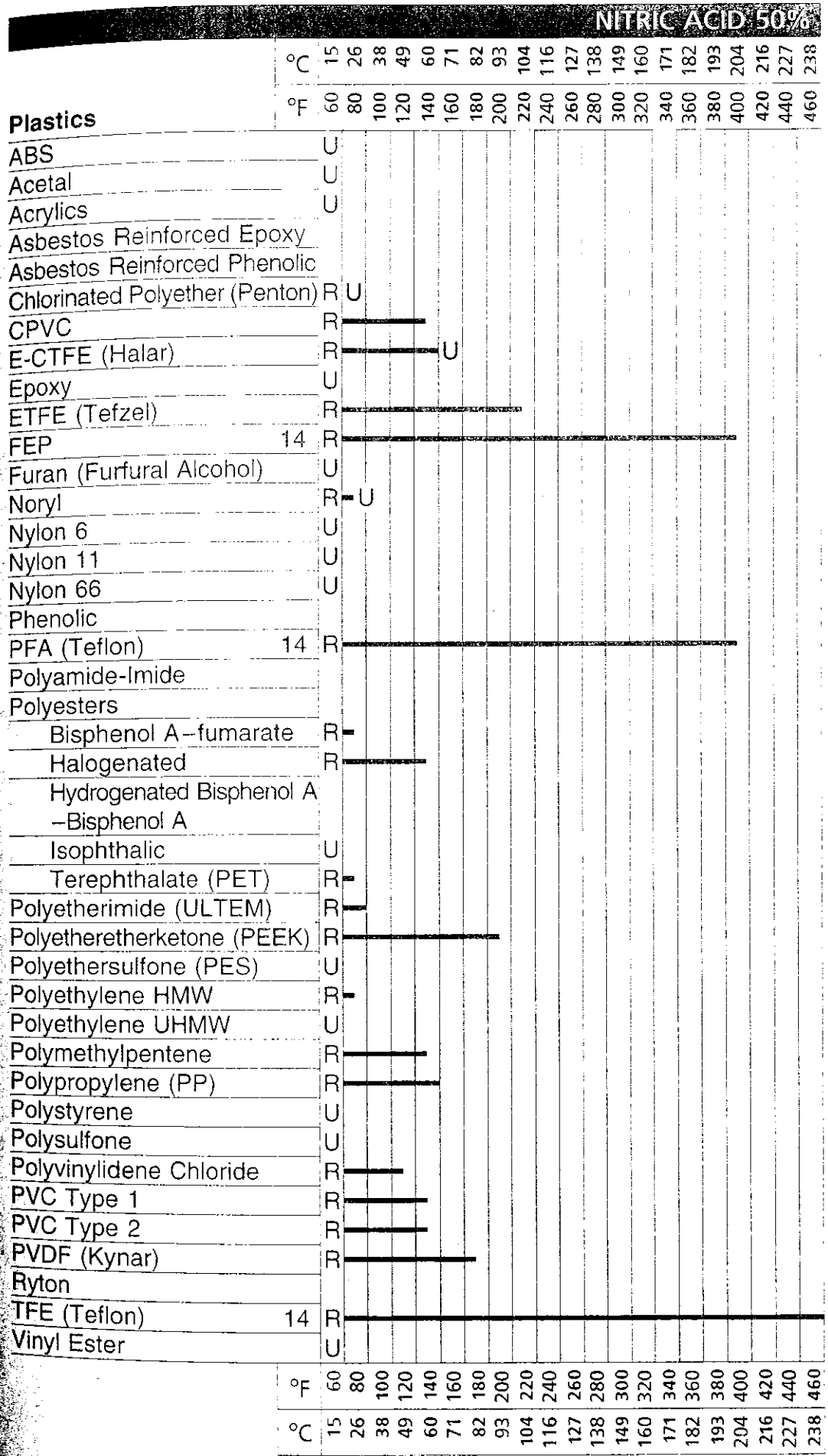



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## NITRIC ACID 50%

| Elastomers* and Linings | °F | °C |
|---|---|---|
| Acrylate-Butadiene (ABR) | | |
| Butyl GR-1 (IIR) | U | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | U | |
| Chloro-Isobutene-Isoprene (CIIR) | U | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | R | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | U | |
| Ethylene-Propylene-Diene (EPDM) | U | |
| Ethylene-Propylene Terpolymer (EPT) | U | |
| FKM (Viton A) | U | |
| Hard Rubber | U | |
| Soft Rubber | U | |
| Isoprene (IR) | U | |
| Kalrez (FPM) | R | |
| Koroseal | U | |
| Natural Rubber (GRS) | U | |
| Neoprene GR-M (CR) | U | |
| Nitrile Buna-N (NBR) | U | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | U | |
| Polyester (PE) | U | |
| Polyether-Urethane (EU) | | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | U | |
| Polyurethane (AU) | U | |
| SBR Styrene (Buna-S) | U | |
| Silicone Rubbers | U | |
| **Fabrics** | | |
| Cotton | U | |
| Felt (Wool) | U | |
| Rayon Viscose | U | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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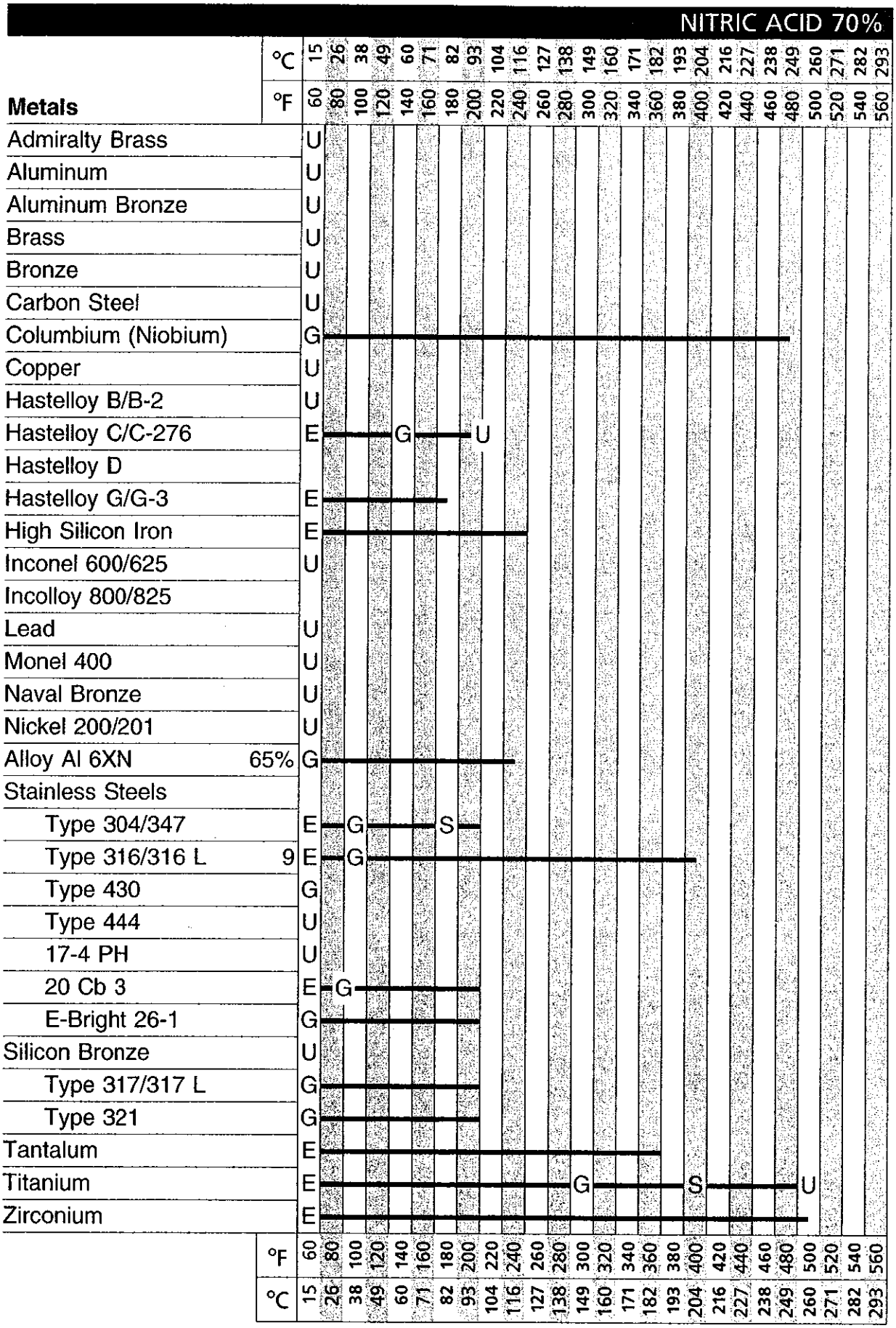
# NITRIC ACID 70%




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## NITRIC ACID 70%

| Nonmetallic Materials | |
|---|---|
| Borosilicate Glass | R |
| Carbon | U |
| Carbon-Graphite Resin Impregnated- | U |
| Ceramics | U |
| **Coatings** | |
| Acrylic | U |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | U |
| Coal Tar Epoxy | U |
| Epoxy General Purpose | U |
| Epoxy Chemical Resistant | U |
| Epoxy Polyamide | U |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | U |
| Polyvinyl Chloride | R |
| Silicones | U |
| Urethanes | U |
| Vinyls | U |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | R |
| Sodium Silicate | R |
| Potassium Silicate | |
| Silica | |
| Sulfur | U |
| Furan Resin | U |
| Polyester | U |
| Epoxy | U |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |



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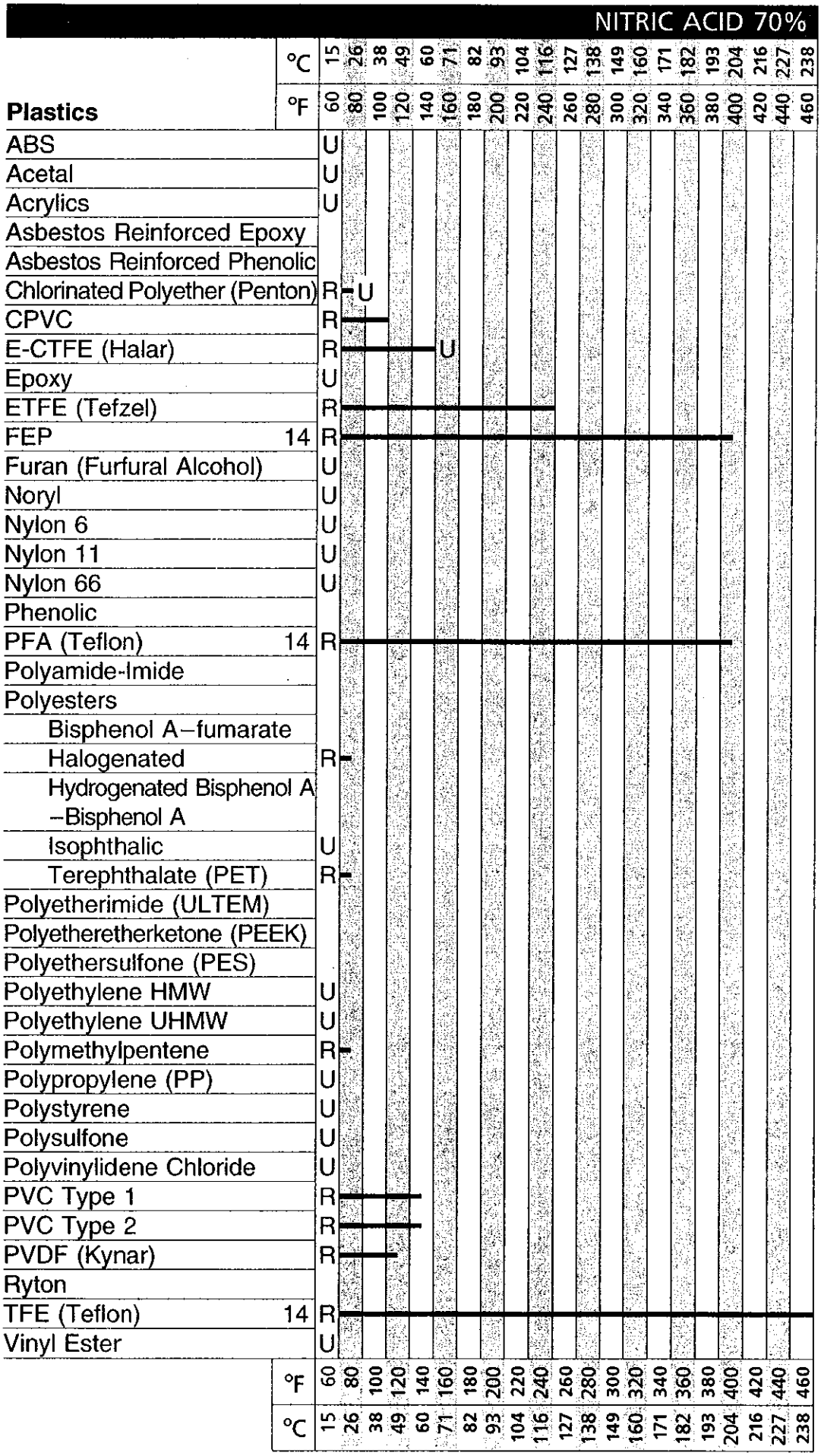



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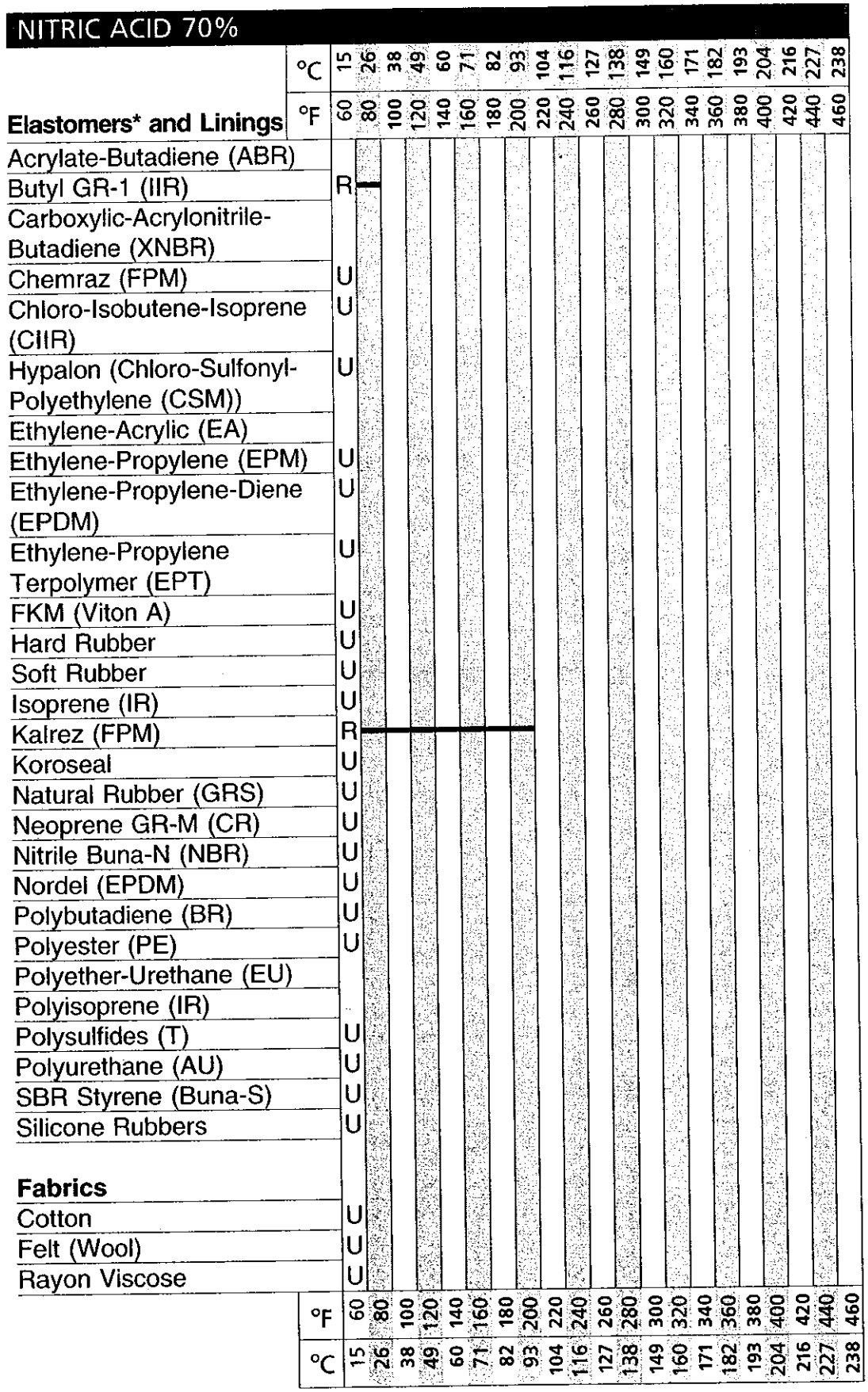
## NITRIC ACID 70%




*See also Nylon 11 under PLASTICS





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# NITRIC ACID 100% (ANHYDROUS)

| Metals | |
|---|---|
| Admiralty Brass | U |
| Aluminum | E |
| Aluminum Bronze | U |
| Brass | U |
| Bronze | U |
| Carbon Steel | U |
| Columbium (Niobium) | |
| Copper | U |
| Hastelloy B/B-2 | U |
| Hastelloy C/C-276 | G |
| Hastelloy D | |
| Hastelloy G/G-3 | |
| High Silicon Iron | E |
| Inconel 600/625 | U |
| Incolloy 800/825 | G |
| Lead | U |
| Monel 400 | U |
| Naval Bronze | U |
| Nickel 200/201 | U |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 | E–U |
| Type 316/316 L | E–U |
| Type 400 series | S |
| Type 904-L | |
| 17-4 PH | |
| 20 Cb 3 | E–U |
| E-Bright 26-1 | |
| Silicon Bronze | U |
| Silicon Copper | U |
| Stellite | |
| Tantalum | E |
| Titanium | G |
| Zirconium | E |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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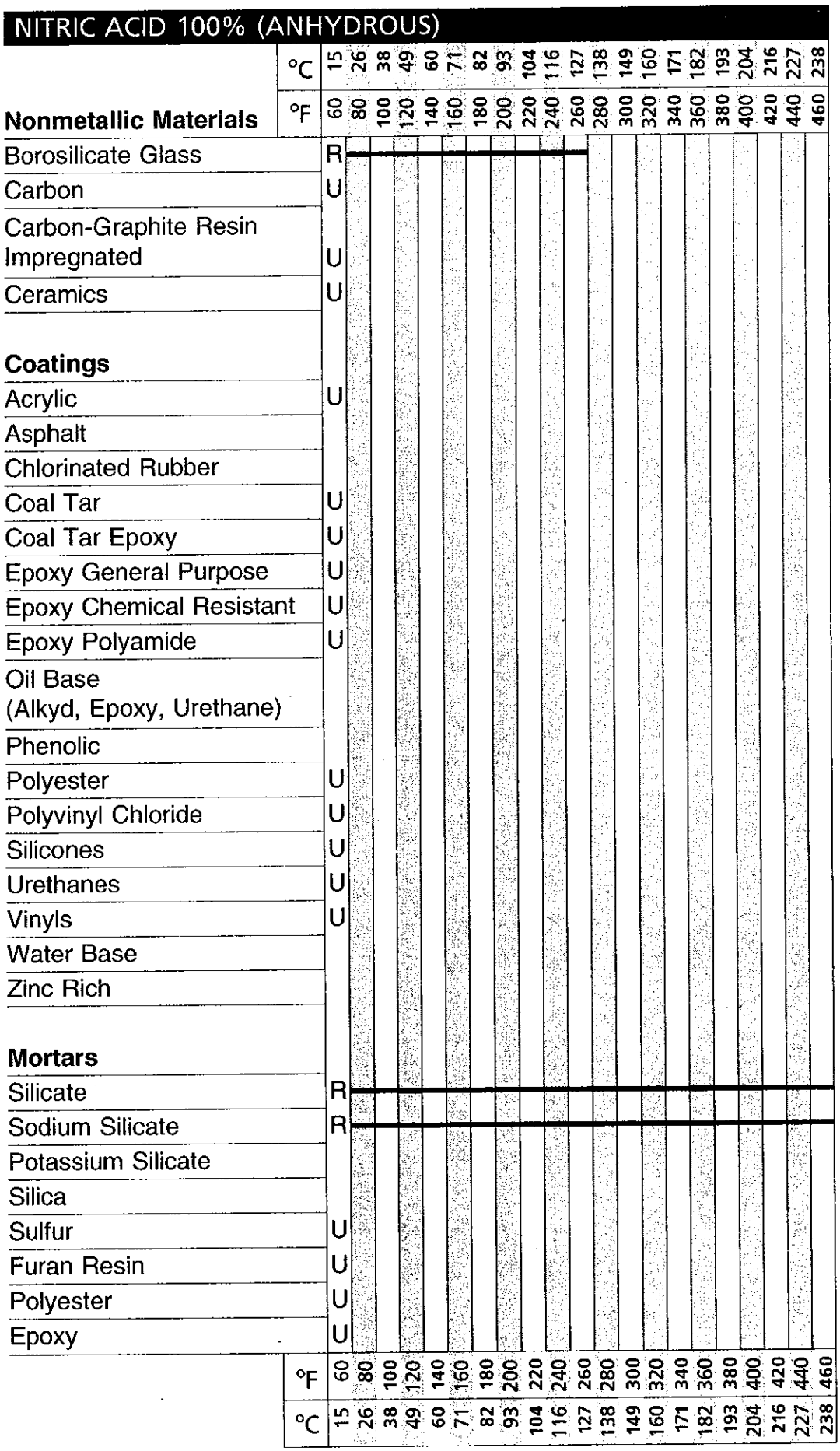





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# NITRIC ACID 100% (ANHYDROUS)

| Plastics | | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |
|---|---|---|
| | | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| ABS | | U |
| Acetal | | U |
| Acrylics | | U |
| Asbestos Reinforced Epoxy | | U |
| Asbestos Reinforced Phenolic | | R |
| Chlorinated Polyether (Penton) | | U |
| CPVC | | U |
| E-CTFE (Halar) | | R — U |
| Epoxy | | U |
| ETFE (Tefzel) | | U |
| FEP | 14 | R |
| Furan (Furfural Alcohol) | | U |
| Noryl | | U |
| Nylon 6 | | U |
| Nylon 11 | | U |
| Nylon 66 | | U |
| Phenolic | | R |
| PFA (Teflon) | 14 90% | R |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | U |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | U |
| Polyethylene UHMW | | U |
| Polymethylpentene | | |
| Polypropylene (PP) | | U |
| Polystyrene | | U |
| Polysulfone | | U |
| Polyvinylidene Chloride | | U |
| PVC Type 1 | | U |
| PVC Type 2 | | U |
| PVDF (Kynar) | | R |
| Ryton | | |
| TFE (Teflon) | 14 | R |
| Vinyl Ester | | U |

°F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

°C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238


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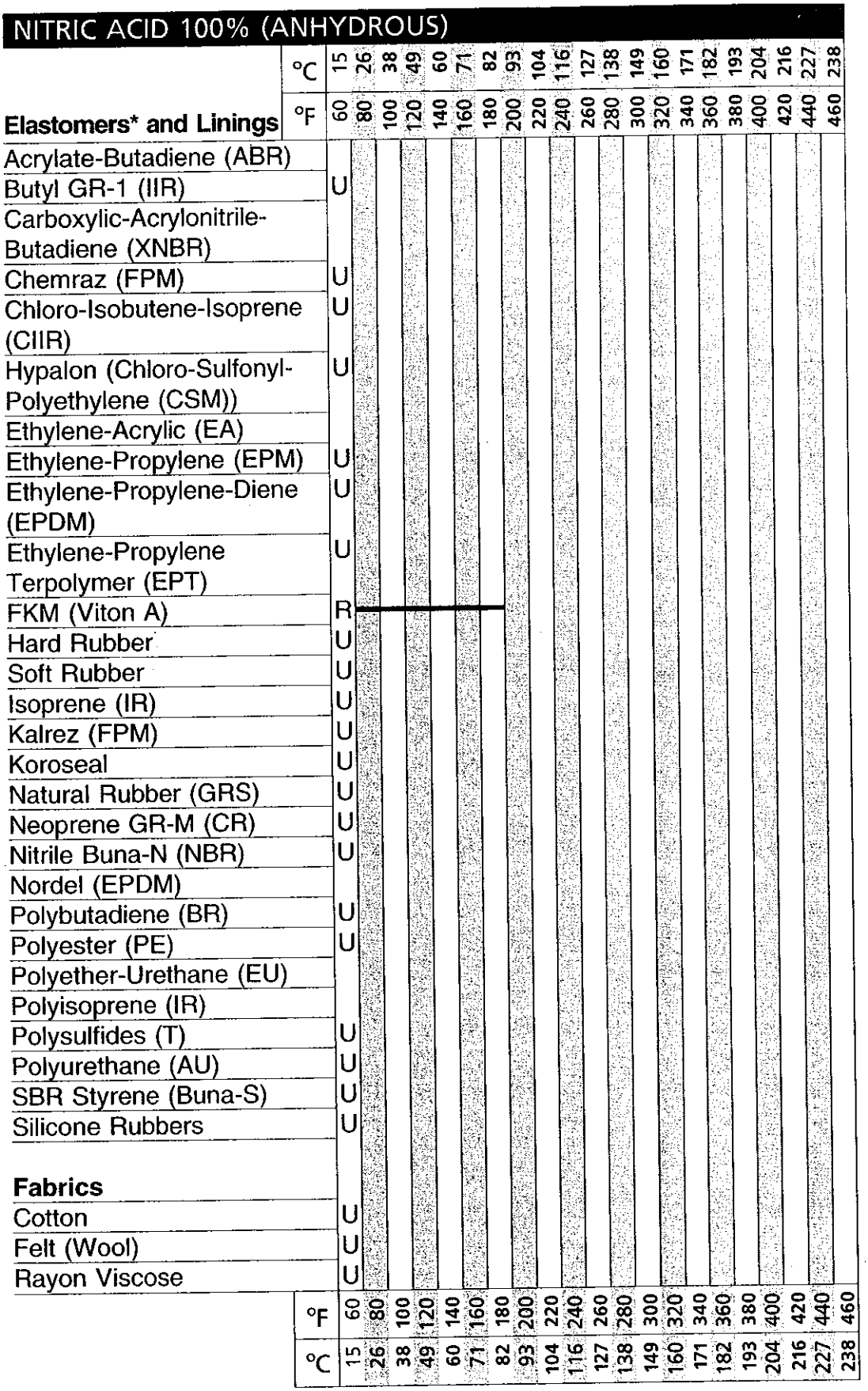

| Elastomers* and Linings | °F | °C |
|---|---|---|
| Acrylate-Butadiene (ABR) | | |
| Butyl GR-1 (IIR) | U | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | U | |
| Chloro-Isobutene-Isoprene (CIIR) | U | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | U | |
| Ethylene-Propylene-Diene (EPDM) | U | |
| Ethylene-Propylene Terpolymer (EPT) | U | |
| FKM (Viton A) | R | |
| Hard Rubber | U | |
| Soft Rubber | U | |
| Isoprene (IR) | U | |
| Kalrez (FPM) | U | |
| Koroseal | U | |
| Natural Rubber (GRS) | U | |
| Neoprene GR-M (CR) | U | |
| Nitrile Buna-N (NBR) | U | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | U | |
| Polyester (PE) | U | |
| Polyether-Urethane (EU) | | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | U | |
| Polyurethane (AU) | U | |
| SBR Styrene (Buna-S) | U | |
| Silicone Rubbers | U | |
| **Fabrics** | | |
| Cotton | U | |
| Felt (Wool) | U | |
| Rayon Viscose | U | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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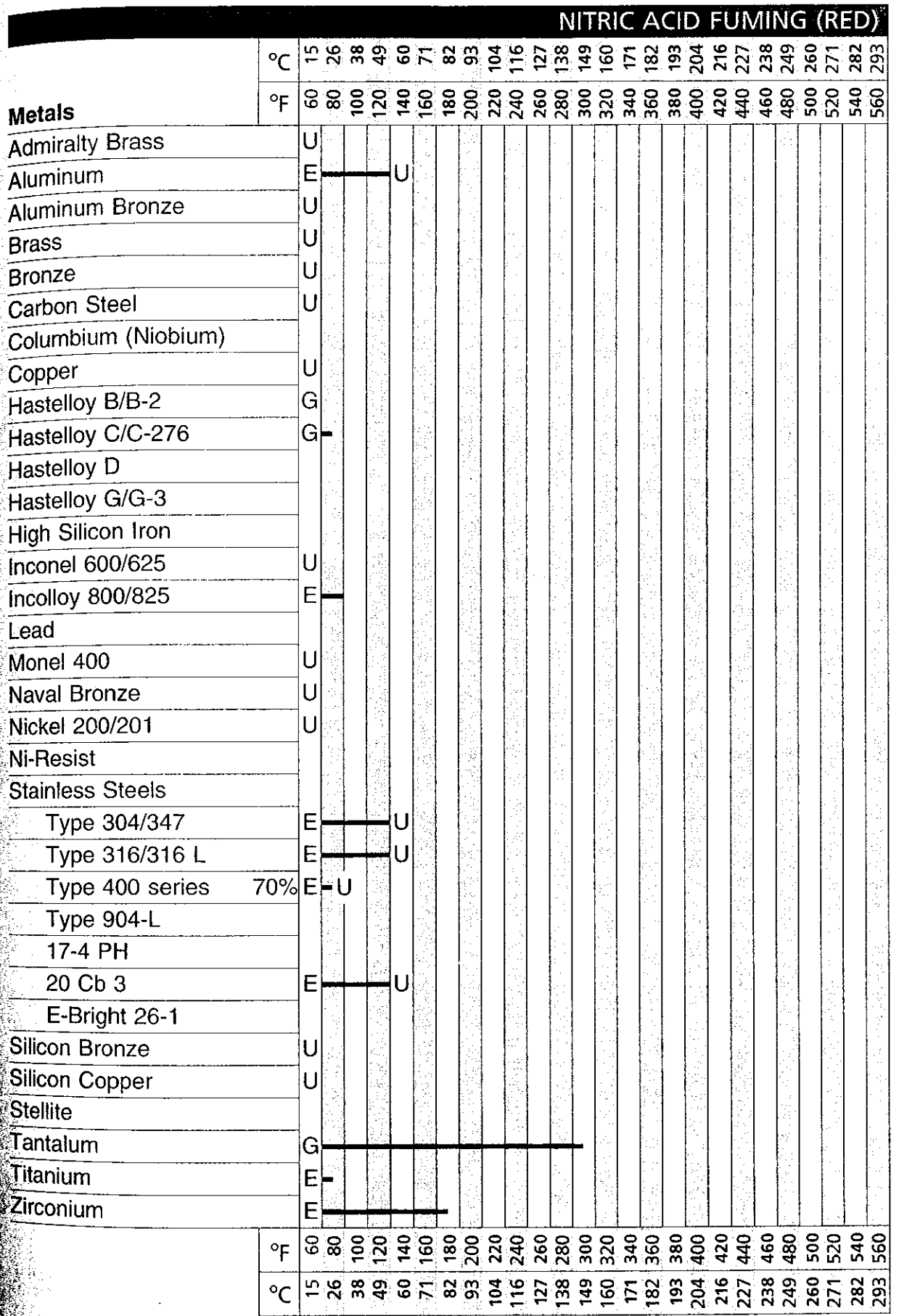


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year
S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant
U = Unsatisfactory

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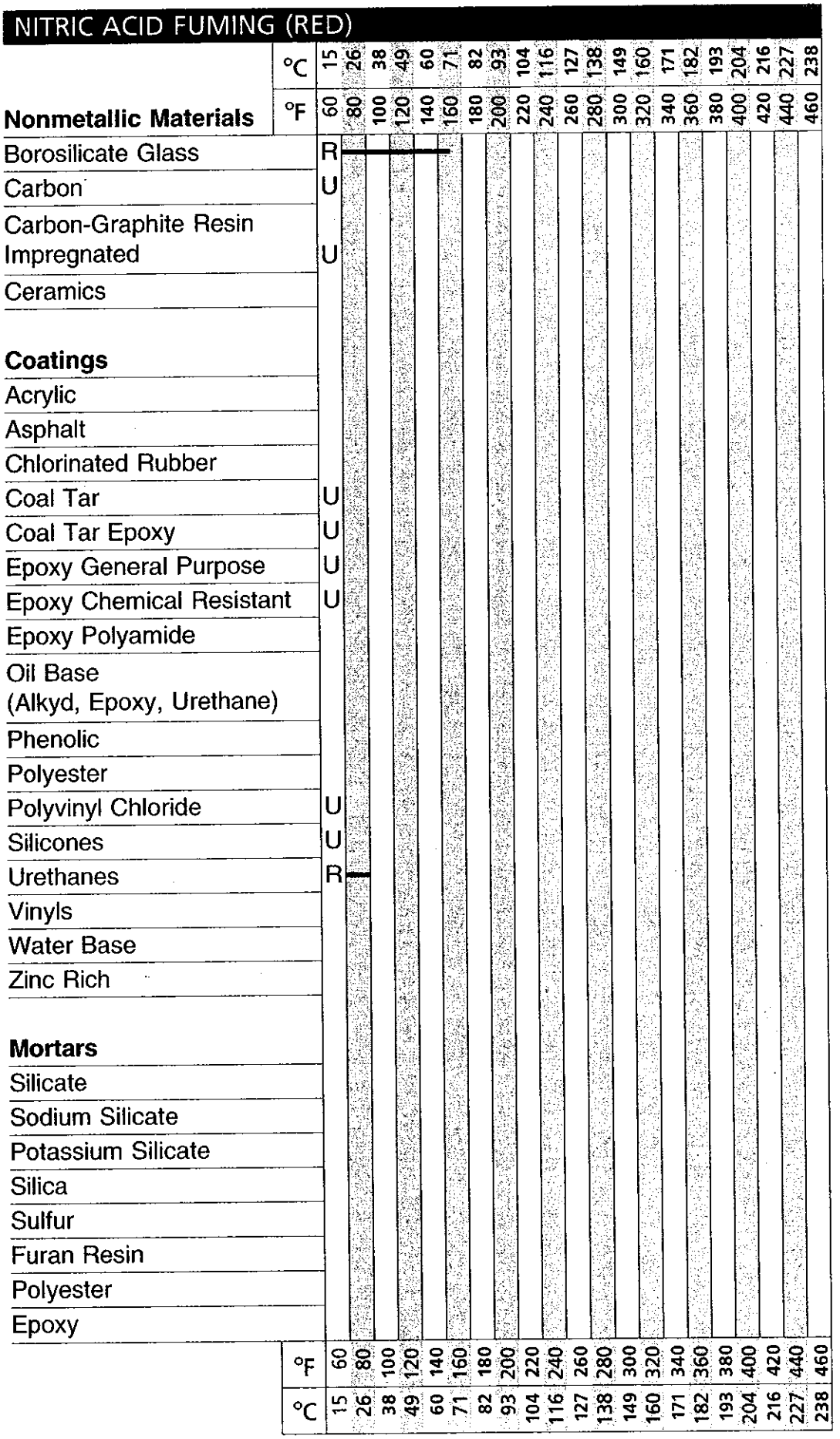
## NITRIC ACID FUMING (RED)





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## NITRIC ACID FUMING (RED)

| Plastics | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
| ABS | | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | U | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | U | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | U | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | 90% | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | U | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | U | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | U | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | R | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | U | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | U | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | U | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | R | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | R | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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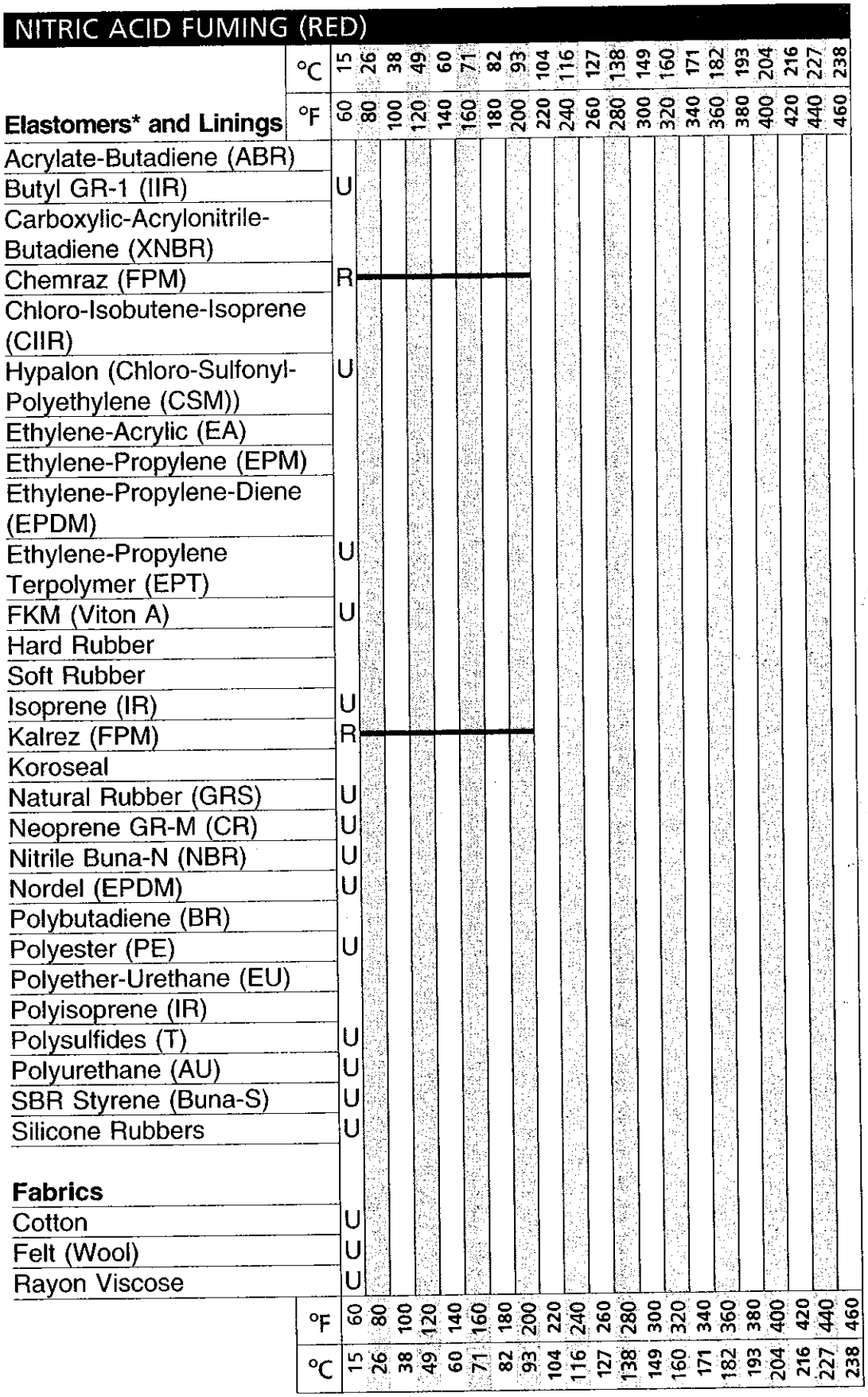
## NITRIC ACID FUMING (RED)

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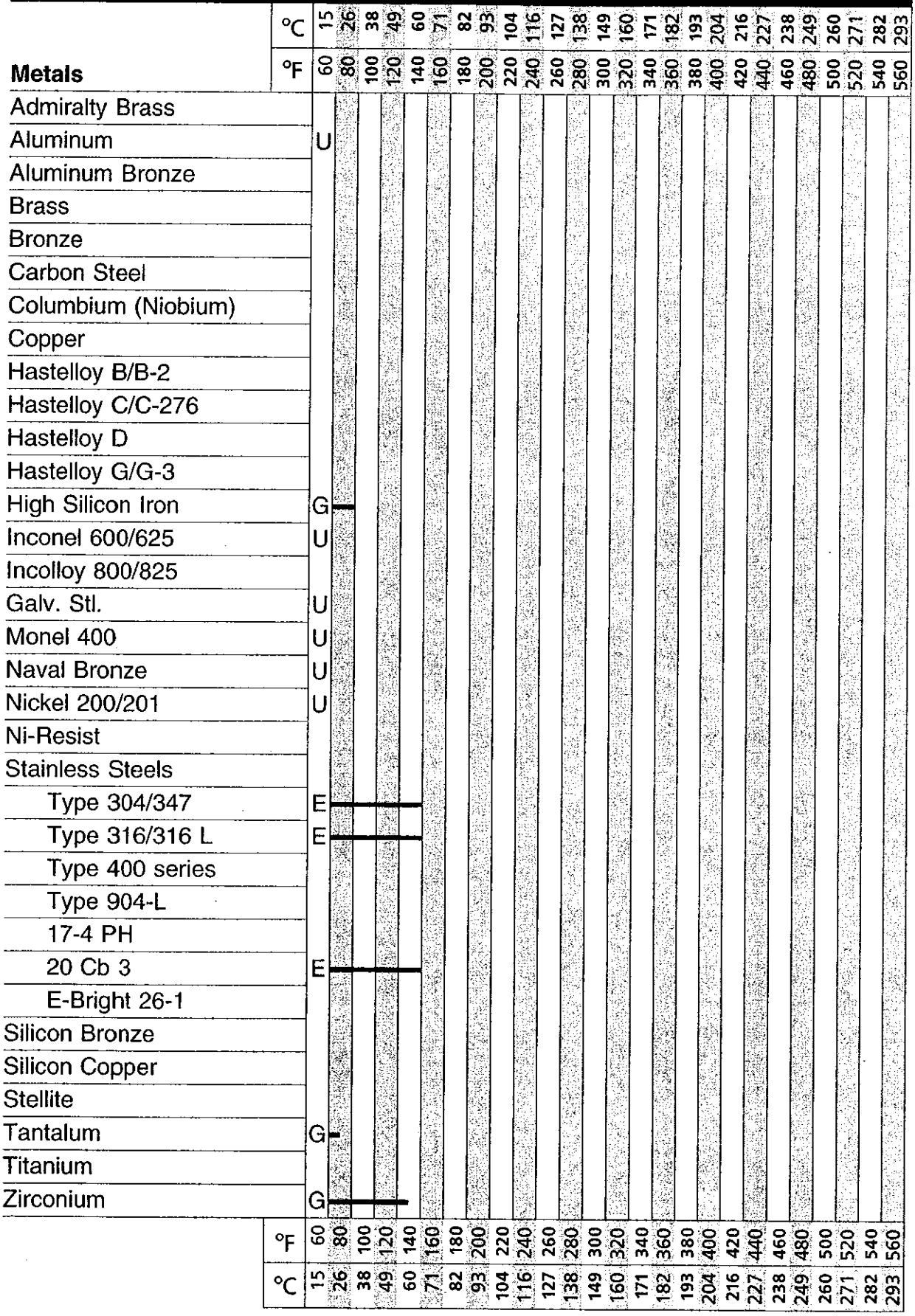
# NITRIC ACID:SULFURIC ACID 50:50

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FOR NONMETALLICS

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U = Unsatisfactory

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## NITRIC ACID:SULFURIC ACID 50:50

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | R | — | — | — | — | — | — | — | | | | | | | | | | | | | |
| Carbon | | U | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | U | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# NITRIC ACID:SULFURIC ACID 50:50

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | U | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | U | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | U | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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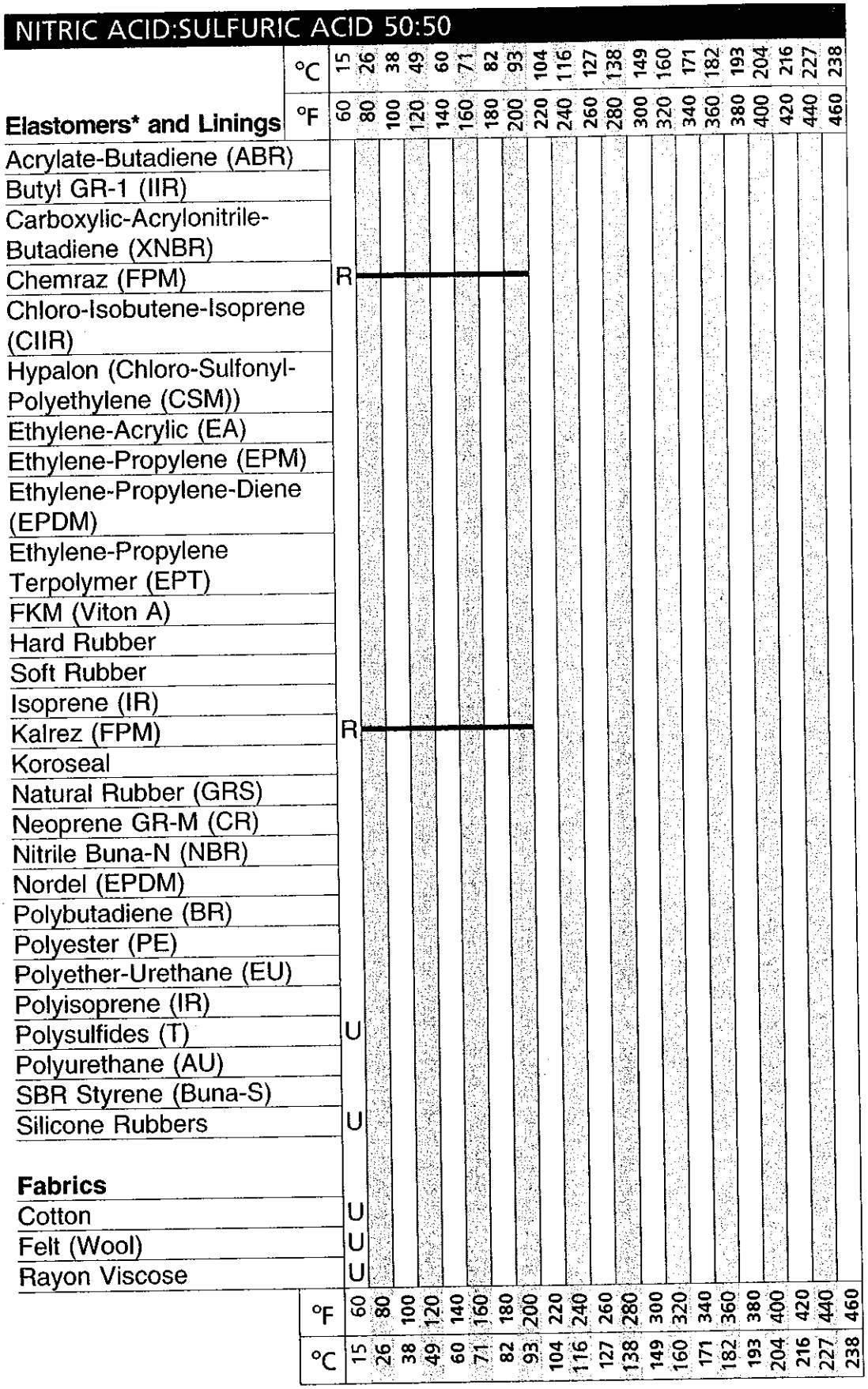
## NITRIC ACID:SULFURIC ACID 50:50




*See also Nylon 11 under PLASTICS



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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 317/317 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## NITRIDING GASES

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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| Plastics | °C | °F |
|---|---|---|
| ABS | ALL | 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| Acetal | | 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | | |
| Vinyl Ester | | |

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## NITRIDING GASES

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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# NITROBENZENE

| Metals | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | E | E | G | G | G | G | G | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | G | G | G | G | G | G | G | G | G | | | | | | | | | | | | | | | | | |
| Bronze | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | | | | | | | | | | | |
| Carbon Steel | | | G | G | G | G | G | G | G | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | | | | | | | | | | | |
| Hastelloy B/B-2 | 85% | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Hastelloy C/C-276 | 85% | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Galv. Stl. | | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Inconel 600/625 | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | G | G | G | G | G | G | G | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Naval Bronze | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Nickel 200/201 | 7 | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Ni-Resist | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Type 316/316 L | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Type 400 series | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |
| Titanium | | | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E | E |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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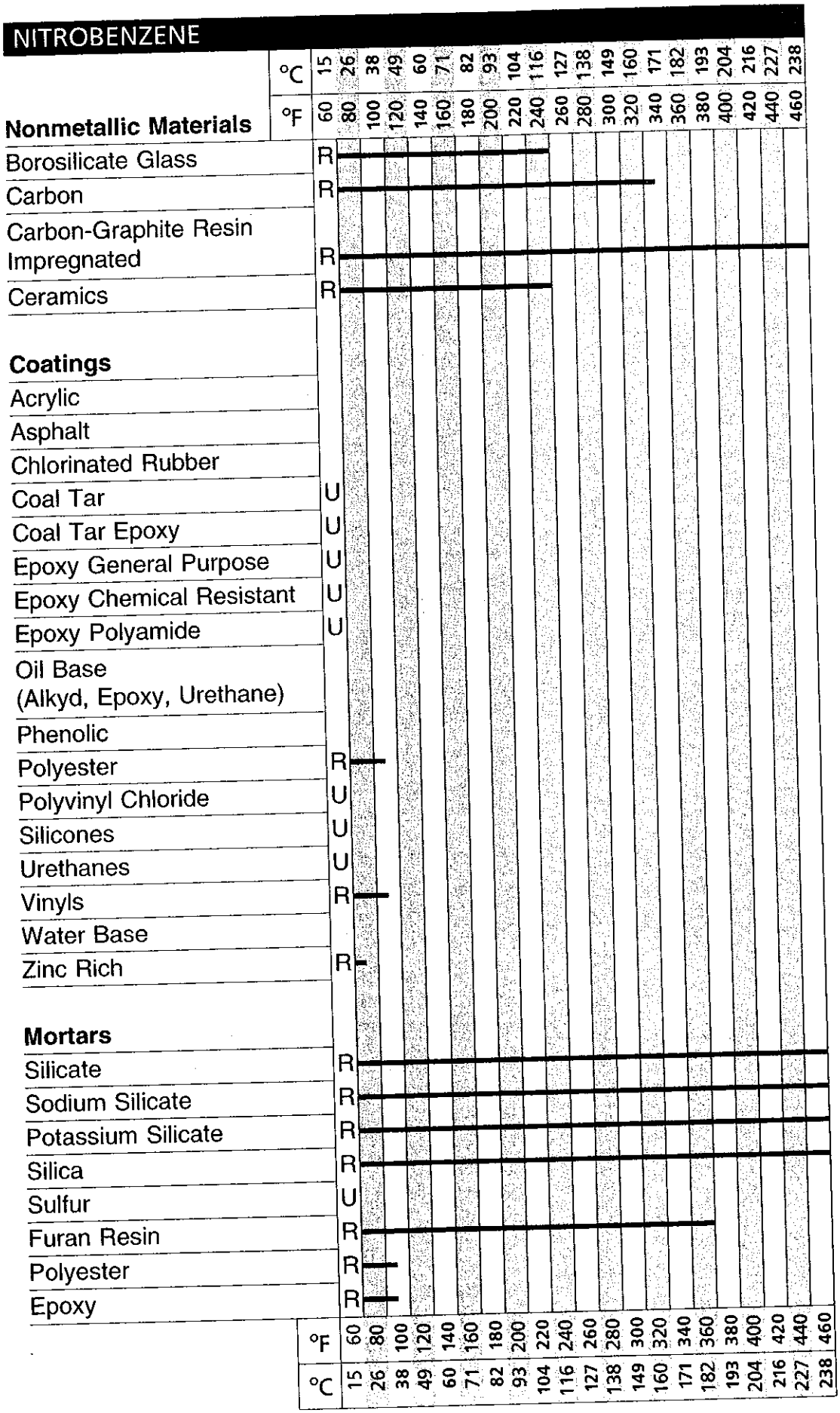




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# NITROBENZENE

| Plastics | | °C | °F |
|---|---|---|---|
| ABS | U | 15 | 60 |
| Acetal | U | 26 | 80 |
| Acrylics | U | 38 | 100 |
| Asbestos Reinforced Epoxy | | 49 | 120 |
| Asbestos Reinforced Phenolic | | 60 | 140 |
| Chlorinated Polyether (Penton) | R | 71 | 160 |
| CPVC | U | 82 | 180 |
| E-CTFE (Halar) | R–U | 93 | 200 |
| Epoxy | U | 104 | 220 |
| ETFE (Tefzel) | R | 116 | 240 |
| FEP 14 | R | 127 | 260 |
| Furan (Furfural Alcohol) | R | 138 | 280 |
| Noryl | U | 149 | 300 |
| Nylon 6 | R | 160 | 320 |
| Nylon 11 | R | 171 | 340 |
| Nylon 66 | R | 182 | 360 |
| Phenolic | R | 193 | 380 |
| PFA (Teflon) 14 | R | 204 | 400 |
| Polyamide-Imide | R | 216 | 420 |
| Polyesters | | 227 | 440 |
| Bisphenol A–fumarate | U | 238 | 460 |
| Halogenated | | | |
| Hydrogenated Bisphenol A –Bisphenol A | U | | |
| Isophthalic | U | | |
| Terephthalate (PET) | R | | |
| Polyetherimide (ULTEM) | | | |
| Polyetheretherketone (PEEK) | R | | |
| Polyethersulfone (PES) | | | |
| Polyethylene HMW | U | | |
| Polyethylene UHMW | U | | |
| Polymethylpentene | U | | |
| Polypropylene (PP) | R–U | | |
| Polystyrene | | | |
| Polysulfone (PSF) | U | | |
| Polyvinylidene Chloride | | | |
| PVC Type 1 | U | | |
| PVC Type 2 | U | | |
| PVDF (Kynar) | R | | |
| Ryton | R | | |
| TFE (Teflon) 14 | R | | |
| Vinyl Ester | R | | |


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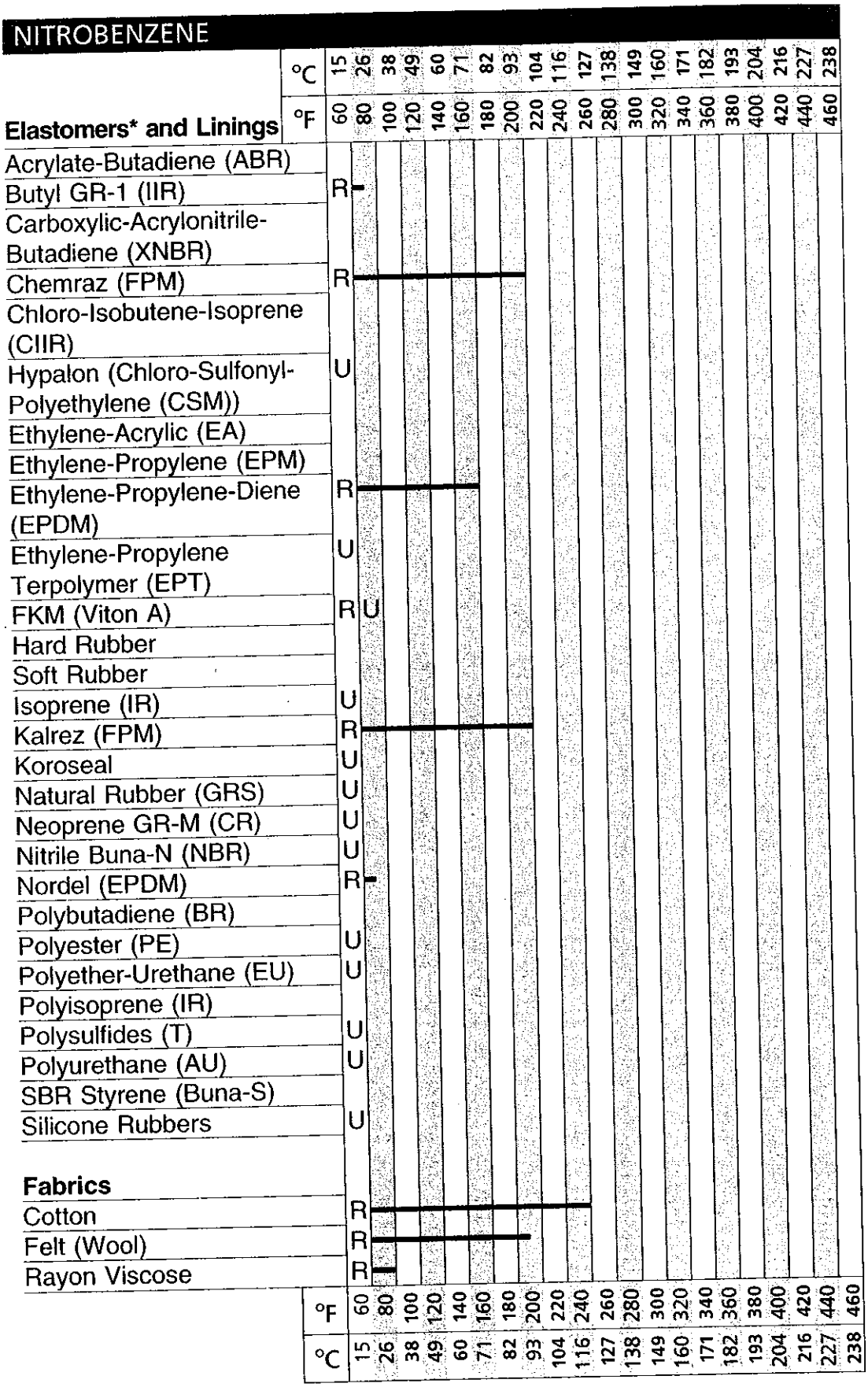


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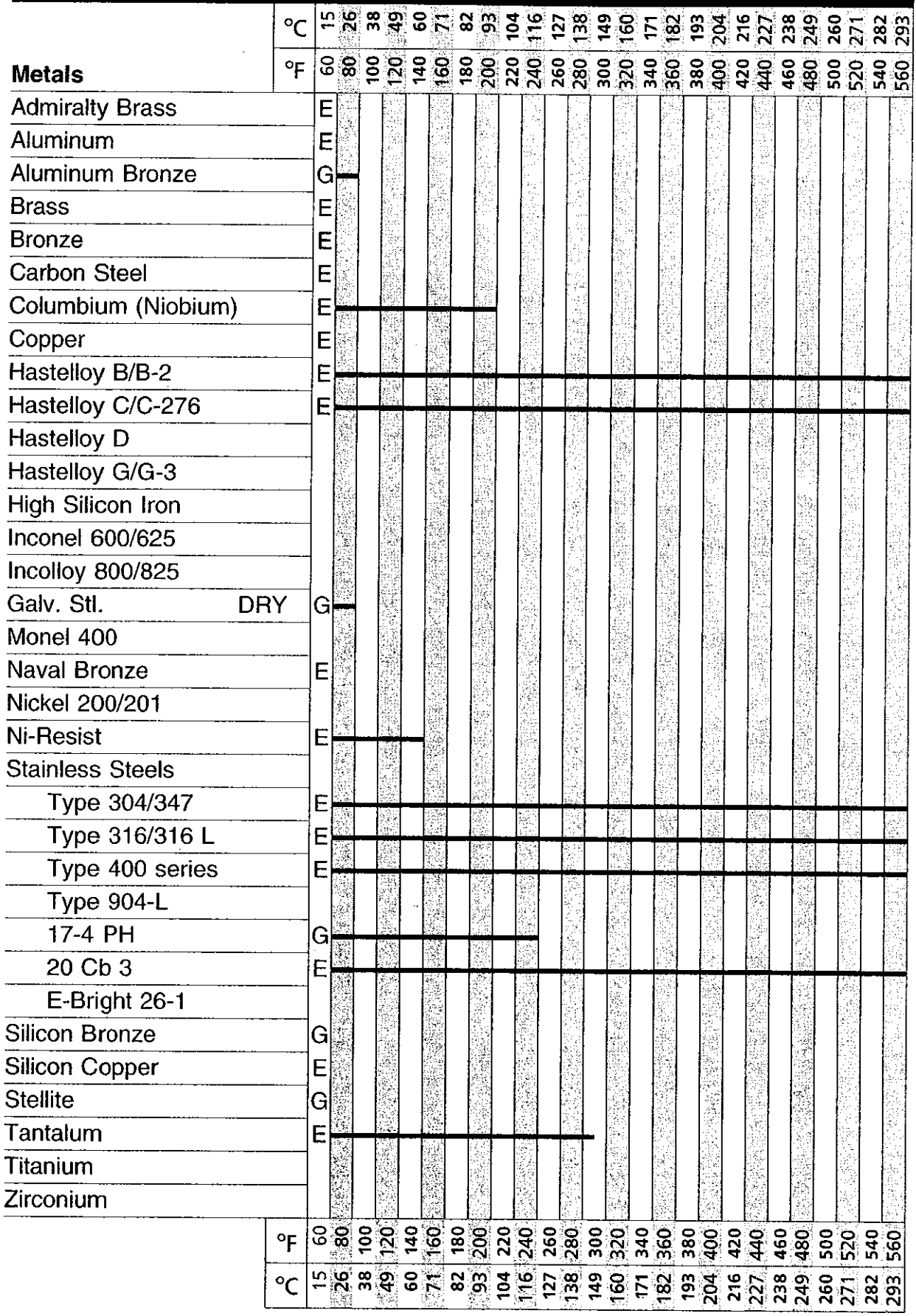


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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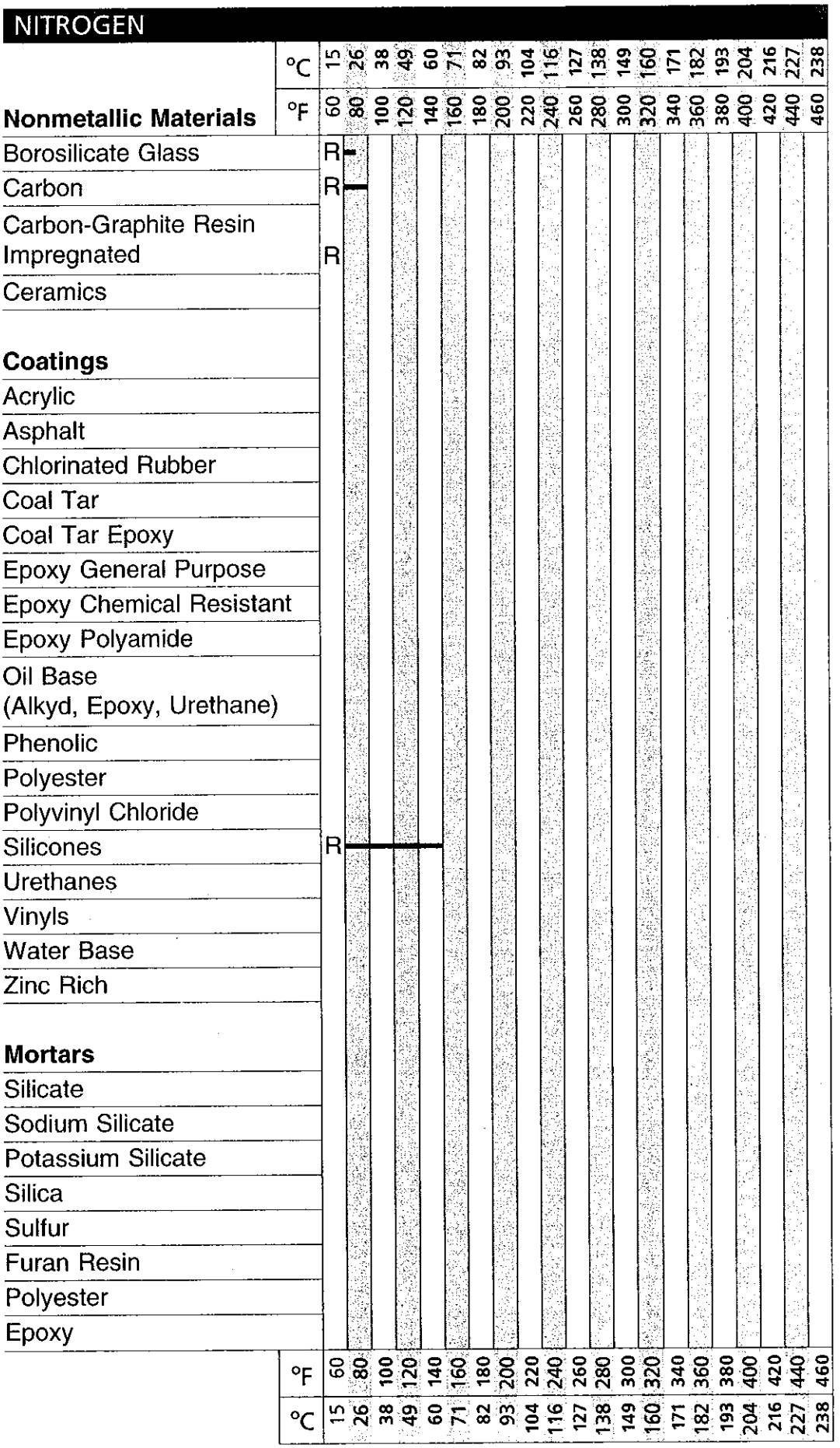




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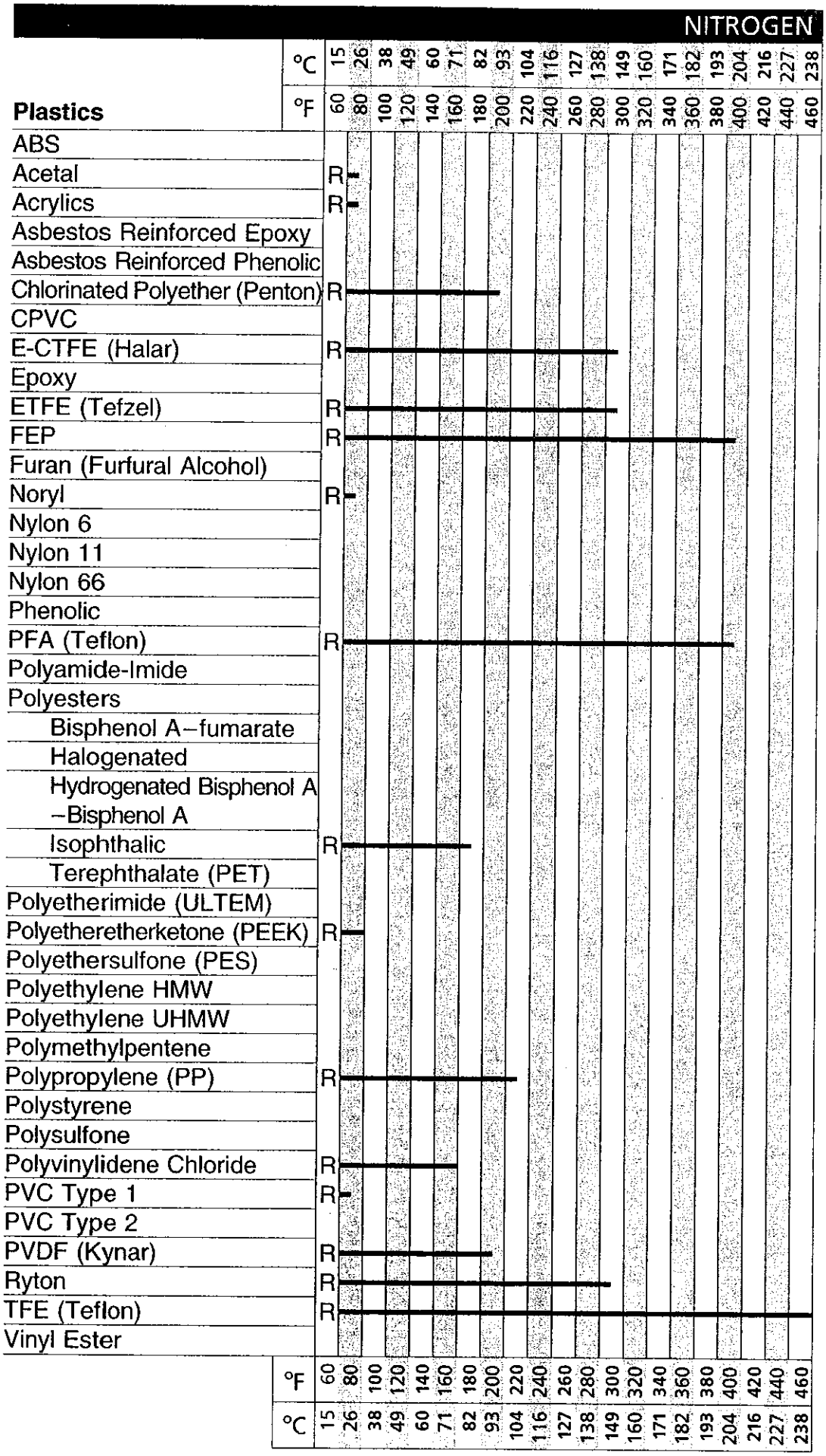



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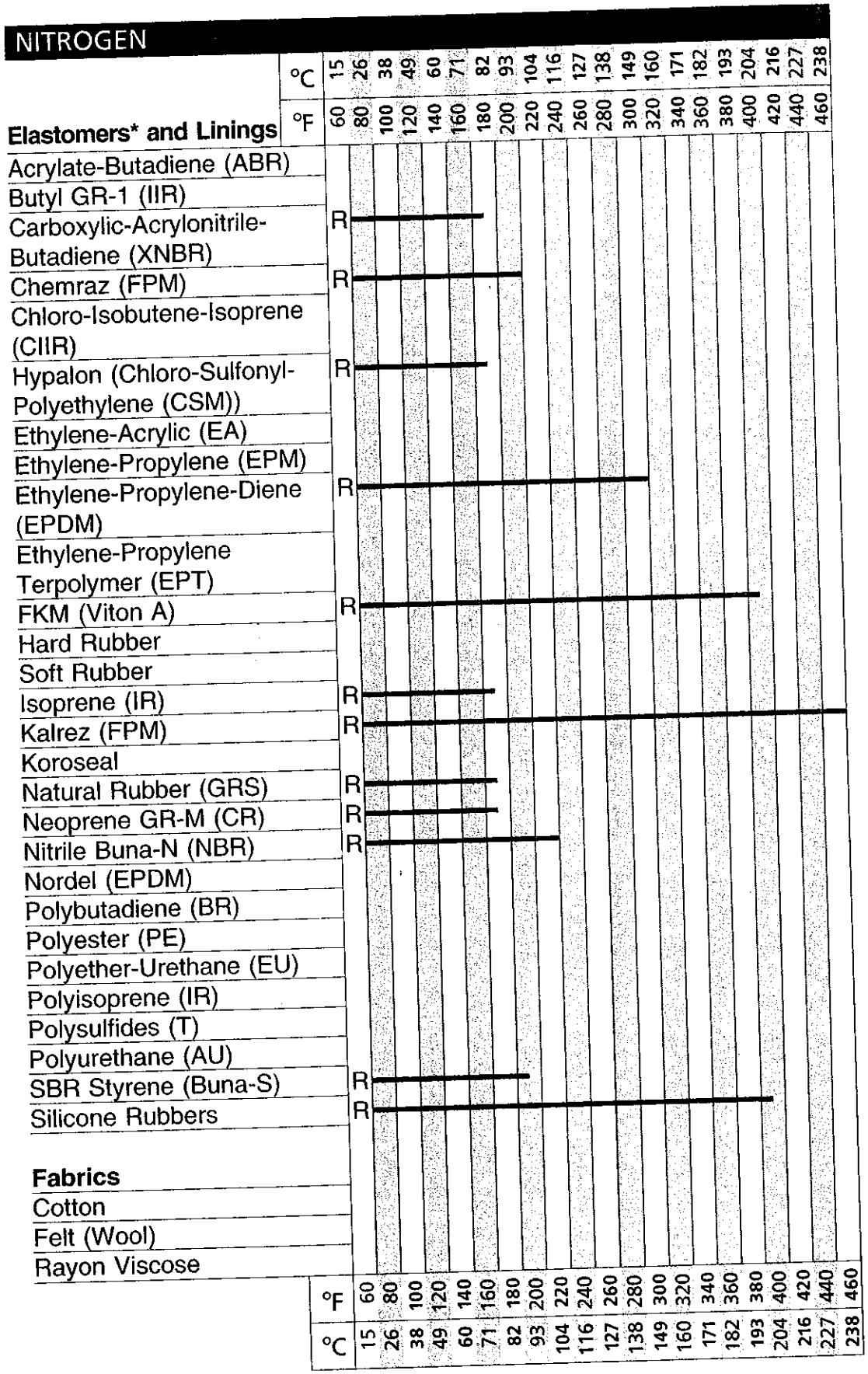


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# NITROGEN DIOXIDE

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Galv. Stl. | G | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | | |
| Type 316/316 L | | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | E | |
| Titanium | | |
| Zirconium | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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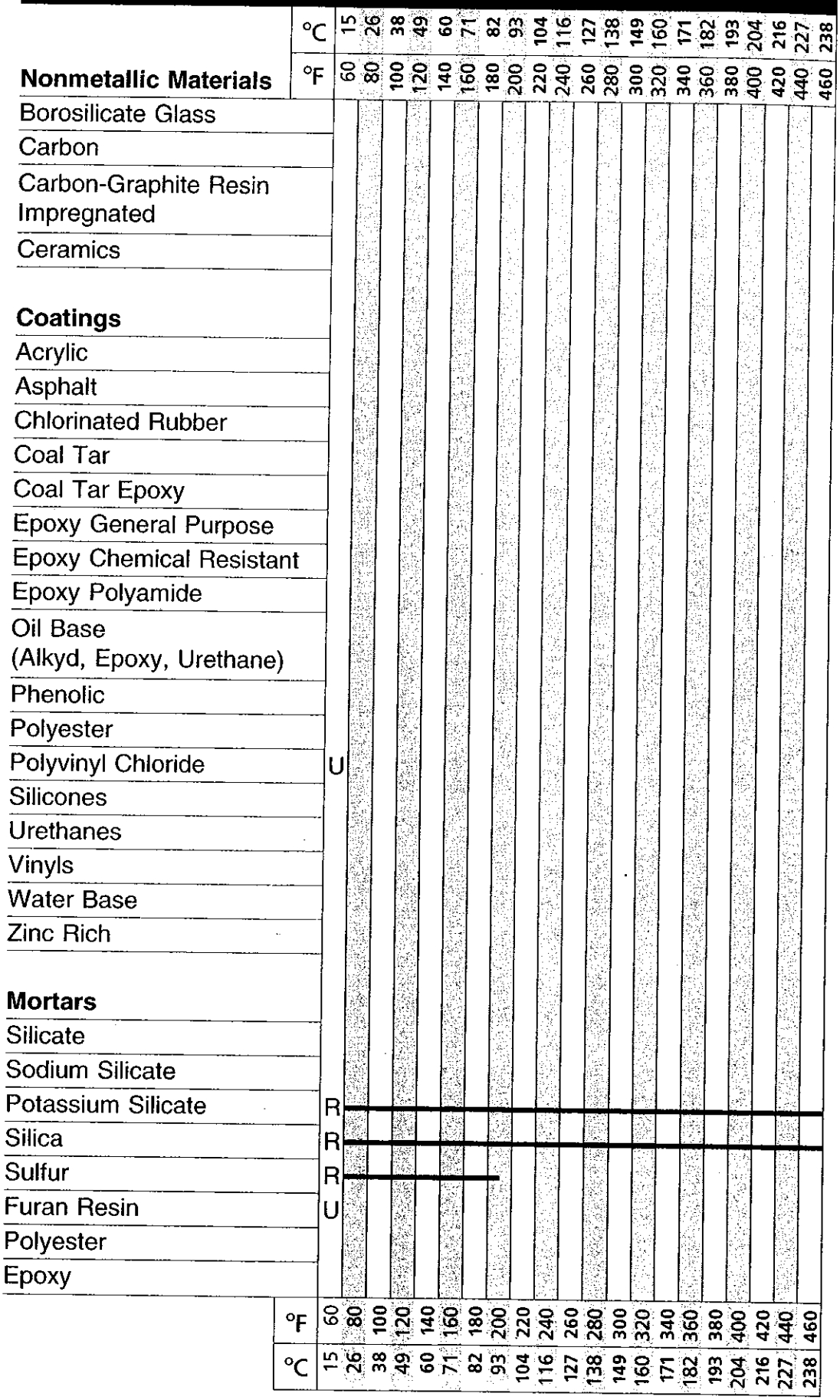




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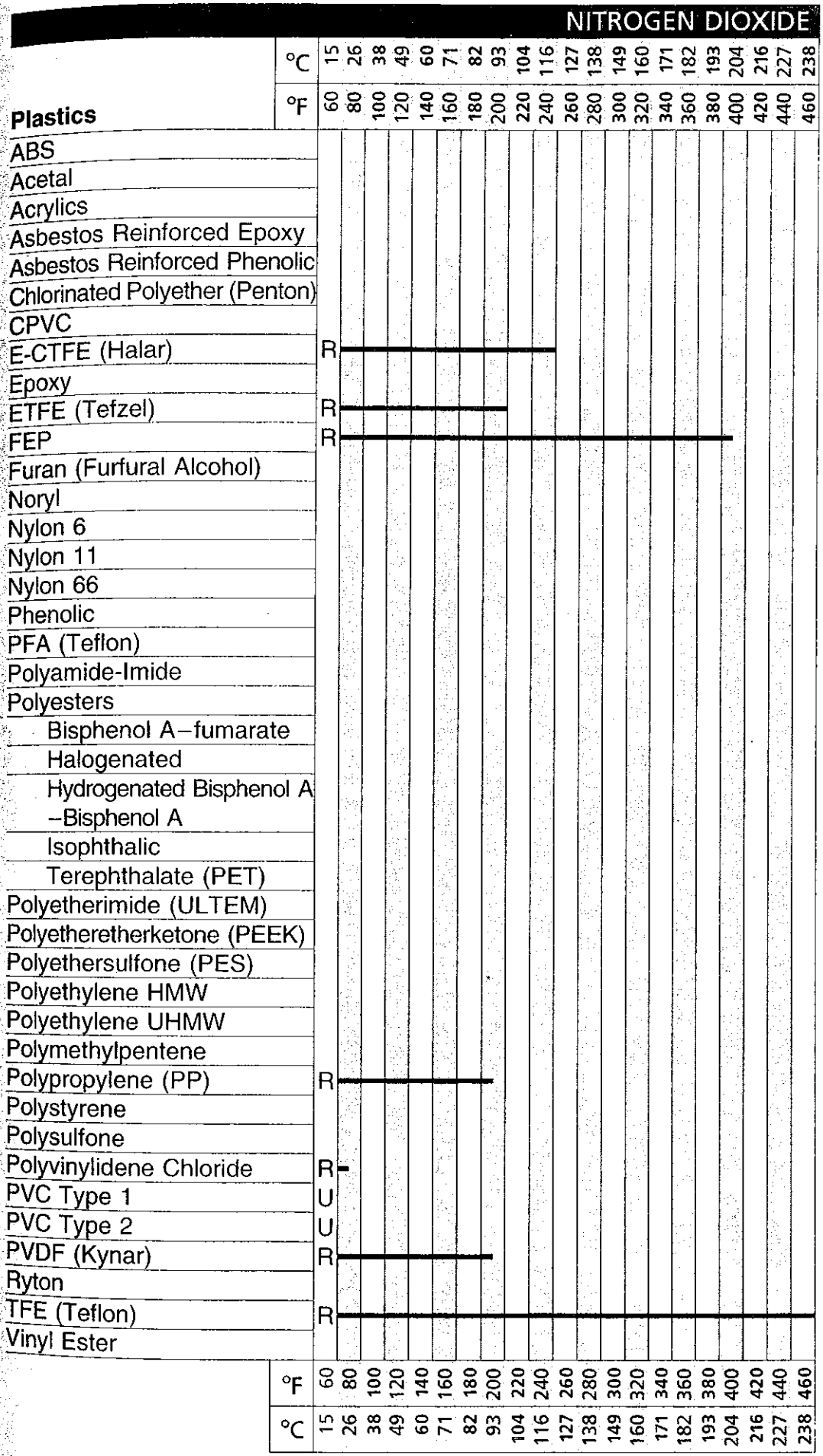



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## NITROGEN DIOXIDE

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | R | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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# NITROMETHANE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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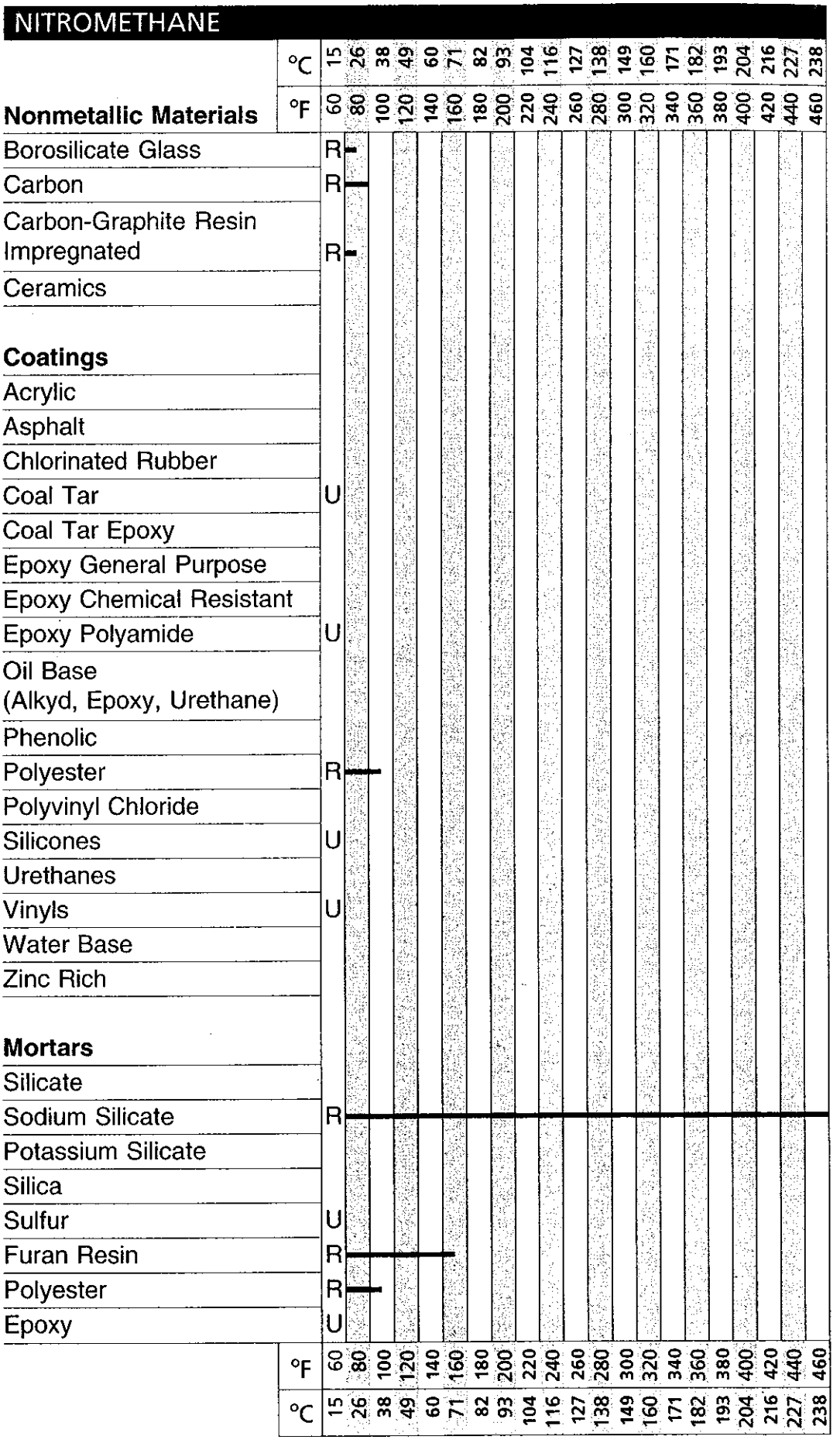
# NITROMETHANE







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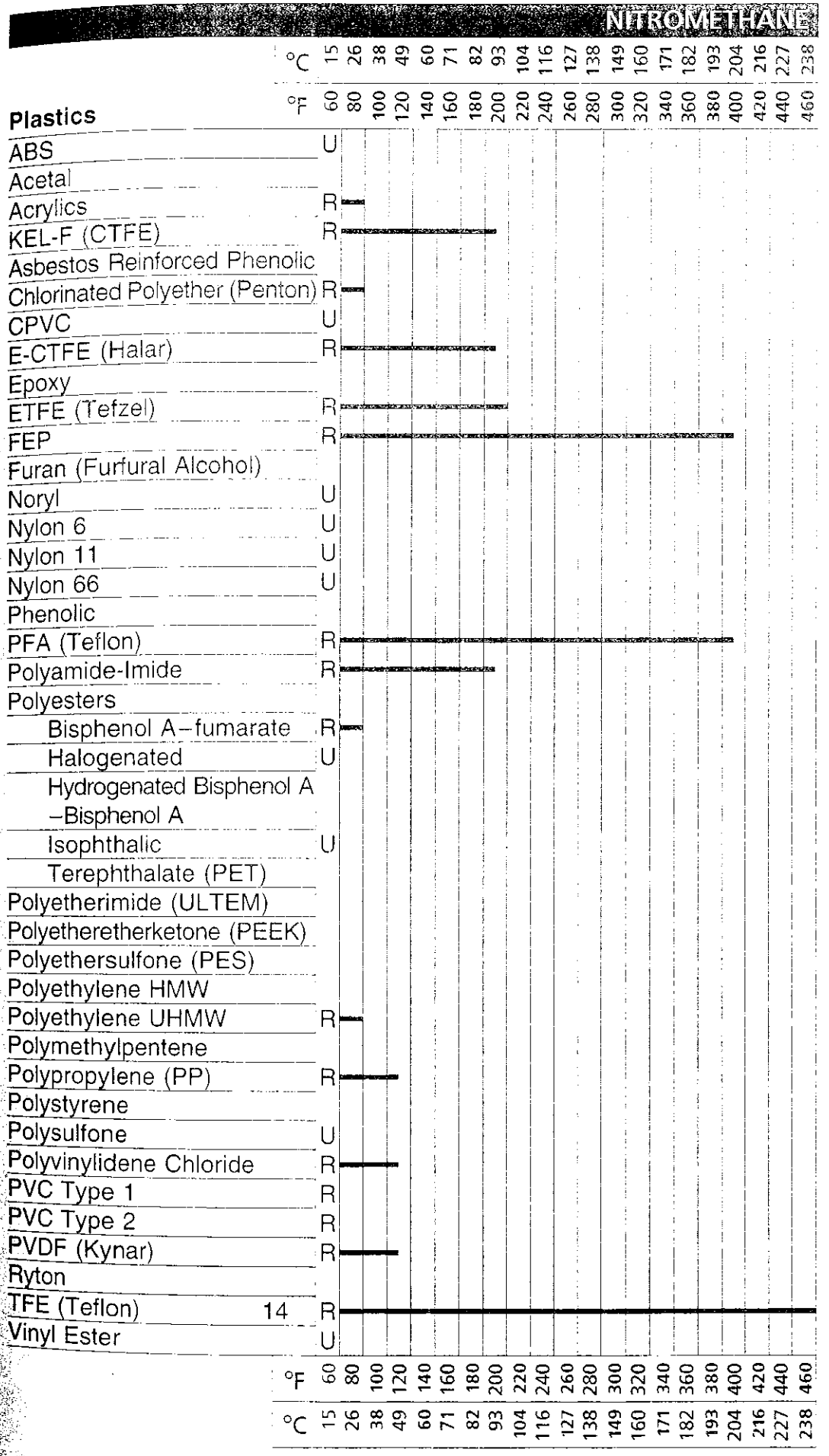




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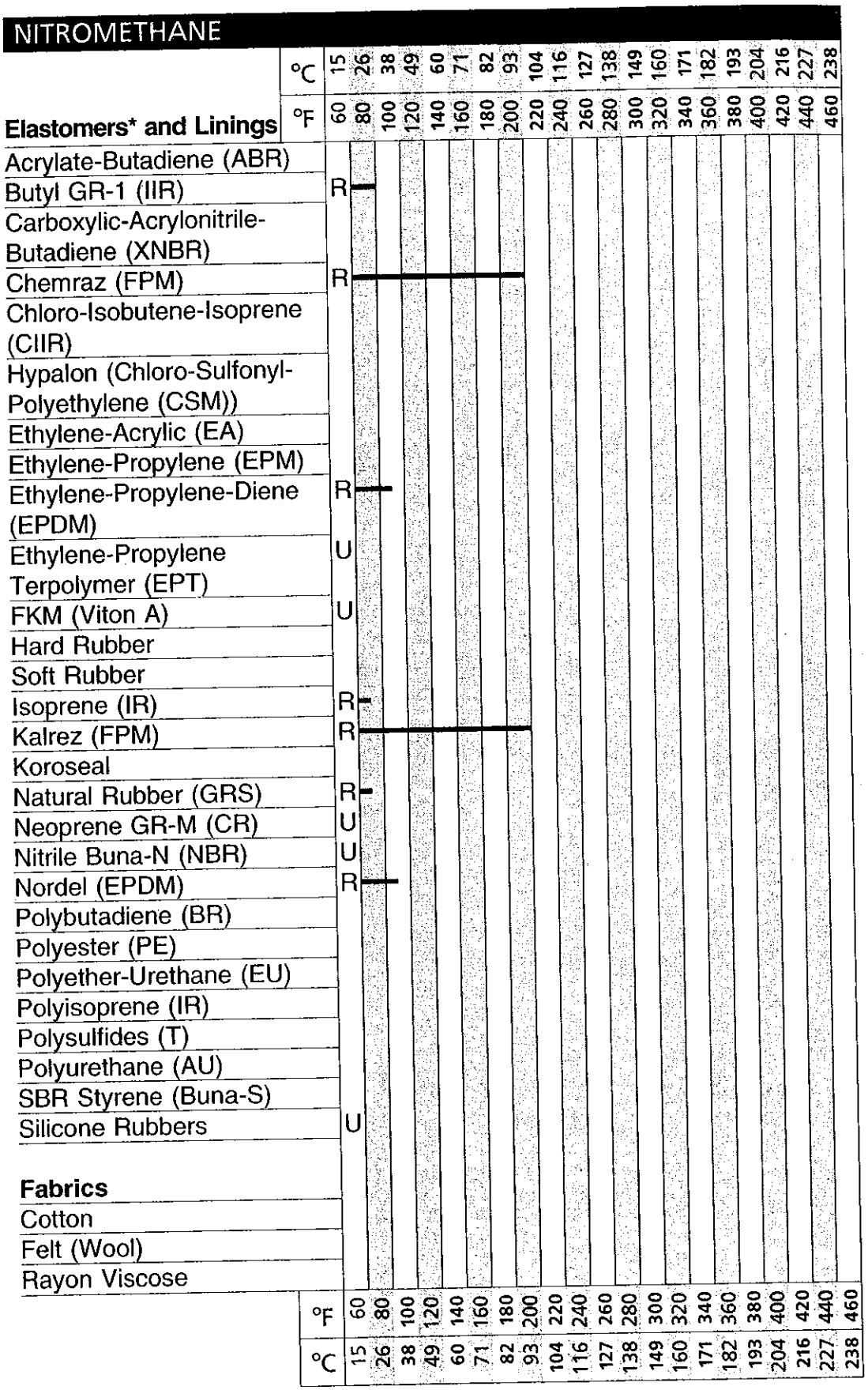


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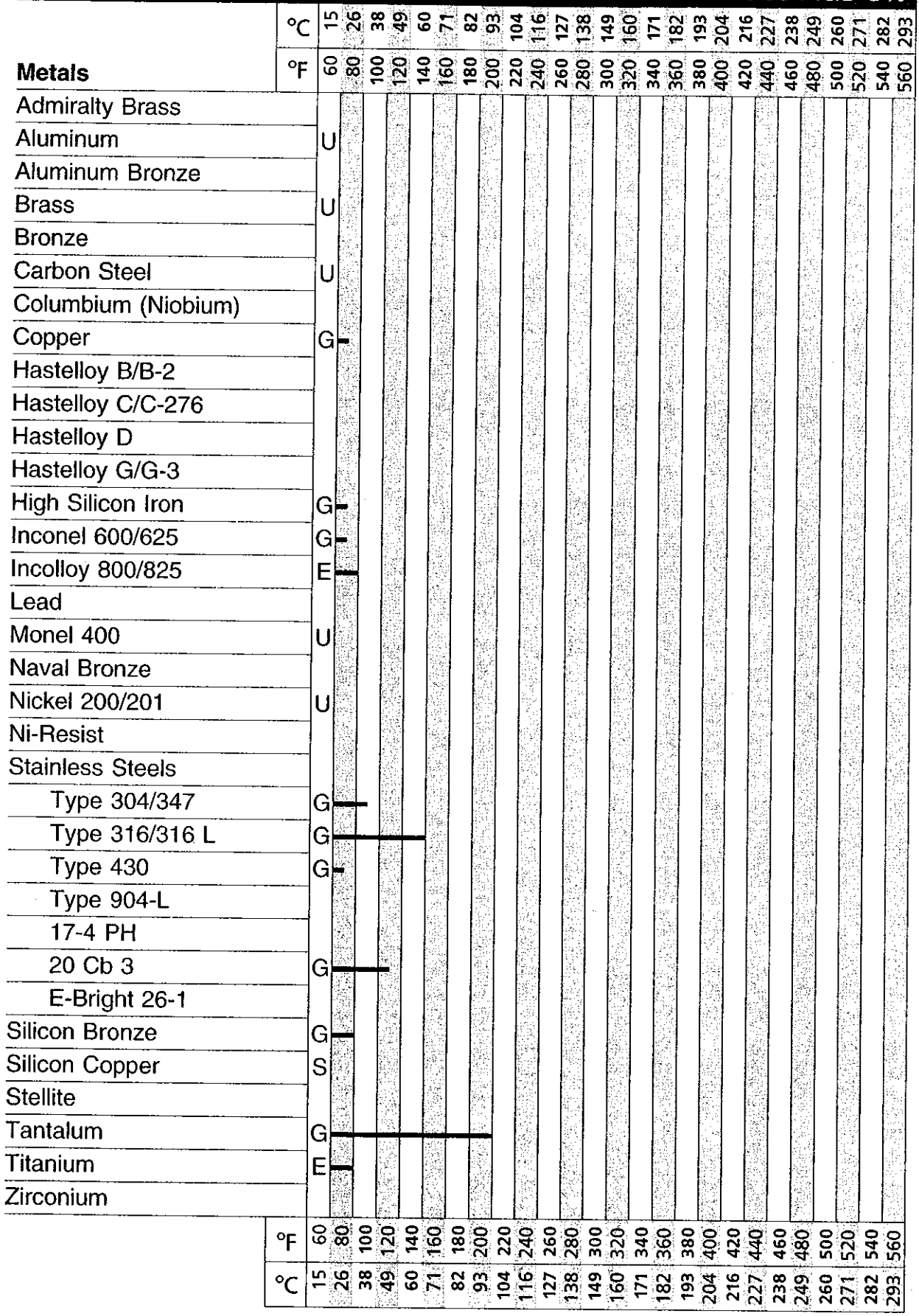


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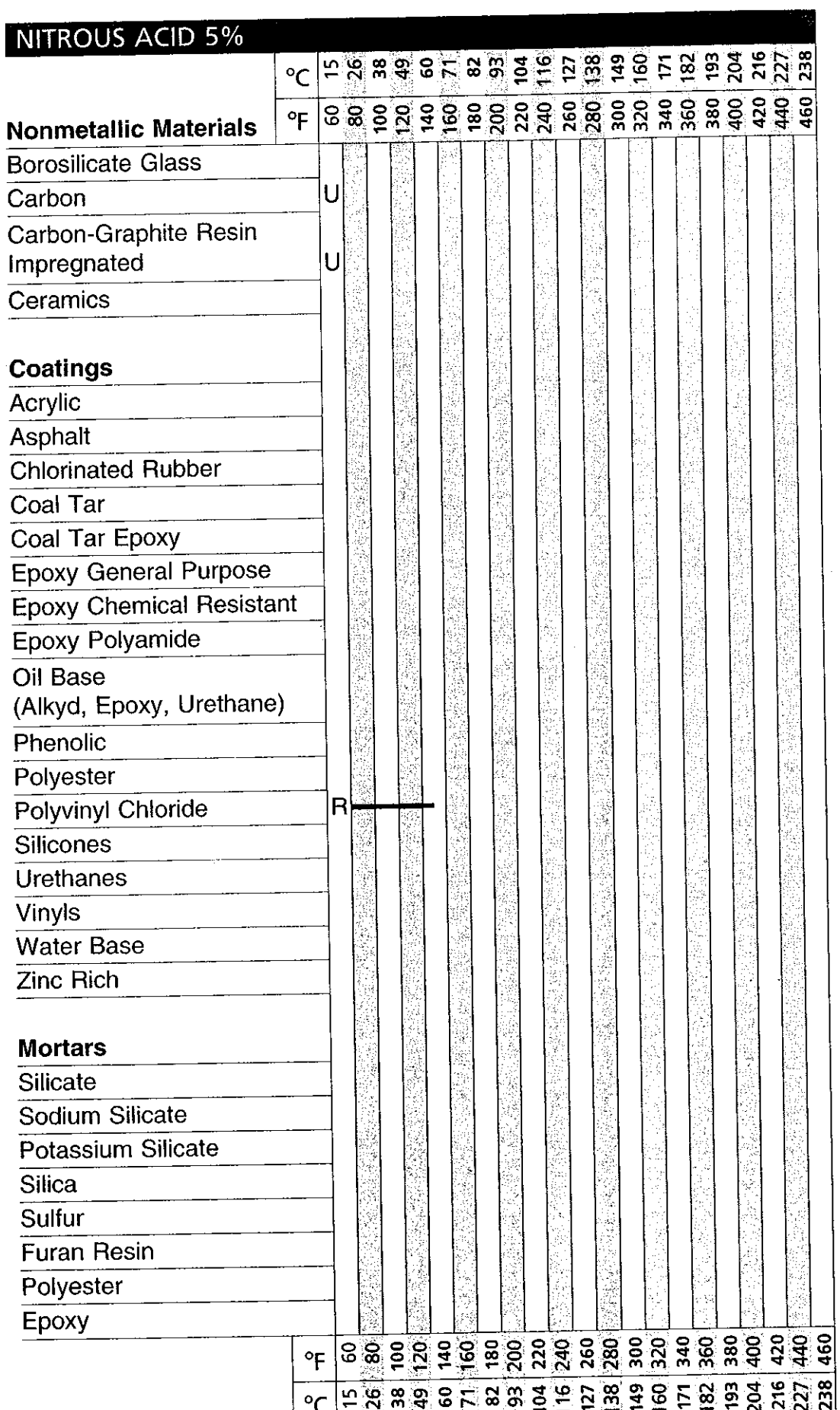




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## NITROUS ACID 5%

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | R | |
| Epoxy | U | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | U | |
| Noryl | | |
| Nylon 6 | U | |
| Nylon 11 | | |
| Nylon 66 | U | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | R | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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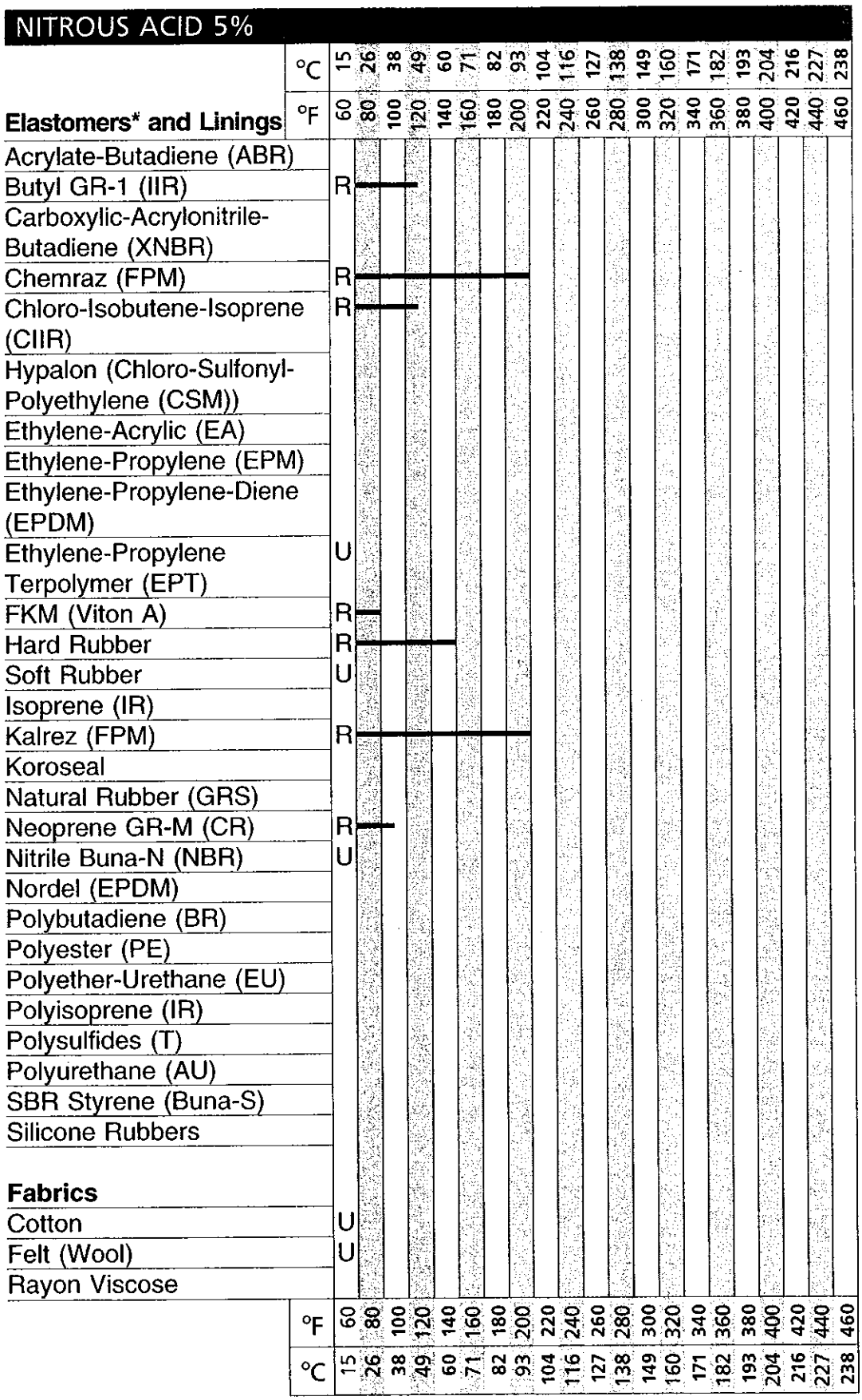


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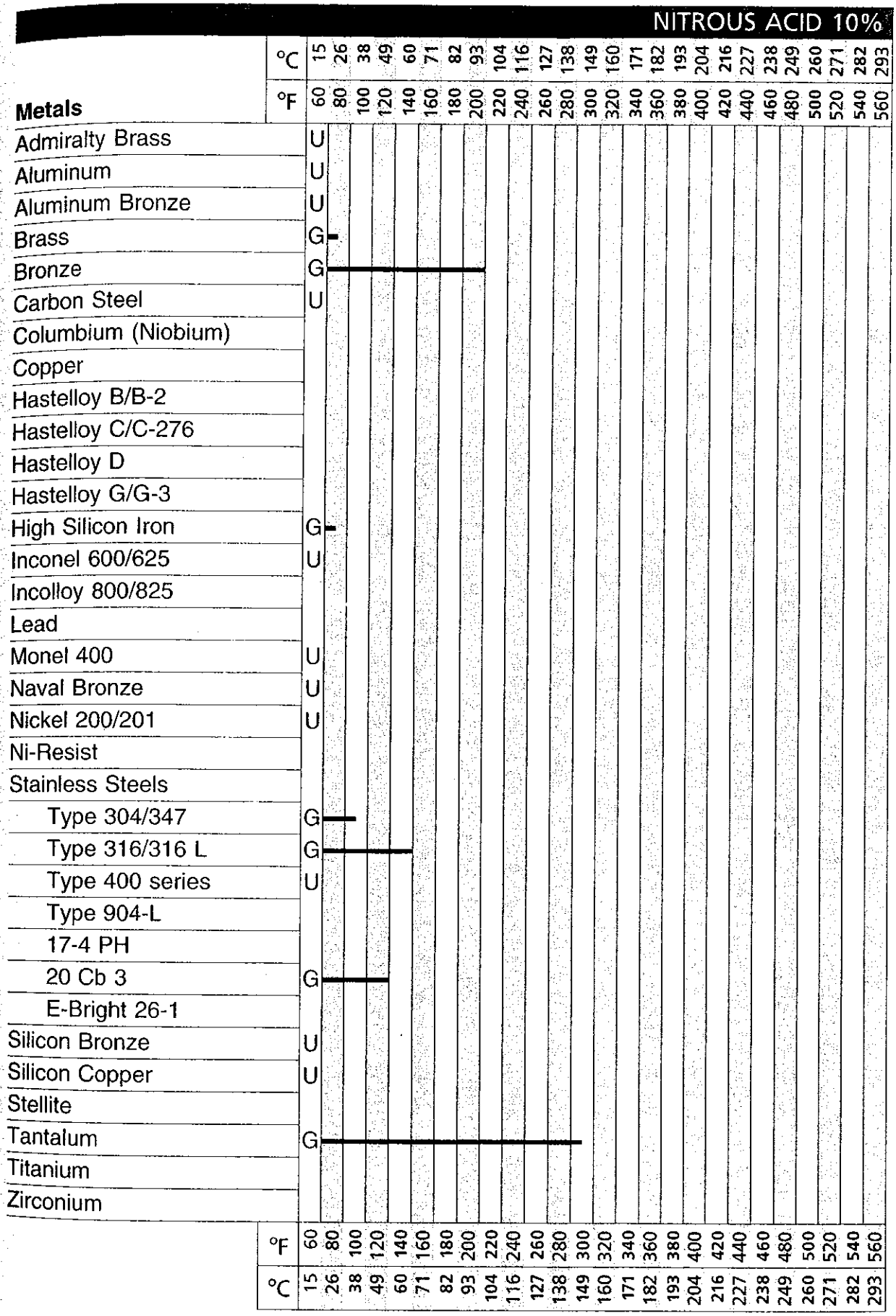


FOR METALS

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## NITROUS ACID 10%

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | U | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | U | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# NITROUS ACID 10%

| Plastics | °F | °C |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | U | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | U | |
| Noryl | | |
| Nylon 6 | U | |
| Nylon 11 | | |
| Nylon 66 | U | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | R | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

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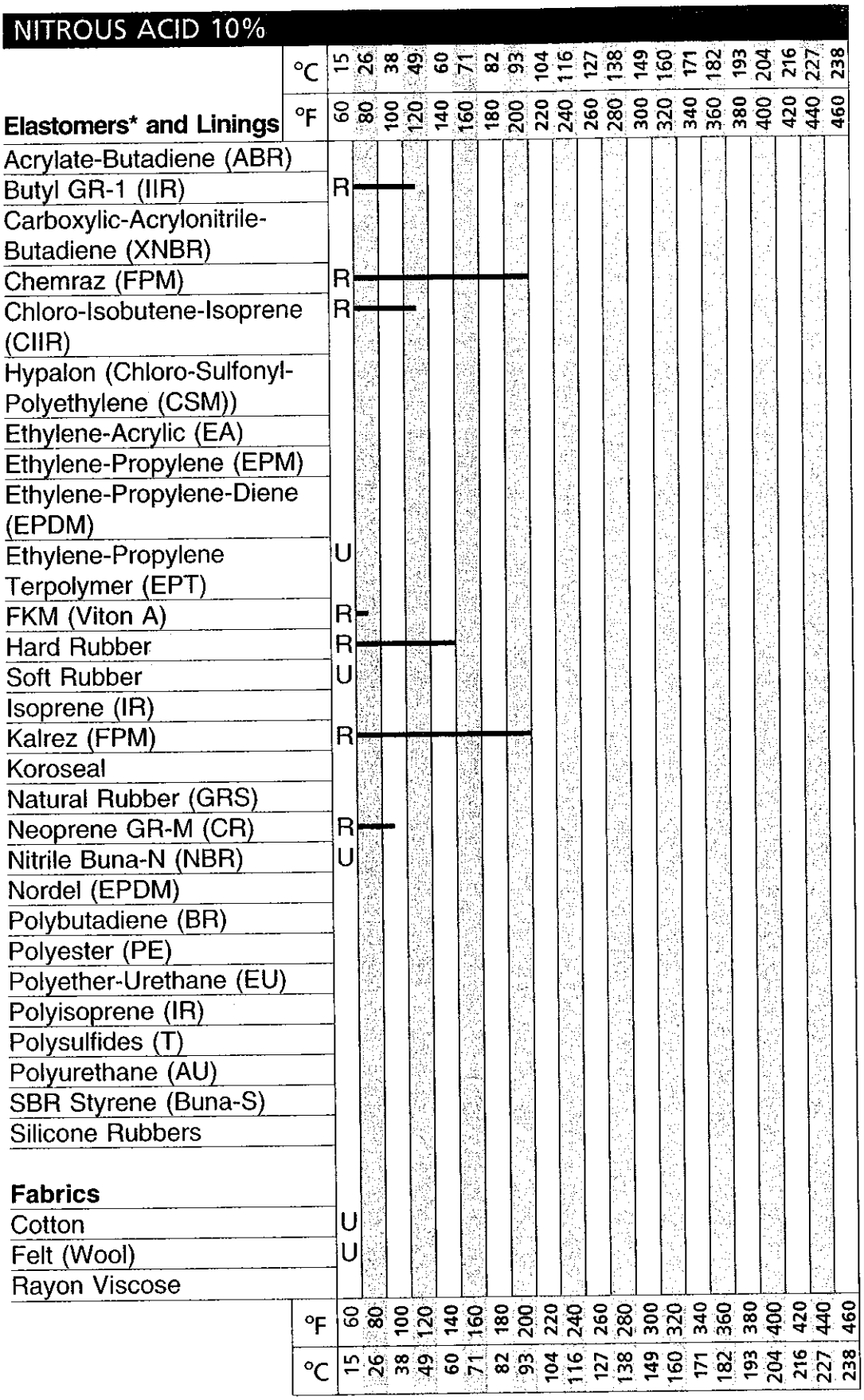
## NITROUS ACID 10%




*See also Nylon 11 under PLASTICS





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# NITROUS ACID (CONC.)

| Metals | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | 10% | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | 10% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | 10% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | 10% | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## NITROUS ACID (CONC.)

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | U | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | U | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | U | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | U | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | U | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | U | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | U | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |





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## NITROUS ACID (CONC.)

| Plastics | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | R | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | U | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | R | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | U | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | R | | | | | | | | | | | | | | | | | | | | | |
| FEP | | R | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | U | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | U | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | U | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | U | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | U | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | R | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | R | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | R | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | R | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | U | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | R | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | R | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | R | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | 10% | R | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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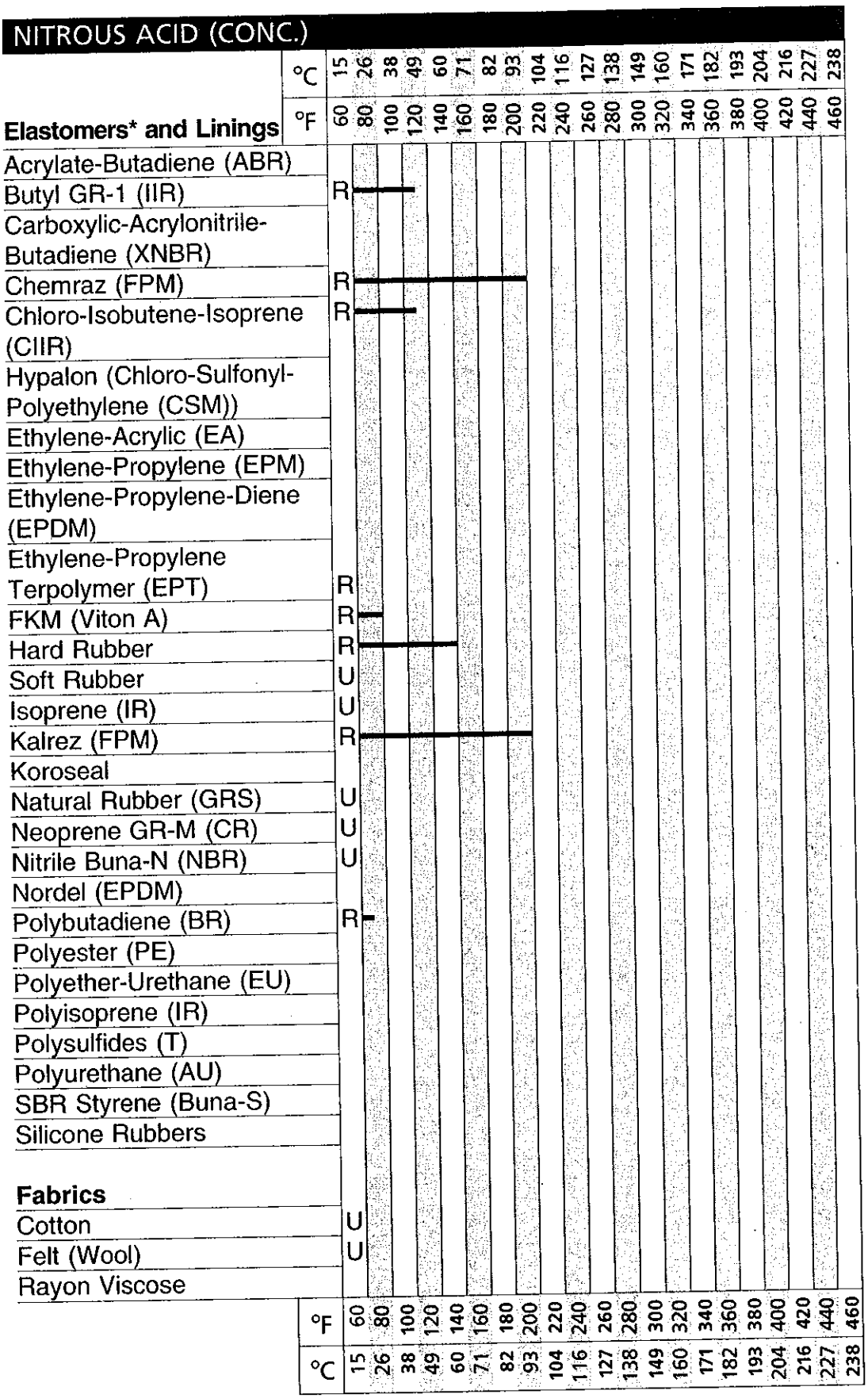


*See also Nylon 11 under PLASTICS





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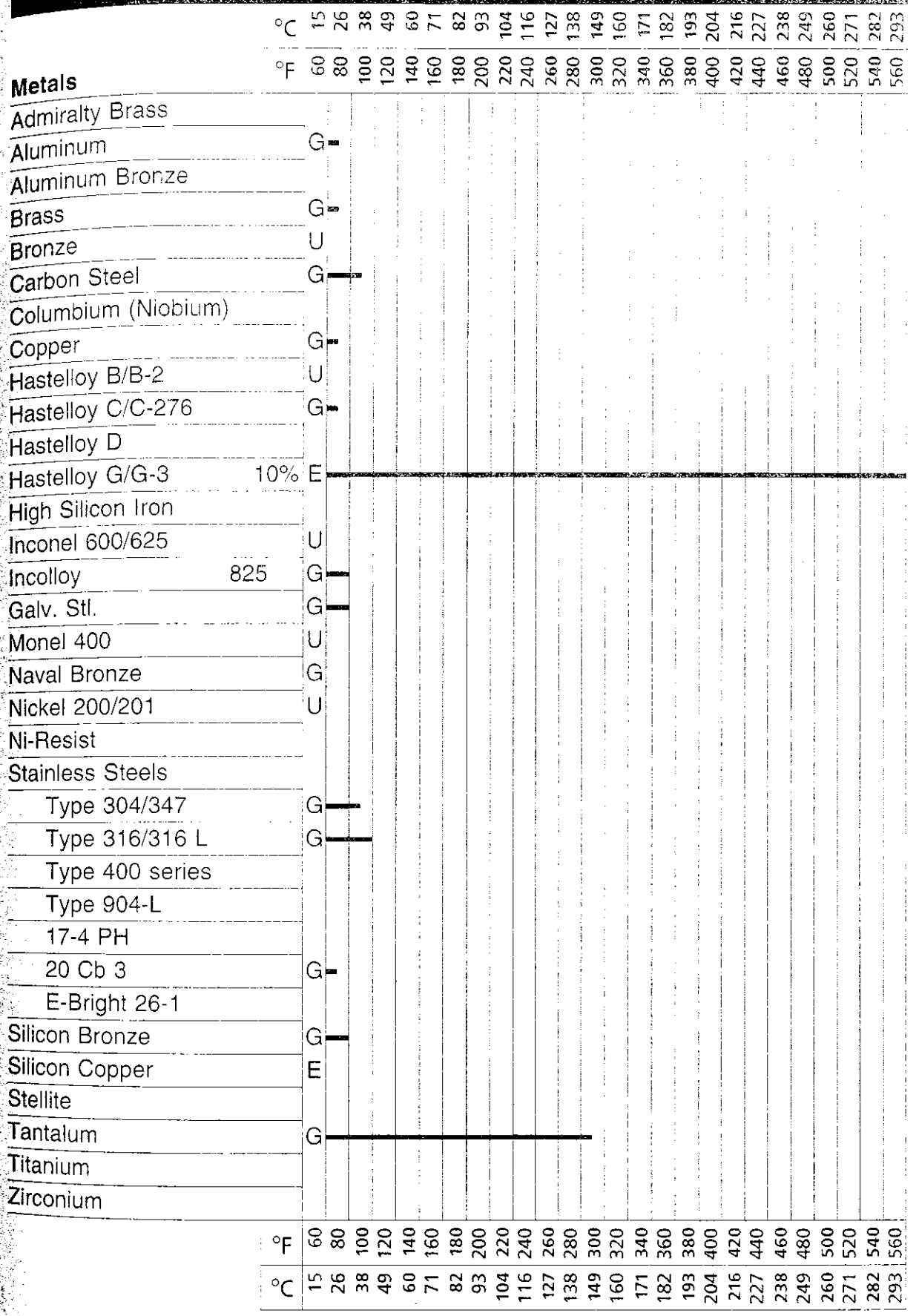


FOR METALS

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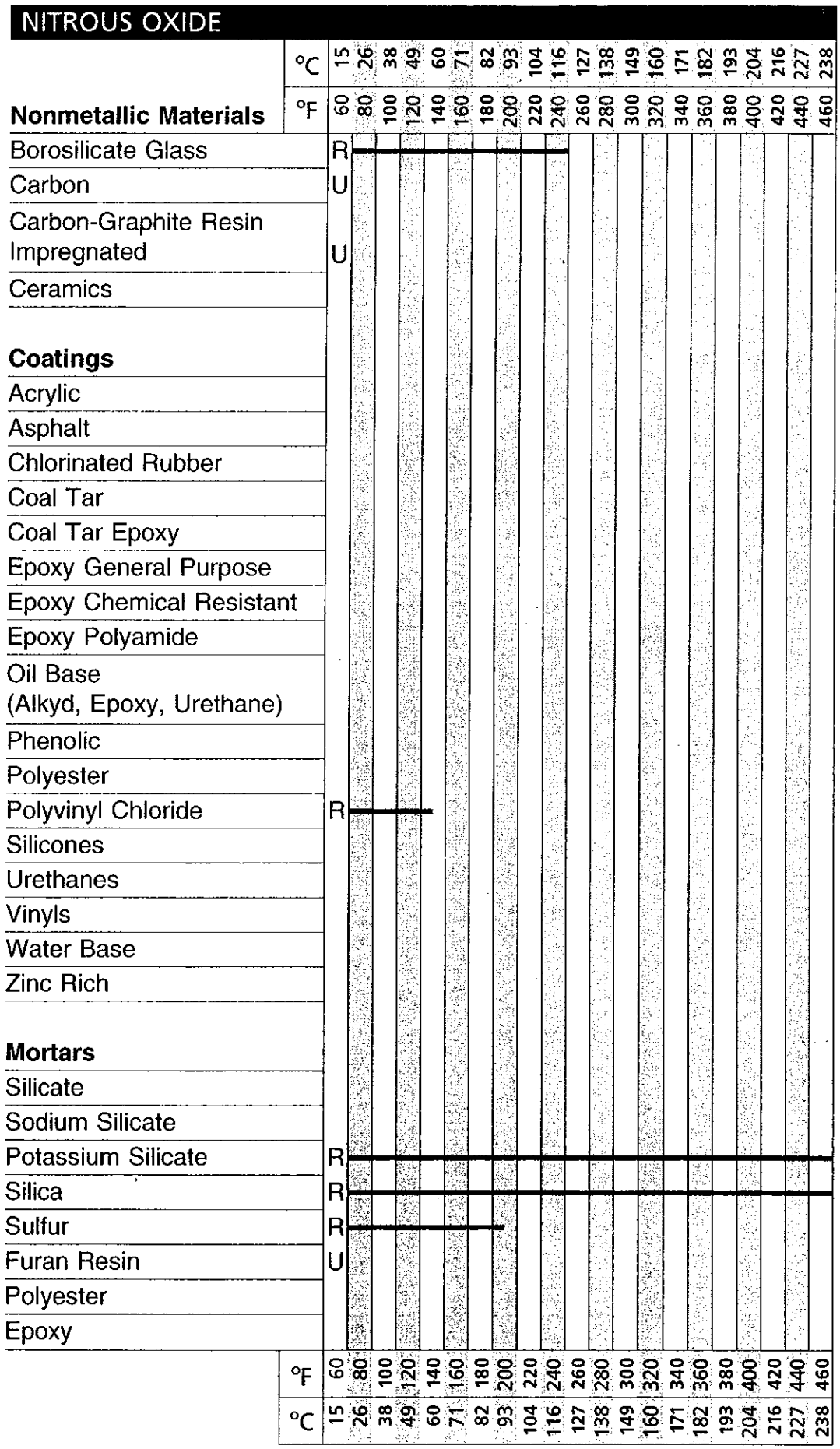
## NITROUS OXIDE



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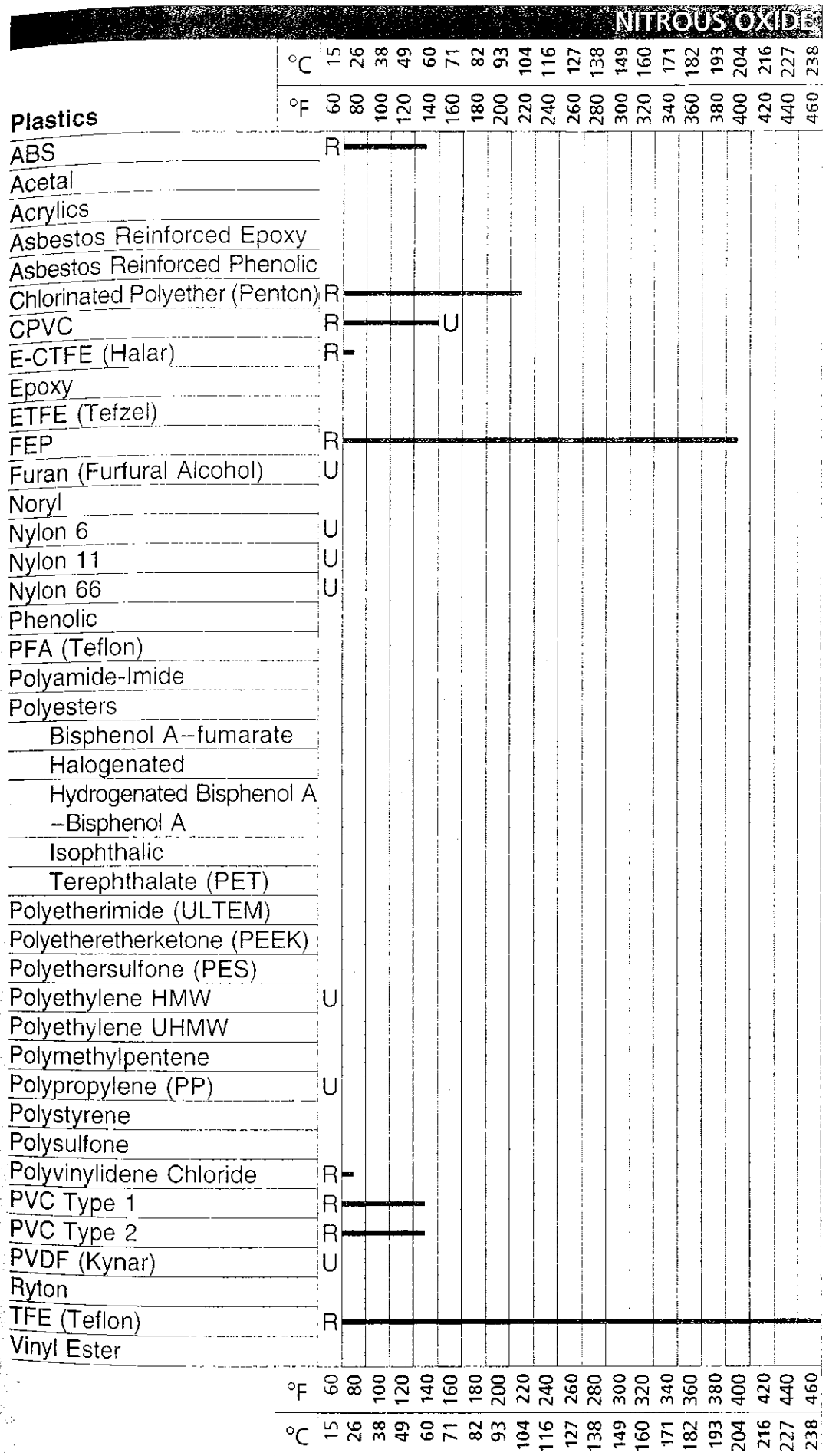


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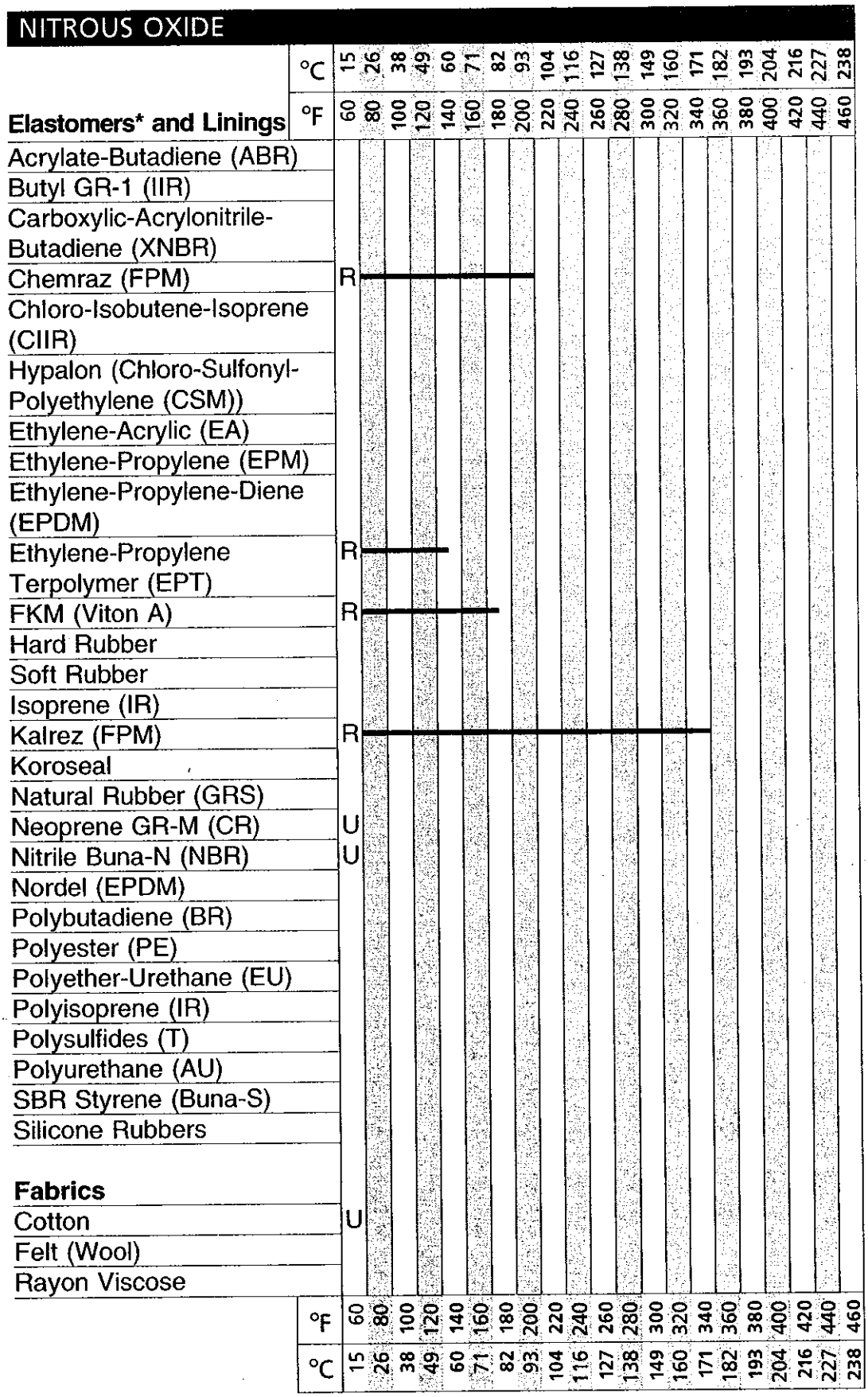


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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

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R = Resistant

U = Unsatisfactory

Schweitzer/*Corrosion Resistance Tables: Fifth Edition, Revised and Expanded* DOI: 10.1081/5672-X-120029643

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## OCENOL

| Nonmetallic Materials | °C | °F |
|---|---|---|
| Borosilicate Glass | | |
| Carbon | | |
| Carbon-Graphite Resin Impregnated | | |
| Ceramics | | |
| **Coatings** | | |
| Acrylic | | |
| Asphalt | | |
| Chlorinated Rubber | | |
| Coal Tar | | |
| Coal Tar Epoxy | | |
| Epoxy General Purpose | | |
| Epoxy Chemical Resistant | | |
| Epoxy Polyamide | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | |
| Phenolic | | |
| Polyester | | |
| Polyvinyl Chloride | R | |
| Silicones | | |
| Urethanes | | |
| Vinyls | | |
| Water Base | | |
| Zinc Rich | | |
| **Mortars** | | |
| Silicate | | |
| Sodium Silicate | | |
| Potassium Silicate | | |
| Silica | | |
| Sulfur | | |
| Furan Resin | | |
| Polyester | | |
| Epoxy | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460



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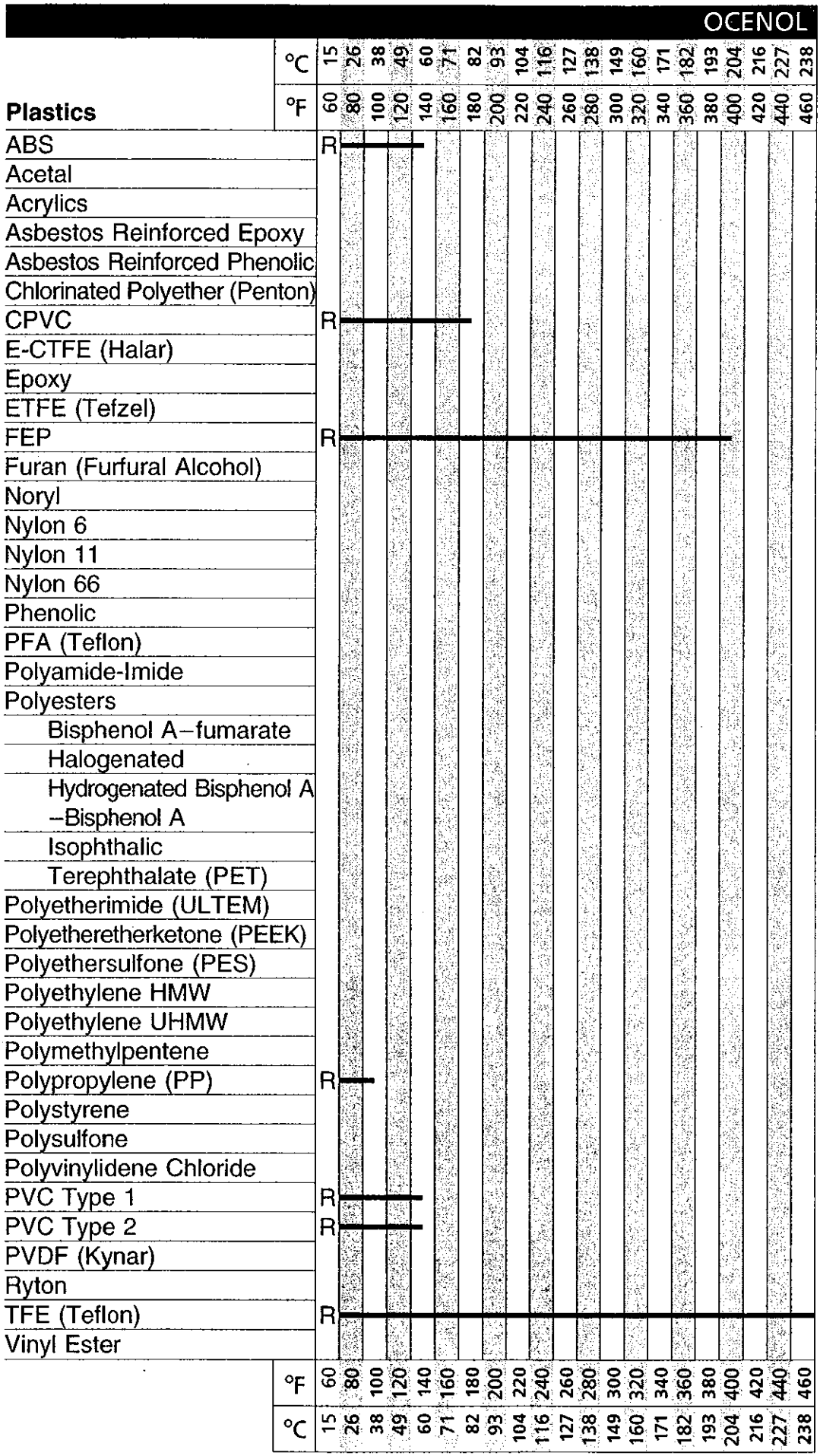



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## OCENOL

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## OCTANE

| Nonmetallic Materials | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | U | | | | | | | | | | | | | | | | | | | | |
| Silicones | U | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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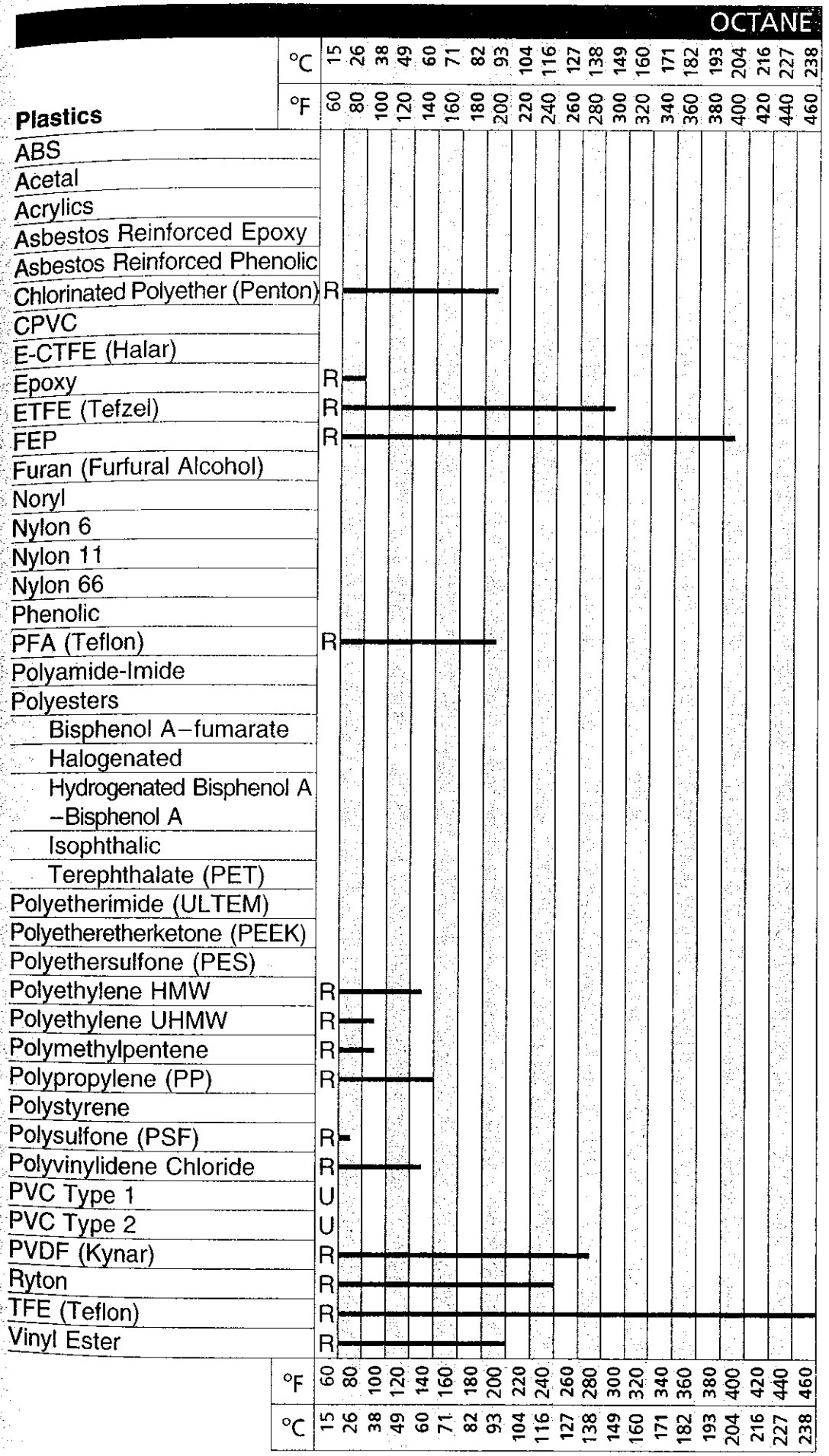



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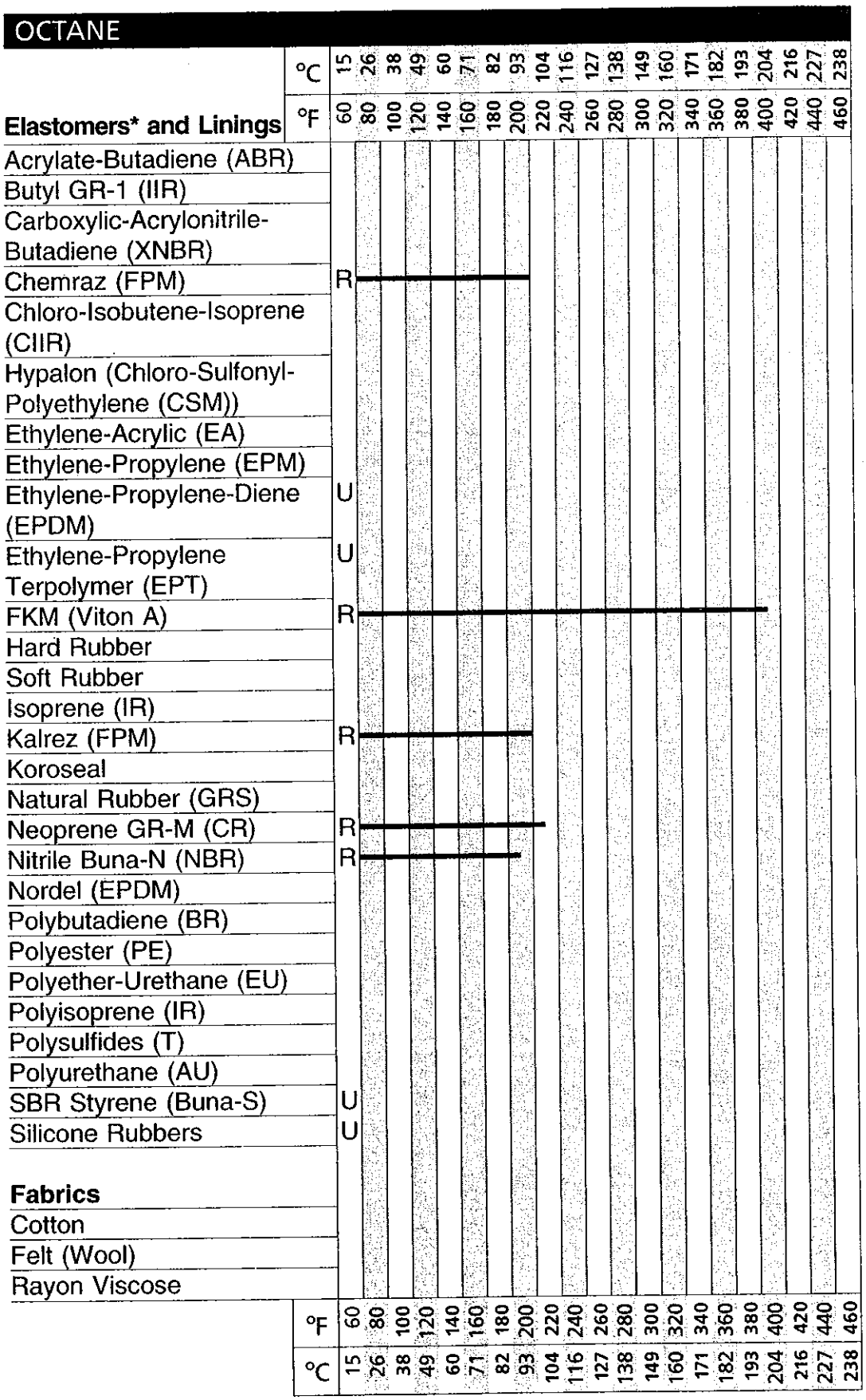
## OCTANE

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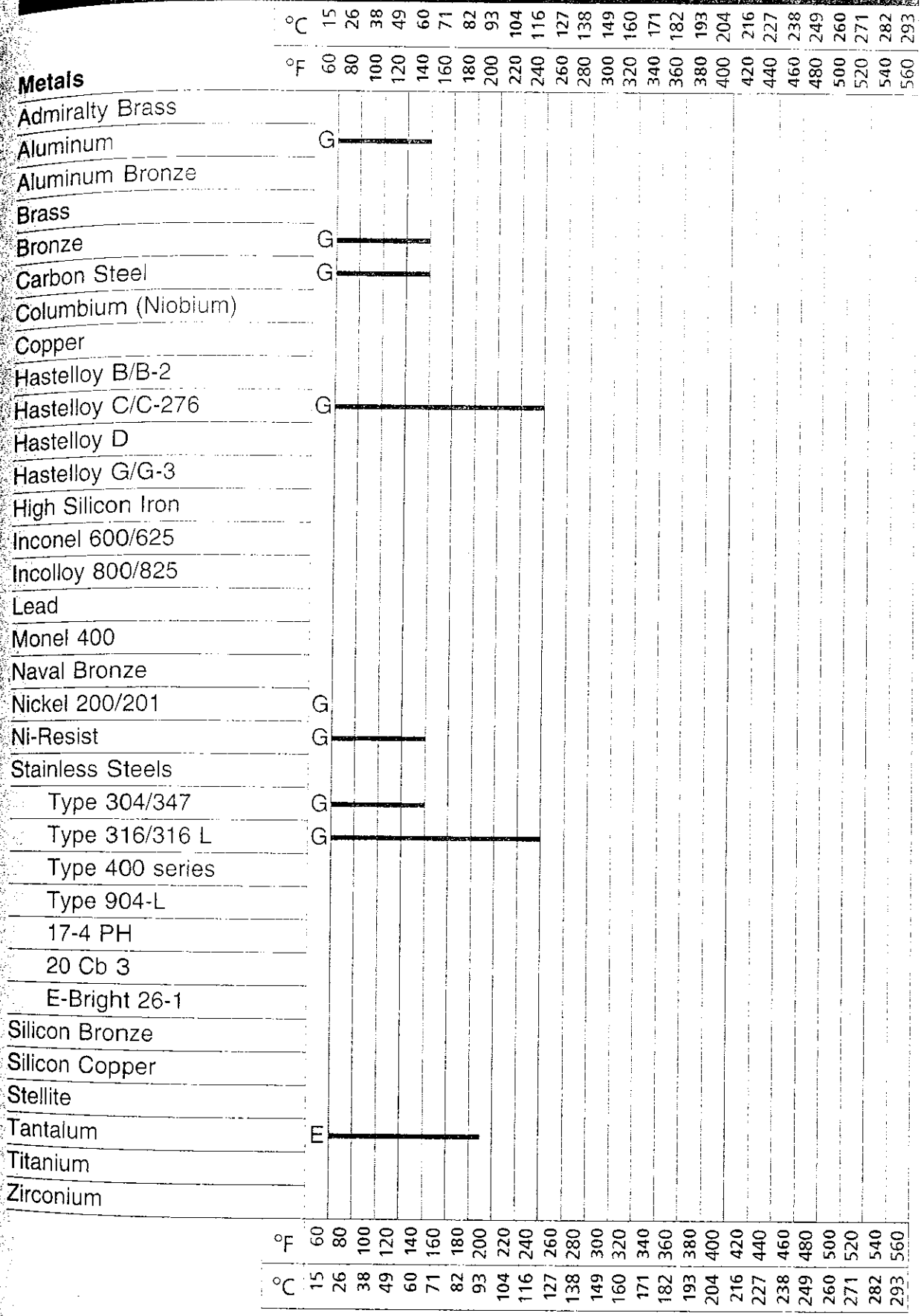


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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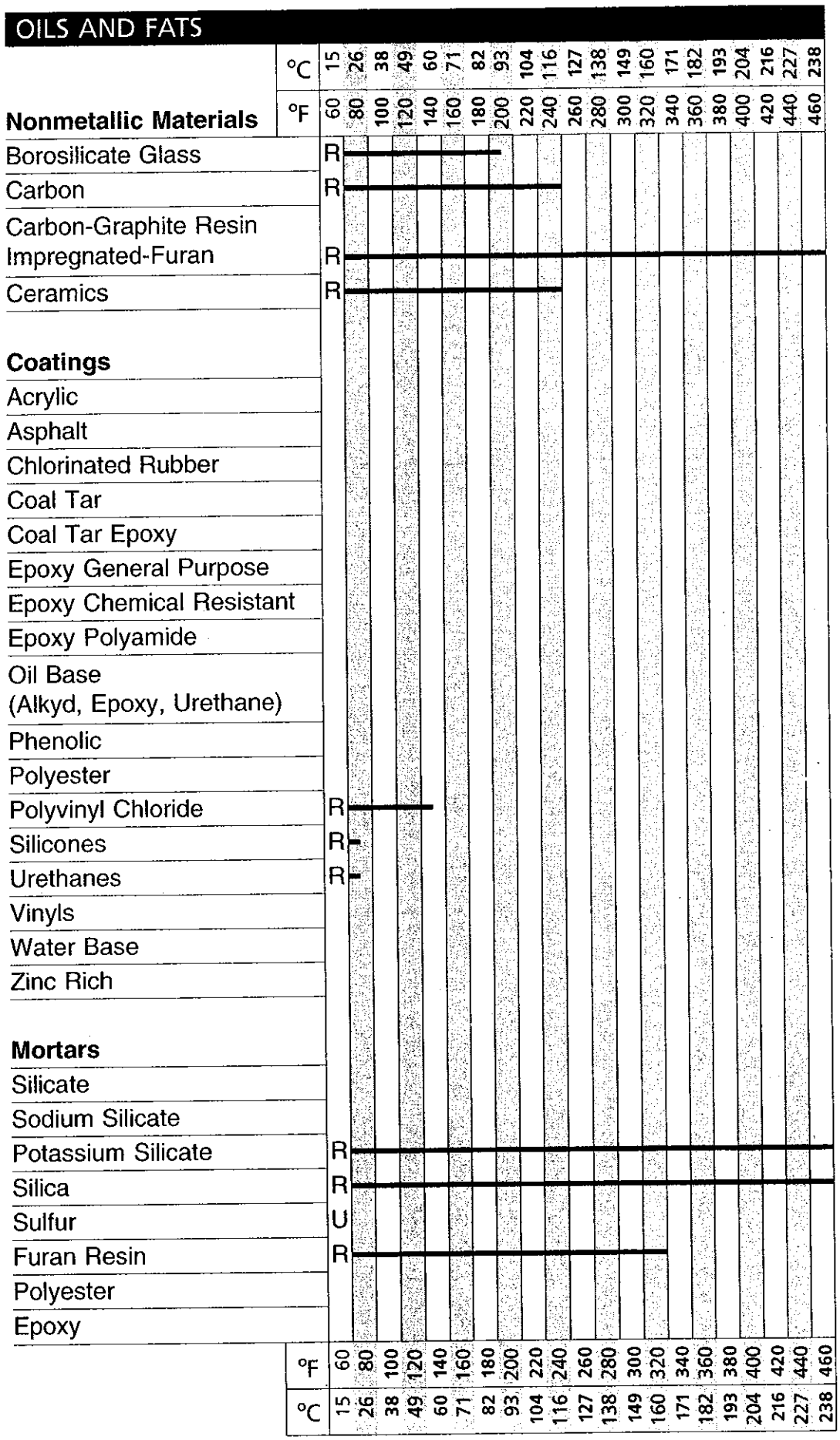
## OILS AND FATS





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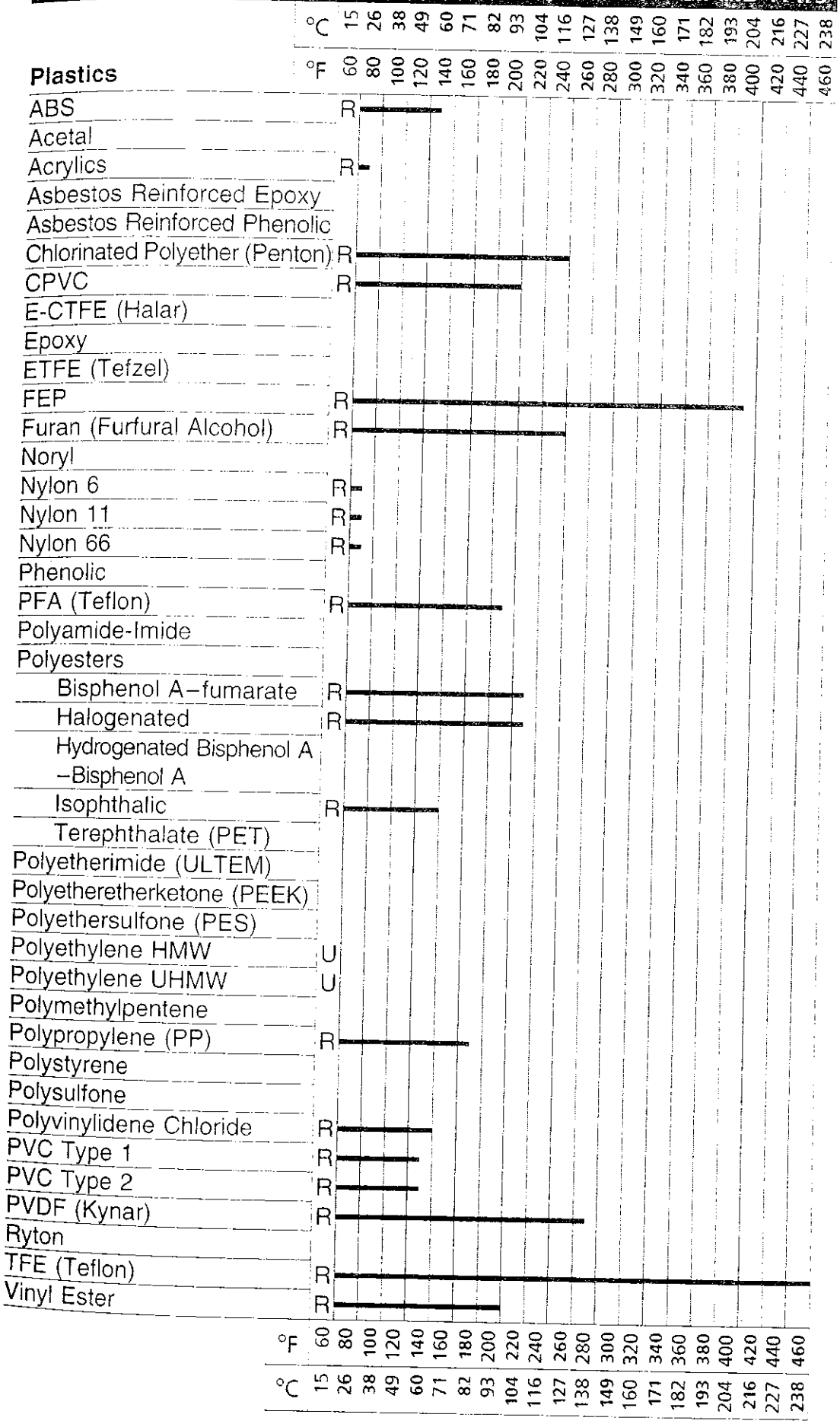


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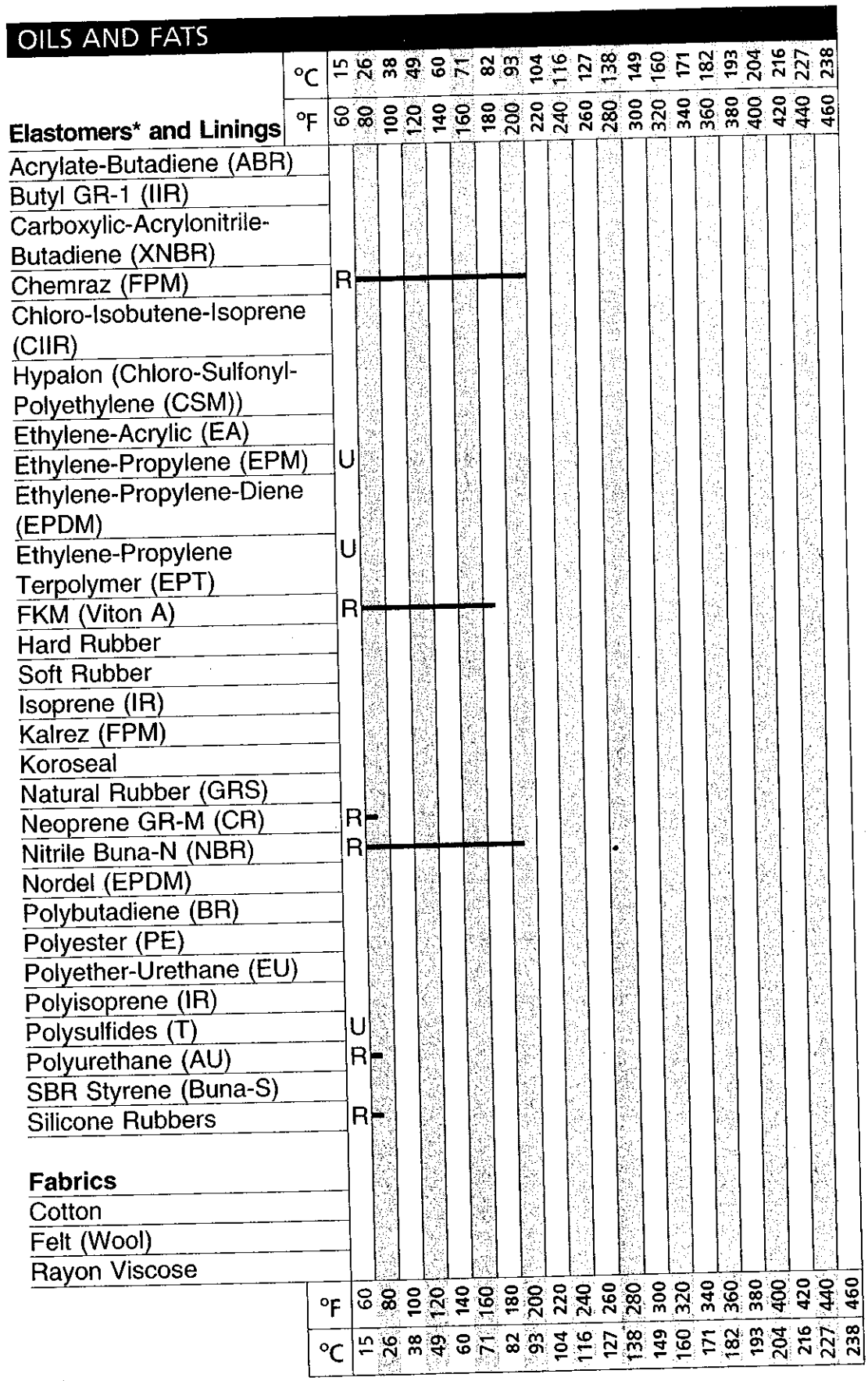


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SEE APPENDIX 3

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | E | |
| Aluminum Bronze | | |
| Brass | E | |
| Bronze | | |
| Carbon Steel | E | |
| Columbium (Niobium) | E | |
| Copper | E | |
| Hastelloy B/B-2 | E | |
| Hastelloy C/C-276 | E | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | E | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | G | |
| Naval Bronze | | |
| Nickel 200/201 | E | |
| Ni-Resist | E | |
| Stainless Steels | | |
| Type 304/347 | E | |
| Type 316 | E | |
| Type 430 | E | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | E | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | E | |
| Stellite | | |
| Tantalum | E | |
| Titanium | E | |
| Zirconium | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

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U = Unsatisfactory

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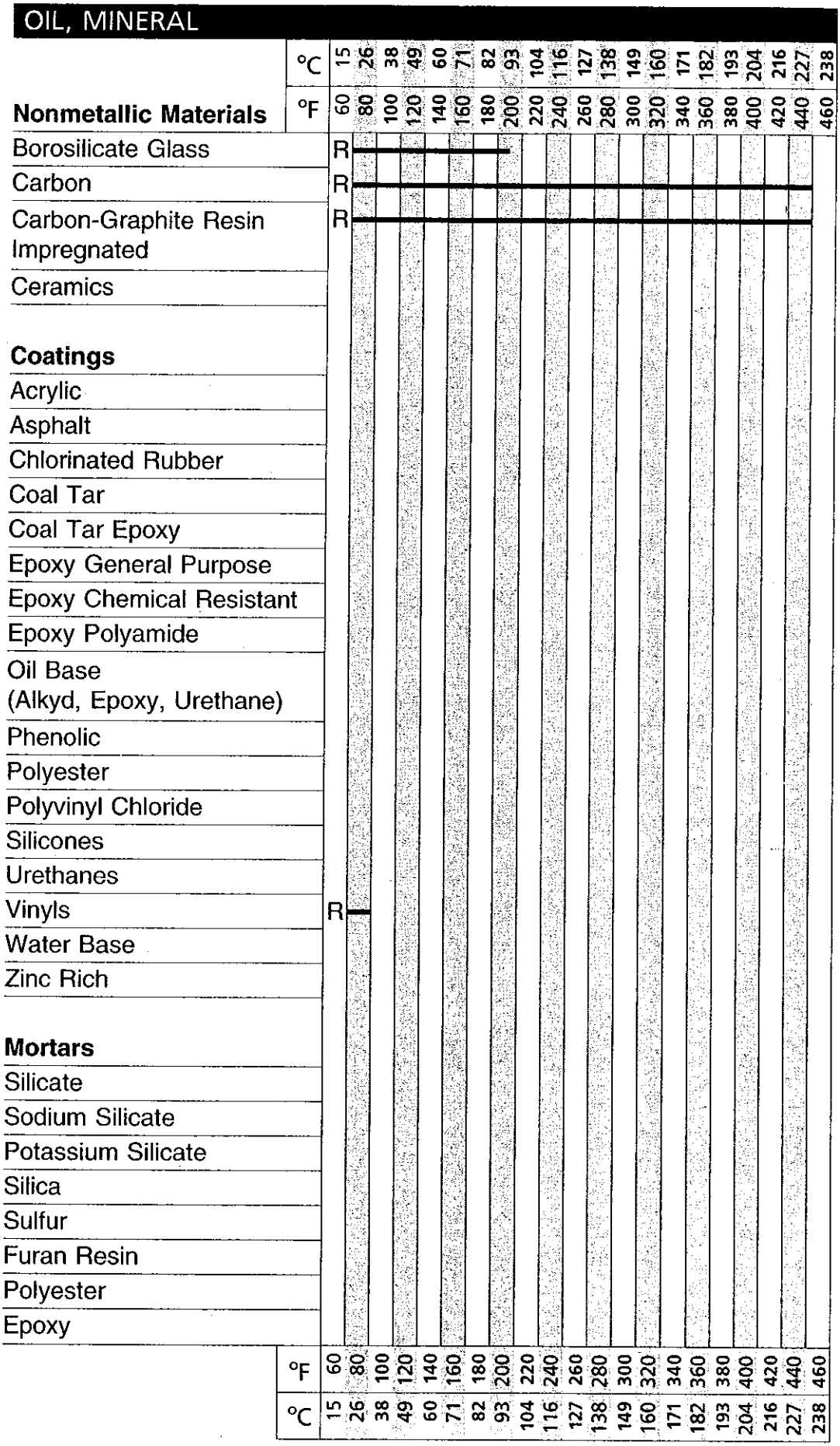
## OIL, MINERAL



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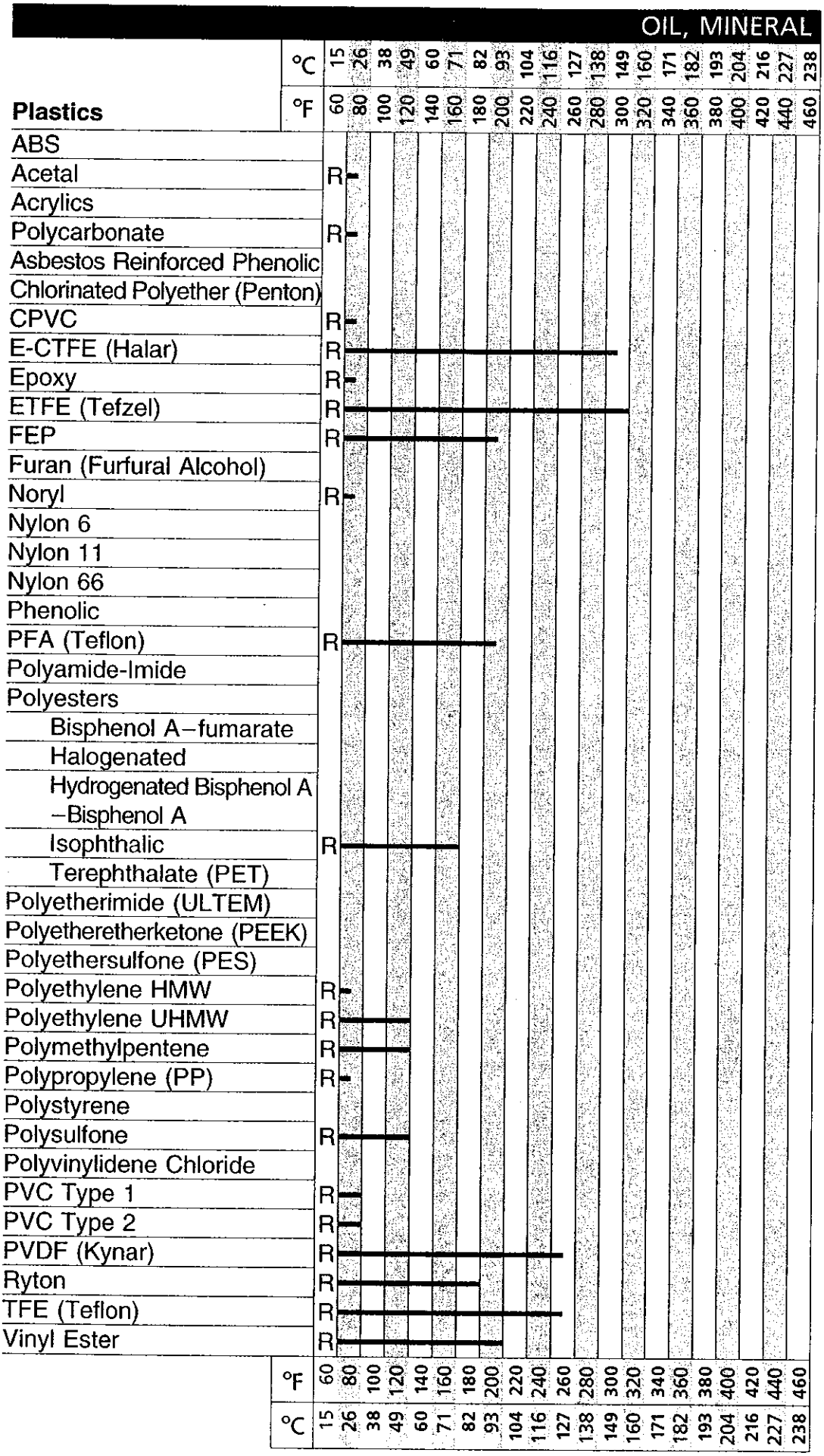



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## OIL, MINERAL

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | U | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | R | — | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | R | — | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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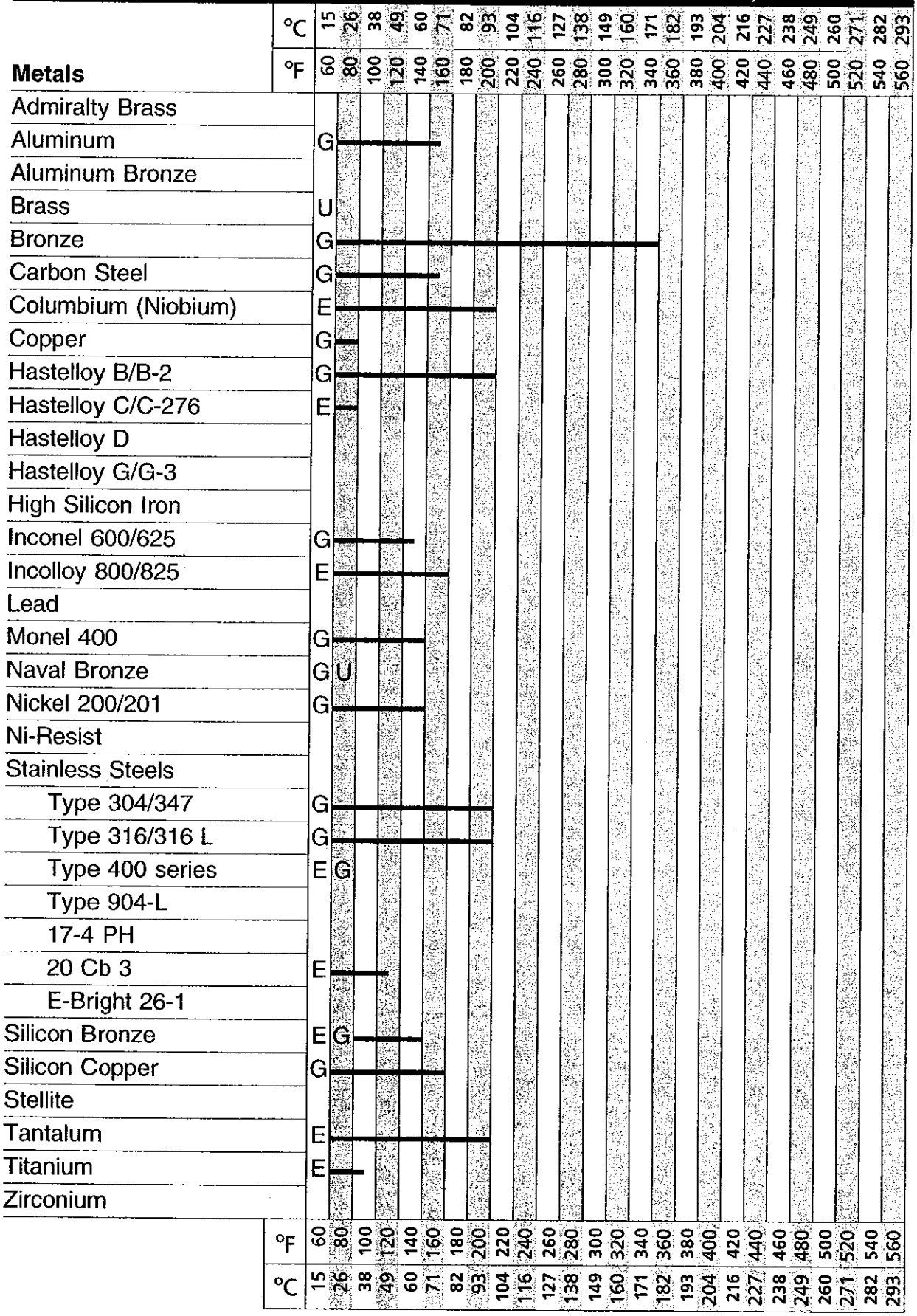


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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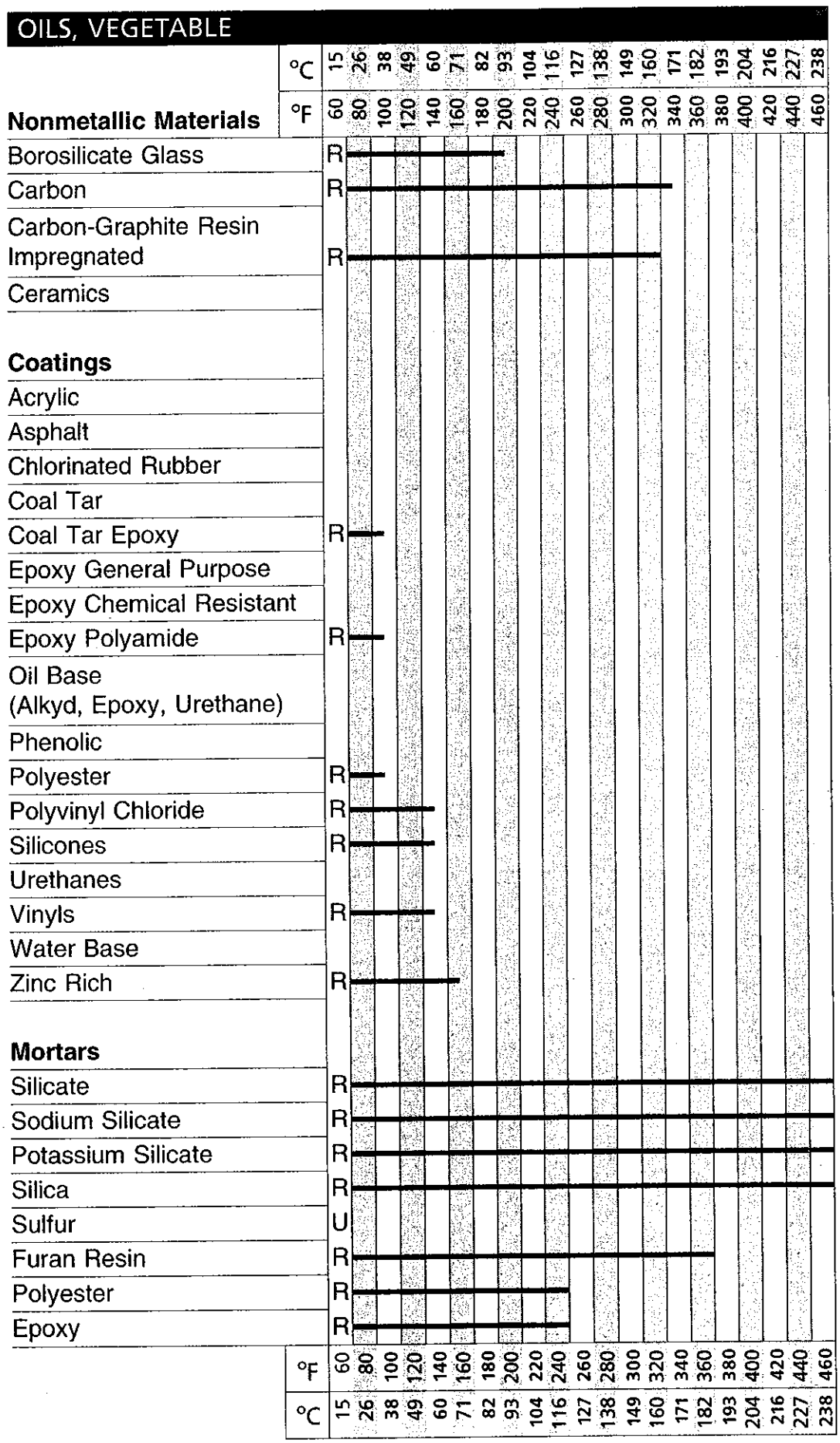
## OILS, VEGETABLE



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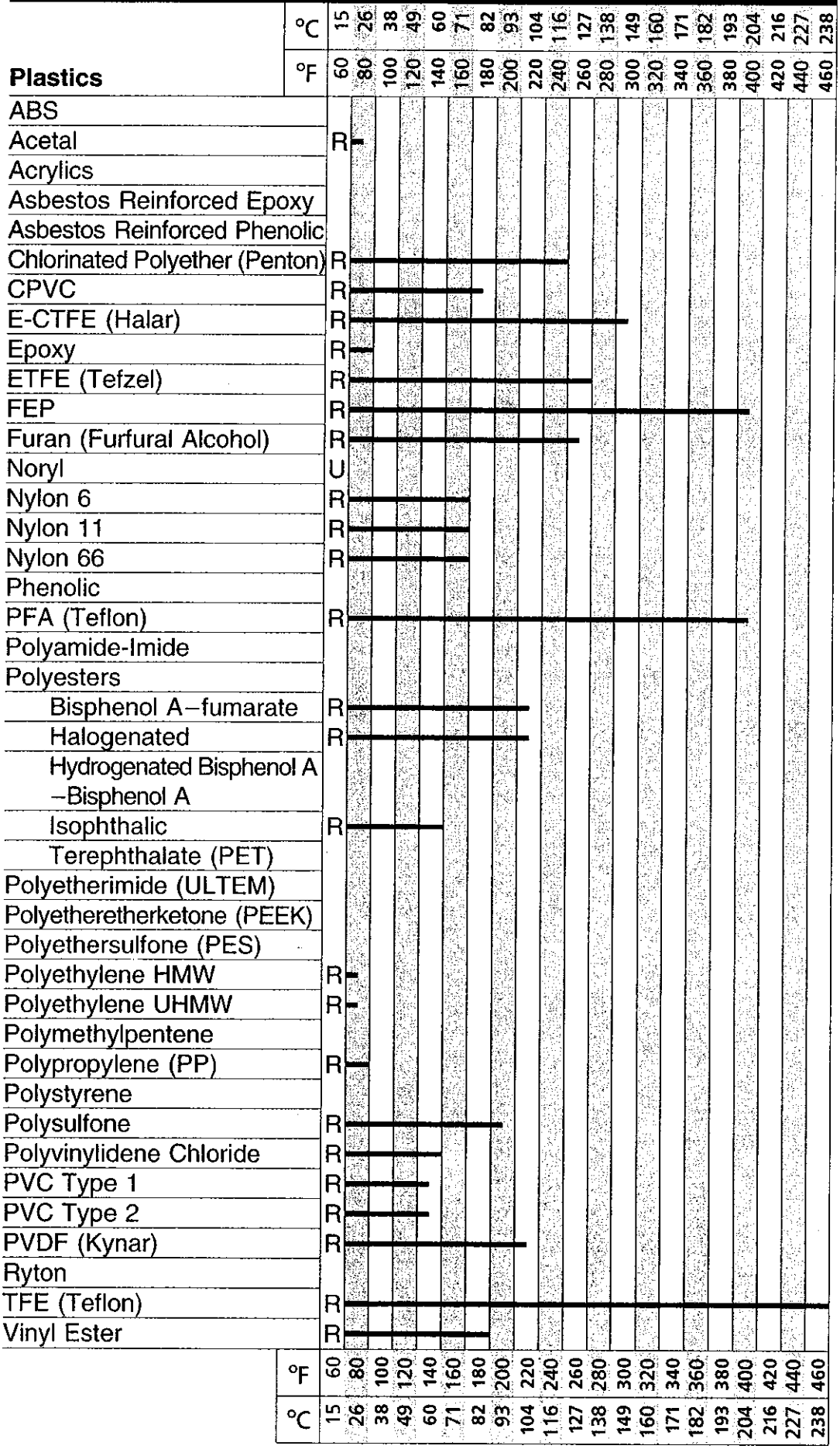


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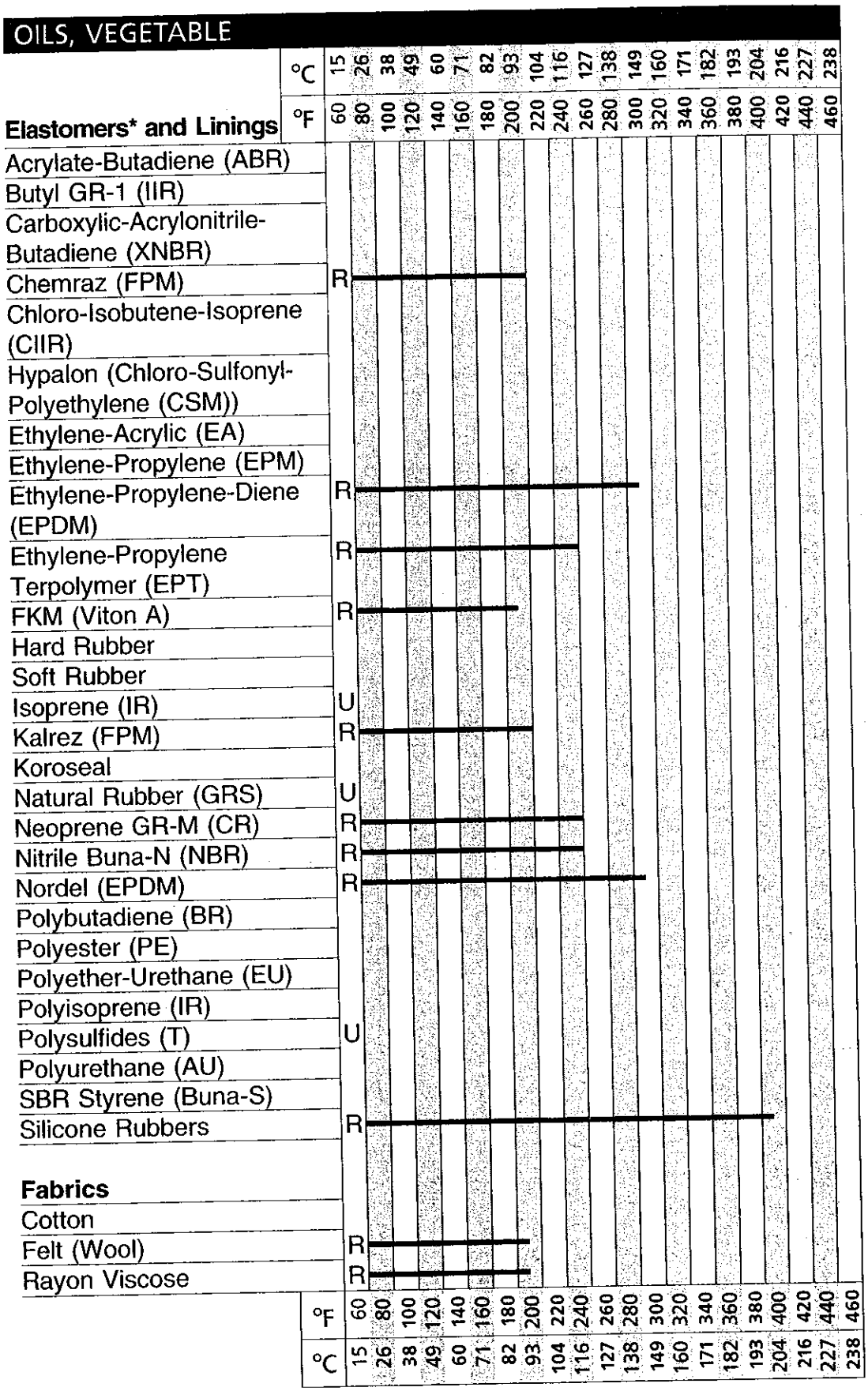


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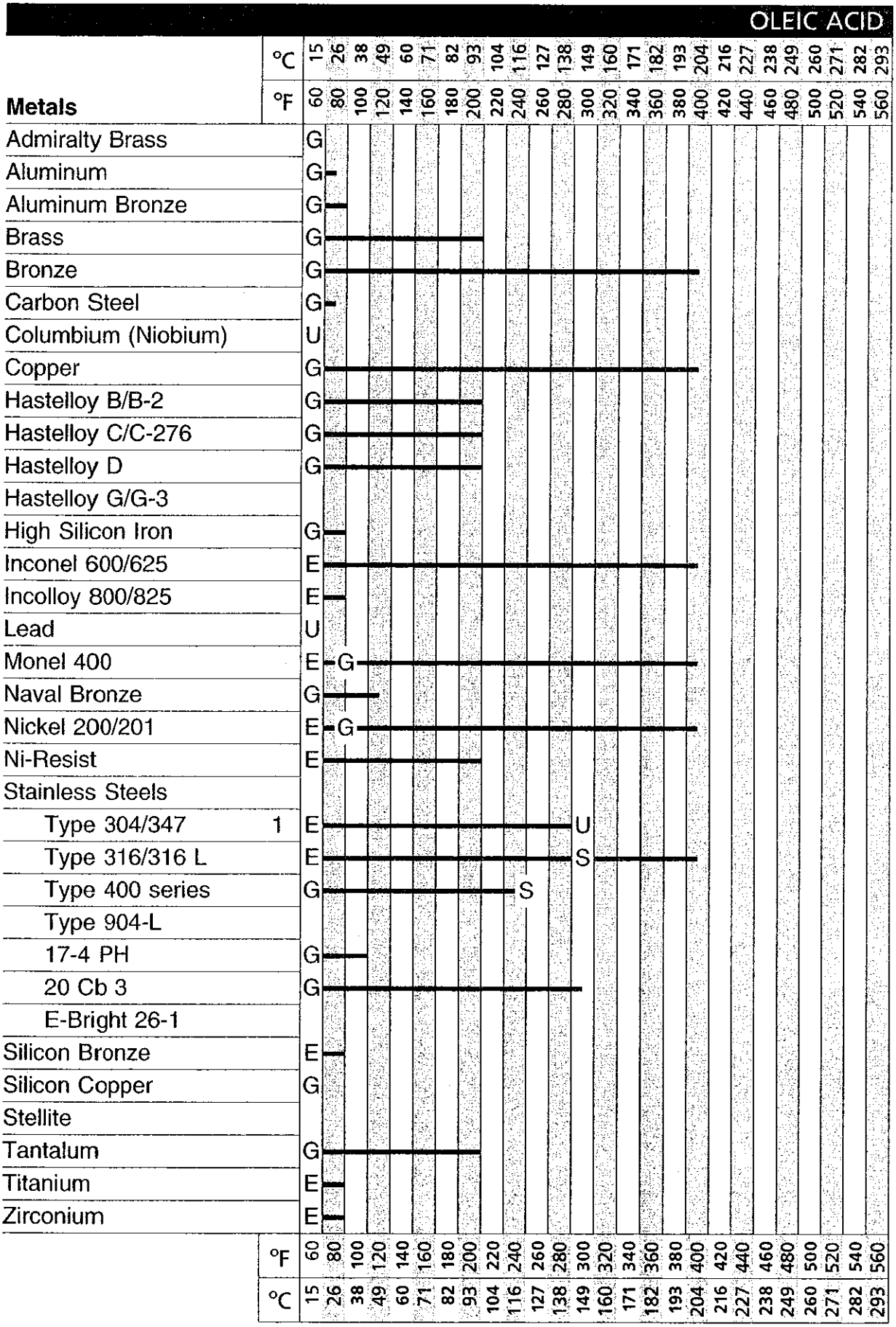


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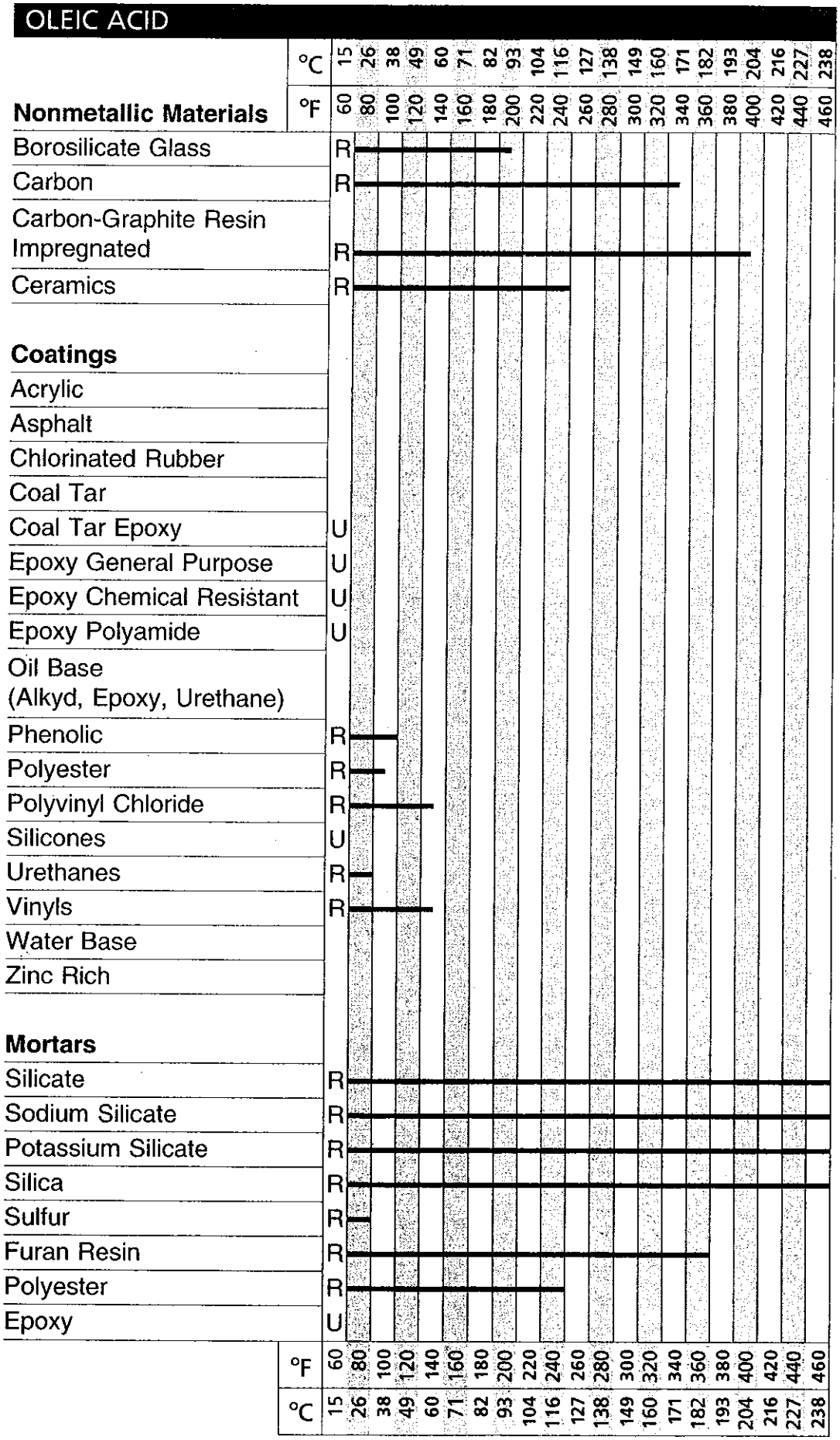




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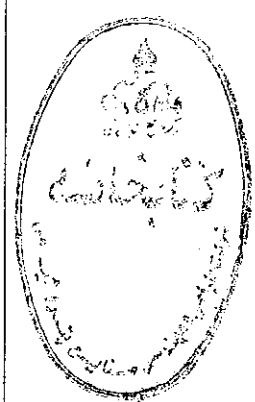
# OLEIC ACID

| Plastics | °C | °F |
|---|---|---|
| ABS | R | |
| Acetal | R | |
| Acrylics | R | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | R | U |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | R | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | R | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | U | |
| Polyethylene UHMW | U | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | R | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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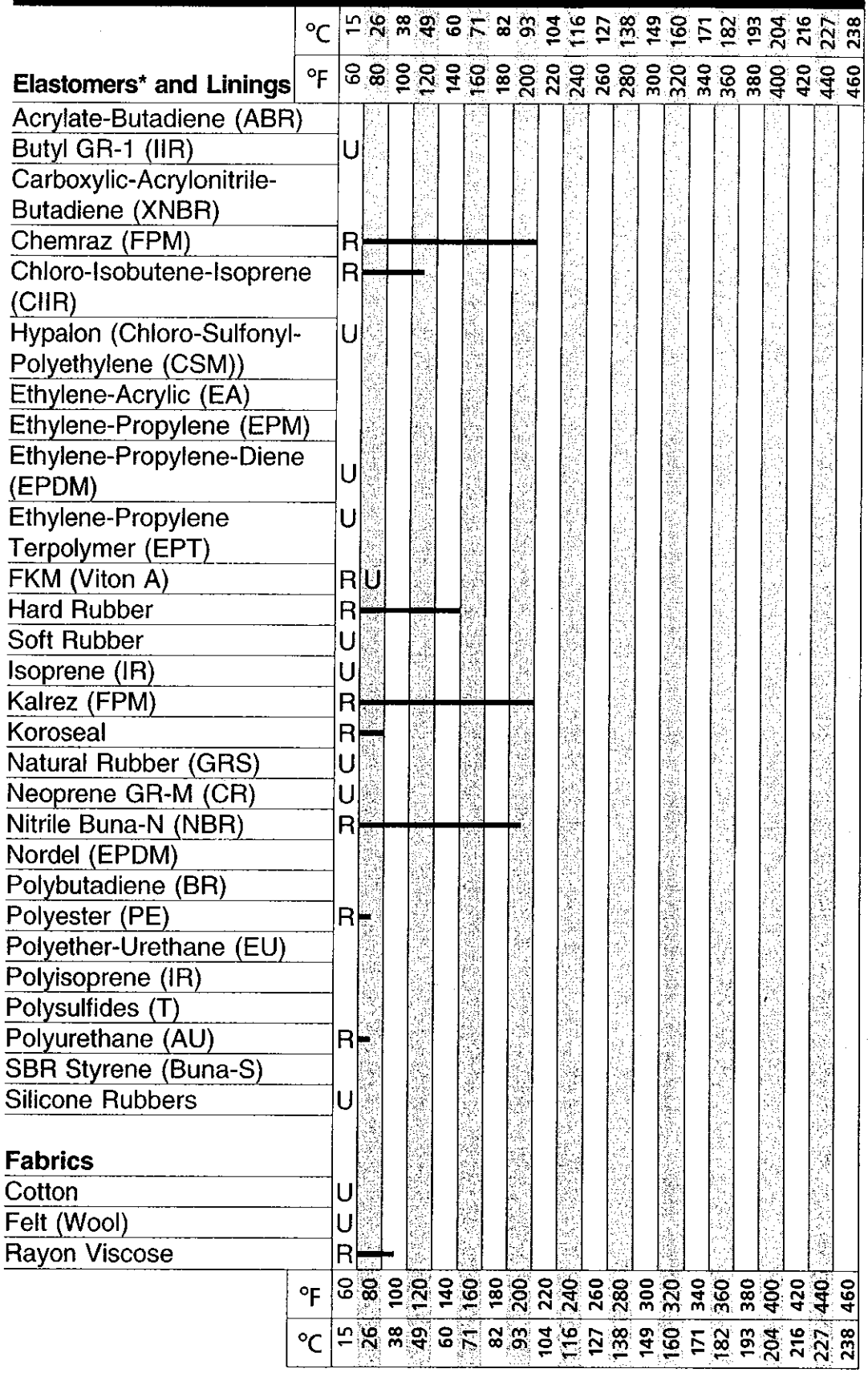


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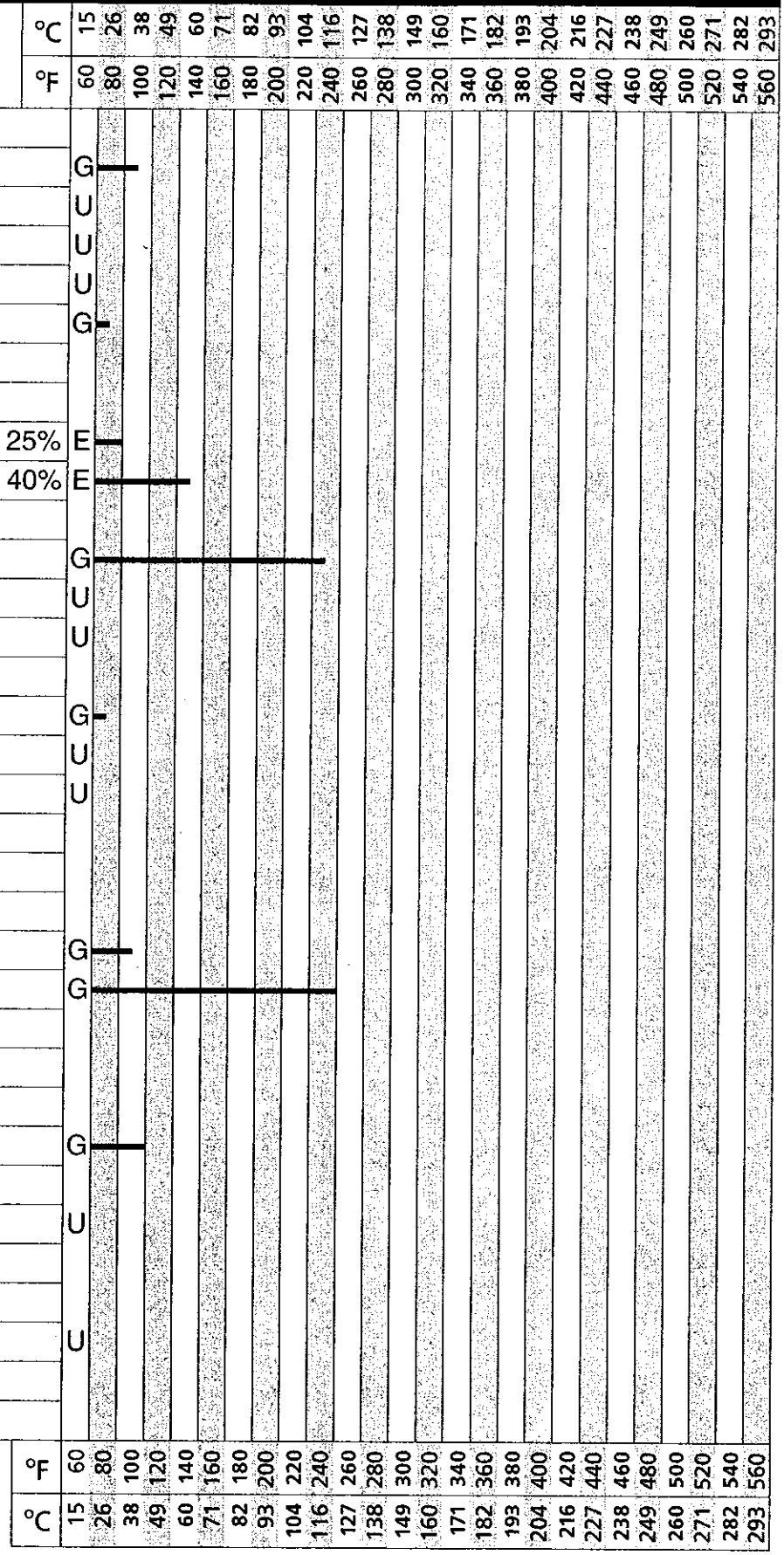
# OLEUM

| Metals | |
|---|---|
| Admiralty Brass | |
| Aluminum | G |
| Aluminum Bronze | U |
| Brass | U |
| Bronze | U |
| Carbon Steel | G |
| Columbium (Niobium) | |
| Copper | |
| Hastelloy B/B-2 | TO 25% E |
| Hastelloy C/C-276 | TO 40% E |
| Hastelloy D | |
| Hastelloy G/G-3 | G |
| High Silicon Iron | U |
| Inconel 600/625 | U |
| Incolloy 800/825 | |
| Lead | G |
| Monel 400 | U |
| Naval Bronze | U |
| Nickel 200/201 | |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 | G |
| Type 316/316 L | G |
| Type 400 series | |
| Type 904-L | |
| 17-4 PH | |
| 20 Cb 3 | G |
| E-Bright 26-1 | |
| Silicon Bronze | U |
| Silicon Copper | |
| Stellite | |
| Tantalum | U |
| Titanium | |
| Zirconium | |




FOR METALS

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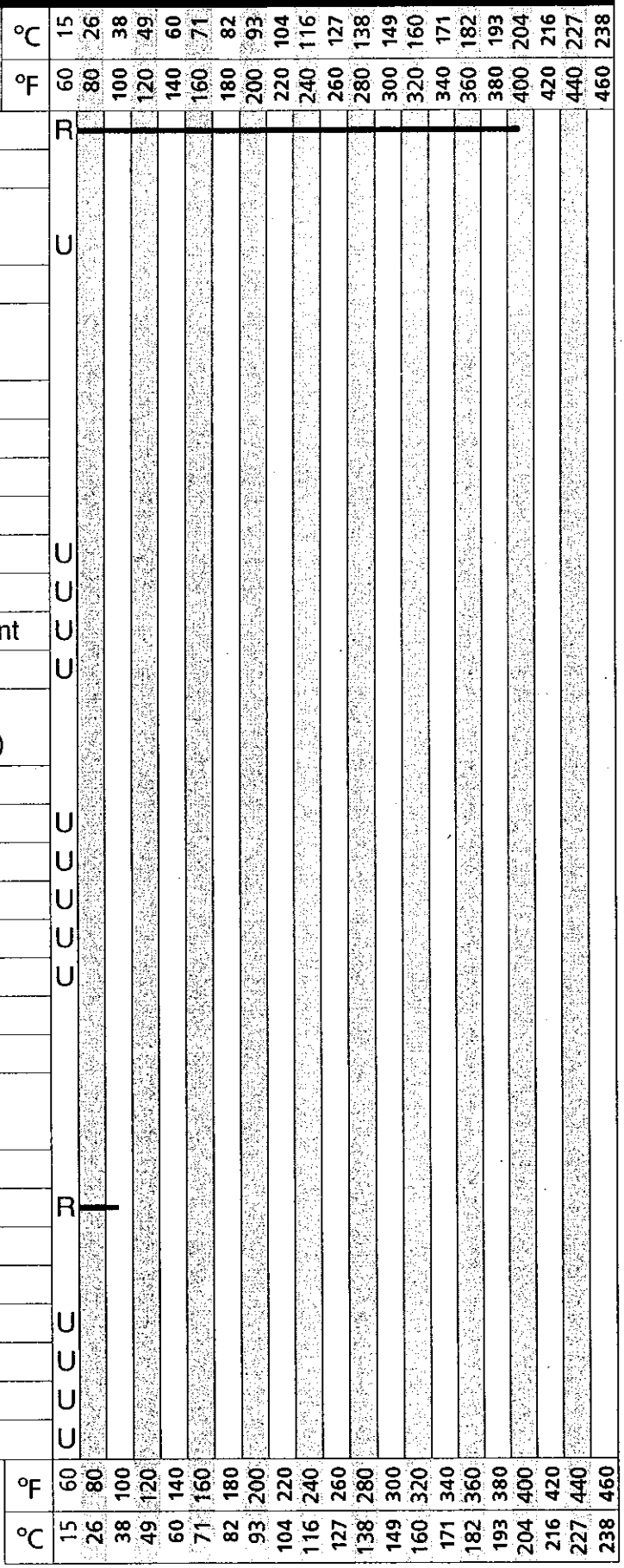
## OLEUM

| Nonmetallic Materials | |
|---|---|
| Borosilicate Glass | R |
| Carbon | |
| Carbon-Graphite Resin Impregnated | U |
| Ceramics | |
| **Coatings** | |
| Acrylic | |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | |
| Coal Tar Epoxy | U |
| Epoxy General Purpose | U |
| Epoxy Chemical Resistant | U |
| Epoxy Polyamide | U |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | U |
| Polyvinyl Chloride | U |
| Silicones | U |
| Urethanes | U |
| Vinyls | U |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | |
| Sodium Silicate | R |
| Potassium Silicate | |
| Silica | |
| Sulfur | U |
| Furan Resin | U |
| Polyester | U |
| Epoxy | U |



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# OLEUM

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | U | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | U | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | U | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | R | U | | | | | | | | | | | | | | | | | | | |
| Epoxy | | U | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | R | | | | | | | U | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | R | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | U | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | U | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | U | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | U | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | U | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | U | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | U | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | U | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | U | | | | | | | | | | | | | | | | | | | | |
| Ryton | | R | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | U | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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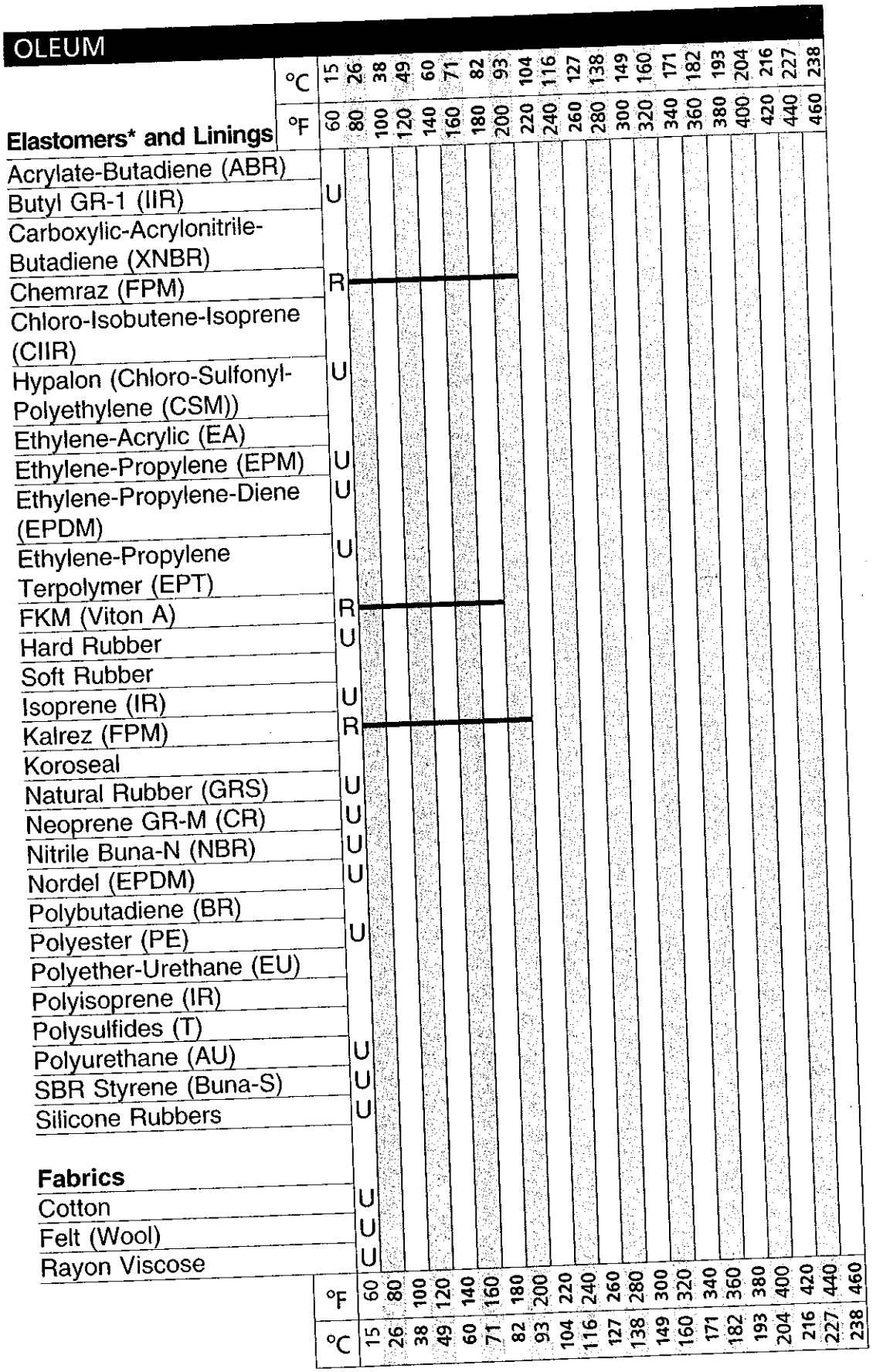


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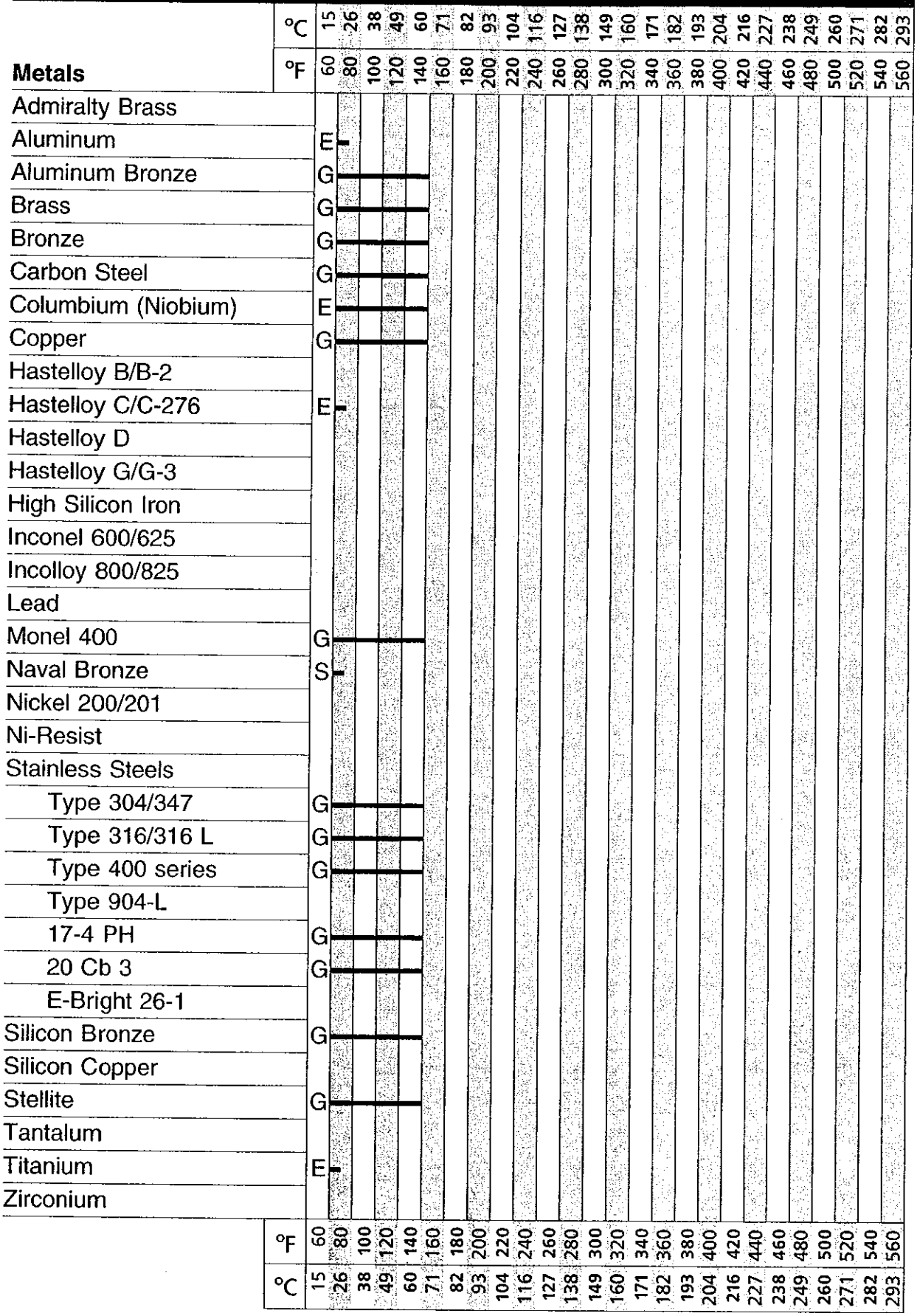


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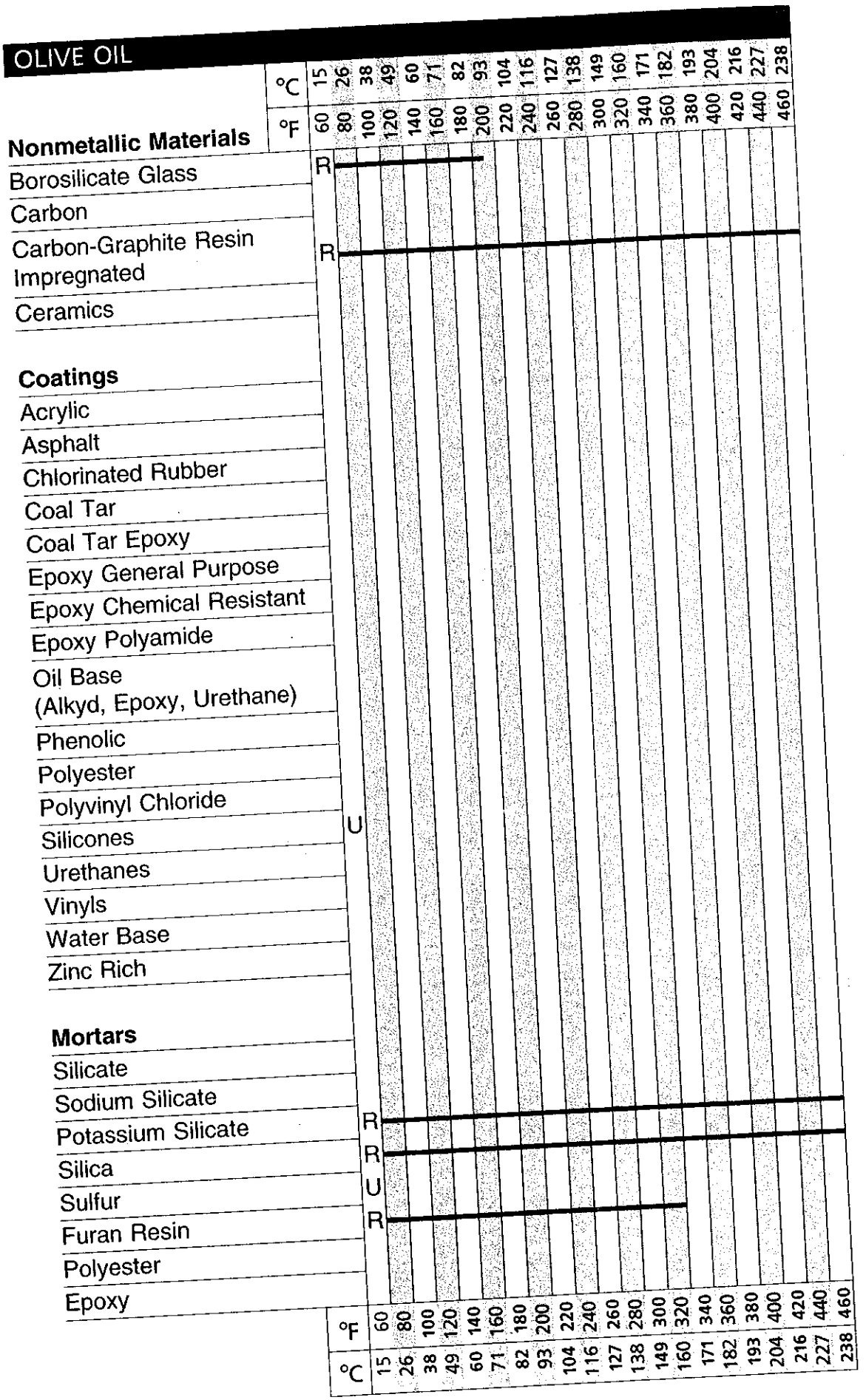



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| Plastics | °C | °F |
|---|---|---|
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| Acetal | | |
| Acrylics | R | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | U | |
| E-CTFE (Halar) | | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | R | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | R | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | R | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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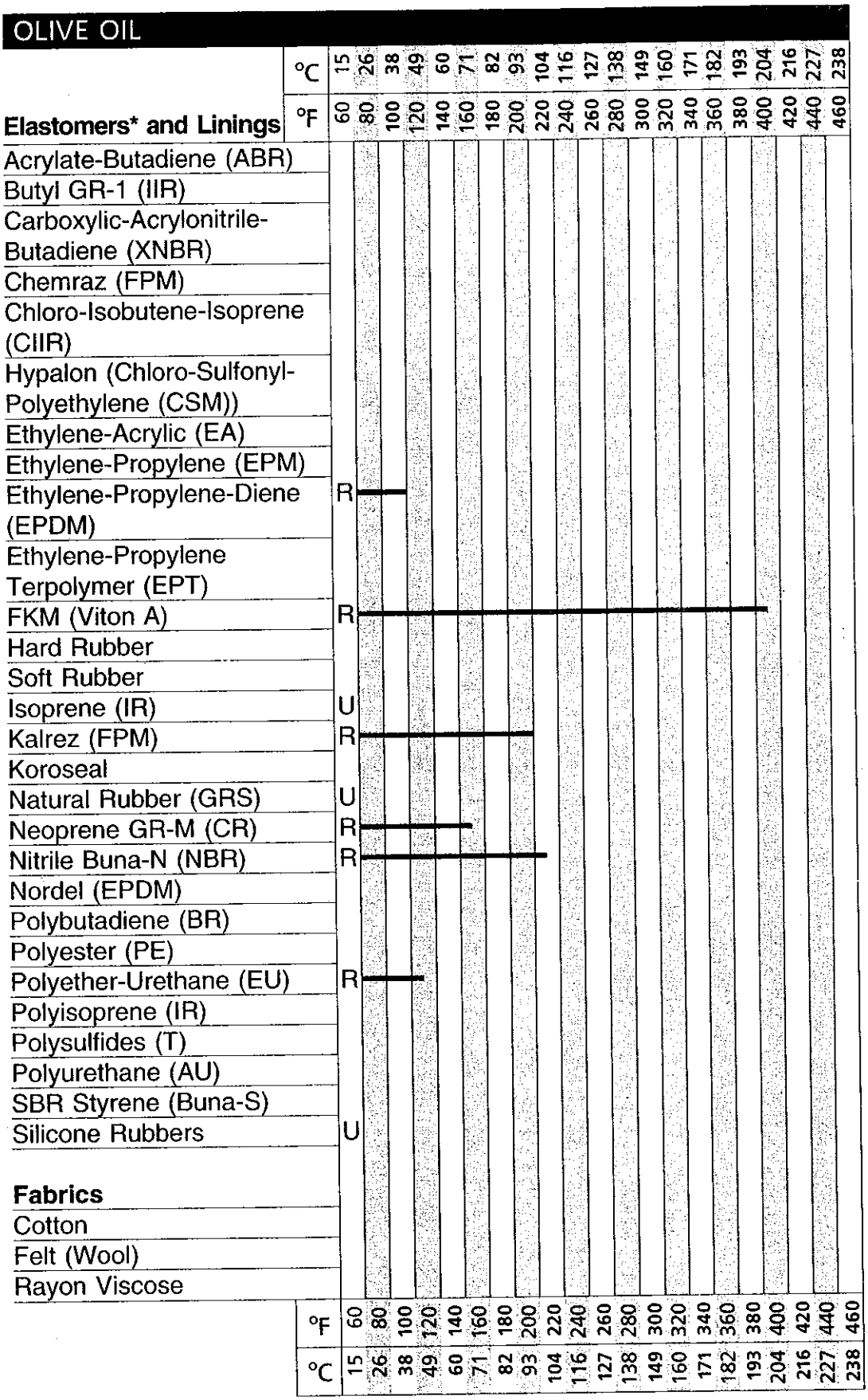


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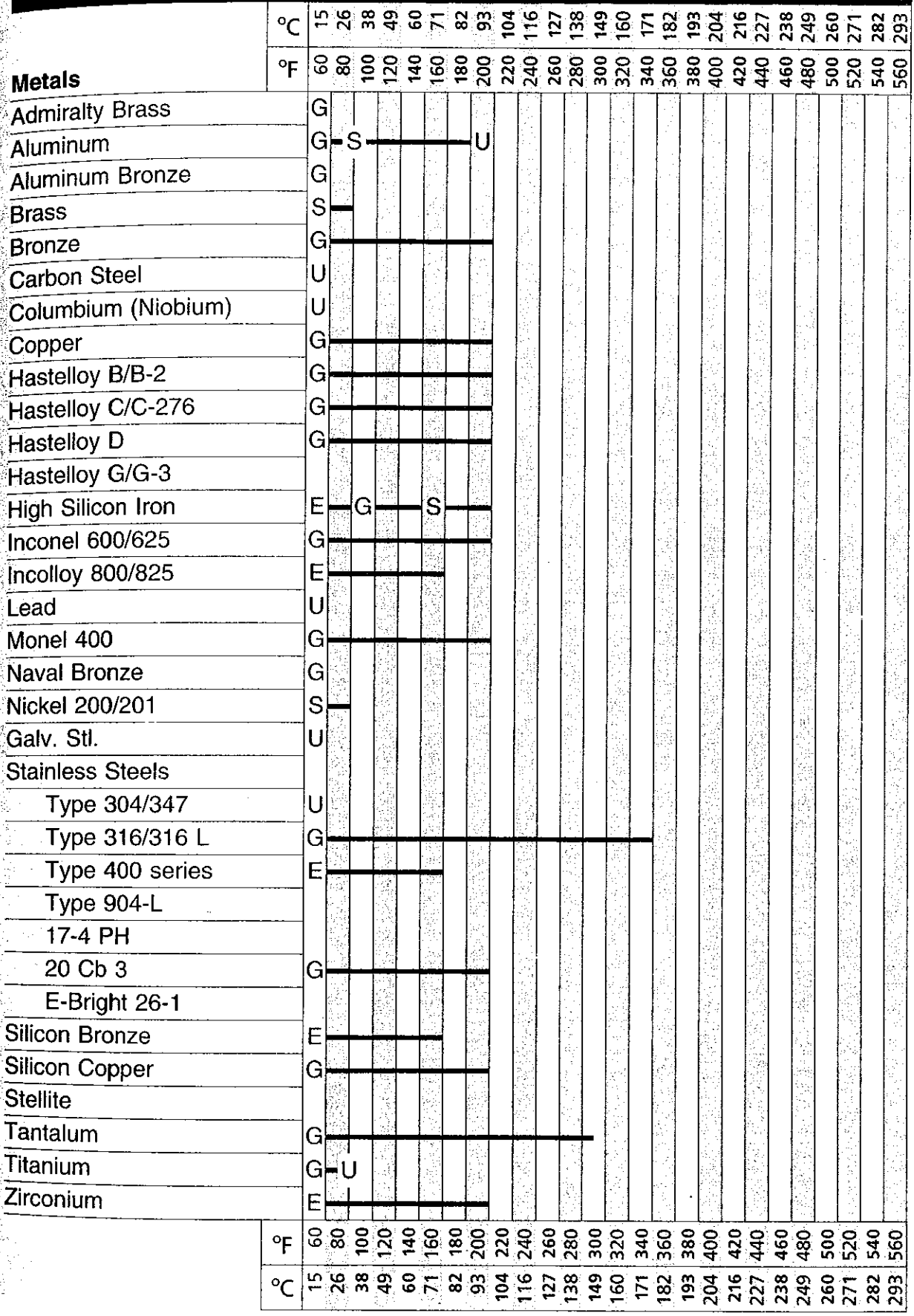


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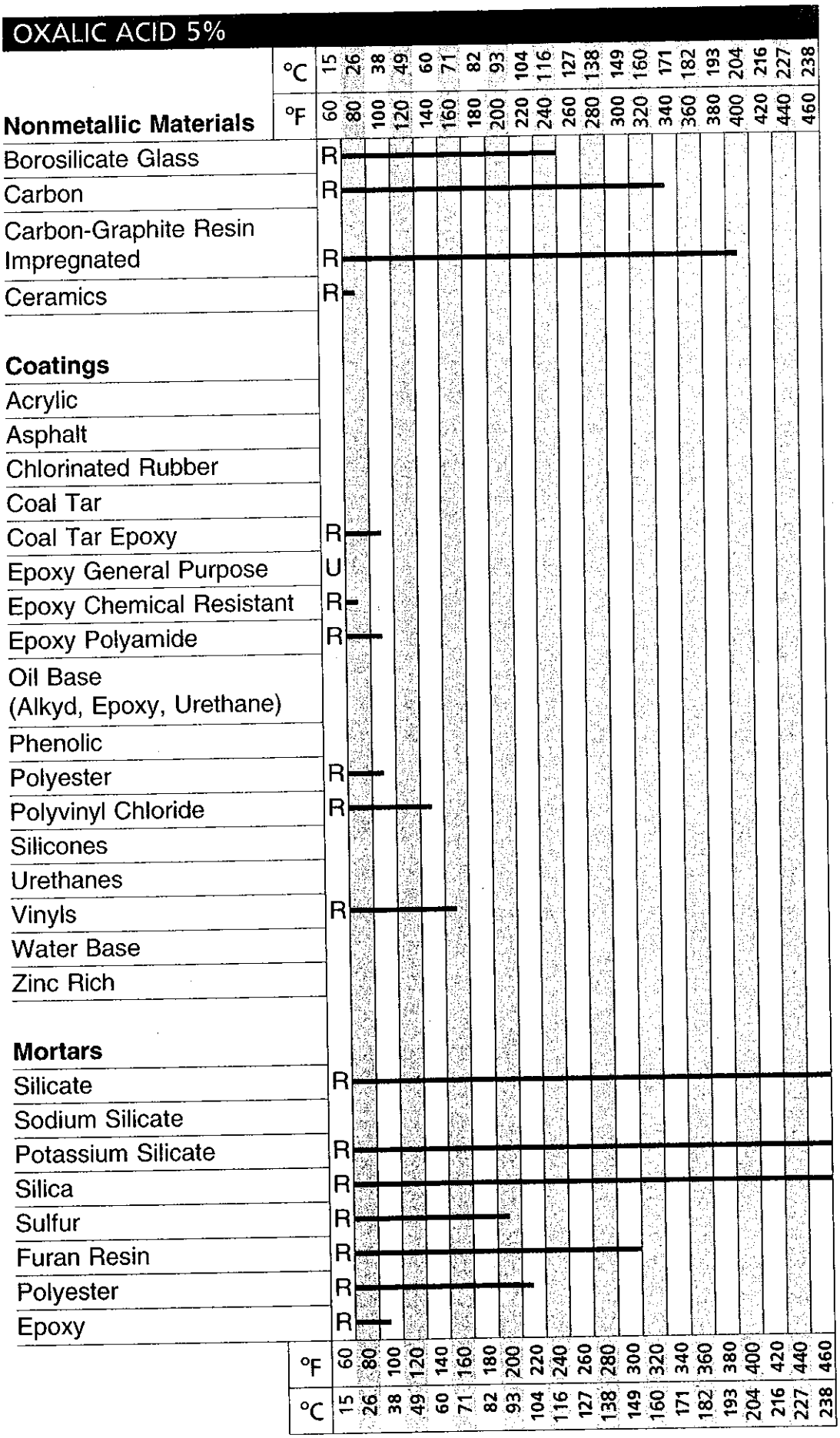






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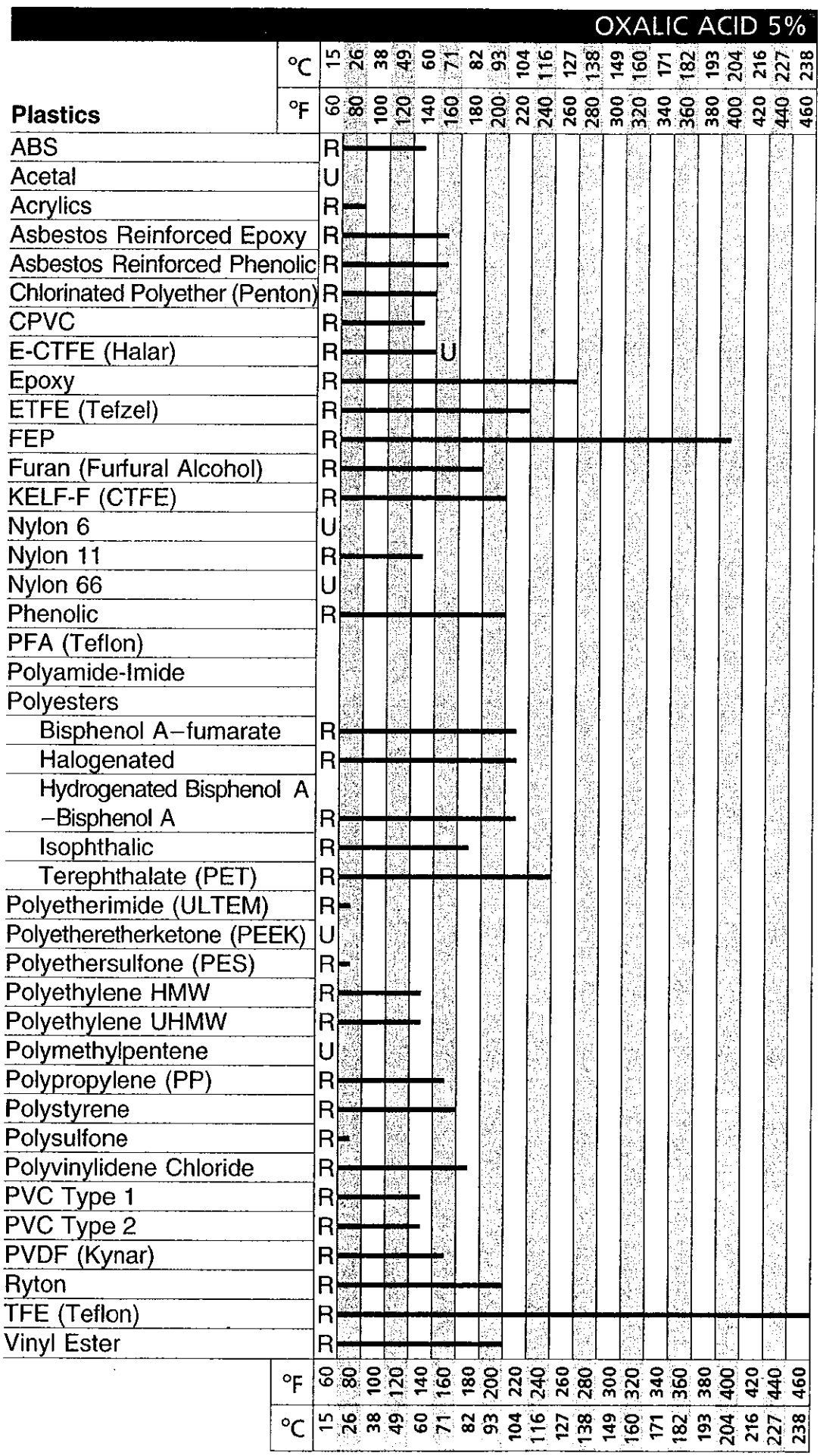



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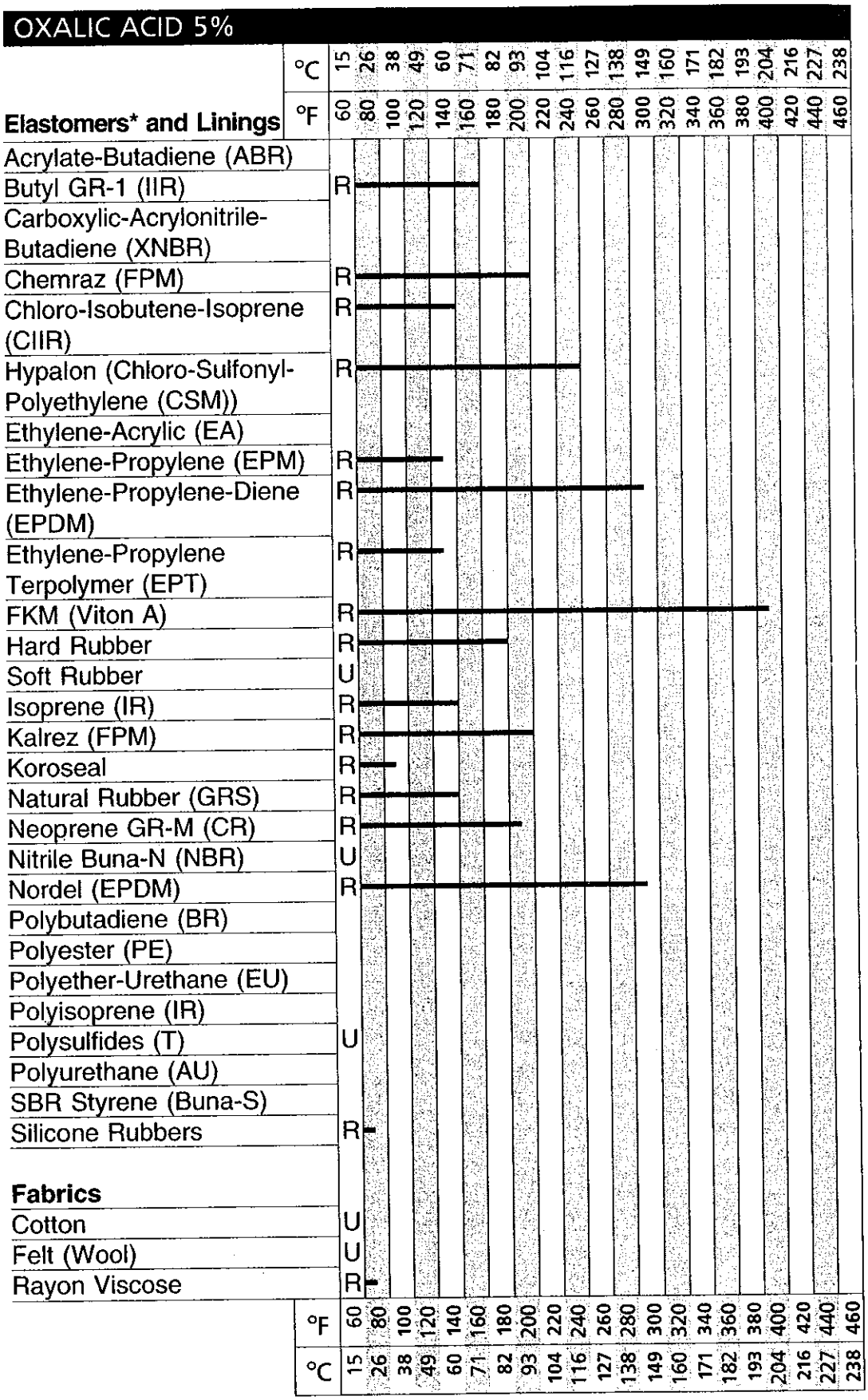


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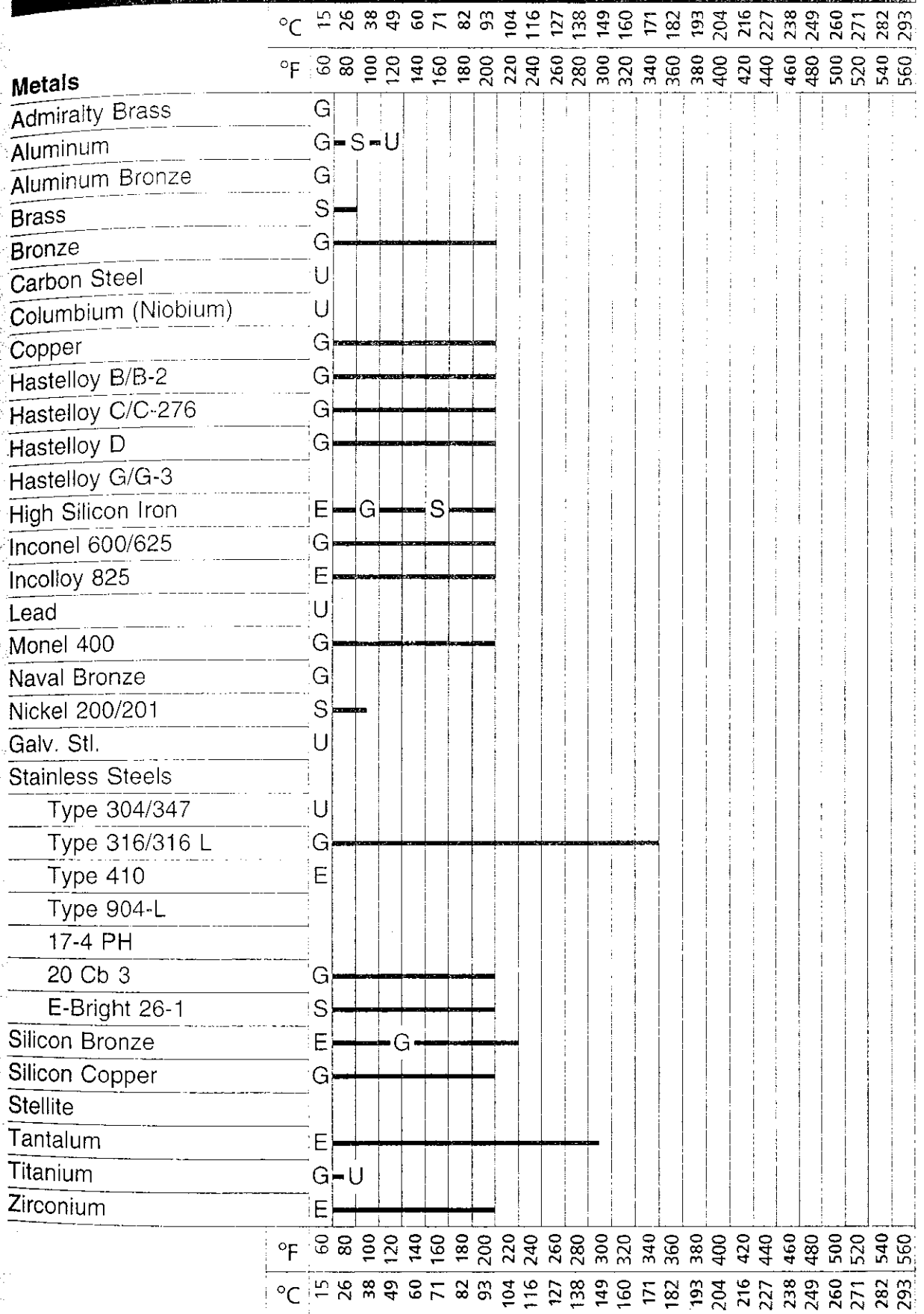


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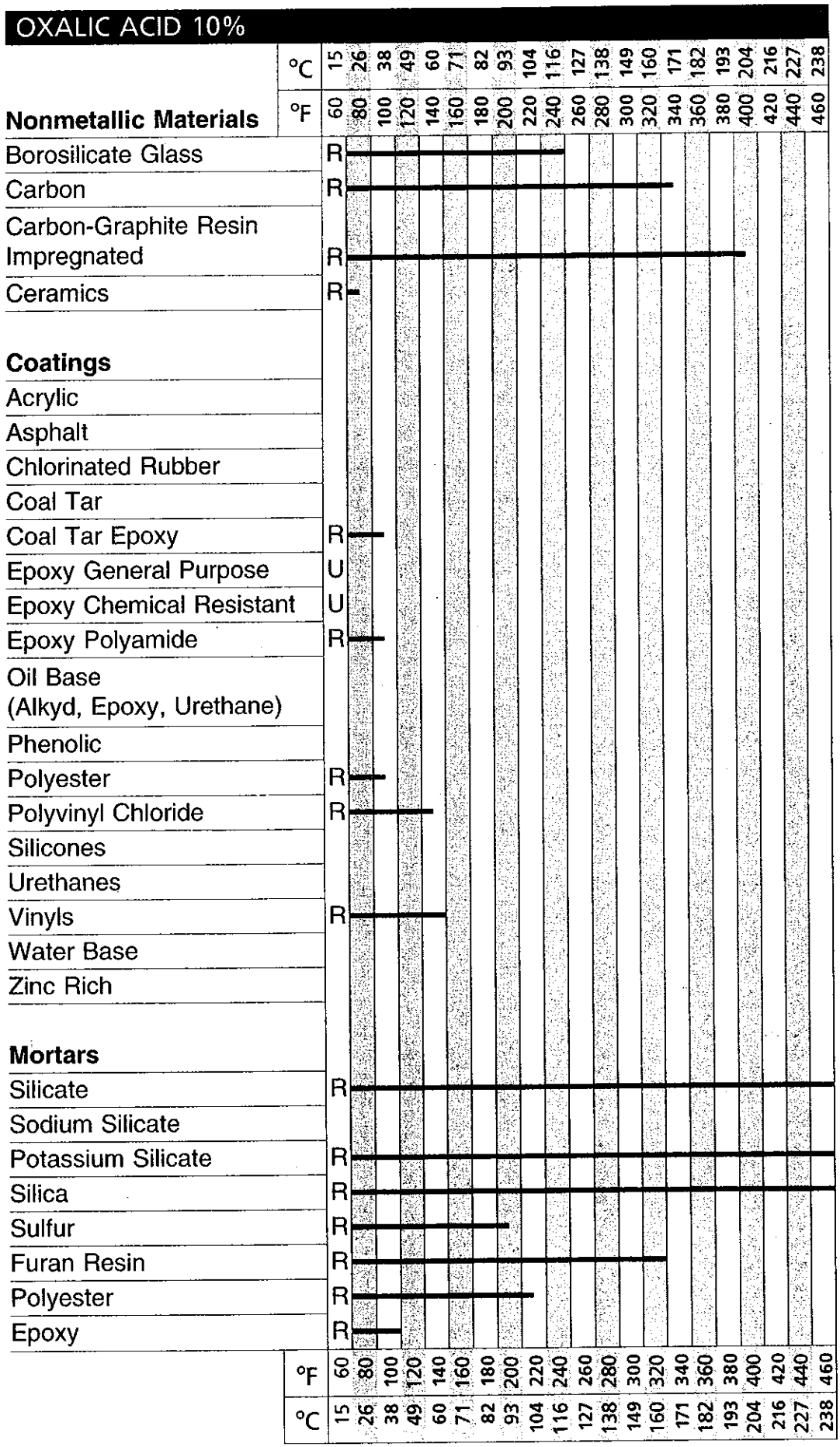




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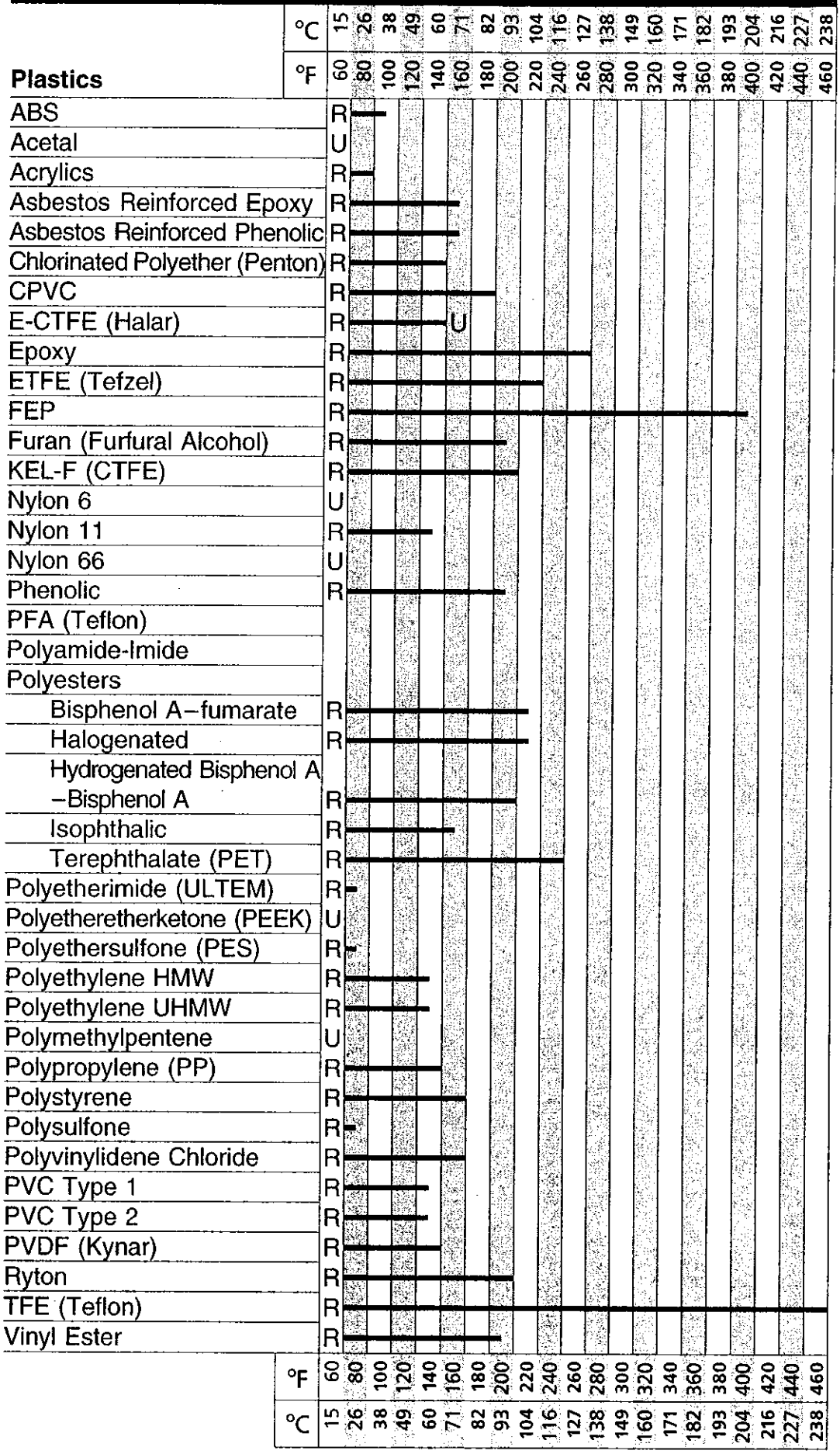



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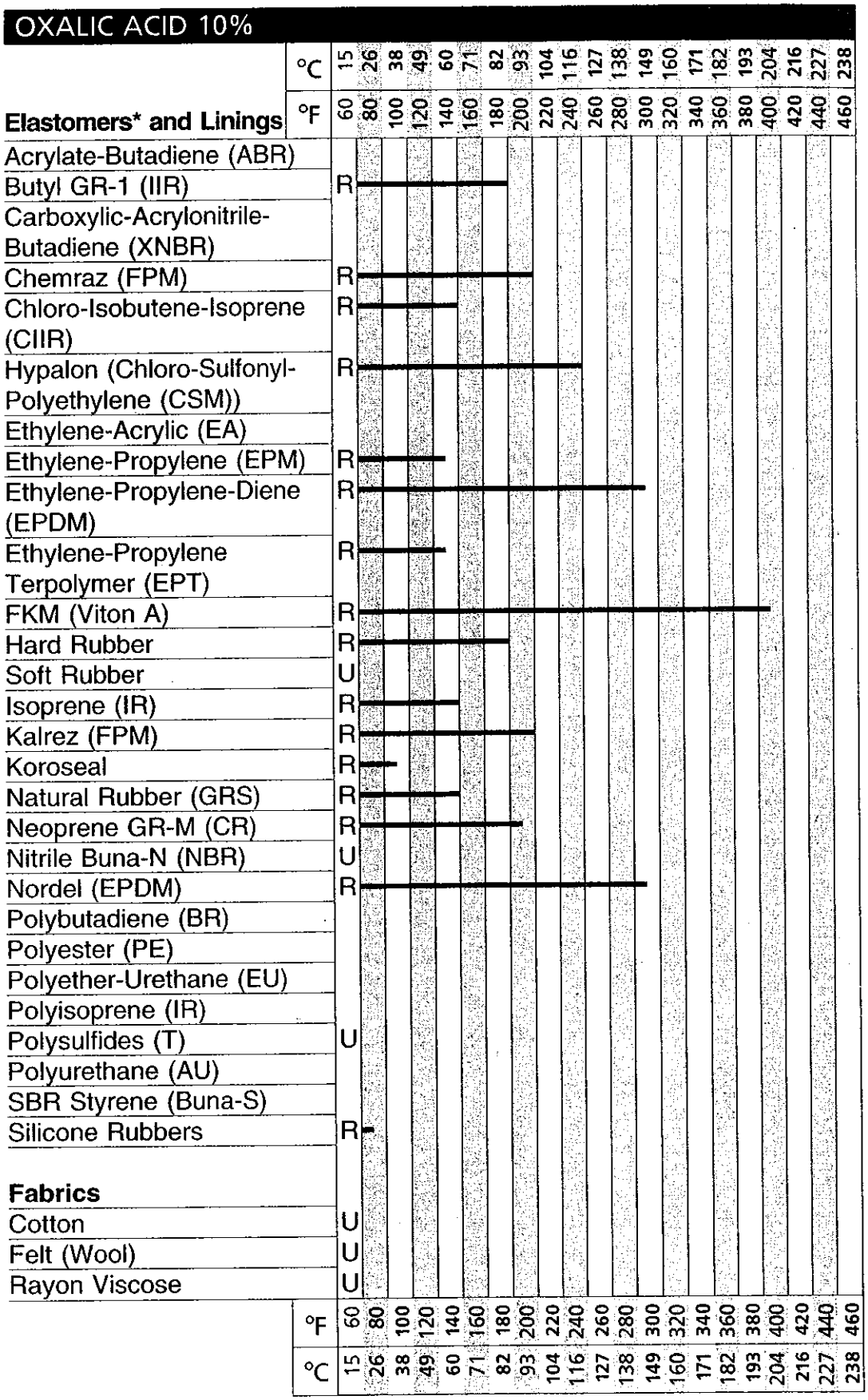


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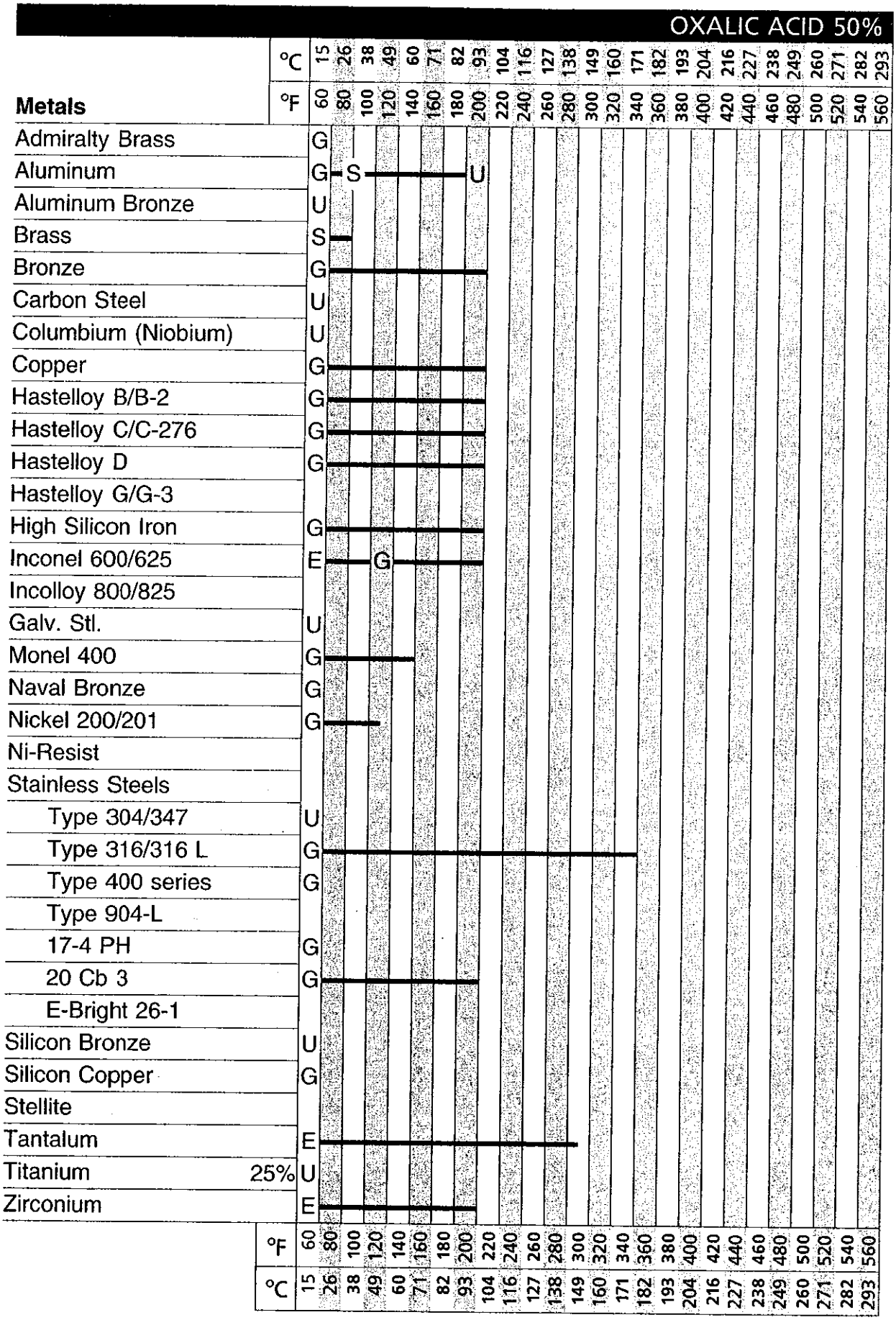


FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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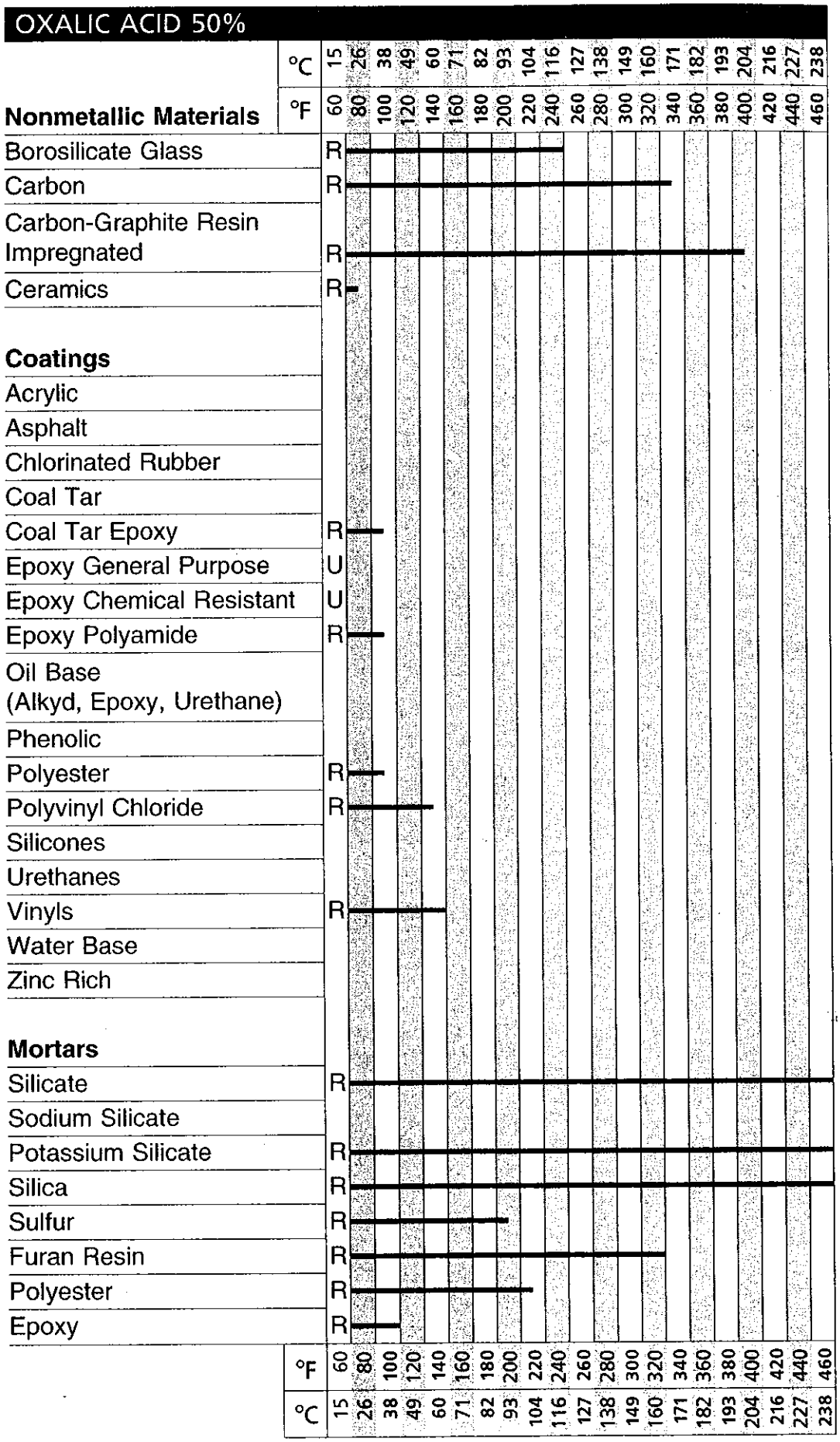




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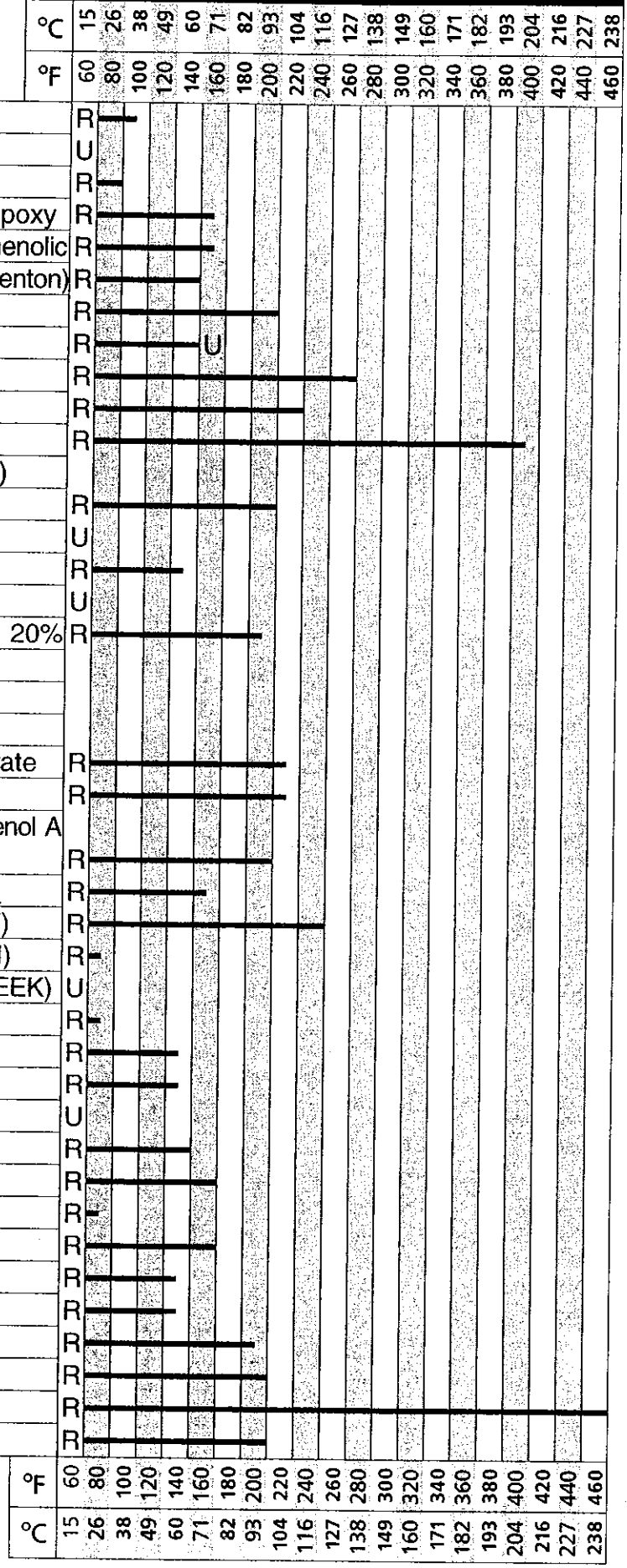
# OXALIC ACID 50%

| Plastics | |
|---|---|
| ABS | R |
| Acetal | U |
| Acrylics | R |
| Asbestos Reinforced Epoxy | R |
| Asbestos Reinforced Phenolic | R |
| Chlorinated Polyether (Penton) | R |
| CPVC | R |
| E-CTFE (Halar) | R |
| Epoxy | R |
| ETFE (Tefzel) | R |
| FEP | R |
| Furan (Furfural Alcohol) | |
| KEL-F (CTFE) | R |
| Nylon 6 | U |
| Nylon 11 | R |
| Nylon 66 | U |
| Phenolic 20% | R |
| PFA (Teflon) | |
| Polyamide-Imide | |
| Polyesters | |
| Bisphenol A–fumarate | R |
| Halogenated | R |
| Hydrogenated Bisphenol A –Bisphenol A | R |
| Isophthalic | R |
| Terephthalate (PET) | R |
| Polyetherimide (ULTEM) | R |
| Polyetheretherketone (PEEK) | U |
| Polyethersulfone (PES) | R |
| Polyethylene HMW | R |
| Polyethylene UHMW | R |
| Polymethylpentene | U |
| Polypropylene (PP) | R |
| Polystyrene | R |
| Polysulfone | R |
| Polyvinylidene Chloride | R |
| PVC Type 1 | R |
| PVC Type 2 | R |
| PVDF (Kynar) | R |
| Ryton | R |
| TFE (Teflon) | R |
| Vinyl Ester | R |





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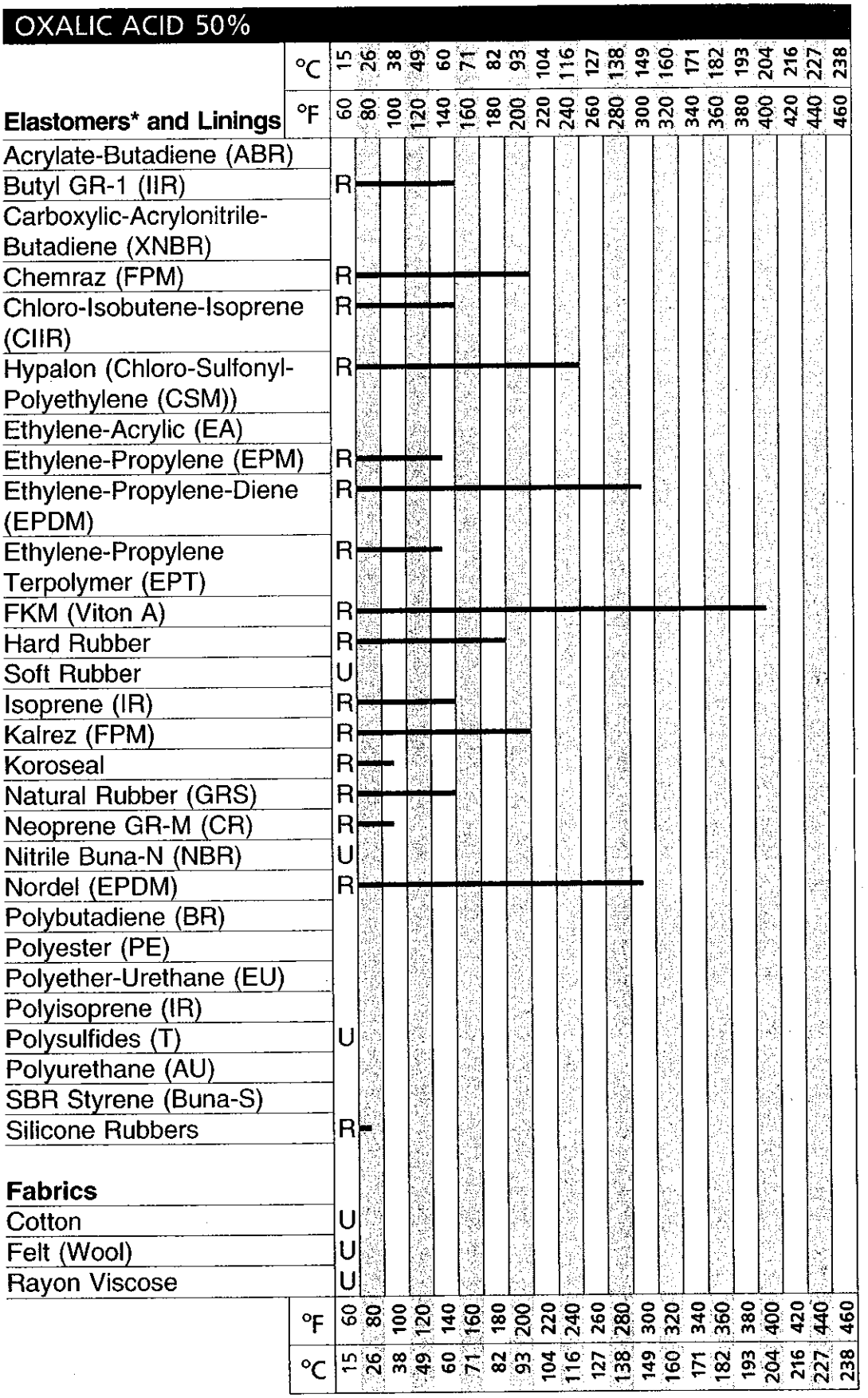


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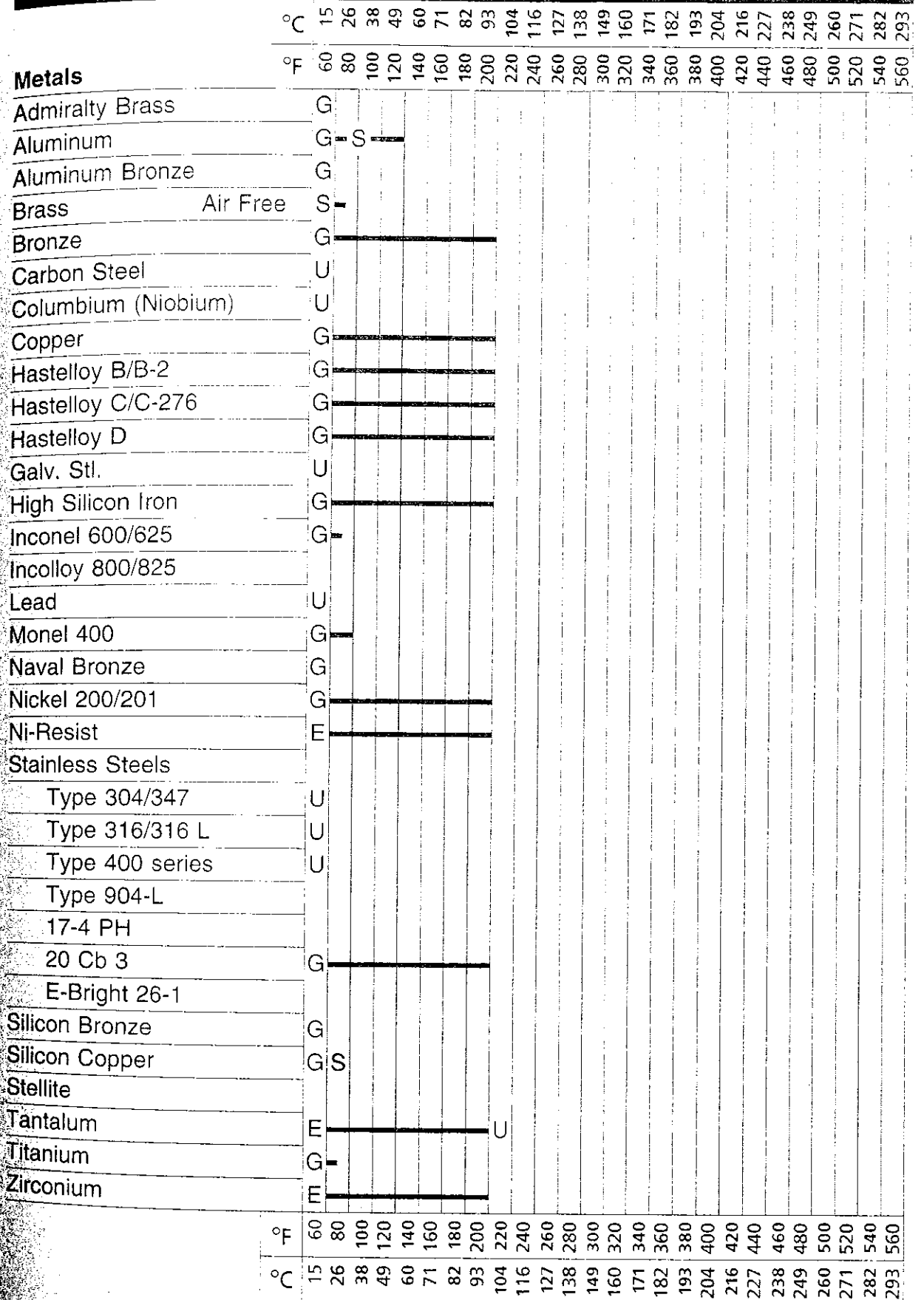


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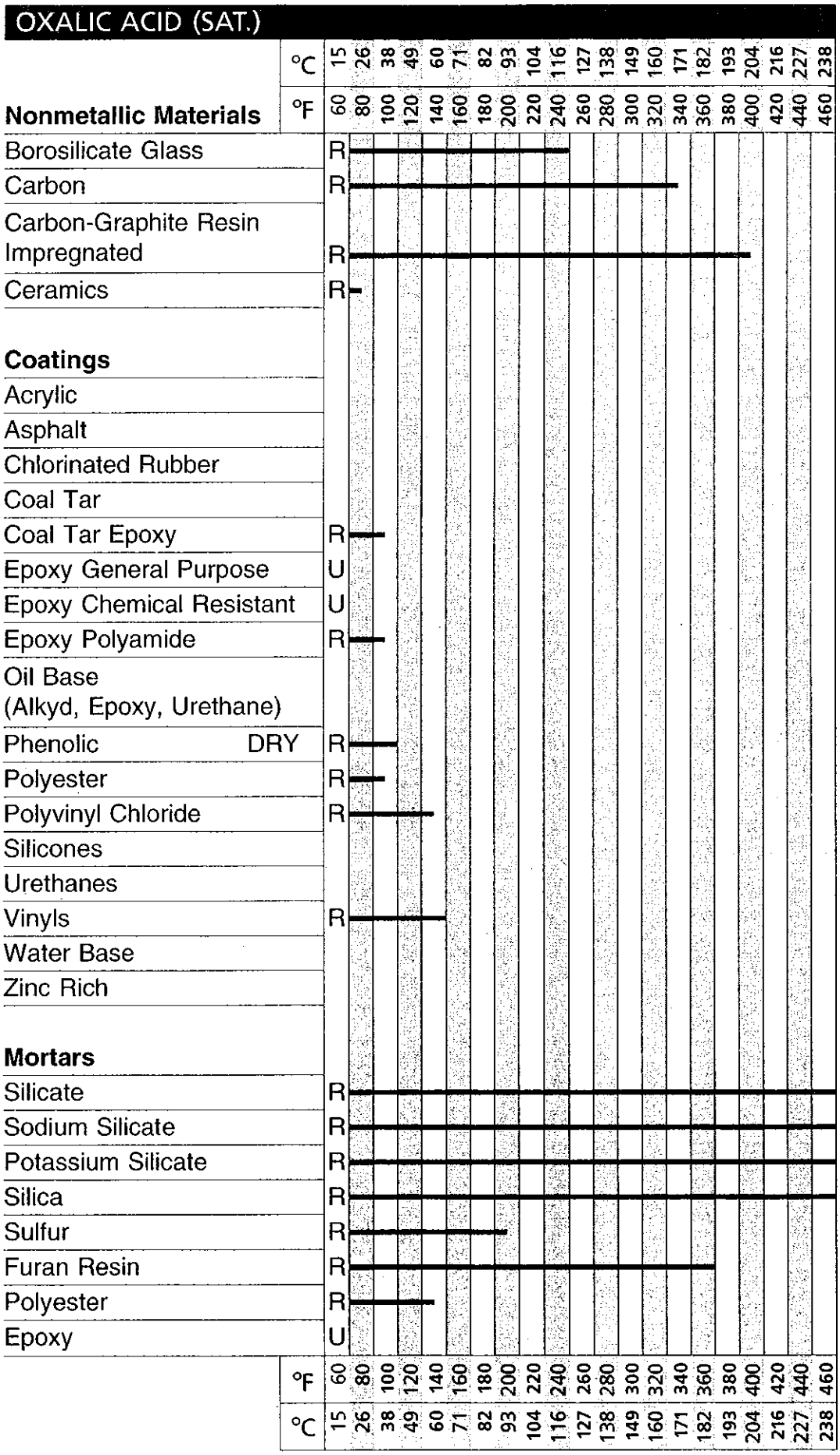




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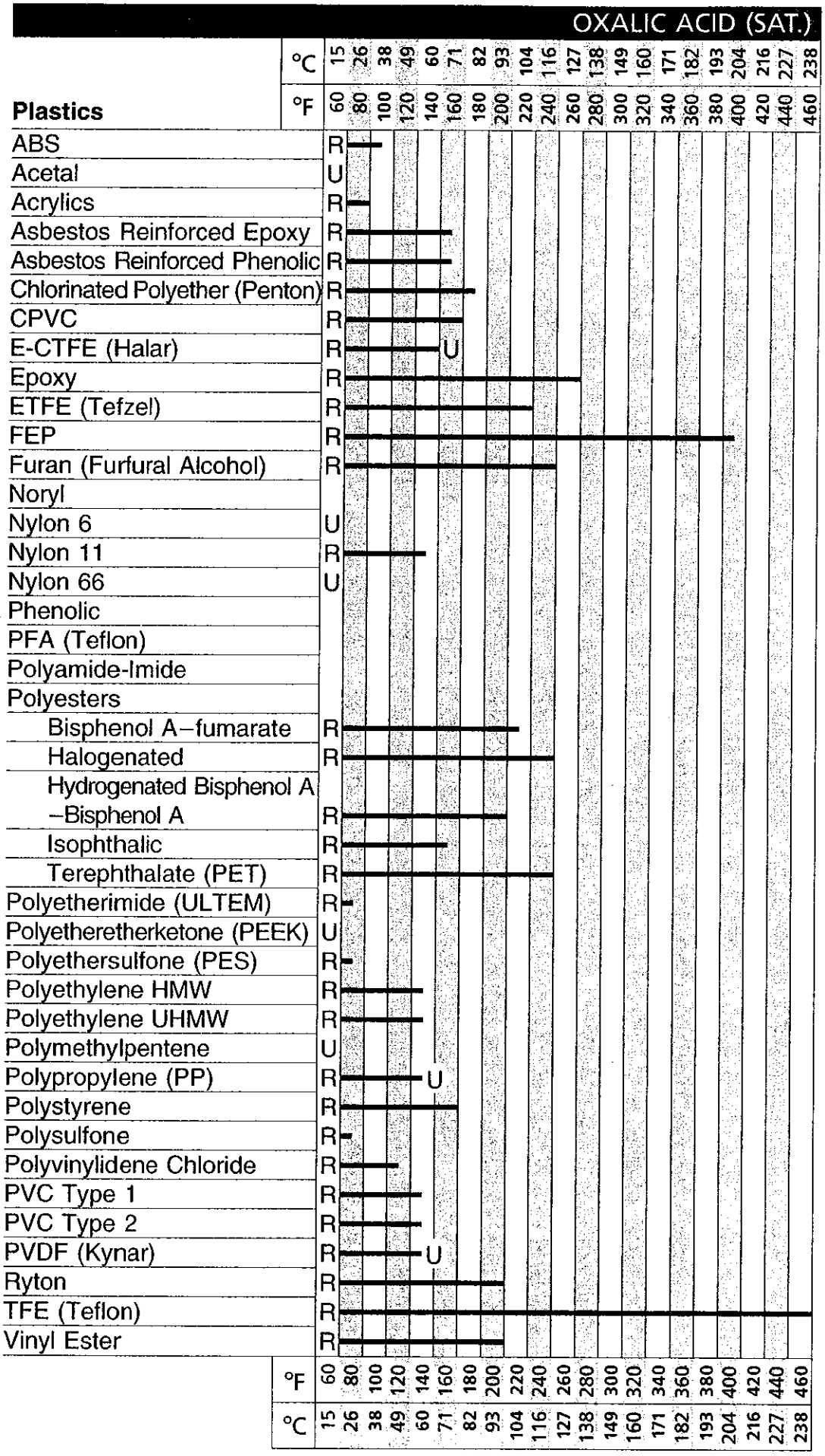



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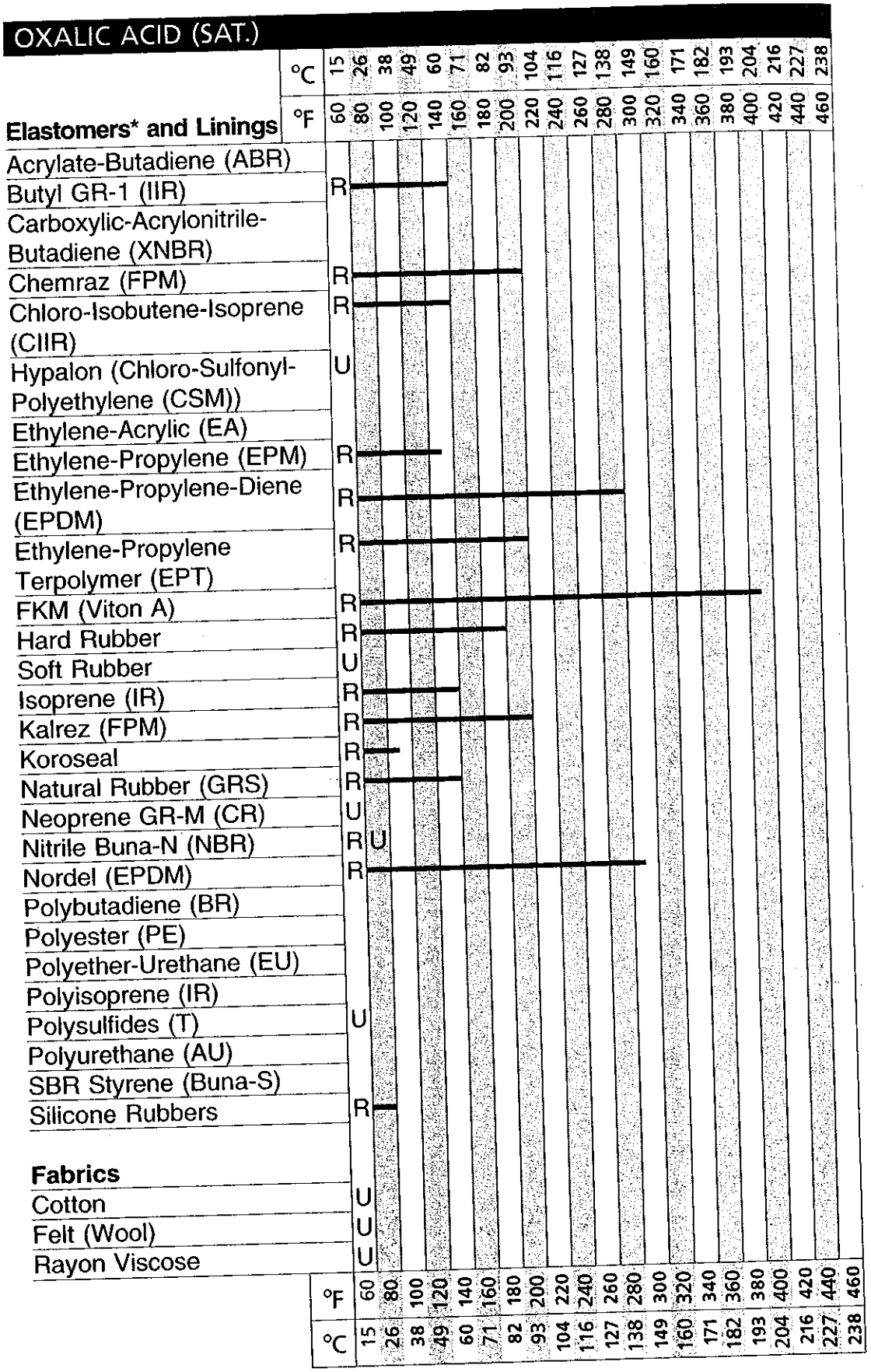
## OXALIC ACID (SAT.)

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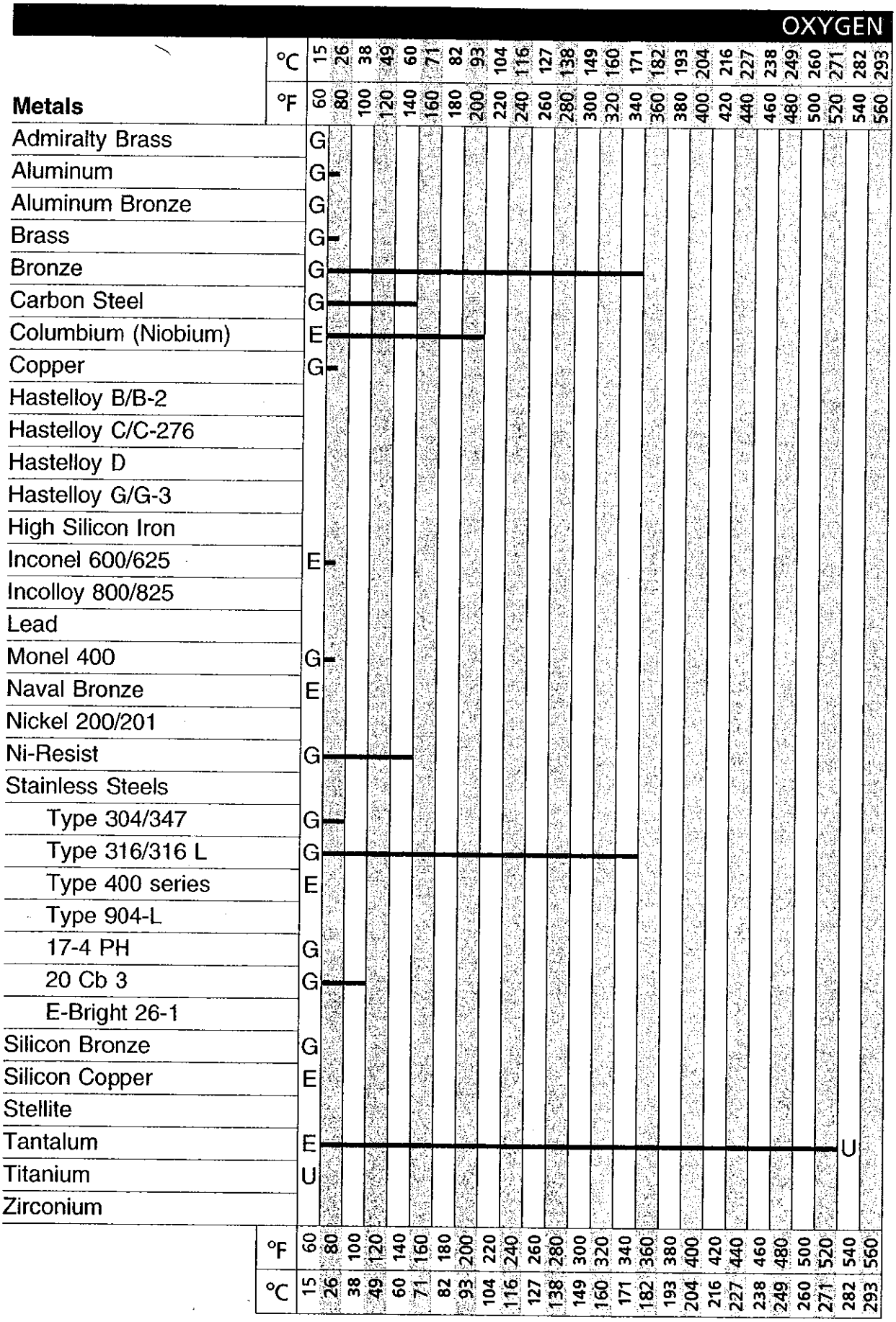


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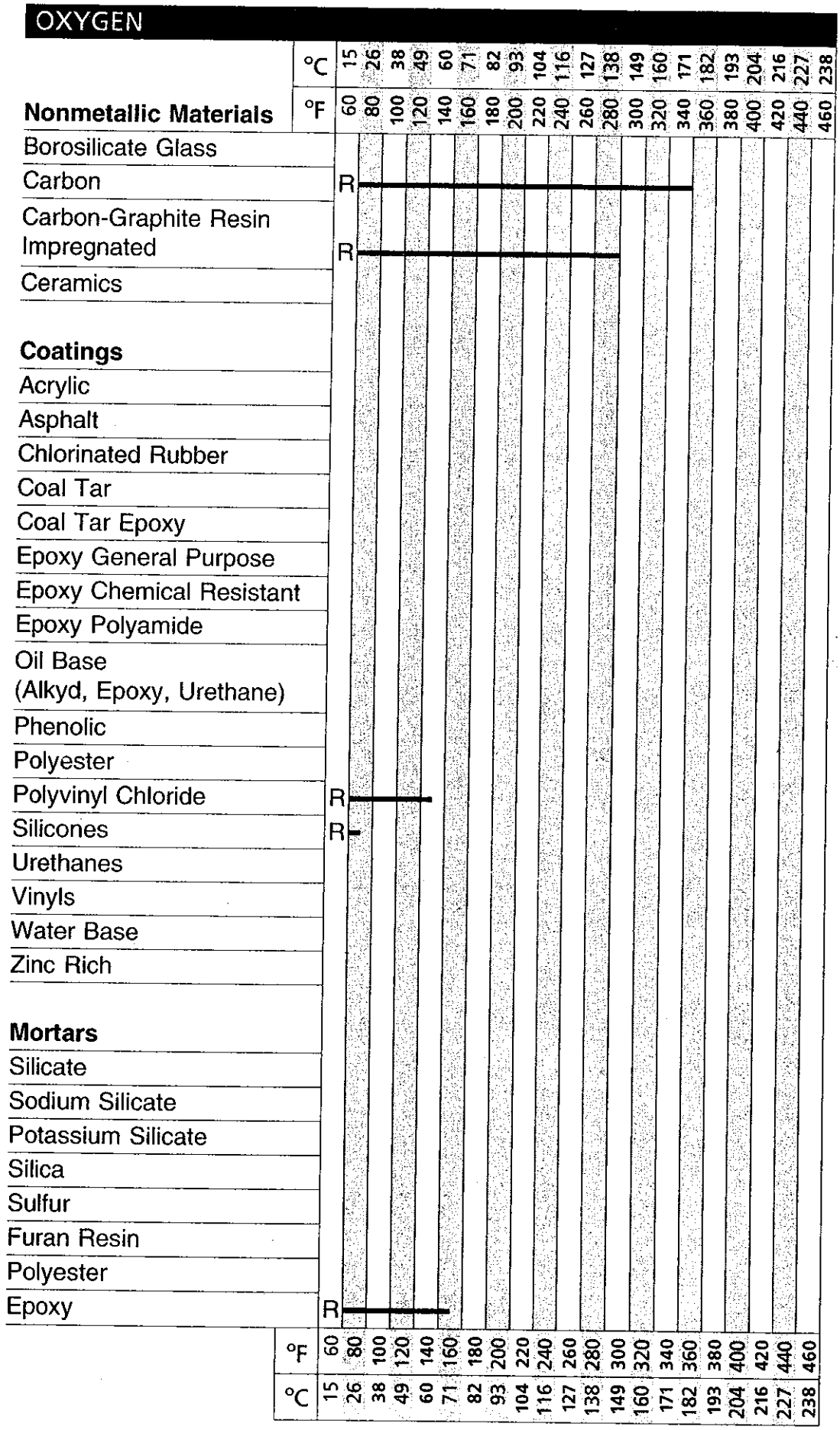




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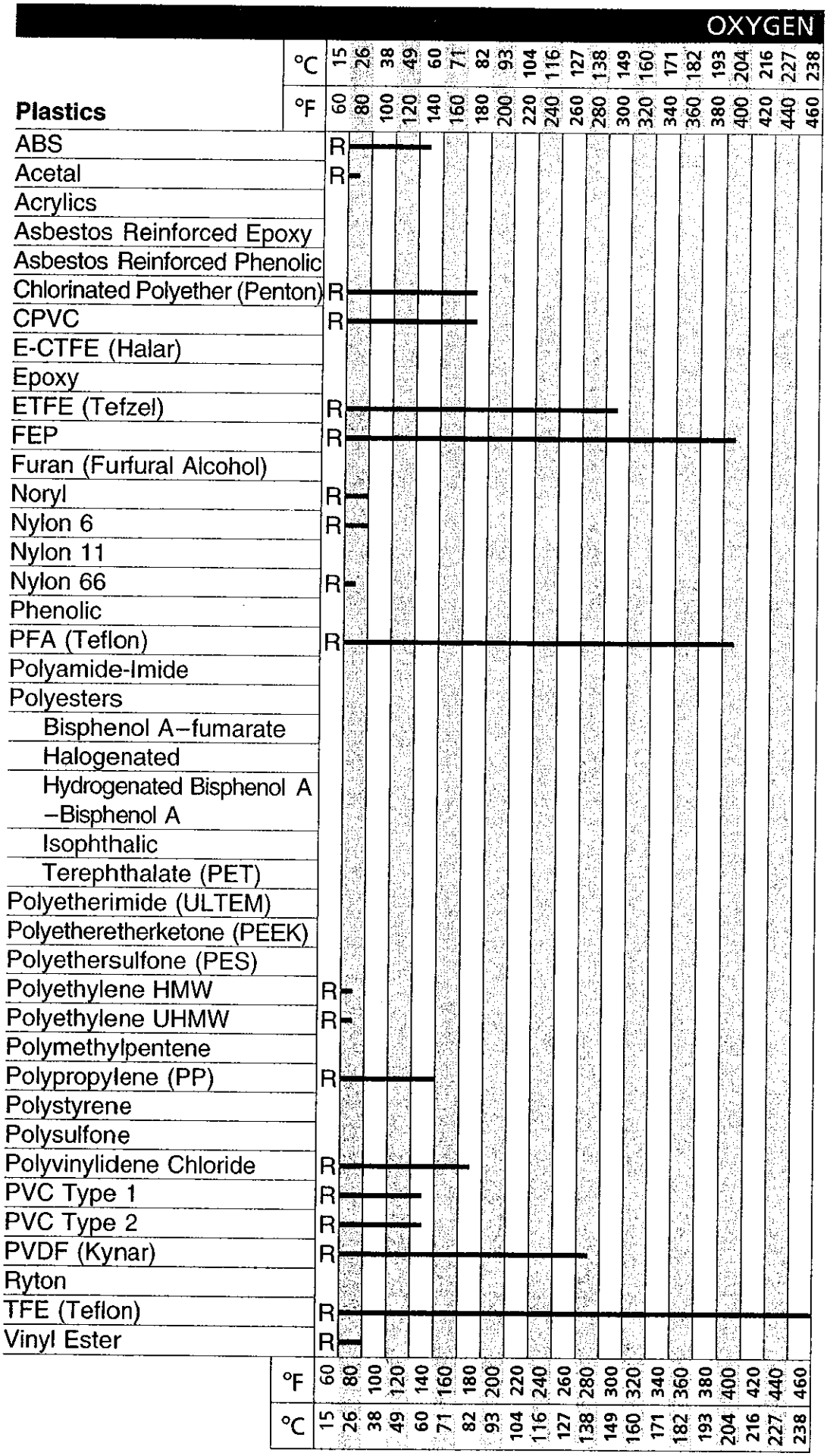



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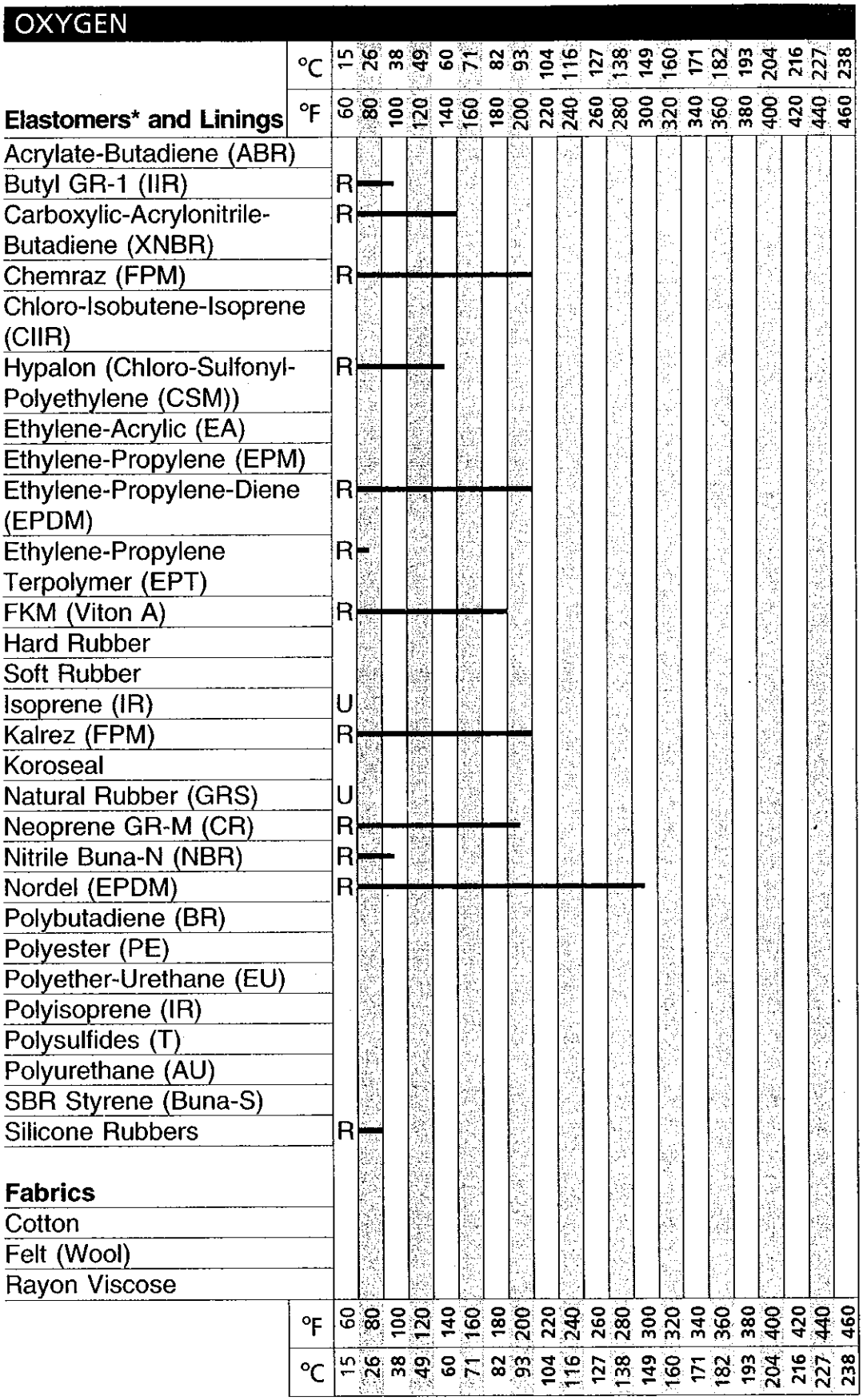


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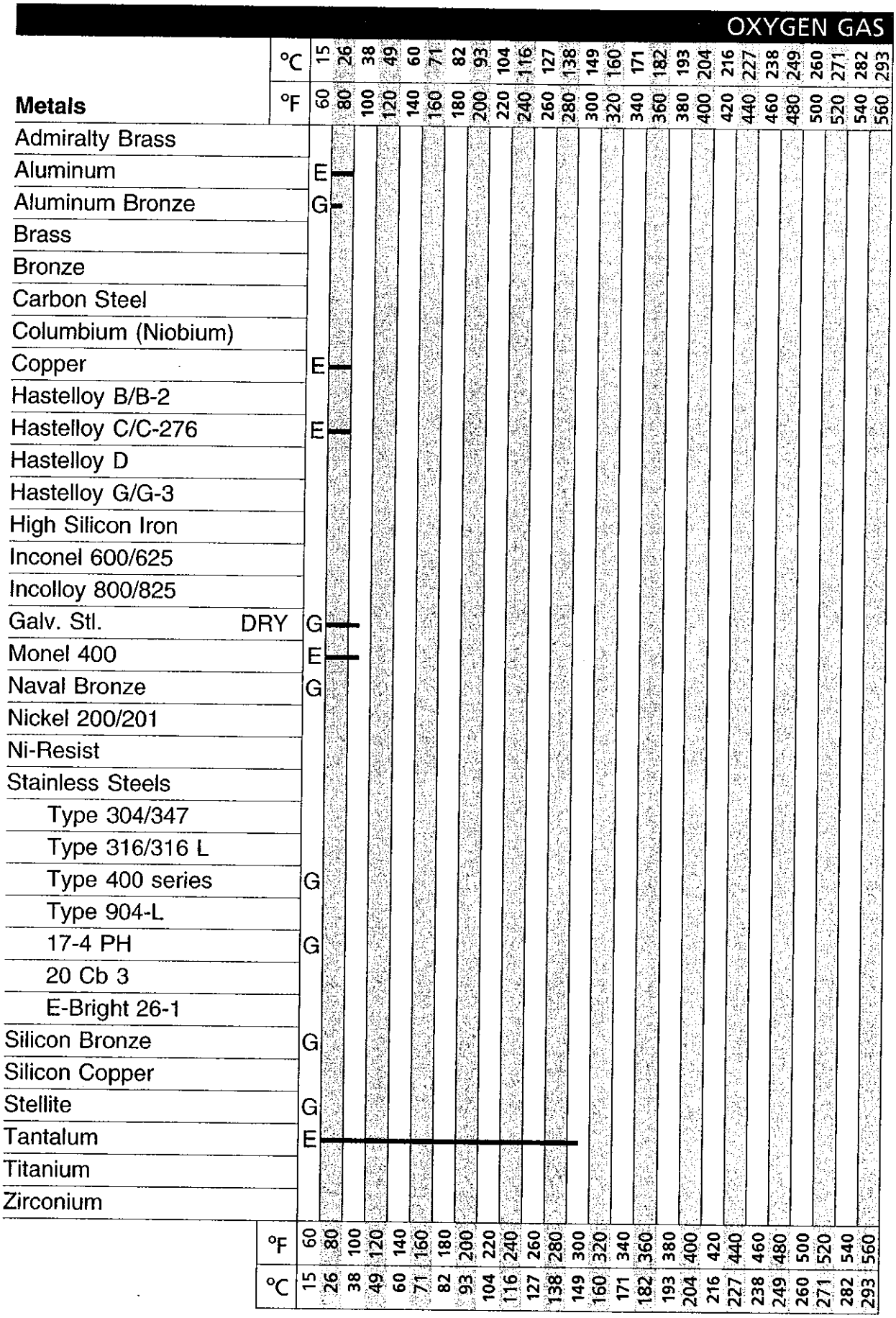


FOR METALS

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# OXYGEN GAS

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# OXYGEN GAS

| Plastics | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | R | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | R | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | R | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | R | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | R | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | R | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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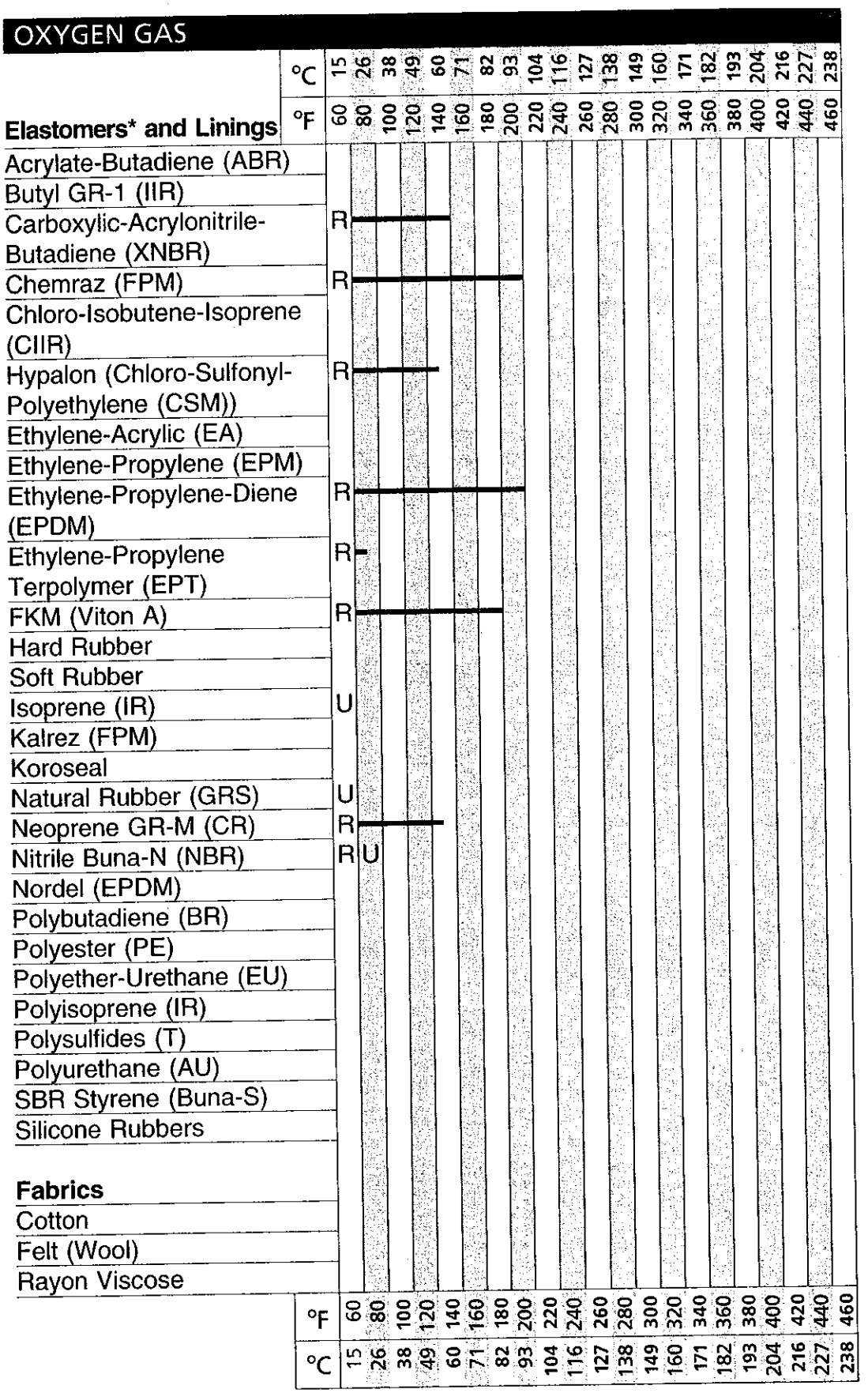


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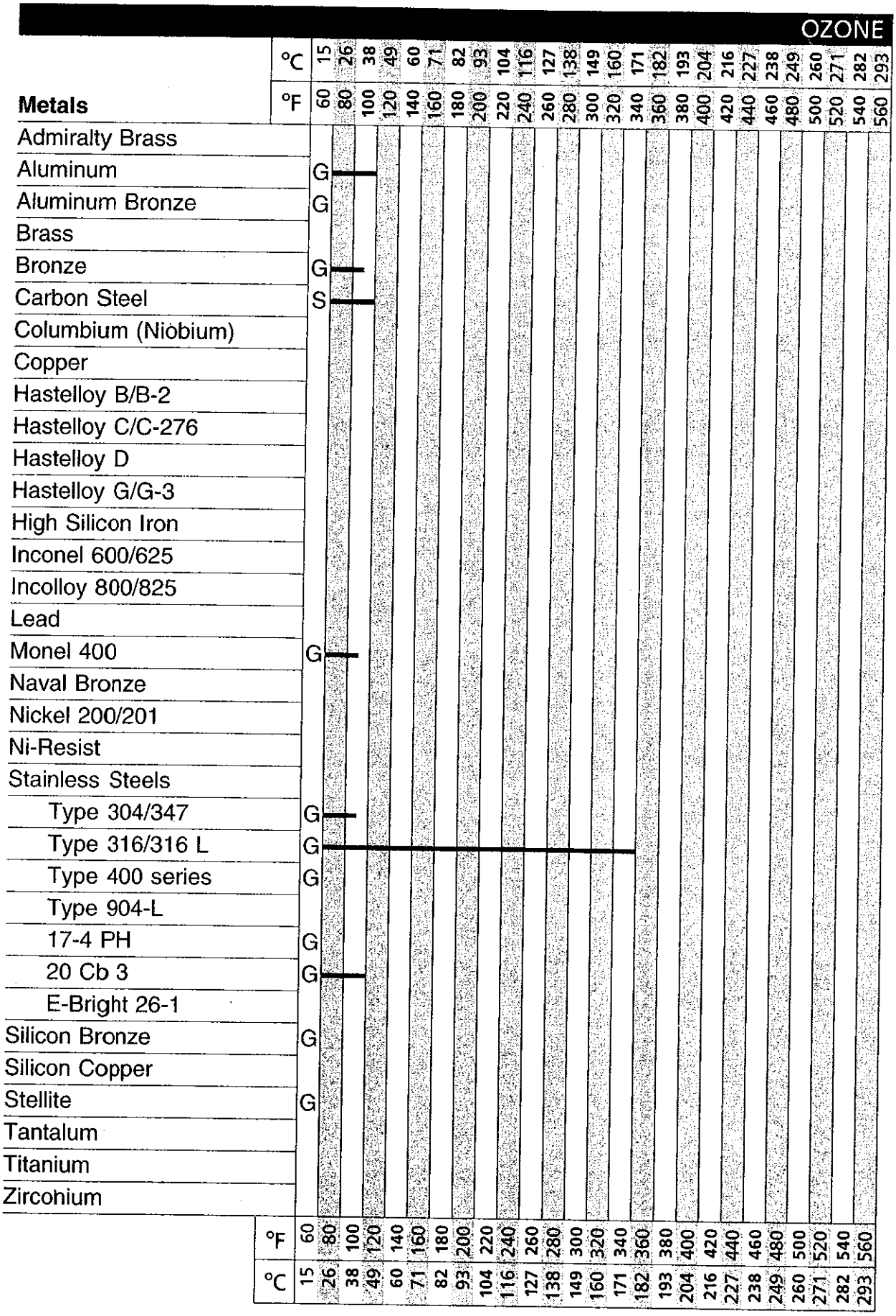


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U = Unsatisfactory

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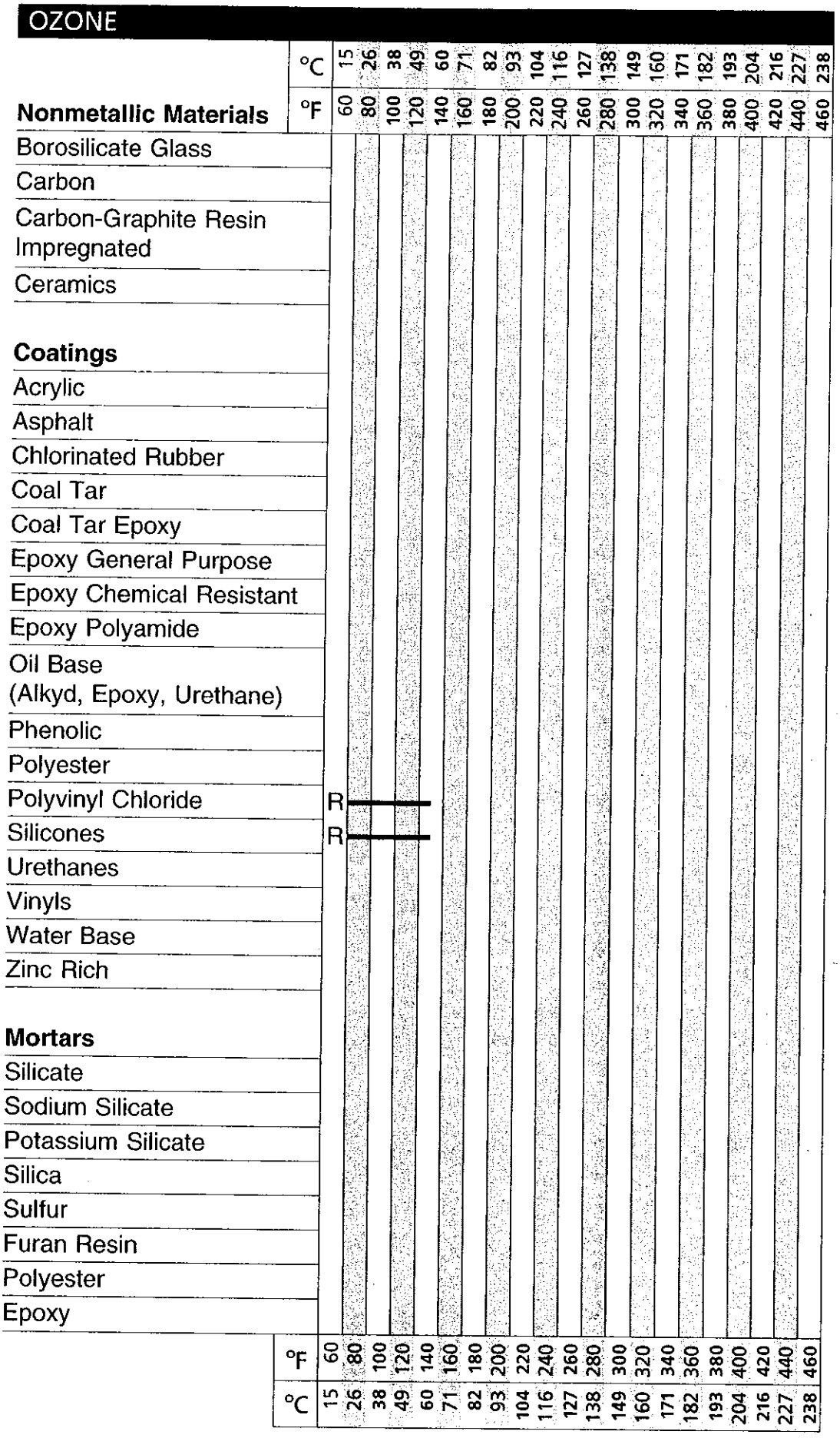
# OZONE



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# OZONE

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | U | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | | |
| ETFE (Tefzel) <1% In Air | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | U | |
| Nylon 11 | R | |
| Nylon 66 | U | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated 3% | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | R | |
| Polyetheretherketone (PEEK) | R | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | R | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | U |
| PVC Type 2 | R | U |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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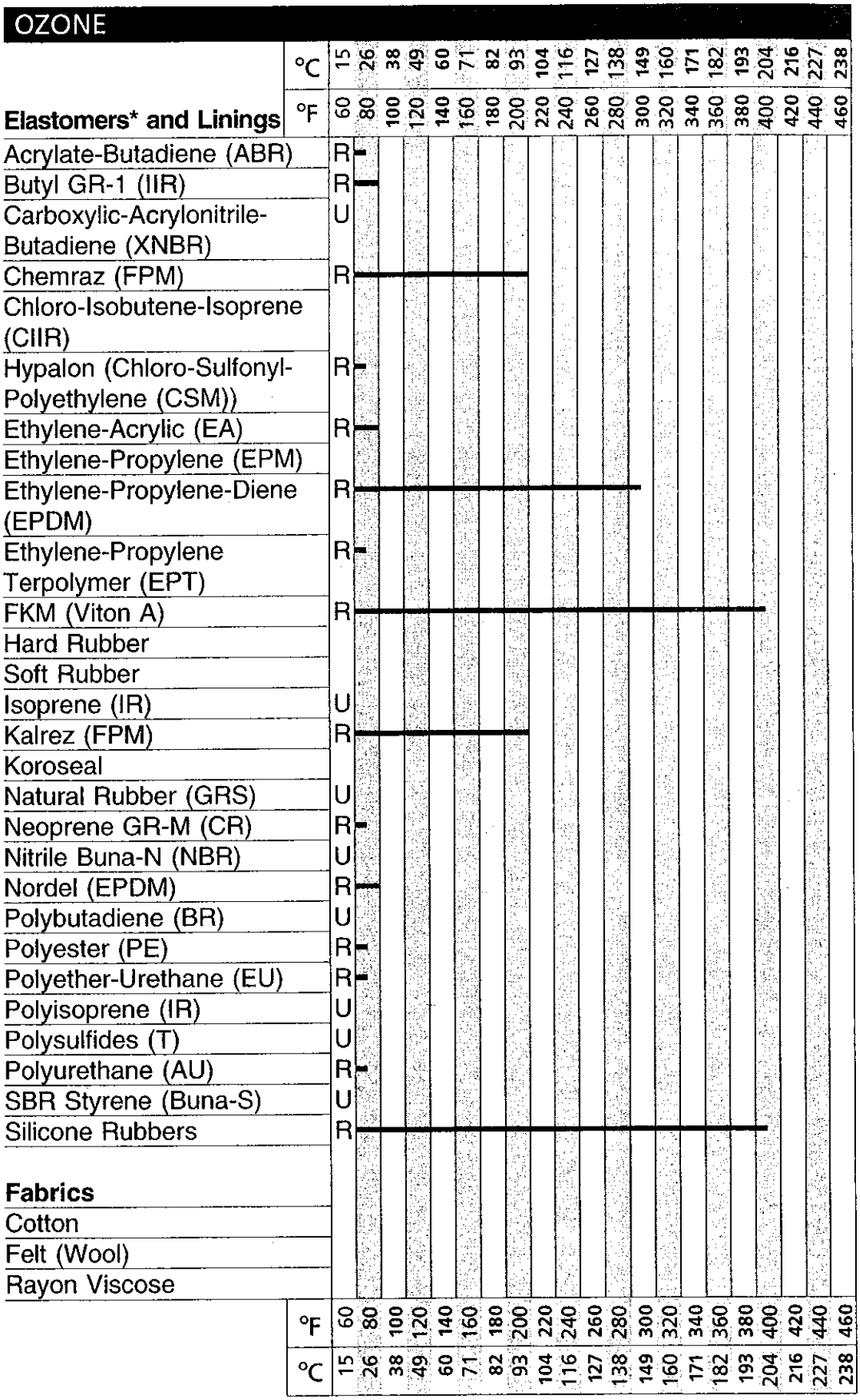
## OZONE

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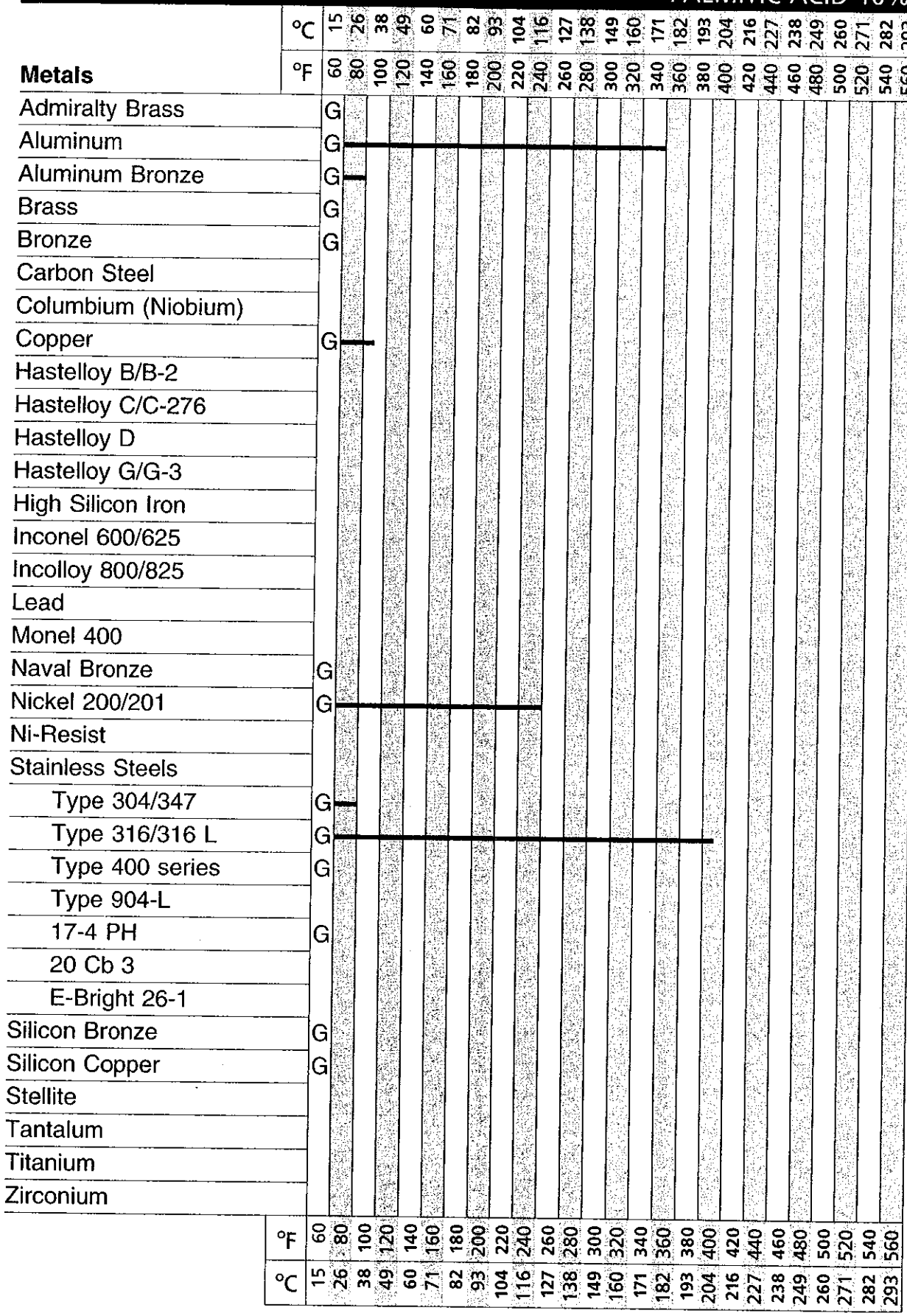


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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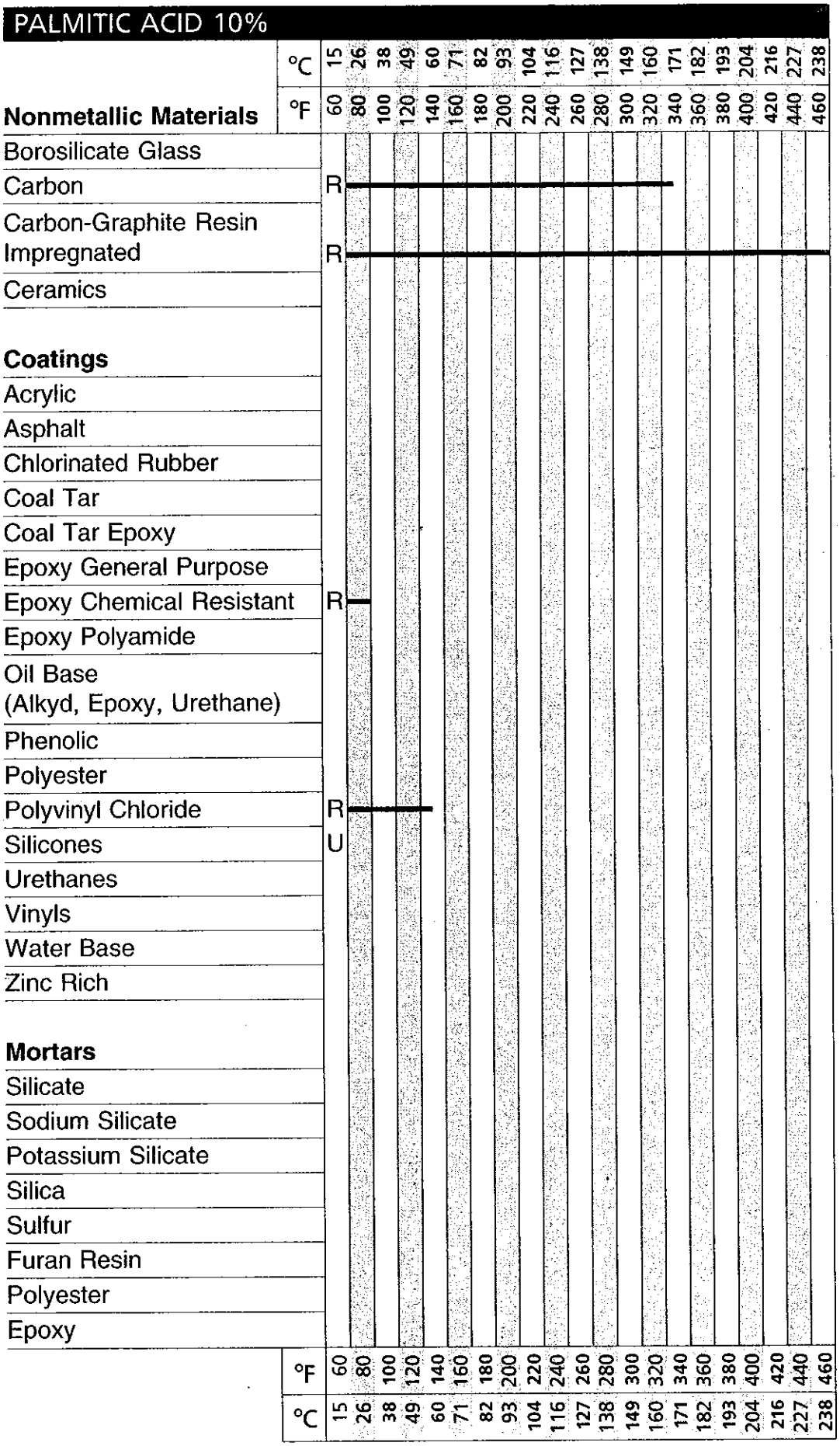




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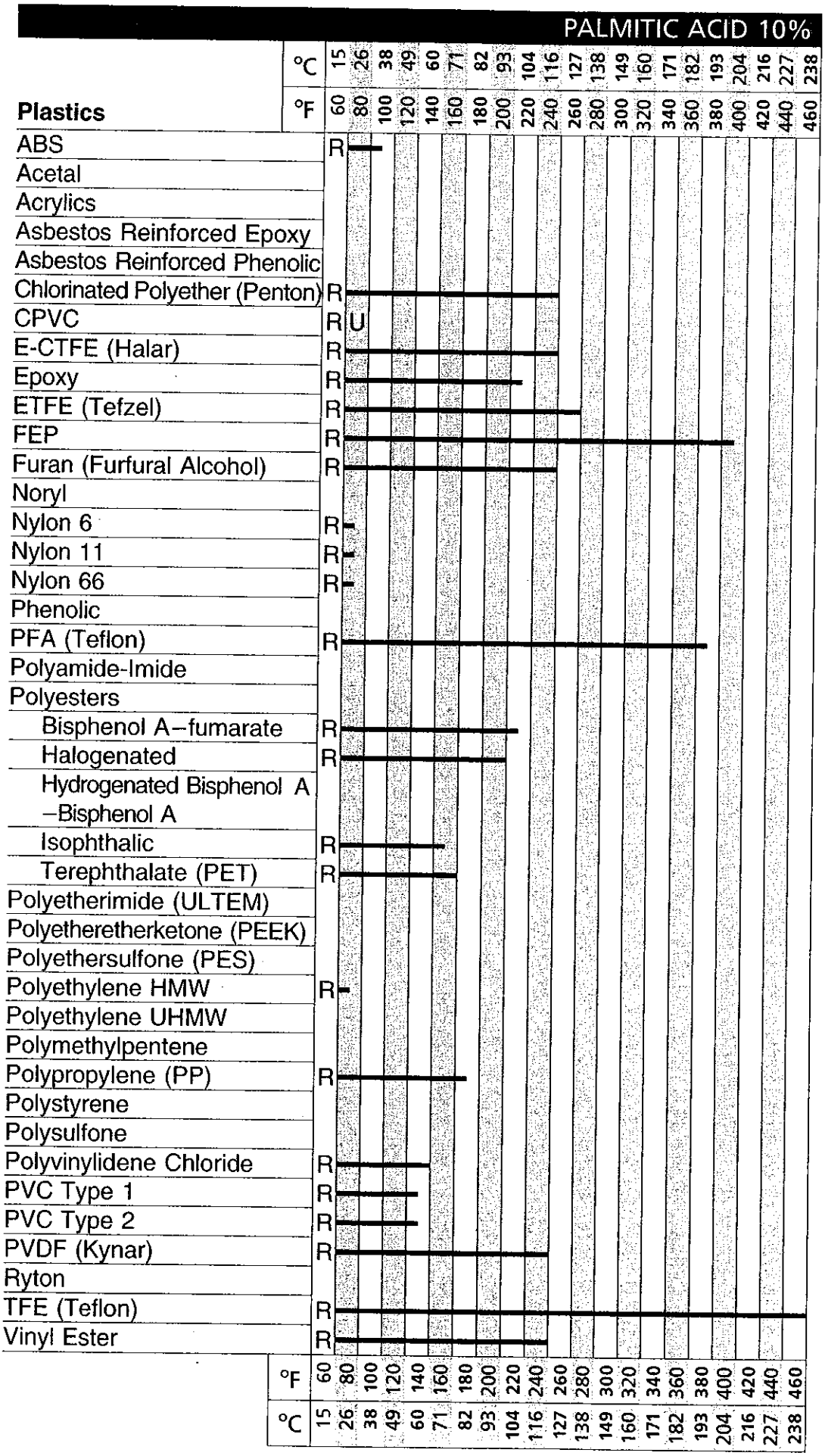


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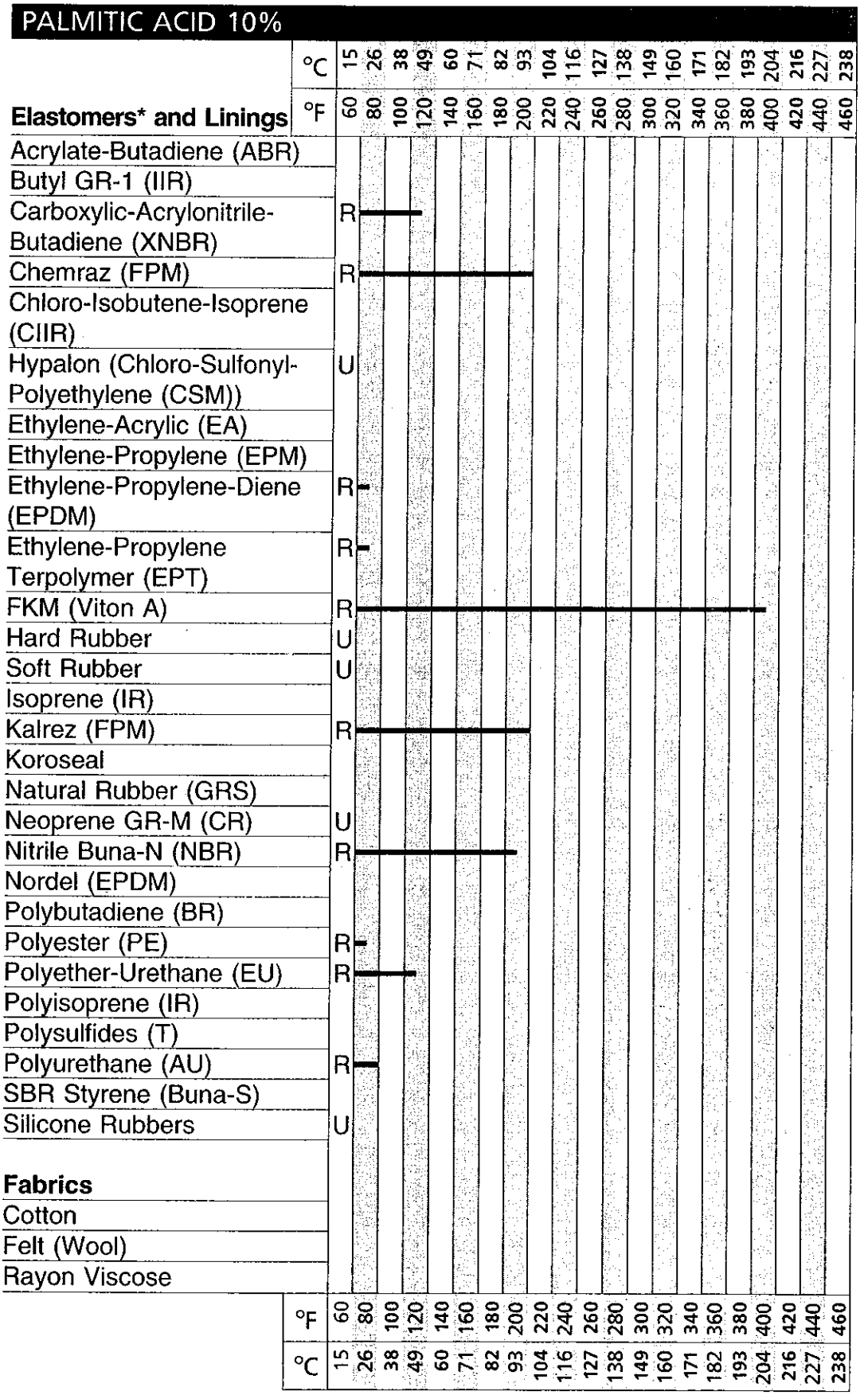


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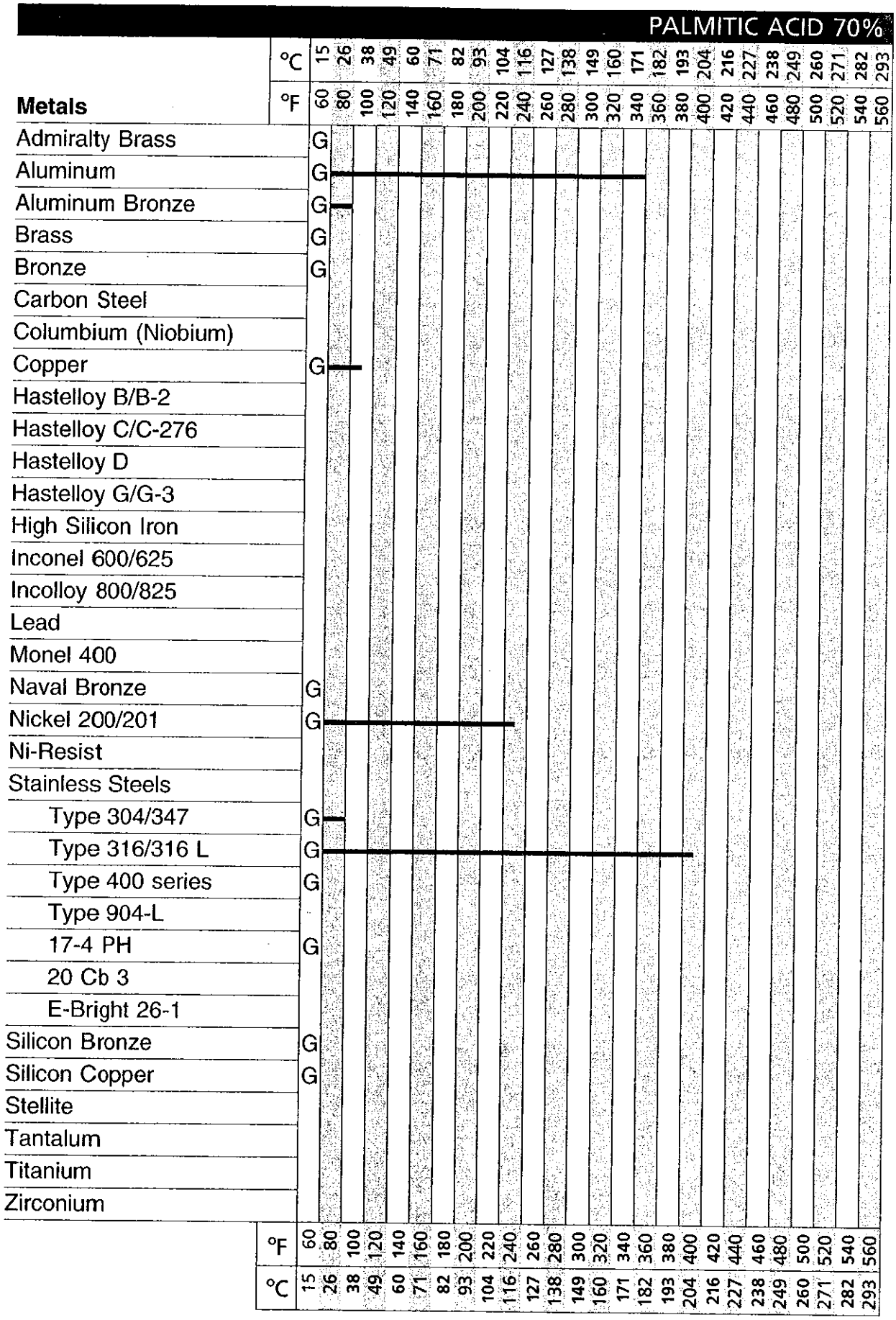


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

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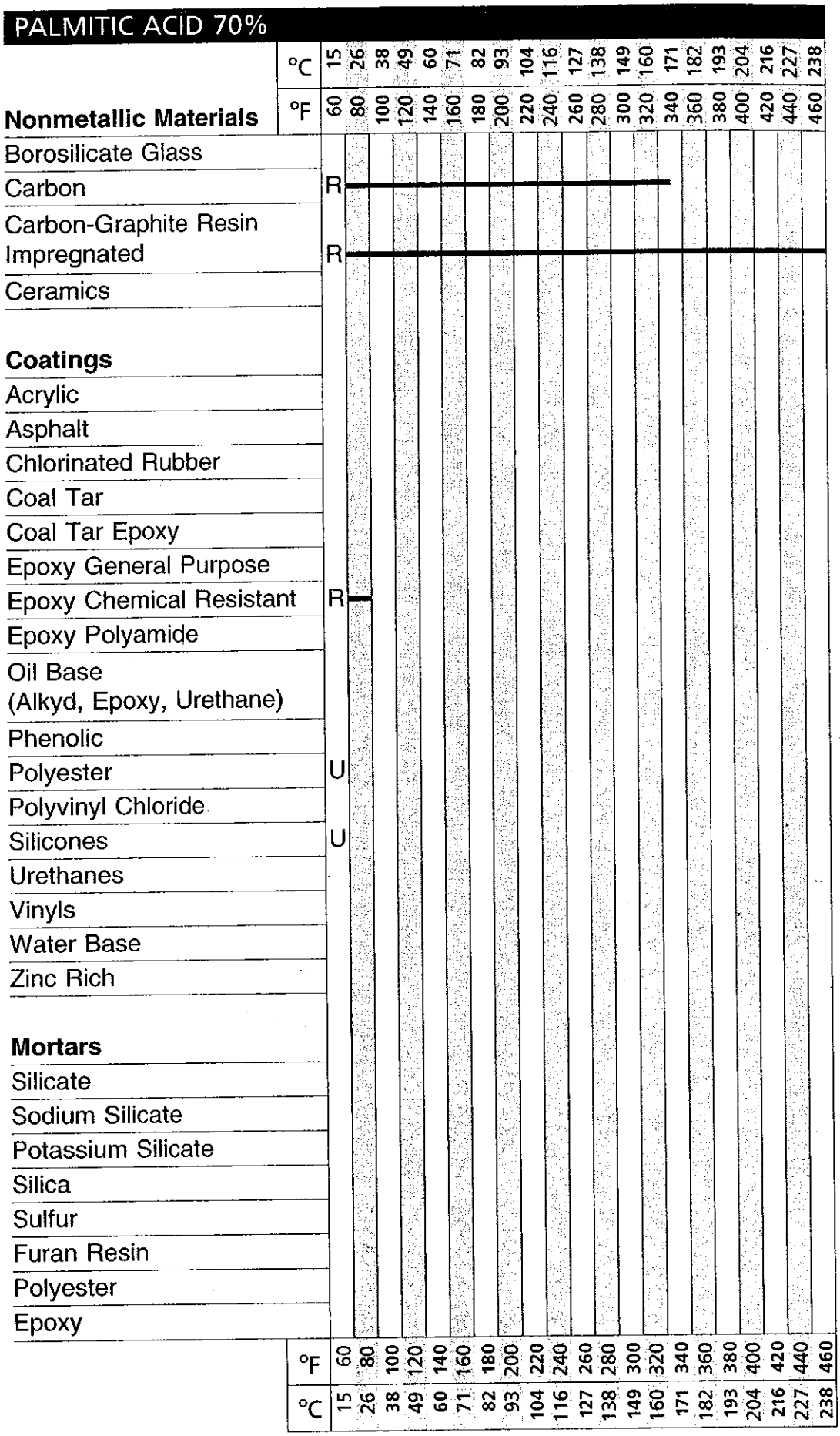




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## PALMITIC ACID 70%

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | U | |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | R | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R U | |
| PVC Type 2 | U | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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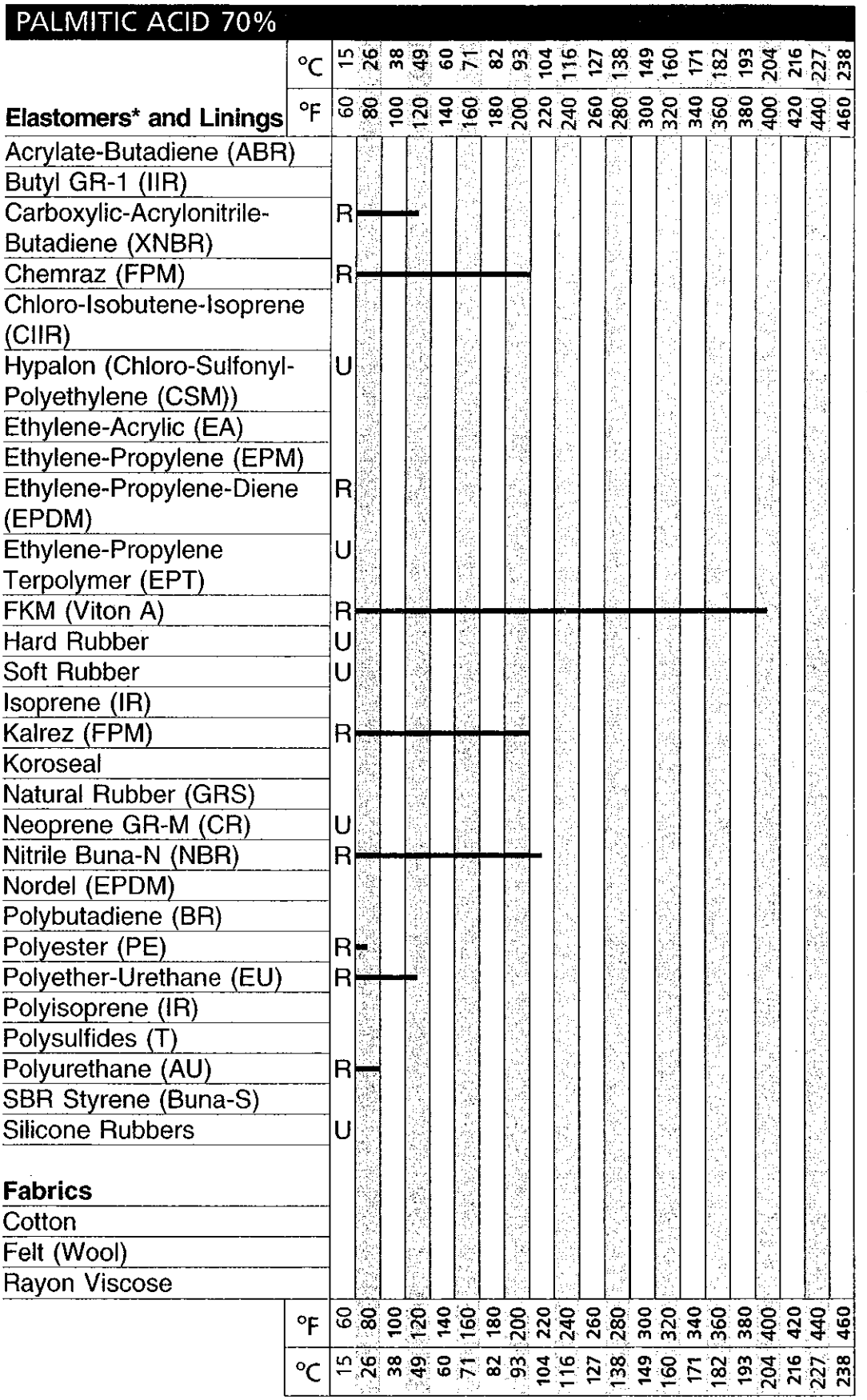


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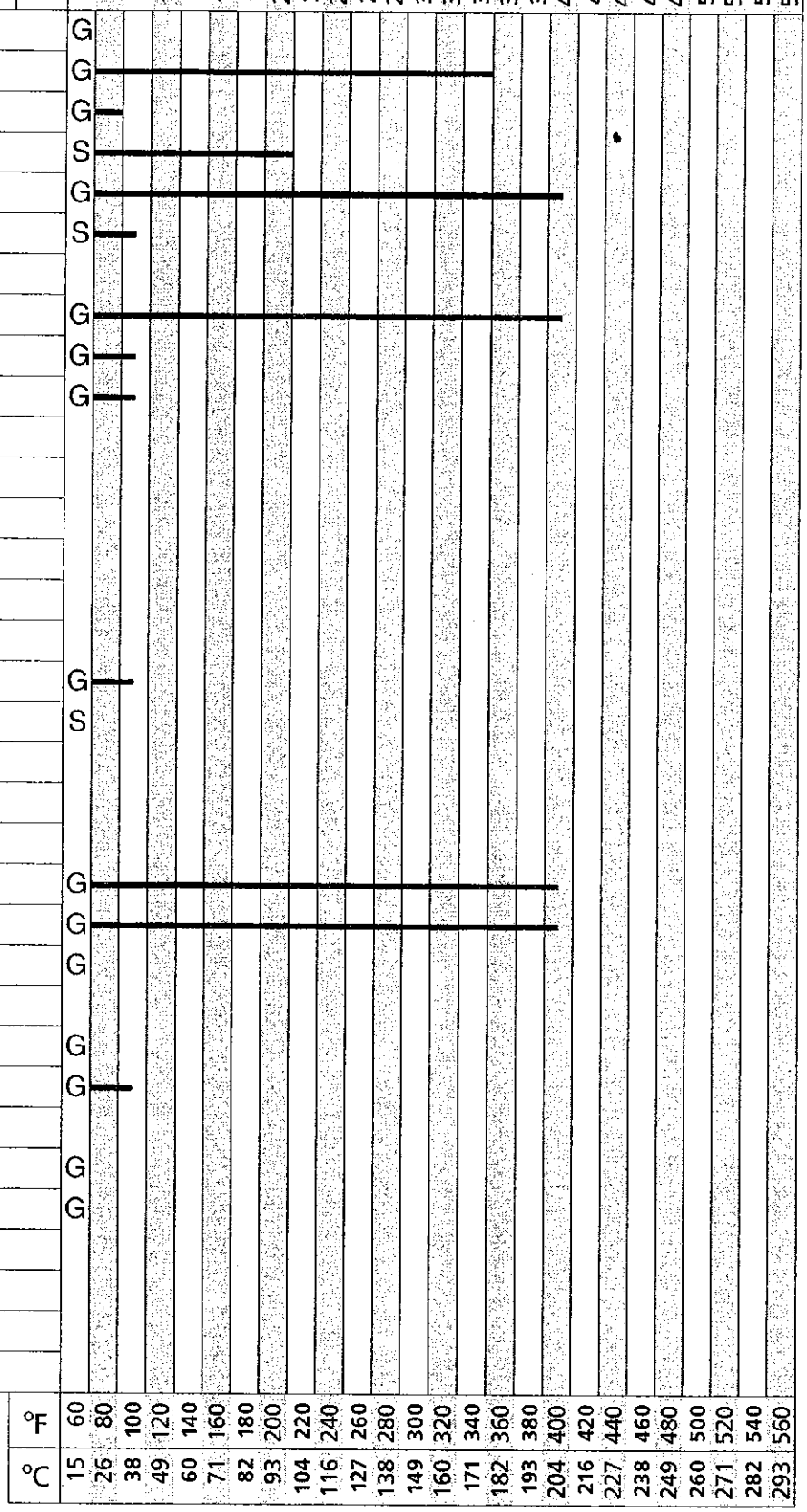
# PALMITIC ACID (CONC.)

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | G | |
| Aluminum | G | |
| Aluminum Bronze | G | |
| Brass | S | |
| Bronze | G | |
| Carbon Steel | S | |
| Columbium (Niobium) | | |
| Copper | G | |
| Hastelloy B/B-2 | G | |
| Hastelloy C/C-276 | G | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | G | |
| Naval Bronze | S | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | G | |
| Type 316/316 L | G | |
| Type 400 series | G | |
| Type 904-L | | |
| 17-4 PH | G | |
| 20 Cb 3 | G | |
| E-Bright 26-1 | | |
| Silicon Bronze | G | |
| Silicon Copper | G | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |




FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

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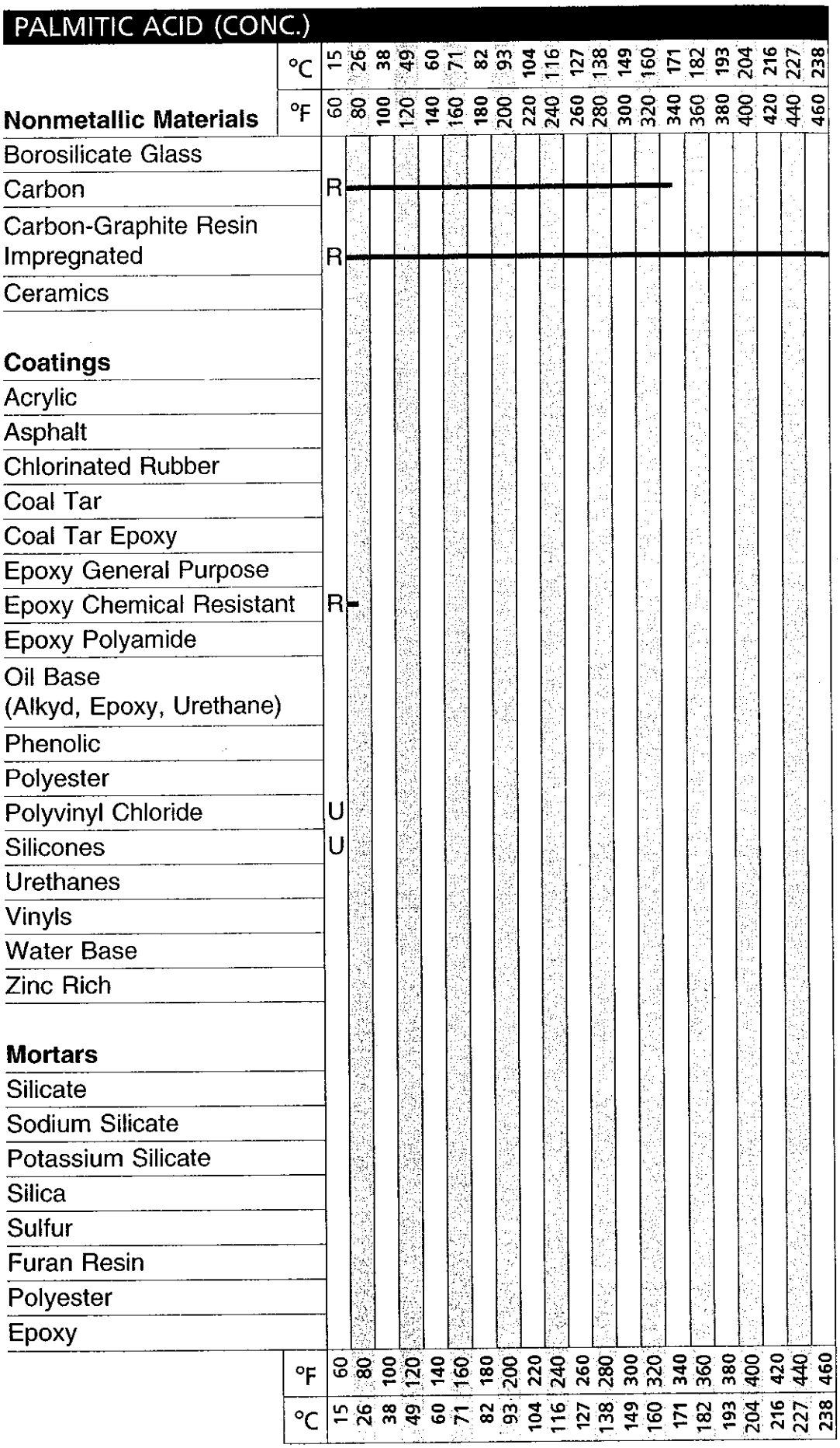
## PALMITIC ACID (CONC.)





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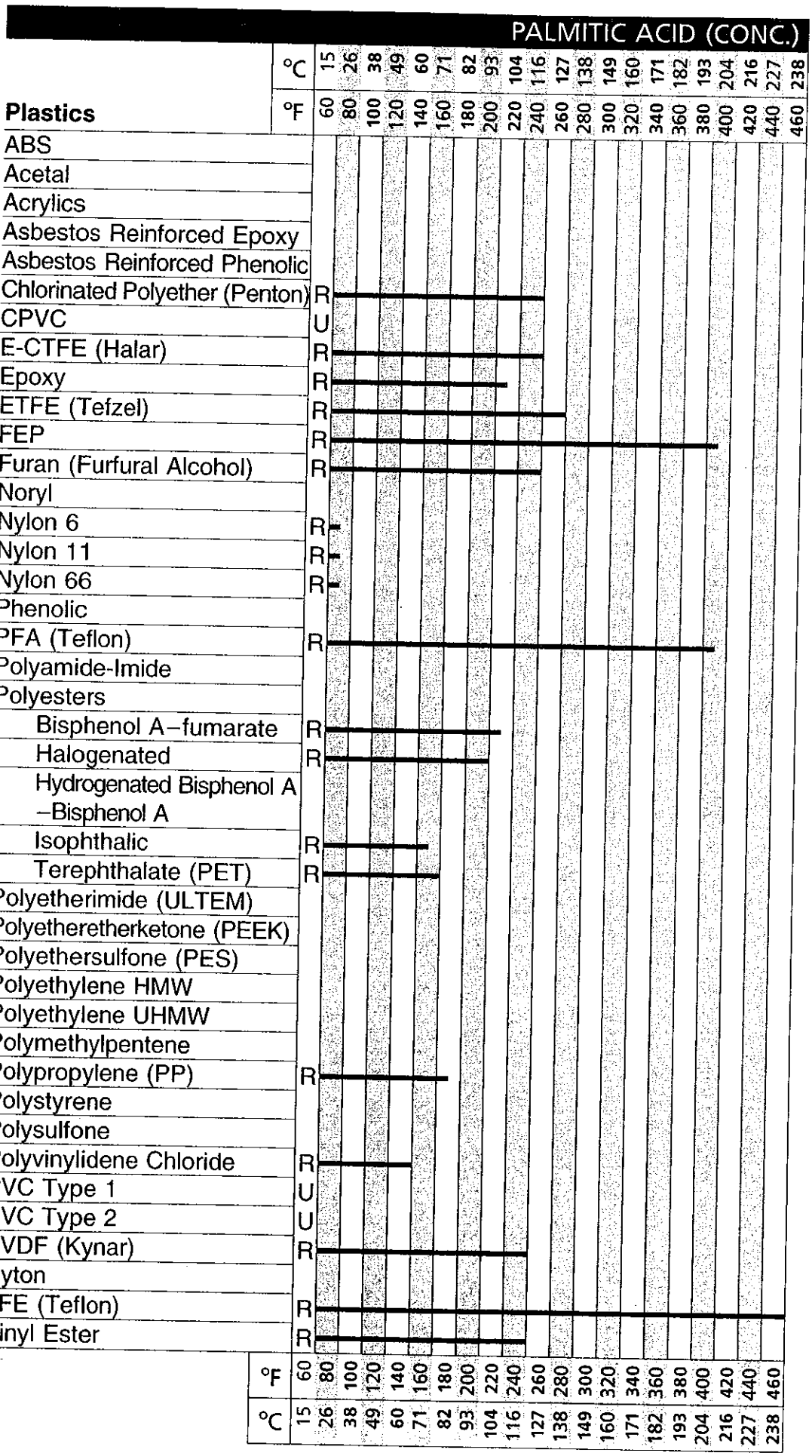



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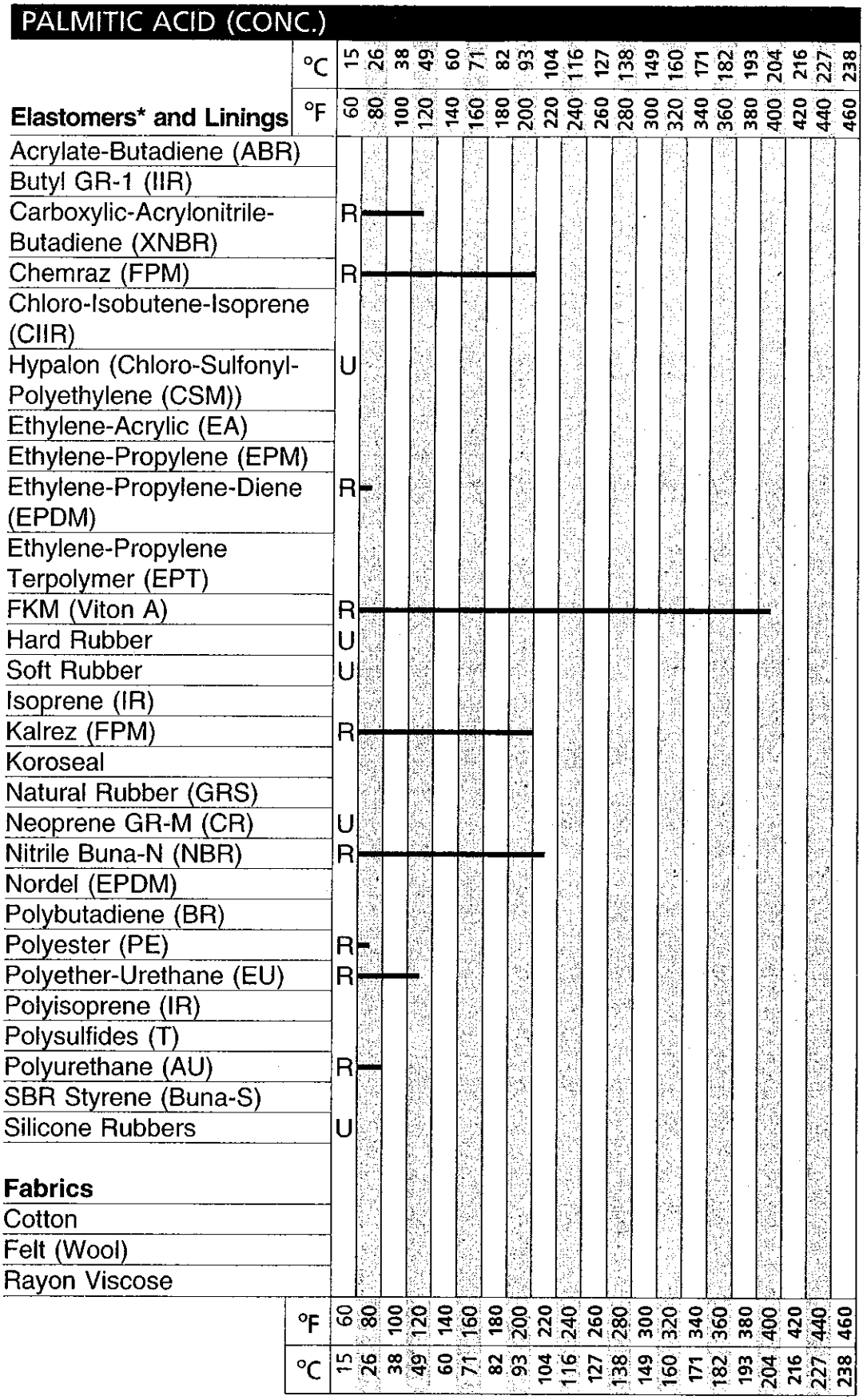
## PALMITIC ACID (CONC.)

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## PAPER PULP (CHLORINATED)

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | G | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | U | |
| Stainless Steels | | |
| Type 304/347 | U | |
| Type 316/316 L | U | |
| Type 400 series | | |
| Type 317/317 L | U | |
| 17-4 PH | | |
| 20 Cb 3 | G | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | | |
| Zirconium | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# PAPER PULP (CHLORINATED)

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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## PAPER PULP (CHLORINATED)

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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## PAPER PULP (CHLORINATED)

| Elastomers* and Linings | °C | °F |
|---|---|---|
| Acrylate-Butadiene (ABR) | | |
| Butyl GR-1 (IIR) | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | | |
| Chloro-Isobutene-Isoprene (CIIR) | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | | |
| Ethylene-Propylene-Diene (EPDM) | | |
| Ethylene-Propylene Terpolymer (EPT) | | |
| FKM (Viton A) | | |
| Hard Rubber | R | |
| Soft Rubber | | |
| Isoprene (IR) | | |
| Kalrez (FPM) | | |
| Koroseal | | |
| Natural Rubber (GRS) | | |
| Neoprene GR-M (CR) | | |
| Nitrile Buna-N (NBR) | | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | | |
| Polyester (PE) | | |
| Polyether-Urethane (EU) | | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | | |
| Polyurethane (AU) | | |
| SBR Styrene (Buna-S) | | |
| Silicone Rubbers | | |
| **Fabrics** | | |
| Cotton | | |
| Felt (Wool) | | |
| Rayon Viscose | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |

*See also Nylon 11 under PLASTICS



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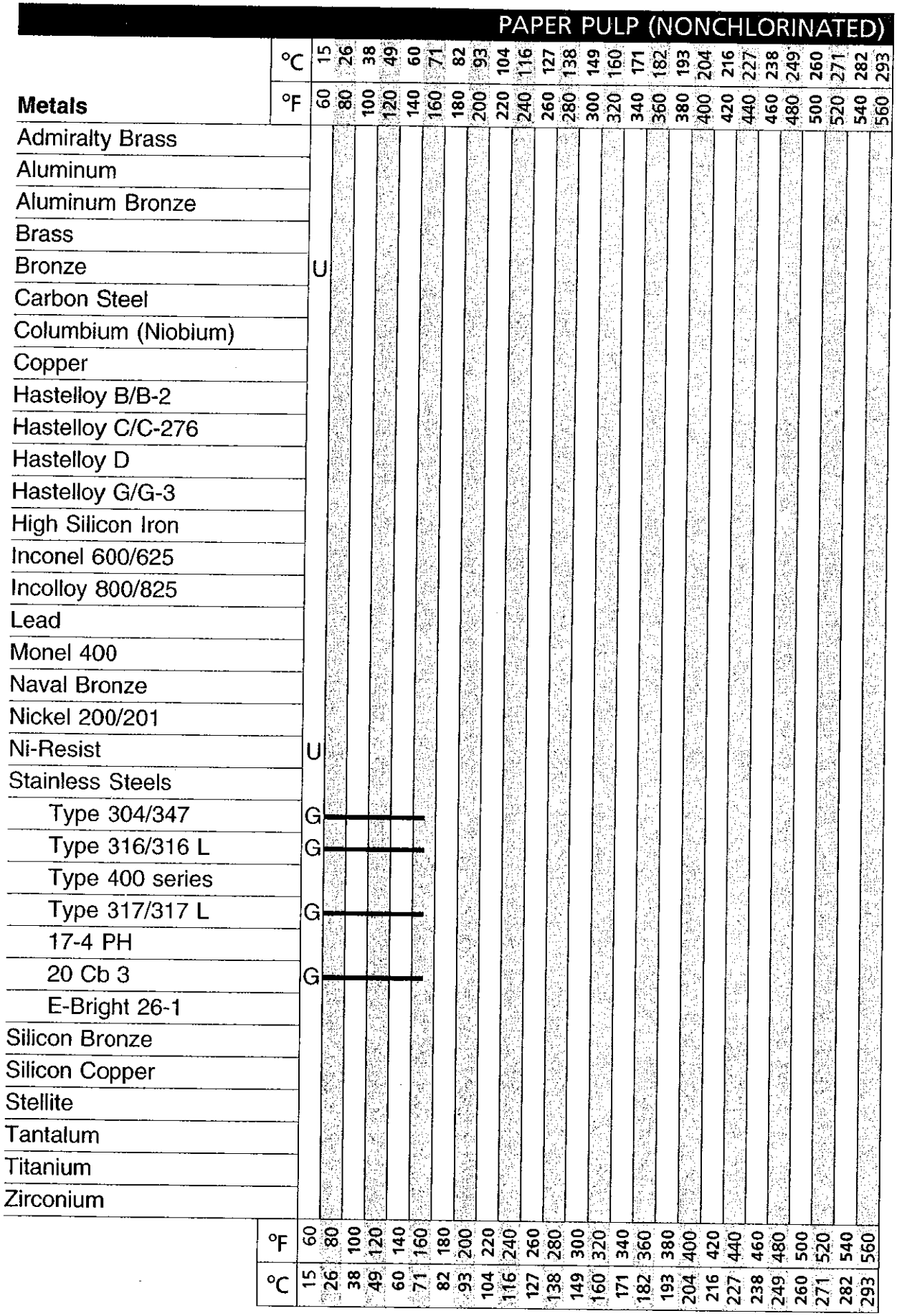
## PAPER PULP (NONCHLORINATED)




FOR METALS

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U = Unsatisfactory

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## PAPER PULP (NONCHLORINATED)

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# PAPER PULP (NONCHLORINATED)

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |


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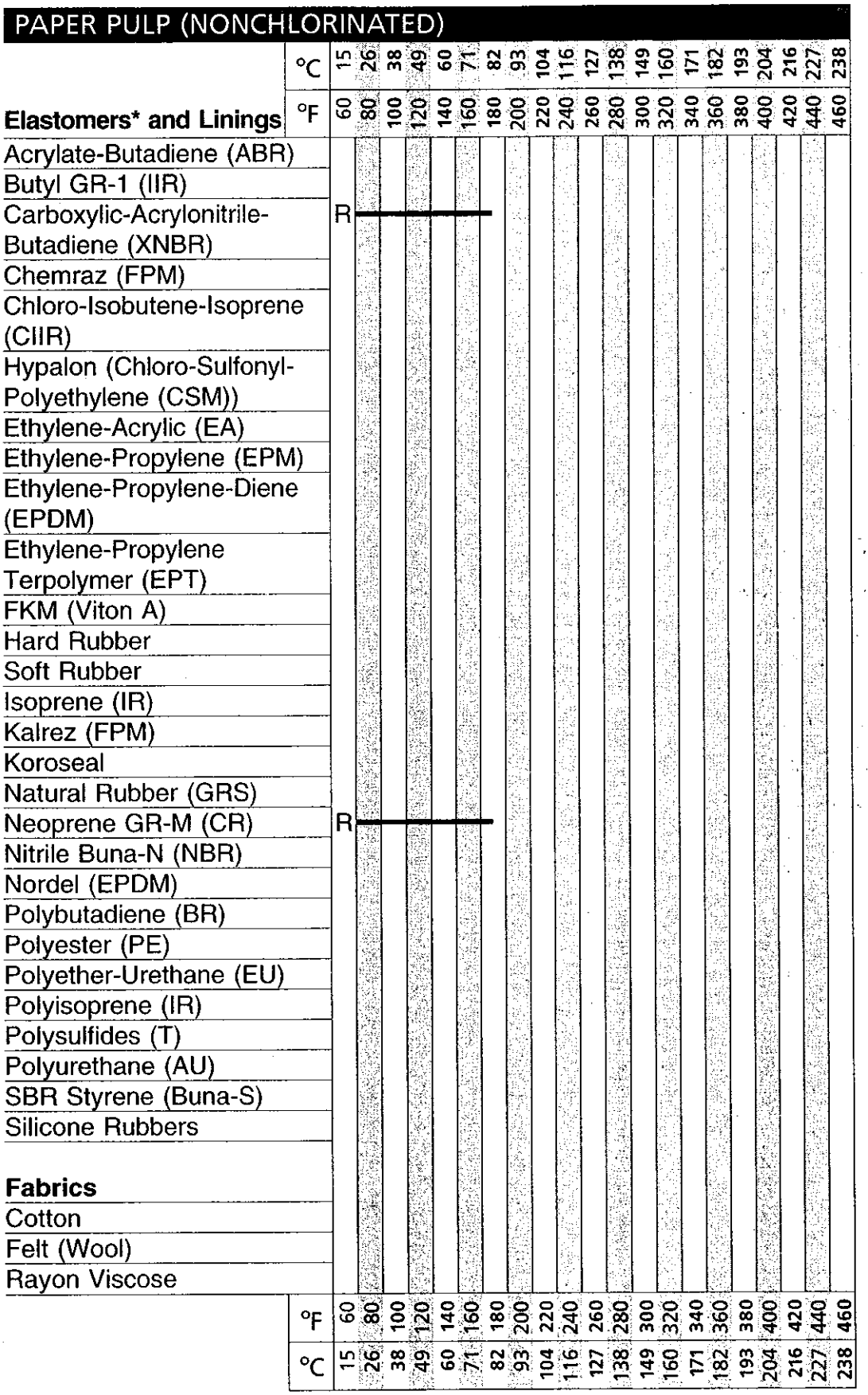


*See also Nylon 11 under PLASTICS



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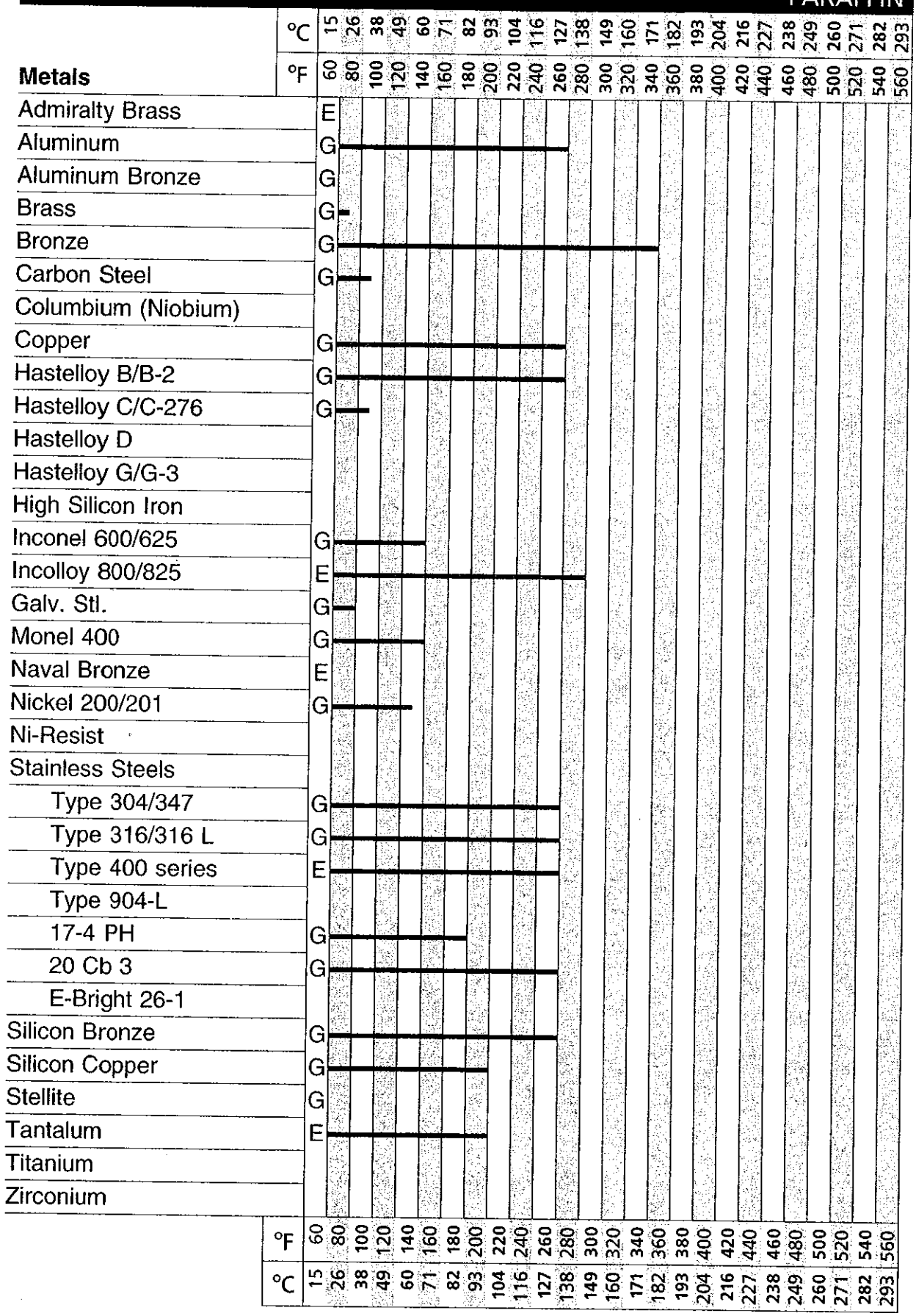


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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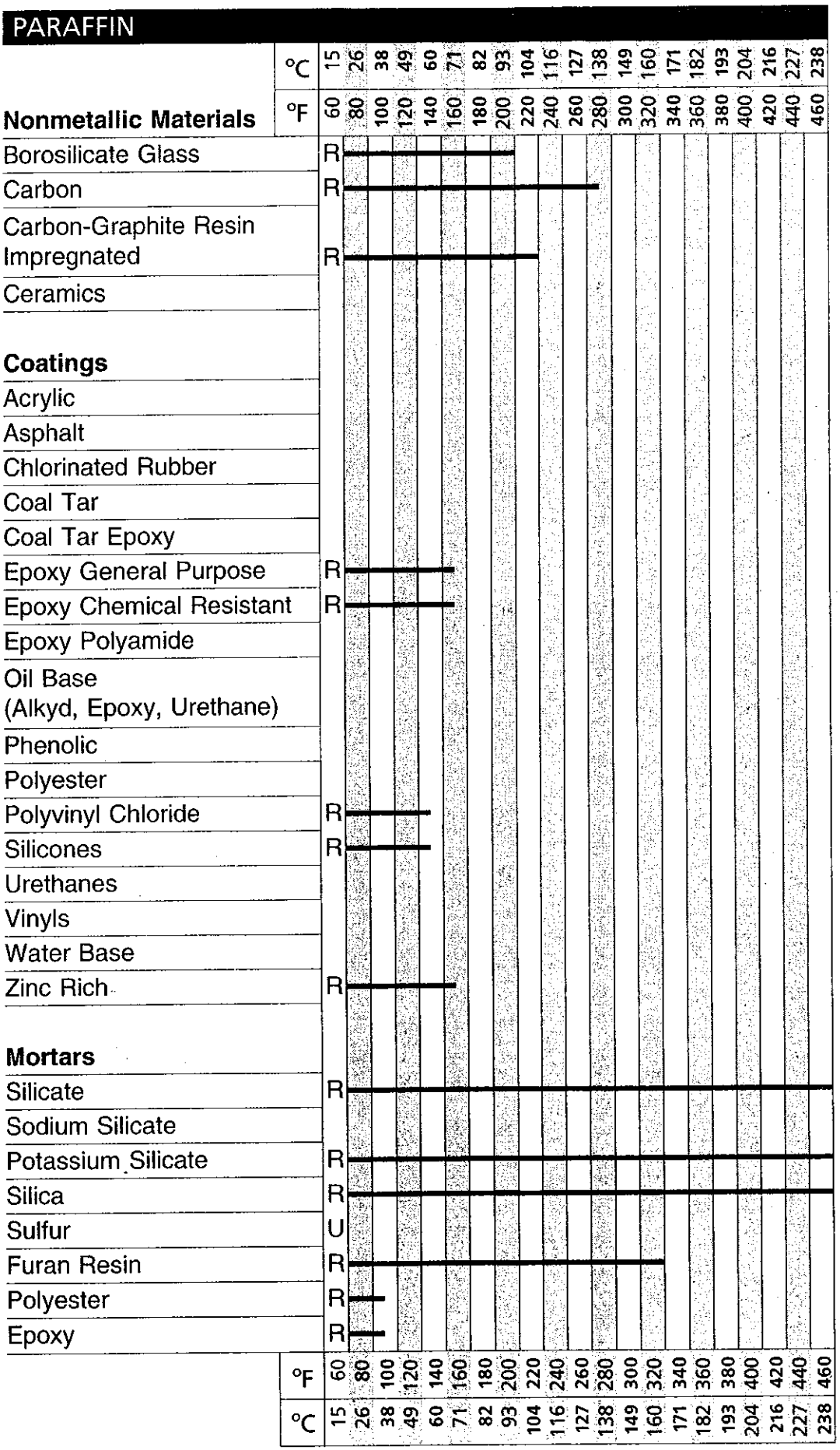
## PARAFFIN



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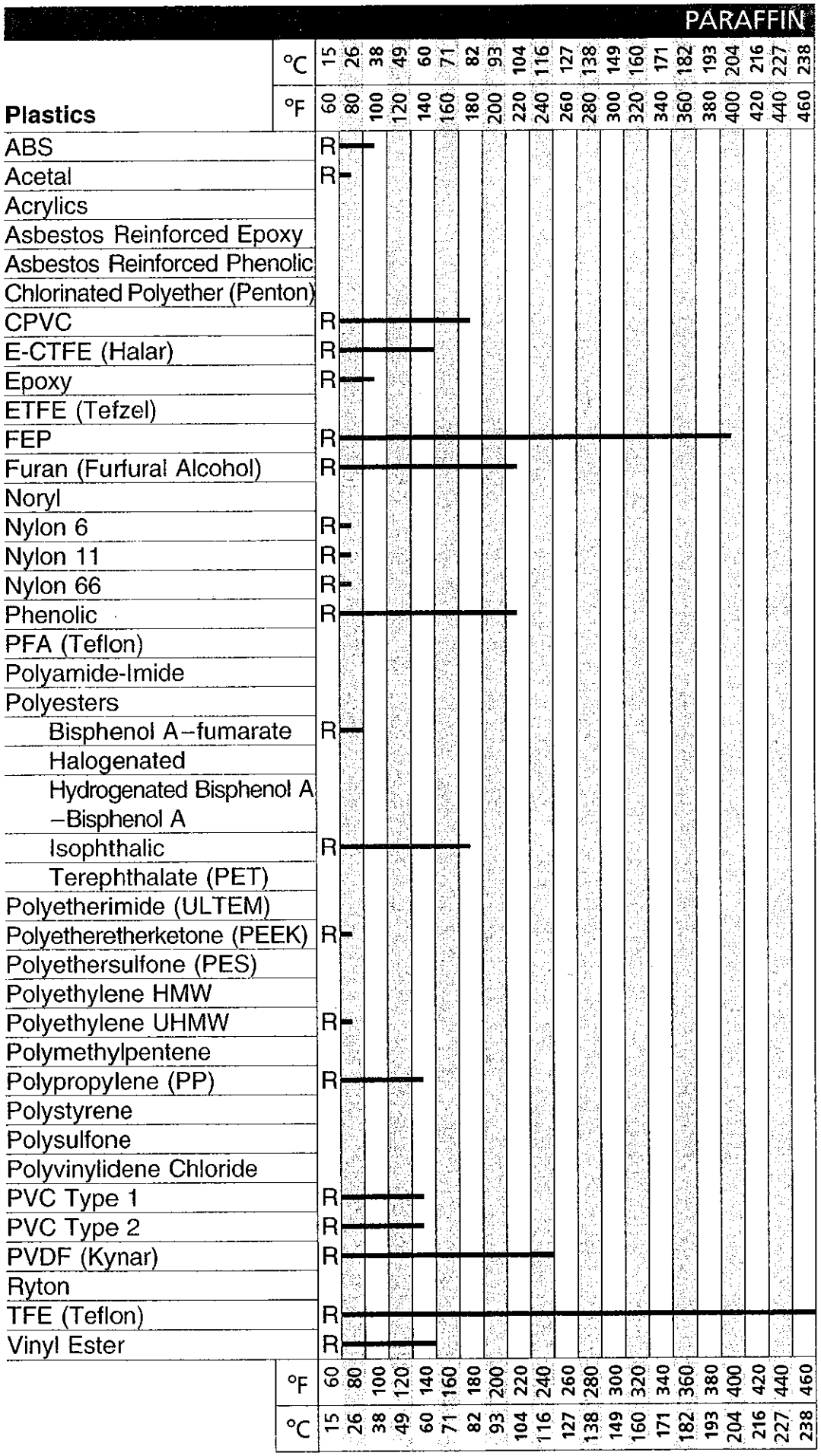



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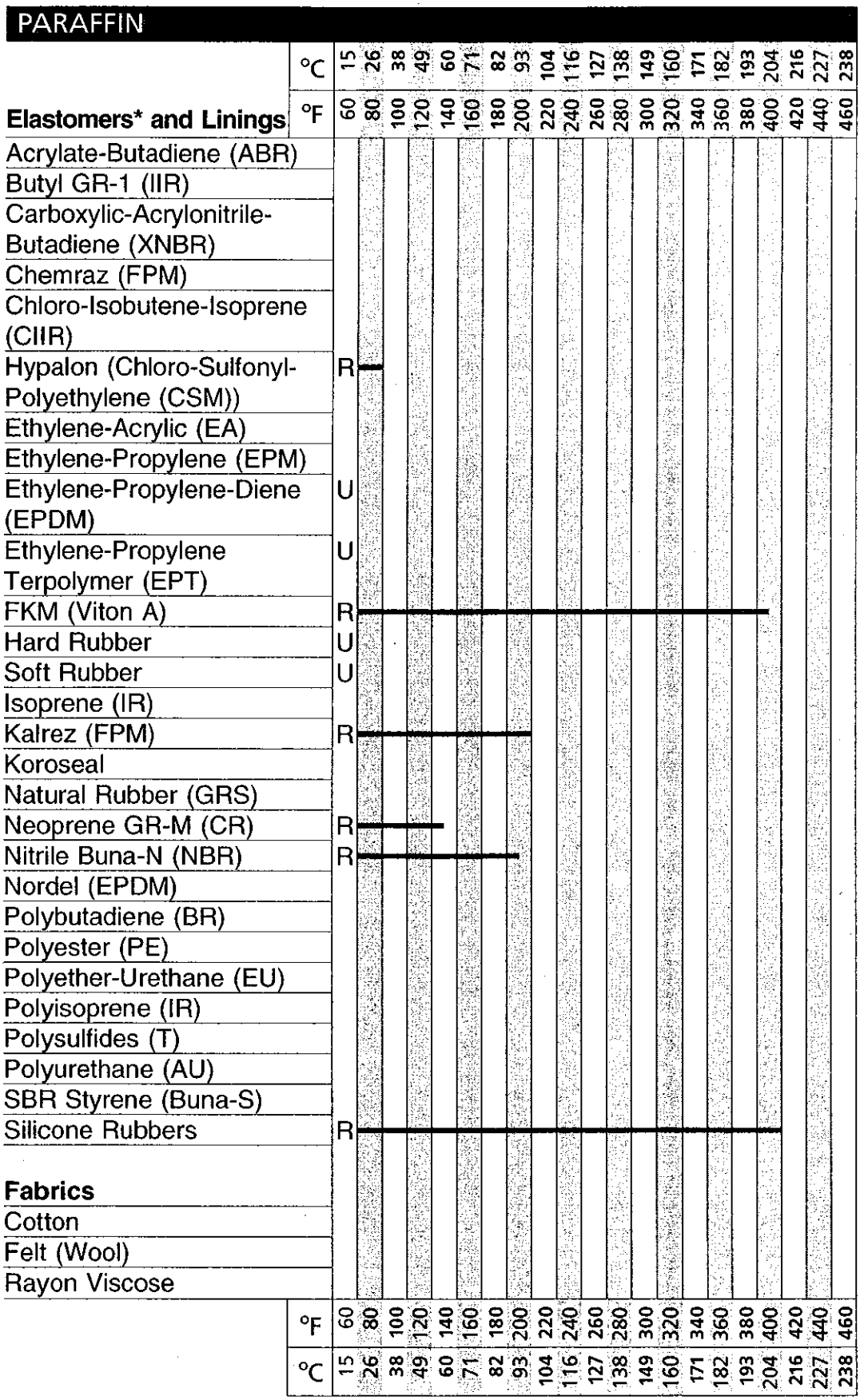
## PARAFFIN

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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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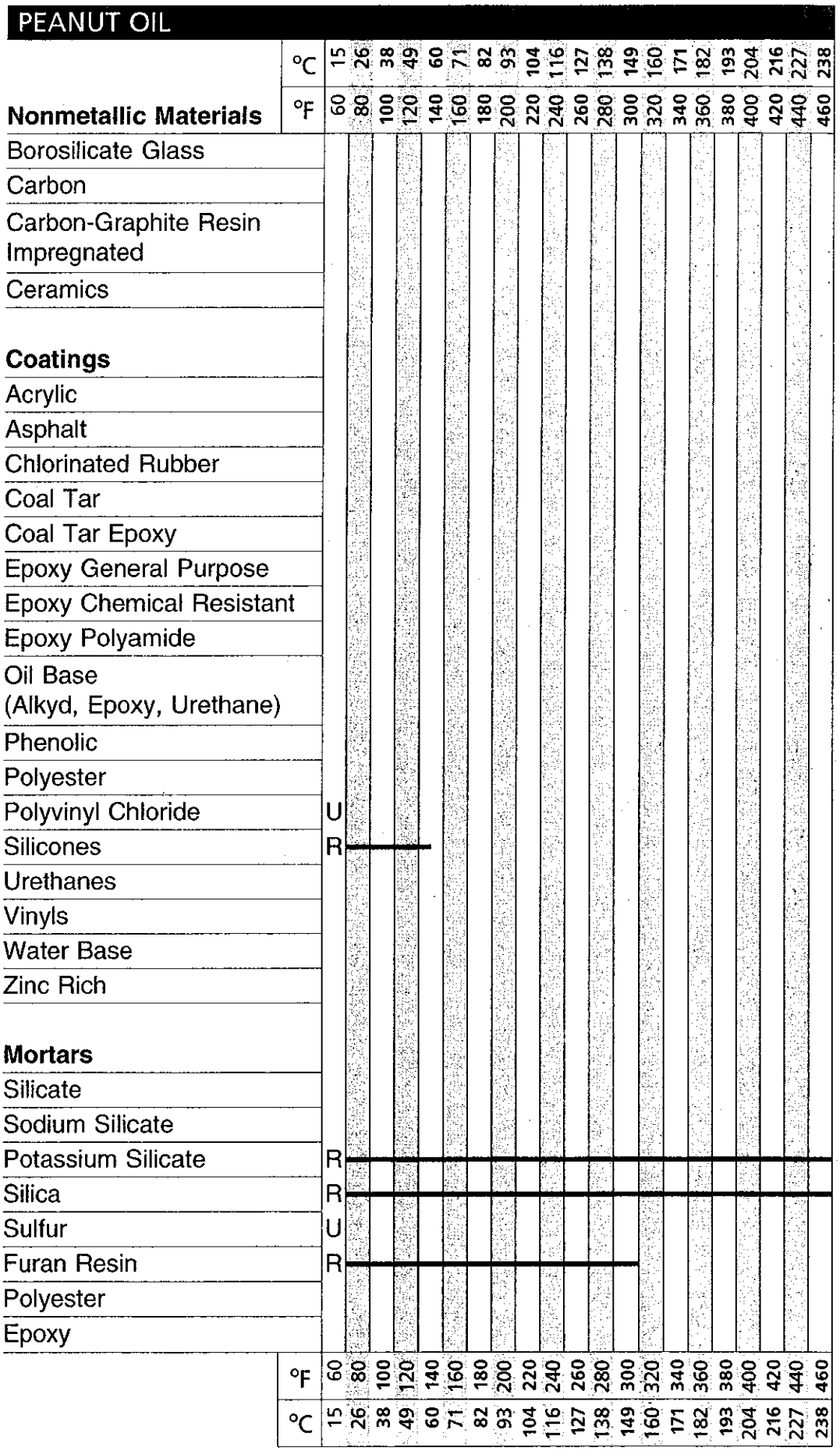
## PEANUT OIL



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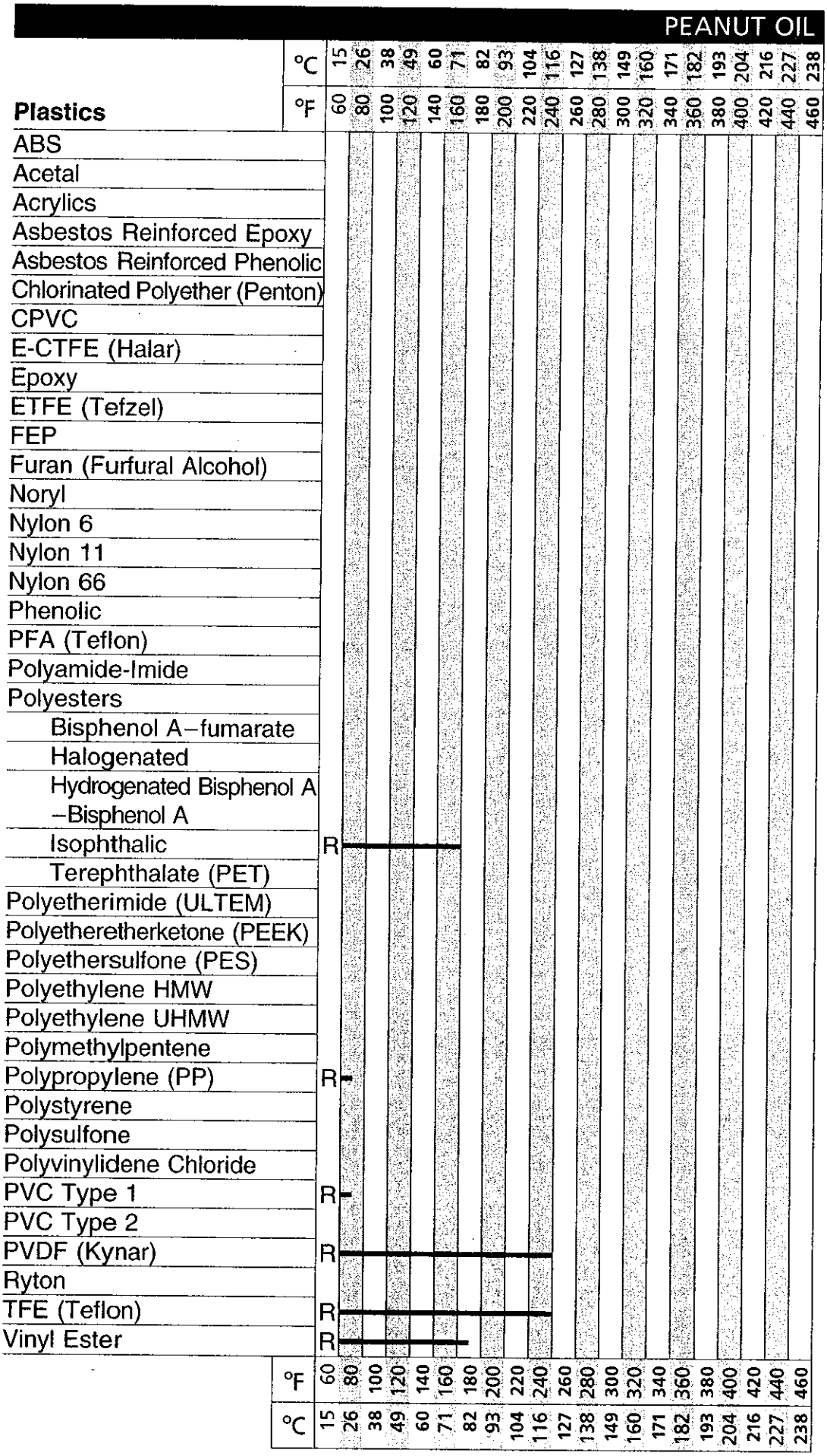



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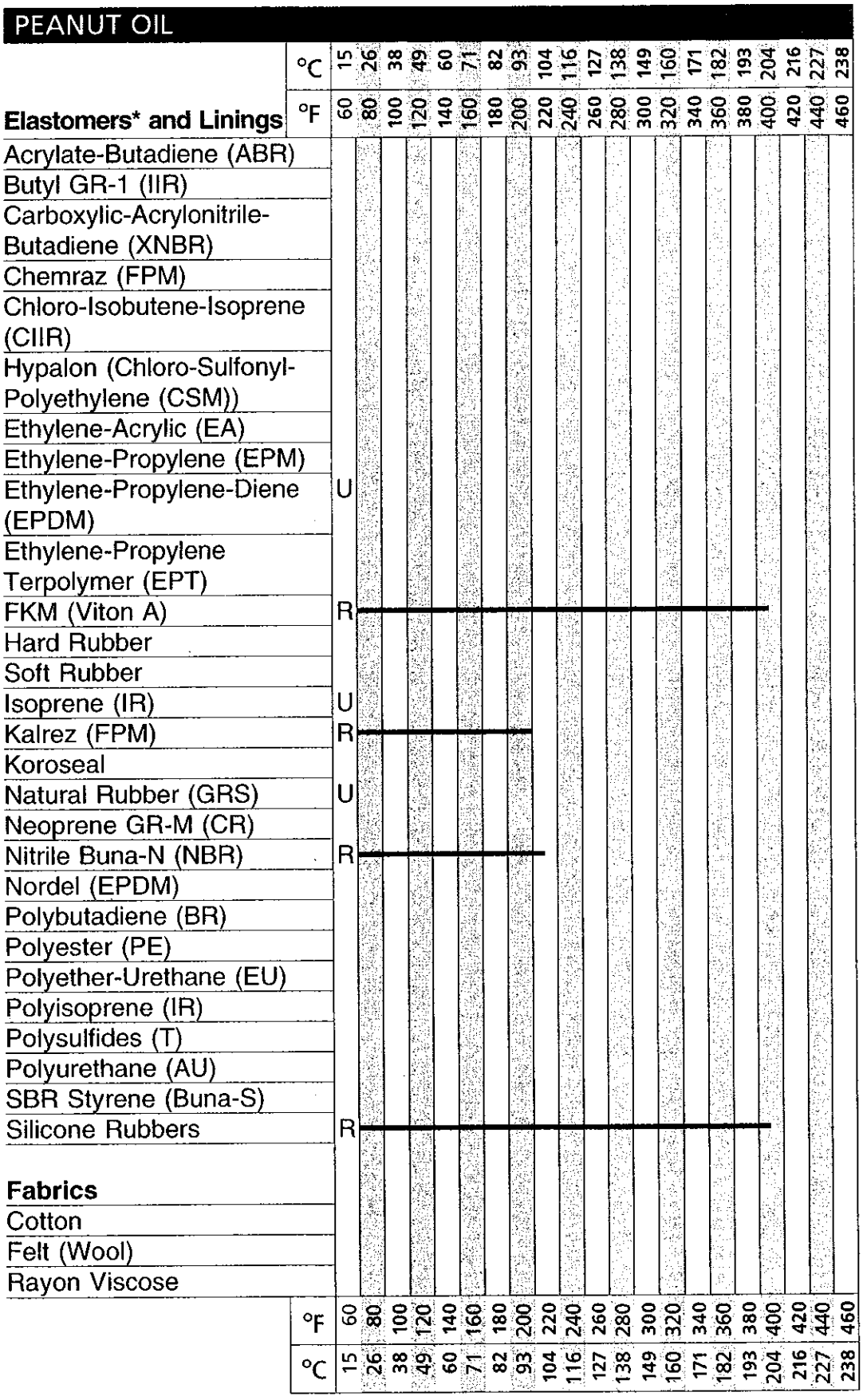
## PEANUT OIL

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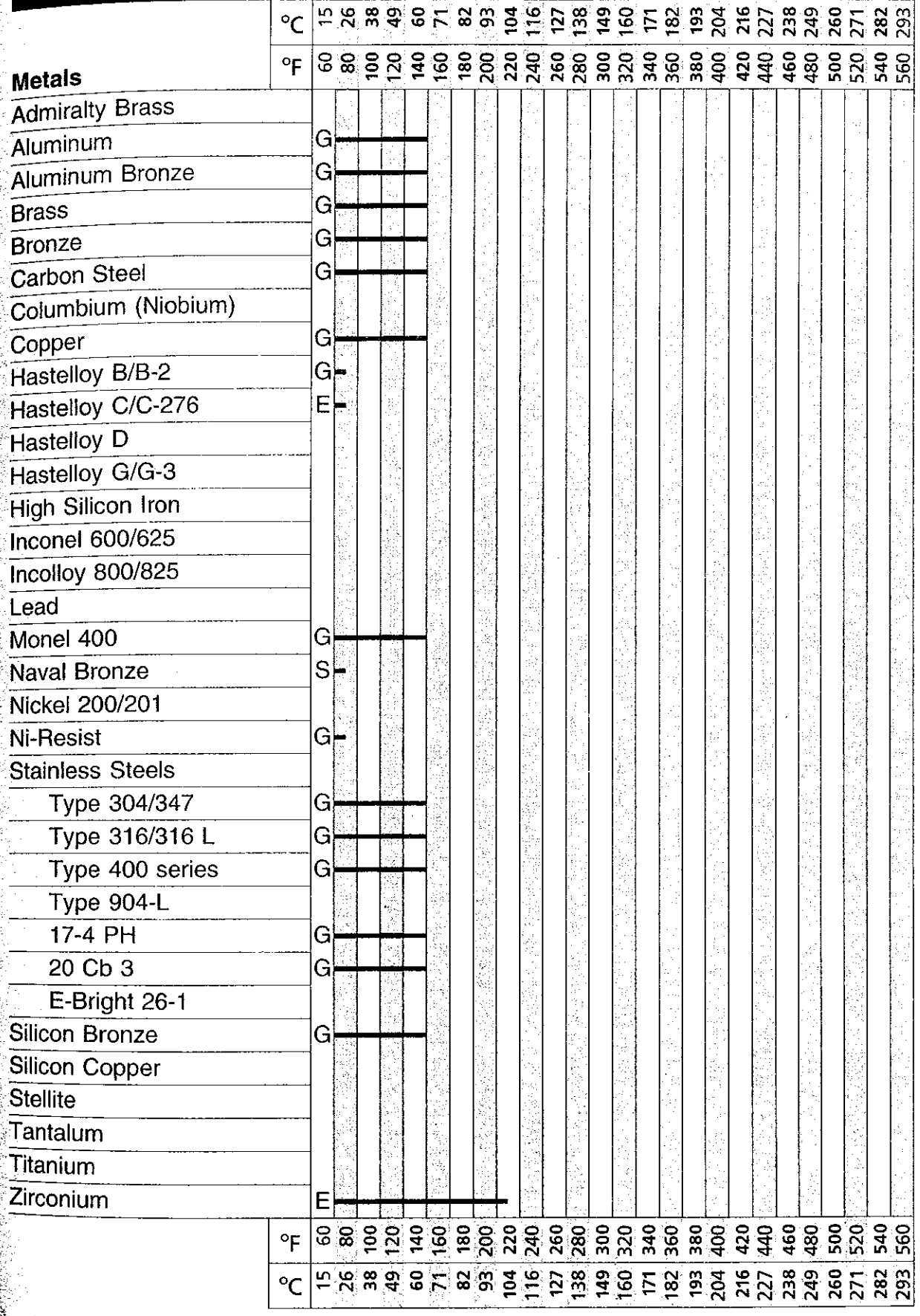


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

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# PENTANE

| Nonmetallic Materials | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | R | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | |
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# PENTANE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | U | |
| E-CTFE (Halar) | | |
| Epoxy | R | |
| ETFE (Tefzel) | | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | R | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | R | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | U | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |

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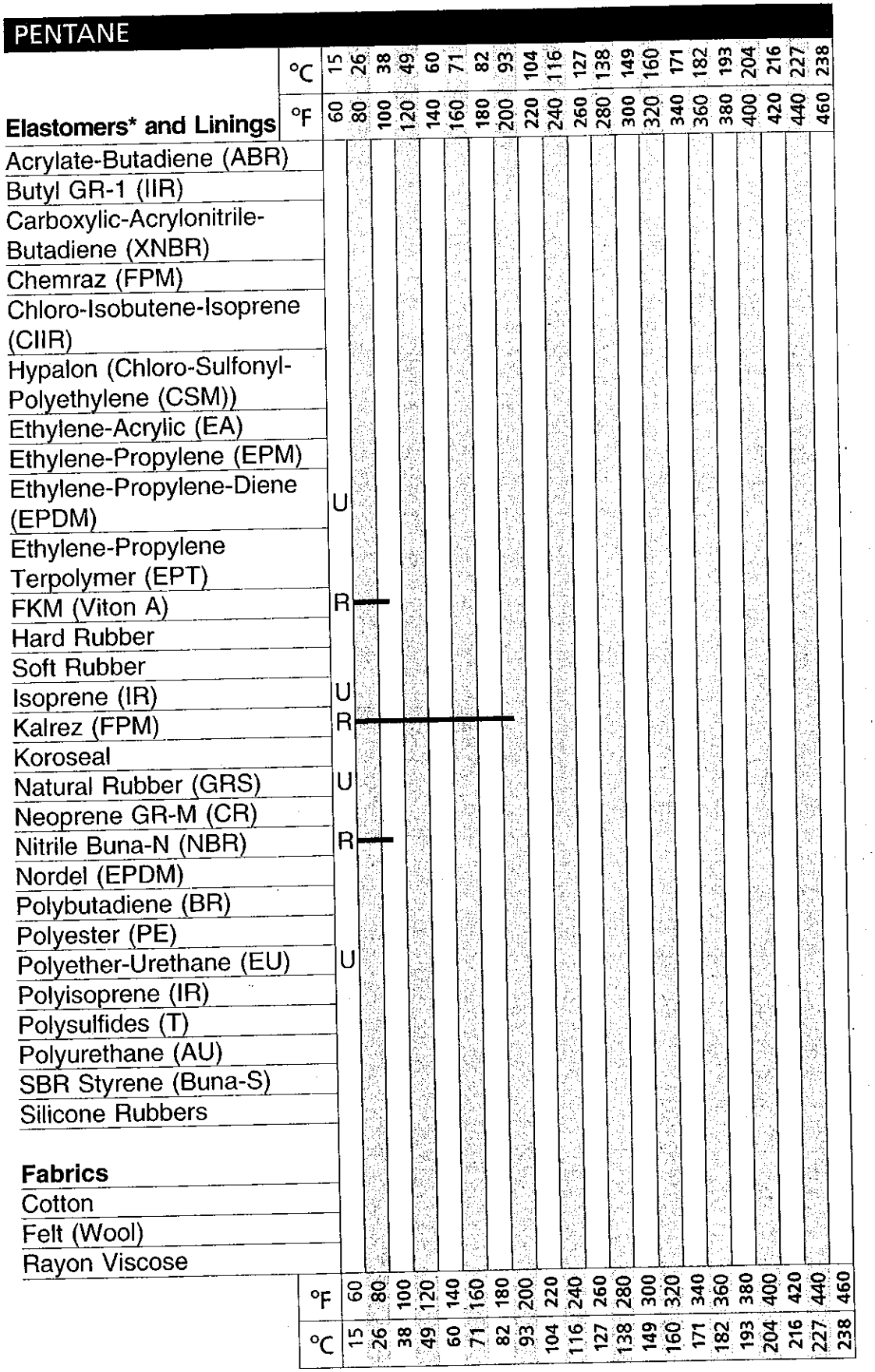
# PENTANE

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# PERACETIC ACID 40%

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## PERACETIC ACID 40%

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | U | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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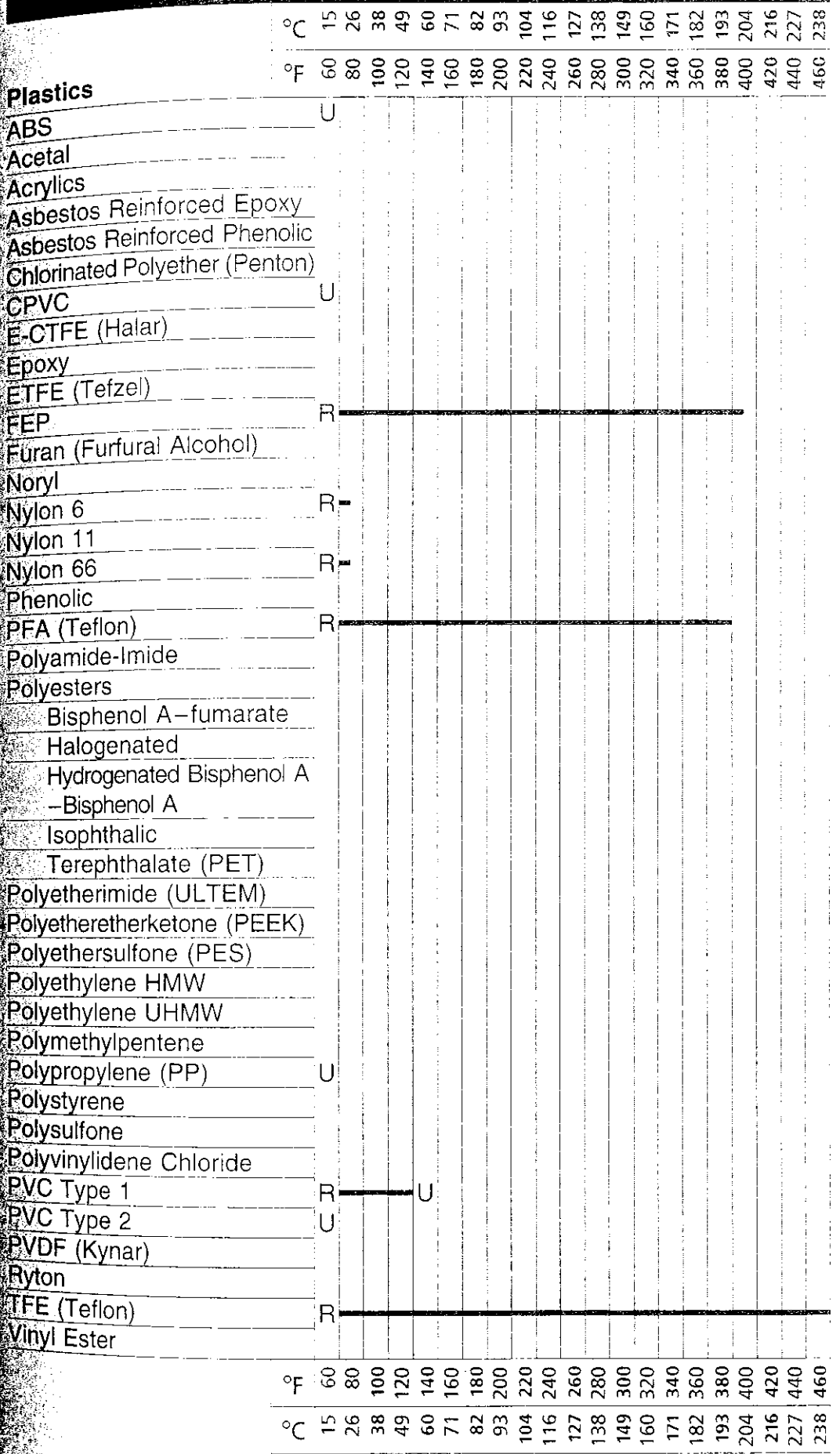


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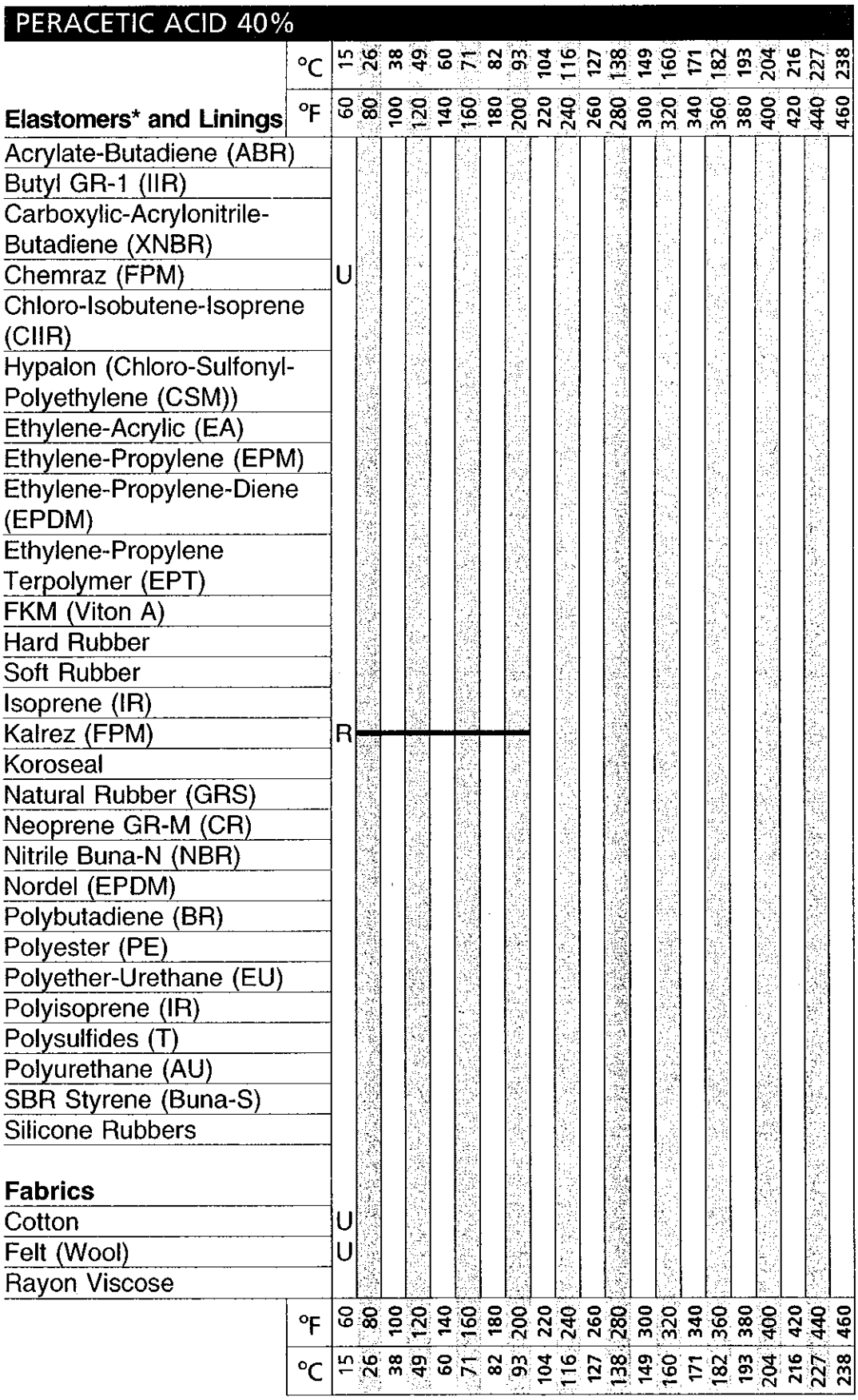


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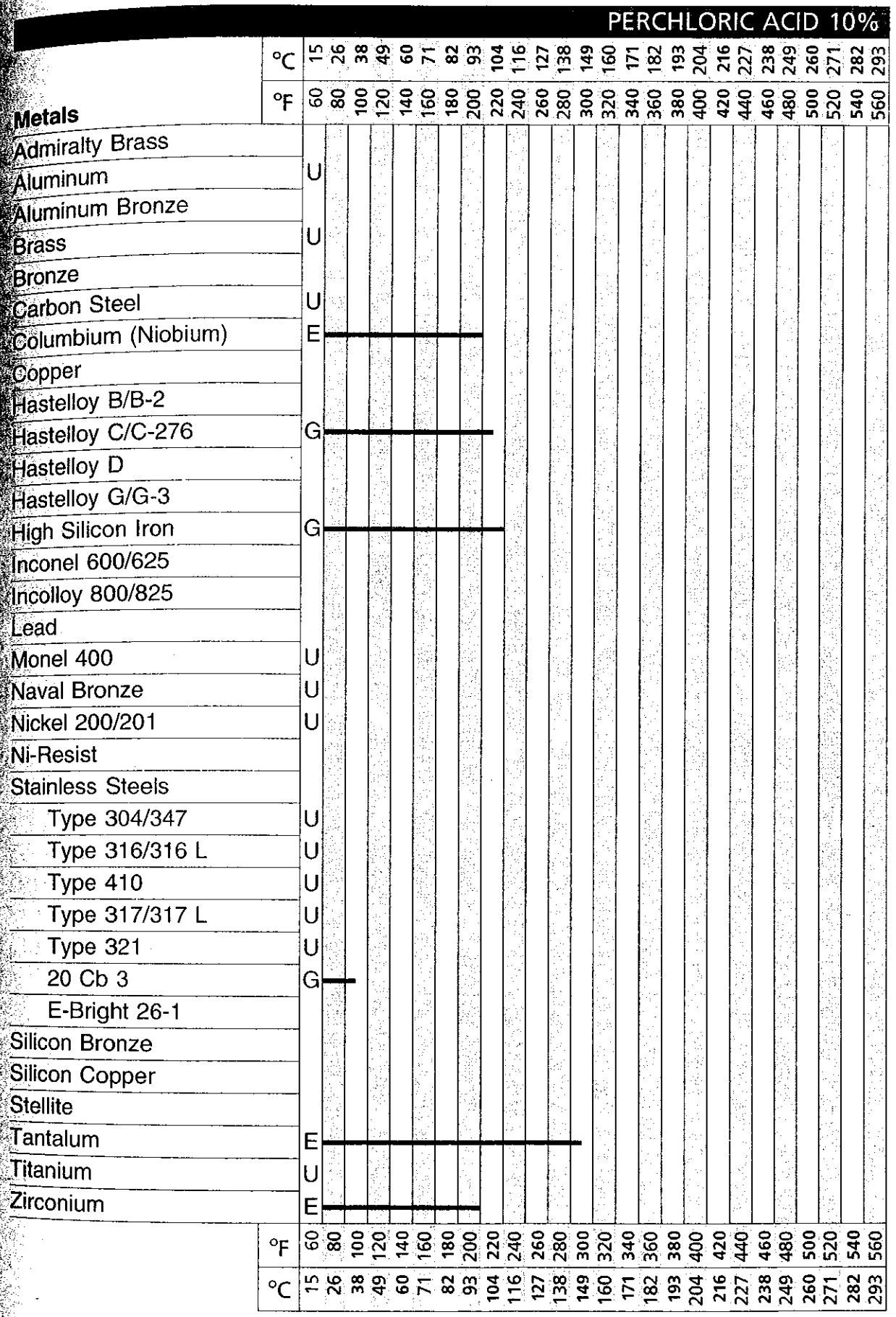


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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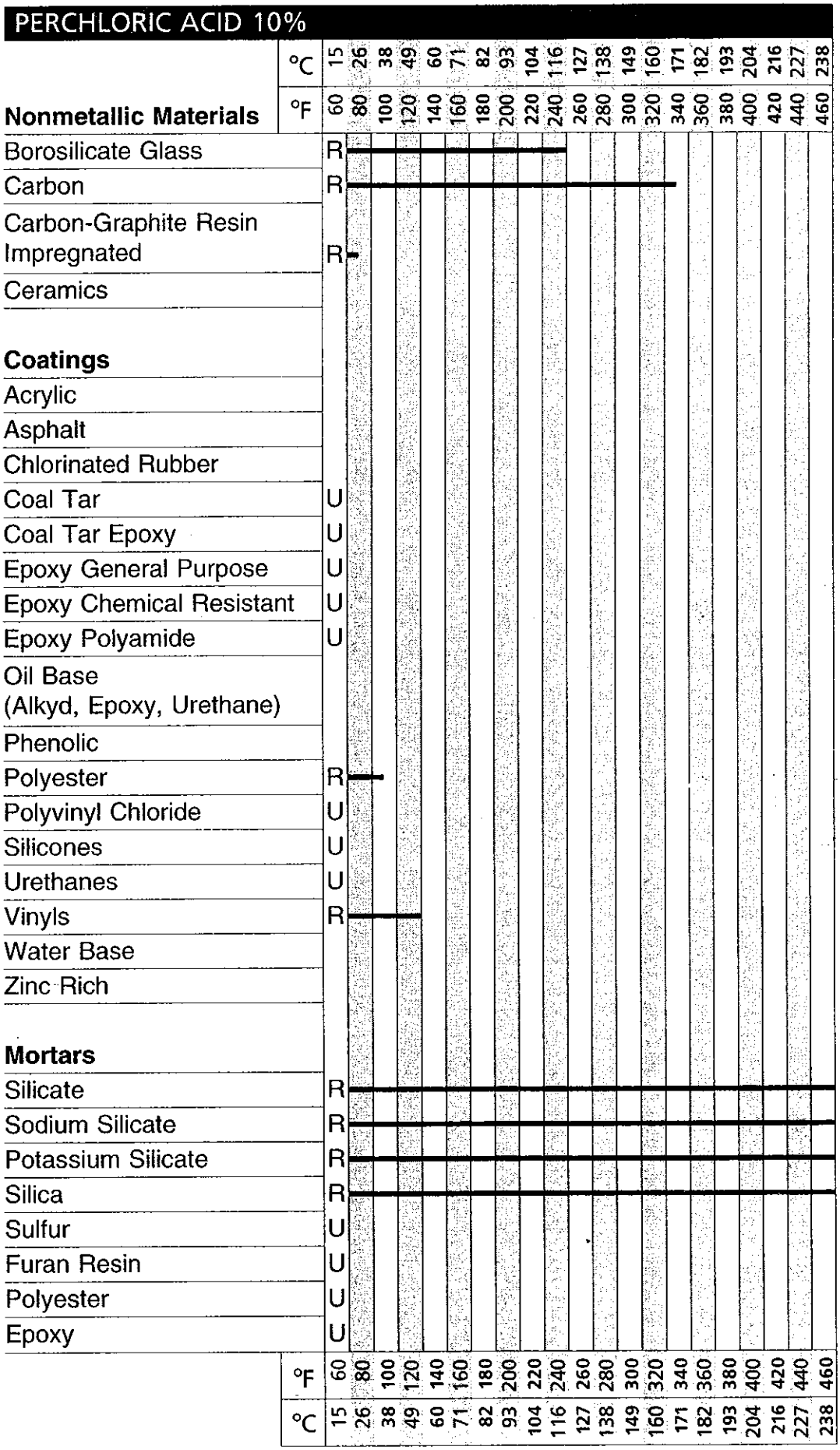





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## PERCHLORIC ACID 10%

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | U | |
| Acrylics | | |
| KELF-F (CTFE) | R | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | U | |
| Noryl | U | |
| Nylon 6 | U | |
| Nylon 11 | U | |
| Nylon 66 | U | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | U | |
| Isophthalic | U | |
| Terephthalate (PET) | U | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | R | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone (PSF) | U | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | U |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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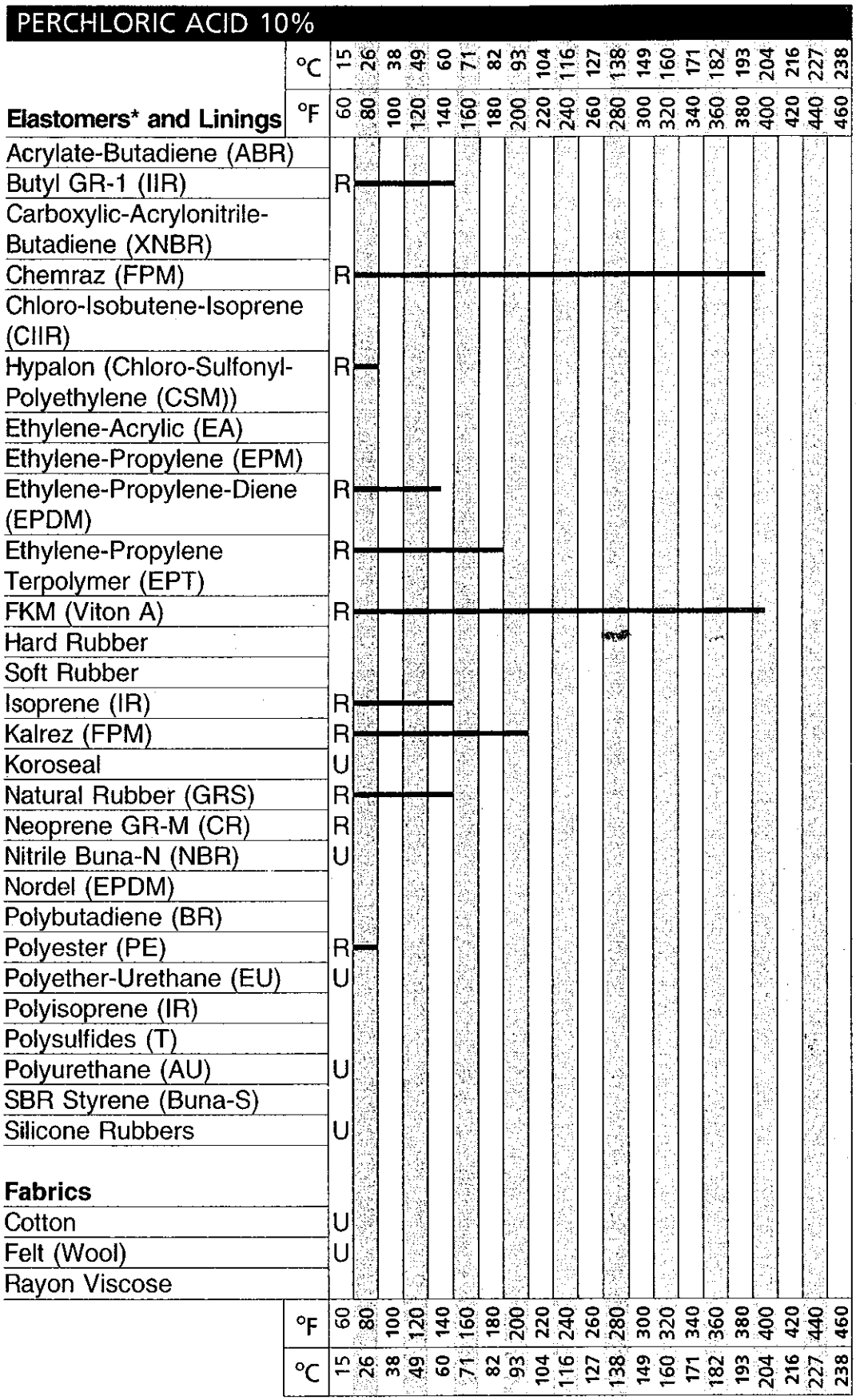


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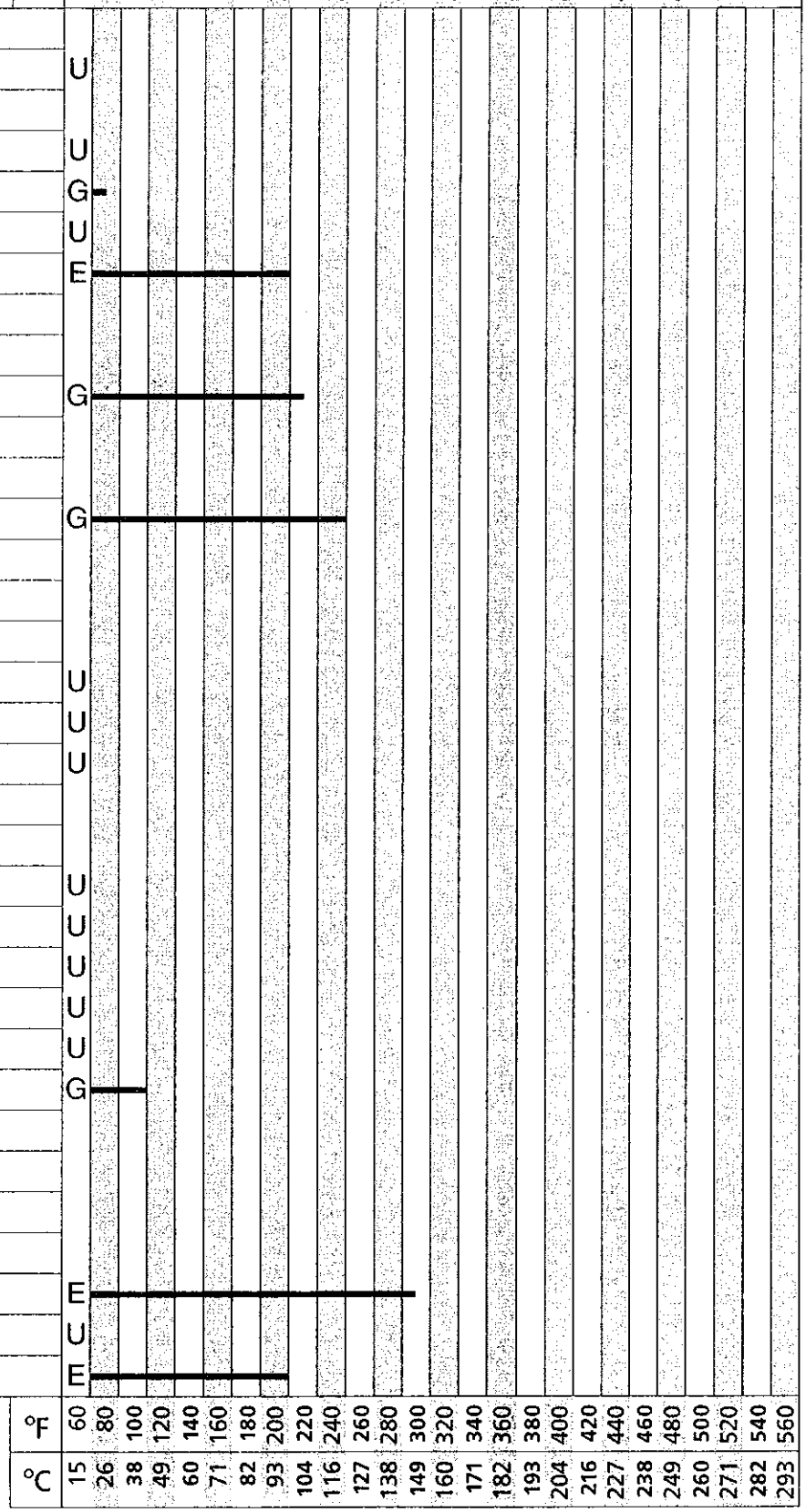
## PERCHLORIC ACID 70%

| Metals | |
|---|---|
| Admiralty Brass | |
| Aluminum | U |
| Aluminum Bronze | |
| Brass | U |
| Bronze | G |
| Carbon Steel | U |
| Columbium (Niobium) | E |
| Copper | |
| Hastelloy B/B-2 | |
| Hastelloy C/C-276 | G |
| Hastelloy D | |
| Hastelloy G/G-3 | |
| High Silicon Iron | G |
| Inconel 600/625 | |
| Incolloy 800/825 | |
| Lead | |
| Monel 400 | U |
| Naval Bronze | U |
| Nickel 200/201 | U |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 | U |
| Type 316/316 L | U |
| Type 410 | U |
| Type 317/317 L | U |
| Type 321 | U |
| 20 Cb 3 | G |
| E-Bright 26-1 | |
| Silicon Bronze | |
| Silicon Copper | |
| Stellite | |
| Tantalum | E |
| Titanium | U |
| Zirconium | E |




FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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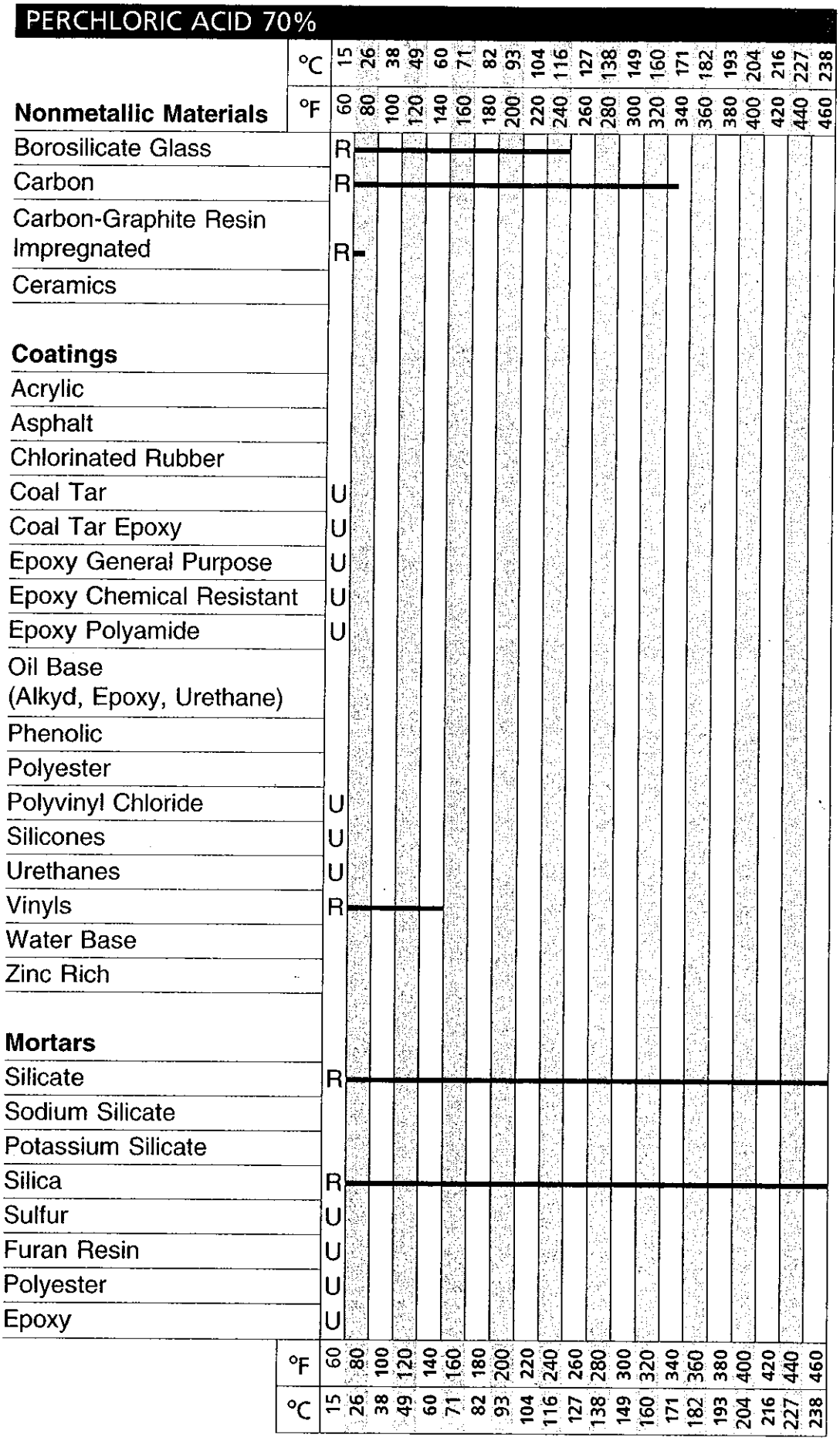





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## PERCHLORIC ACID 70%

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | U | |
| Acrylics | | |
| KEL-F (CTFE) | R | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | U | |
| CPVC | R | |
| E-CTFE (Halar) | R | |
| Epoxy | R–U | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | U | |
| Nylon 6 | U | |
| Nylon 11 | U | |
| Nylon 66 | U | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | U | |
| Isophthalic | U | |
| Terephthalate (PET) | U | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | U | |
| Polyethylene UHMW | U | |
| Polymethylpentene | U | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R–U | |
| PVC Type 2 | R–U | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | U | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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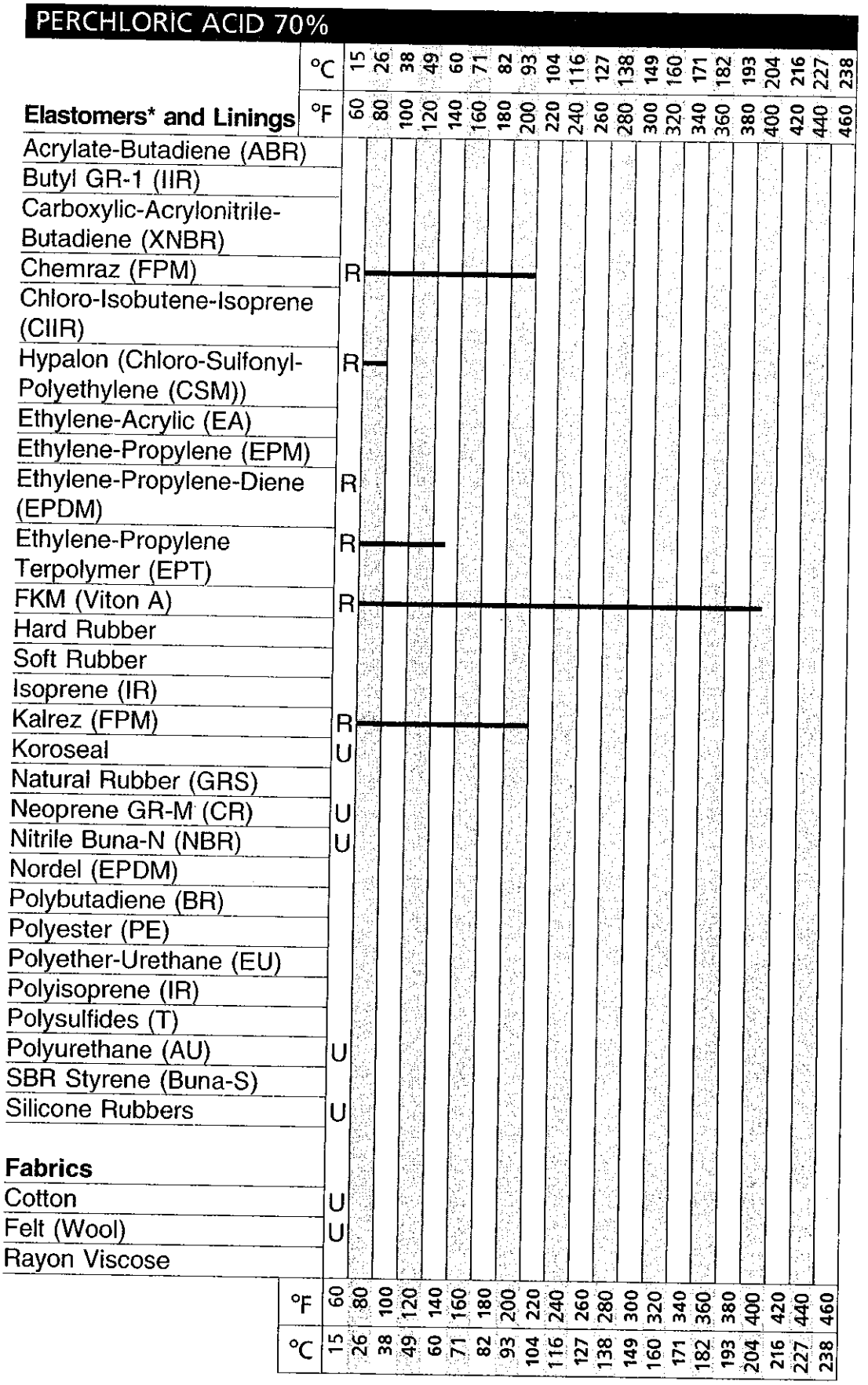


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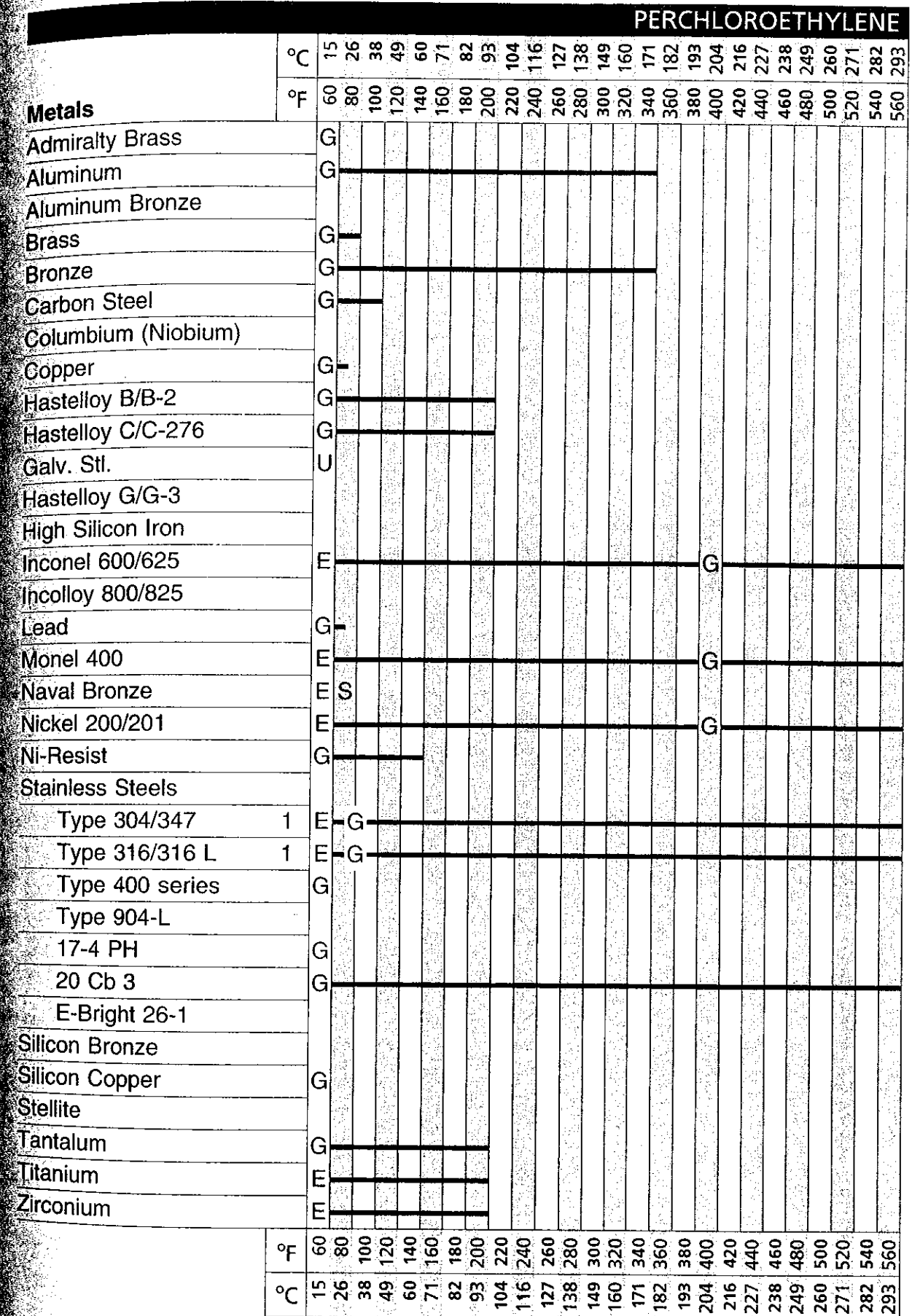


FOR METALS

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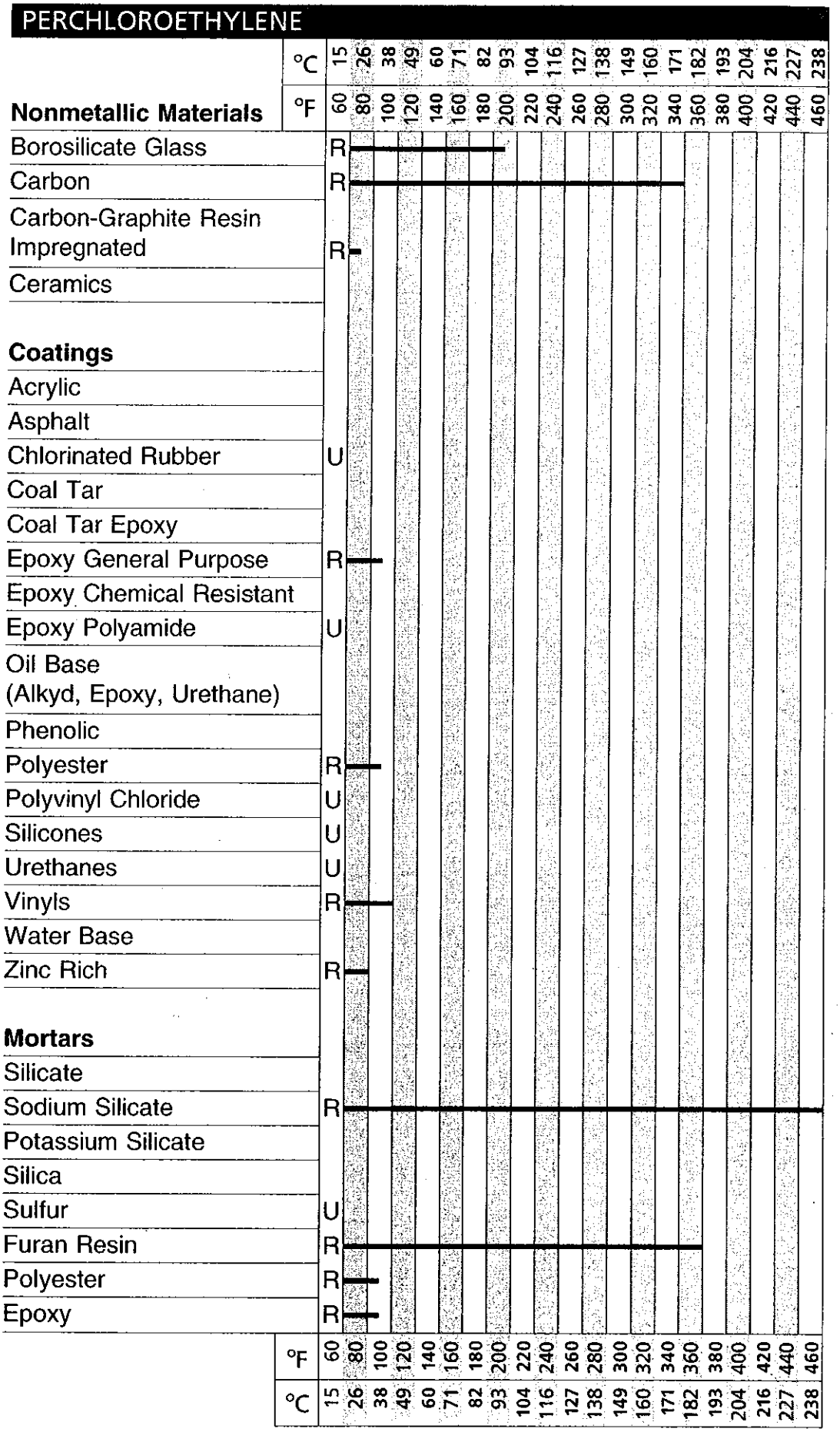




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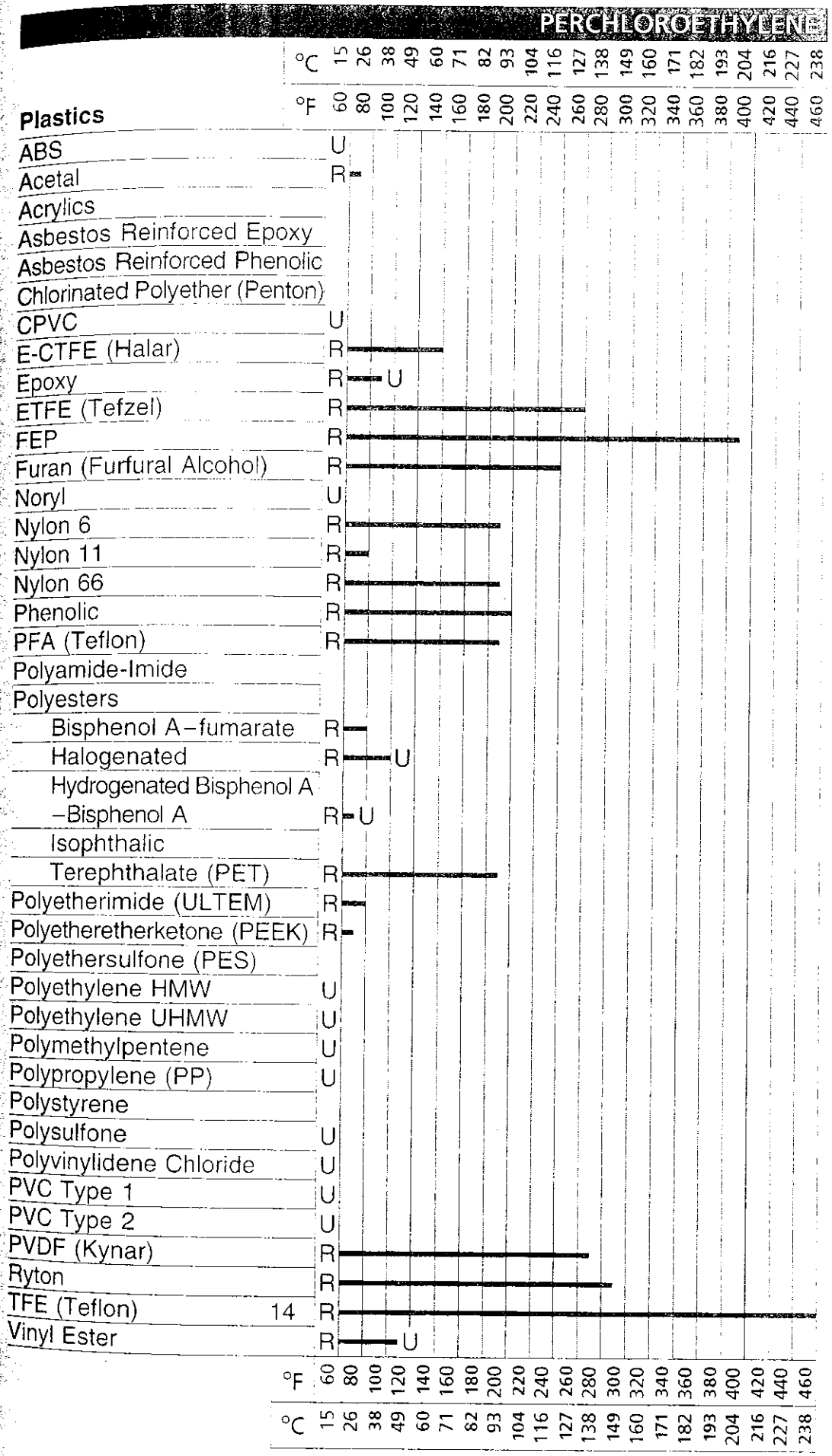




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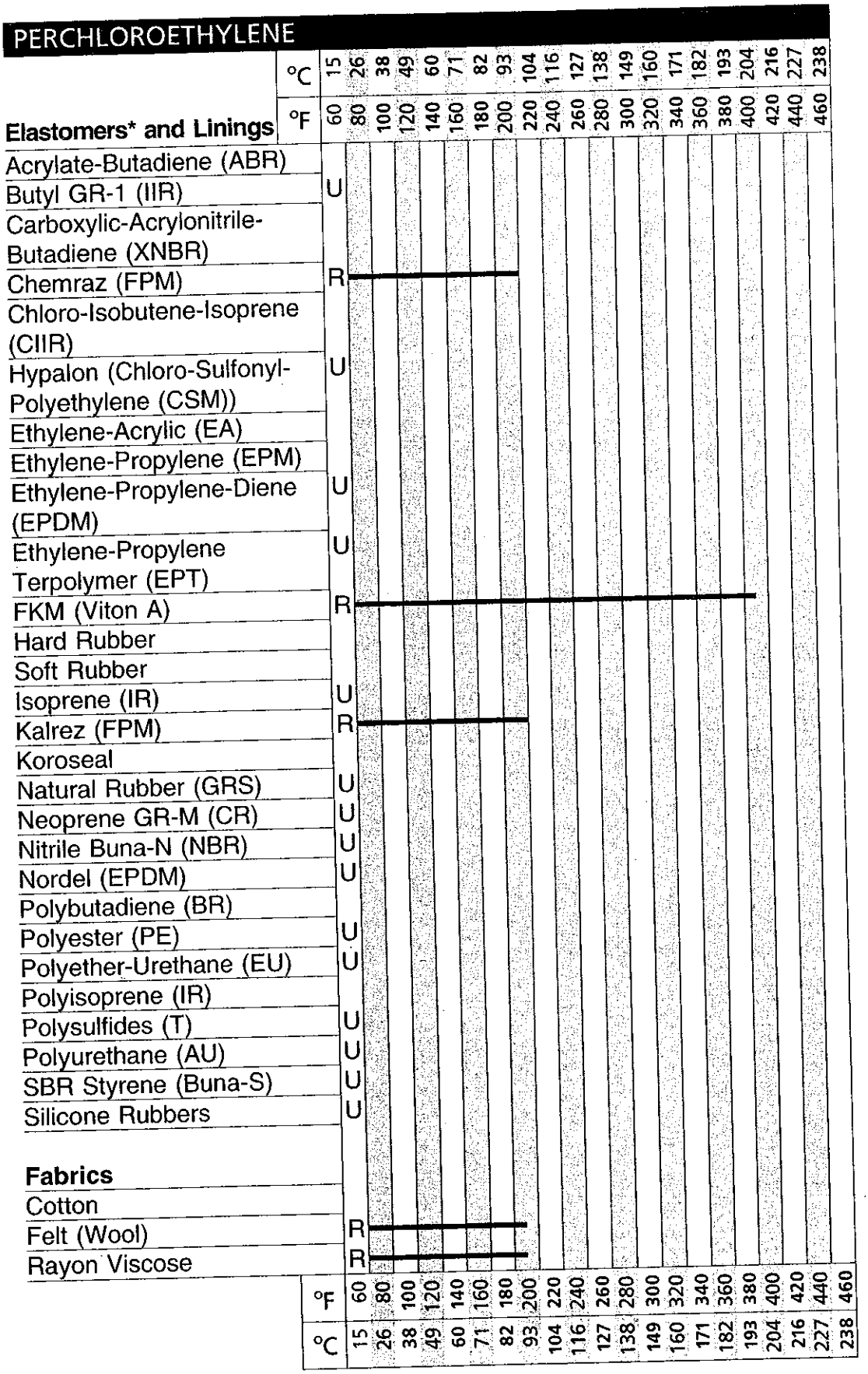


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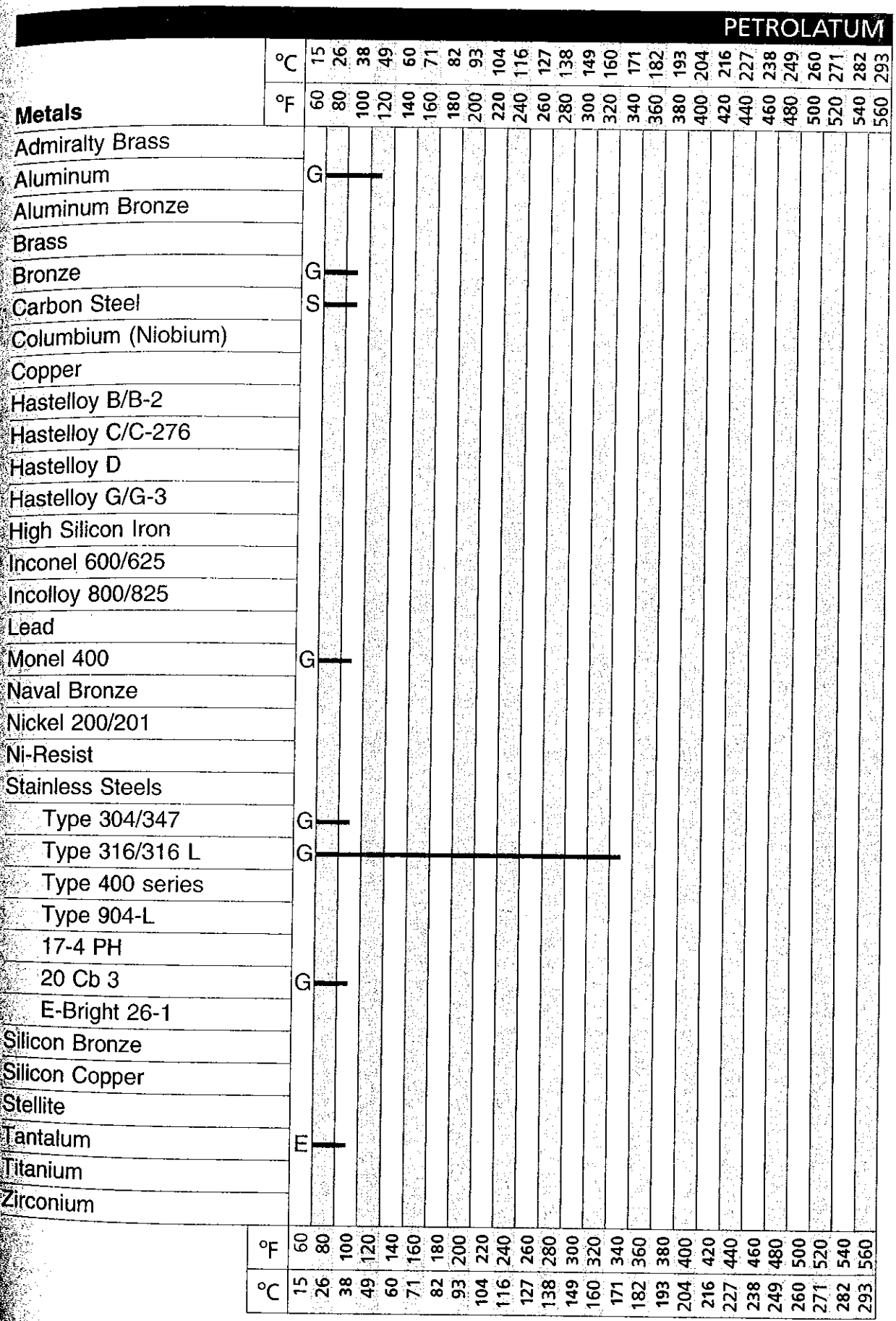


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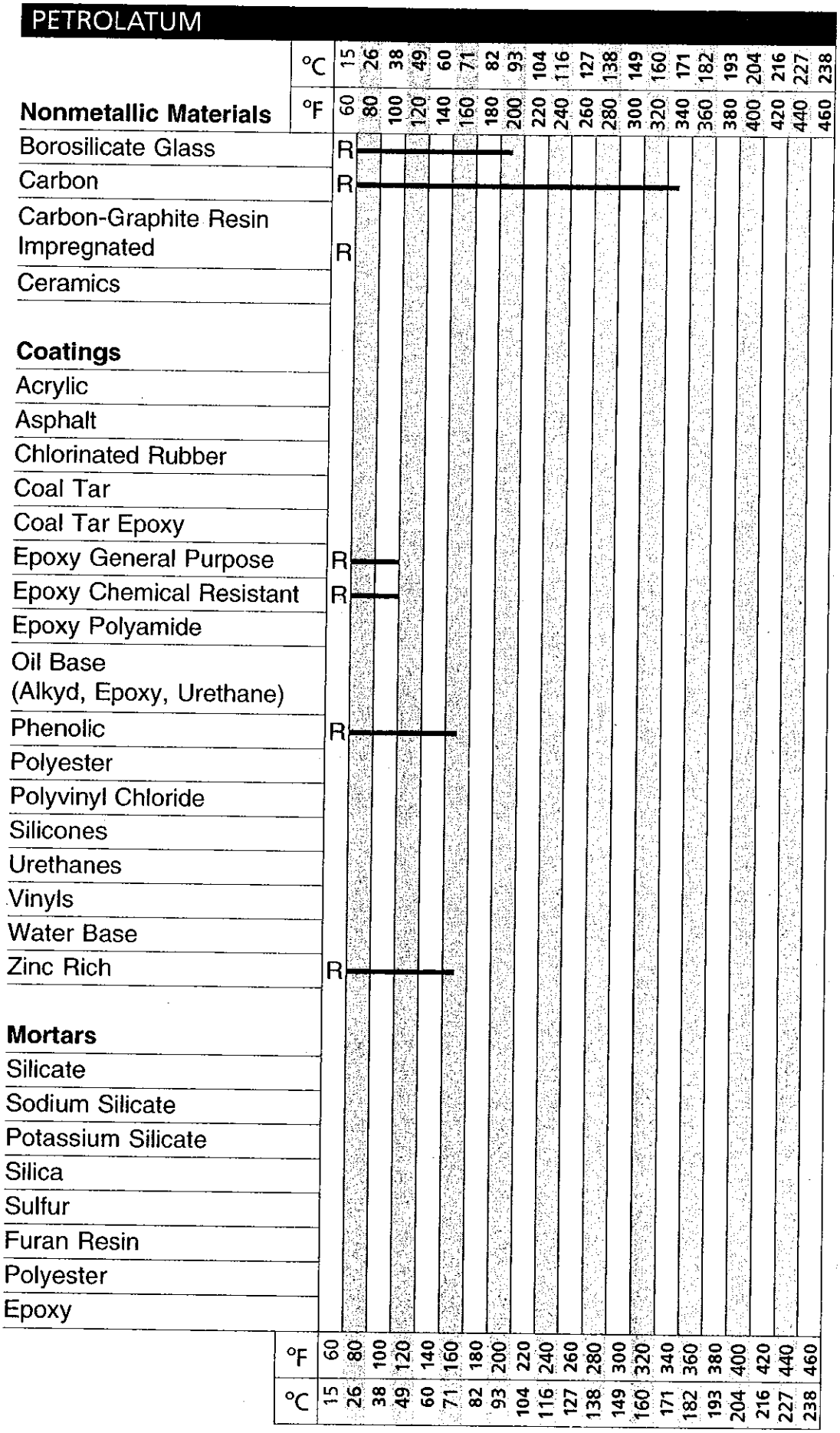




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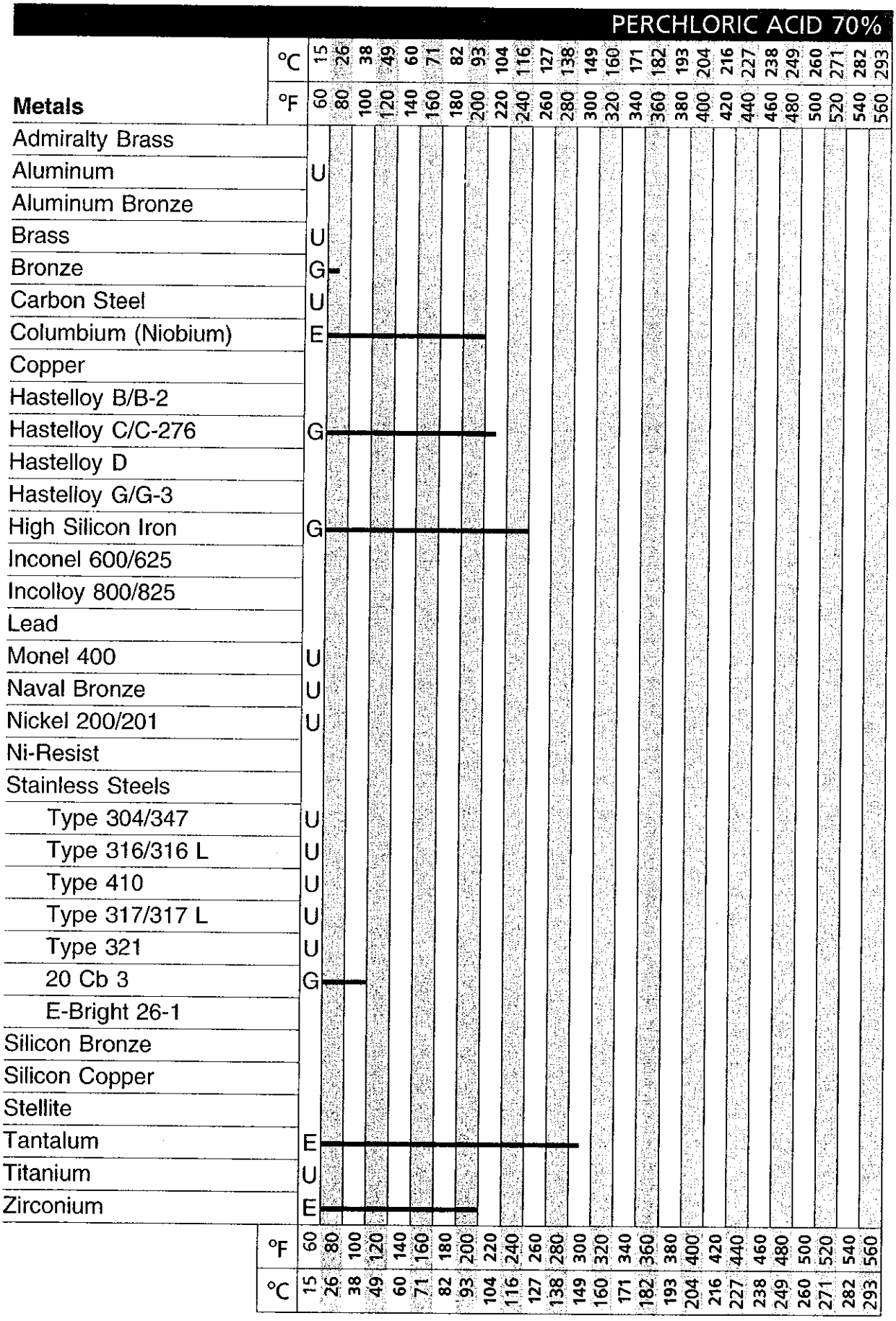


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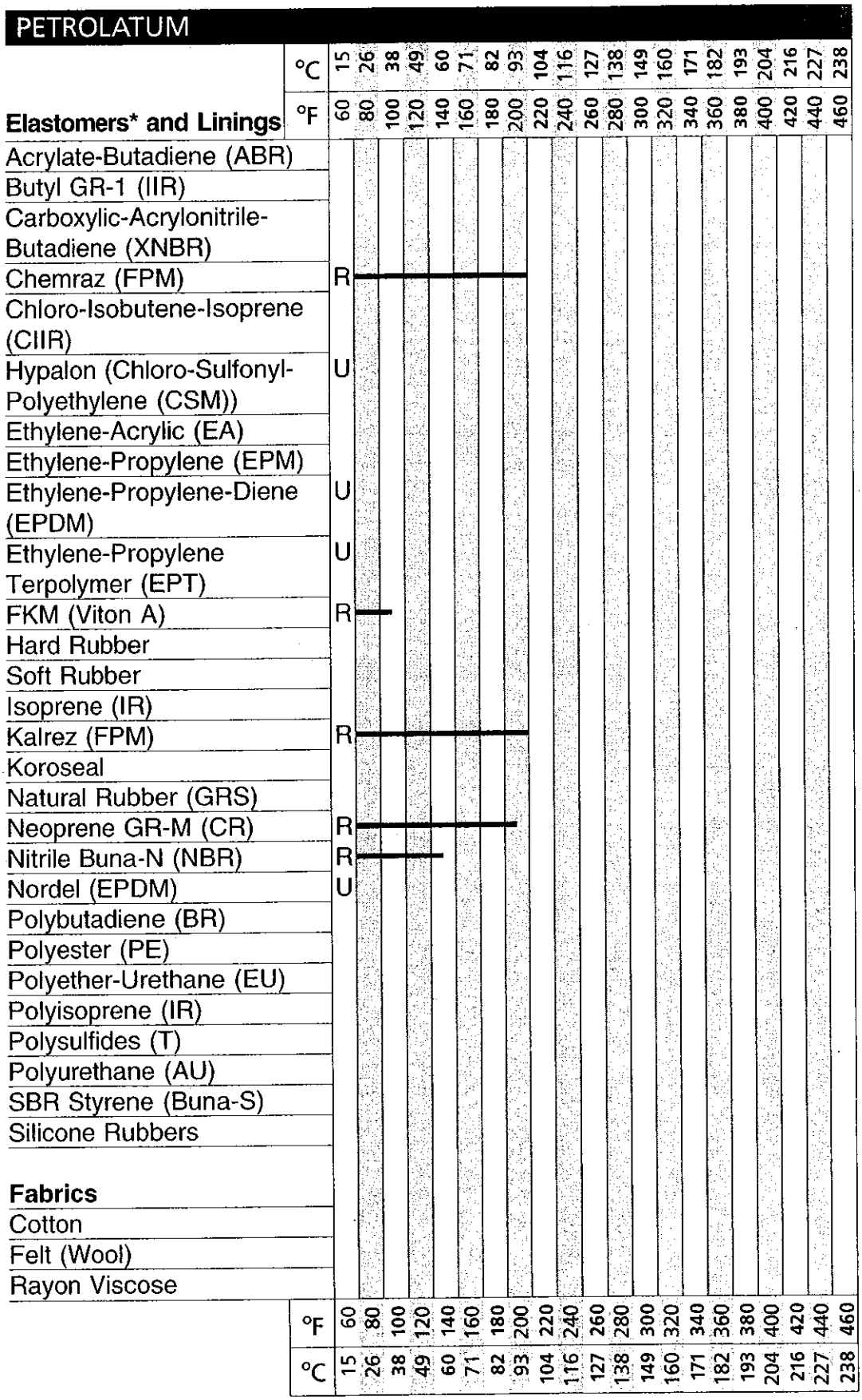


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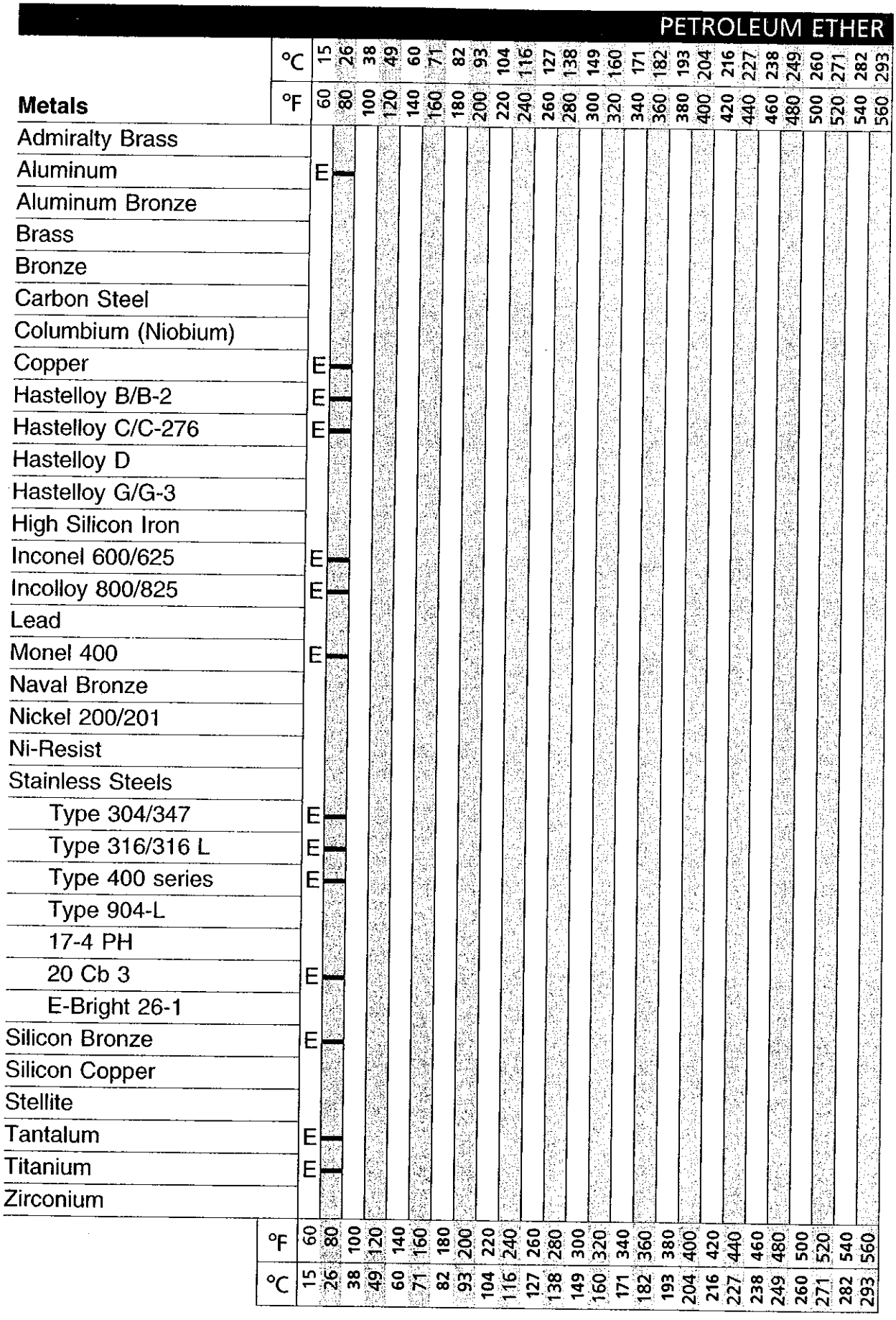


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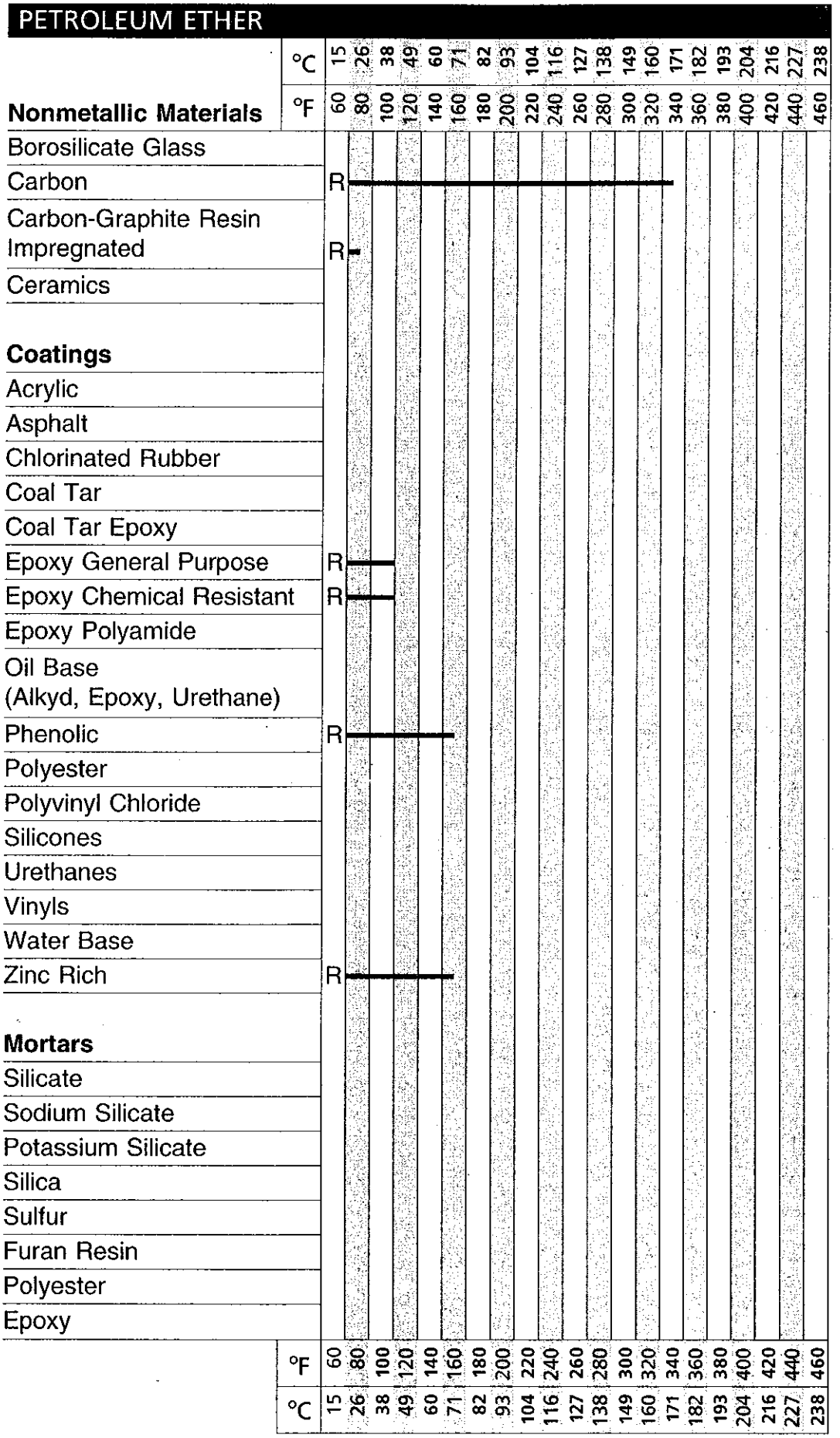
## PETROLEUM ETHER



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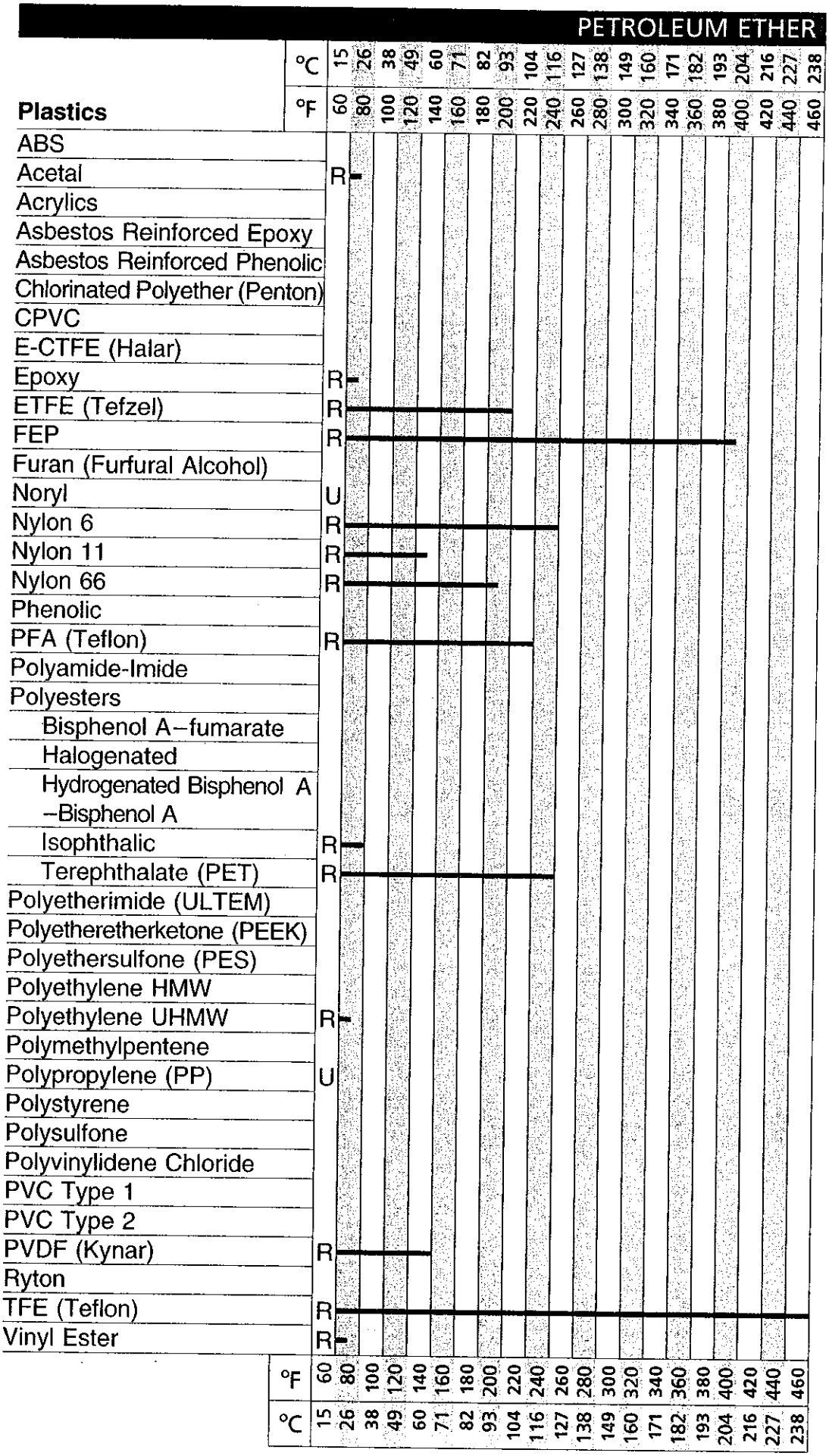


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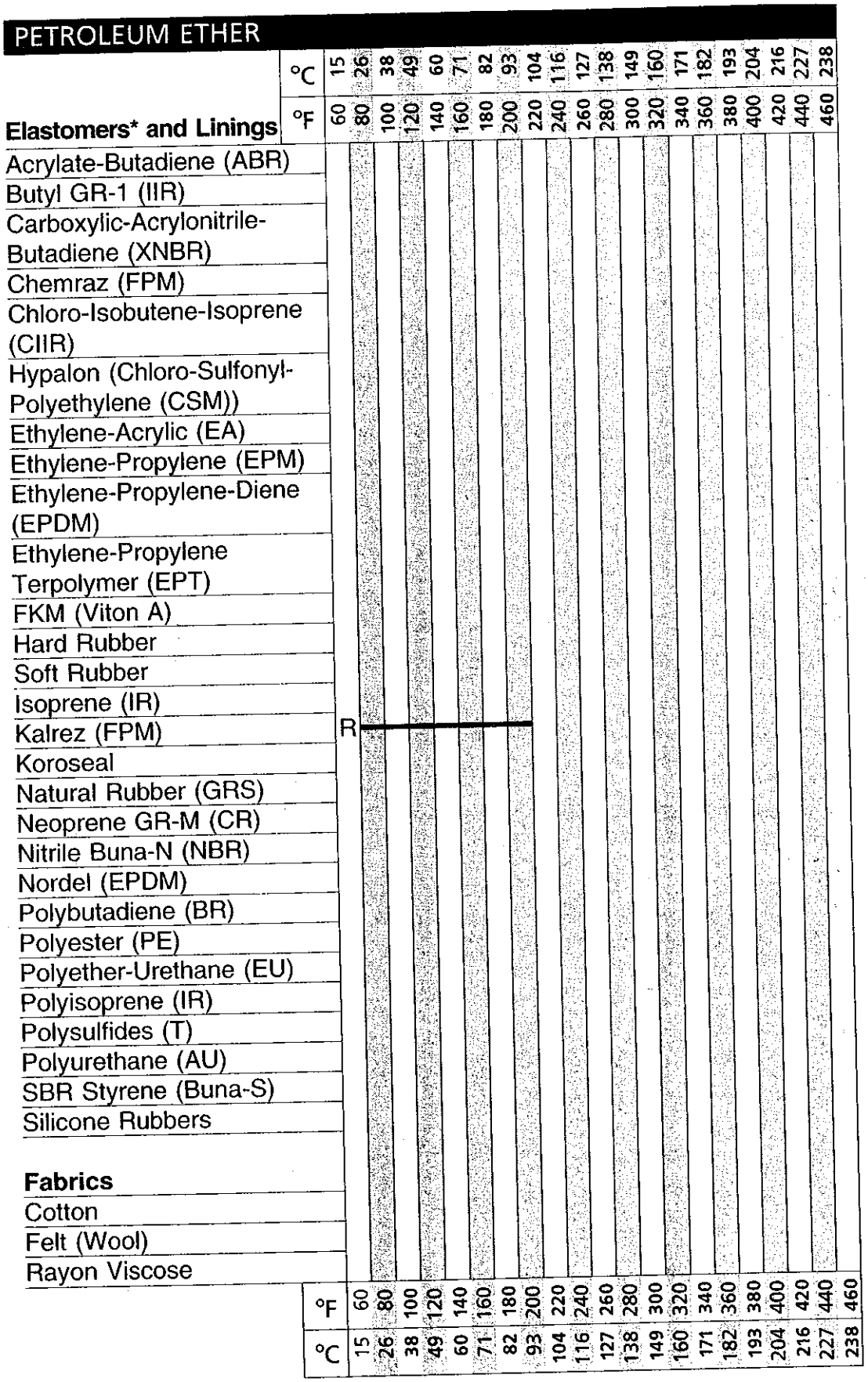


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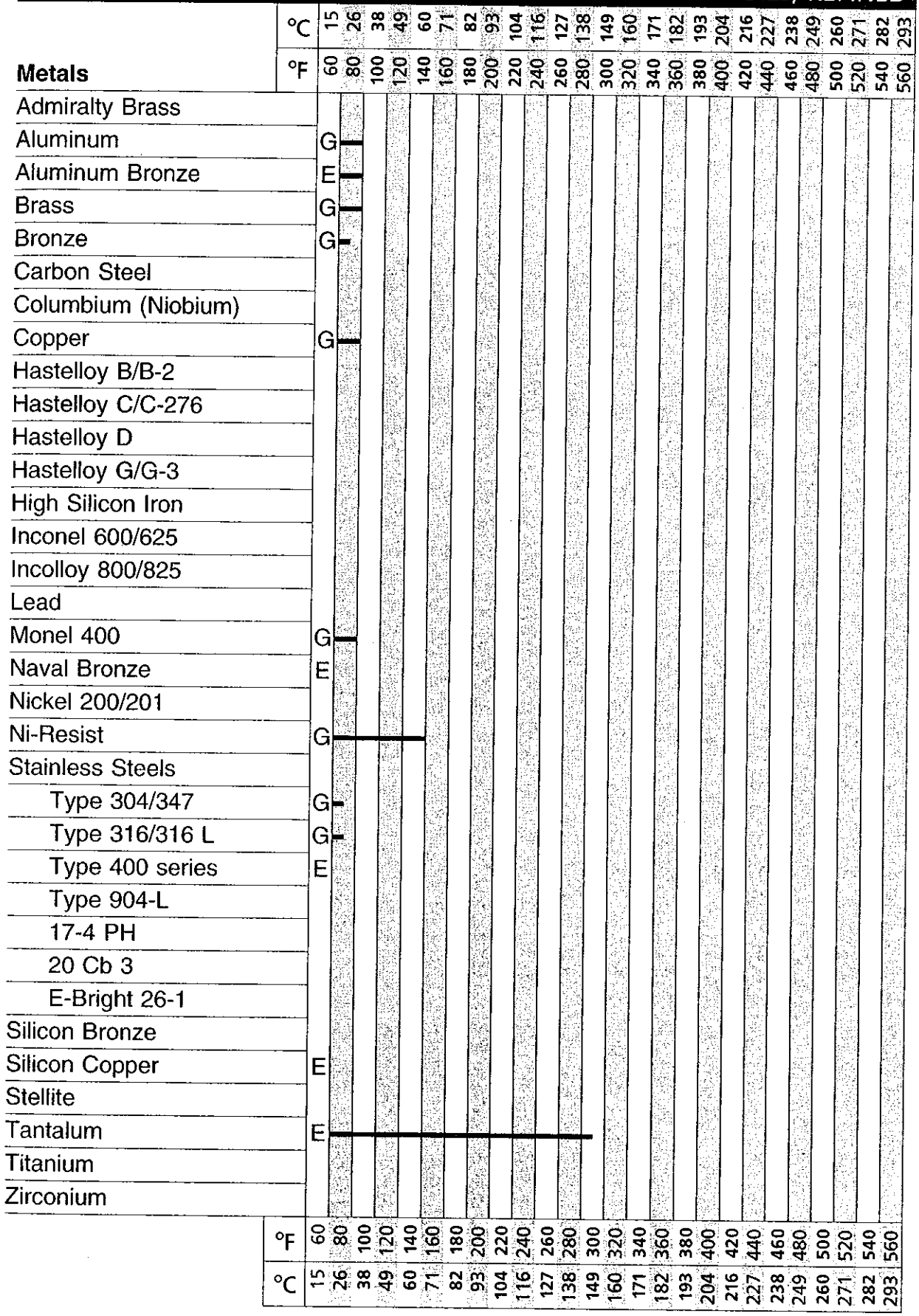
## PETROLEUM OILS, REFINED




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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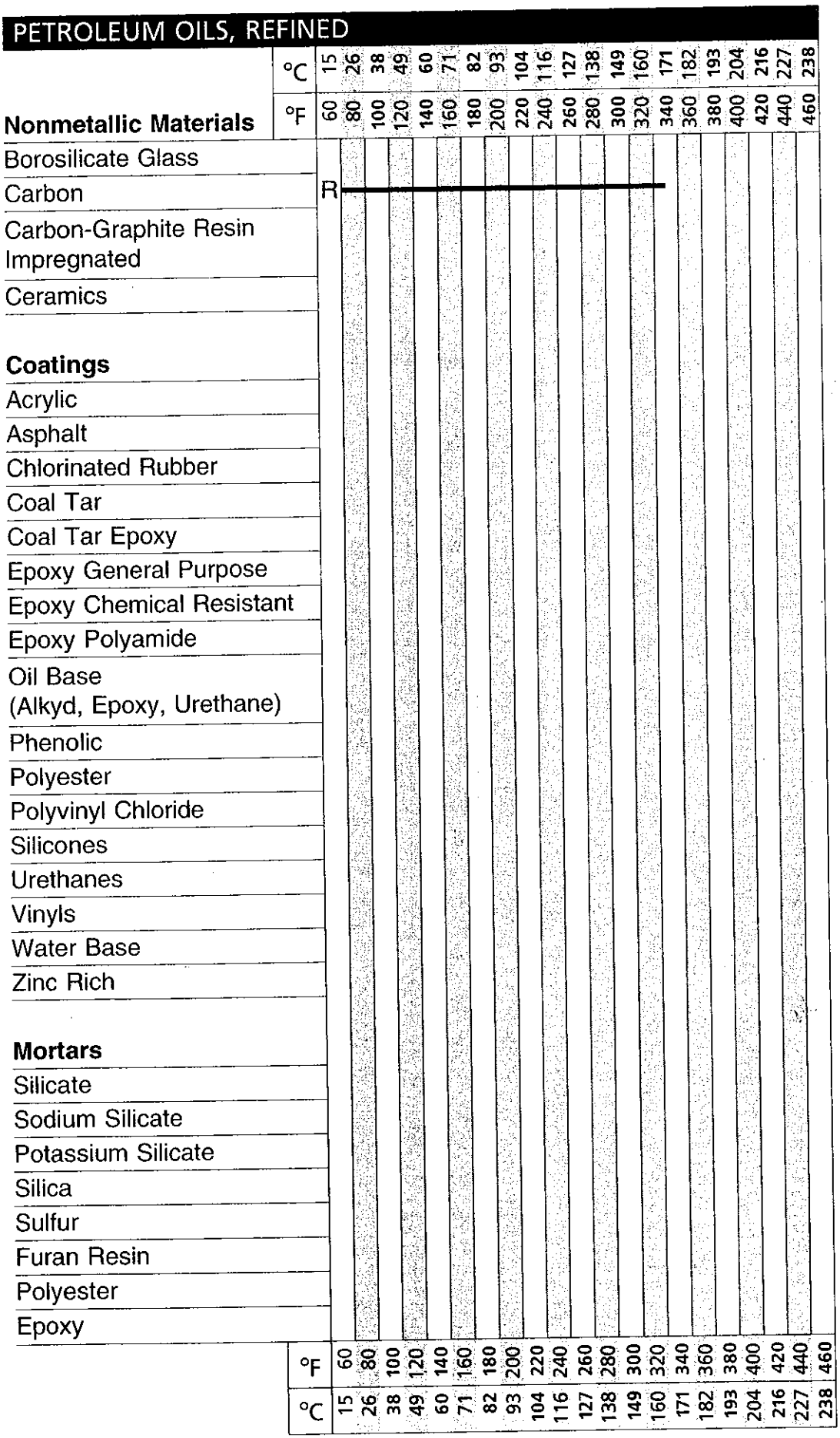




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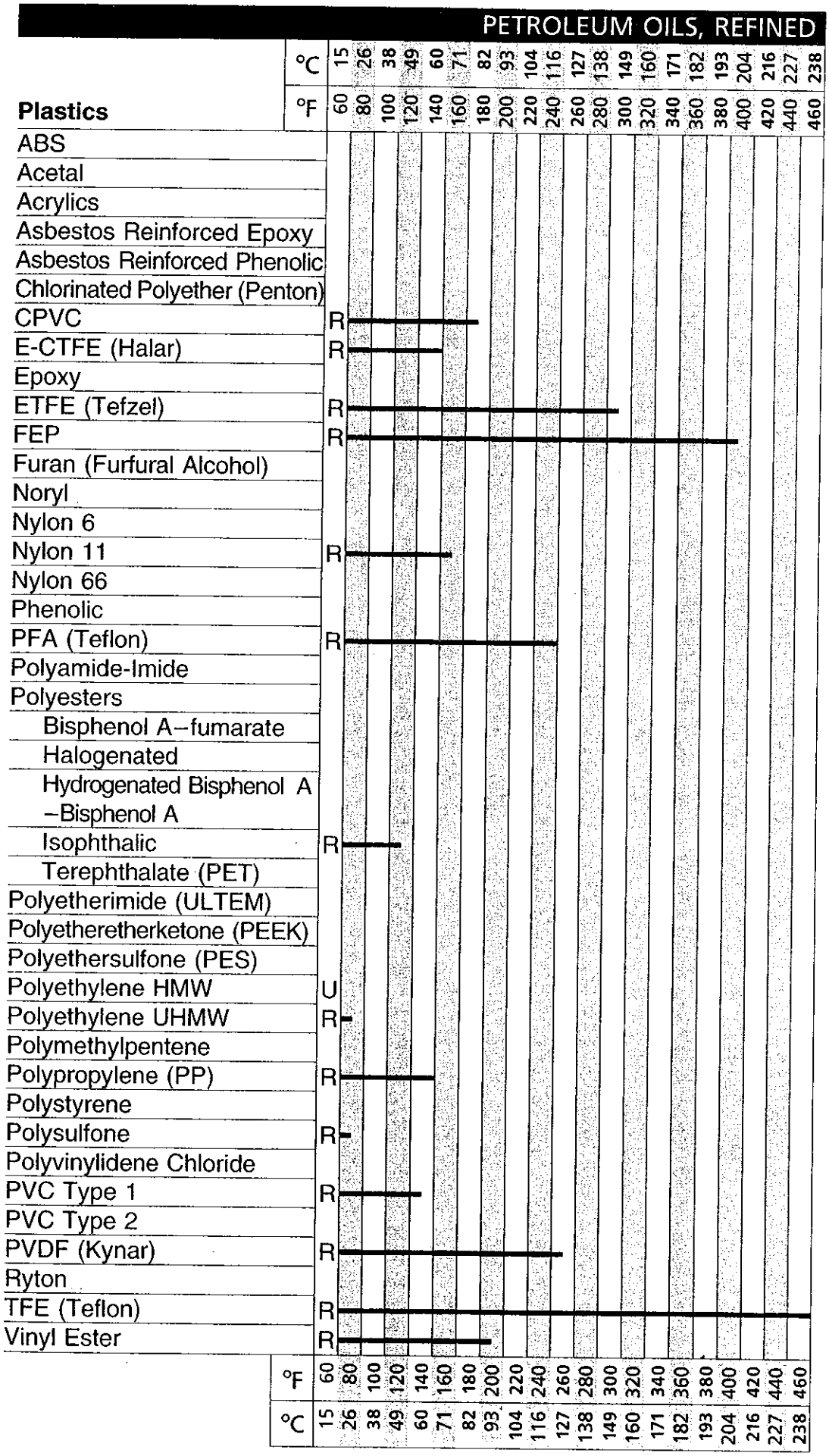



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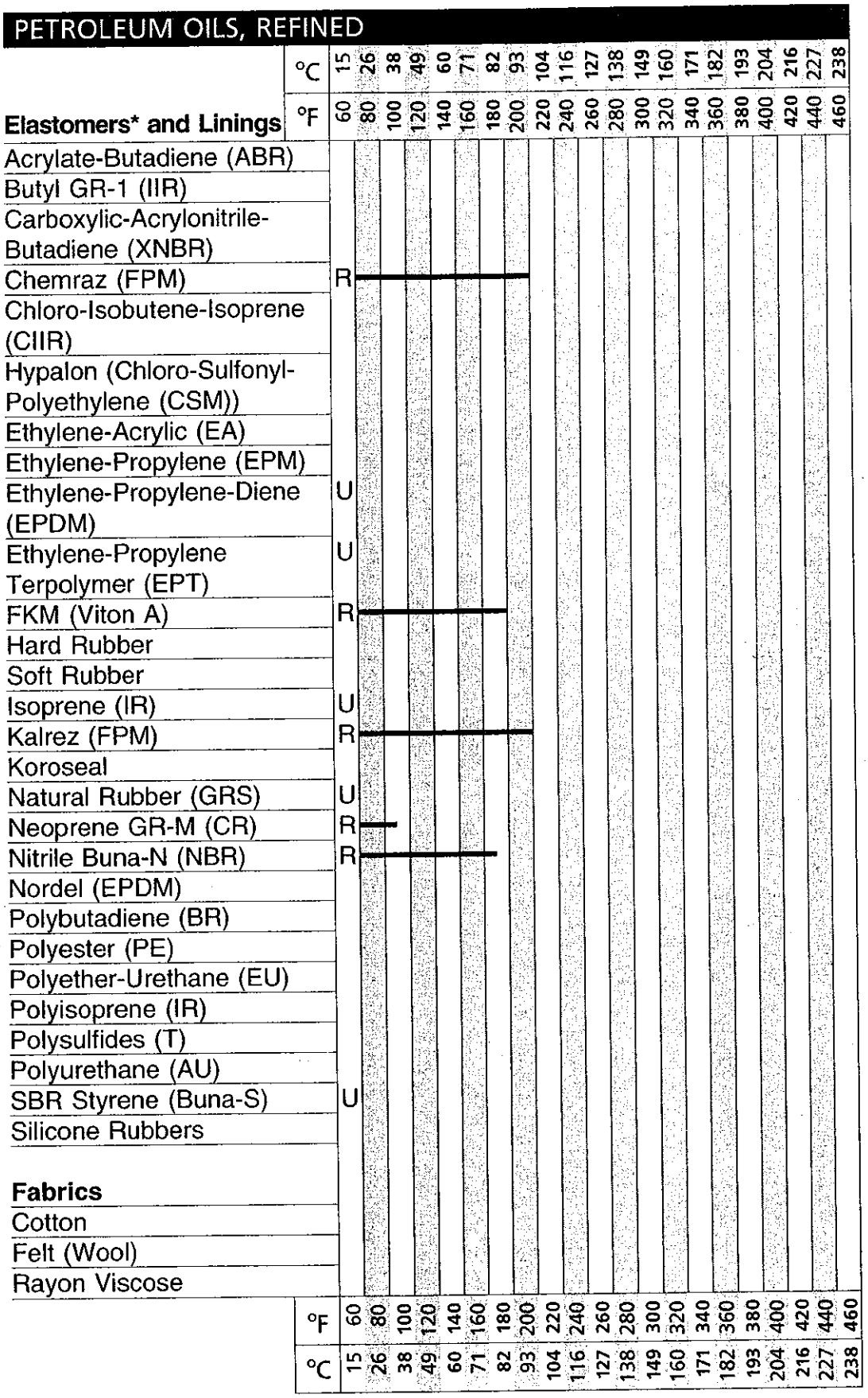


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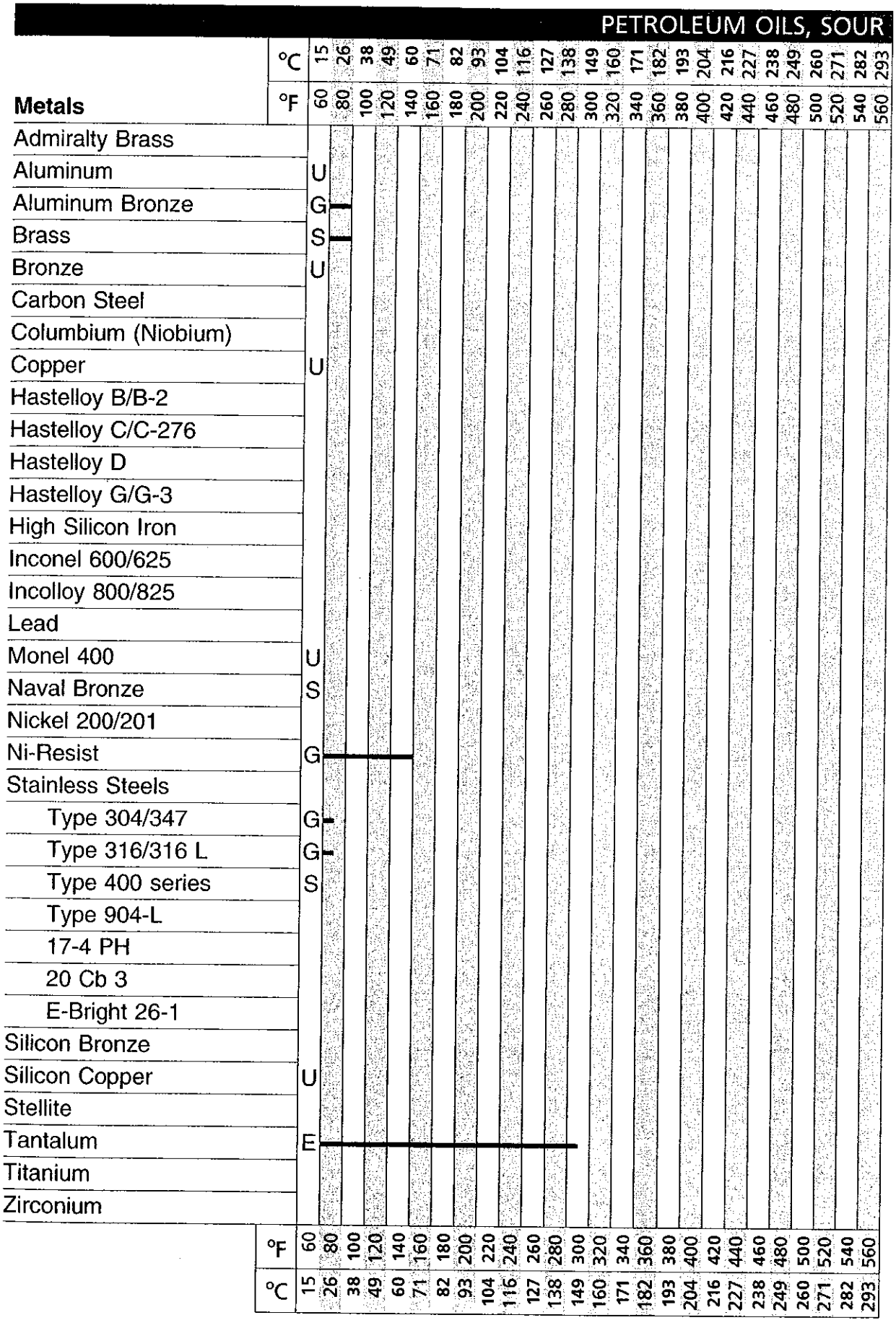
# PETROLEUM OILS, SOUR

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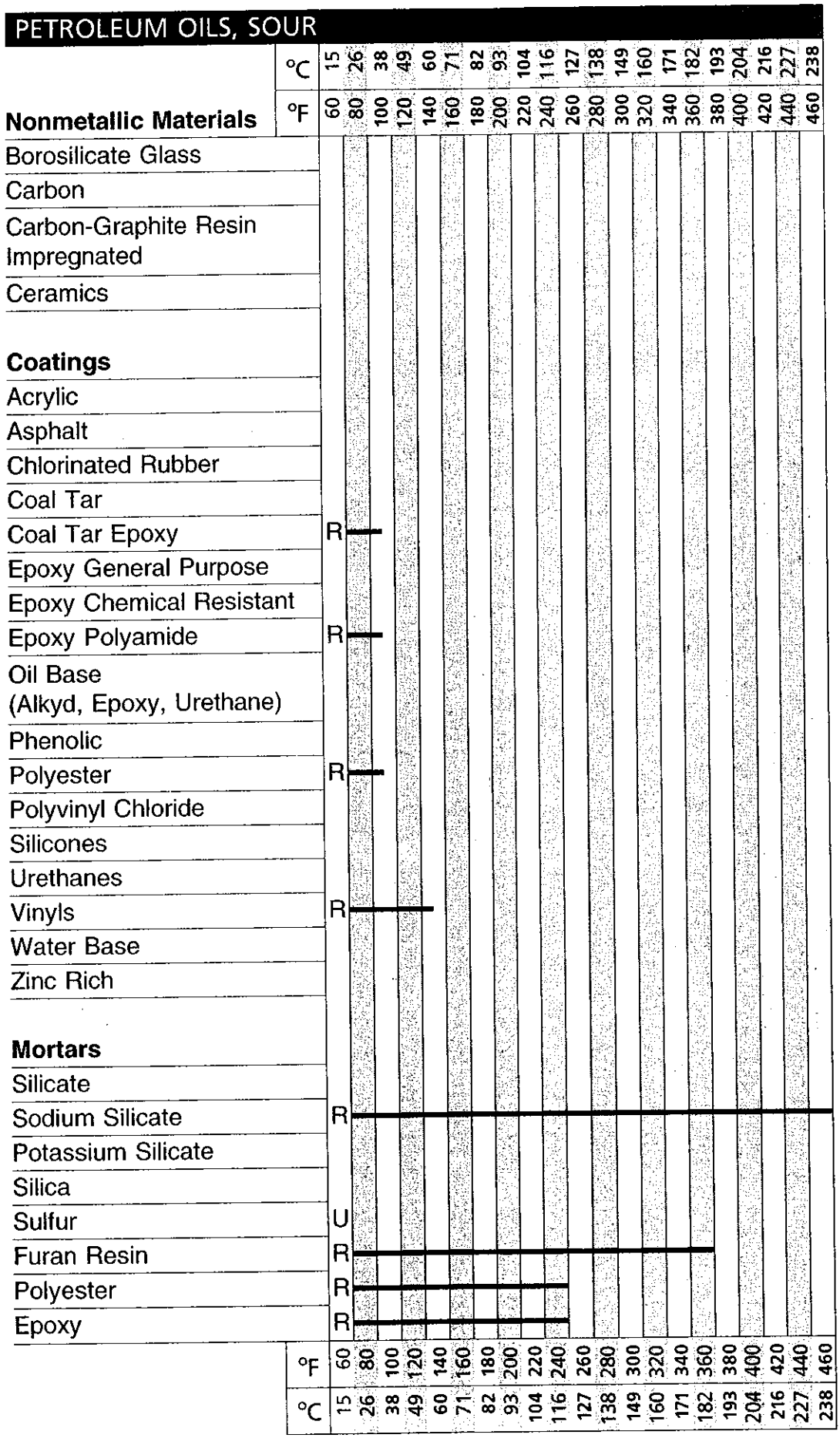




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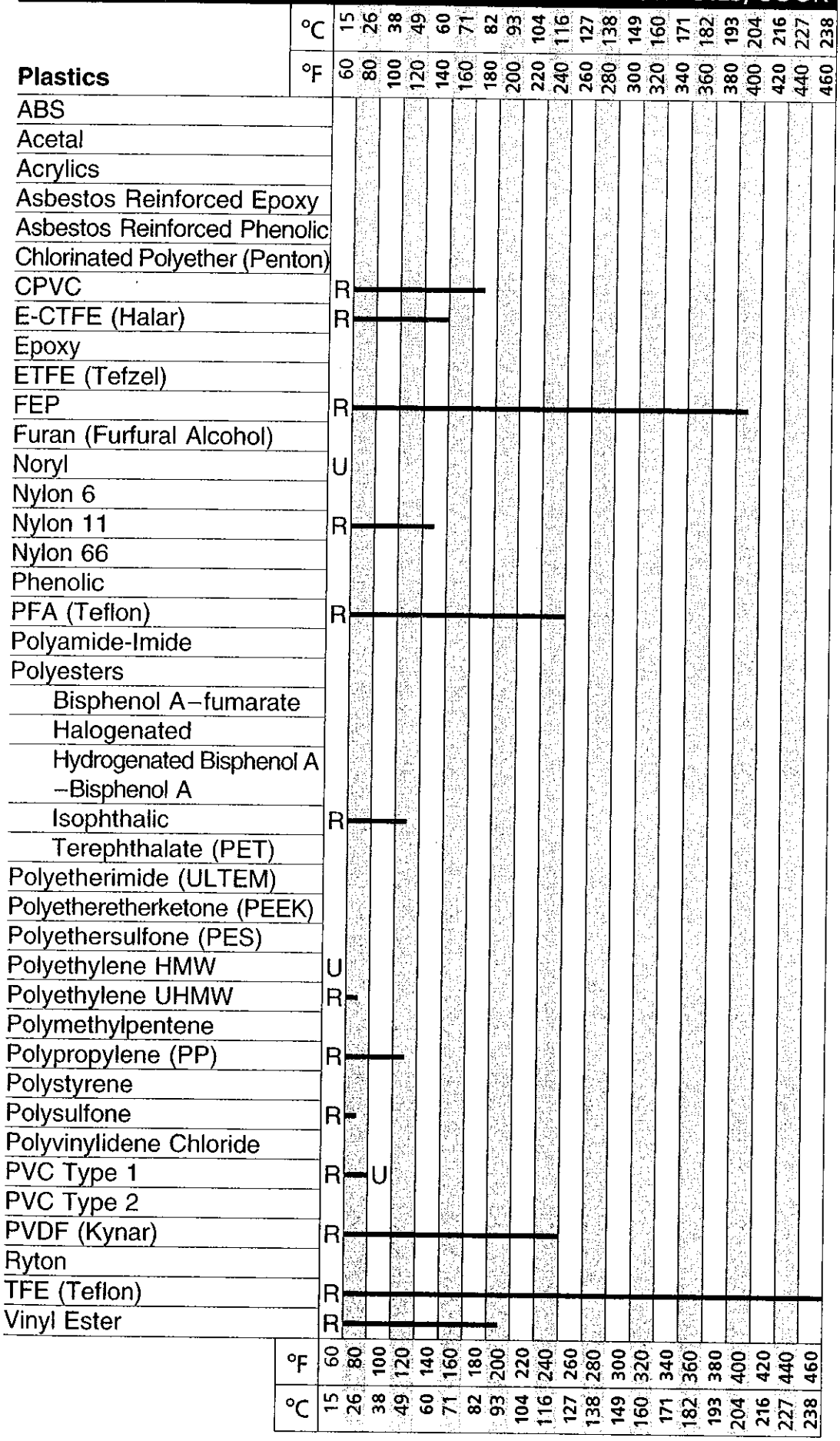


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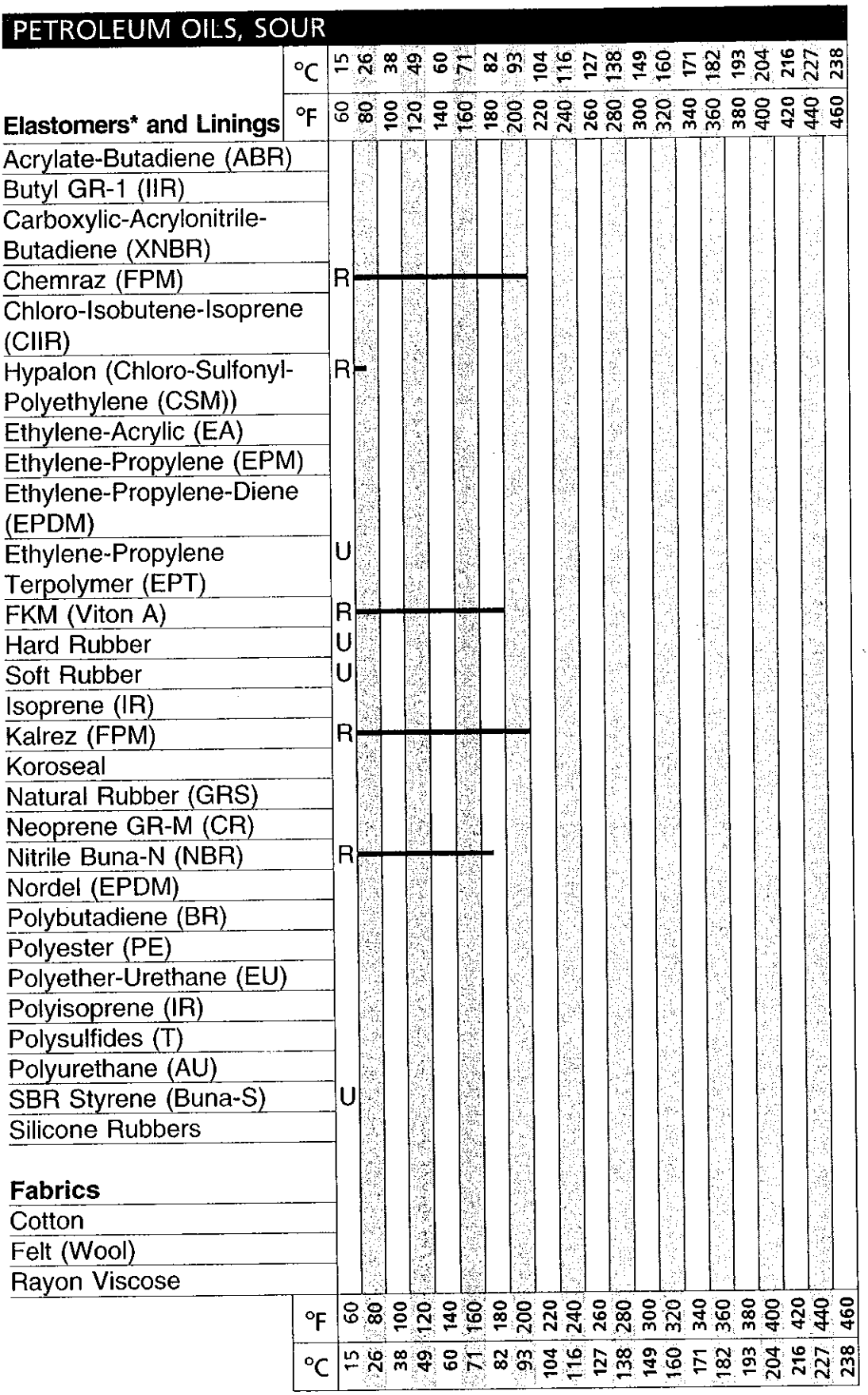


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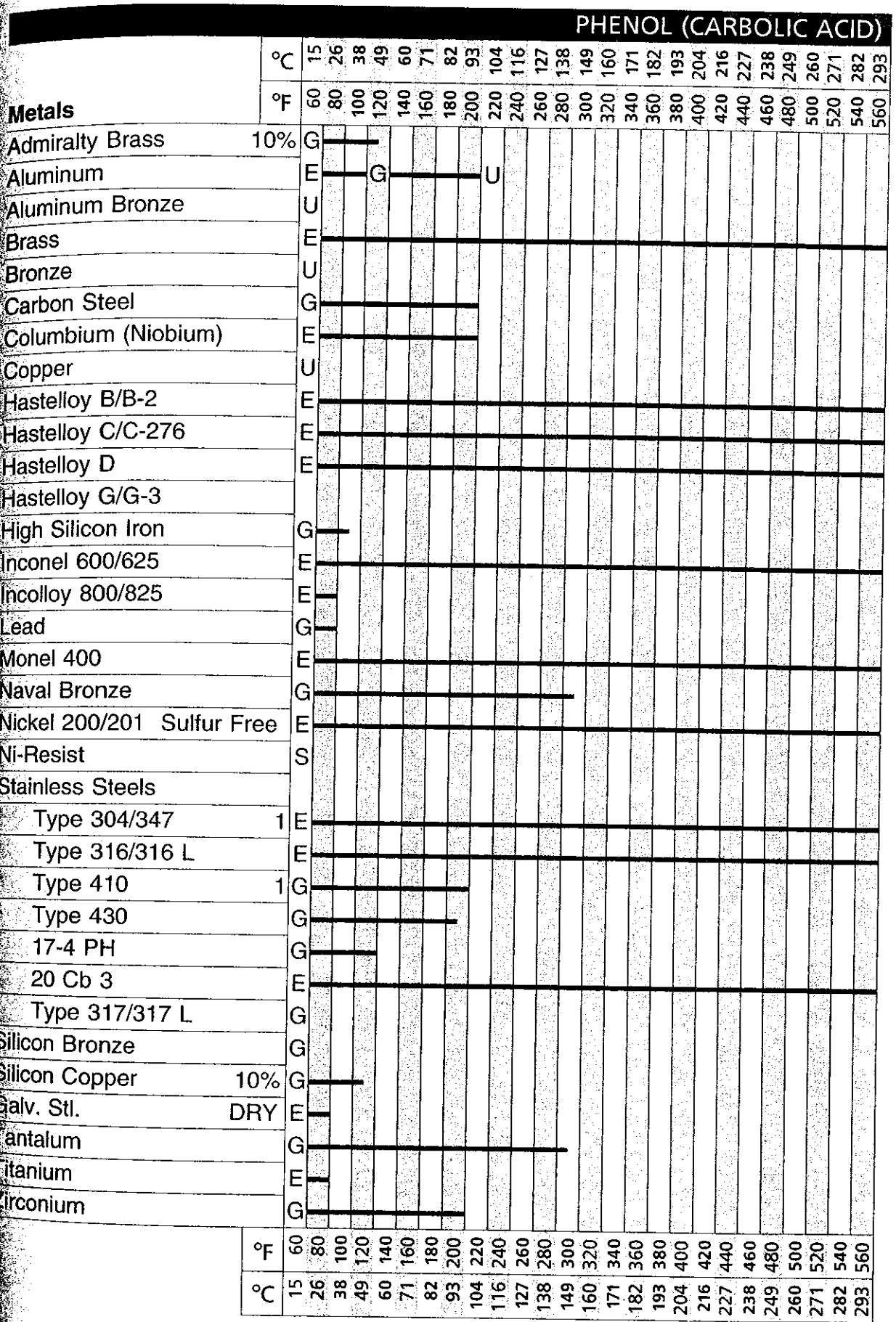
# PHENOL (CARBOLIC ACID)

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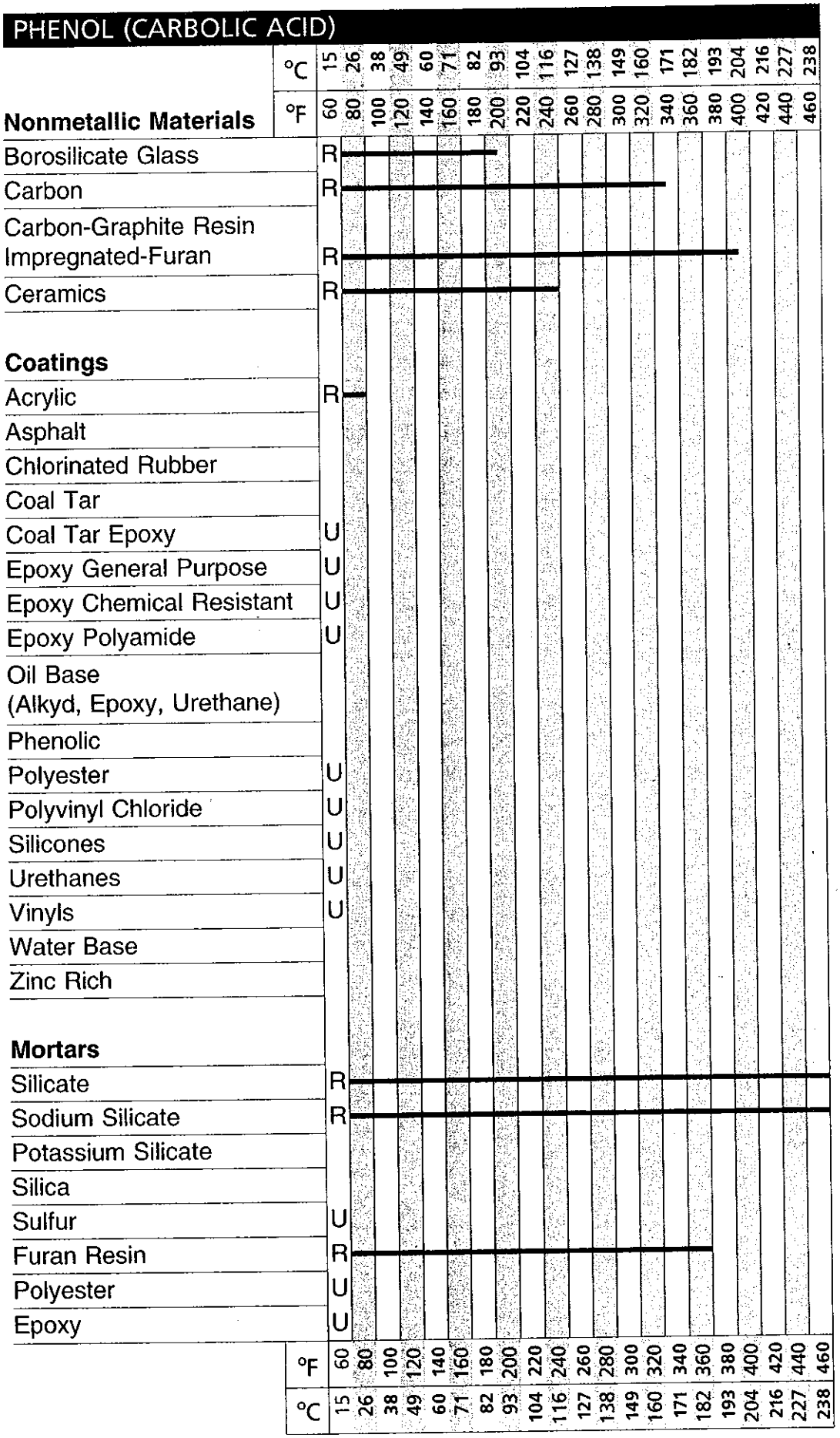




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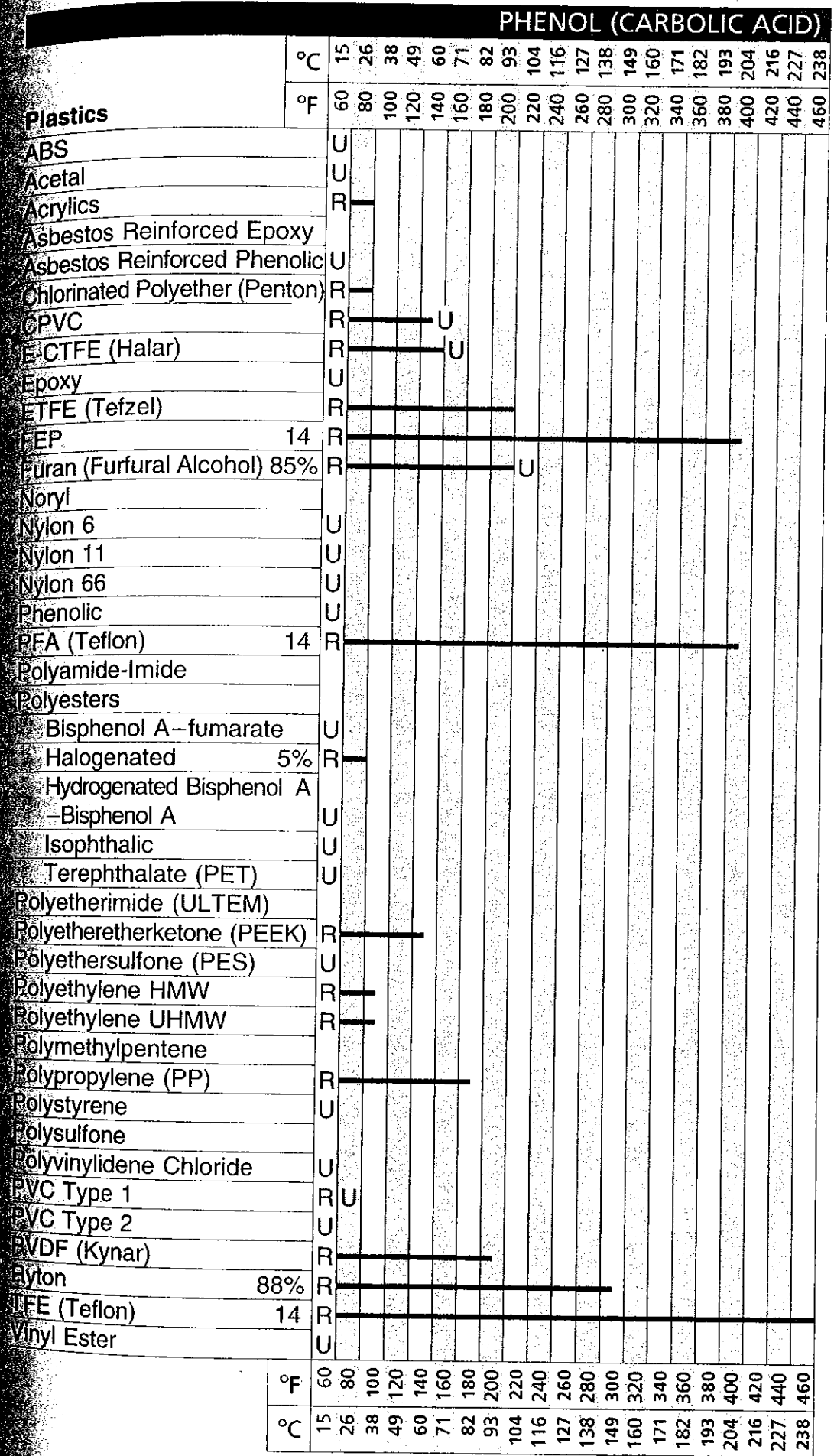

| Plastics | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | U | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | R | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | U | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | R | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | R | | | | U | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | R | | | | | U | | | | | | | | | | | | | | | |
| Epoxy | | | U | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | 85% | | R | | | | | | | | U | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | U | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | U | | | | | | | | | | | | | | | | | | | | |
| Halogenated | 5% | | R | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | U | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | U | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | U | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | R | U | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | U | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | 88% | | R | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | 14 | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | U | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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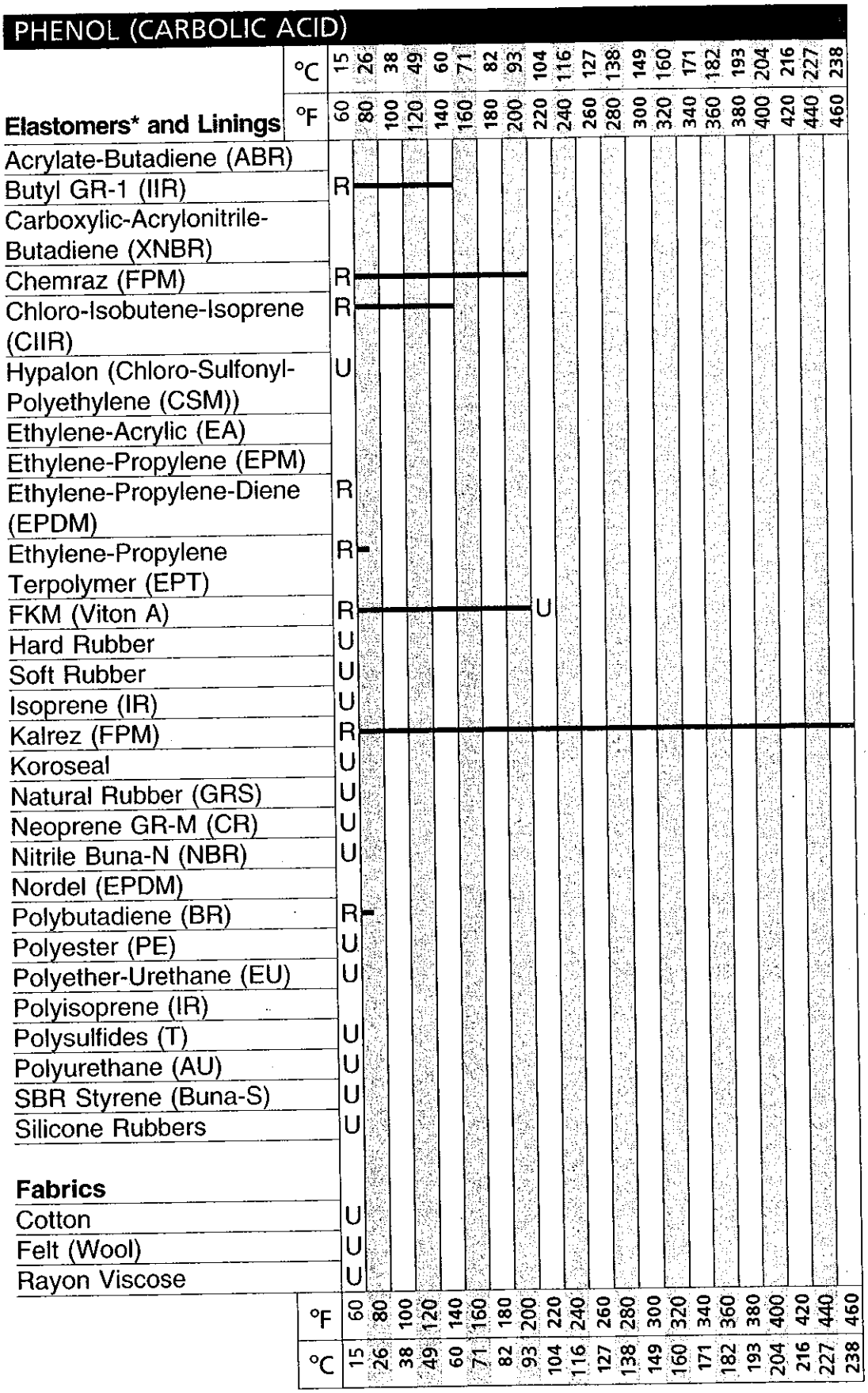
## PHENOL (CARBOLIC ACID)

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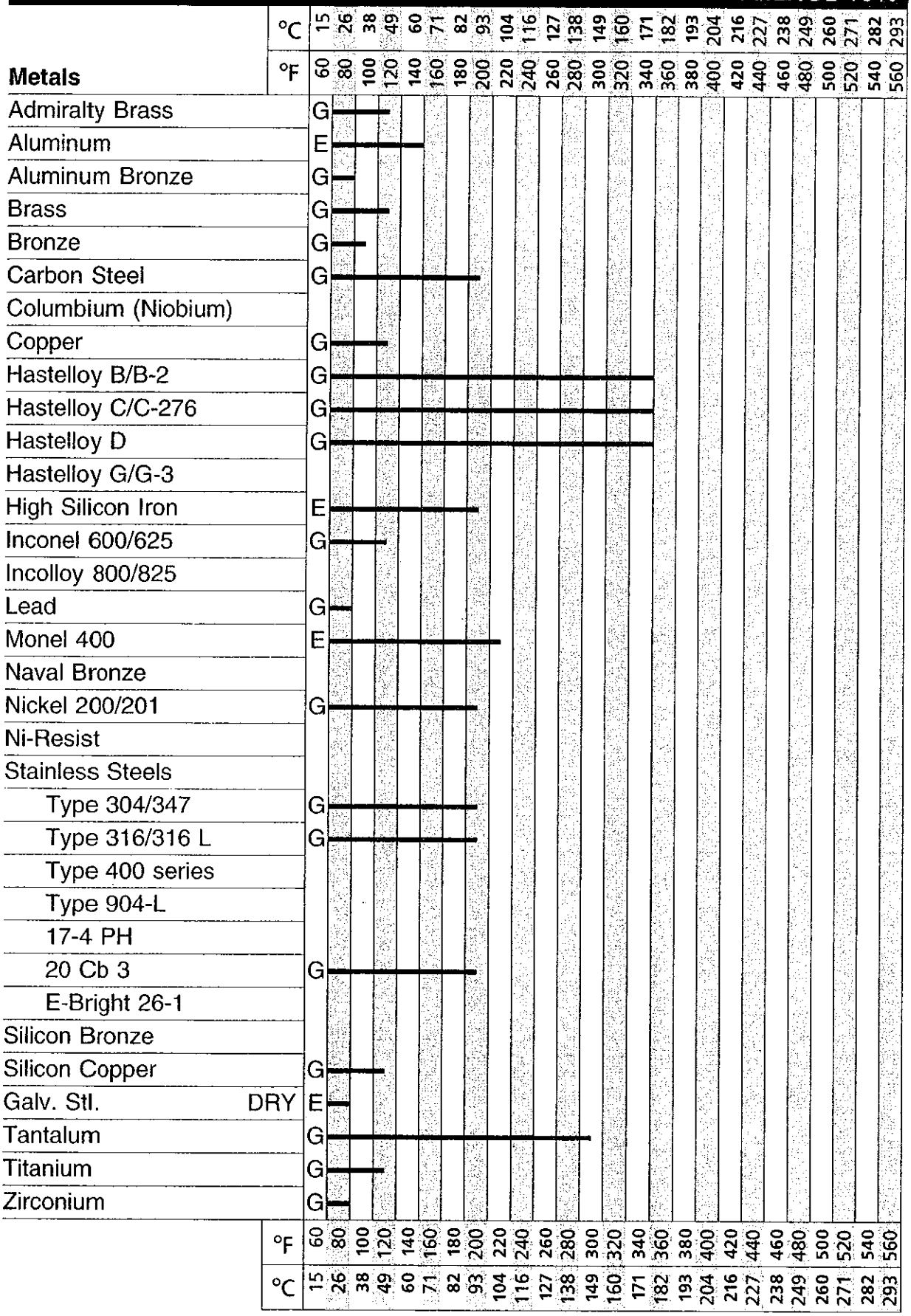
## PHENOL 10%




FOR METALS

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FOR NONMETALLICS

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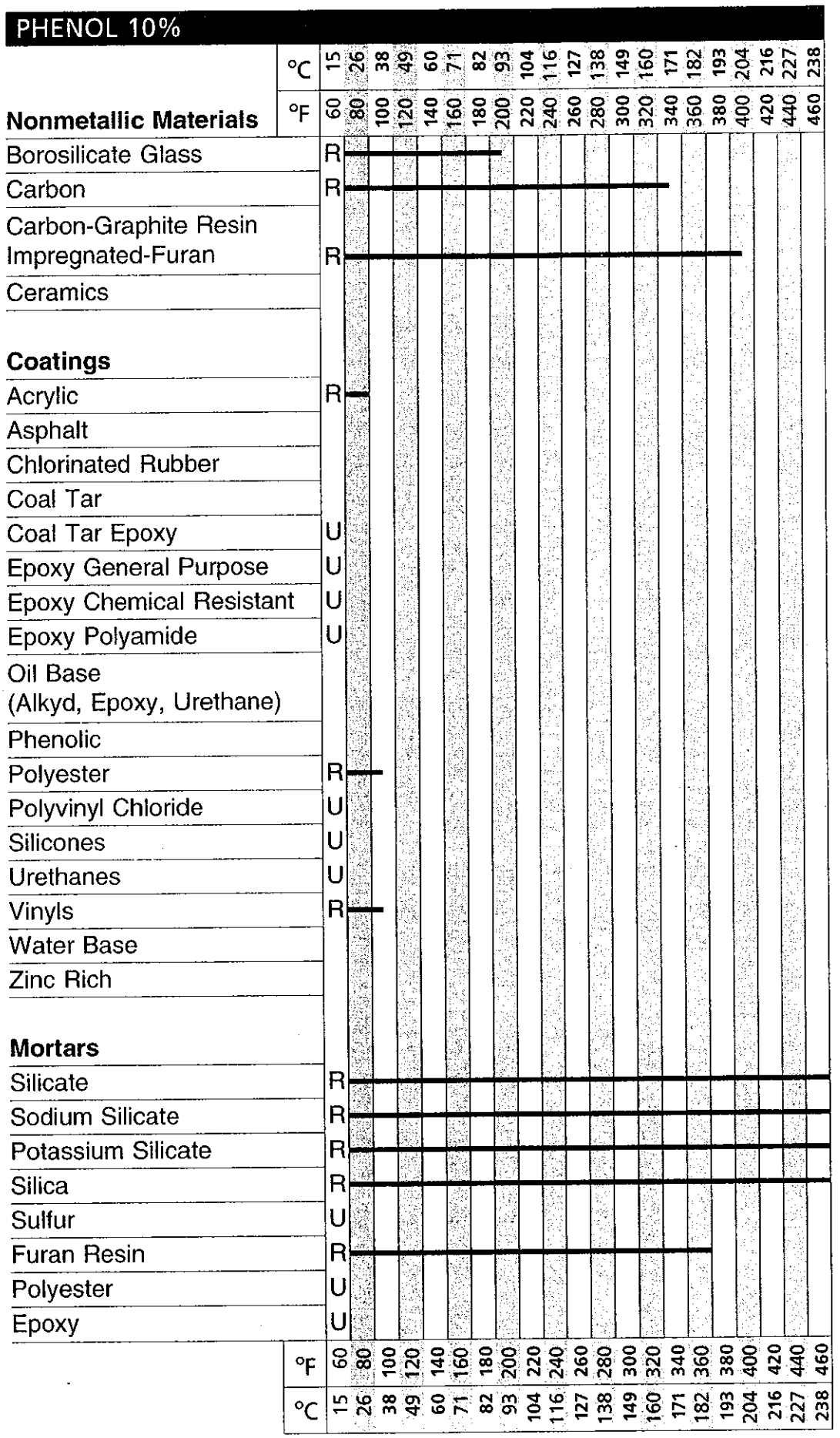
## PHENOL 10%





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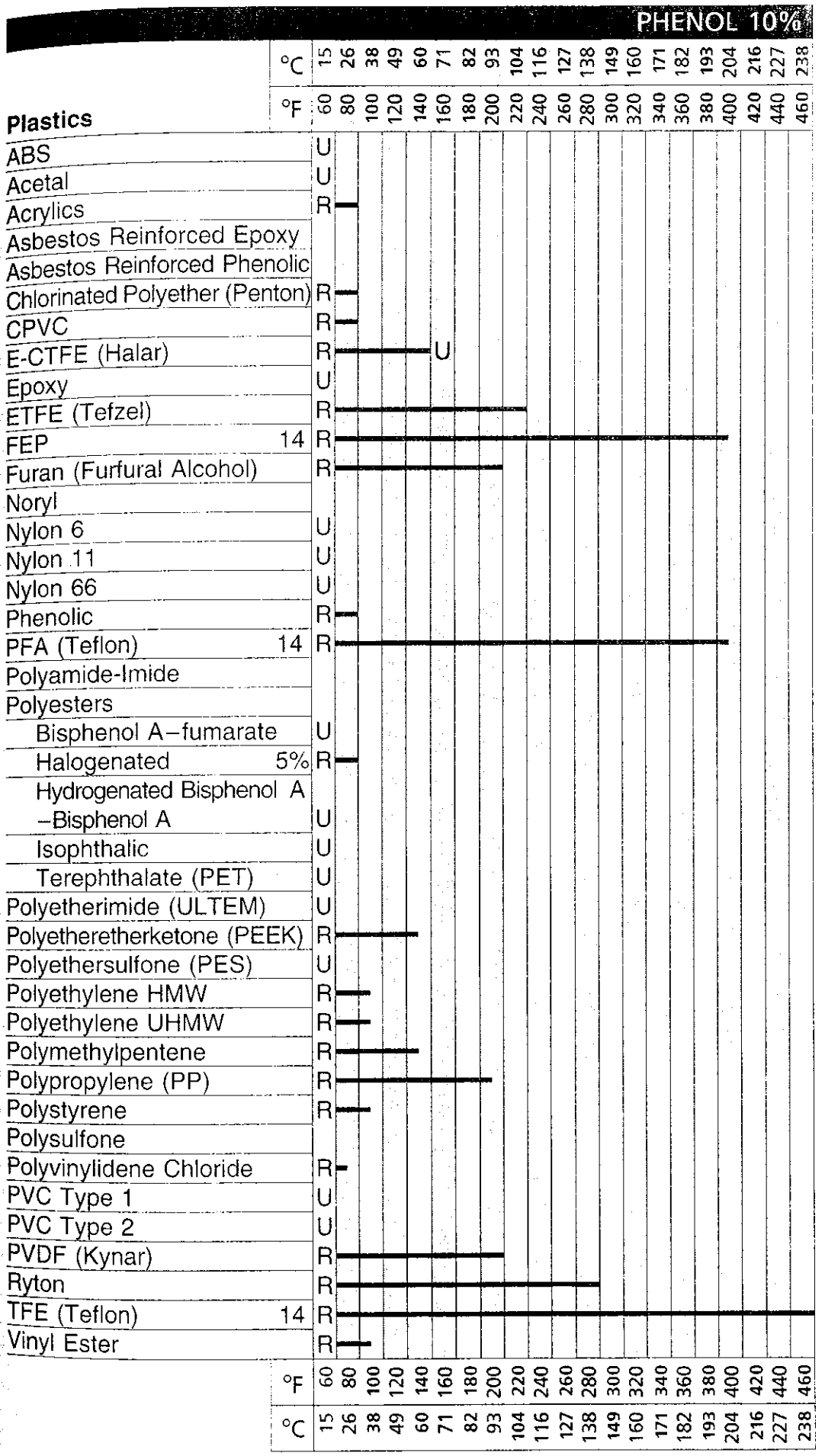


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## PHENOL 10%

| Elastomers* and Linings | °F | °C |
|---|---|---|
| Acrylate-Butadiene (ABR) | | |
| Butyl GR-1 (IIR) | R | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | R | |
| Chloro-Isobutene-Isoprene (CIIR) | R | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | U | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | | |
| Ethylene-Propylene-Diene (EPDM) | R | |
| Ethylene-Propylene Terpolymer (EPT) | R | |
| FKM (Viton A) | R | |
| Hard Rubber | U | |
| Soft Rubber | U | |
| Isoprene (IR) | R | |
| Kalrez (FPM) | R | |
| Koroseal | U | |
| Natural Rubber (GRS) | R | |
| Neoprene GR-M (CR) | U | |
| Nitrile Buna-N (NBR) | U | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | | |
| Polyester (PE) | U | |
| Polyether-Urethane (EU) | U | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | U | |
| Polyurethane (AU) | U | |
| SBR Styrene (Buna-S) | U | |
| Silicone Rubbers | U | |
| **Fabrics** | | |
| Cotton | U | |
| Felt (Wool) | U | |
| Rayon Viscose 5% | R | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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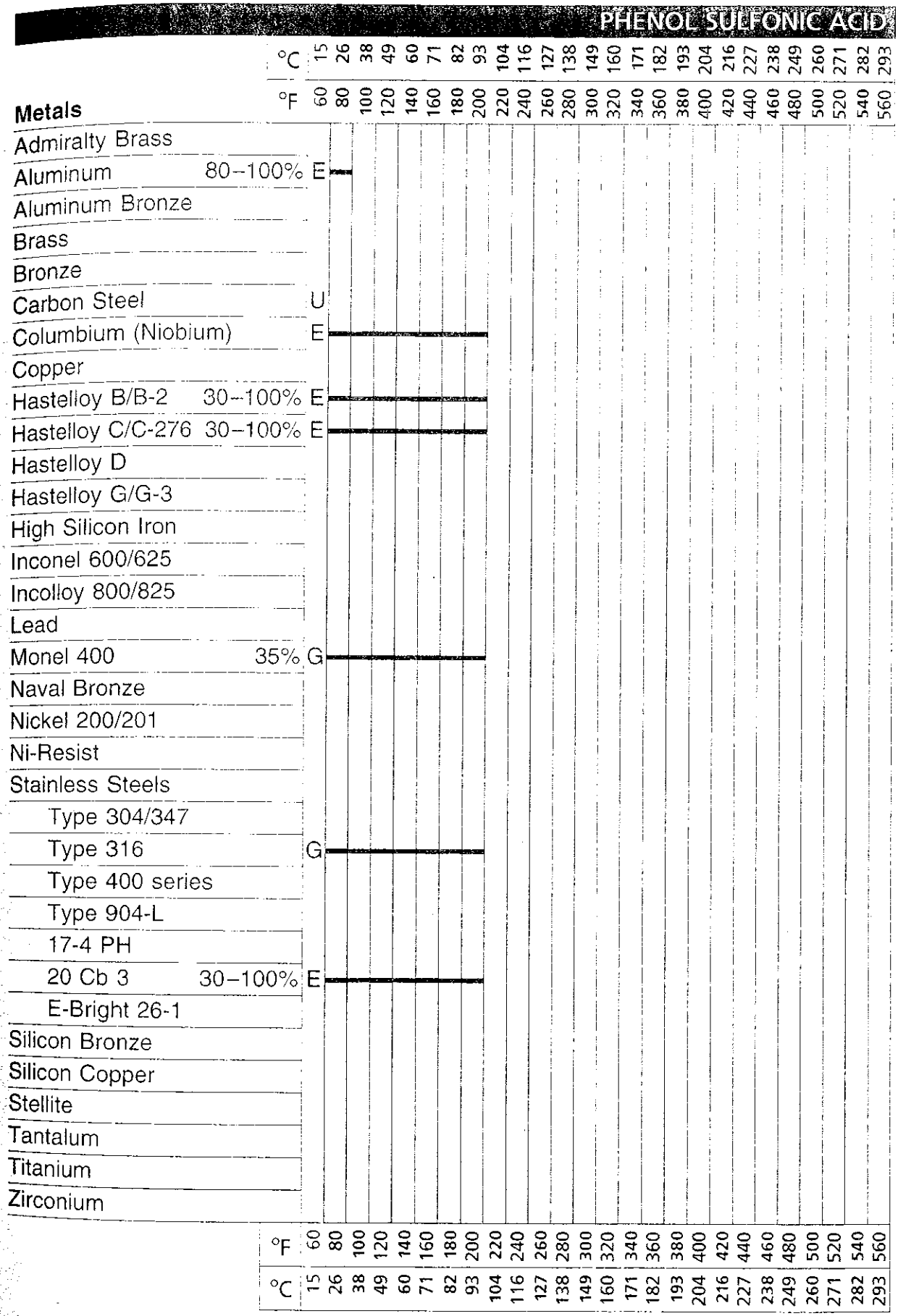


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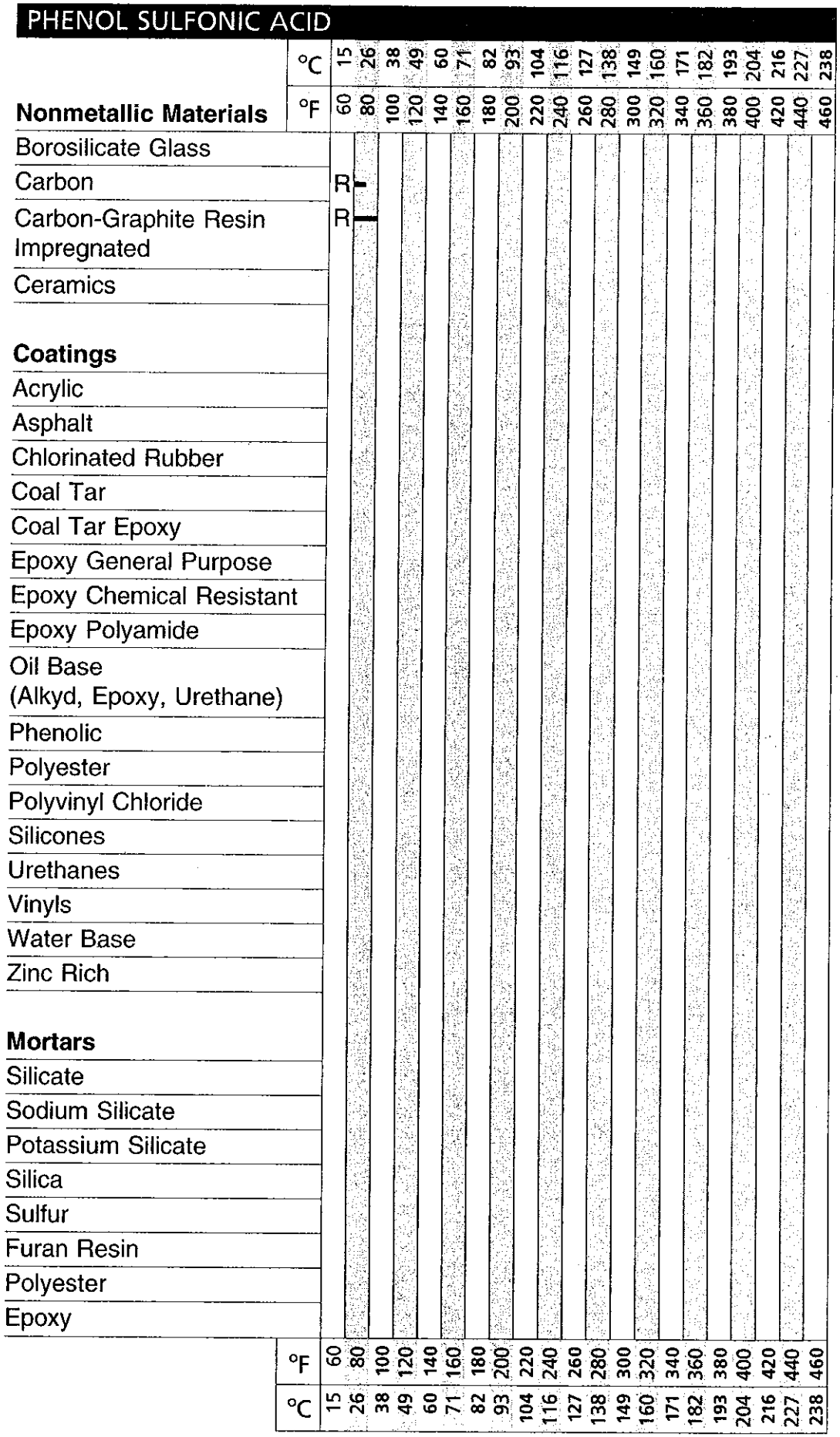
## PHENOL SULFONIC ACID



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# PHENOL SULFONIC ACID

| Plastics | | °C | °F |
|---|---|---|---|
| ABS | | | |
| Acetal | | | |
| Acrylics | | | |
| Asbestos Reinforced Epoxy | | | |
| Asbestos Reinforced Phenolic | | | |
| Chlorinated Polyether (Penton) | | | |
| CPVC | | | |
| E-CTFE (Halar) | | | |
| Epoxy | | | |
| ETFE (Tefzel) | | | | R |
| FEP | | | |
| Furan (Furfural Alcohol) | | | |
| Noryl | | | |
| Nylon 6 | | | |
| Nylon 11 | | | |
| Nylon 66 | | | |
| Phenolic | | | |
| PFA (Teflon) | | | |
| Polyamide-Imide | | | |
| Polyesters | | | |
| Bisphenol A–fumarate | | | |
| Halogenated | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | |
| Isophthalic | | | |
| Terephthalate (PET) | | | |
| Polyetherimide (ULTEM) | | | |
| Polyetheretherketone (PEEK) | | | |
| Polyethersulfone (PES) | | | |
| Polyethylene HMW | | | |
| Polyethylene UHMW | | | |
| Polymethylpentene | | | |
| Polypropylene (PP) | | | |
| Polystyrene | | | |
| Polysulfone | | | |
| Polyvinylidene Chloride | | | |
| PVC Type 1 | | | | R |
| PVC Type 2 | | | | R |
| PVDF (Kynar) | 65% | | | R |
| Ryton | | | |
| TFE (Teflon) | | | | R |
| Vinyl Ester | TO 65% | | | R |

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238


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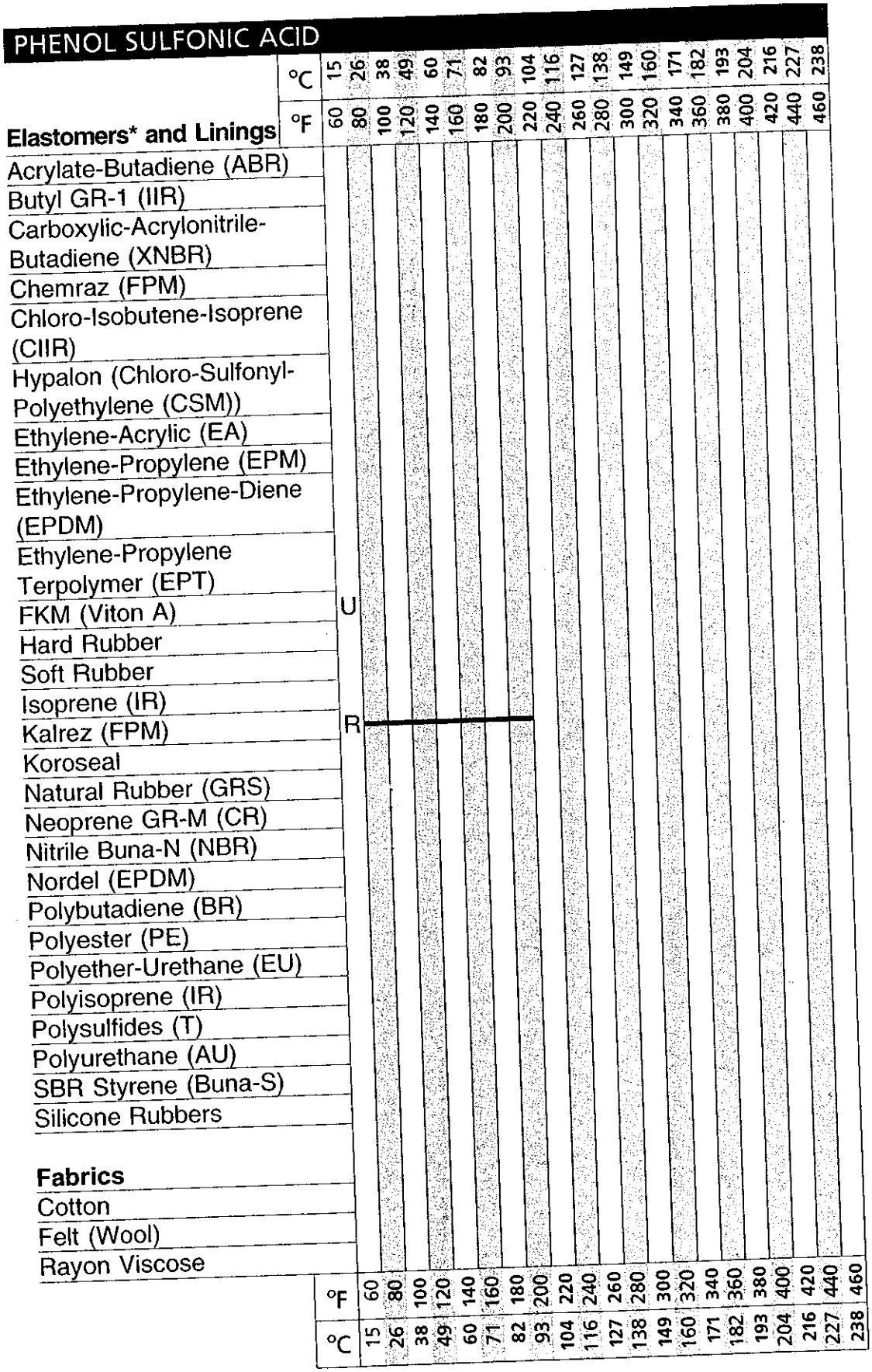


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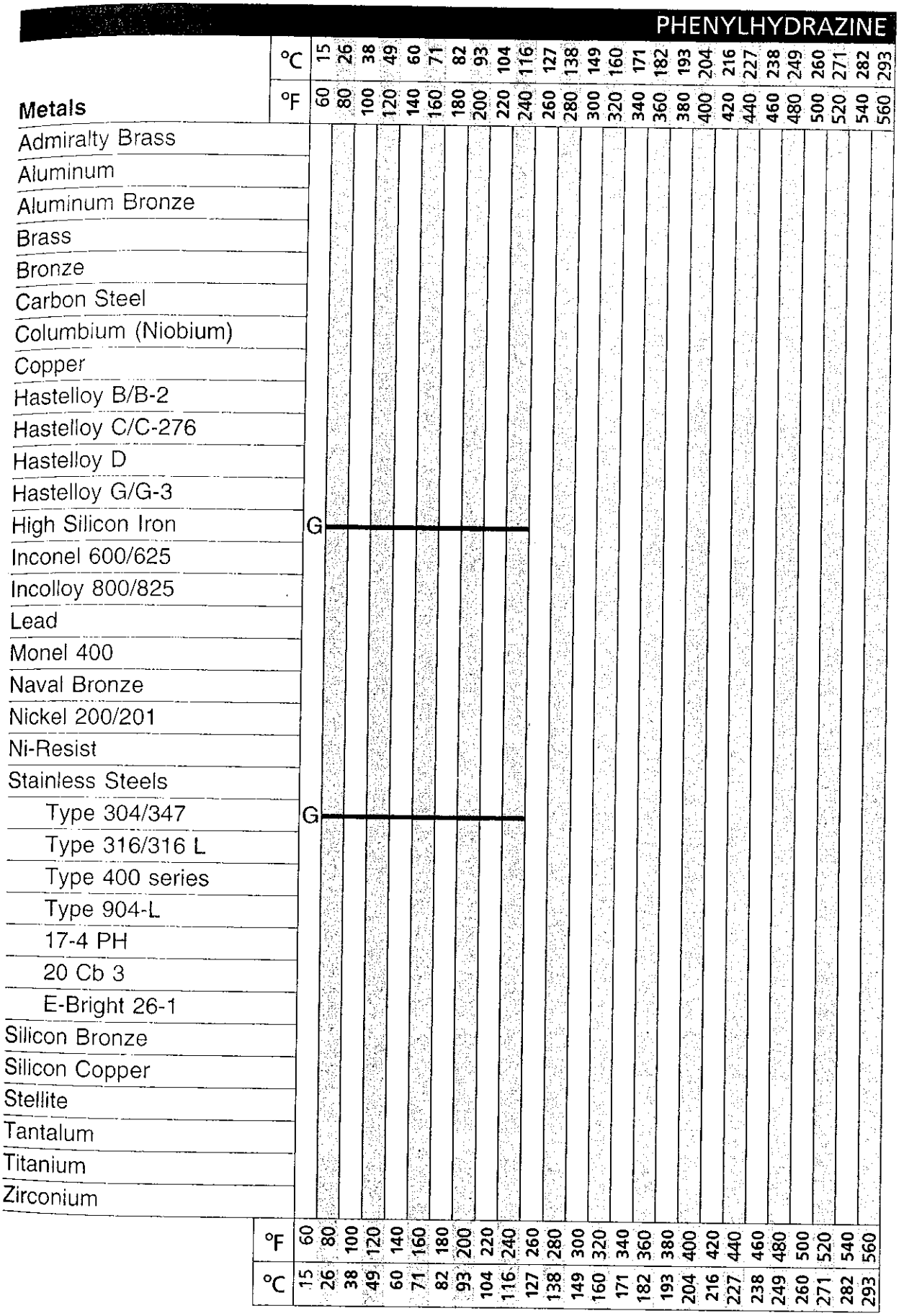


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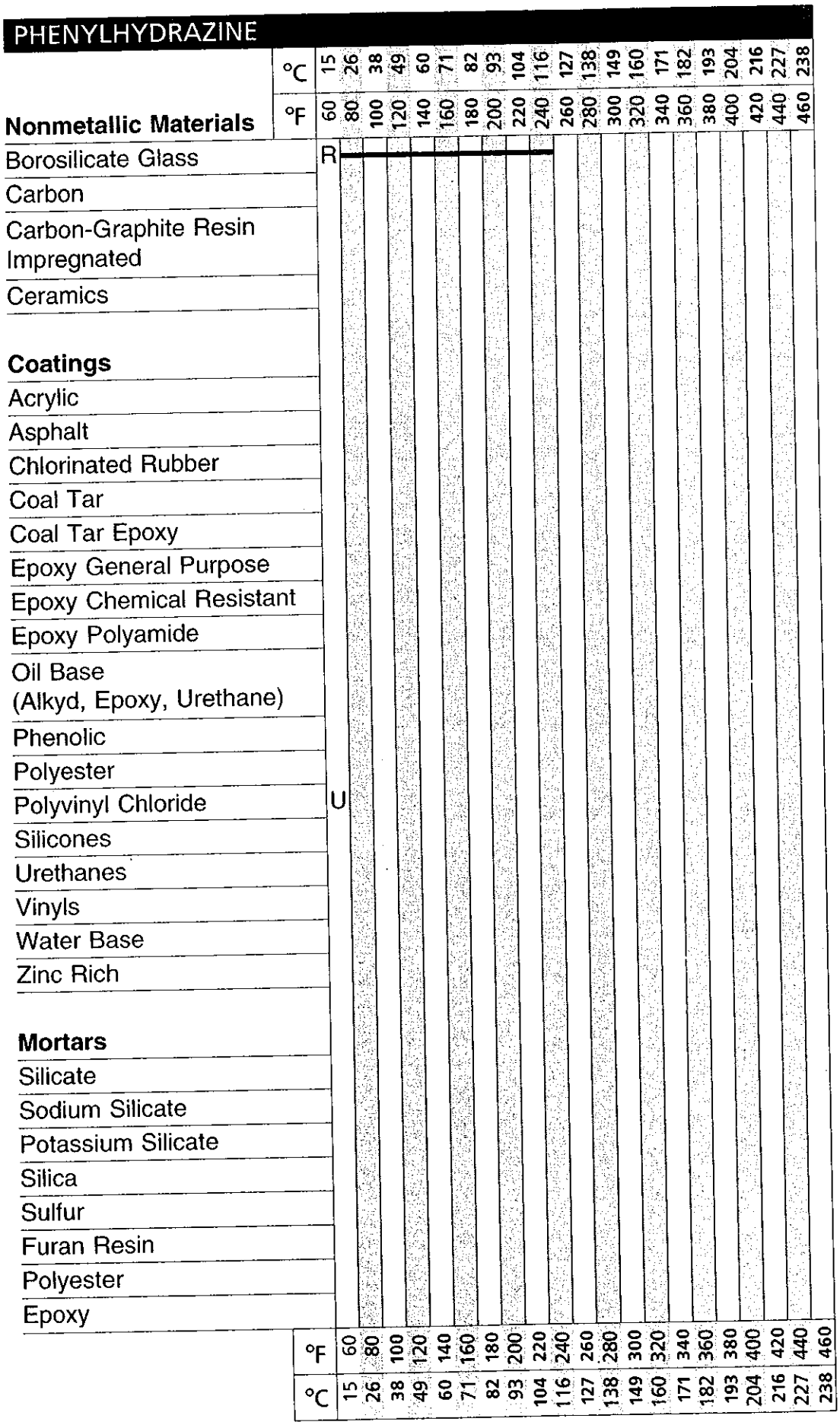




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## PHENYLHYDRAZINE

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | R | | | | | | | | | | | | | | | | | | | | |
| CPVC | | U | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | U | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | U | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | U | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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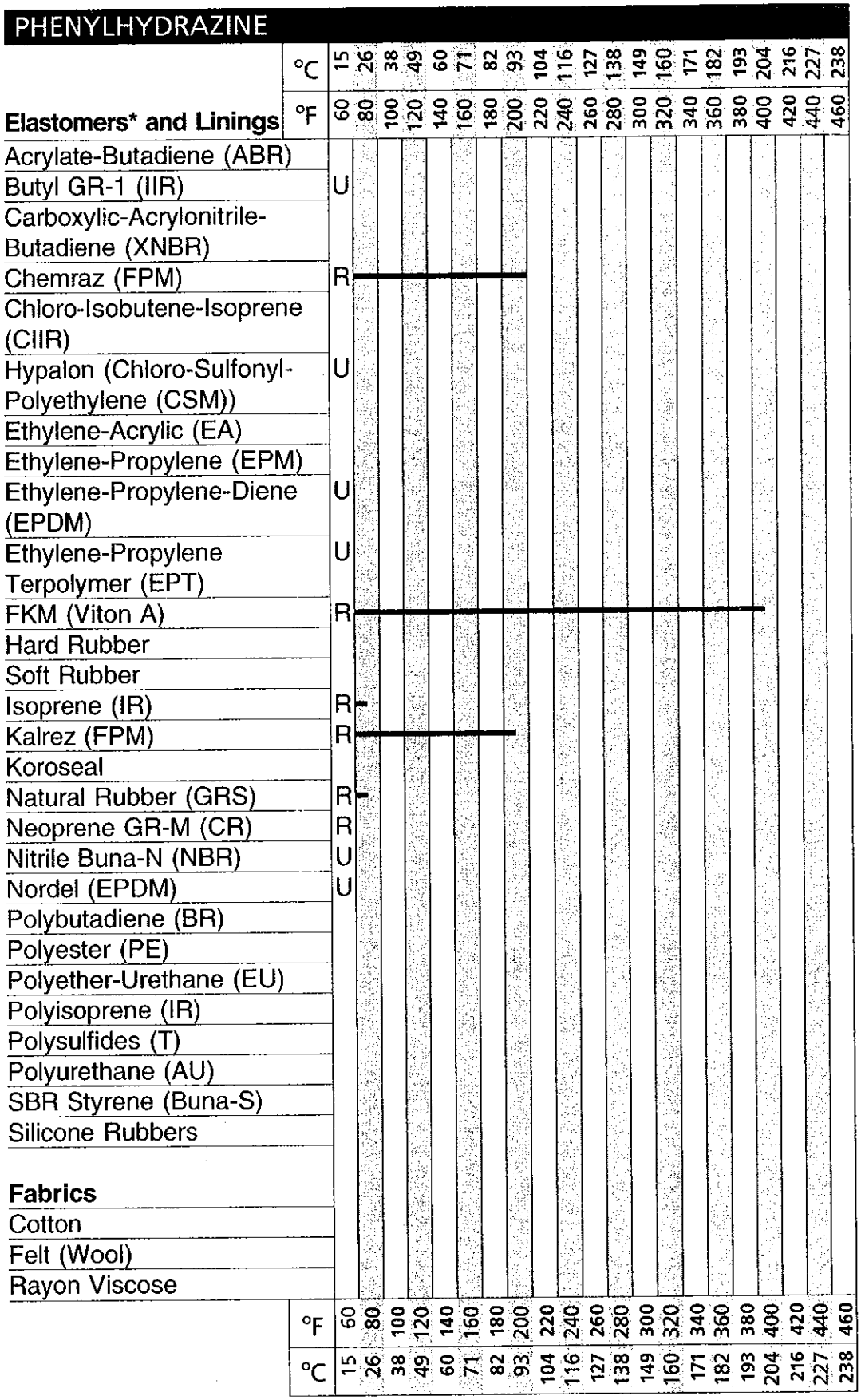
## PHENYLHYDRAZINE




*See also Nylon 11 under PLASTICS



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# PHENYLHYDRAZINE HYDROCHLORIDE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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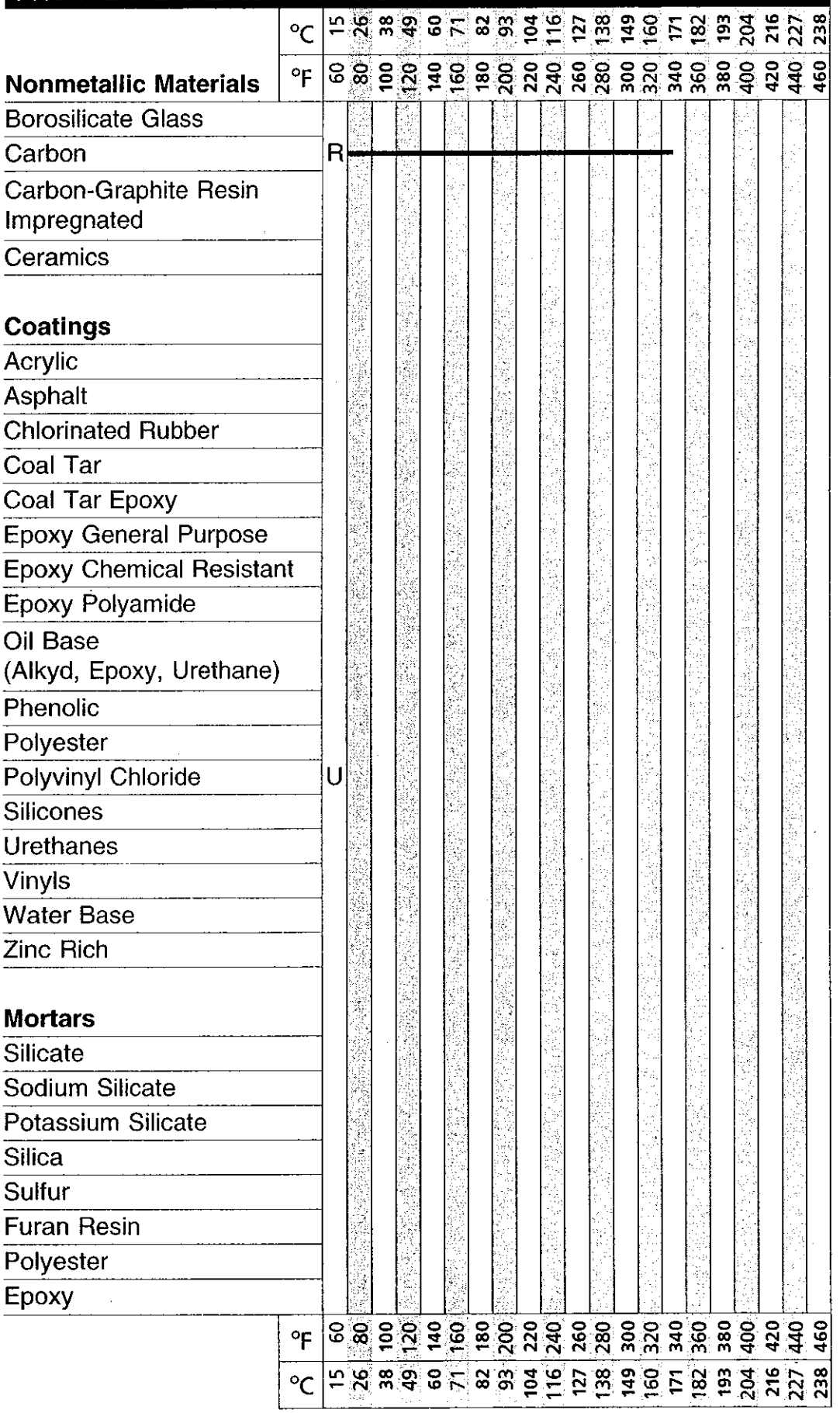





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# PHENYLHYDRAZINE HYDROCHLORIDE

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | U | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | U | |
| PVC Type 1 | R | U |
| PVC Type 2 | U | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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## PHENYLHYDRAZINE HYDROCHLORIDE

| Elastomers* and Linings | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | R | R | R | R | R | R | R | R | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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| Metals | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Galv. Stl. | DRY | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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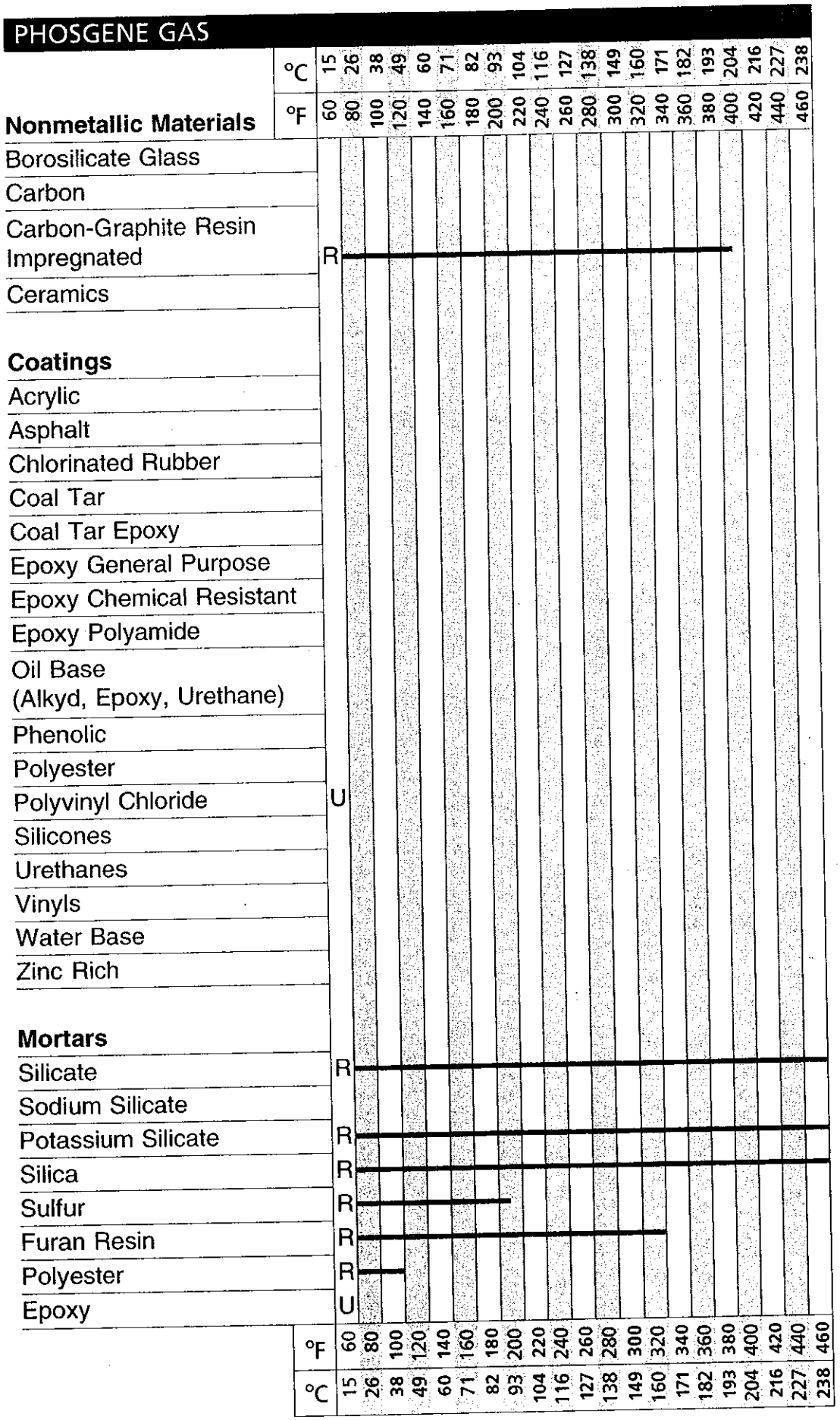
## PHOSGENE GAS





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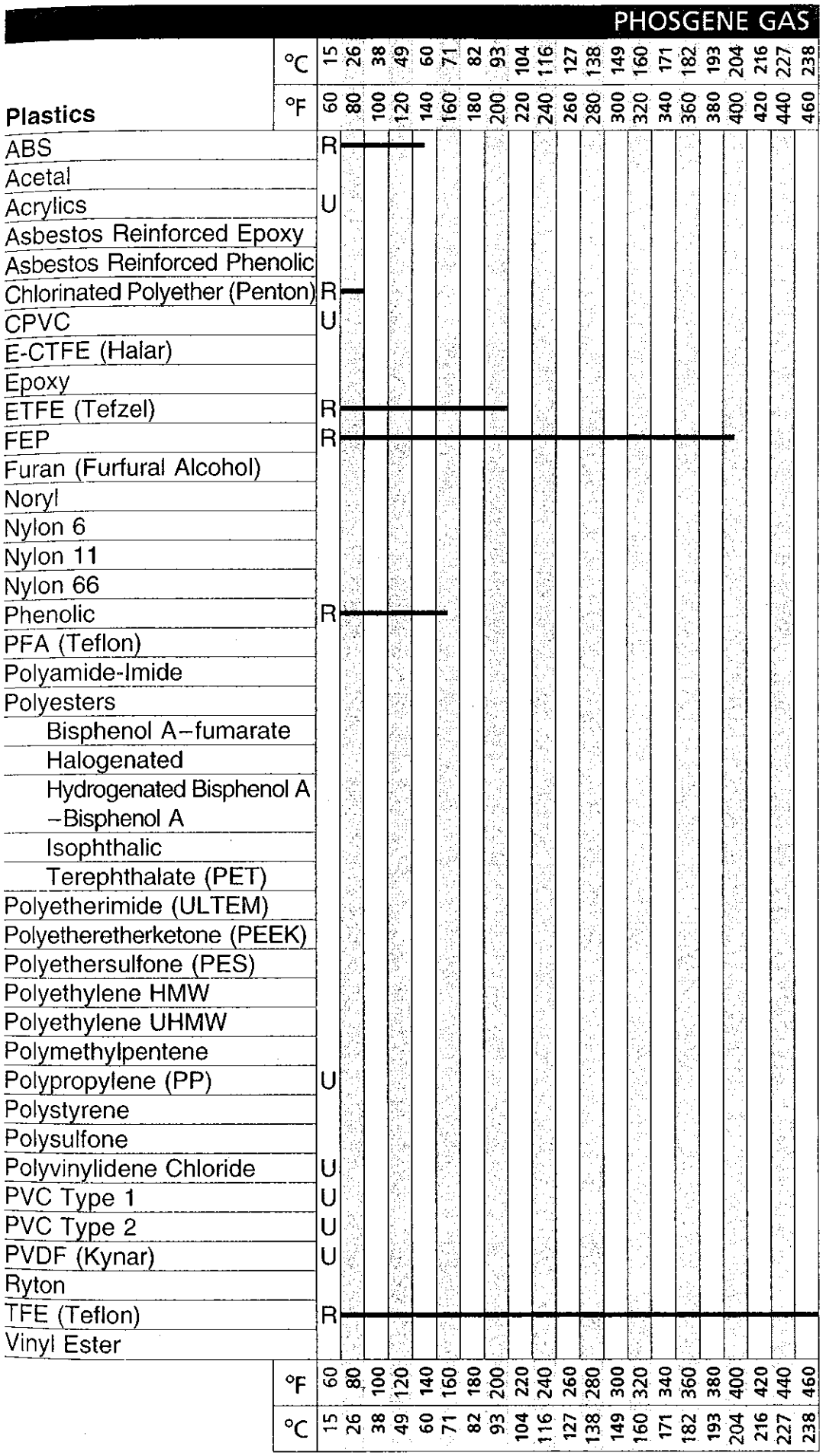


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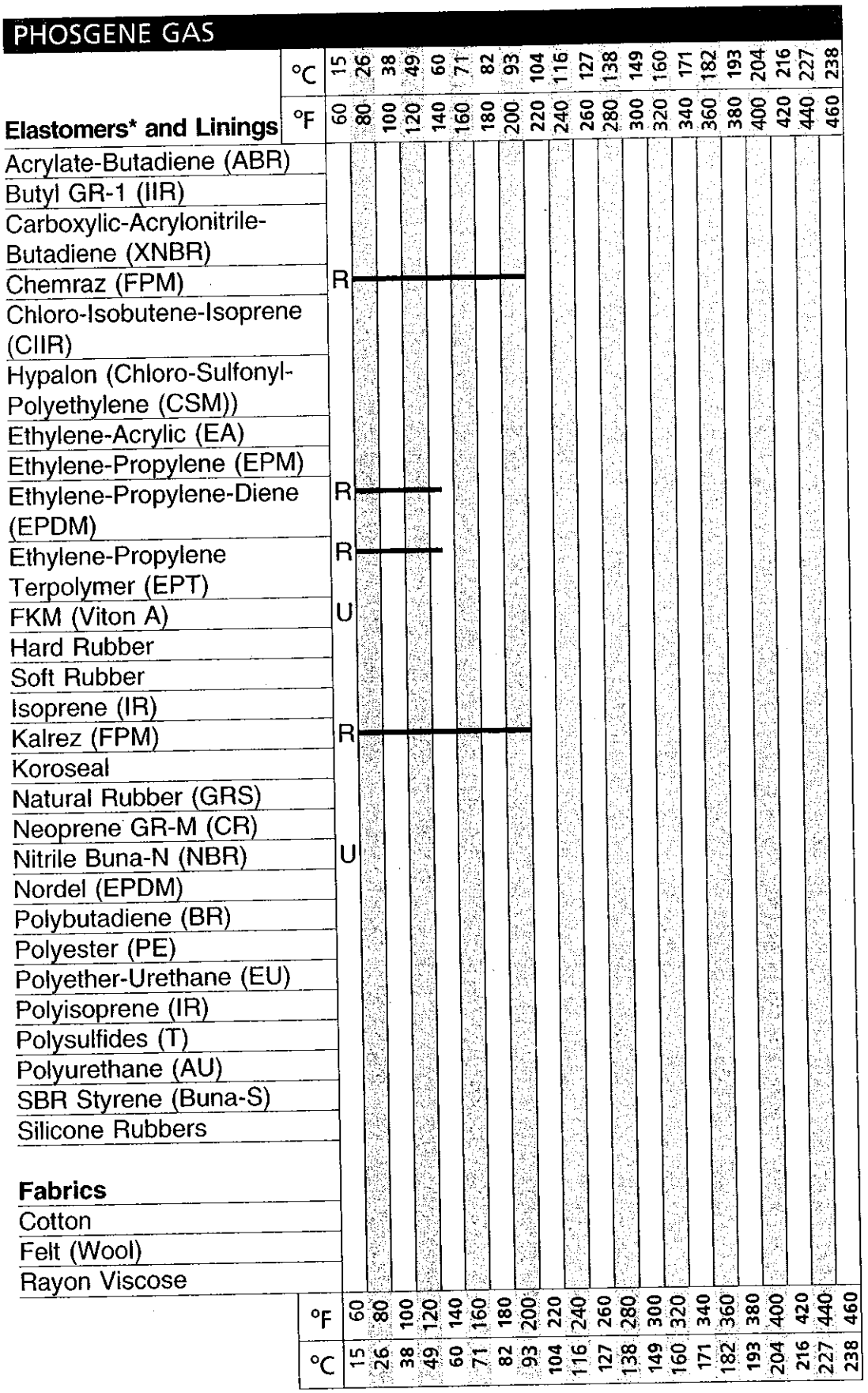


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# PHOSGENE LIQUID

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | G | G |
| Type 316/316 L | G | G |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | G | G |
| Titanium | | |
| Zirconium | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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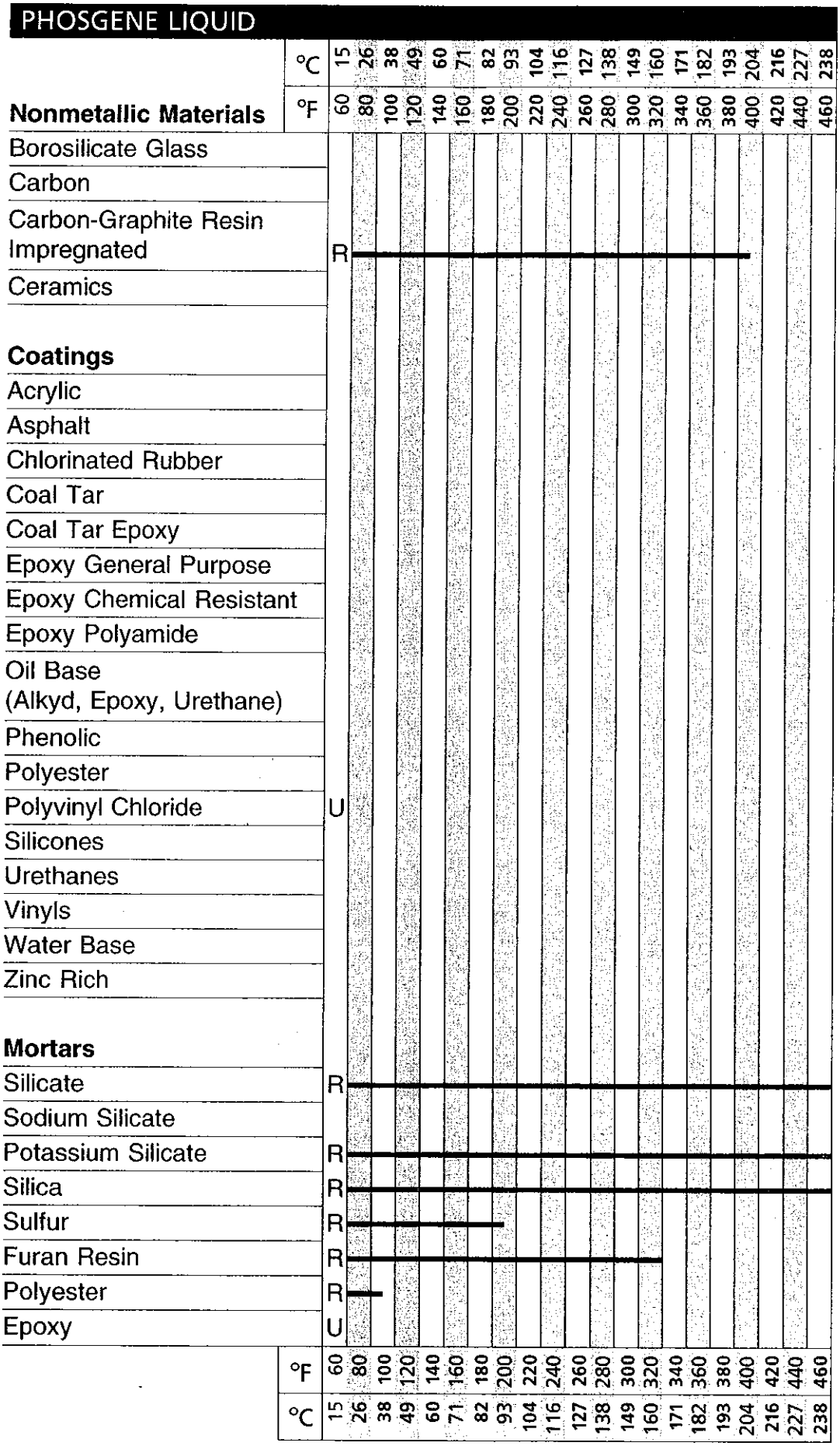
## PHOSGENE LIQUID



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## PHOSGENE LIQUID

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | U | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | U | |
| PVC Type 2 | U | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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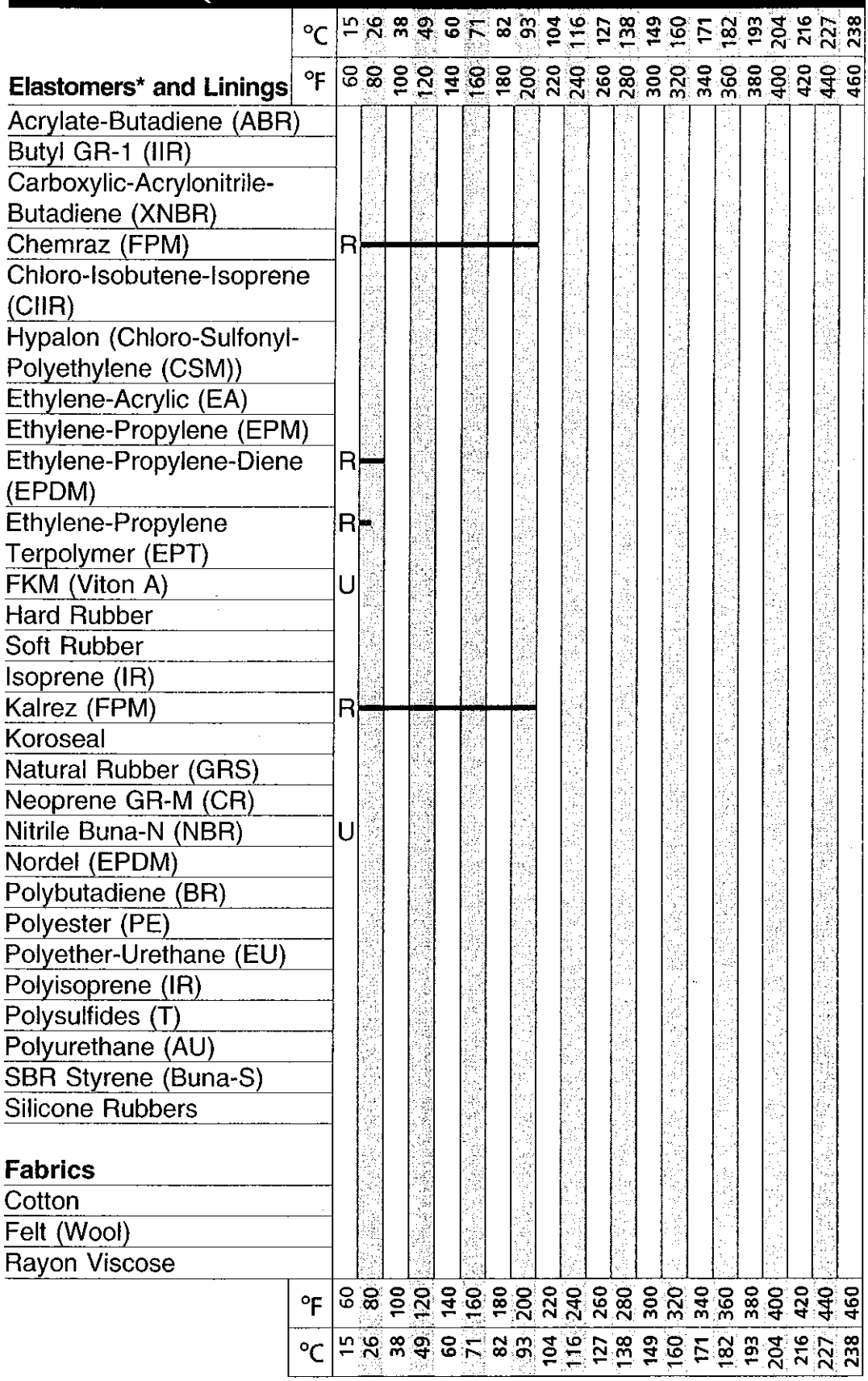


*See also Nylon 11 under PLASTICS



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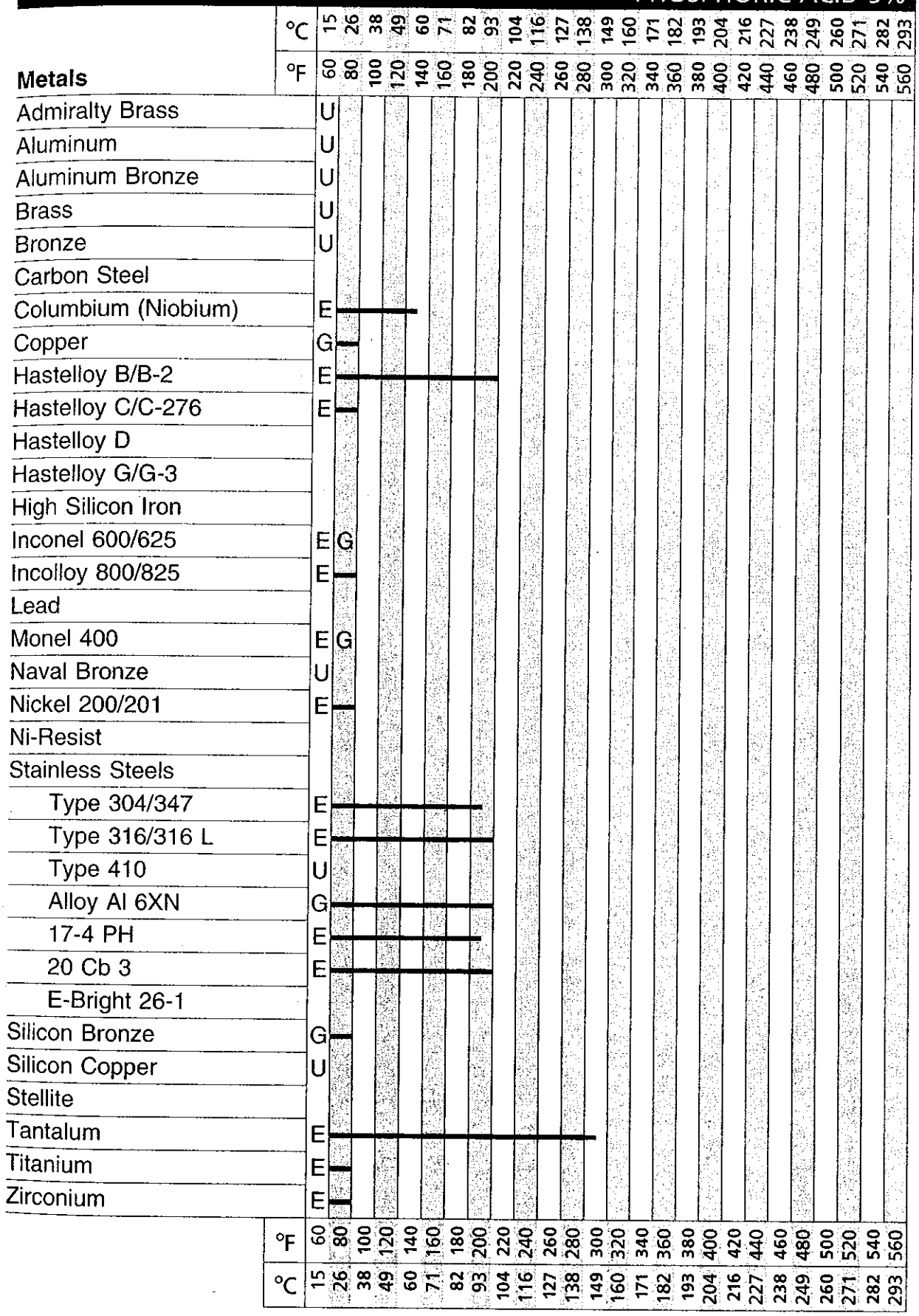


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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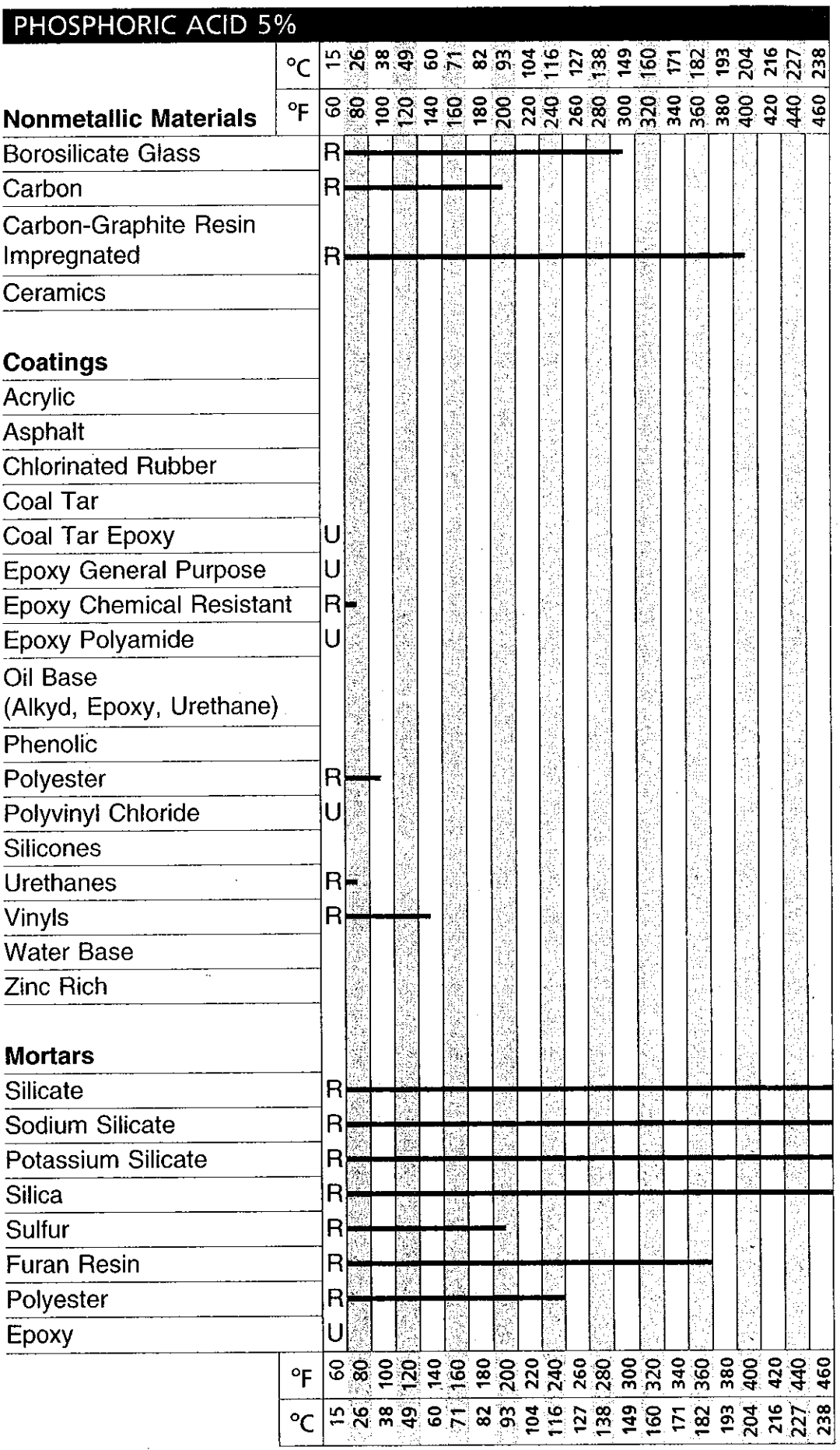




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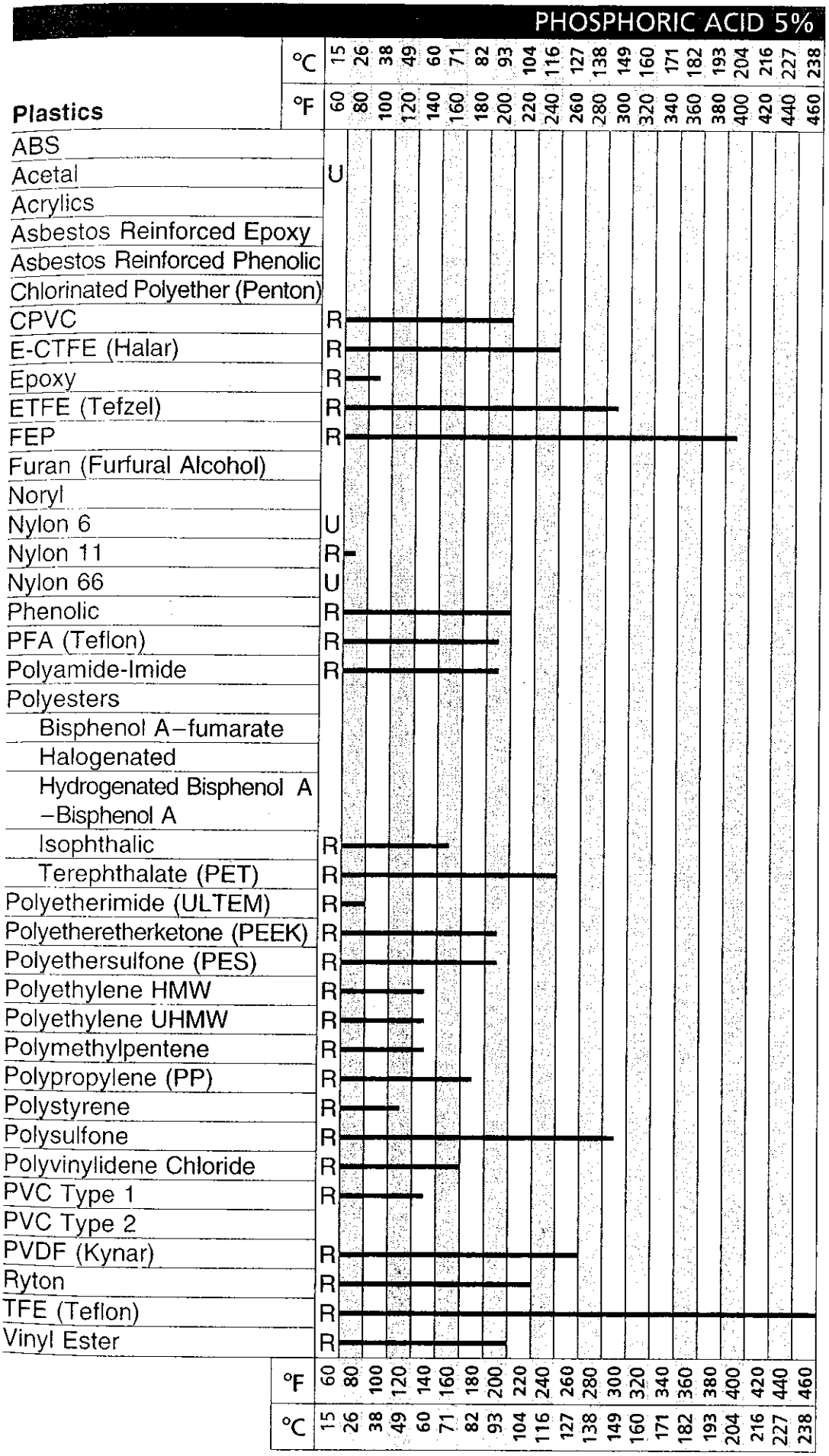


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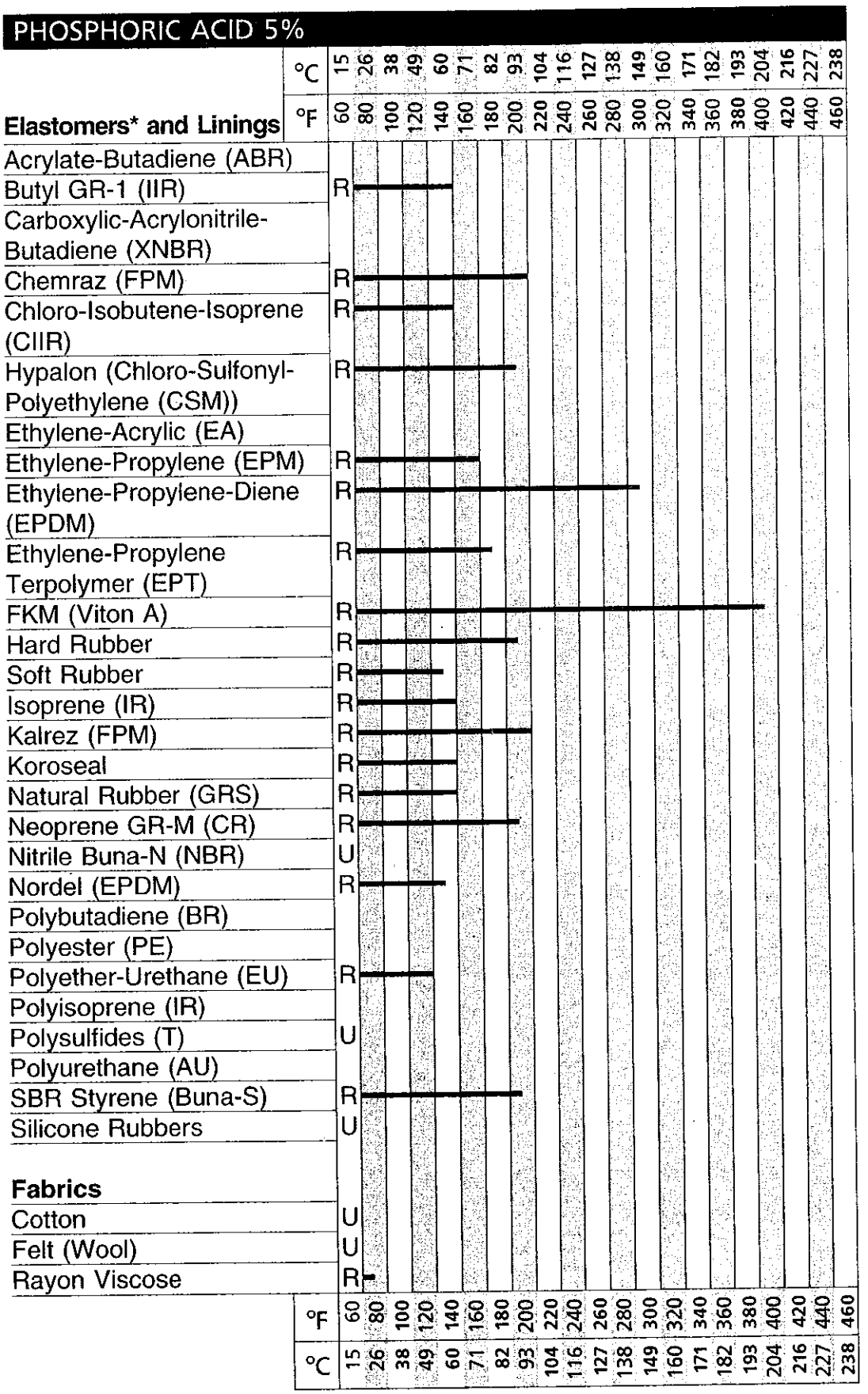


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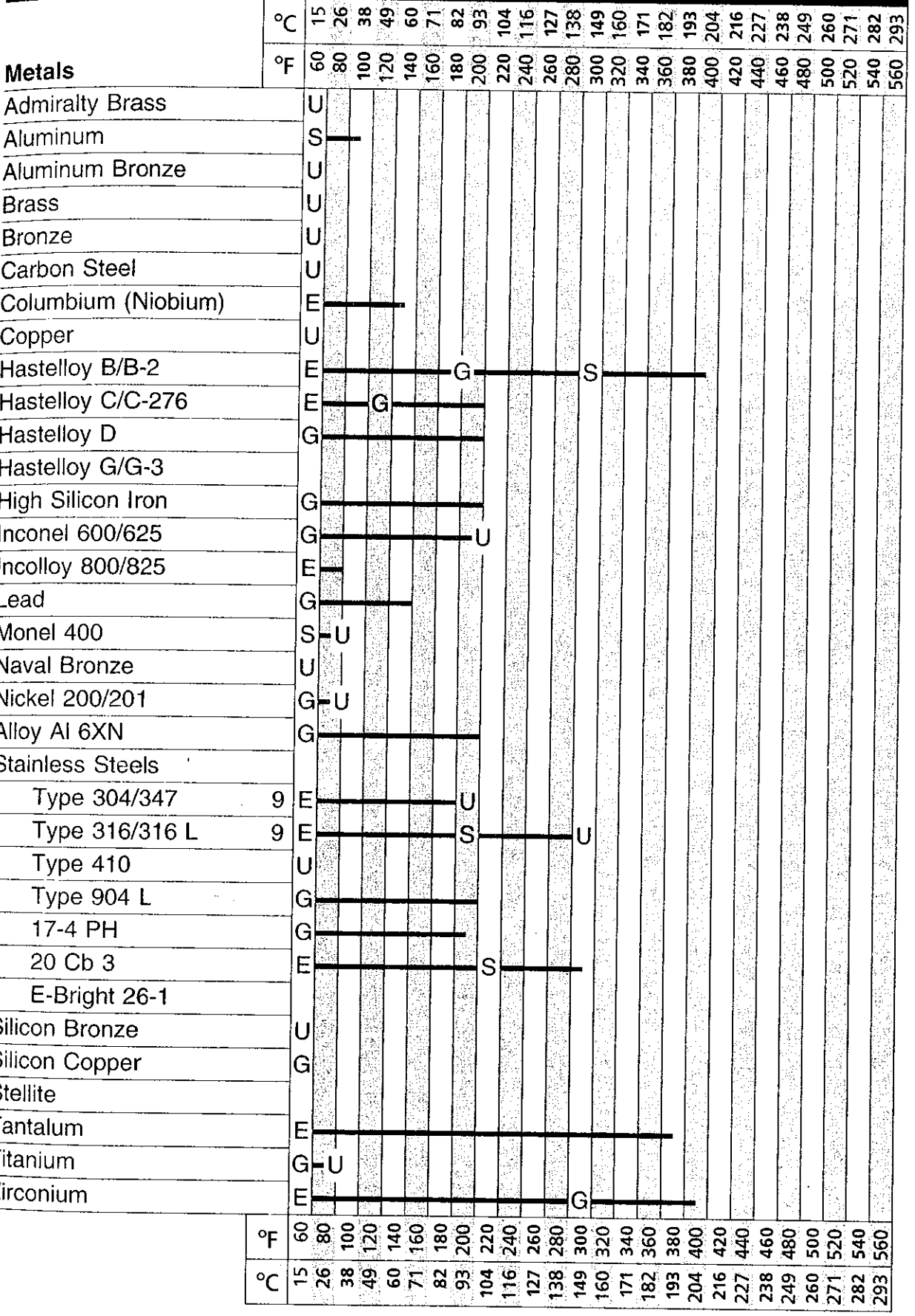


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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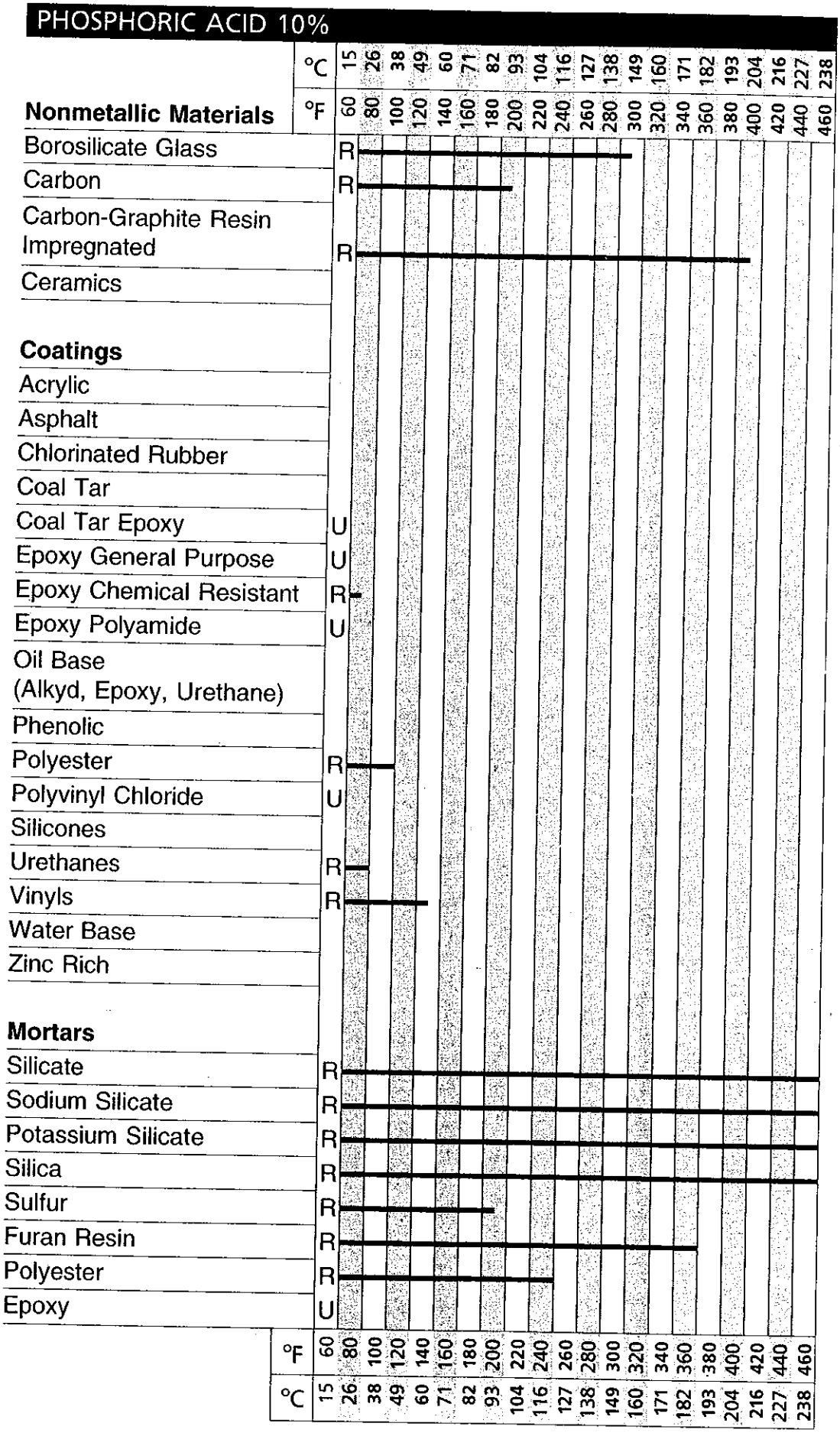




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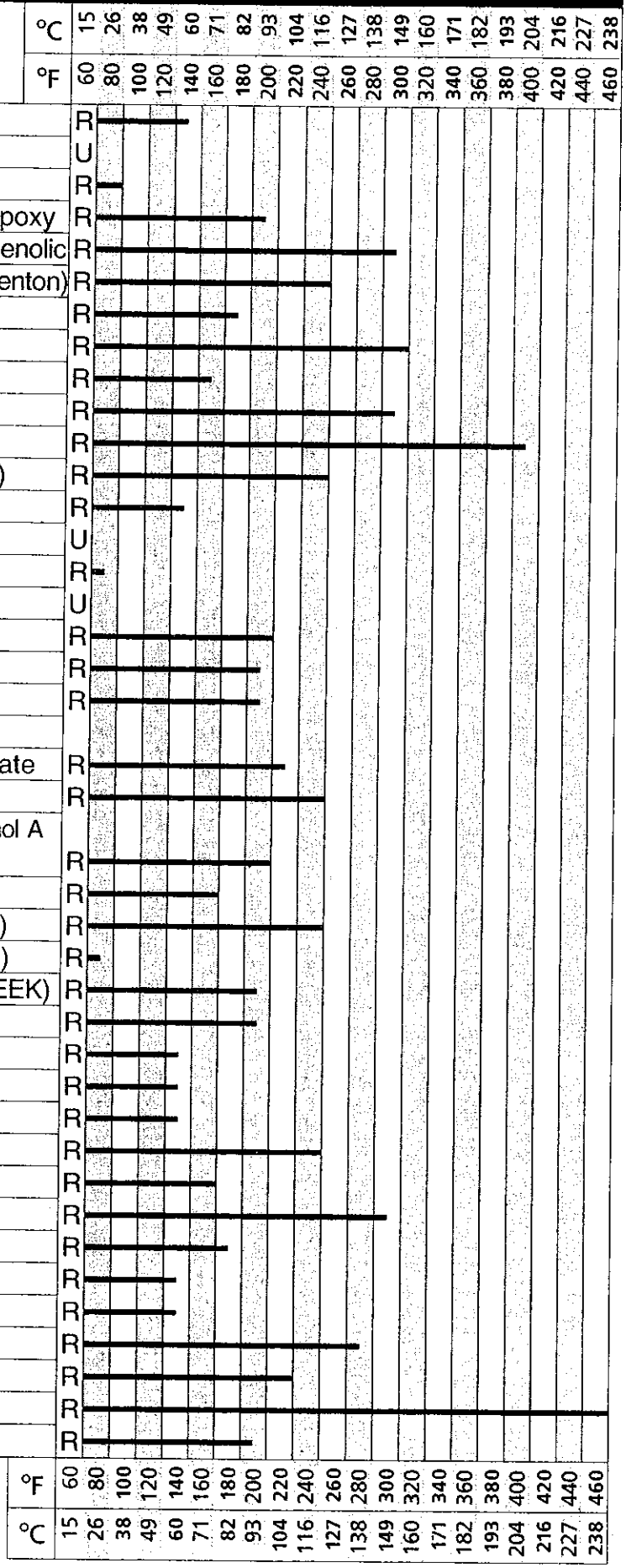
# PHOSPHORIC ACID 10%

| Plastics | |
|---|---|
| ABS | R |
| Acetal | U |
| Acrylics | R |
| Asbestos Reinforced Epoxy | R |
| Asbestos Reinforced Phenolic | R |
| Chlorinated Polyether (Penton) | R |
| CPVC | R |
| E-CTFE (Halar) | R |
| Epoxy | R |
| ETFE (Tefzel) | R |
| FEP | R |
| Furan (Furfural Alcohol) | R |
| Noryl | R |
| Nylon 6 | U |
| Nylon 11 | R |
| Nylon 66 | U |
| Phenolic | R |
| PFA (Teflon) | R |
| Polyamide-Imide | R |
| Polyesters | |
| Bisphenol A–fumarate | R |
| Halogenated | R |
| Hydrogenated Bisphenol A –Bisphenol A | R |
| Isophthalic | R |
| Terephthalate (PET) | R |
| Polyetherimide (ULTEM) | R |
| Polyetheretherketone (PEEK) | R |
| Polyethersulfone (PES) | R |
| Polyethylene HMW | R |
| Polyethylene UHMW | R |
| Polymethylpentene | R |
| Polypropylene (PP) | R |
| Polystyrene | R |
| Polysulfone | R |
| Polyvinylidene Chloride | R |
| PVC Type 1 | R |
| PVC Type 2 | R |
| PVDF (Kynar) | R |
| Ryton | R |
| TFE (Teflon) | R |
| Vinyl Ester | R |

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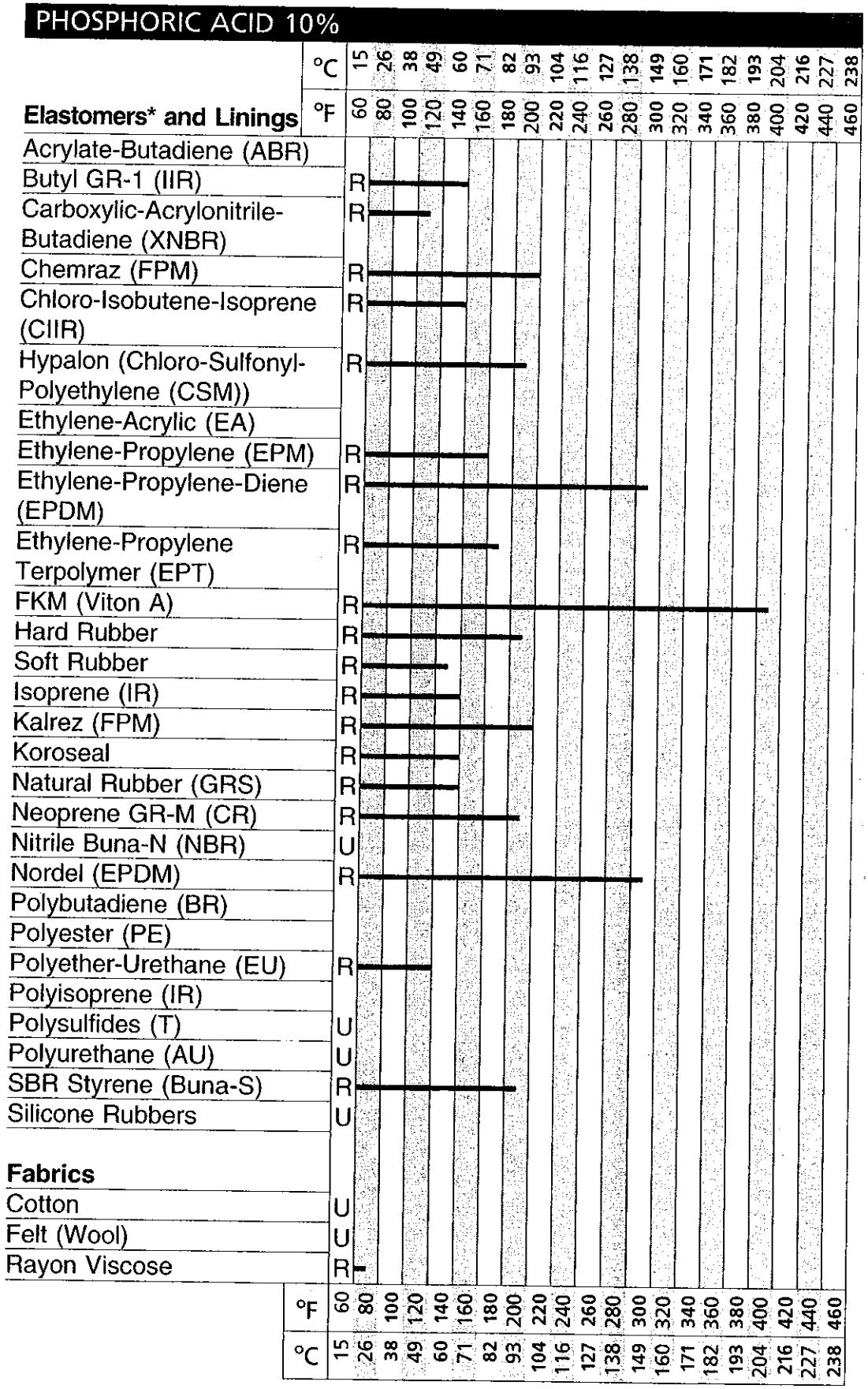


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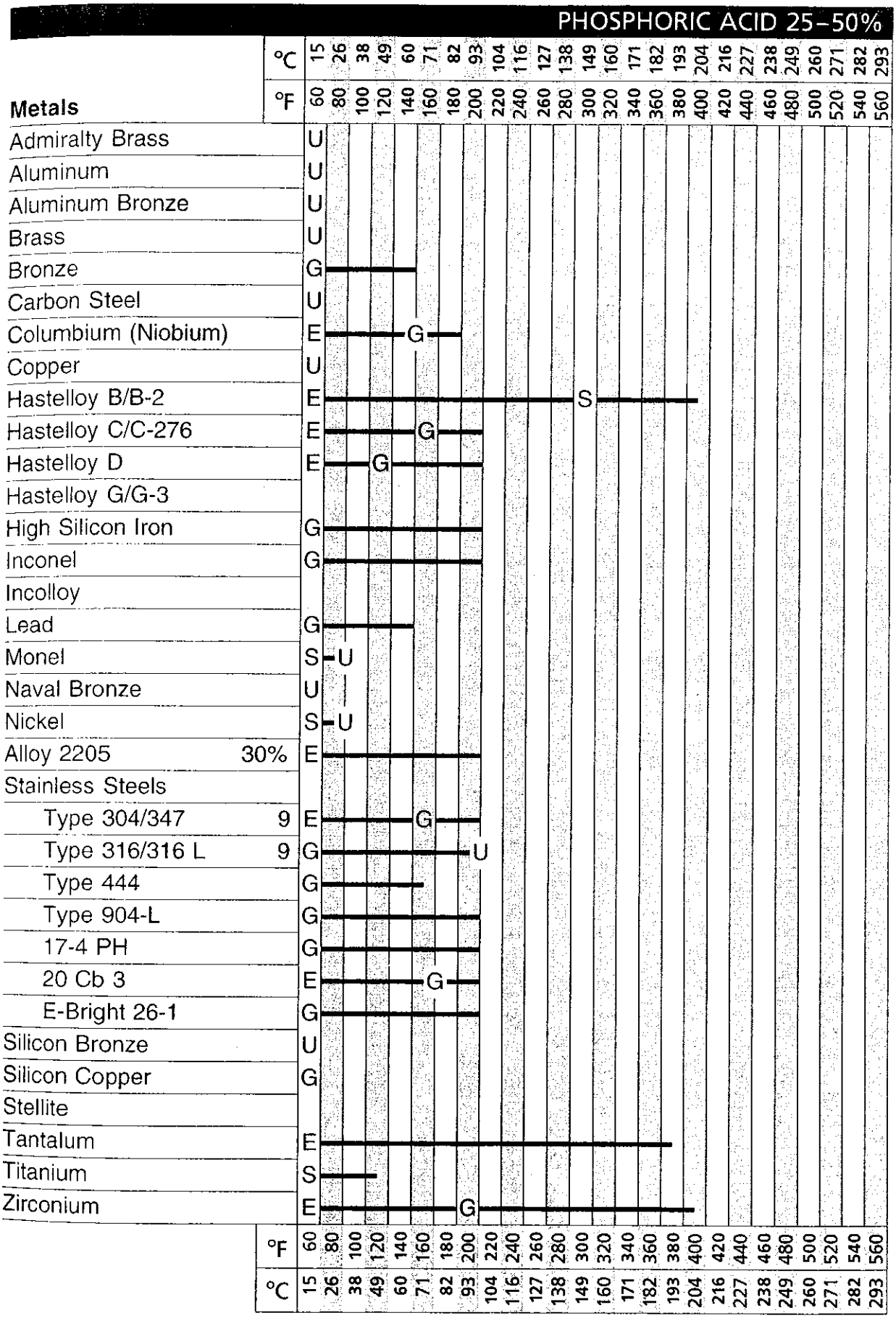


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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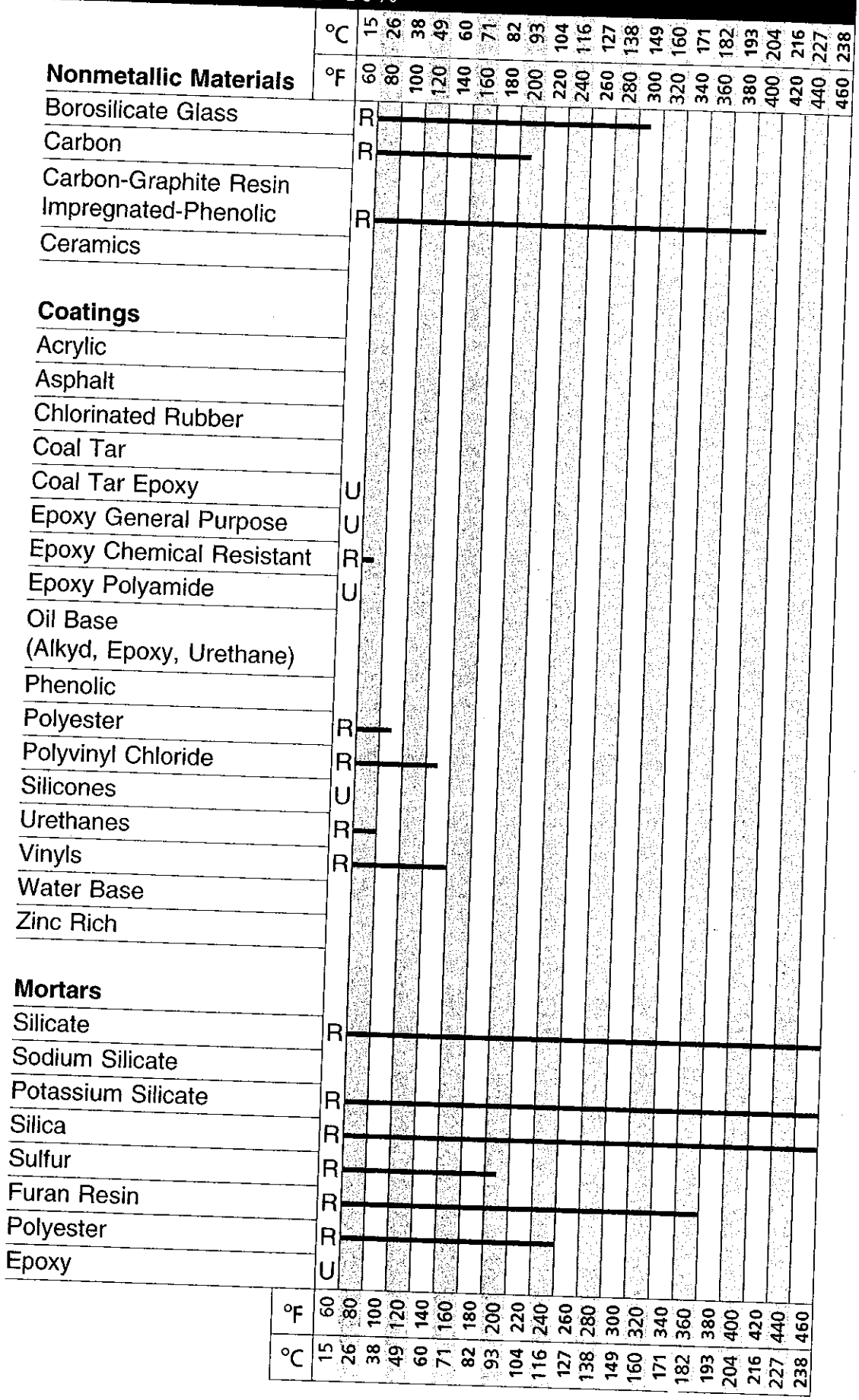
## PHOSPHORIC ACID 25–50%



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# PHOSPHORIC ACID 25–50%

| Plastics | | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 / °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
|---|---|---|
| ABS | | R |
| Acetal | | U |
| Acrylics | | R |
| Asbestos Reinforced Epoxy | | R |
| Asbestos Reinforced Phenolic | | R |
| Chlorinated Polyether (Penton) | | R |
| CPVC | | R |
| E-CTFE (Halar) | | R |
| Epoxy | | R U |
| ETFE (Tefzel) | 30% | R |
| FEP | | R |
| Furan (Furfural Alcohol) | | R |
| Noryl | | R |
| Nylon 6 | | U |
| Nylon 11 | | U |
| Nylon 66 | | U |
| Phenolic | 50% | R |
| PFA (Teflon) | | R |
| Polyamide-Imide | 35% | R |
| Polyesters | | |
| Bisphenol A–fumarate | | R |
| Halogenated | | R |
| Hydrogenated Bisphenol A –Bisphenol A | | R |
| Isophthalic | | R |
| Terephthalate (PET) | | R |
| Polyetherimide (ULTEM) | | R |
| Polyetheretherketone (PEEK) | | R |
| Polyethersulfone (PES) | | R |
| Polyethylene HMW | | R |
| Polyethylene UHMW | | R |
| Polymethylpentene | | R |
| Polypropylene (PP) | | R |
| Polystyrene | | R |
| Polysulfone | | R |
| Polyvinylidene Chloride | | R |
| PVC Type 1 | | R |
| PVC Type 2 | | R |
| PVDF (Kynar) | | R |
| Ryton | | R |
| TFE (Teflon) | | R |
| Vinyl Ester | | R |


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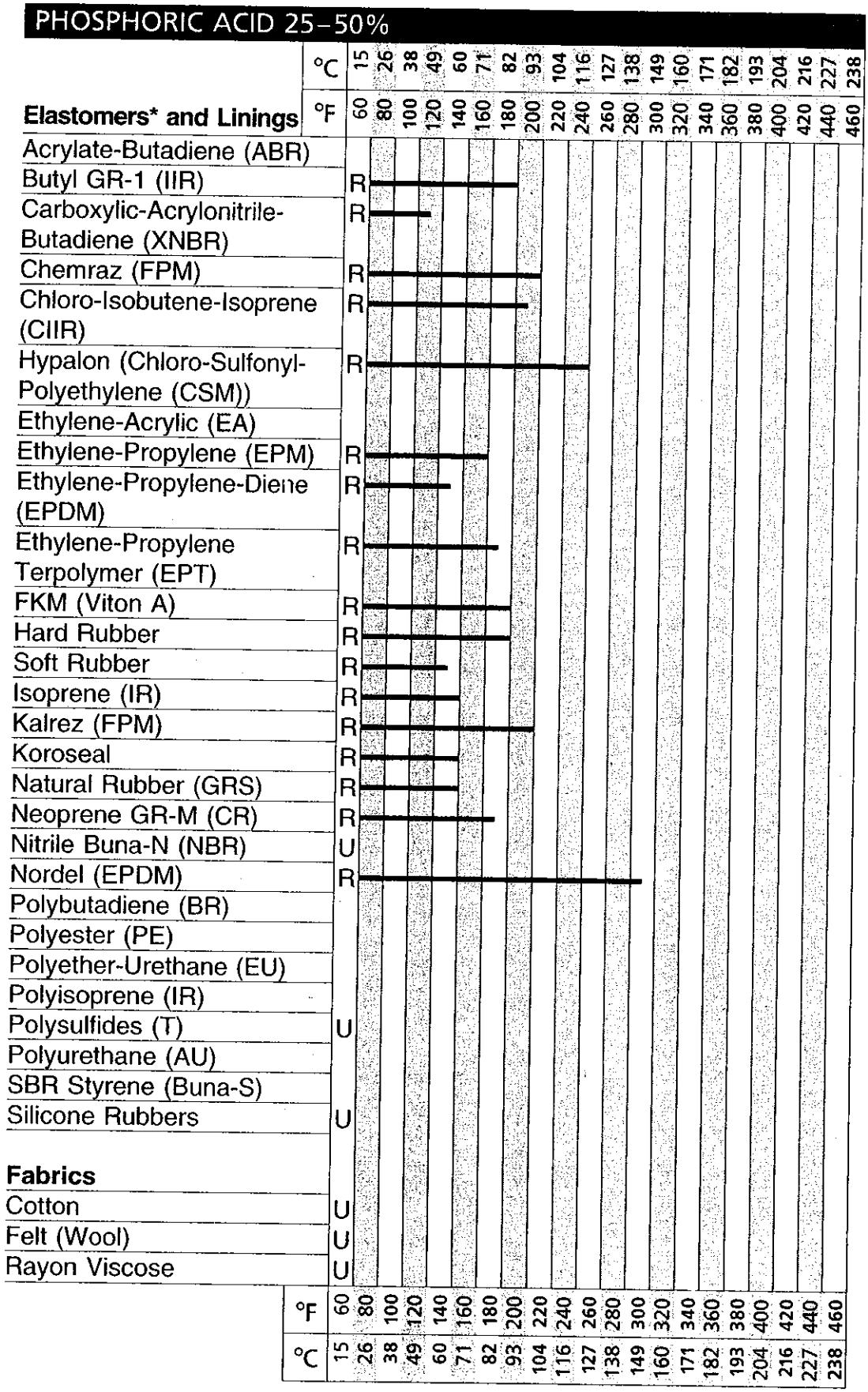


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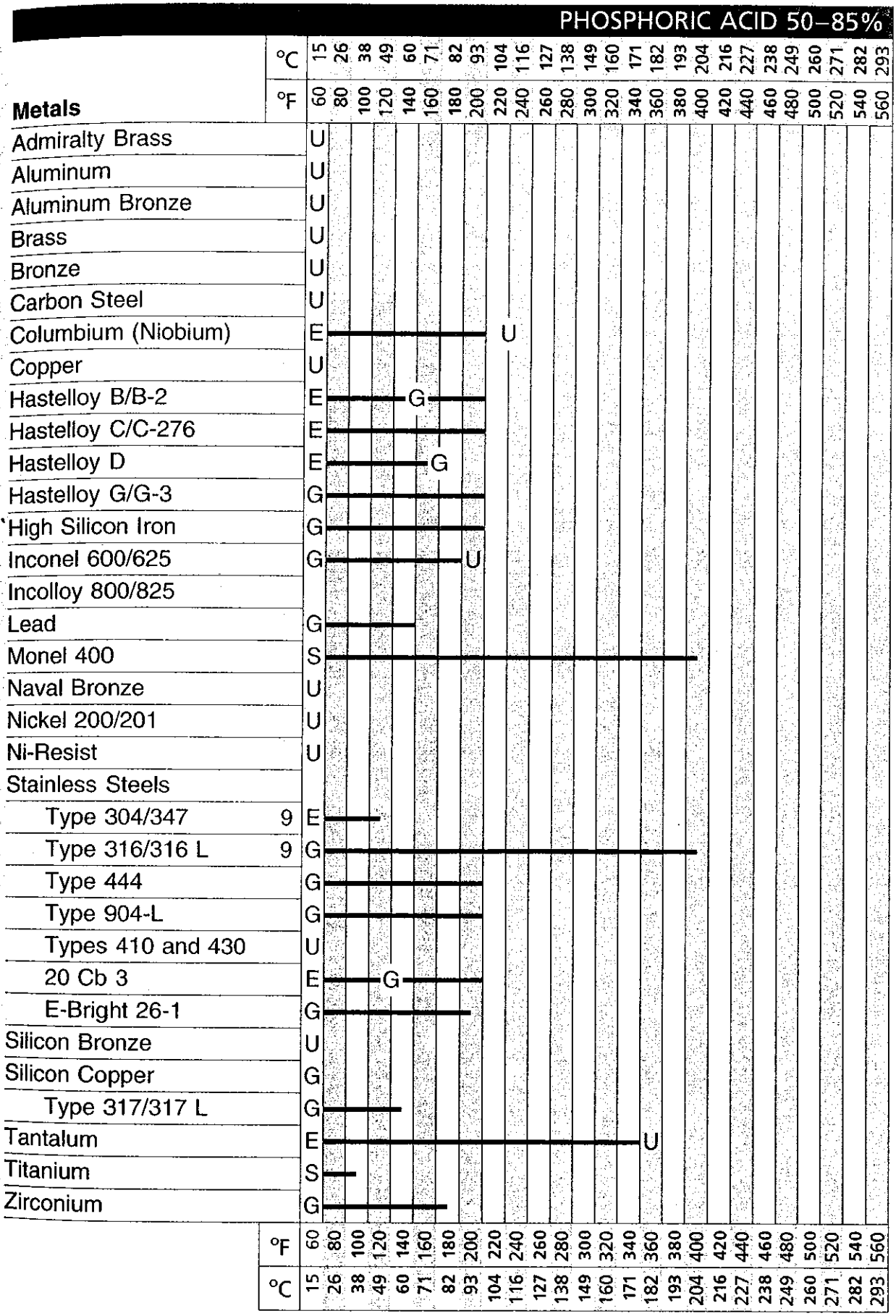
# PHOSPHORIC ACID 50–85%




FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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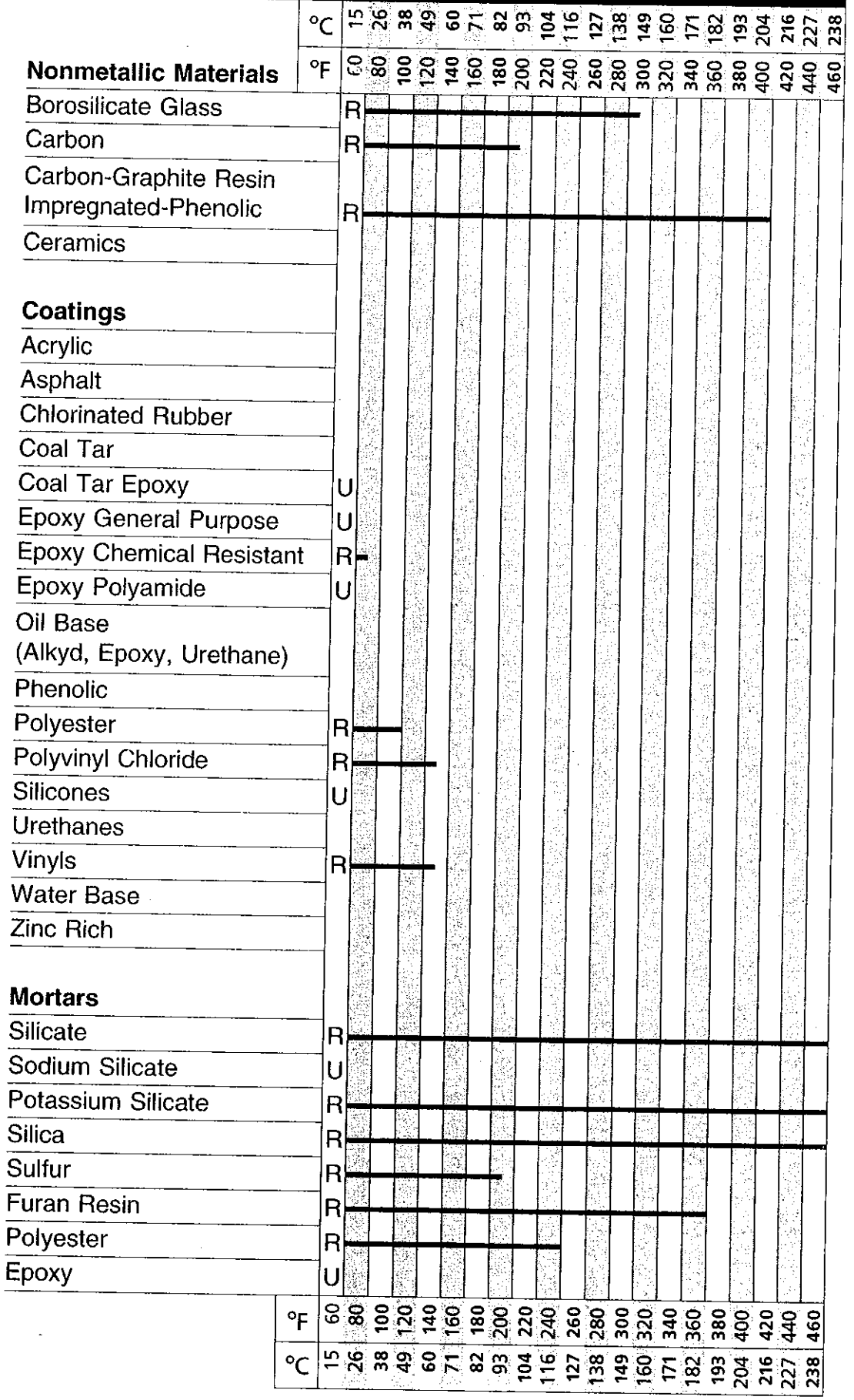




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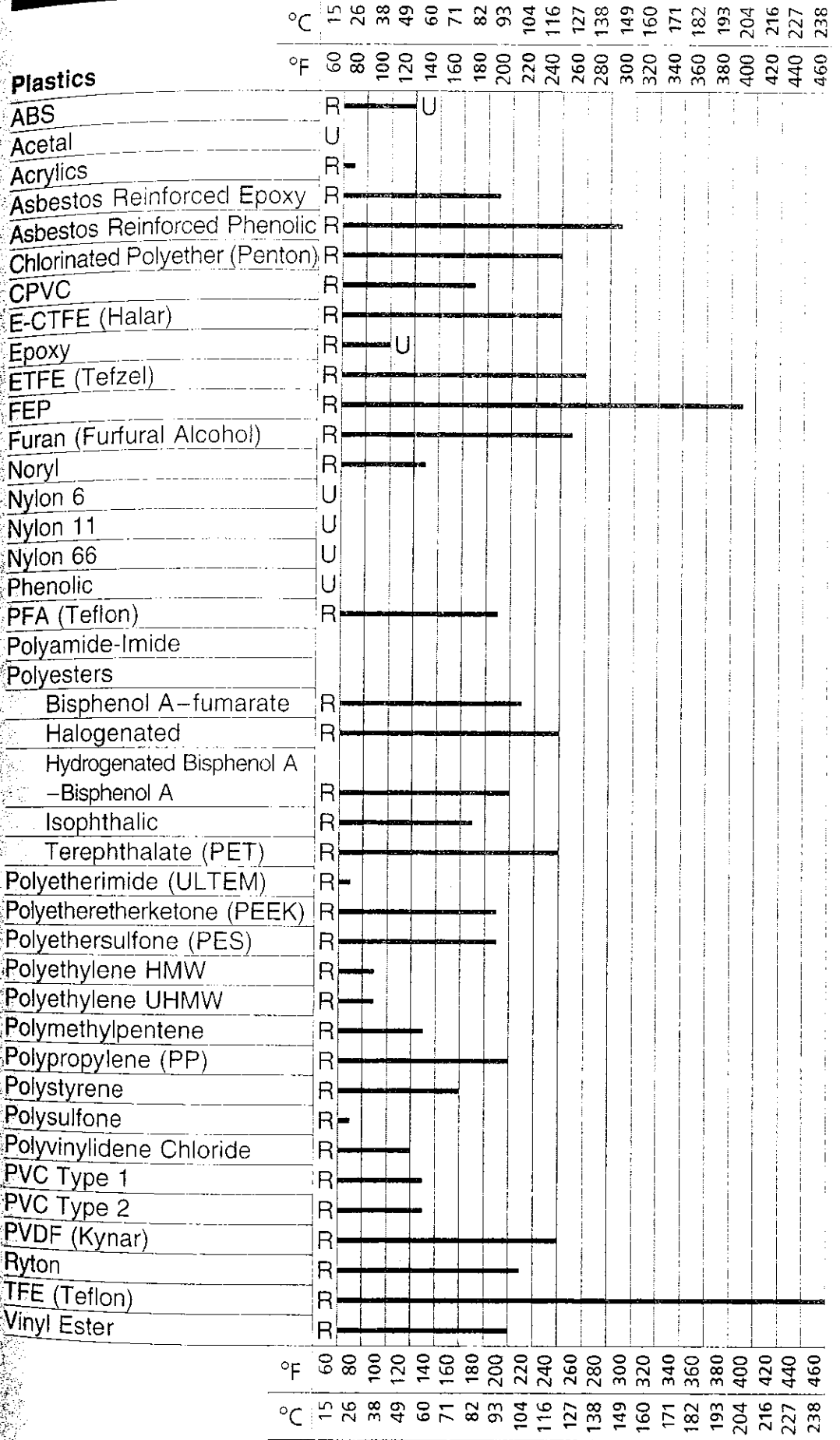


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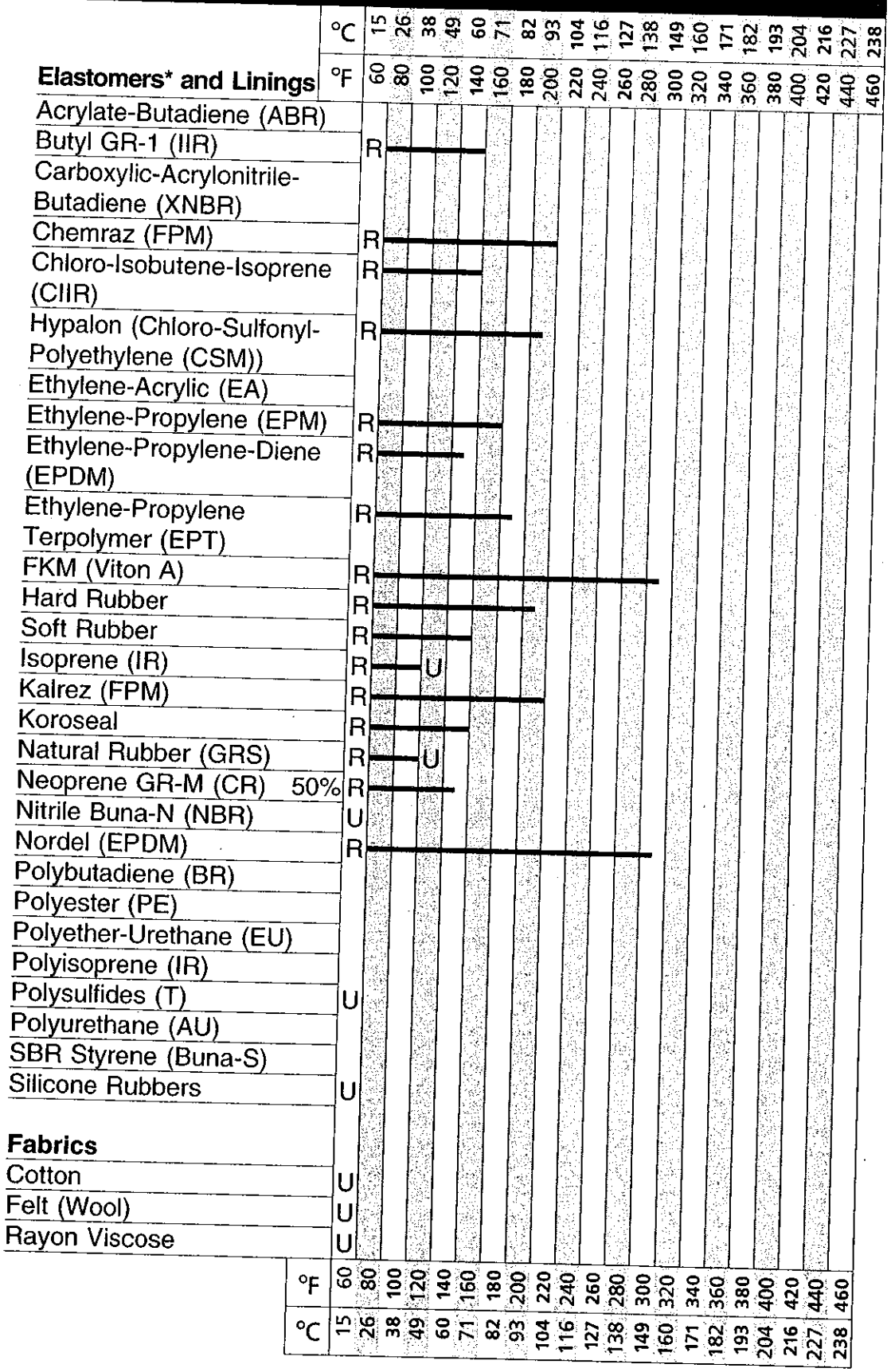


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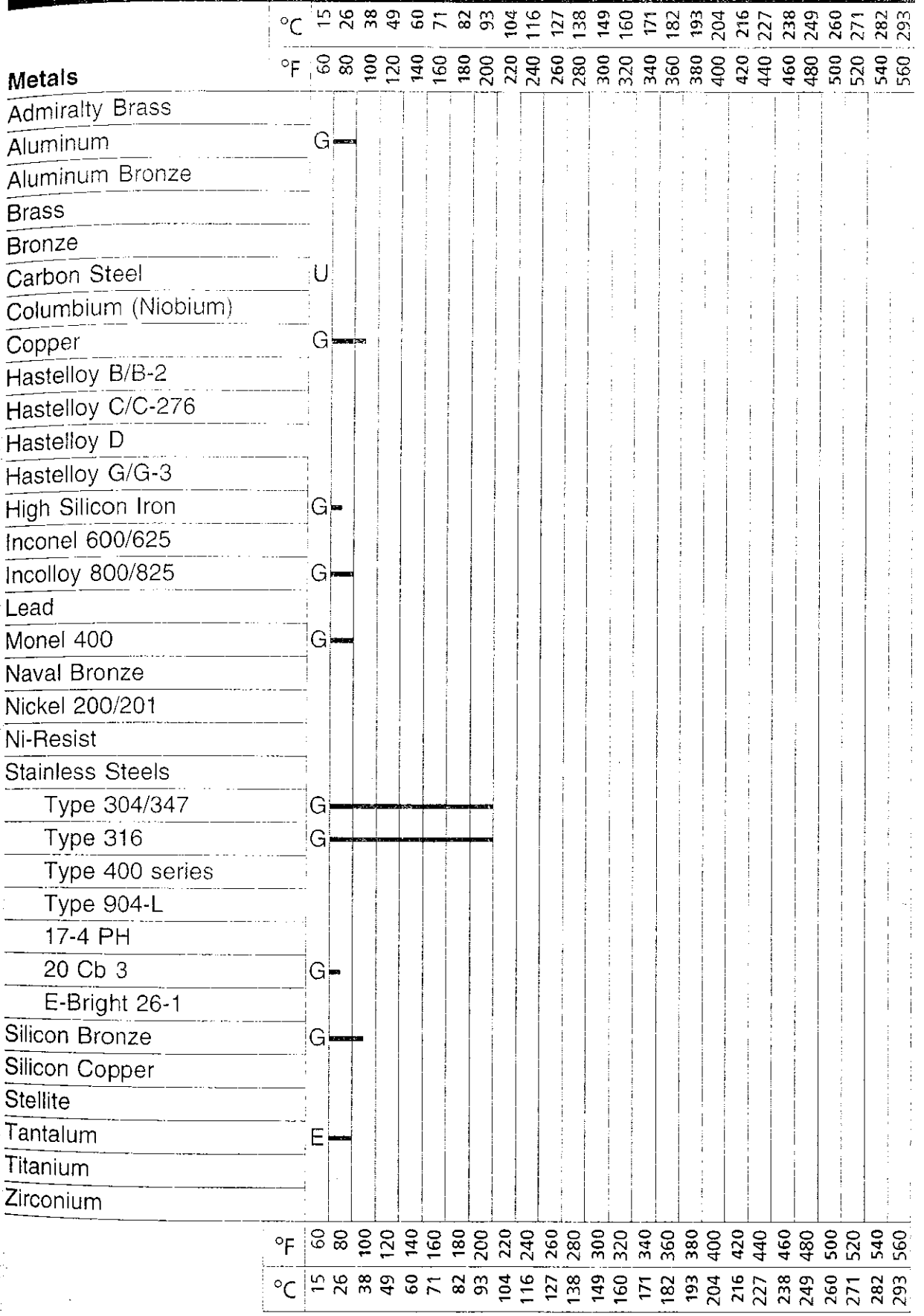
# PHOSPHORIC ANHYDRIDE (DRY OR MOIST)




FOR METALS

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## PHOSPHORIC ANHYDRIDE (DRY OR MOIST)

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | U | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | U | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | U | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# PHOSPHORIC ANHYDRIDE (DRY OR MOIST)

| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | U | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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## PHOSPHORIC ANHYDRIDE (DRY OR MOIST)

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | U | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | R | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | U | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | U | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | U | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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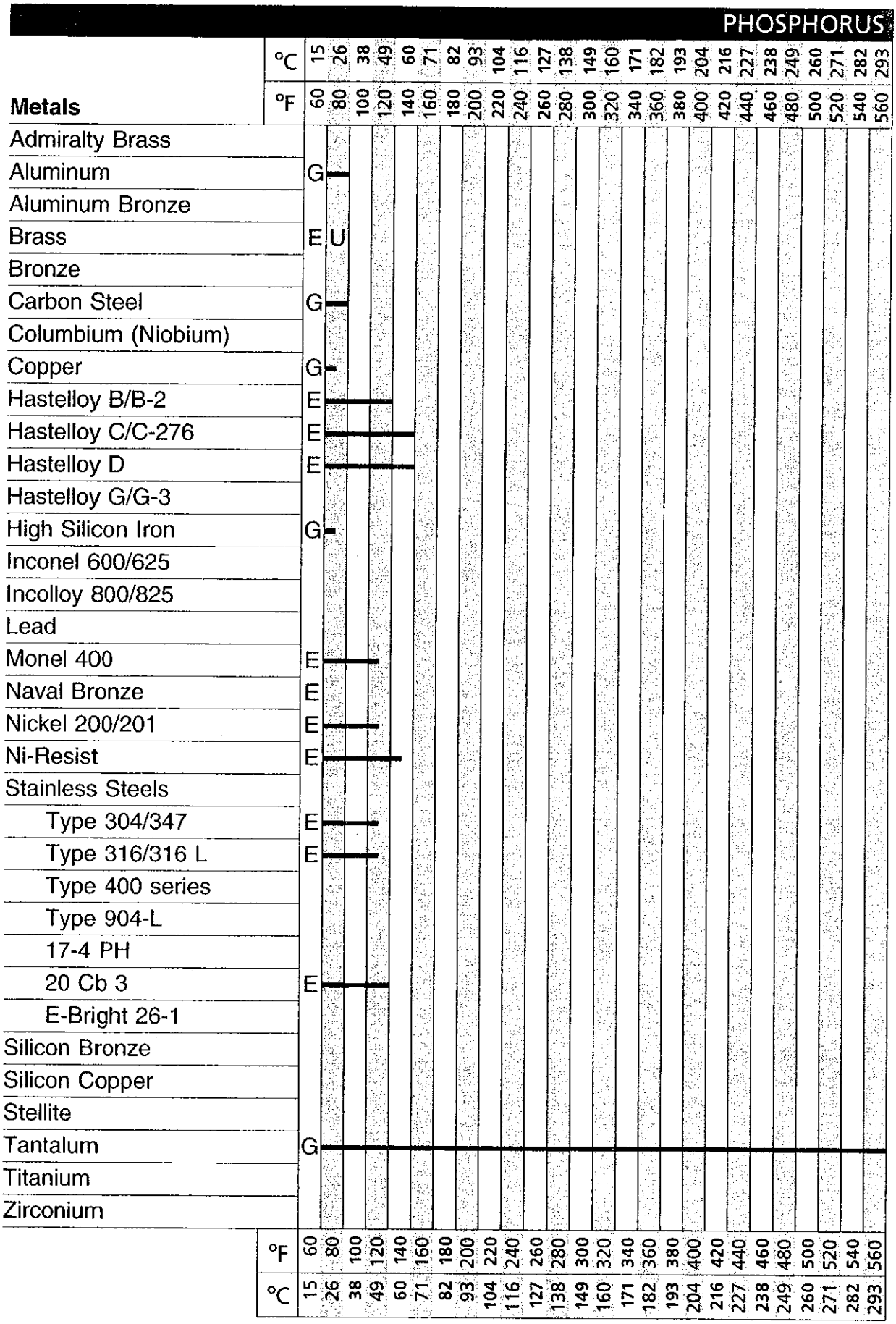


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# PHOSPHORUS

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | U | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | R | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | U | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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| Plastics | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | R | | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | |
| FEP | R | | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | R | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | R | | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | R | | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | R | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | R | | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | R | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester 70% | R | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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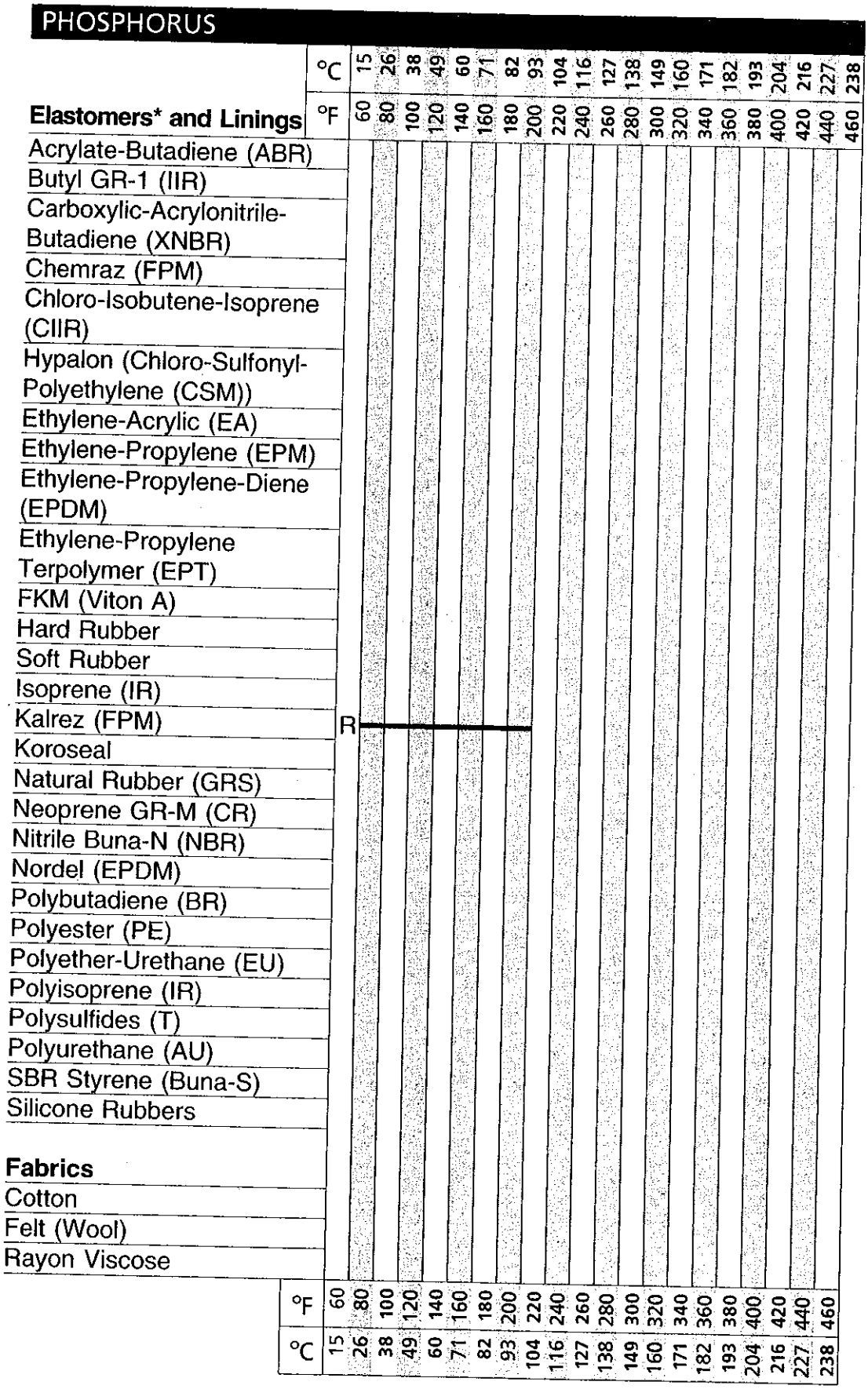


*See also Nylon 11 under PLASTICS



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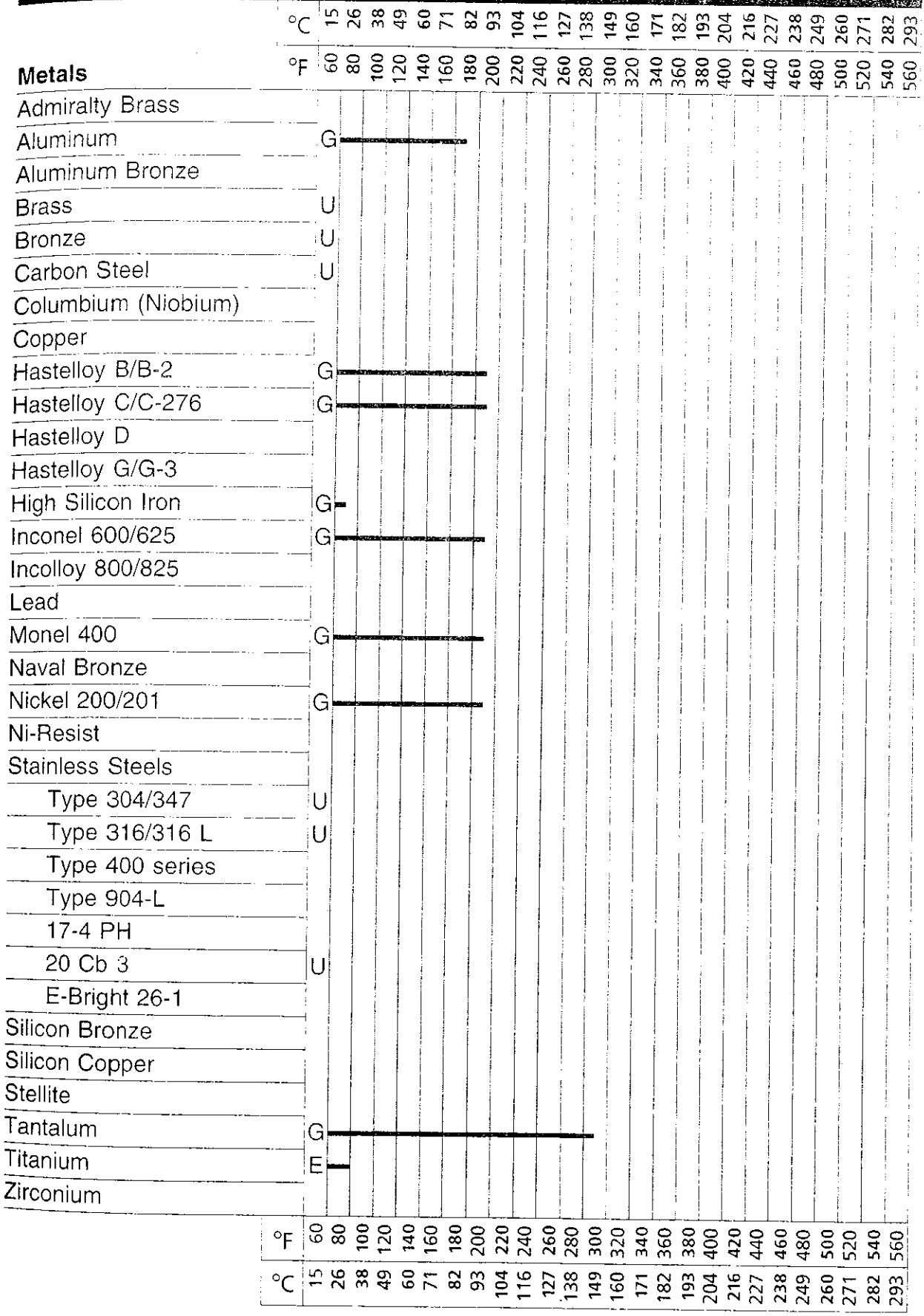


FOR METALS

E = < 2 Mils Penetration/Year: G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year: U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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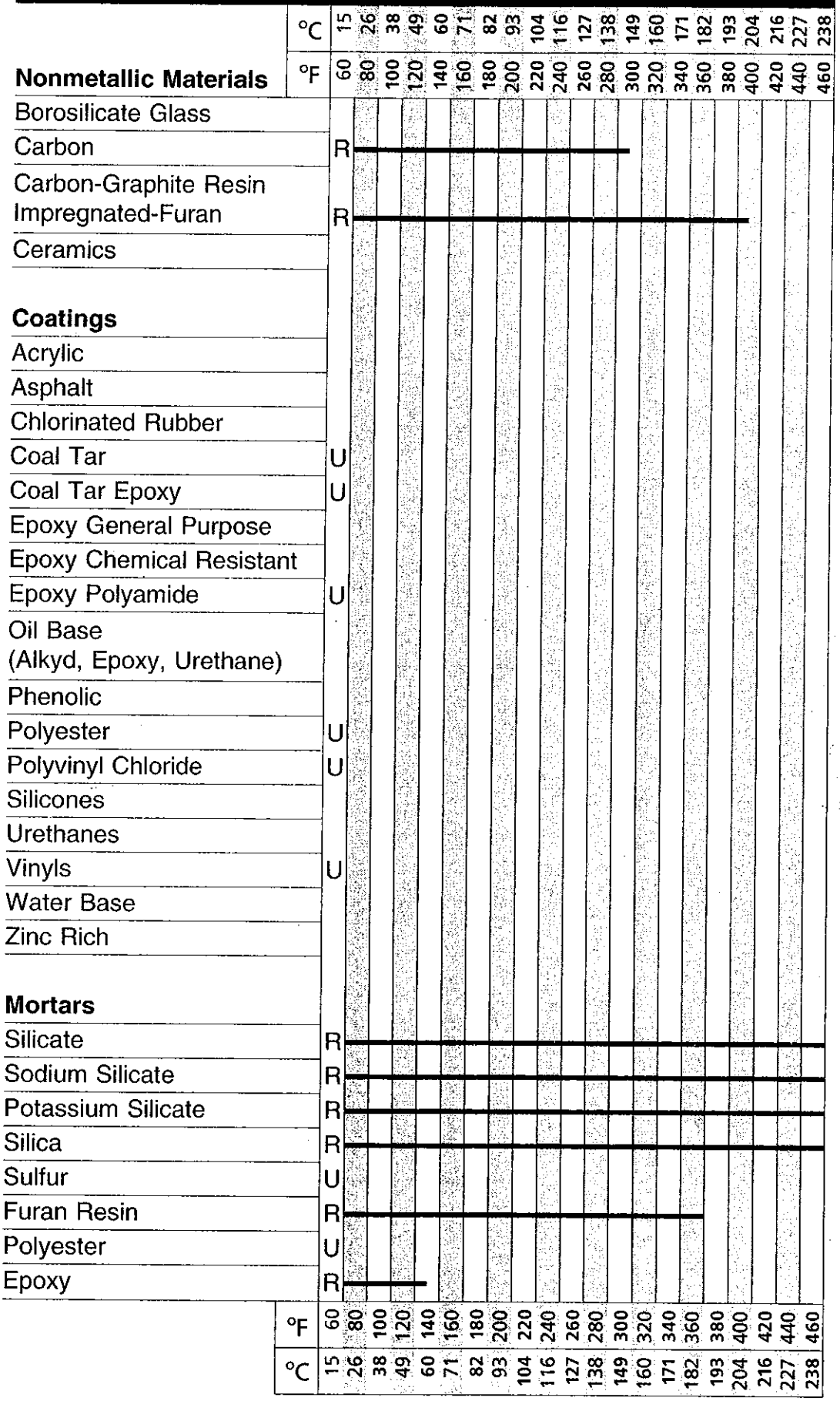
# PHOSPHORUS OXYCHLORIDE



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# PHOSPHORUS OXYCHLORIDE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | U | |
| CPVC | R | |
| E-CTFE (Halar) | | |
| Epoxy | U | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate 75% | U | |
| Halogenated 75% | U | |
| Hydrogenated Bisphenol A –Bisphenol A | U | |
| Isophthalic | U | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | U | |
| PVC Type 1 | R | |
| PVC Type 2 | | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | U | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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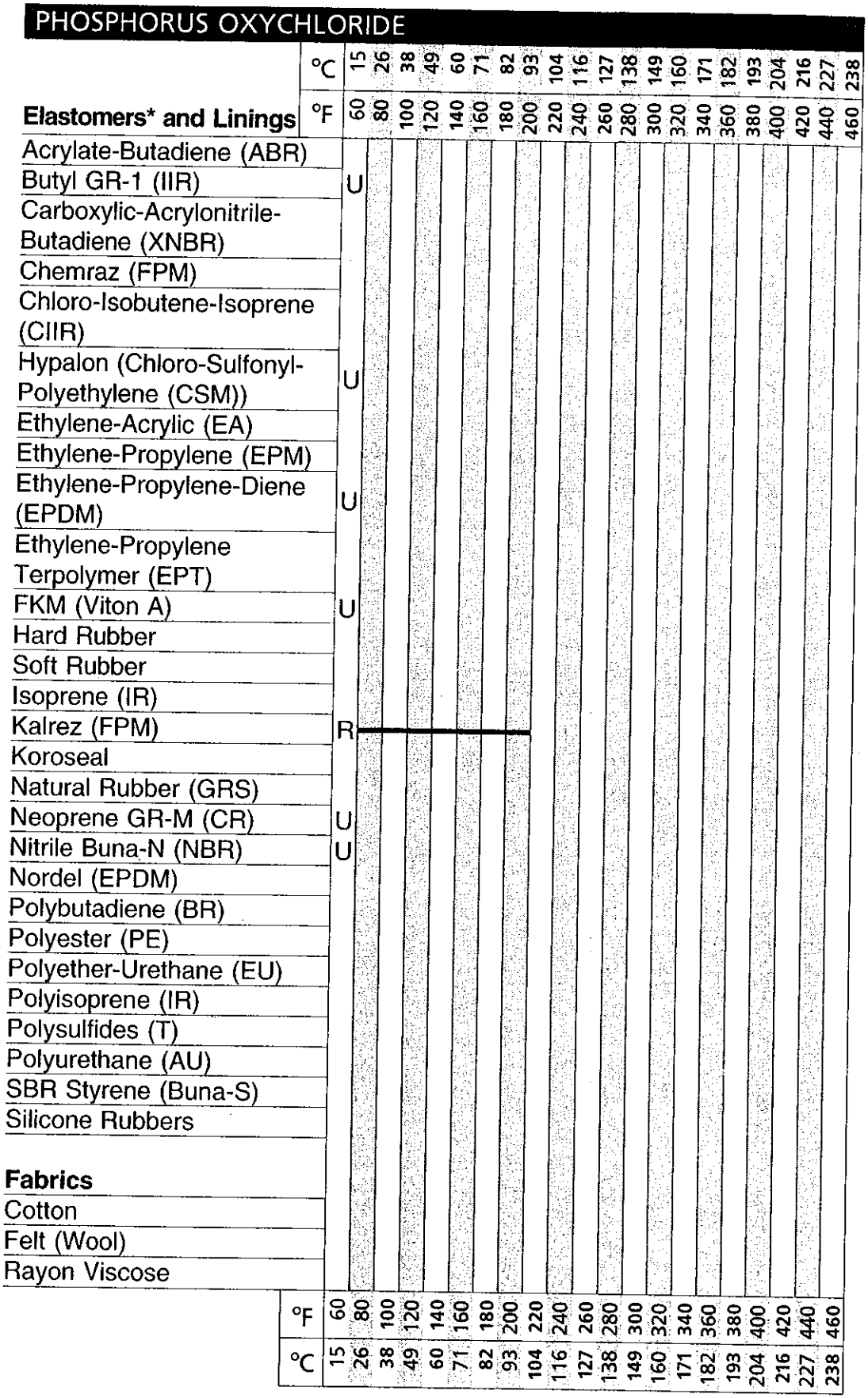


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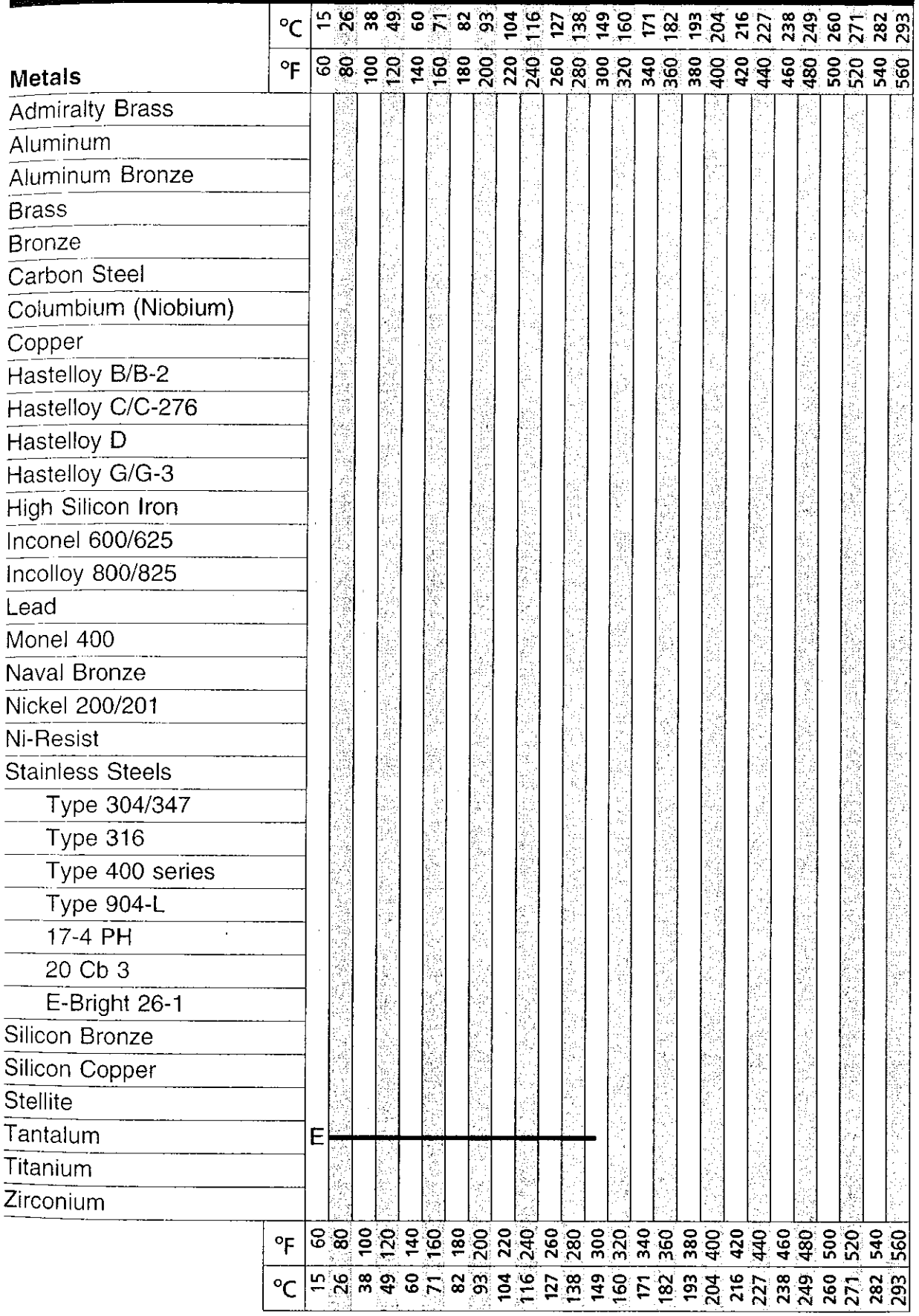


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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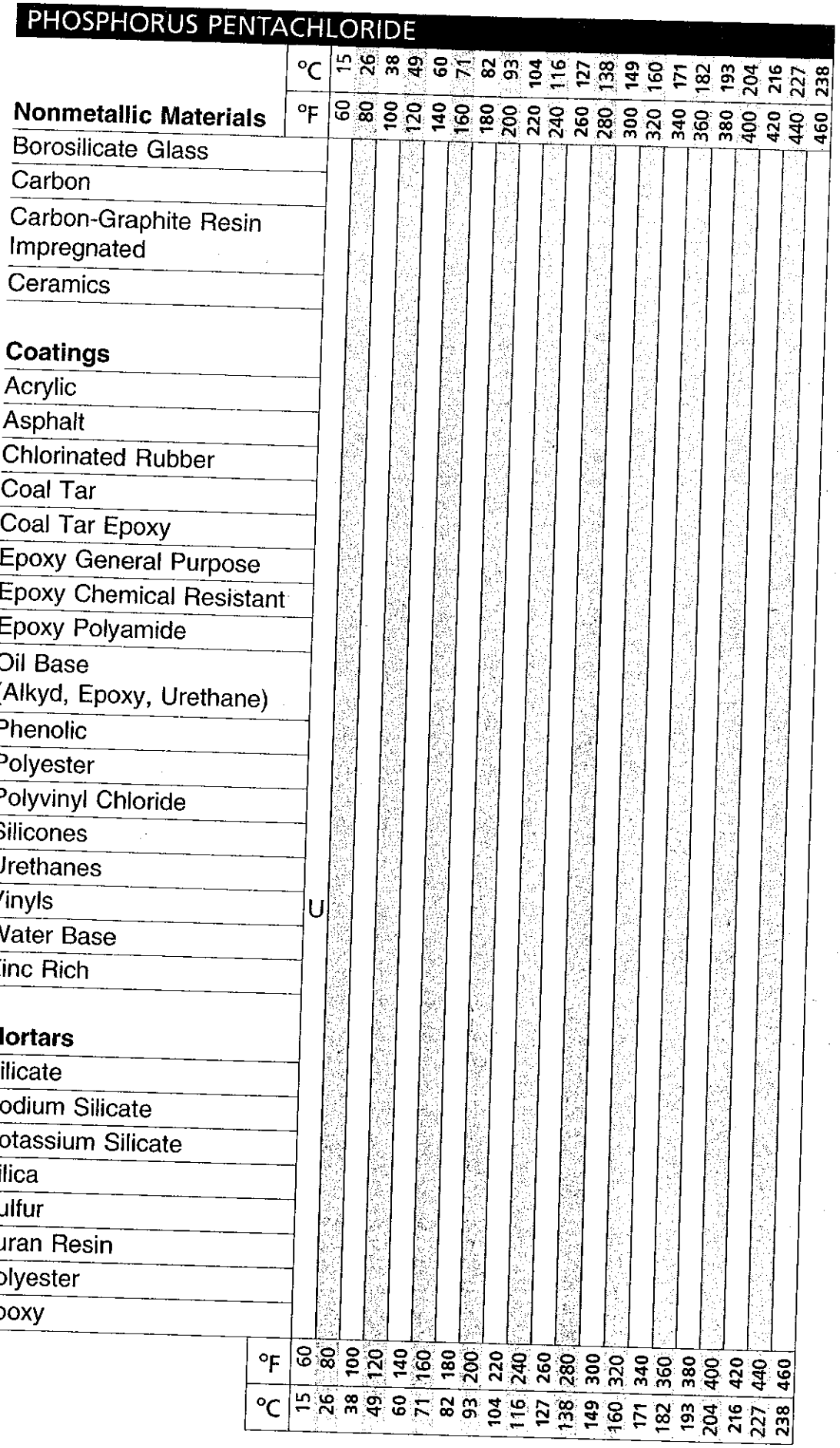




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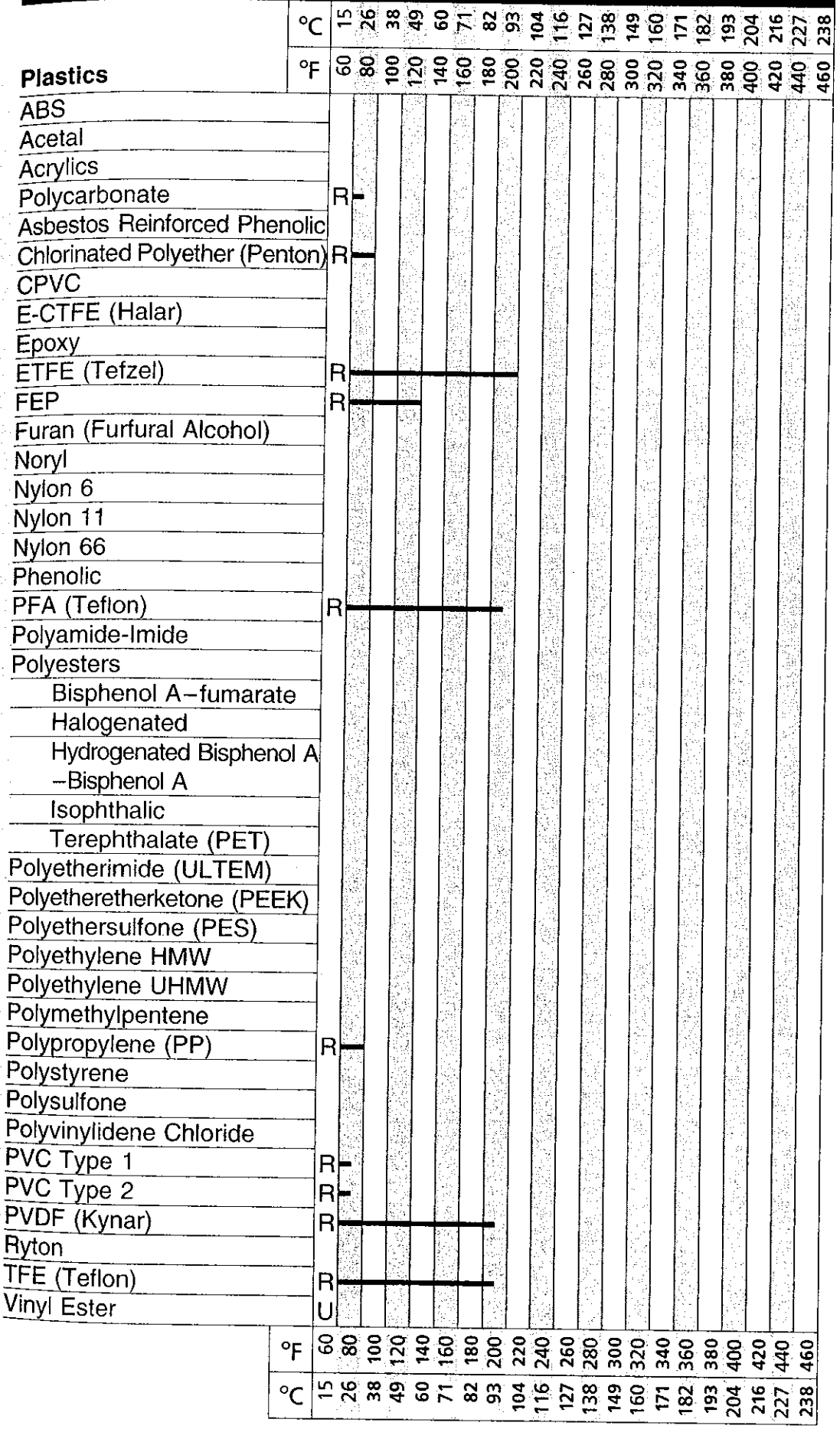


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## PHOSPHORUS PENTACHLORIDE

| Elastomers* and Linings | °C | °F |
|---|---|---|
| Acrylate-Butadiene (ABR) | 15–238 | 60–460 |
| Butyl GR-1 (IIR) | 15–238 | 60–460 |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | 15–238 | 60–460 |
| Chemraz (FPM) | 15–238 | 60–460 |
| Chloro-Isobutene-Isoprene (CIIR) | 15–238 | 60–460 |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | 15–238 | 60–460 |
| Ethylene-Acrylic (EA) | 15–238 | 60–460 |
| Ethylene-Propylene (EPM) | 15–238 | 60–460 |
| Ethylene-Propylene-Diene (EPDM) | 15–238 | 60–460 |
| Ethylene-Propylene Terpolymer (EPT) | 15–238 | 60–460 |
| FKM (Viton A) | 15–238 | 60–460 |
| Hard Rubber | 15–238 | 60–460 |
| Soft Rubber | 15–238 | 60–460 |
| Isoprene (IR) | 15–238 | 60–460 |
| Kalrez (FPM) | 15–238 | 60–460 |
| Koroseal | 15–238 | 60–460 |
| Natural Rubber (GRS) | 15–238 | 60–460 |
| Neoprene GR-M (CR) | 15–238 | 60–460 |
| Nitrile Buna-N (NBR) | 15–238 | 60–460 |
| Nordel (EPDM) | 15–238 | 60–460 |
| Polybutadiene (BR) | 15–238 | 60–460 |
| Polyester (PE) | 15–238 | 60–460 |
| Polyether-Urethane (EU) | 15–238 | 60–460 |
| Polyisoprene (IR) | 15–238 | 60–460 |
| Polysulfides (T) | 15–238 | 60–460 |
| Polyurethane (AU) | 15–238 | 60–460 |
| SBR Styrene (Buna-S) | 15–238 | 60–460 |
| Silicone Rubbers | 15–238 | 60–460 |
| **Fabrics** | | |
| Cotton | 15–238 | 60–460 |
| Felt (Wool) | 15–238 | 60–460 |
| Rayon Viscose | 15–238 | 60–460 |

*See also Nylon 11 under PLASTICS



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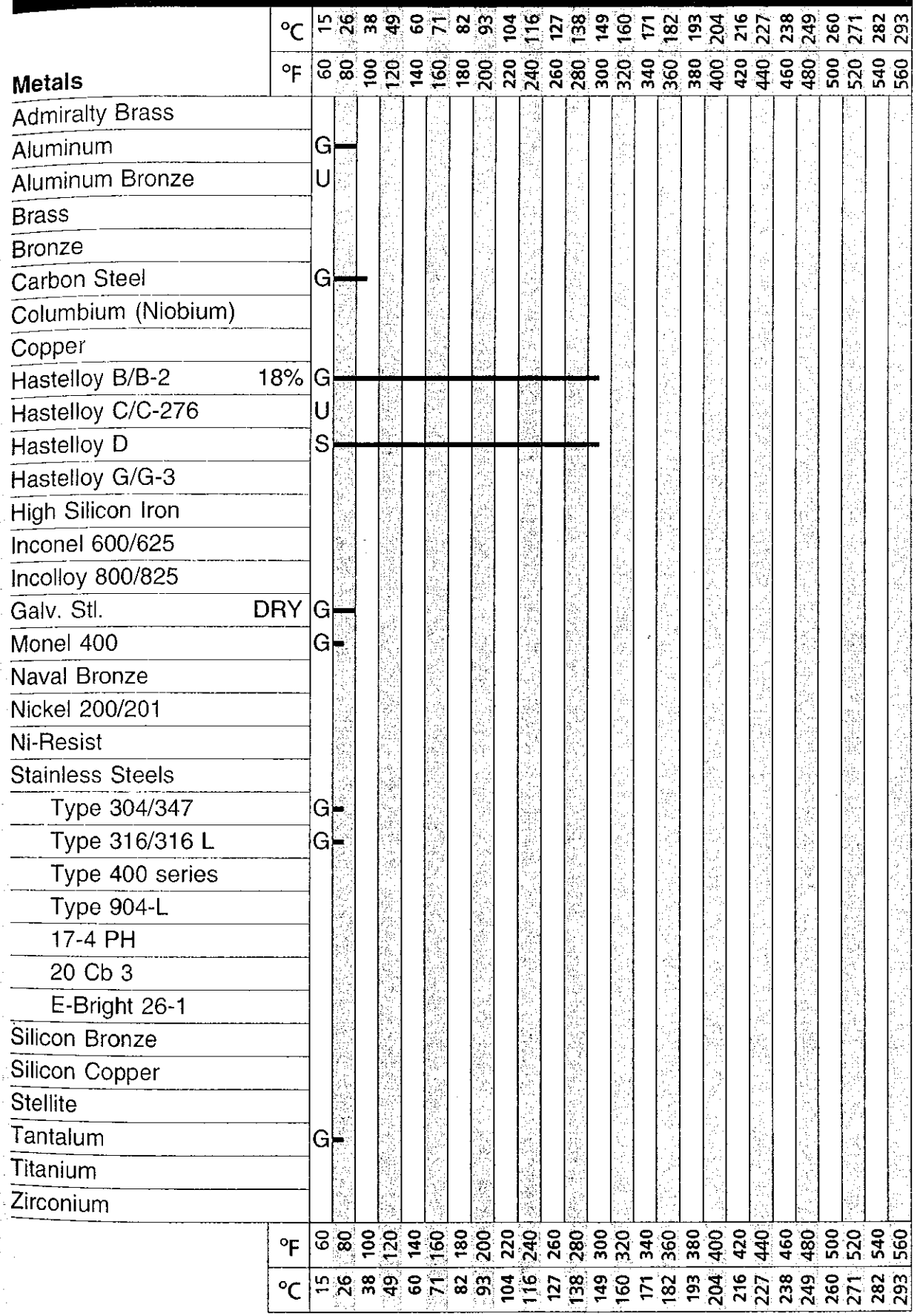


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

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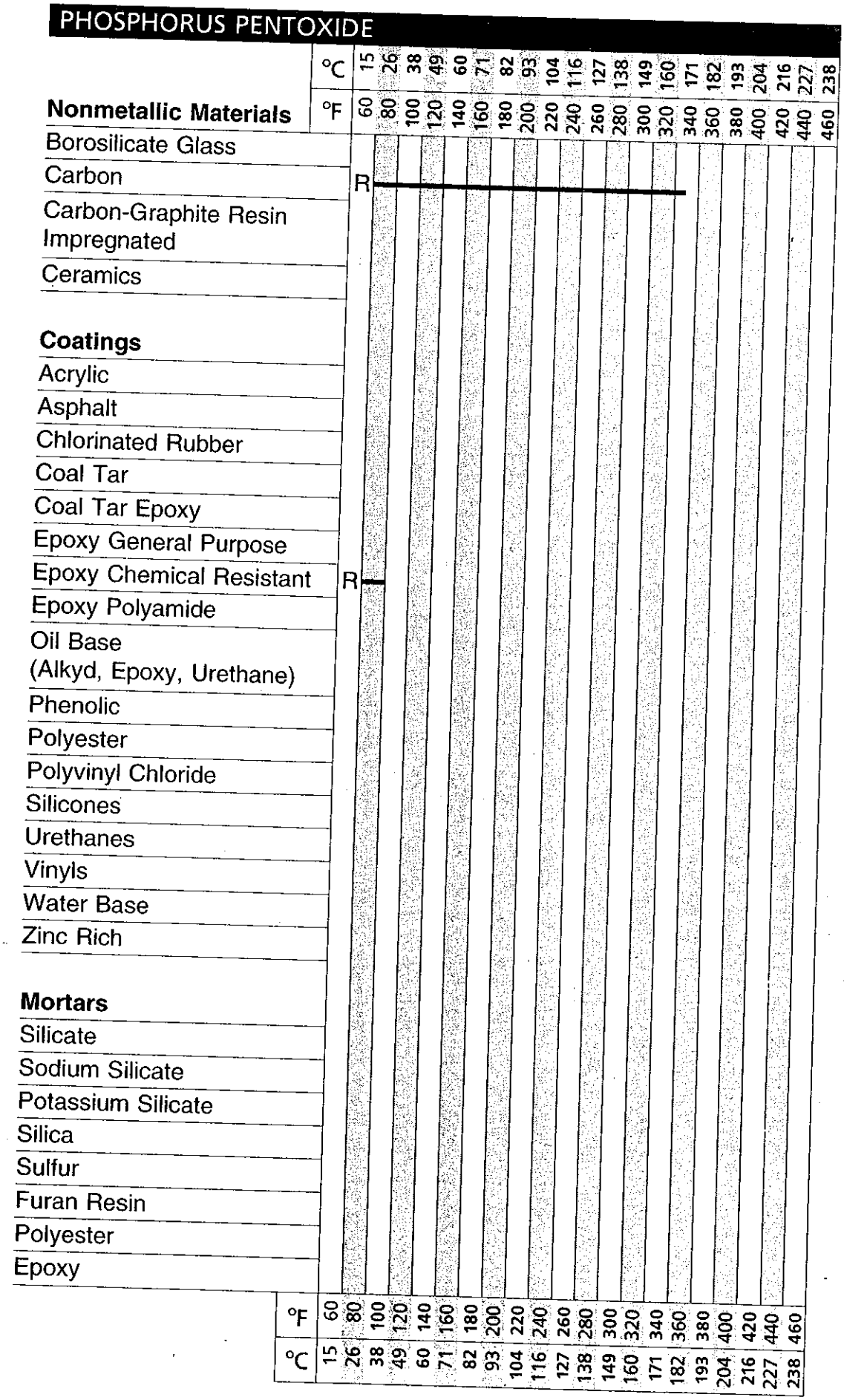
# PHOSPHORUS PENTOXIDE



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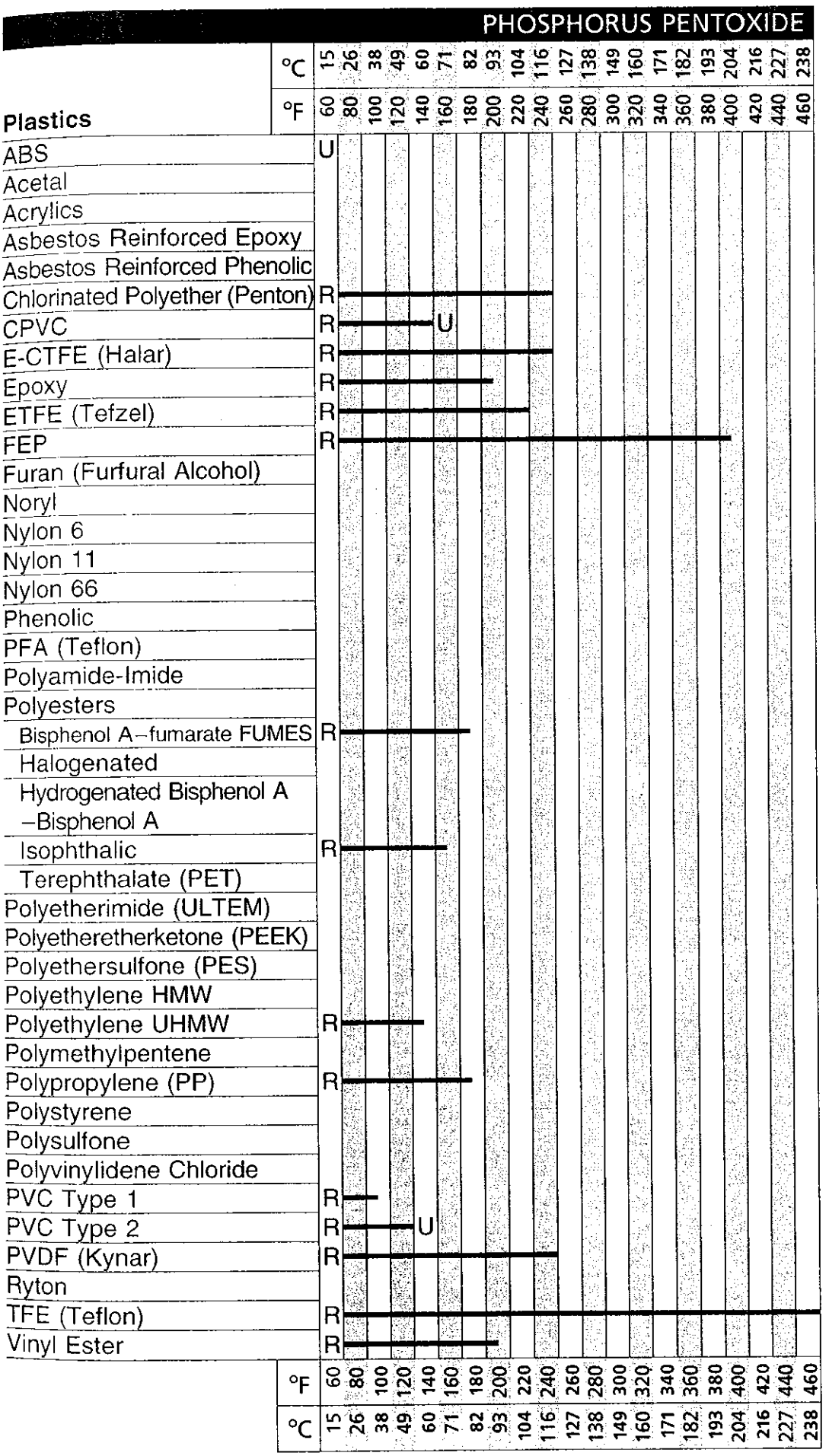



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## PHOSPHORUS PENTOXIDE

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | R | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | |
| °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | |

*See also Nylon 11 under PLASTICS




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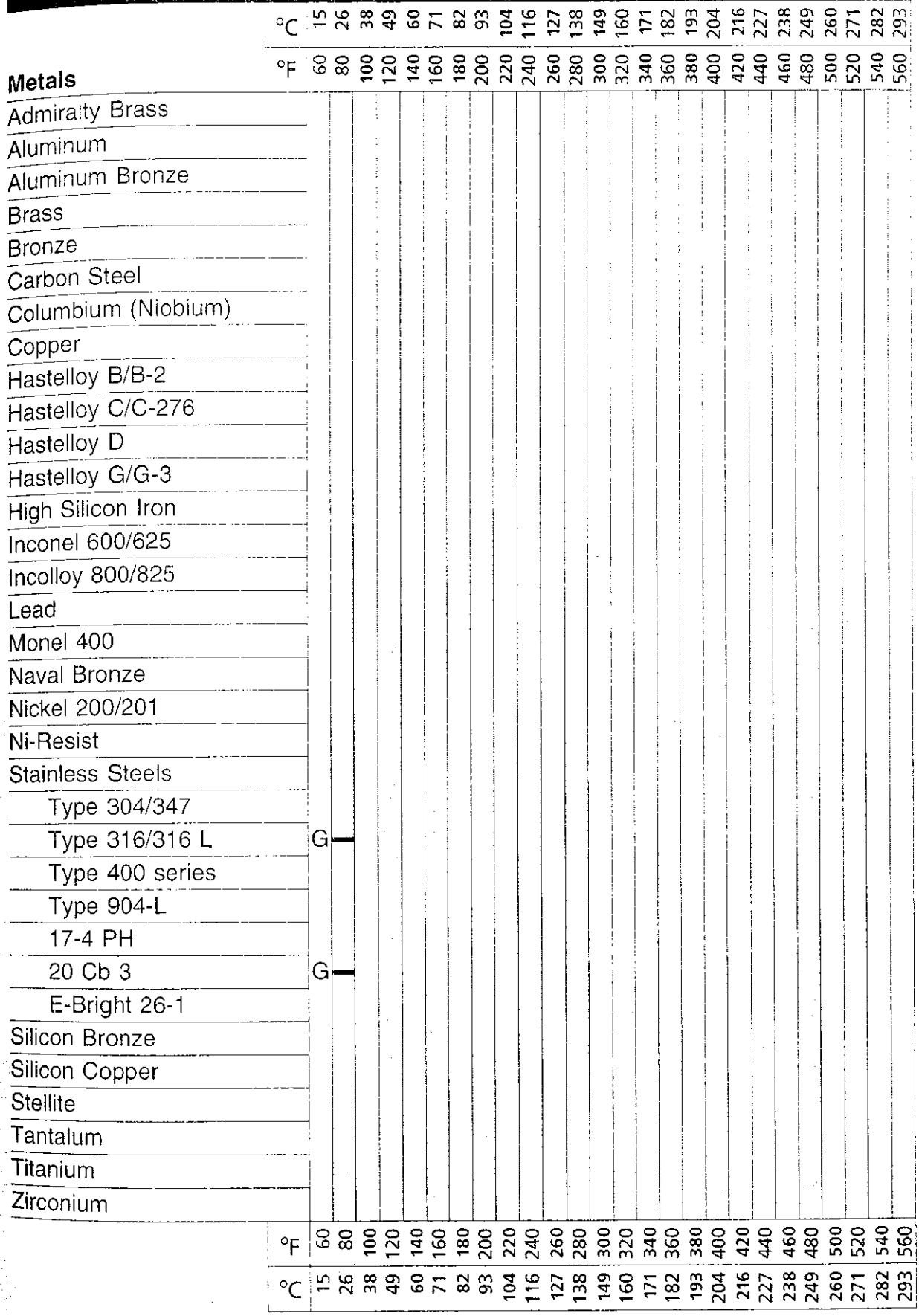


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## PHOSPHORUS RED

| Nonmetallic Materials | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |
|---|---|
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| Borosilicate Glass | |
| Carbon | R |
| Carbon-Graphite Resin Impregnated | |
| Ceramics | |
| **Coatings** | |
| Acrylic | |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | |
| Coal Tar Epoxy | |
| Epoxy General Purpose | |
| Epoxy Chemical Resistant | |
| Epoxy Polyamide | |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | |
| Polyvinyl Chloride | U |
| Silicones | |
| Urethanes | |
| Vinyls | U |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | |
| Sodium Silicate | |
| Potassium Silicate | |
| Silica | |
| Sulfur | |
| Furan Resin | |
| Polyester | |
| Epoxy | |
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |



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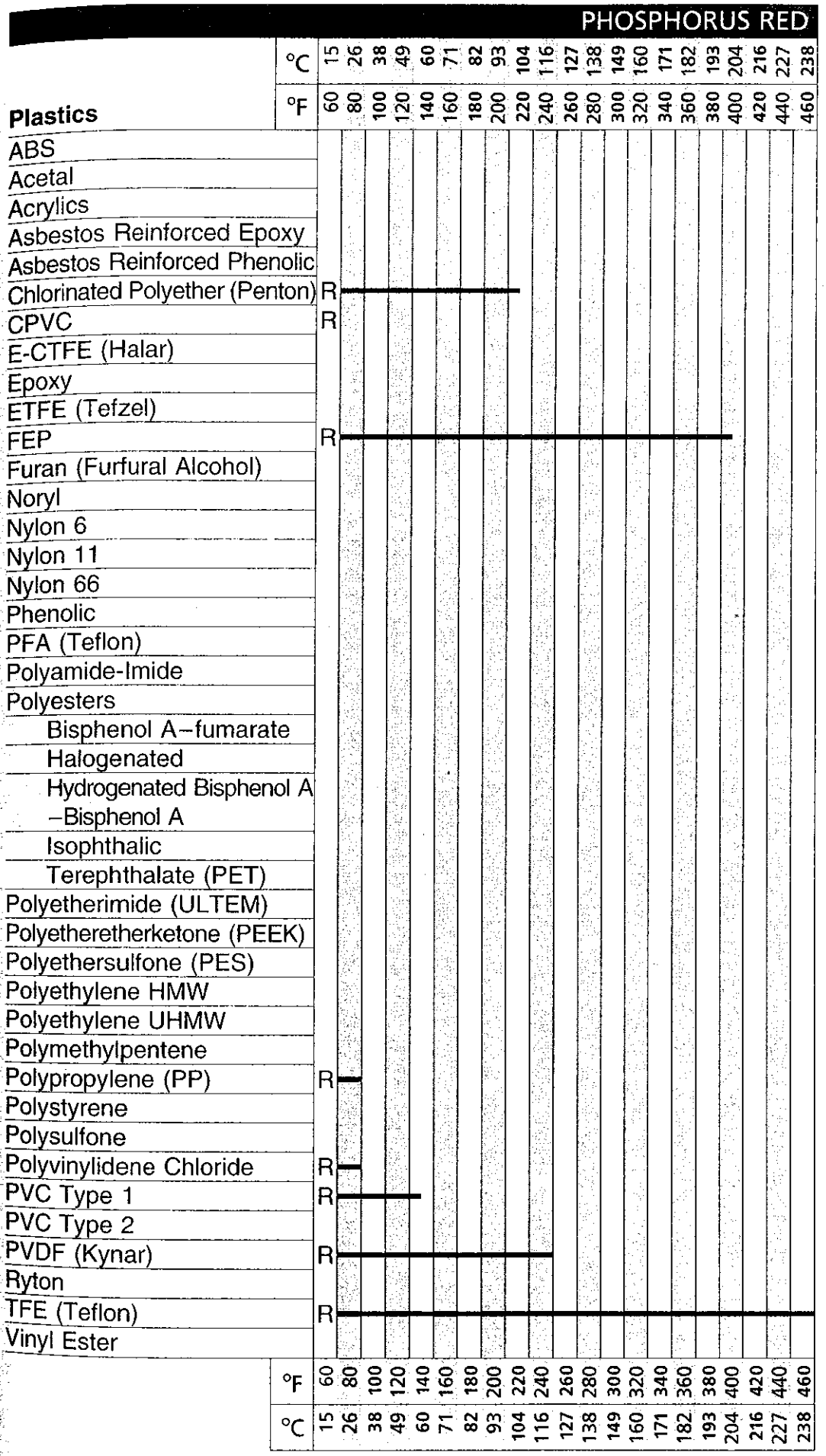


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## PHOSPHORUS RED

| Elastomers* and Linings | °C 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Acrylate-Butadiene (ABR) | | | | | | | | | | | | | | | | | | | | | |
| Butyl GR-1 (IIR) | | | | | | | | | | | | | | | | | | | | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | | | | | | | | | | | | | | | | | | | | |
| Chemraz (FPM) | | | | | | | | | | | | | | | | | | | | | |
| Chloro-Isobutene-Isoprene (CIIR) | | | | | | | | | | | | | | | | | | | | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Acrylic (EA) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene (EPM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene-Diene (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Ethylene-Propylene Terpolymer (EPT) | | | | | | | | | | | | | | | | | | | | | |
| FKM (Viton A) | | | | | | | | | | | | | | | | | | | | | |
| Hard Rubber | | | | | | | | | | | | | | | | | | | | | |
| Soft Rubber | | | | | | | | | | | | | | | | | | | | | |
| Isoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Kalrez (FPM) | R | | | | | | | | | | | | | | | | | | | | |
| Koroseal | | | | | | | | | | | | | | | | | | | | | |
| Natural Rubber (GRS) | | | | | | | | | | | | | | | | | | | | | |
| Neoprene GR-M (CR) | | | | | | | | | | | | | | | | | | | | | |
| Nitrile Buna-N (NBR) | | | | | | | | | | | | | | | | | | | | | |
| Nordel (EPDM) | | | | | | | | | | | | | | | | | | | | | |
| Polybutadiene (BR) | | | | | | | | | | | | | | | | | | | | | |
| Polyester (PE) | | | | | | | | | | | | | | | | | | | | | |
| Polyether-Urethane (EU) | | | | | | | | | | | | | | | | | | | | | |
| Polyisoprene (IR) | | | | | | | | | | | | | | | | | | | | | |
| Polysulfides (T) | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane (AU) | | | | | | | | | | | | | | | | | | | | | |
| SBR Styrene (Buna-S) | | | | | | | | | | | | | | | | | | | | | |
| Silicone Rubbers | | | | | | | | | | | | | | | | | | | | | |
| **Fabrics** | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | |
| Felt (Wool) | | | | | | | | | | | | | | | | | | | | | |
| Rayon Viscose | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

*See also Nylon 11 under PLASTICS



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# PHOSPHORUS TRICHLORIDE

| Metals | DRY |
|---|---|
| Admiralty Brass | |
| Aluminum | U |
| Aluminum Bronze | |
| Brass | |
| Bronze | |
| Carbon Steel | E |
| Columbium (Niobium) | |
| Copper | G U |
| Hastelloy B/B-2 | U |
| Hastelloy C/C-276 | G |
| Hastelloy D | |
| Hastelloy G/G-3 | |
| High Silicon Iron | G |
| Inconel 600/625 | |
| Incolloy 800/825 | G |
| Lead | |
| Monel 400 | |
| Naval Bronze | |
| Nickel 200/201 | G |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 | E |
| Type 316/316 L | E |
| Type 400 series | |
| Type 904-L | |
| 17-4 PH | |
| 20 Cb 3 | E |
| E-Bright 26-1 | |
| Silicon Bronze | G U |
| Silicon Copper | G U |
| Stellite | |
| Tantalum | E |
| Titanium | E |
| Zirconium | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

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FOR NONMETALLICS

R = Resistant

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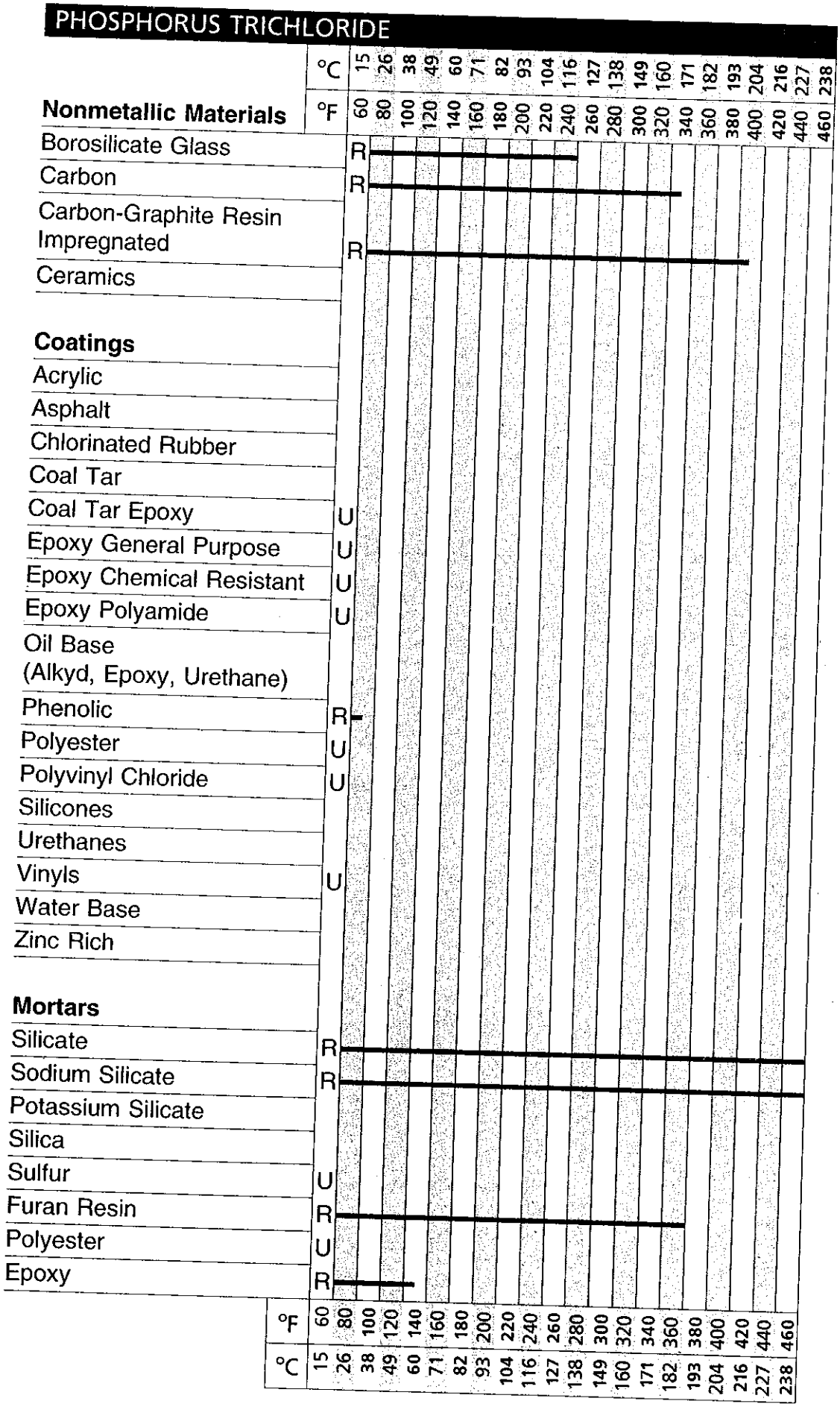




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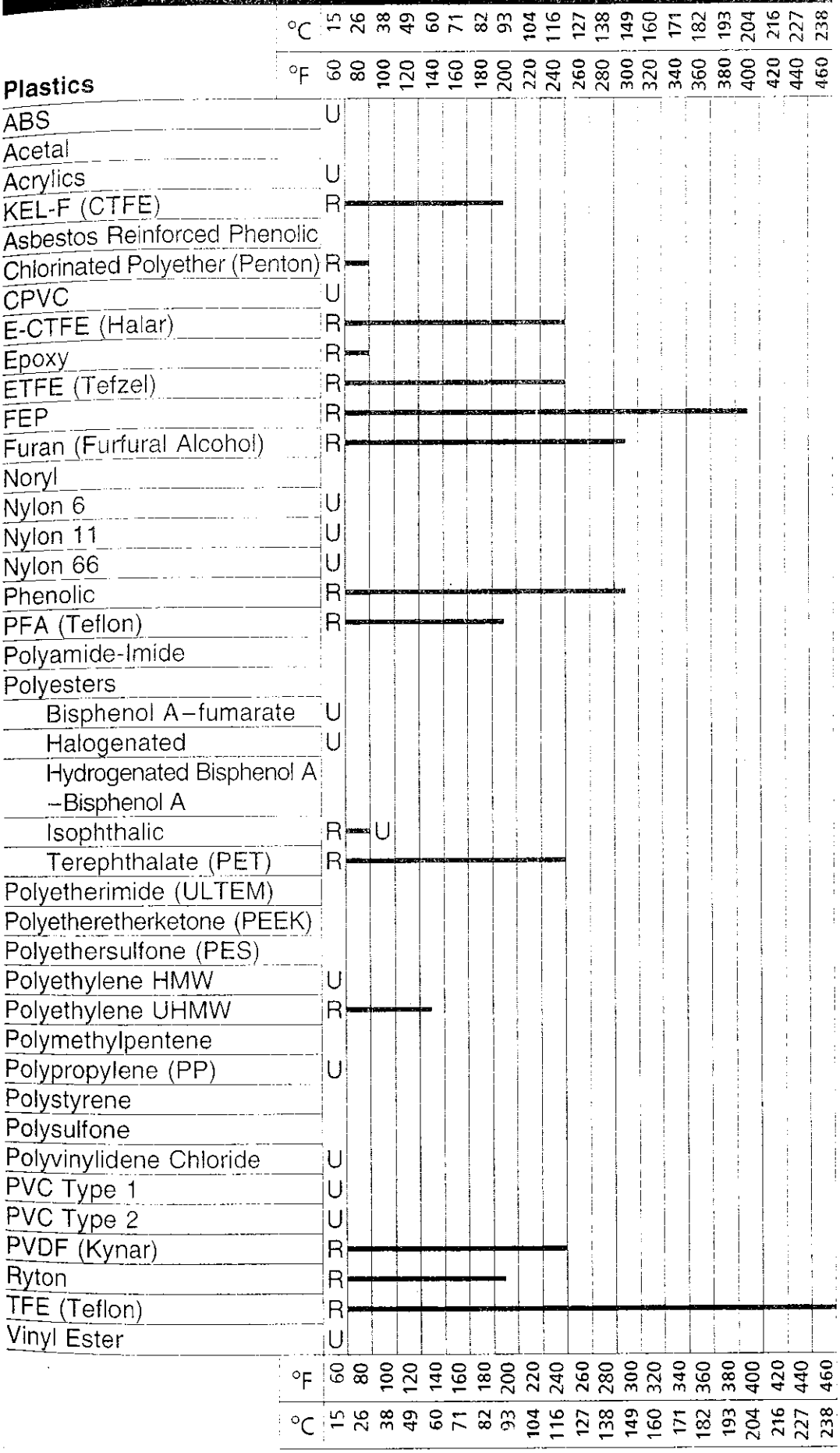



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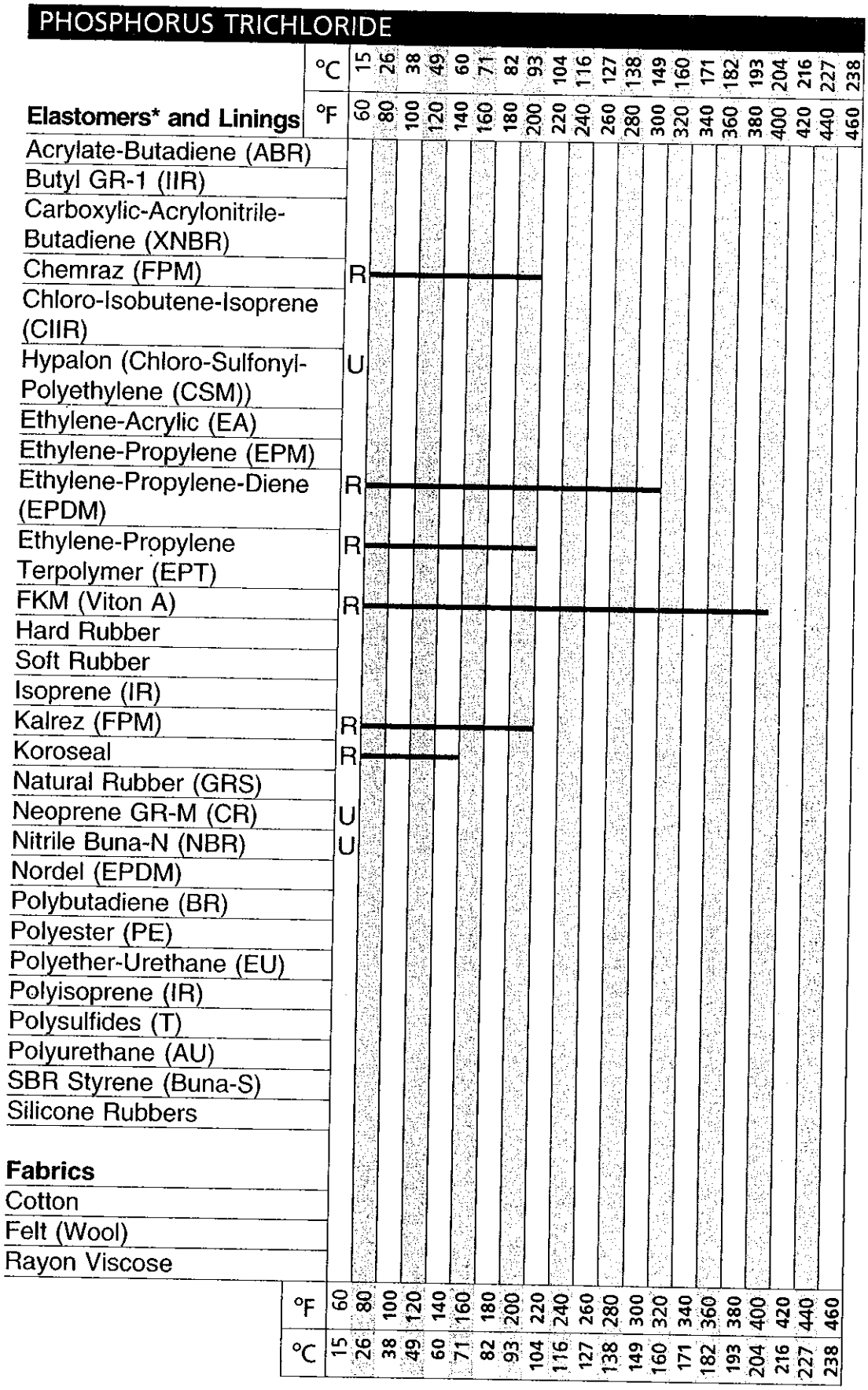
## PHOSPHORUS TRICHLORIDE

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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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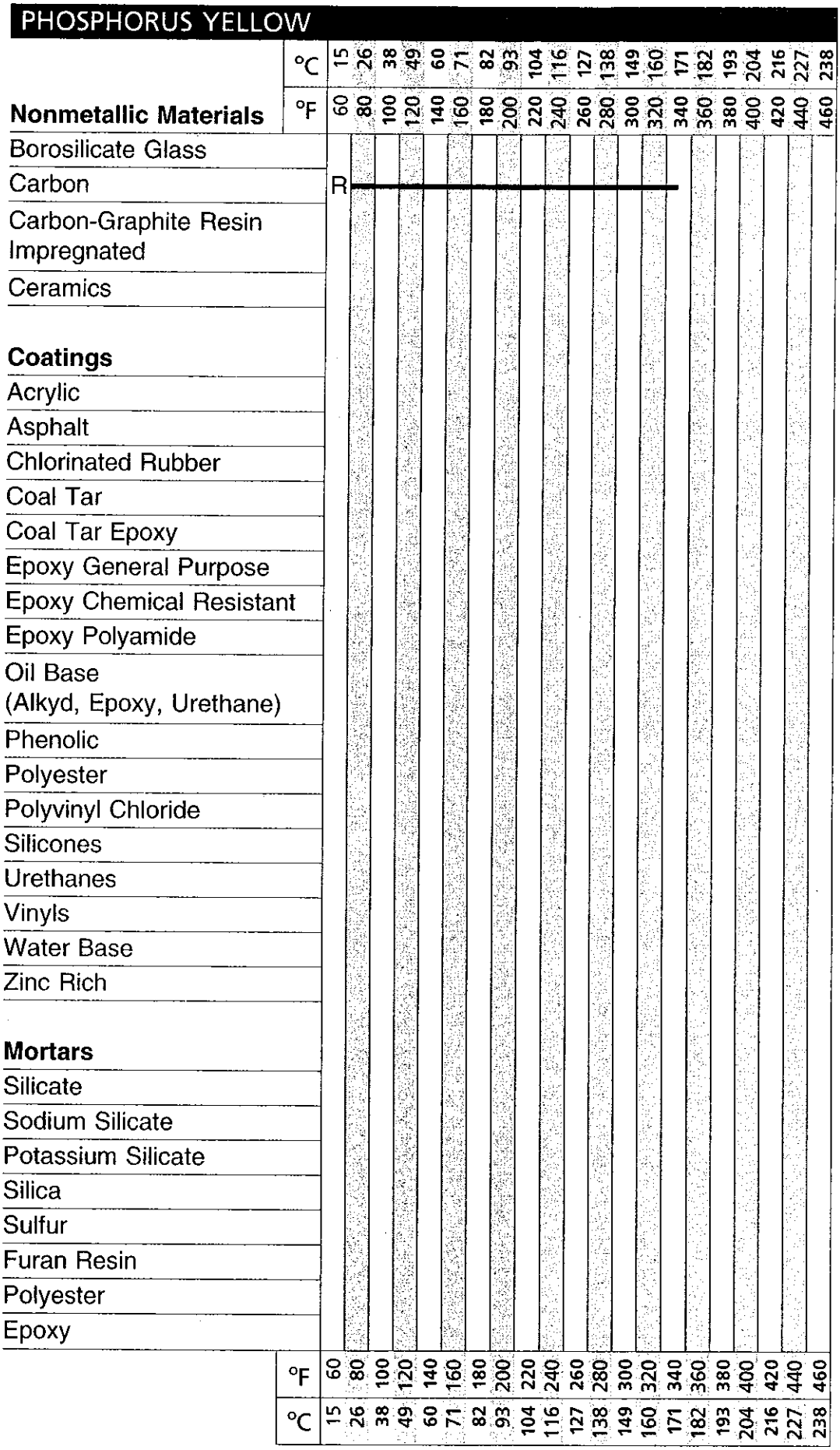
## PHOSPHORUS YELLOW



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## PHOSPHORUS YELLOW

| Plastics | °C | °F |
|---|---|---|
| ABS | U | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | U |
| E-CTFE (Halar) | R | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | U | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238


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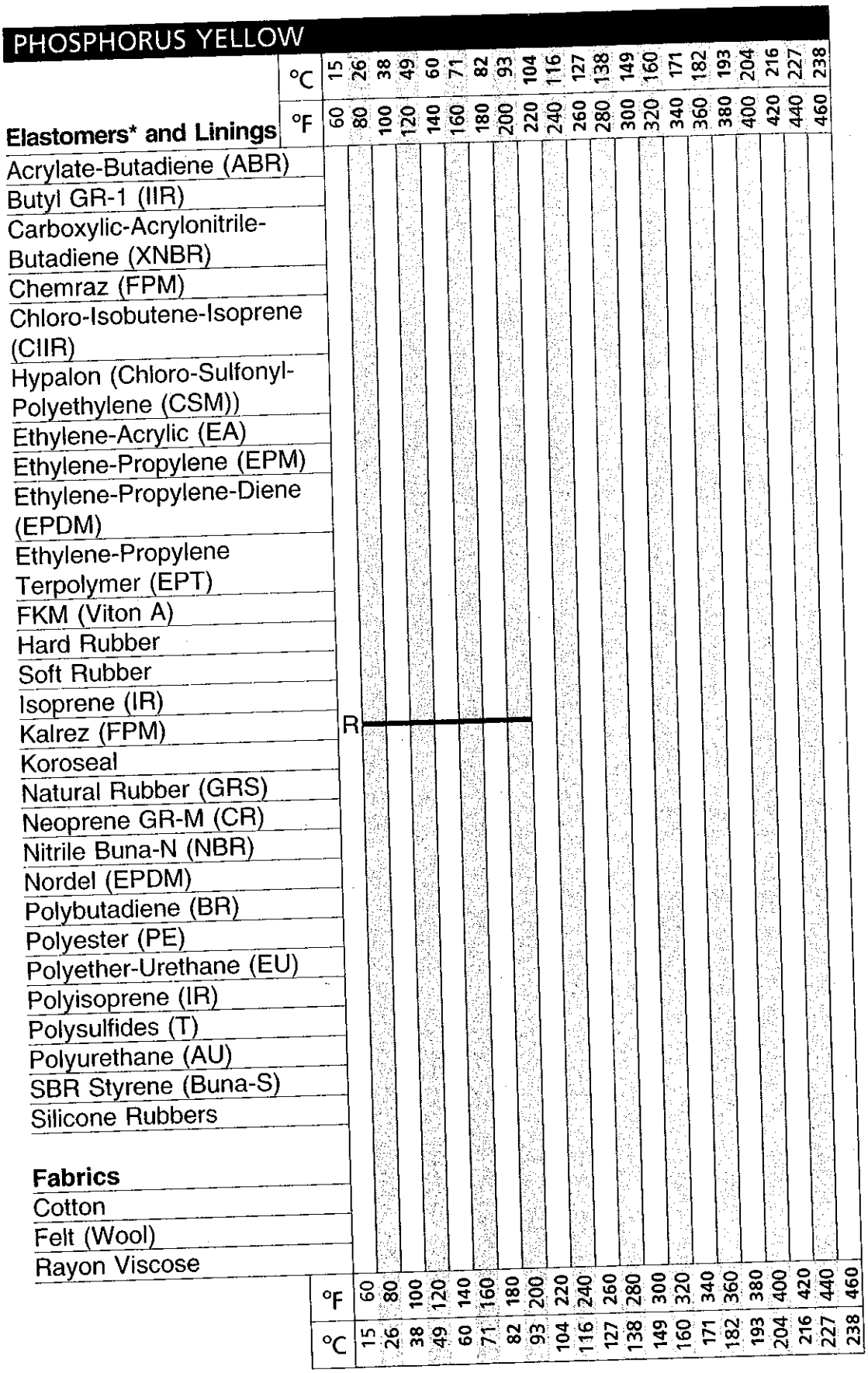


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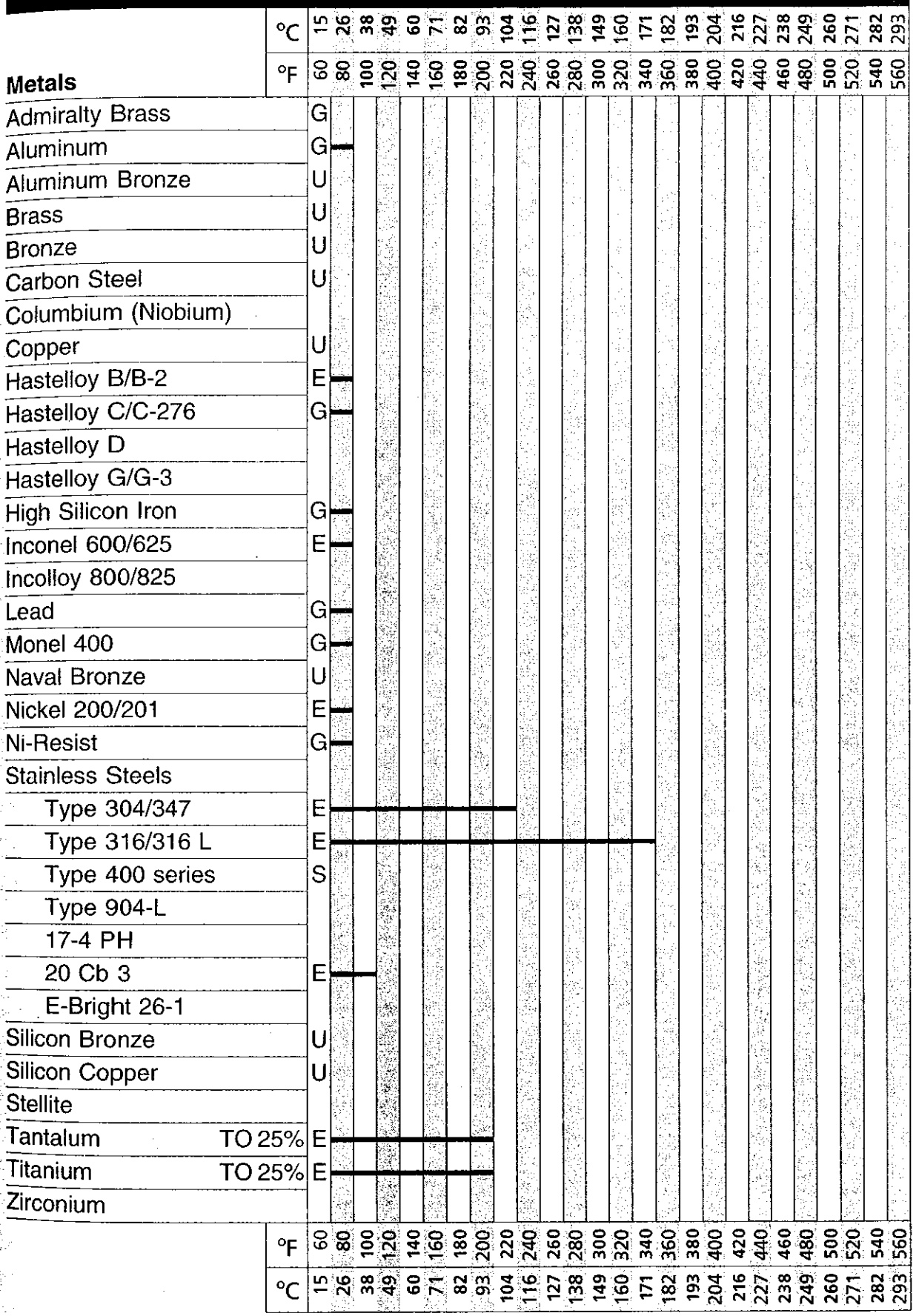


FOR METALS

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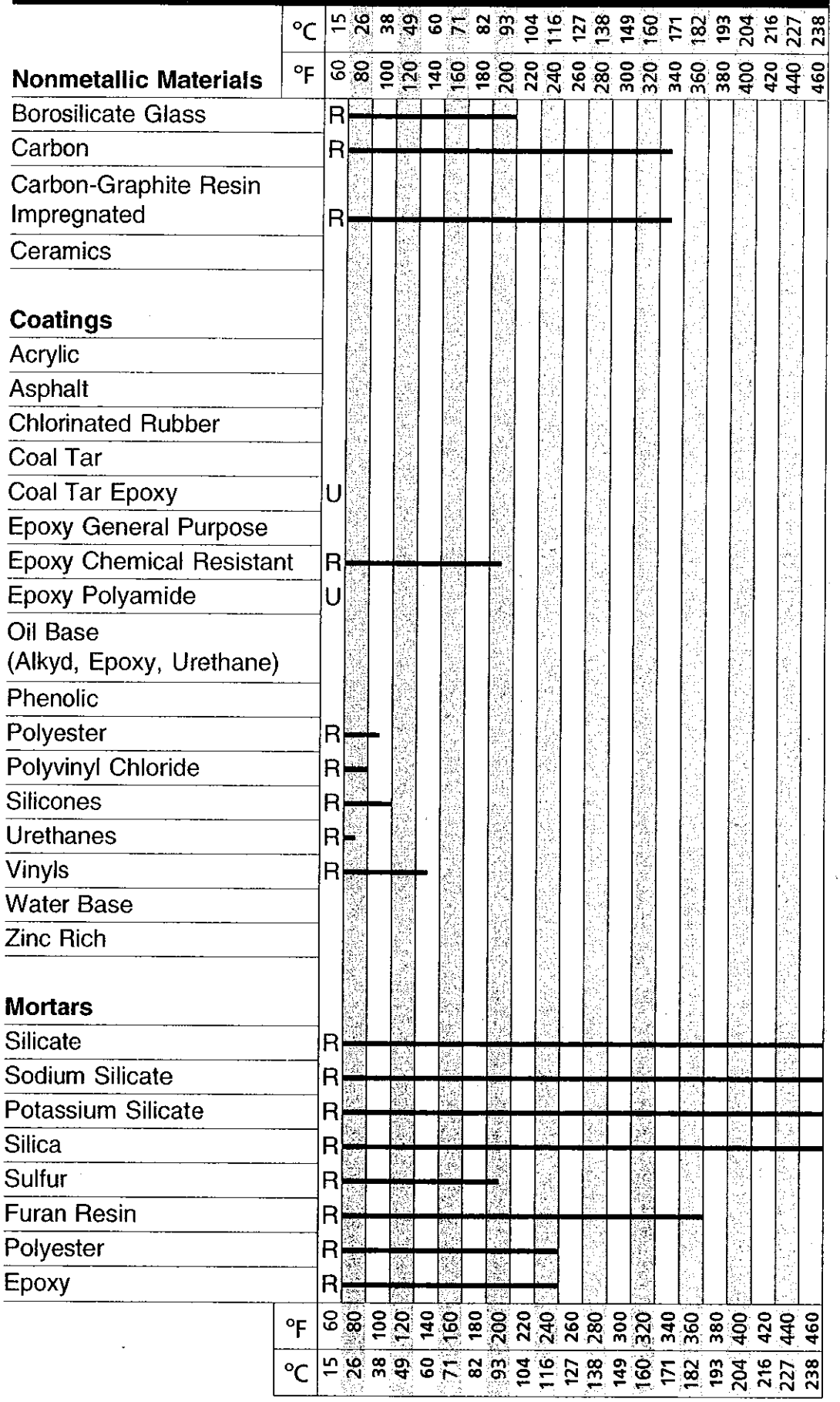




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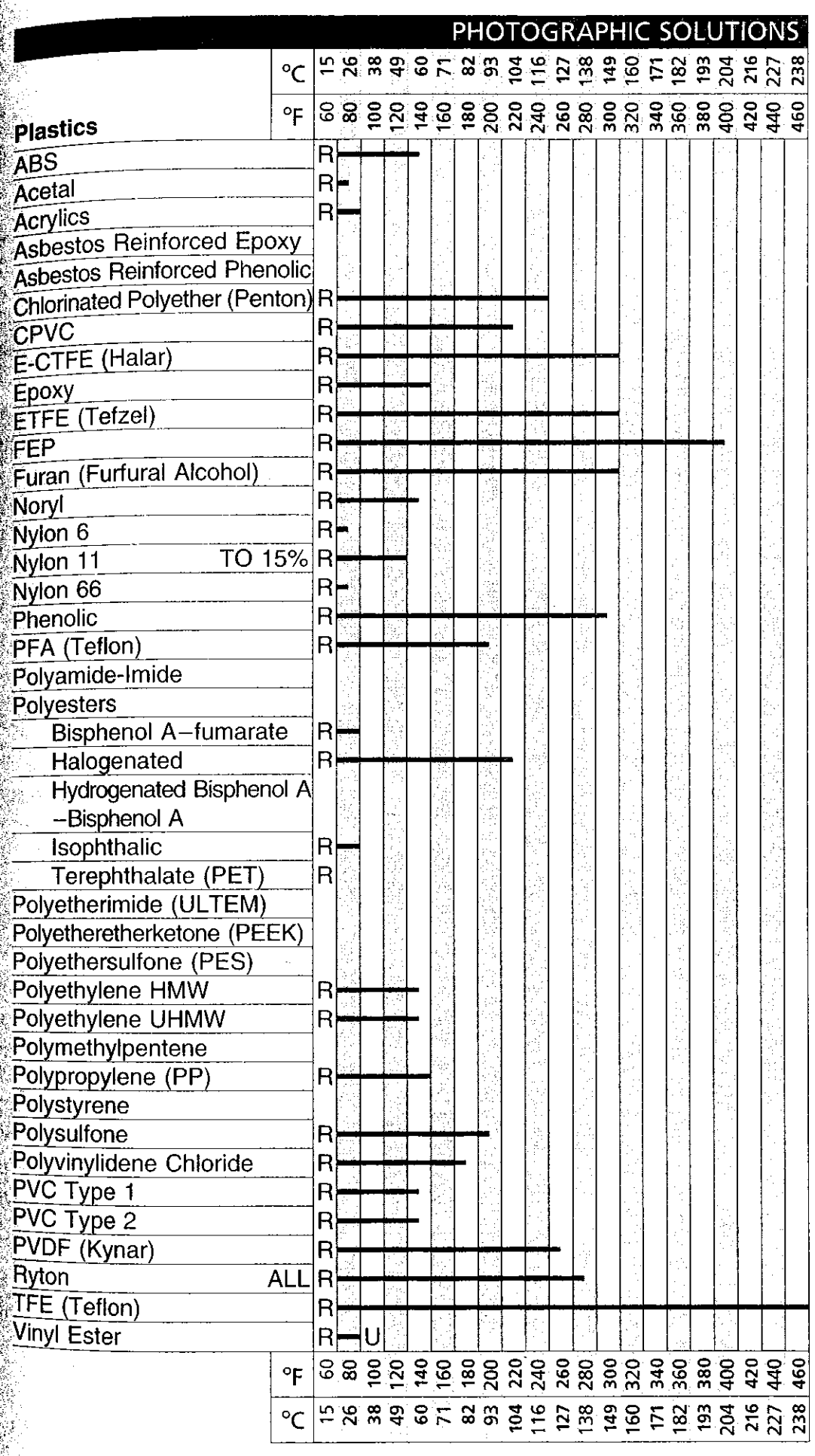


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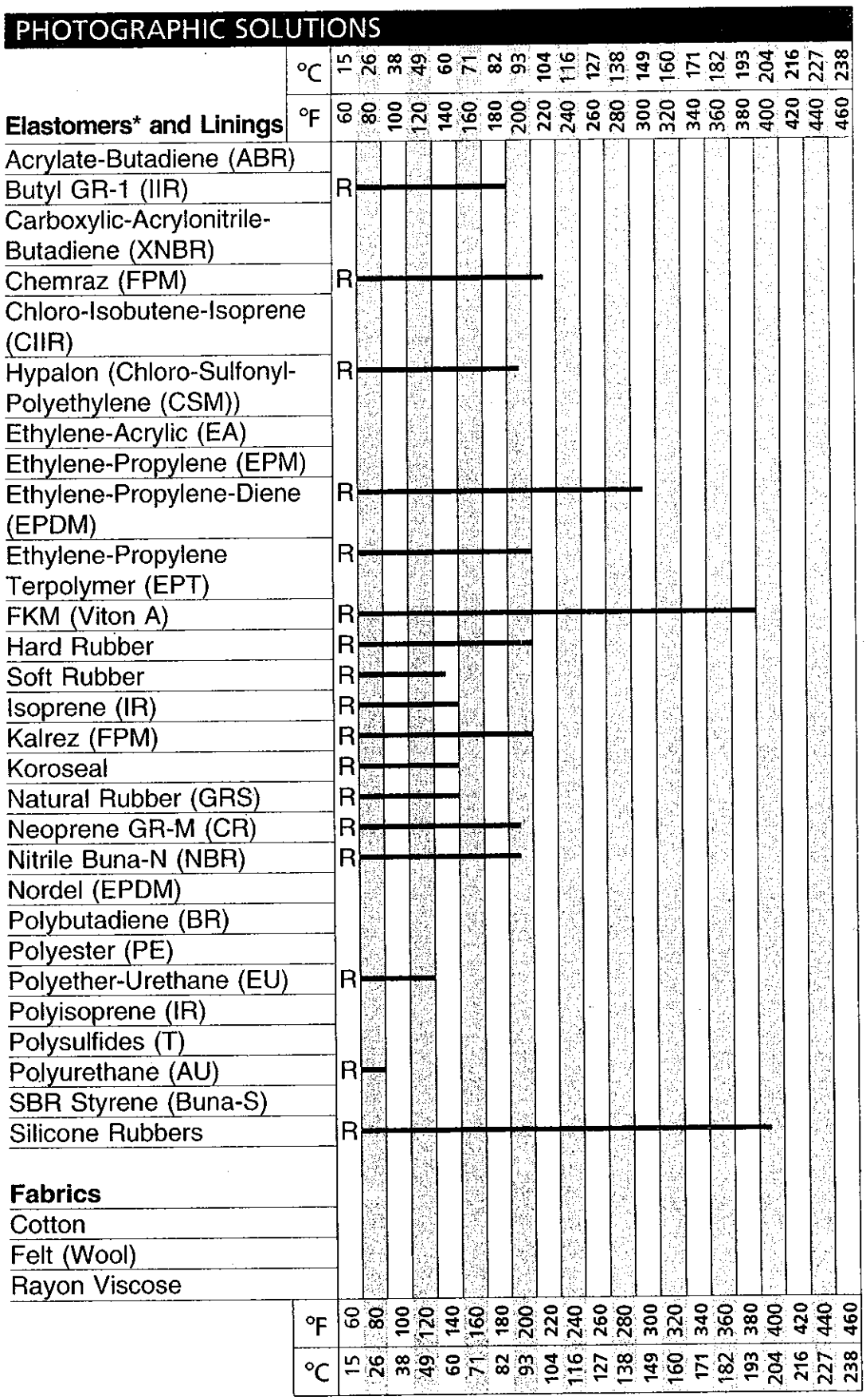


*See also Nylon 11 under PLASTICS





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| Metals | | | |
|---|---|---|---|
| Admiralty Brass | | | G |
| Aluminum | | | G |
| Aluminum Bronze | | | G |
| Brass | | | S |
| Bronze | | | G |
| Carbon Steel | | | G |
| Columbium (Niobium) | | | G |
| Copper | | | S |
| Hastelloy B/B-2 | | | G |
| Hastelloy C/C-276 | | | E |
| Hastelloy D | | | G |
| Hastelloy G/G-3 | | | G |
| High Silicon Iron | | | G |
| Inconel 600/625 | | | G |
| Incolloy | 825 | 10% | E |
| Lead | | | G |
| Monel 400 | | | G |
| Naval Bronze | | | G |
| Nickel 200/201 | | | G |
| Ni-Resist | | | G |
| Stainless Steels | | | G |
| Type 304/347 | | 9 | E |
| Type 316/316 L | | | G |
| Type 410 | | | G |
| Type 904-L | | | G |
| 17-4 PH | | | G |
| 20 Cb 3 | | | G |
| E-Bright 26-1 | | | E |
| Silicon Bronze | | | E |
| Silicon Copper | | | |
| Stellite | | | |
| Tantalum | | | |
| Titanium | | | |
| Zirconium | | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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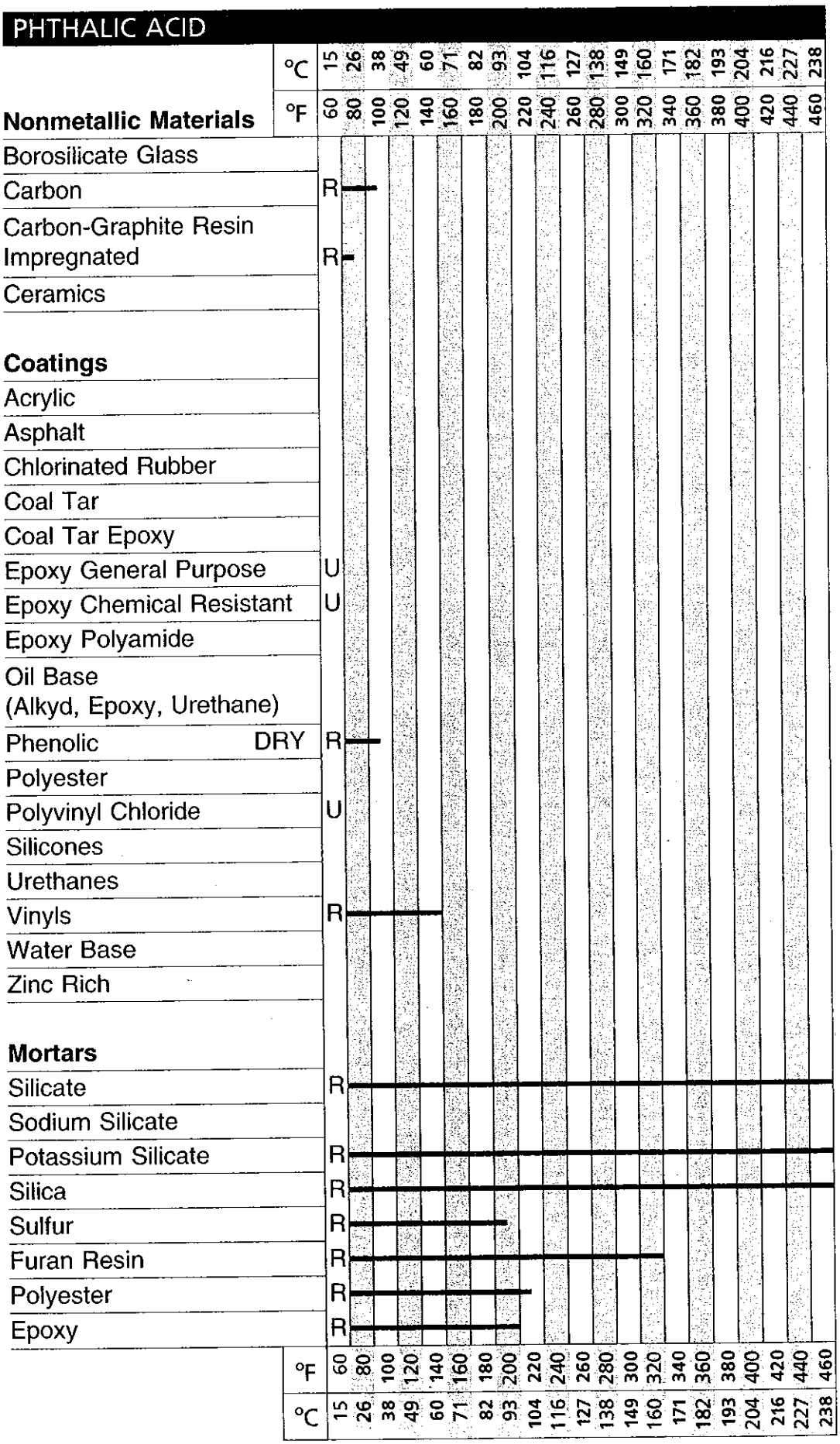
## PHTHALIC ACID





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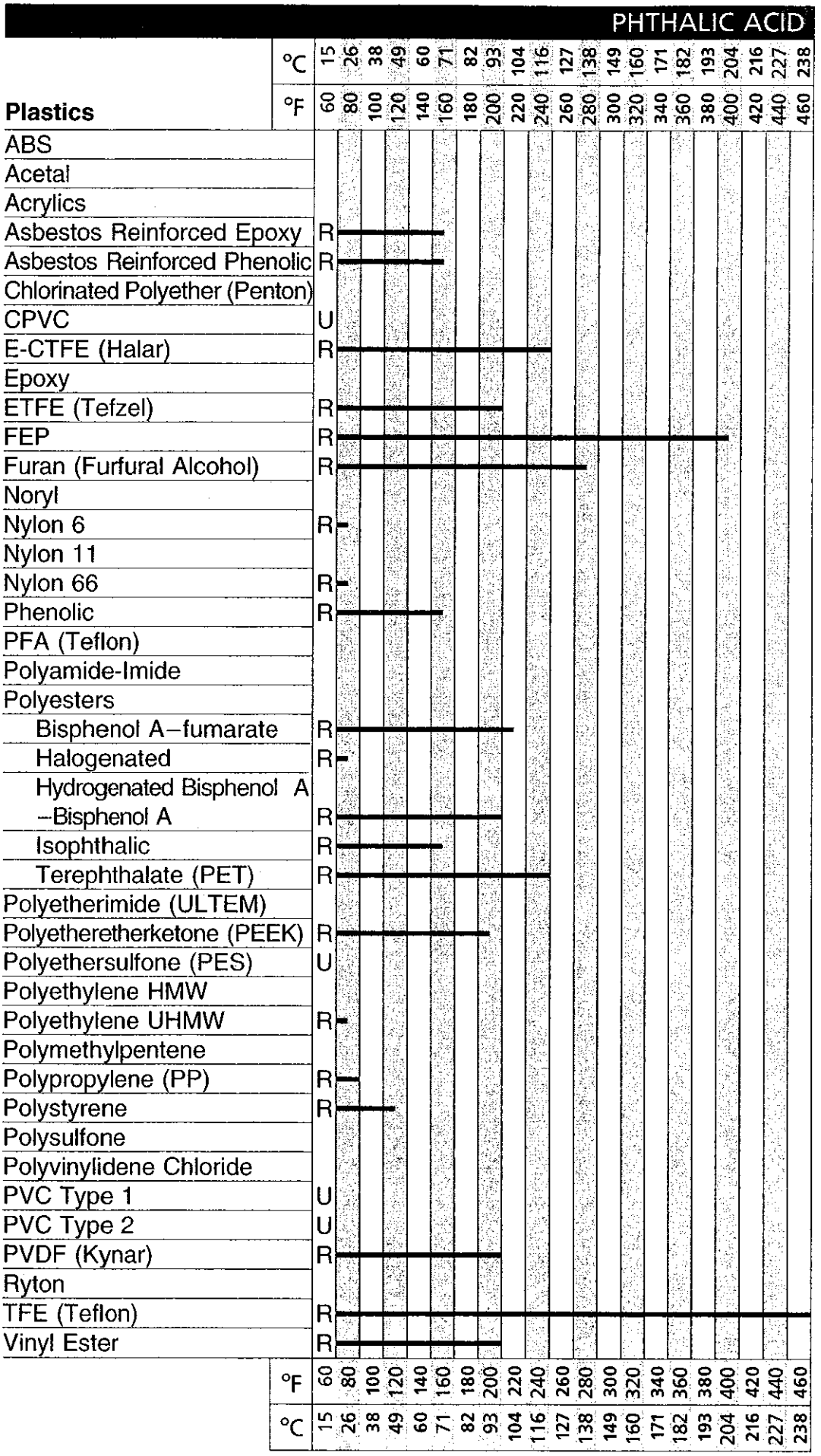



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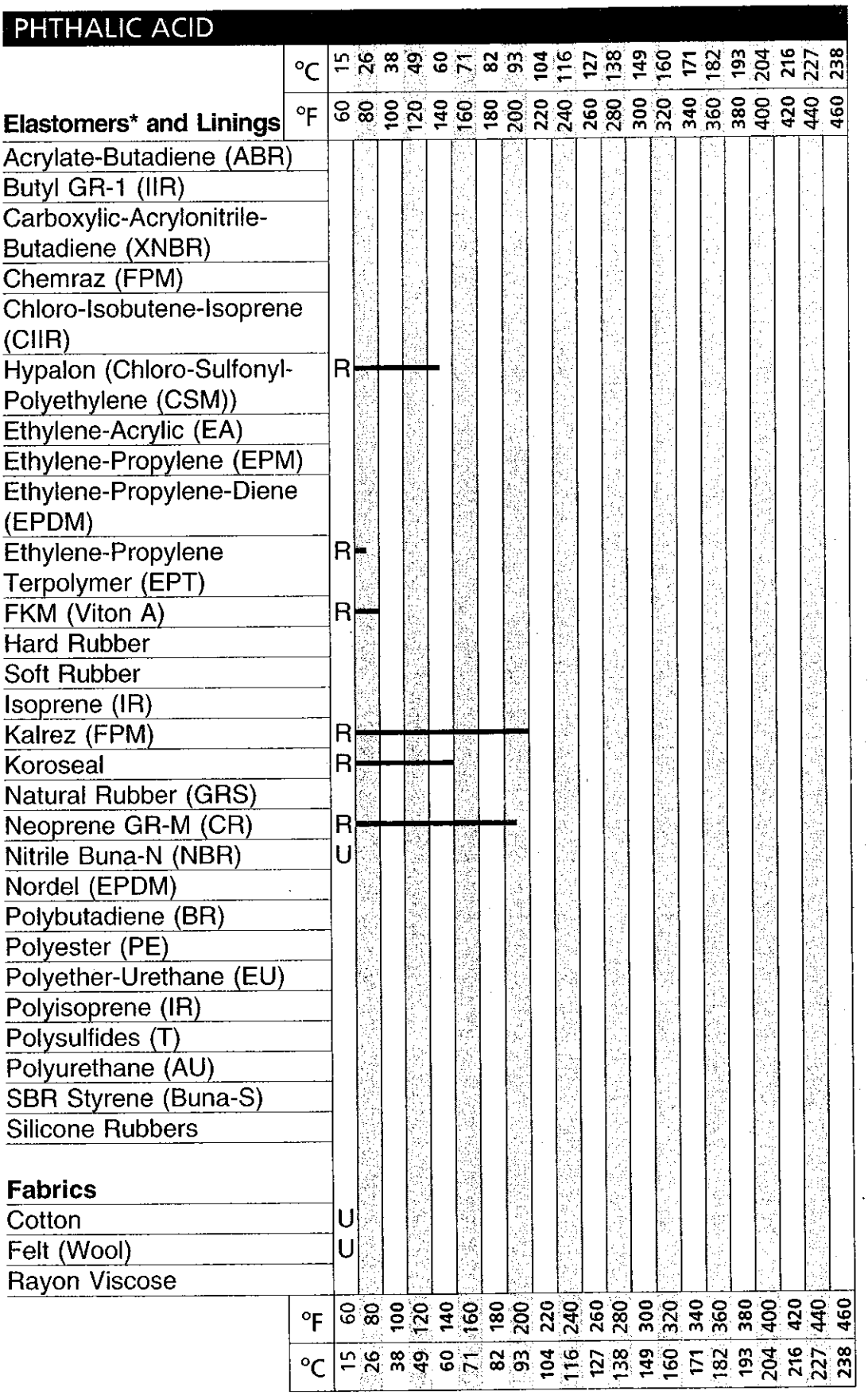
## PHTHALIC ACID

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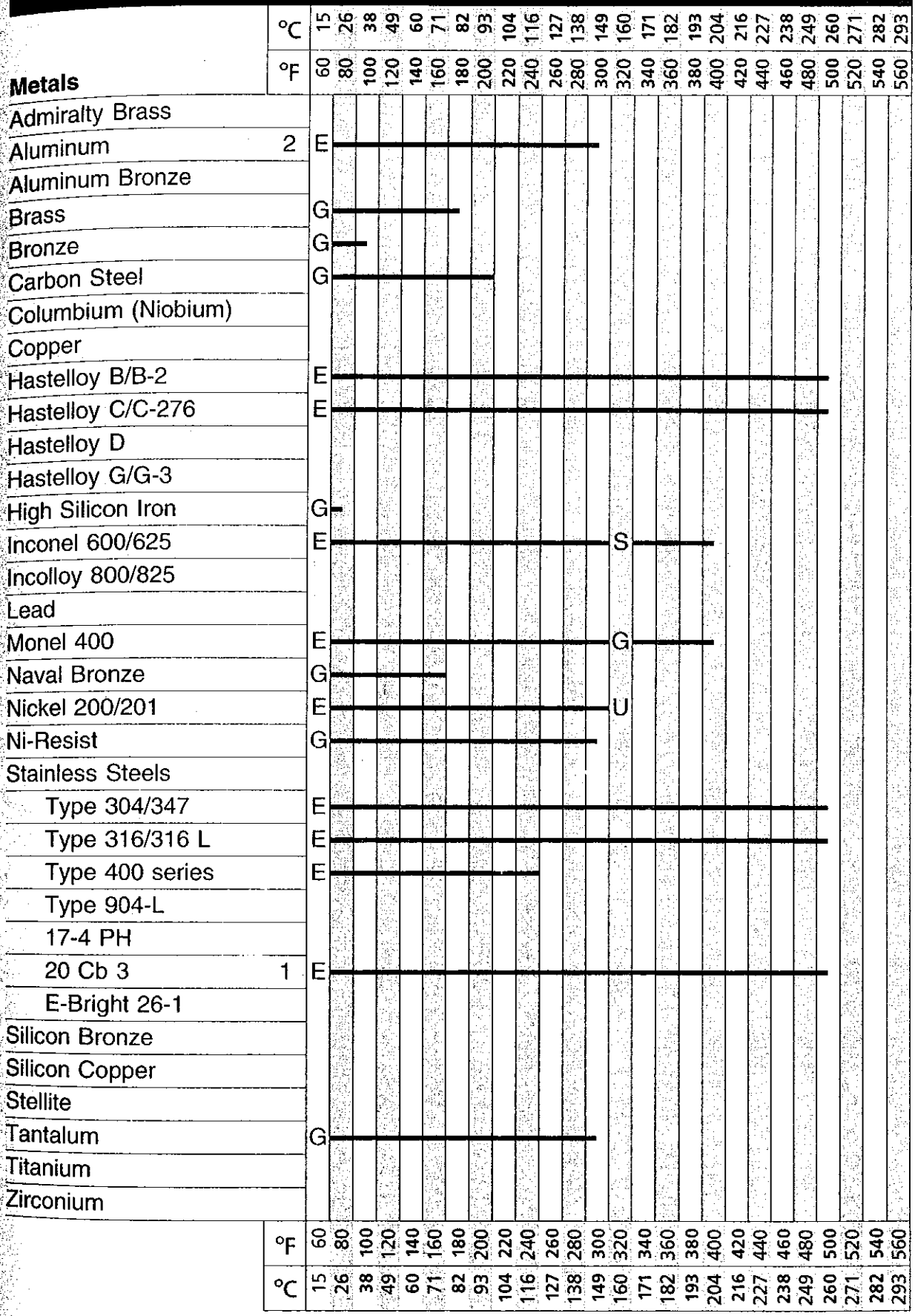


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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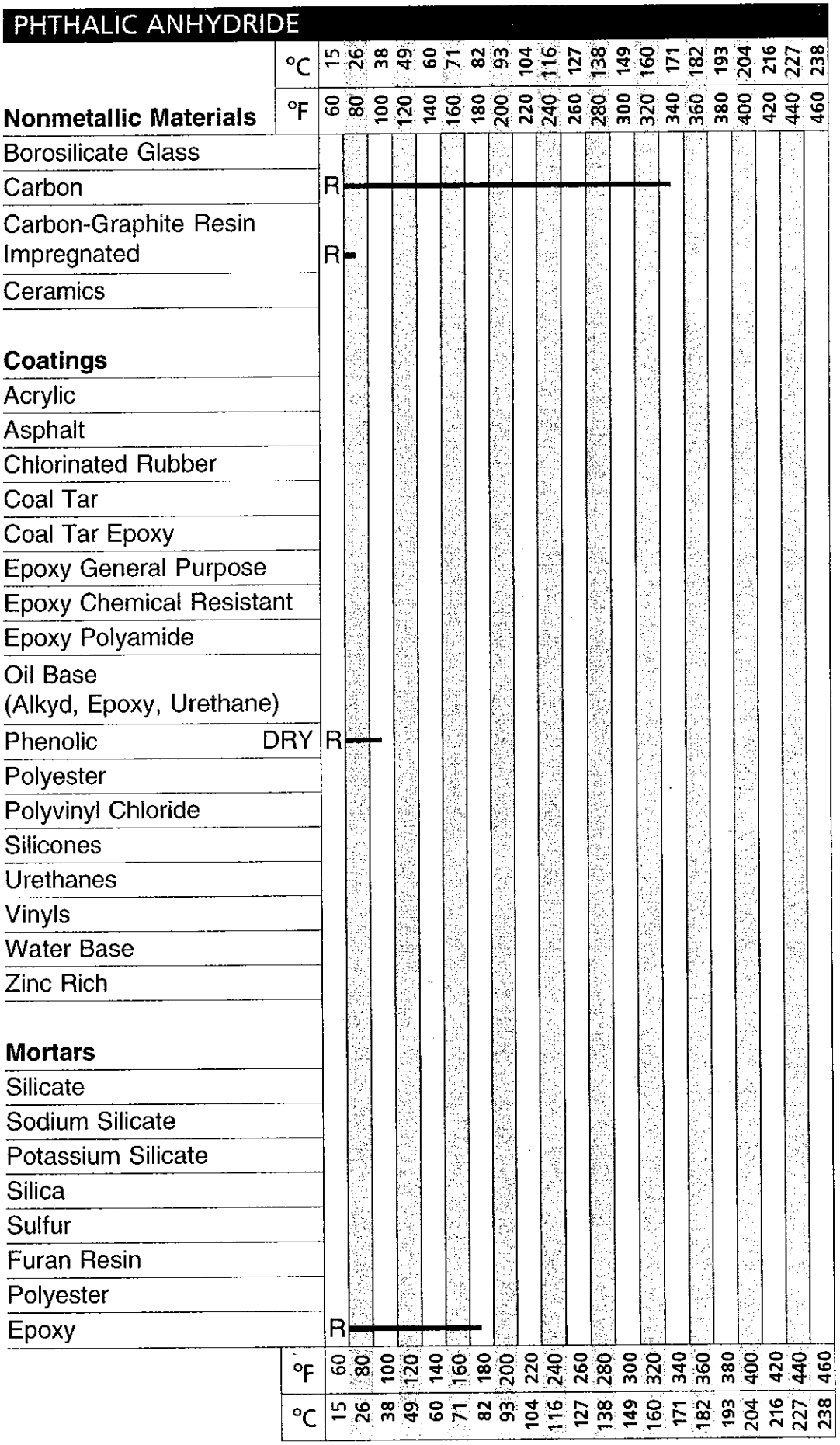
## PHTHALIC ANHYDRIDE







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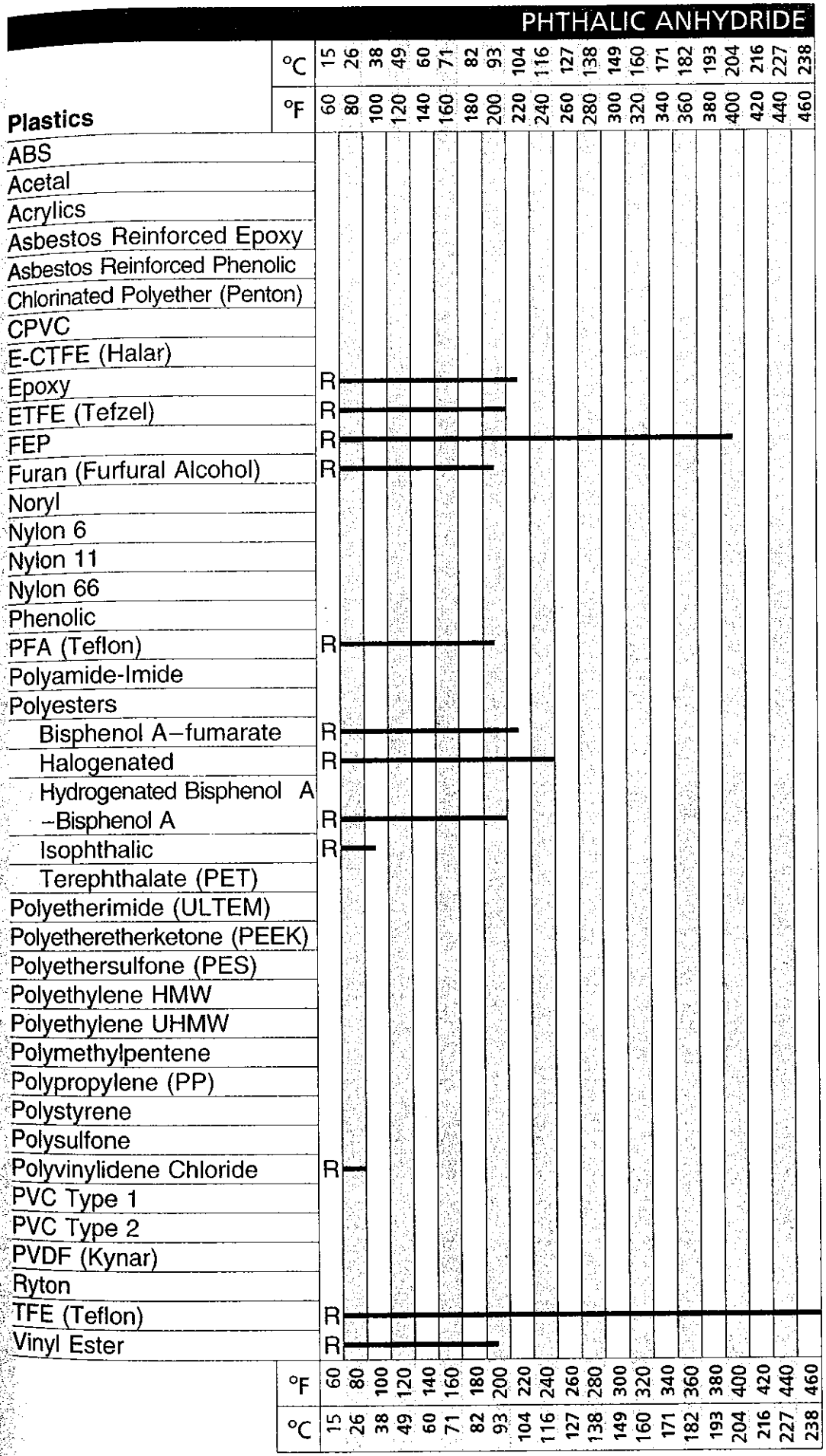


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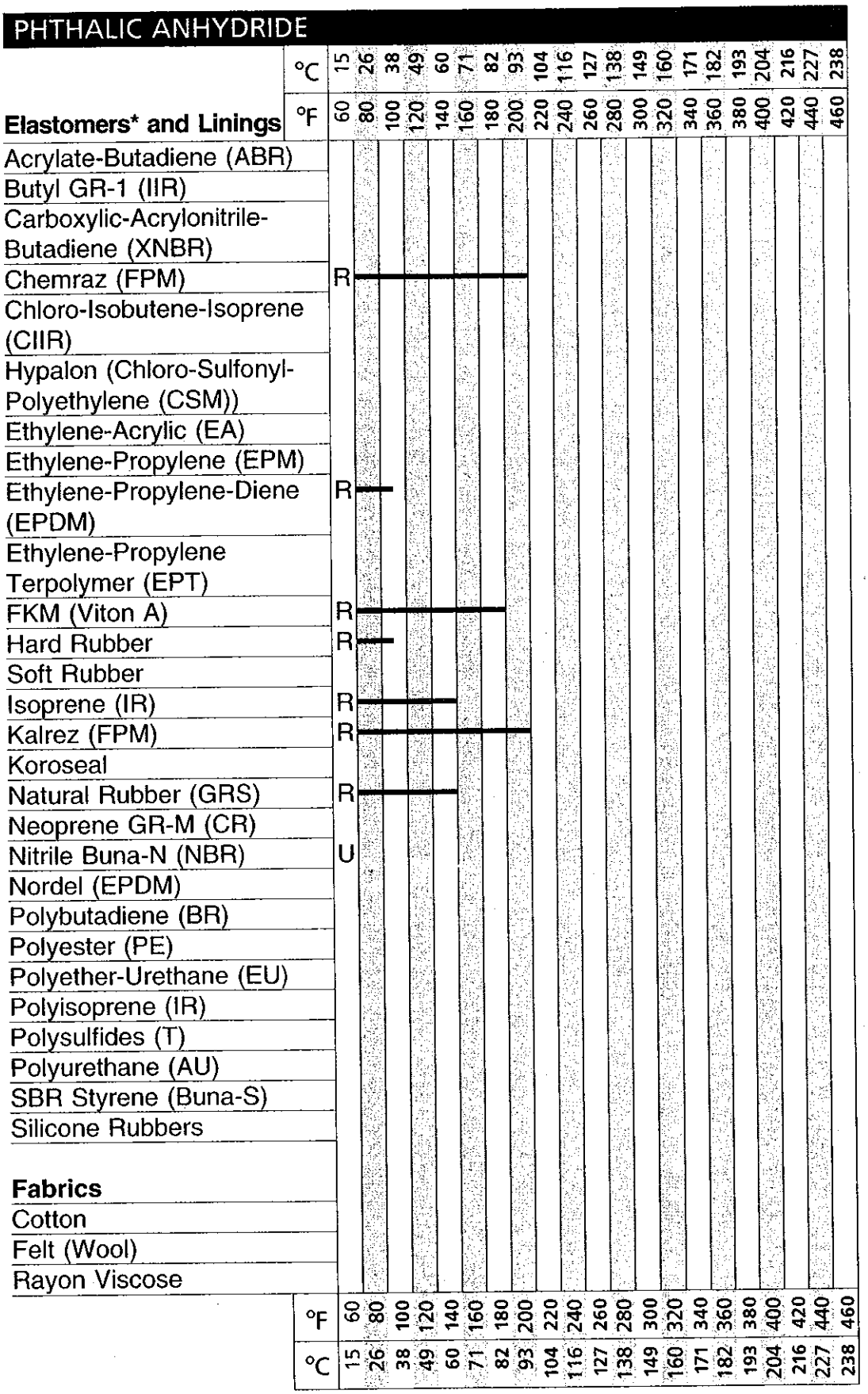
# PHTHALIC ANHYDRIDE

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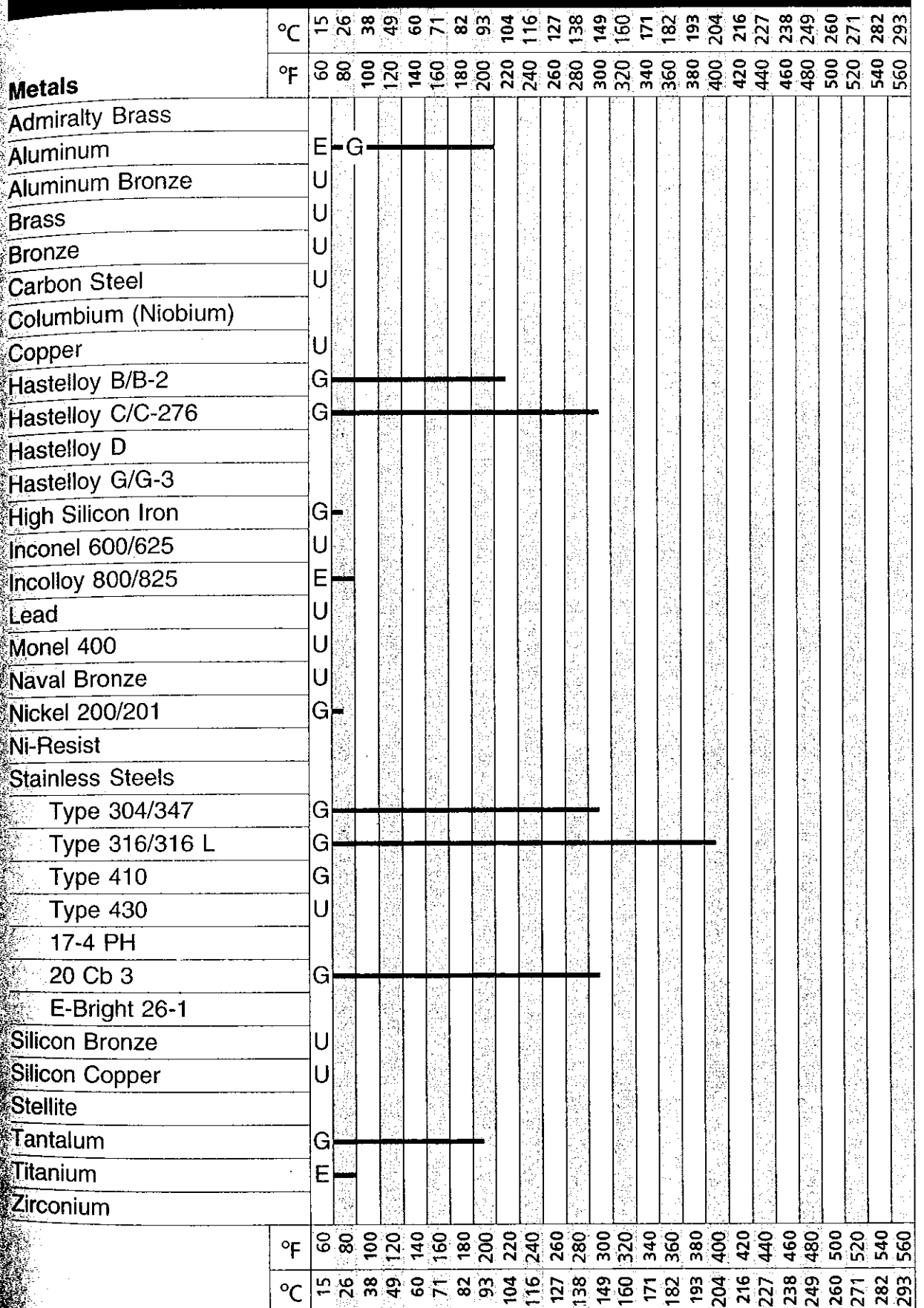


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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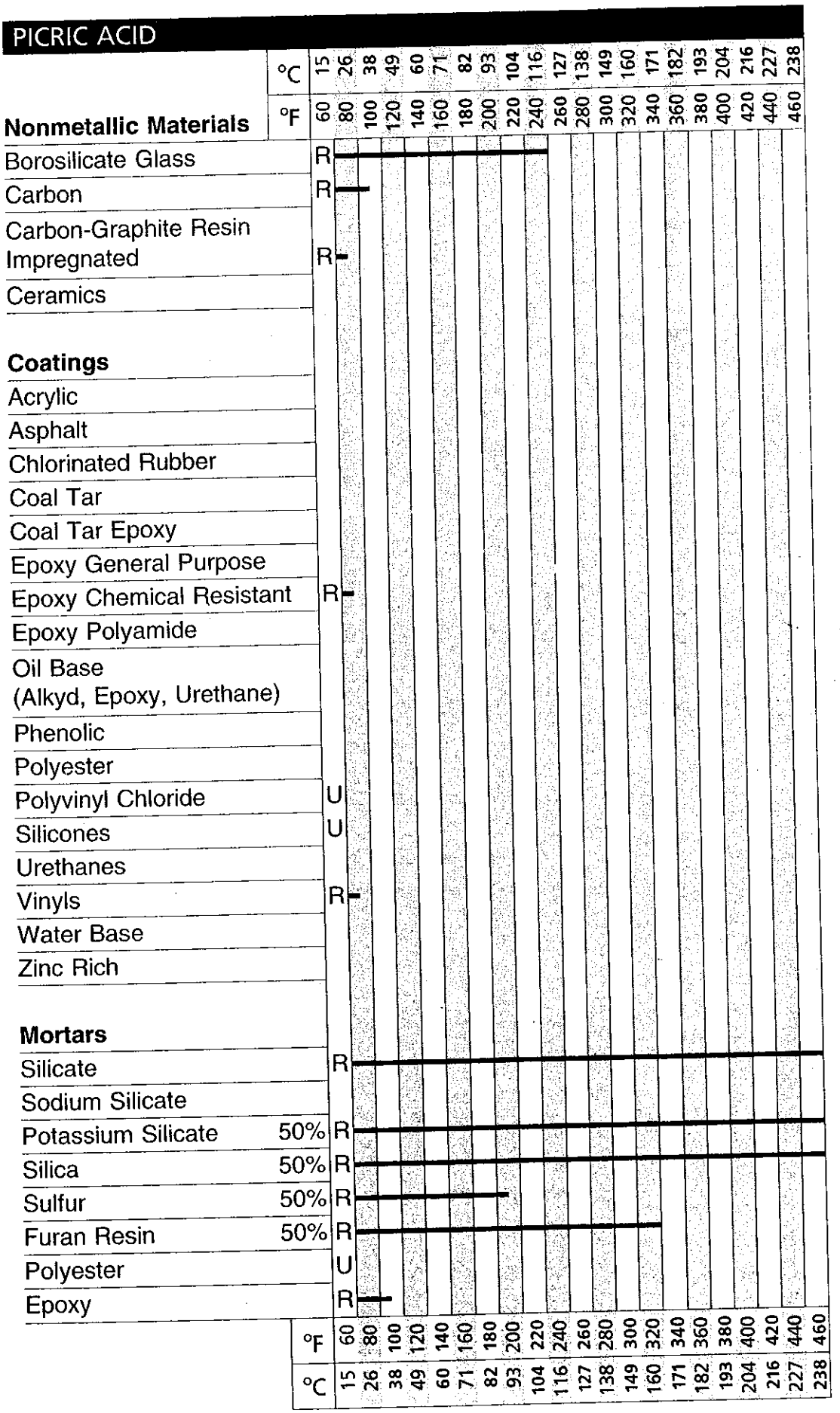
# PICRIC ACID



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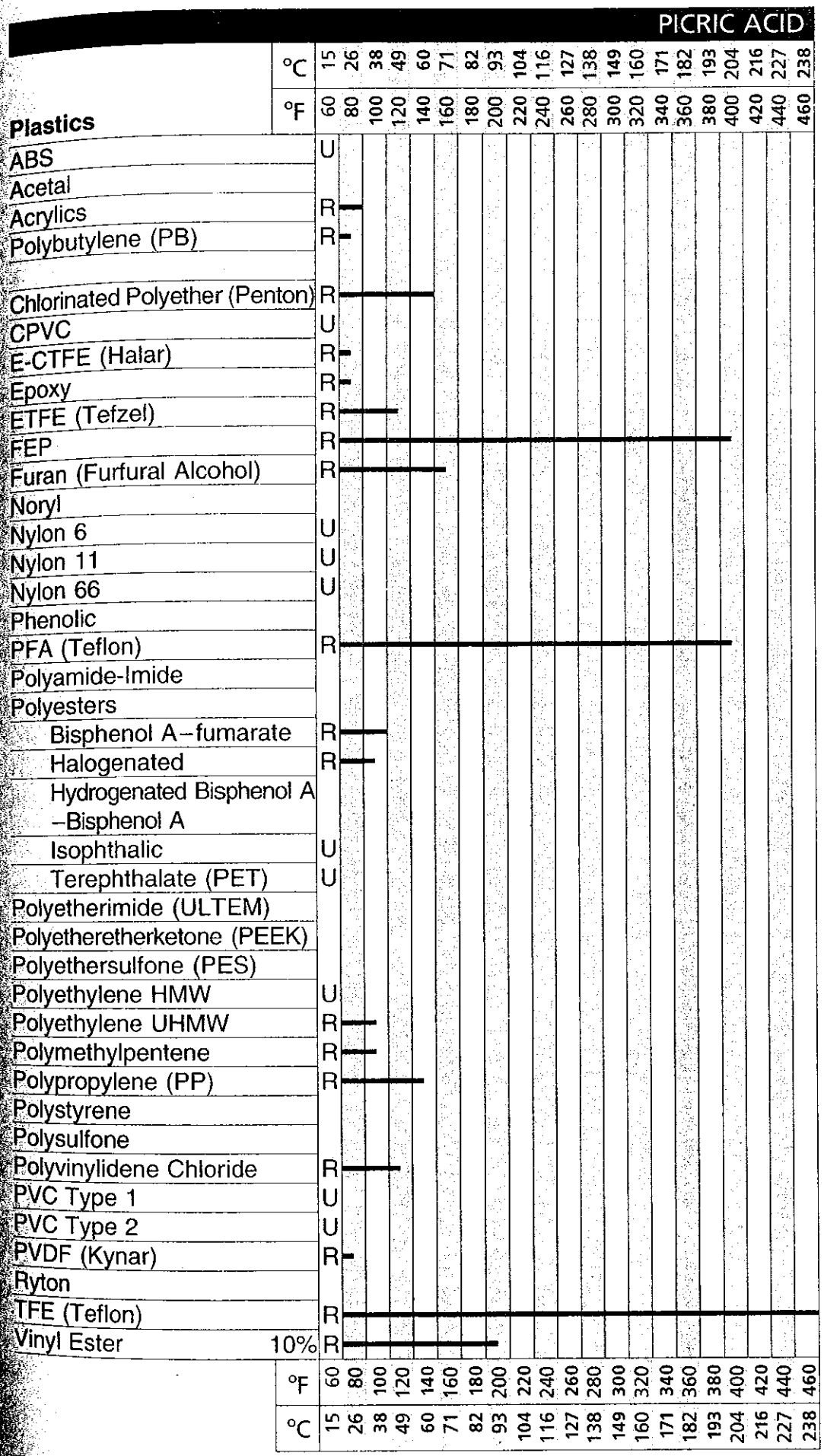



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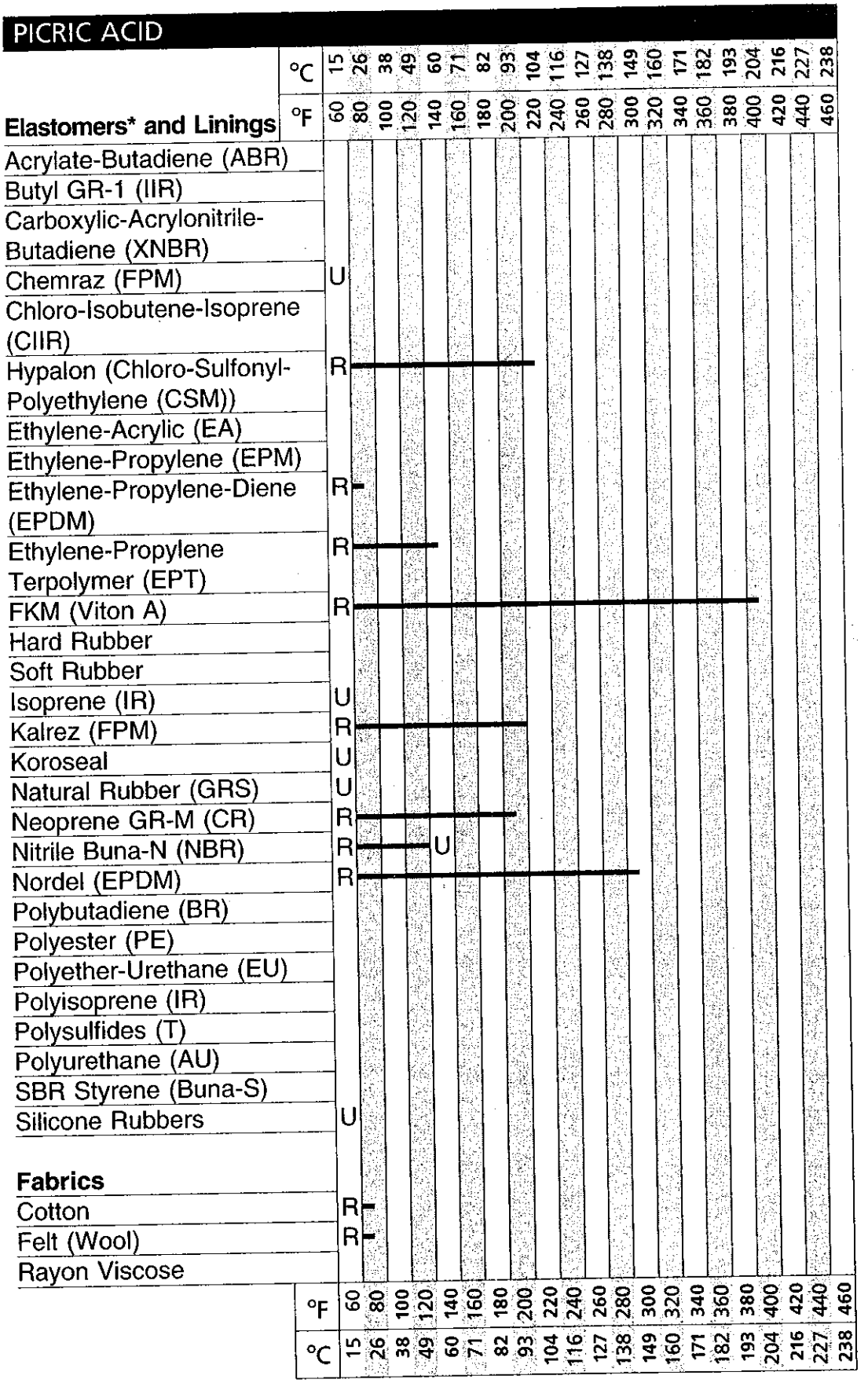


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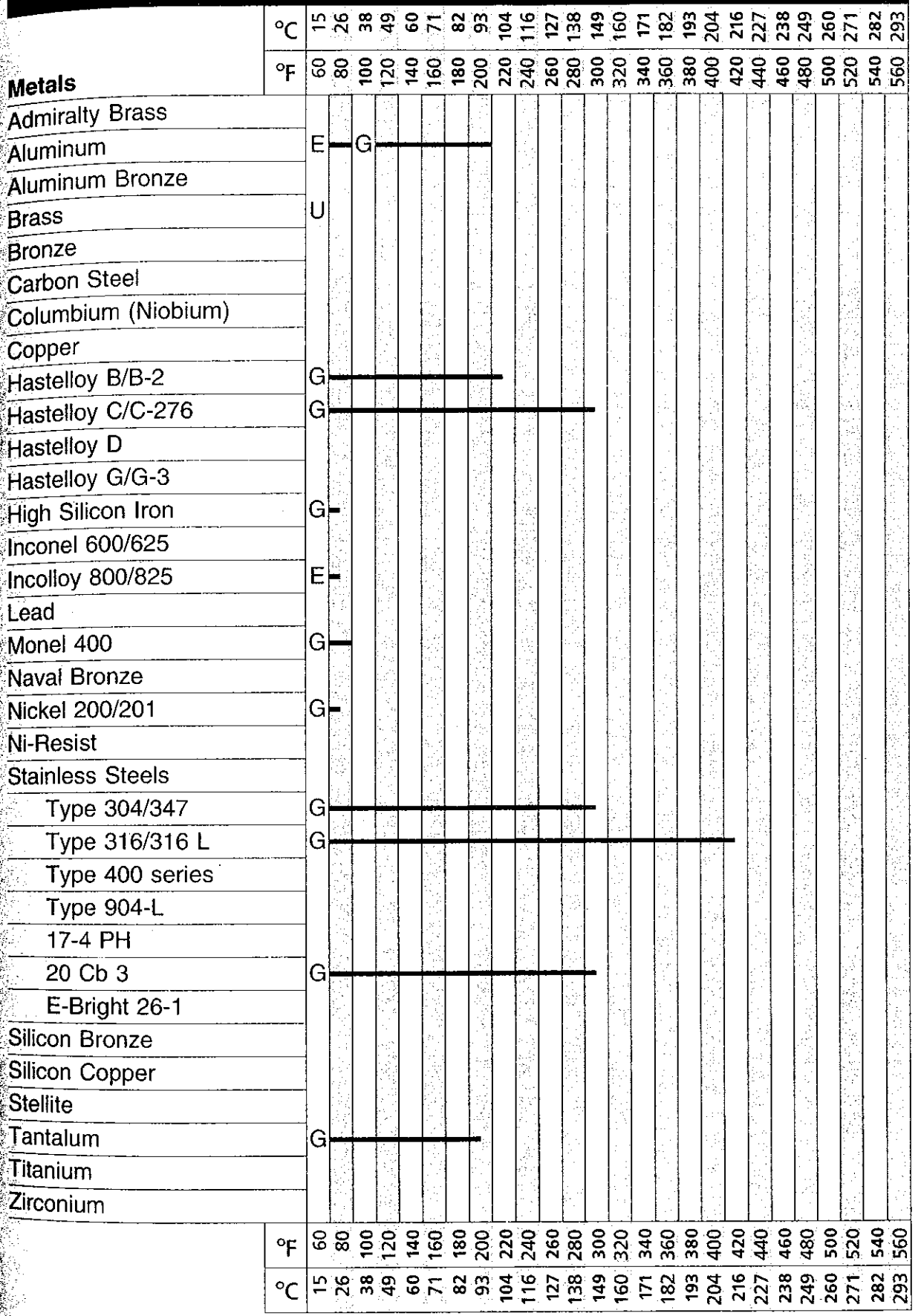
# PICRIC ACID 10%




FOR METALS

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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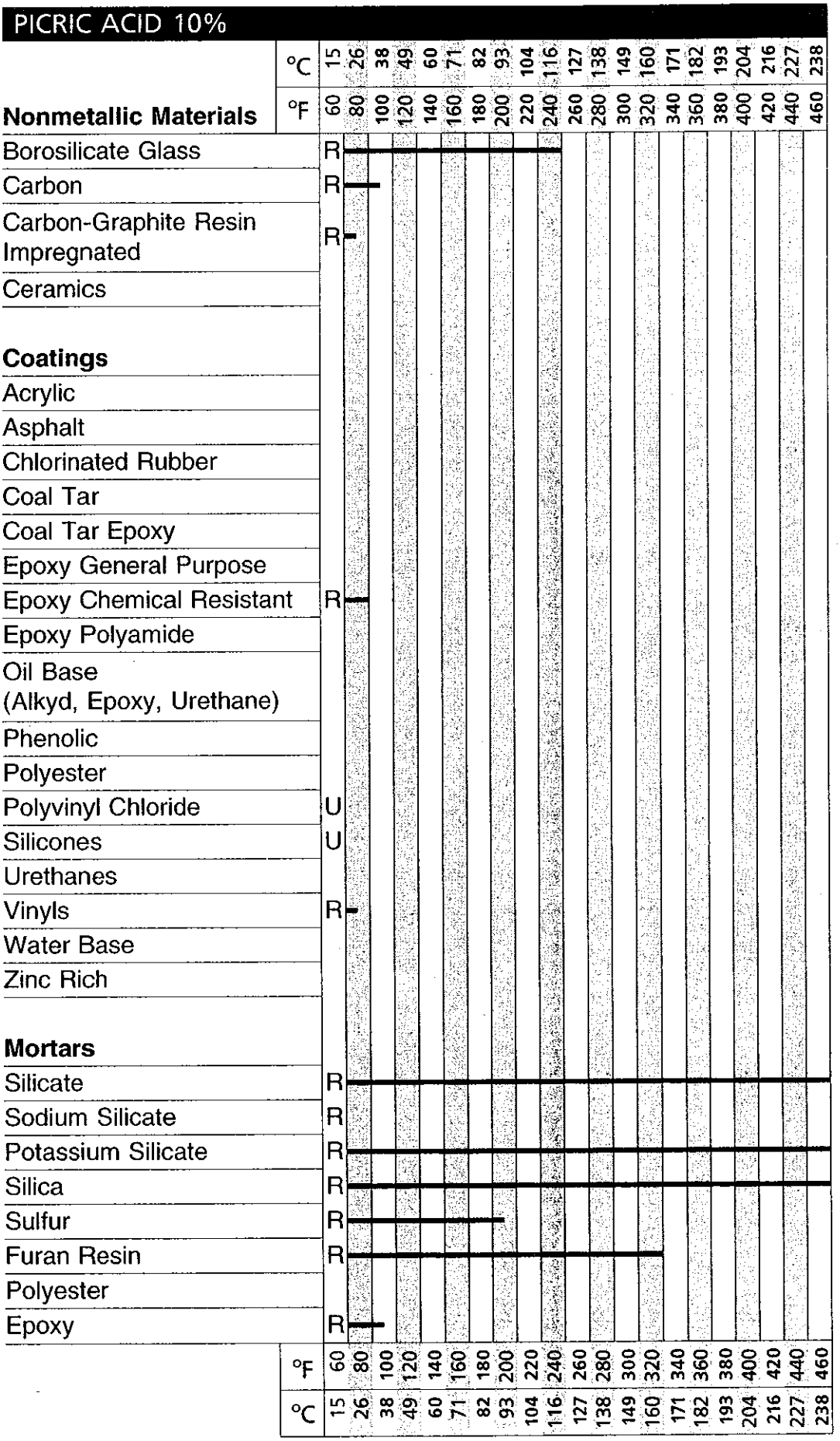






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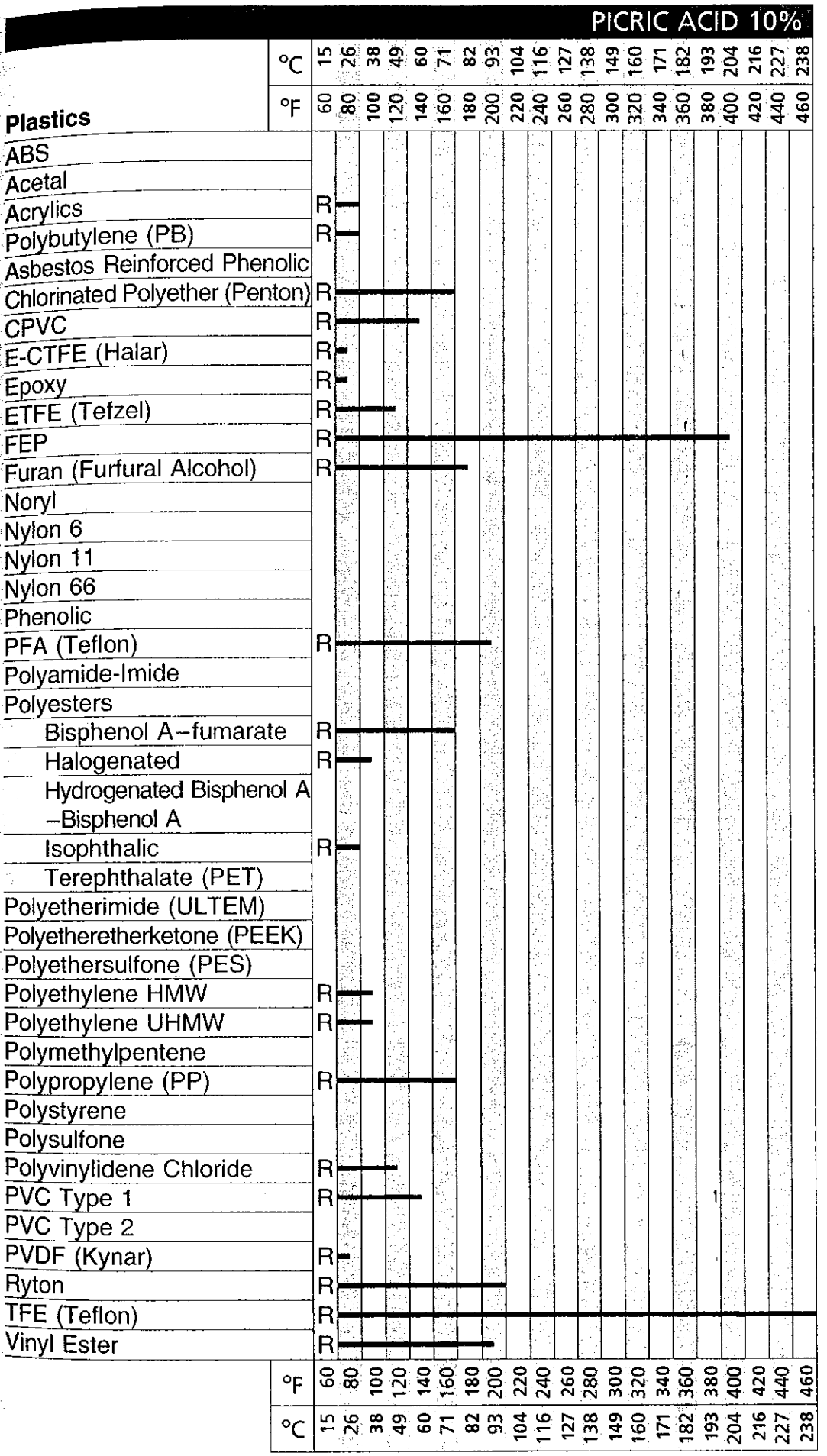



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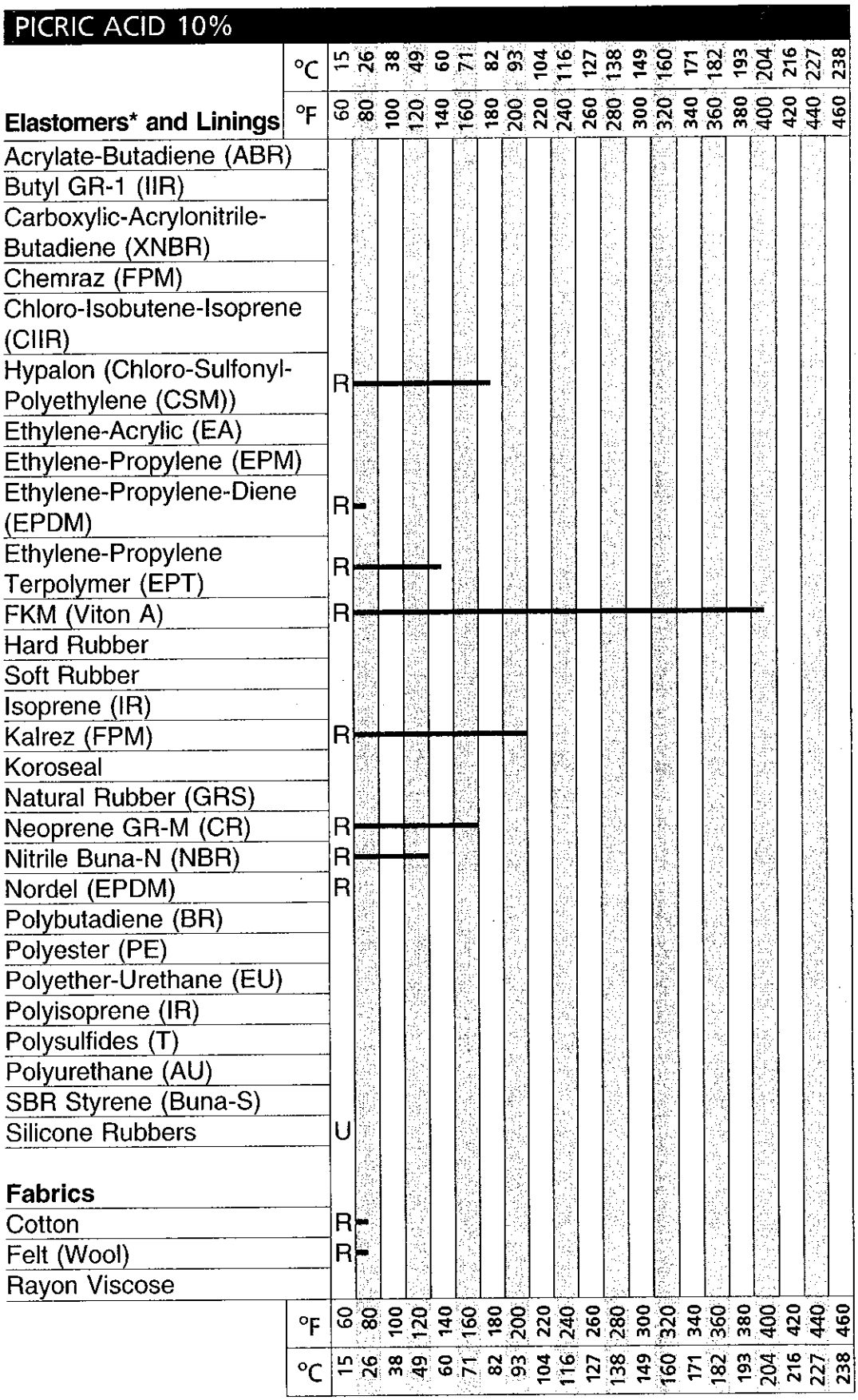


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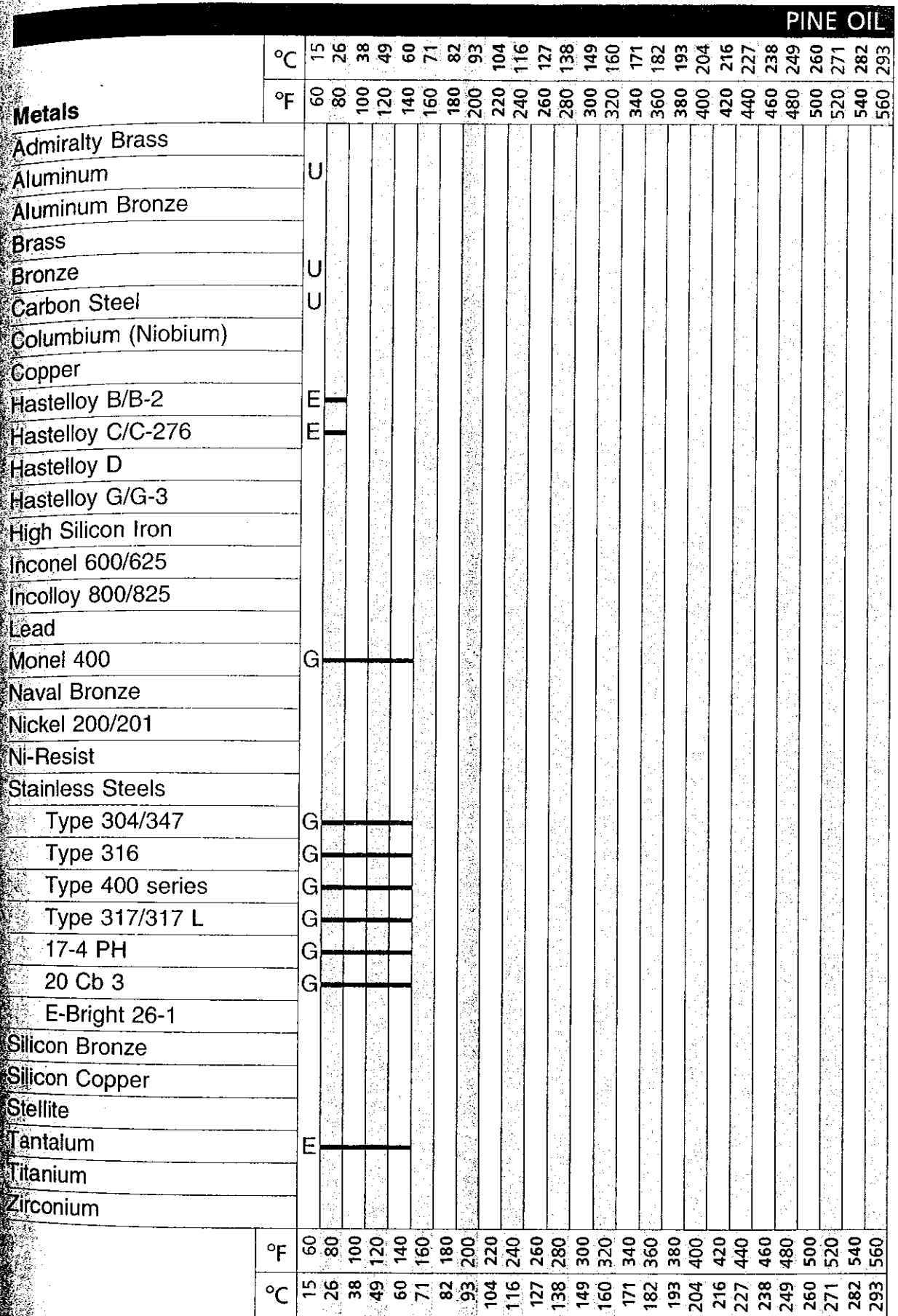
# PINE OIL




FOR METALS

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U = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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# PINE OIL

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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# PINE OIL

| Plastics | °C | °F |
|---|---|---|
| Polycarbonate | R | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | U | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | | |
| FEP | R | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | U |
| Polyethylene UHMW | R | |
| Polymethylpentene | R | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | U | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | U | |
| PVC Type 2 | U | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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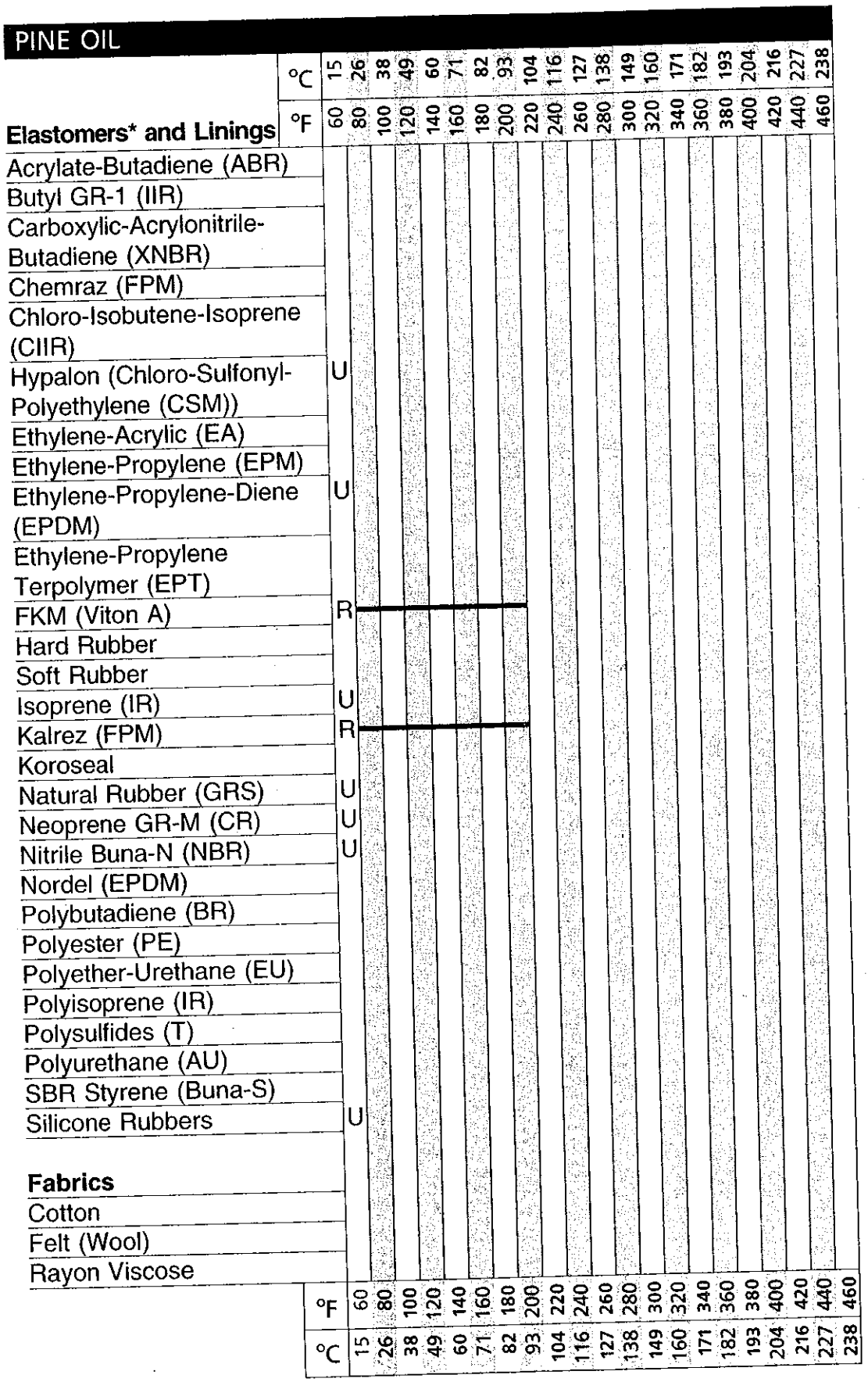
## PINE OIL

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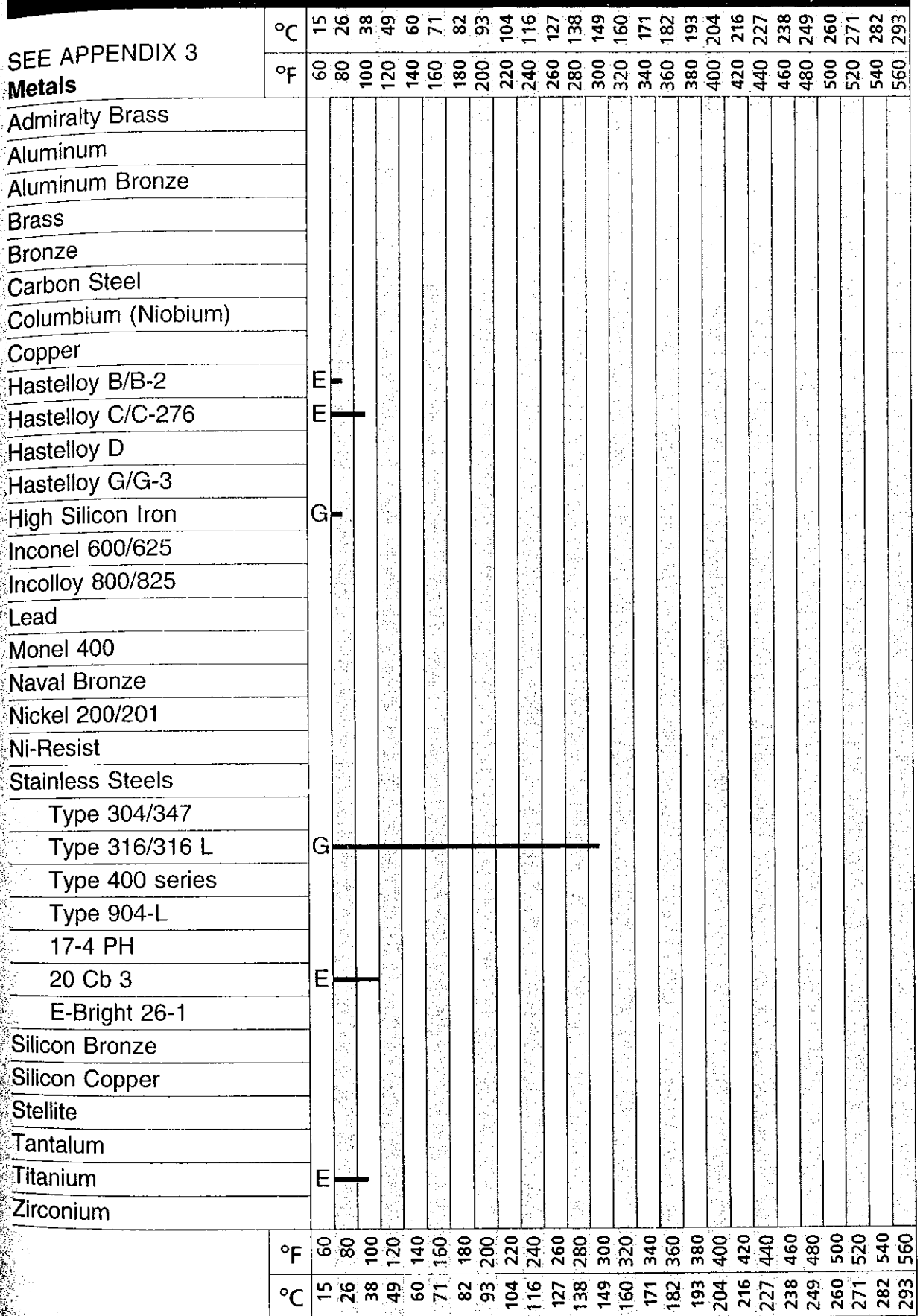


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## PLATING SOLUTIONS, BRASS

SEE APPENDIX 3

| **Nonmetallic Materials** | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |
|---|---|
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| Borosilicate Glass | |
| Carbon | R |
| Carbon-Graphite Resin Impregnated | R |
| Ceramics | |
| **Coatings** | |
| Acrylic | |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | |
| Coal Tar Epoxy | |
| Epoxy General Purpose | |
| Epoxy Chemical Resistant | |
| Epoxy Polyamide | |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | |
| Polyvinyl Chloride | R |
| Silicones | |
| Urethanes | |
| Vinyls | |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | |
| Sodium Silicate | |
| Potassium Silicate | |
| Silica | |
| Sulfur | |
| Furan Resin | |
| Polyester | |
| Epoxy | |
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |



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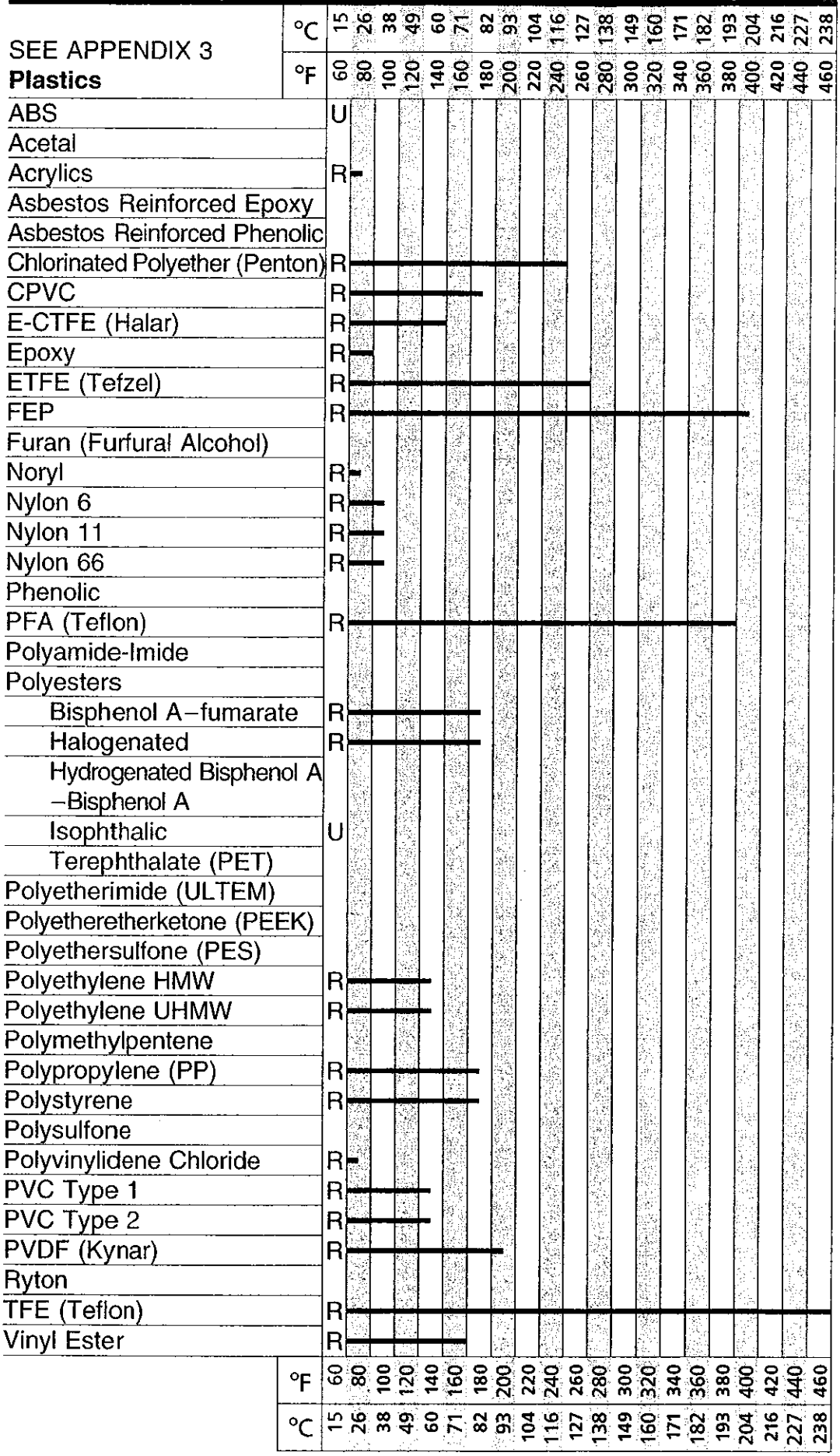
SEE APPENDIX 3

**Plastics**

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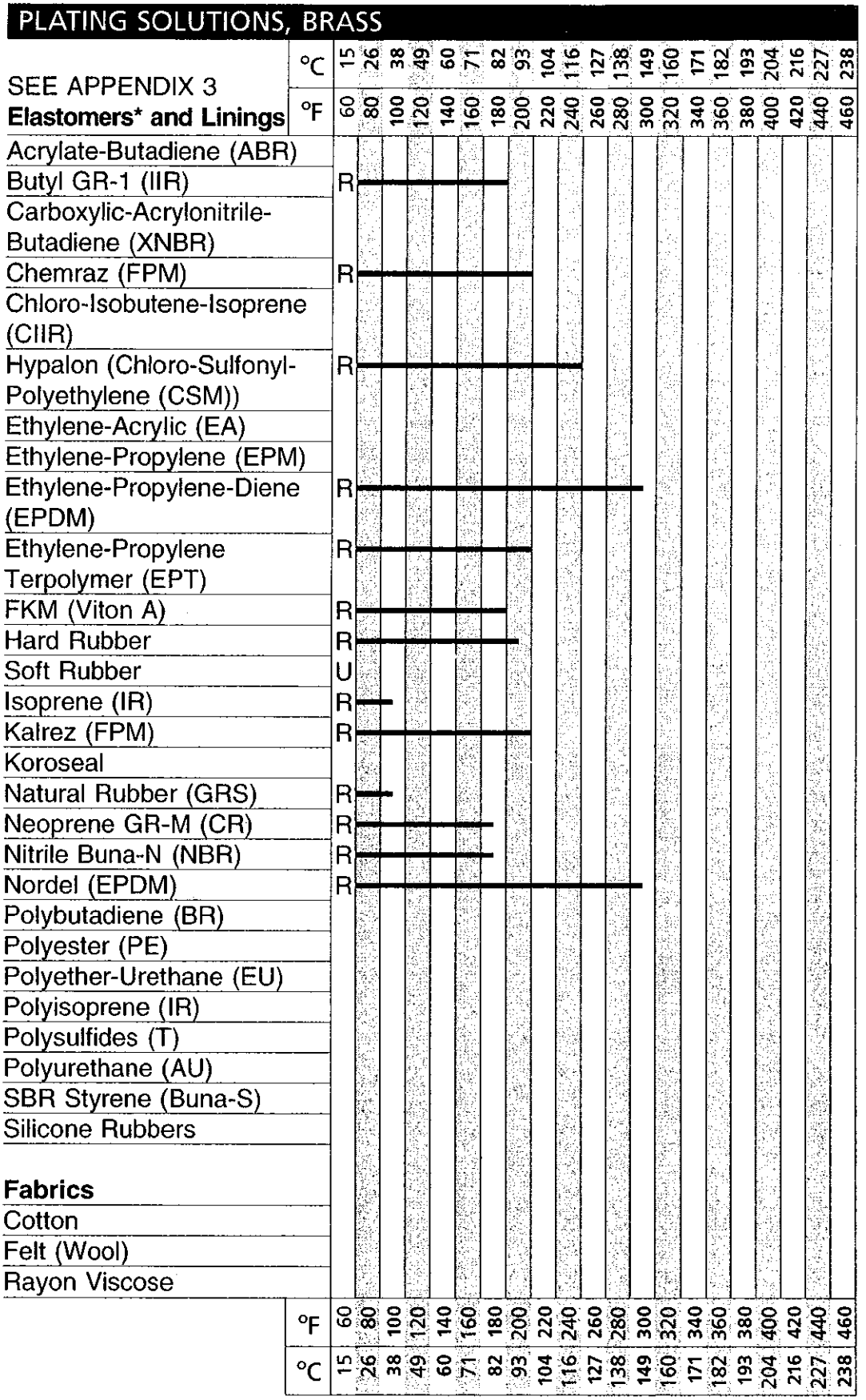


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SEE APPENDIX 3

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | E | |
| Hastelloy C/C-276 | E | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | G | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | G | |
| Type 316/316 L | G | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | E | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | E | |
| Zirconium | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# PLATING SOLUTIONS, CADMIUM

SEE APPENDIX 3

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | R | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | R | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | R | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | U | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | U | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | R | | | | | | | | | | | | | | | | | | | | |
| Polyester | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | R | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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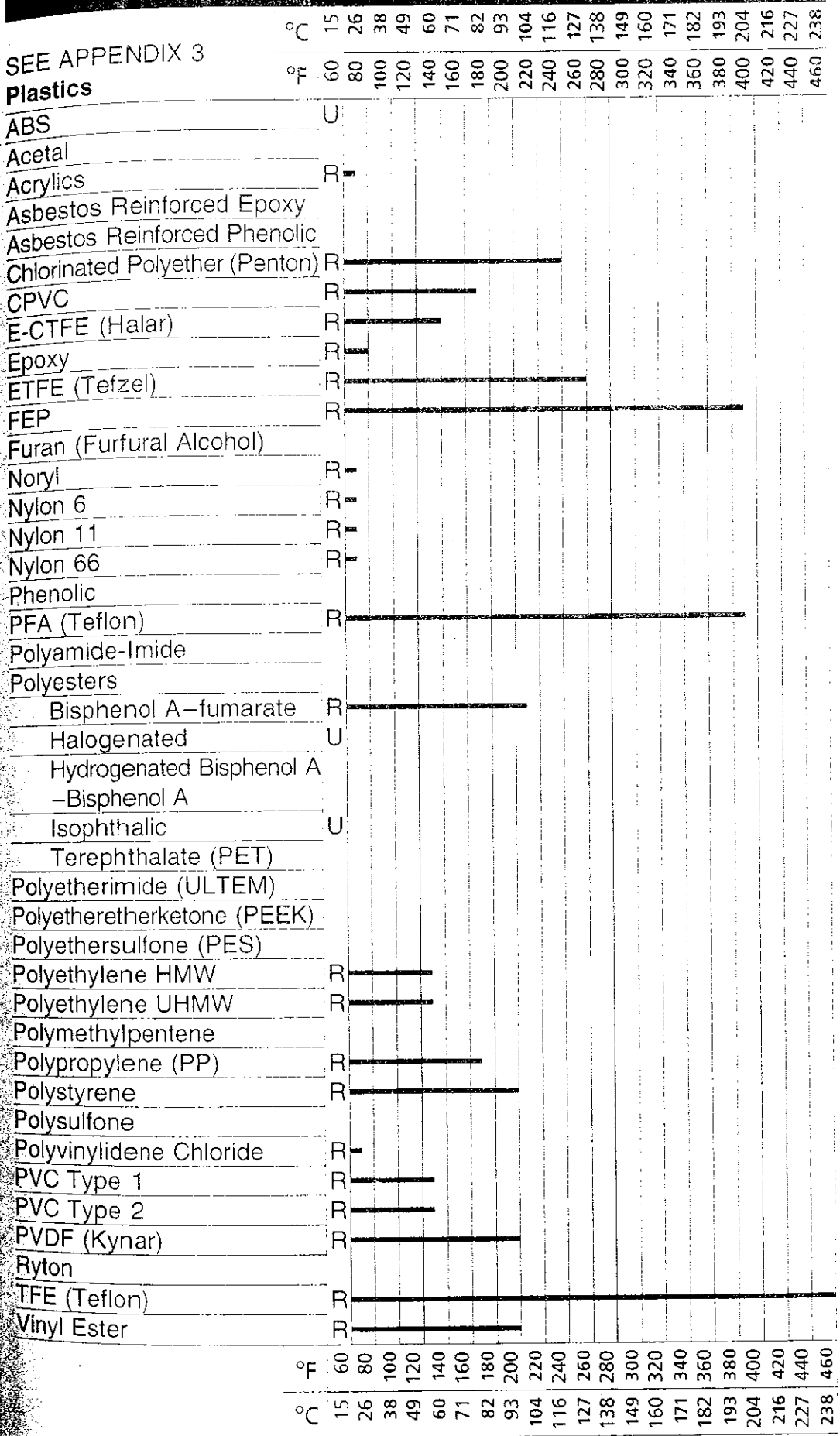
**Plastics**

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## PLATING SOLUTIONS, CADMIUM

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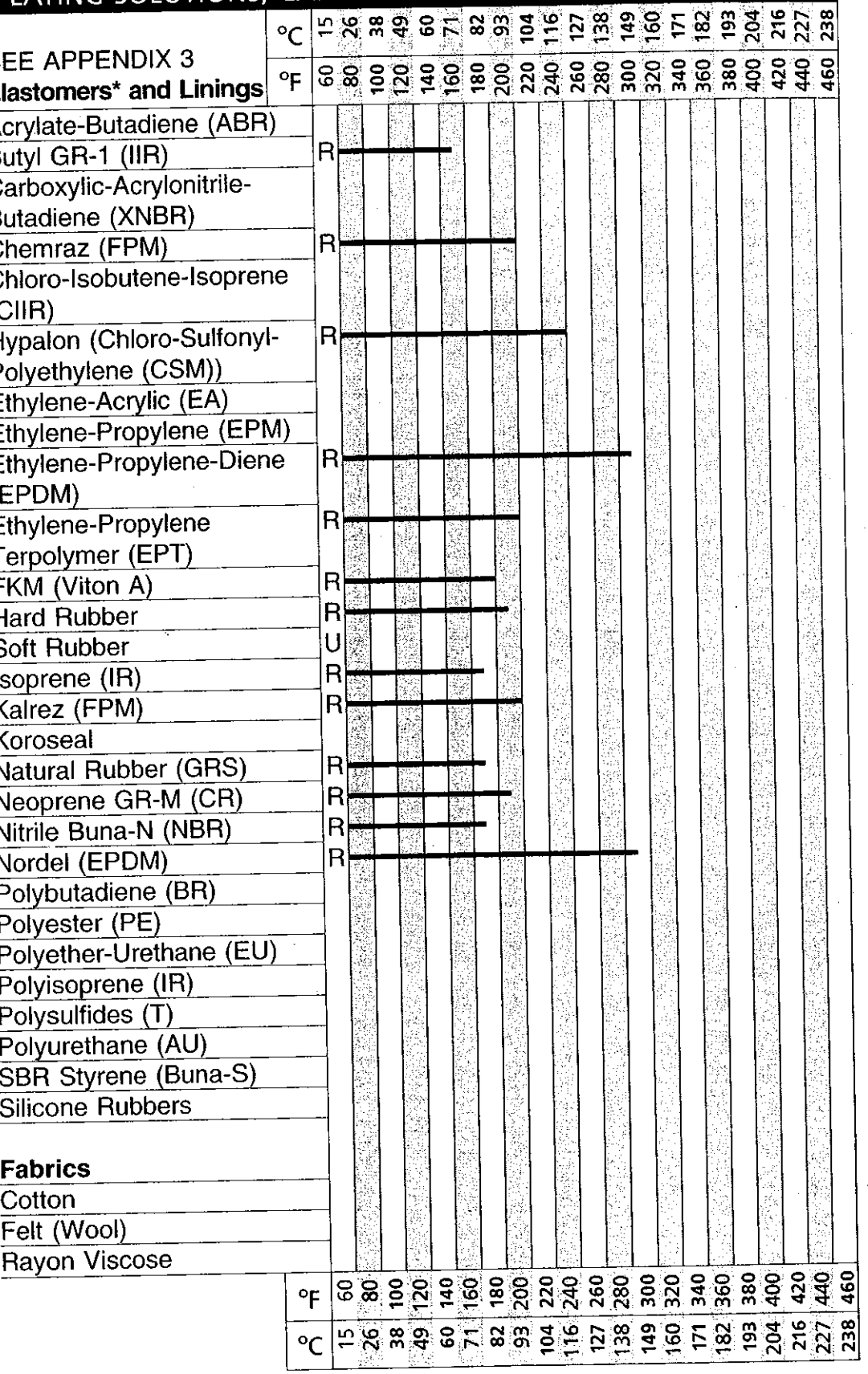
**Elastomers* and Linings**




*See also Nylon 11 under PLASTICS



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# PLATING SOLUTIONS, CHROME 25%

SEE APPENDIX 3

| Metals | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293 |
|---|---|
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560 |
| Admiralty Brass | |
| Aluminum | U |
| Aluminum Bronze | |
| Brass | G |
| Bronze | G |
| Carbon Steel | U |
| Columbium (Niobium) | G |
| Copper | U |
| Hastelloy B/B-2 | S |
| Hastelloy C/C-276 | E |
| Hastelloy D | |
| Hastelloy G/G-3 | |
| High Silicon Iron | G |
| Inconel 600/625 | U |
| Incolloy 800/825 | E G |
| Lead | |
| Monel 400 | U |
| Naval Bronze | |
| Nickel 200/201 | U |
| Ni-Resist | |
| Stainless Steels | |
| Type 304/347 | G |
| Type 316/316 L | G |
| Type 400 series | |
| Type 904-L | |
| 17-4 PH | |
| 20 Cb 3 | E |
| E-Bright 26-1 | |
| Silicon Bronze | U |
| Silicon Copper | |
| Stellite | |
| Tantalum | E |
| Titanium | U |
| Zirconium | U |

°F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560

°C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 249 260 271 282 293

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# PLATING SOLUTIONS, CHROME 25%

SEE APPENDIX 3

| Nonmetallic Materials | °C | °F |
|---|---|---|
| Borosilicate Glass | R | |
| Carbon | U | |
| Carbon-Graphite Resin Impregnated | R | |
| Ceramics | | |
| **Coatings** | | |
| Acrylic | R | |
| Asphalt | | |
| Chlorinated Rubber | | |
| Coal Tar | | |
| Coal Tar Epoxy | | |
| Epoxy General Purpose | U | |
| Epoxy Chemical Resistant | U | |
| Epoxy Polyamide | U | |
| Oil Base (Alkyd, Epoxy, Urethane) | | |
| Phenolic | | |
| Polyester | | |
| Polyvinyl Chloride | R | |
| Silicones | U | |
| Urethanes | | |
| Vinyls | | |
| Water Base | | |
| Zinc Rich | | |
| **Mortars** | | |
| Silicate | | |
| Sodium Silicate | | |
| Potassium Silicate | | |
| Silica | | |
| Sulfur | | |
| Furan Resin | | |
| Polyester | | |
| Epoxy | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |



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# PLATING SOLUTIONS, CHROME 25%

SEE APPENDIX 3

**Plastics**

| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | R | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | R | | | | | U | | | | | | | | | | | | | | | |
| CPVC | | R | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | U | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | R | | U | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | U | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | U | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | R | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) 2 | | R | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | R | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | R | | | | | U | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | U | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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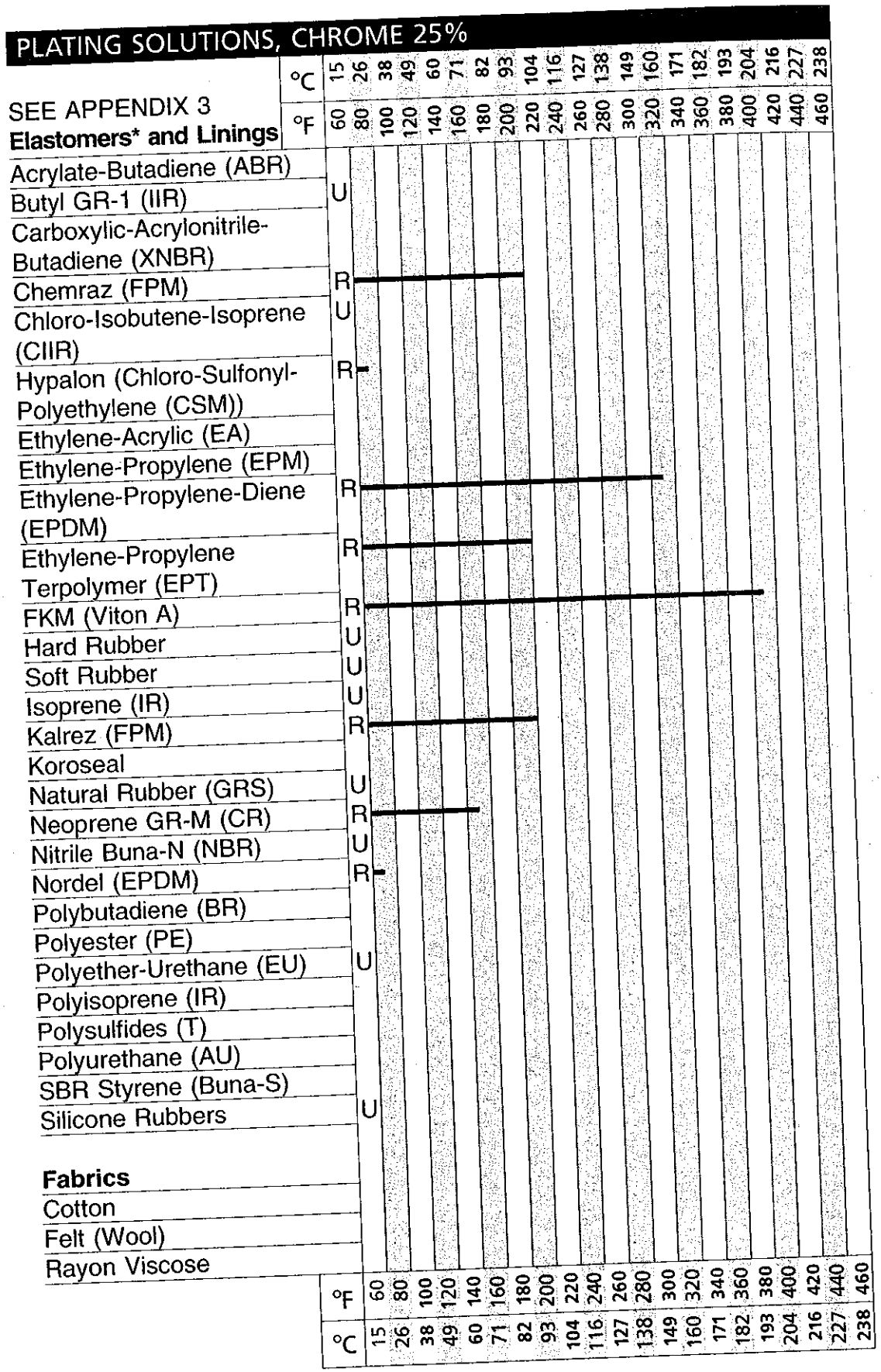


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# PLATING SOLUTIONS, CHROME 40%

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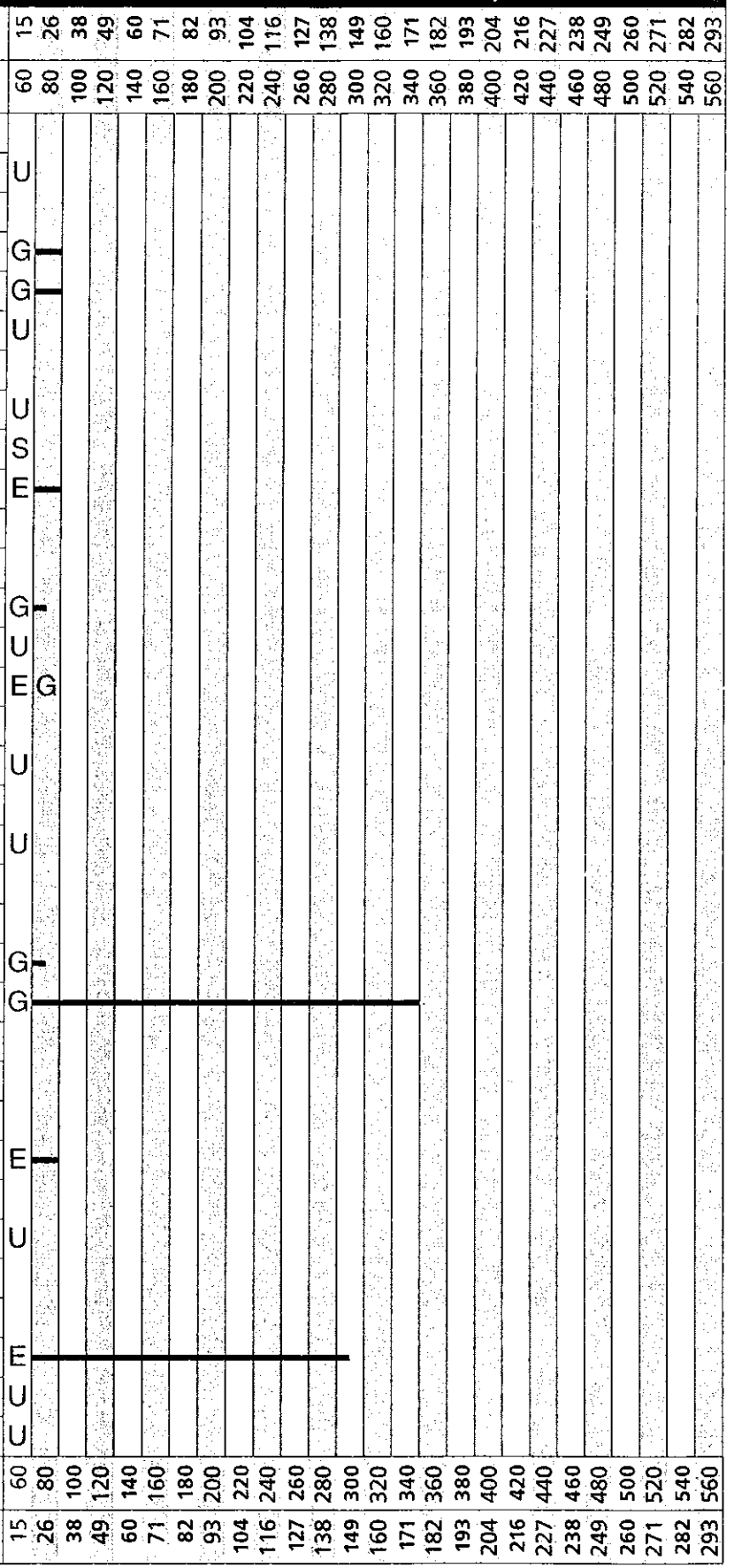
| Metals | °F | °C |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | U | |
| Aluminum Bronze | | |
| Brass | G | |
| Bronze | G | |
| Carbon Steel | U | |
| Columbium (Niobium) | | |
| Copper | U | |
| Hastelloy B/B-2 | S | |
| Hastelloy C/C-276 | E | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | G | |
| Inconel 600/625 | U | |
| Incolloy 800/825 | E G | |
| Lead | | |
| Monel 400 | U | |
| Naval Bronze | | |
| Nickel 200/201 | U | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | G | |
| Type 316/316 L | G | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | E | |
| E-Bright 26-1 | | |
| Silicon Bronze | U | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | E | |
| Titanium | U | |
| Zirconium | U | |




FOR METALS
E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year
S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS
R = Resistant
U = Unsatisfactory

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SEE APPENDIX 3

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |

| **Nonmetallic Materials** | |
|---|---|
| Borosilicate Glass | R |
| Carbon | U |
| Carbon-Graphite Resin Impregnated | R |
| Ceramics | |
| **Coatings** | |
| Acrylic | |
| Asphalt | |
| Chlorinated Rubber | |
| Coal Tar | |
| Coal Tar Epoxy | |
| Epoxy General Purpose | U |
| Epoxy Chemical Resistant | U |
| Epoxy Polyamide | U |
| Oil Base (Alkyd, Epoxy, Urethane) | |
| Phenolic | |
| Polyester | |
| Polyvinyl Chloride | R |
| Silicones | U |
| Urethanes | |
| Vinyls | |
| Water Base | |
| Zinc Rich | |
| **Mortars** | |
| Silicate | |
| Sodium Silicate | |
| Potassium Silicate | |
| Silica | |
| Sulfur | |
| Furan Resin | |
| Polyester | |
| Epoxy | |

| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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SEE APPENDIX 3

**Plastics**

| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | U | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | R | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | R | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | R | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | U | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | R | | | | | | | | | | | | | | | | | | | | |
| FEP | | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | R | | U | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | U | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | U | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | 2 | | R | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | R | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | R | | | | | U | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | U | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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| **Elastomers* and Linings** | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |
|---|---|
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| Acrylate-Butadiene (ABR) | |
| Butyl GR-1 (IIR) | U |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | |
| Chemraz (FPM) | R |
| Chloro-Isobutene-Isoprene (CIIR) | U |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | R |
| Ethylene-Acrylic (EA) | |
| Ethylene-Propylene (EPM) | |
| Ethylene-Propylene-Diene (EPDM) | R |
| Ethylene-Propylene Terpolymer (EPT) | R |
| FKM (Viton A) | R |
| Hard Rubber | U |
| Soft Rubber | U |
| Isoprene (IR) | U |
| Kalrez (FPM) | R |
| Koroseal | |
| Natural Rubber (GRS) | U |
| Neoprene GR-M (CR) | R |
| Nitrile Buna-N (NBR) | U |
| Nordel (EPDM) | |
| Polybutadiene (BR) | |
| Polyester (PE) | |
| Polyether-Urethane (EU) | U |
| Polyisoprene (IR) | |
| Polysulfides (T) | |
| Polyurethane (AU) | |
| SBR Styrene (Buna-S) | |
| Silicone Rubbers | U |
| **Fabrics** | |
| Cotton | |
| Felt (Wool) | |
| Rayon Viscose | |
| | °F 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 |
| | °C 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238 |

*See also Nylon 11 under PLASTICS



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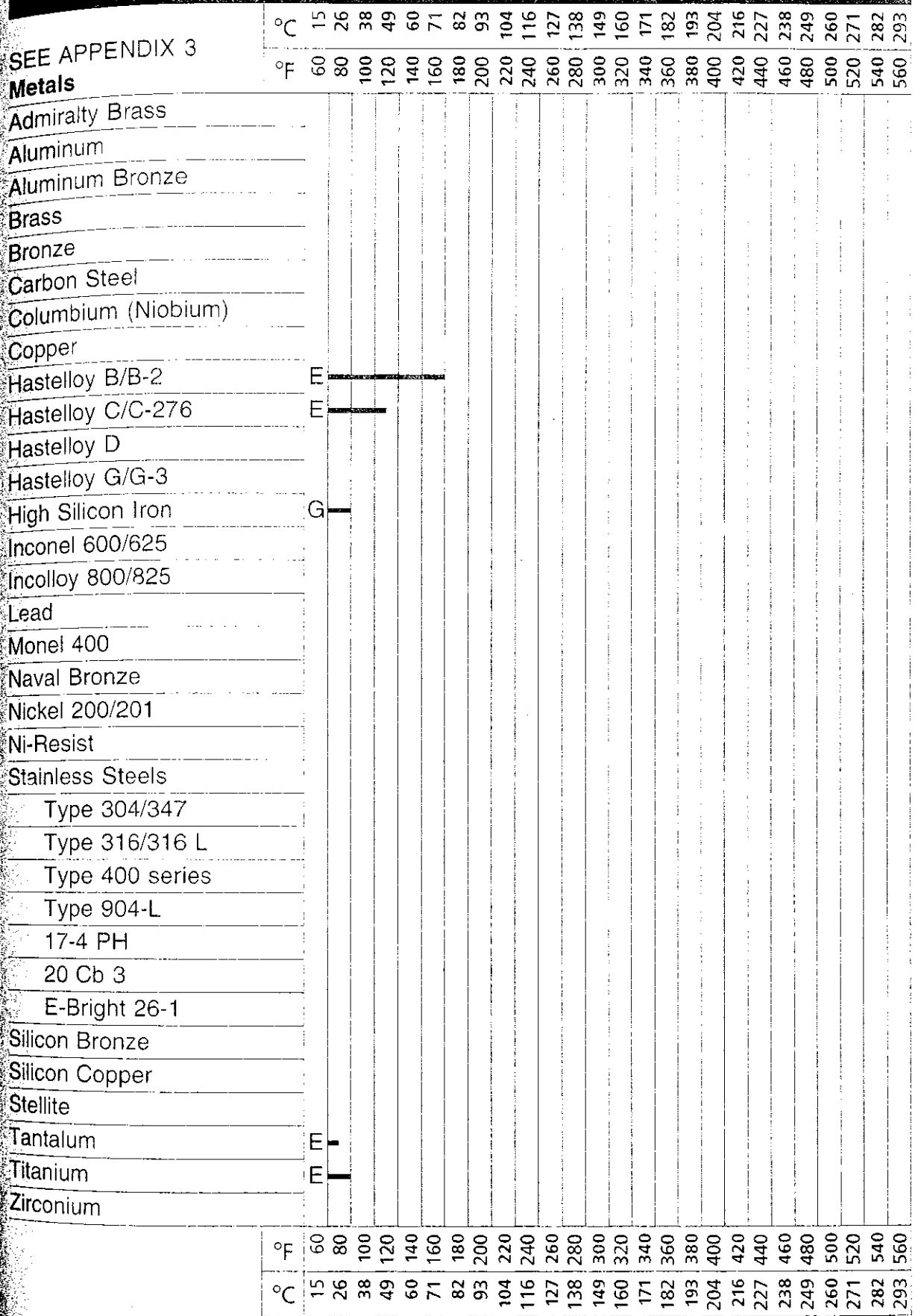


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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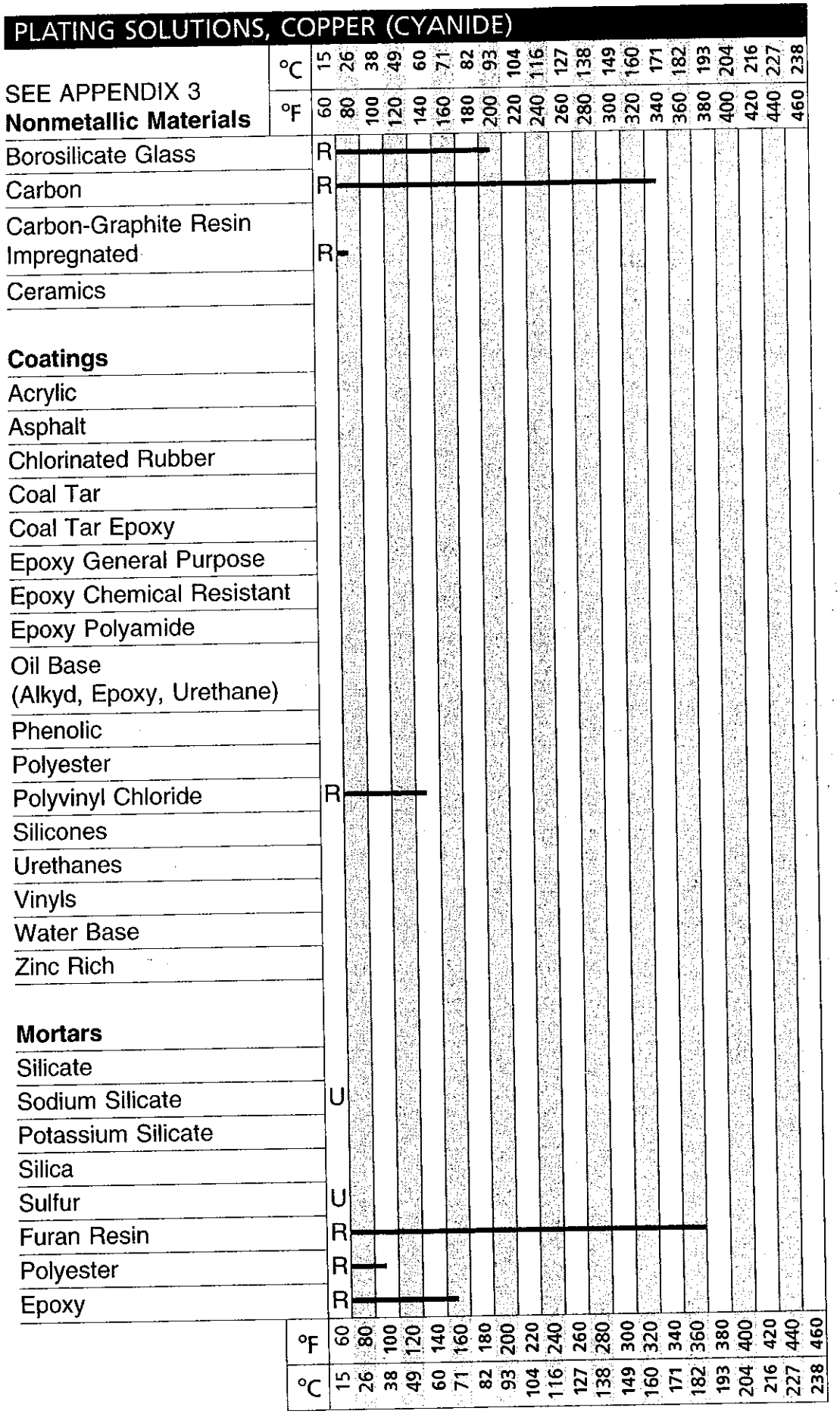




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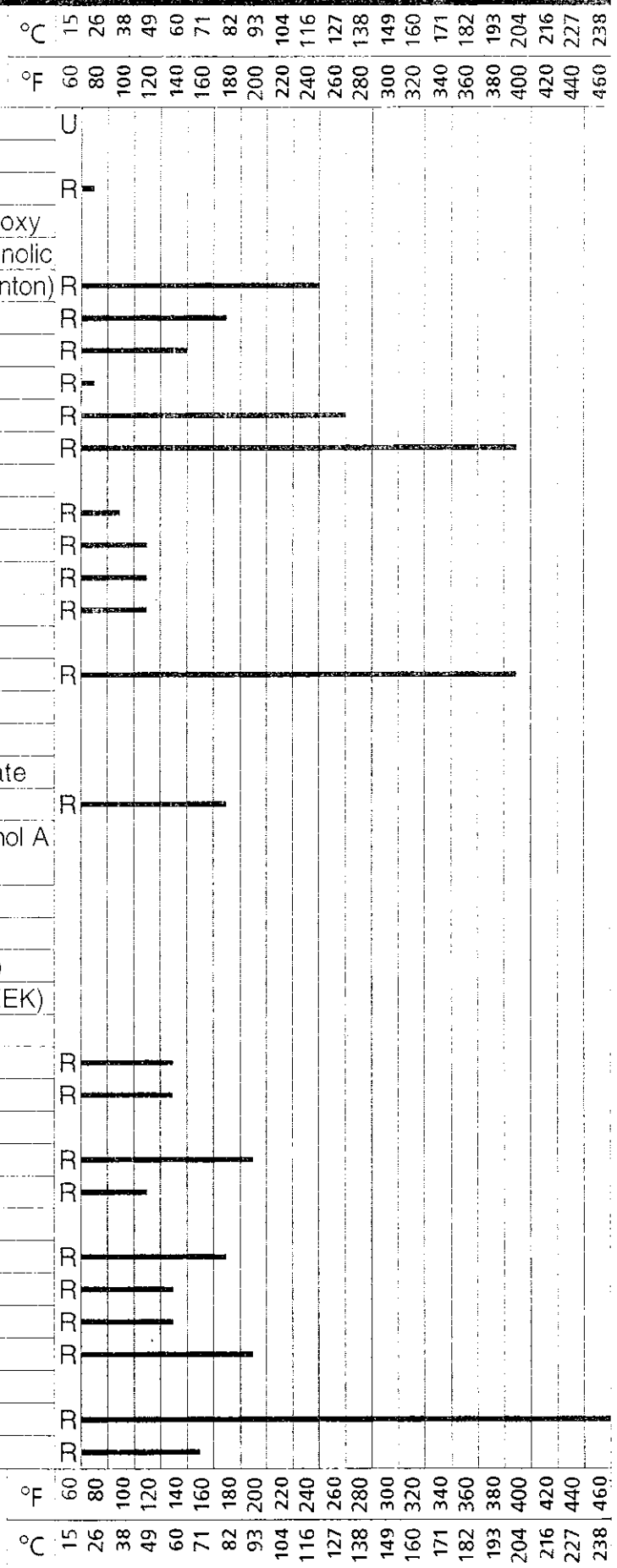


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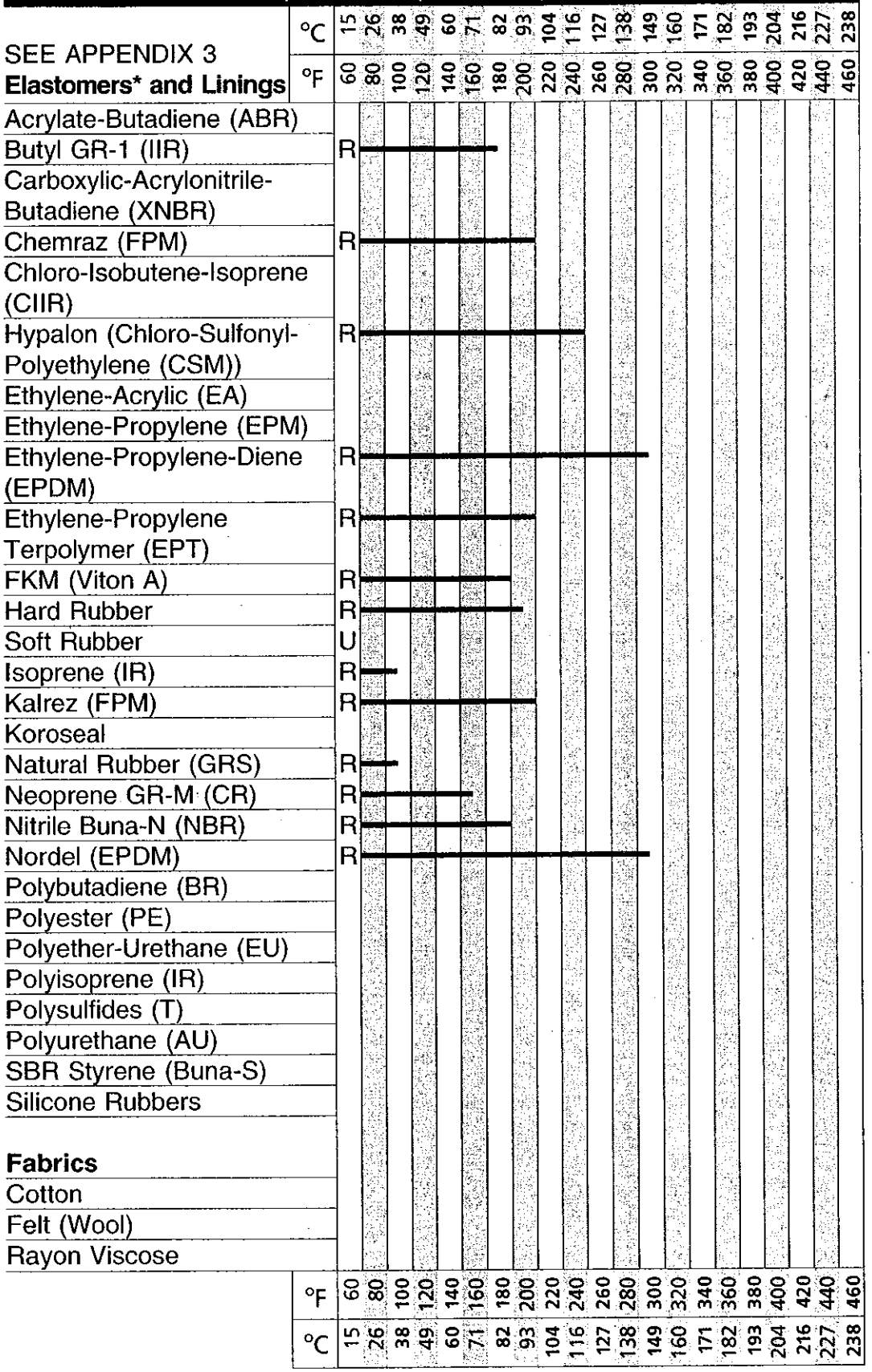


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SEE APPENDIX 3

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | | |
| Hastelloy C/C-276 | E | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | G | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | | |
| Type 316/316 L | E | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | E | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | E | |
| Zirconium | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## PLATING SOLUTIONS, GOLD

SEE APPENDIX 3

**Nonmetallic Materials**

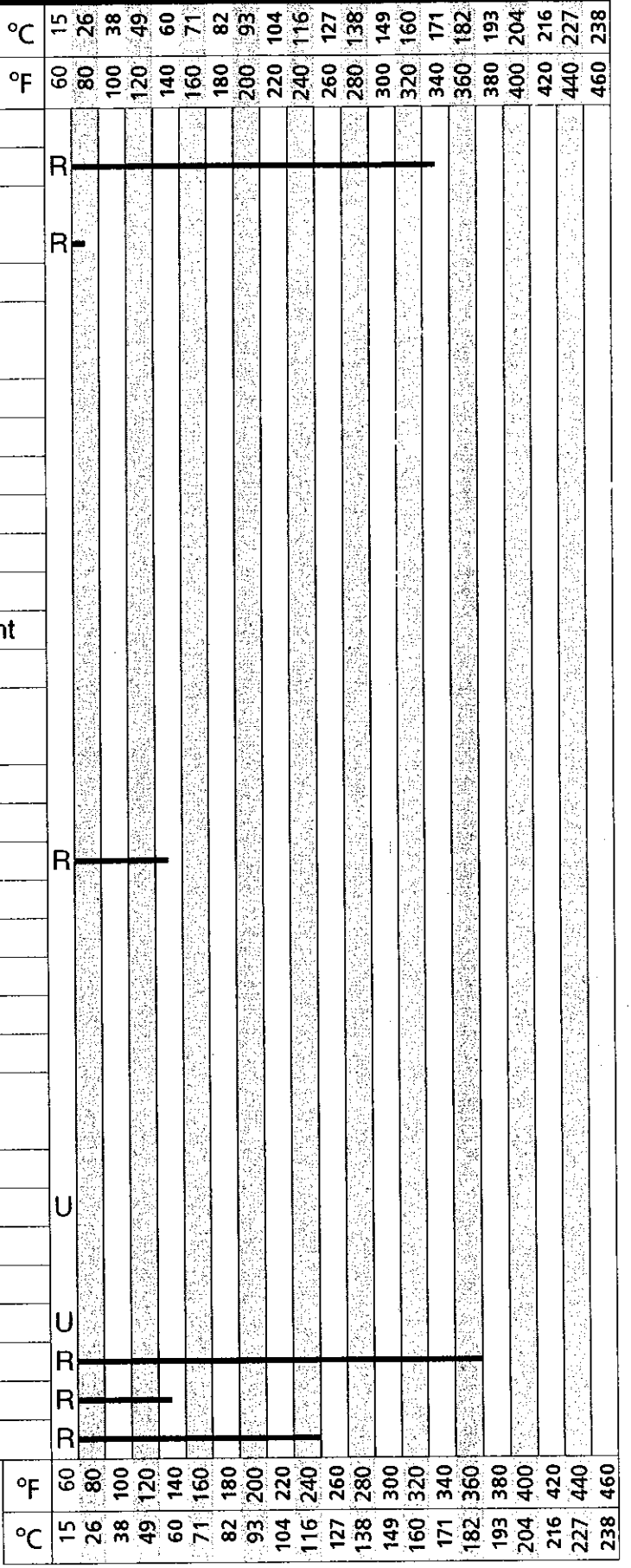
- Borosilicate Glass
- Carbon — R
- Carbon-Graphite Resin Impregnated — R
- Ceramics

**Coatings**

- Acrylic
- Asphalt
- Chlorinated Rubber
- Coal Tar
- Coal Tar Epoxy
- Epoxy General Purpose
- Epoxy Chemical Resistant
- Epoxy Polyamide
- Oil Base (Alkyd, Epoxy, Urethane)
- Phenolic
- Polyester
- Polyvinyl Chloride — R
- Silicones
- Urethanes
- Vinyls
- Water Base
- Zinc Rich

**Mortars**

- Silicate
- Sodium Silicate — U
- Potassium Silicate
- Silica
- Sulfur — U
- Furan Resin — R
- Polyester — R
- Epoxy — R



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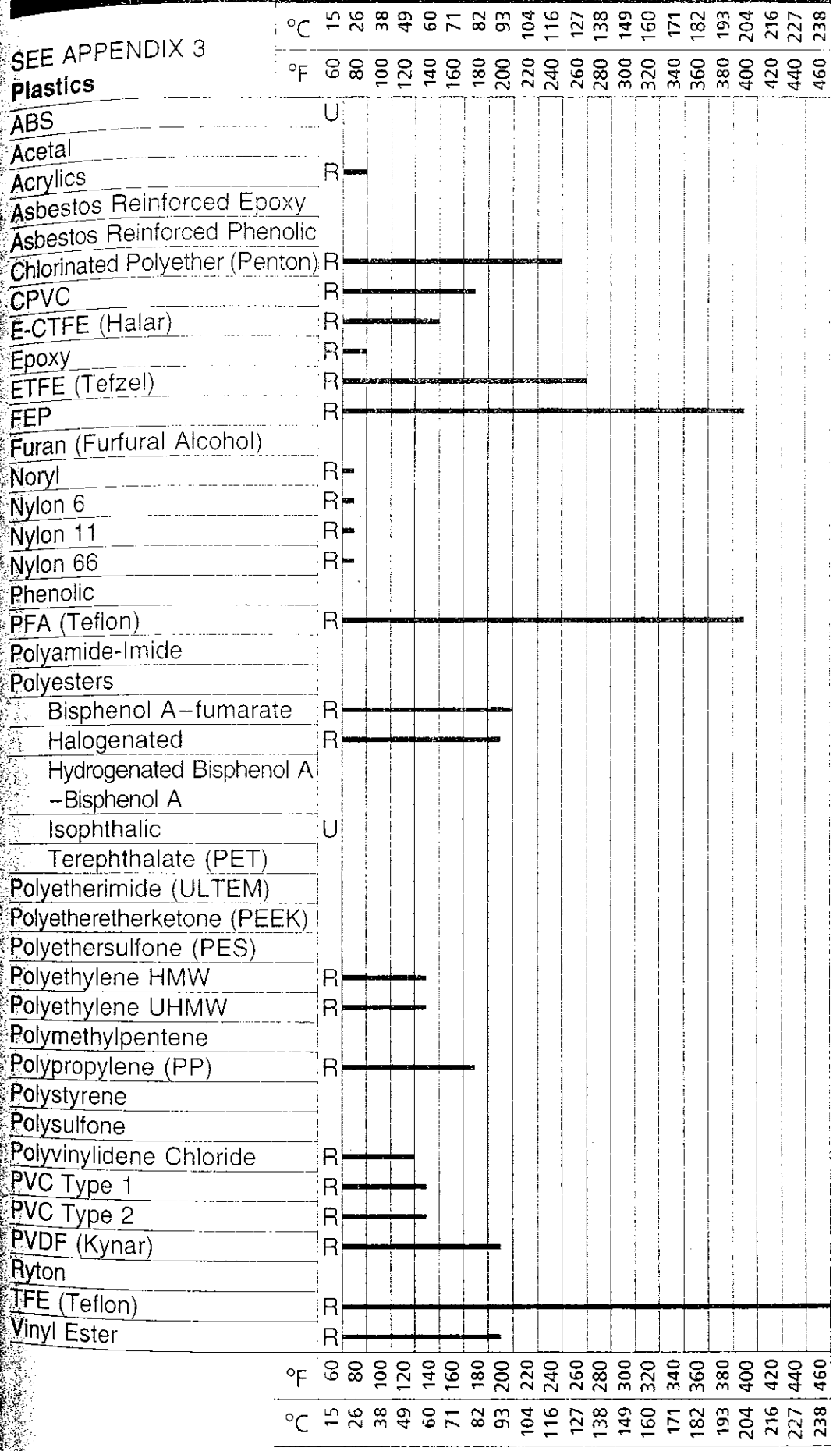
**Plastics**

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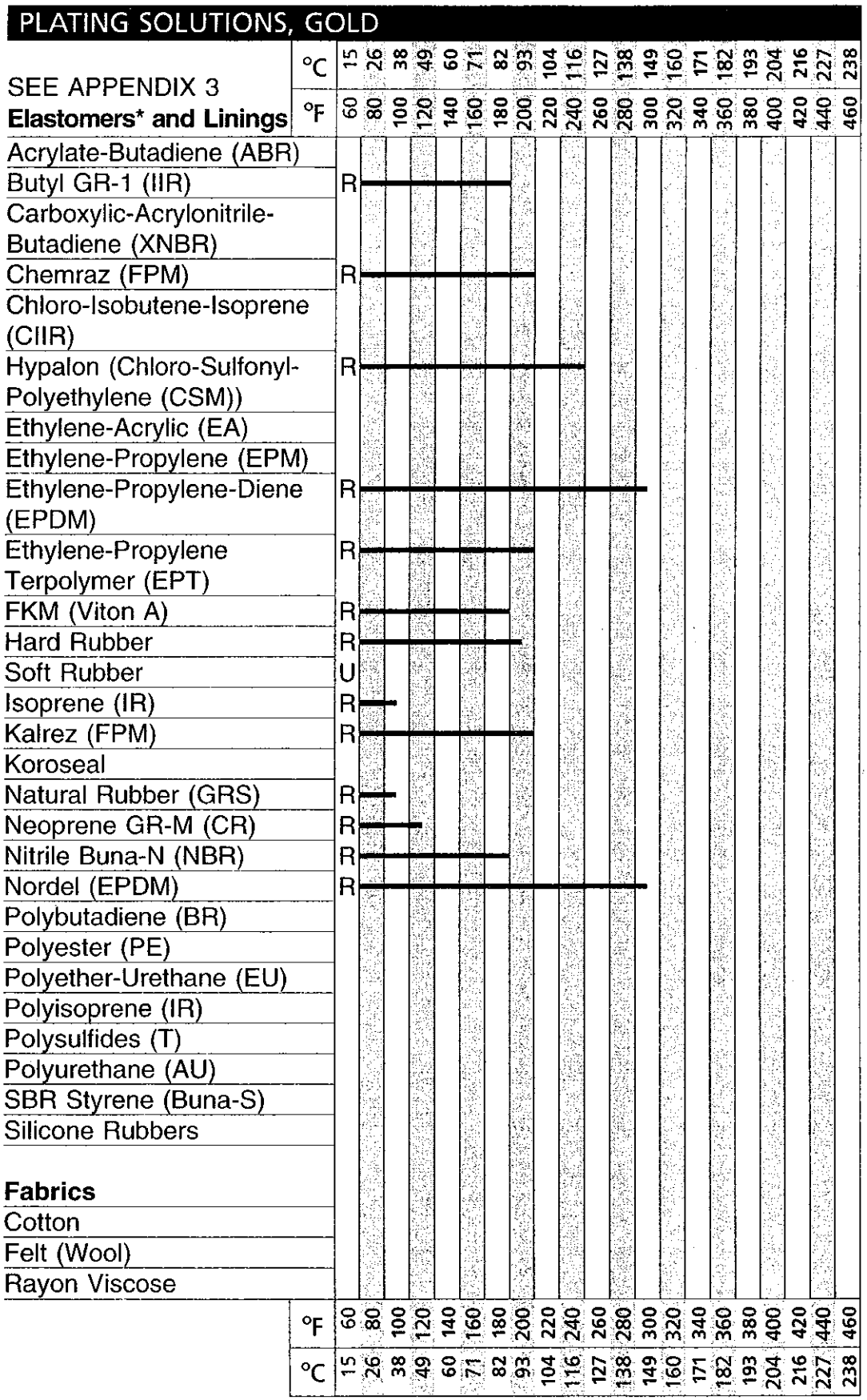
## PLATING SOLUTIONS, GOLD

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P

| SEE APPENDIX 3 **Metals** | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | G | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## PLATING SOLUTIONS, IRON

SEE APPENDIX 3

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | R | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | R | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |


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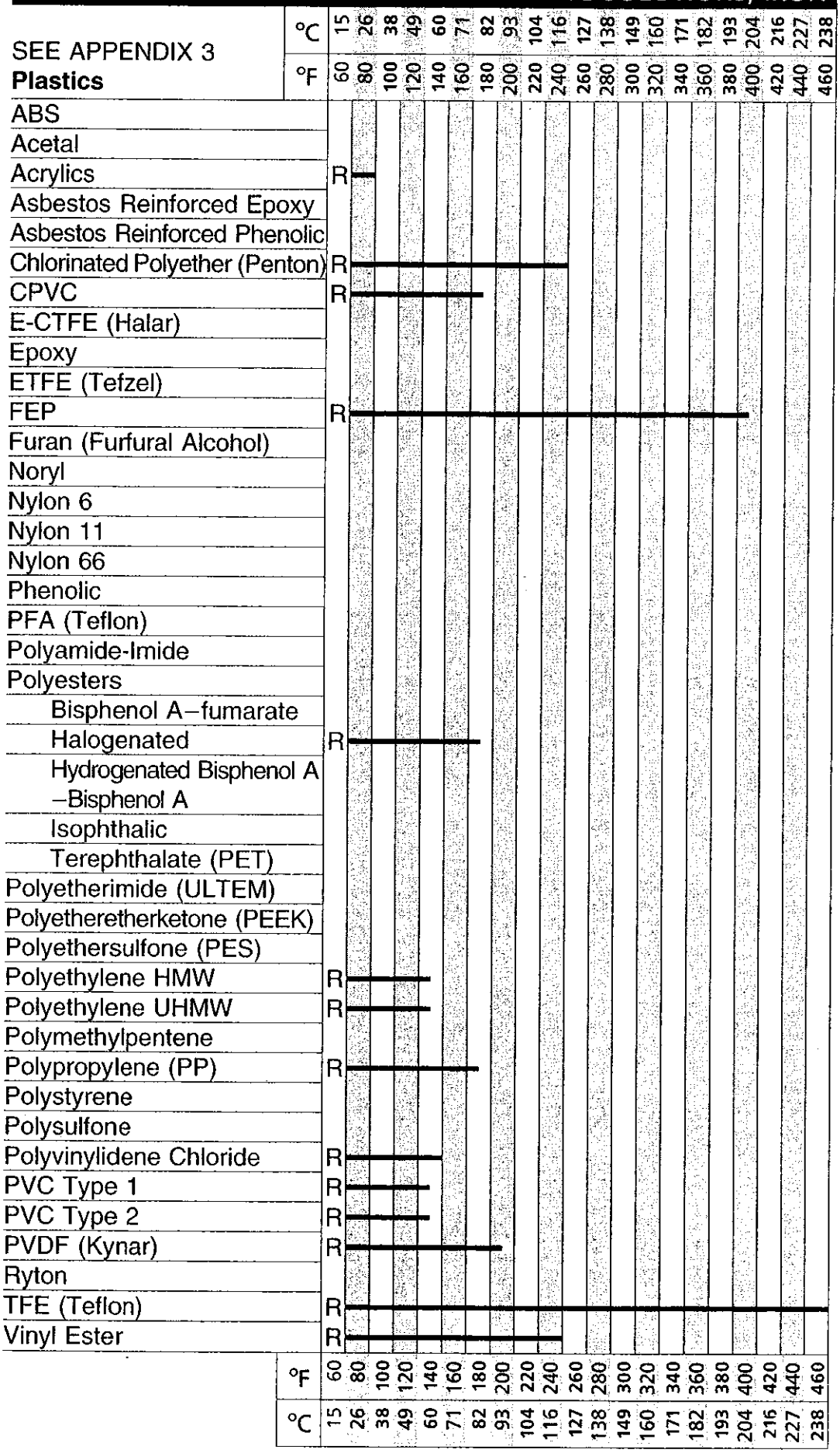
# PLATING SOLUTIONS, IRON

SEE APPENDIX 3

**Plastics**

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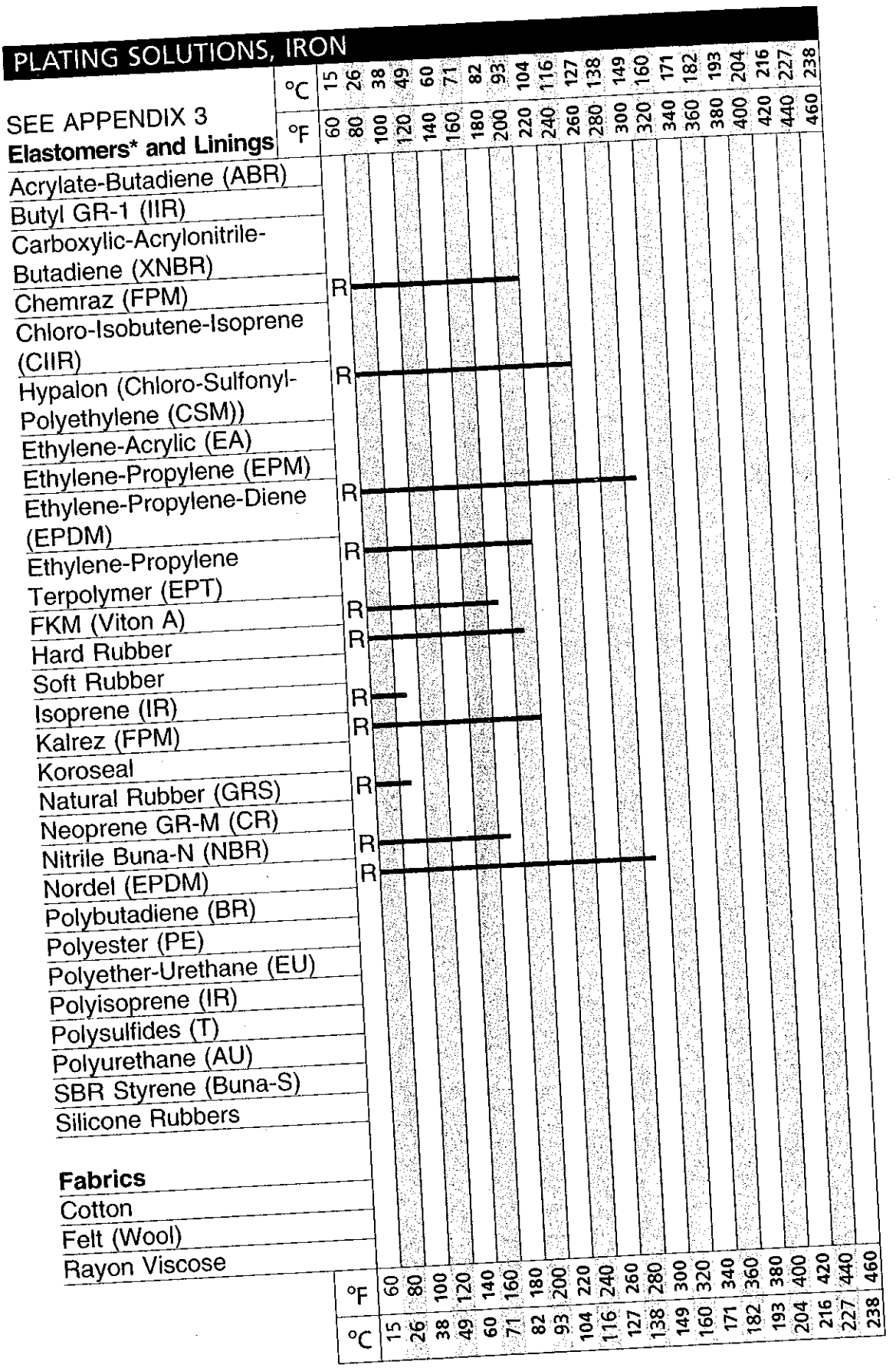
## PLATING SOLUTIONS, IRON

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SEE APPENDIX 3

| Metals | °C | °F |
|---|---|---|
| Admiralty Brass | | |
| Aluminum | | |
| Aluminum Bronze | | |
| Brass | | |
| Bronze | | |
| Carbon Steel | | |
| Columbium (Niobium) | | |
| Copper | | |
| Hastelloy B/B-2 | E | |
| Hastelloy C/C-276 | E | |
| Hastelloy D | | |
| Hastelloy G/G-3 | | |
| High Silicon Iron | G | |
| Inconel 600/625 | | |
| Incolloy 800/825 | | |
| Lead | | |
| Monel 400 | | |
| Naval Bronze | | |
| Nickel 200/201 | | |
| Ni-Resist | | |
| Stainless Steels | | |
| Type 304/347 | E | |
| Type 316/316 L | E | |
| Type 400 series | | |
| Type 904-L | | |
| 17-4 PH | | |
| 20 Cb 3 | E | |
| E-Bright 26-1 | | |
| Silicon Bronze | | |
| Silicon Copper | | |
| Stellite | | |
| Tantalum | | |
| Titanium | U | |
| Zirconium | | |

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## PLATING SOLUTIONS, LEAD

| SEE APPENDIX 3 **Nonmetallic Materials** | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | R | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | R | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | R | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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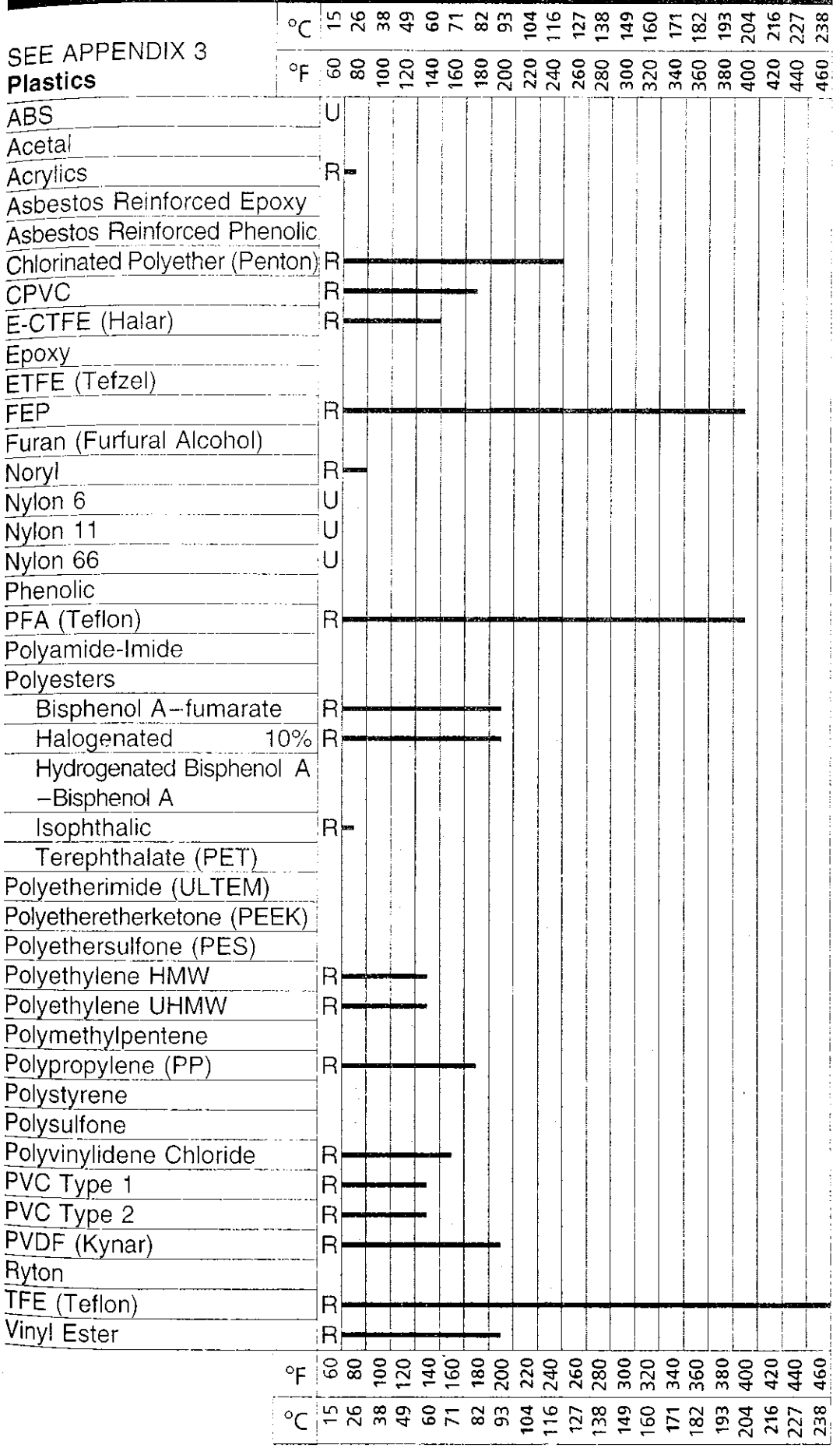
SEE APPENDIX 3
**Plastics**





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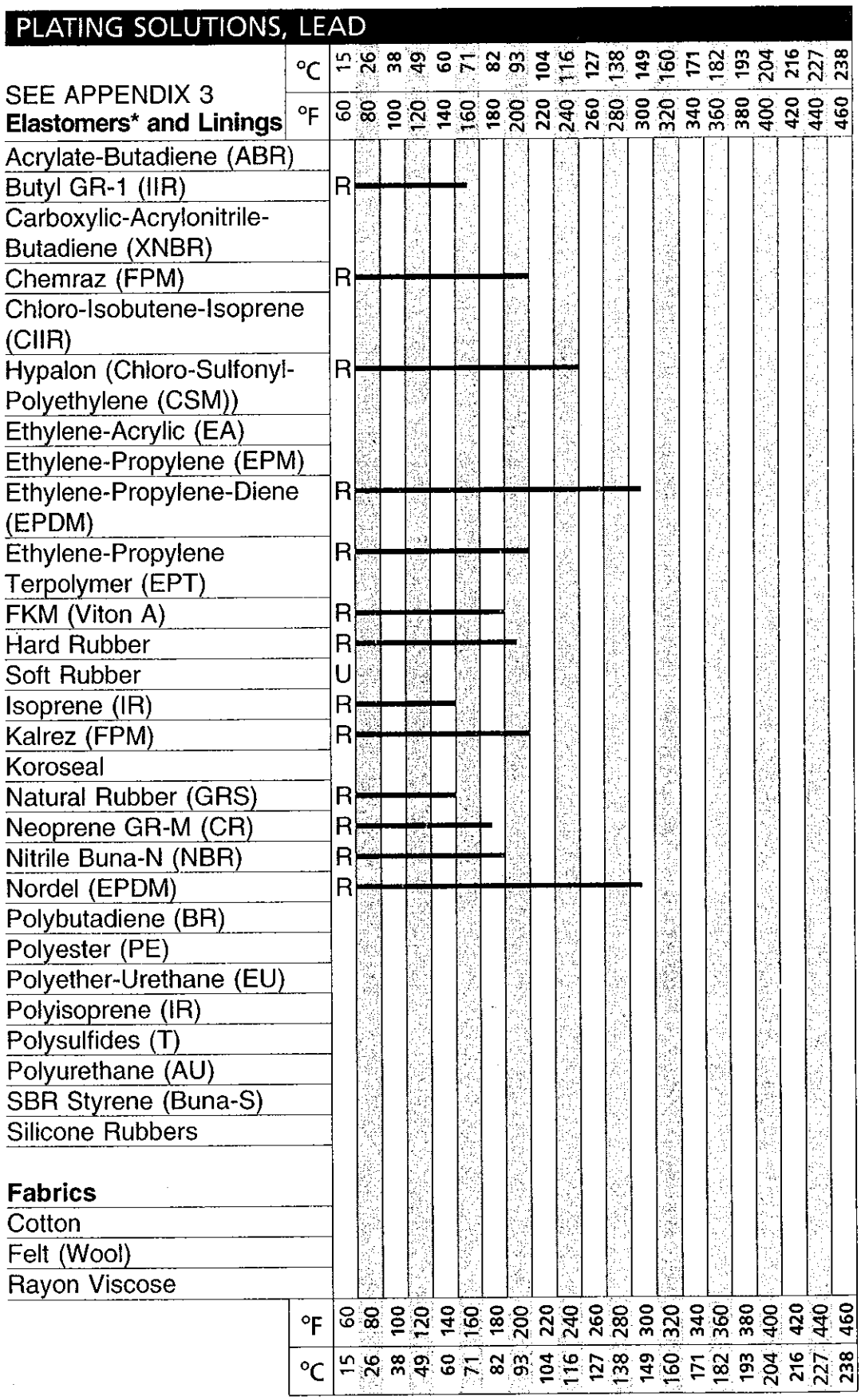
## PLATING SOLUTIONS, LEAD

SEE APPENDIX 3

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SEE APPENDIX 3

**Metals**

| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | E | | G | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | E | | G | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | |
| °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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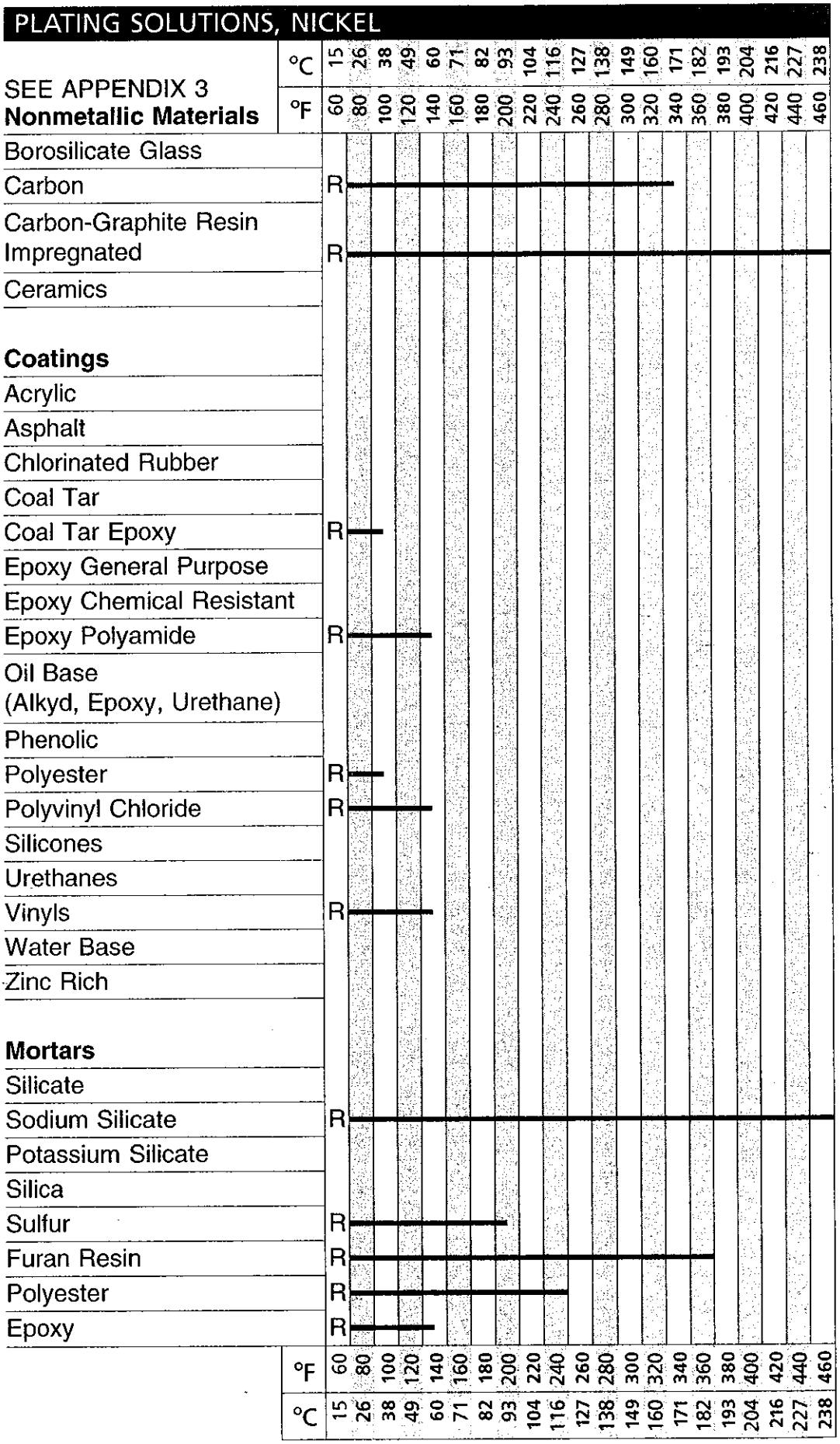
## PLATING SOLUTIONS, NICKEL



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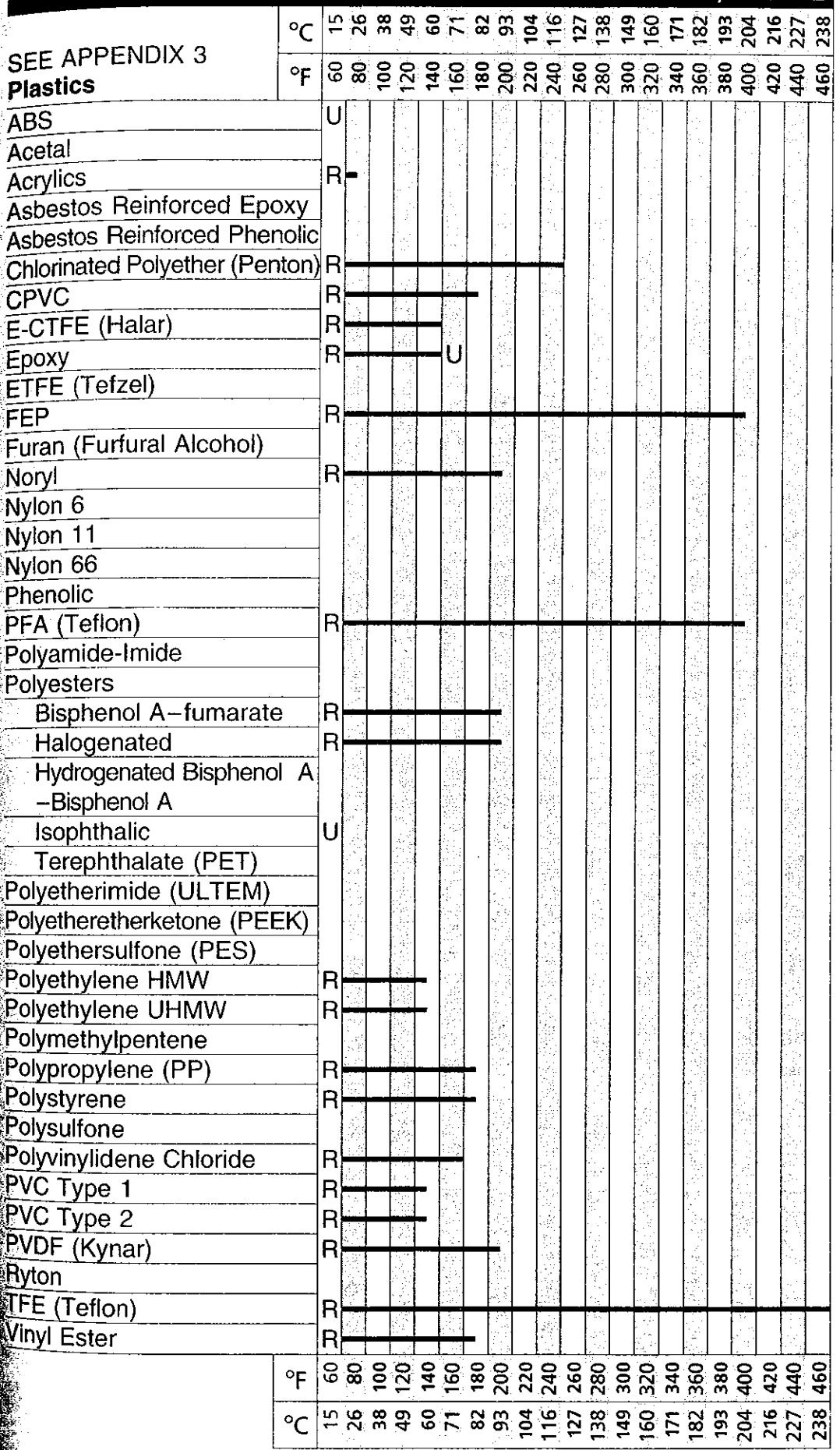
**Plastics**

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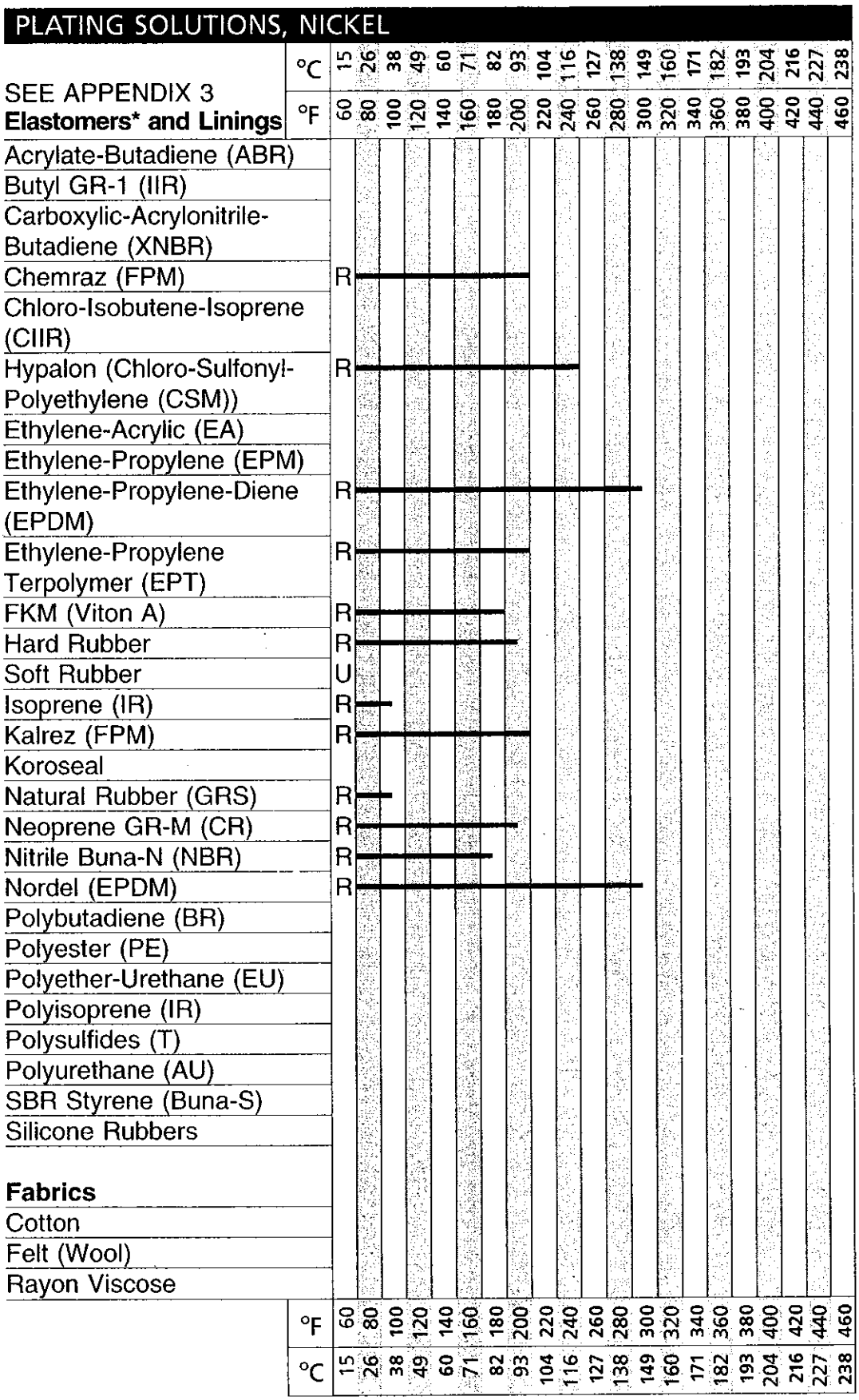
## PLATING SOLUTIONS, NICKEL




*See also Nylon 11 under PLASTICS

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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

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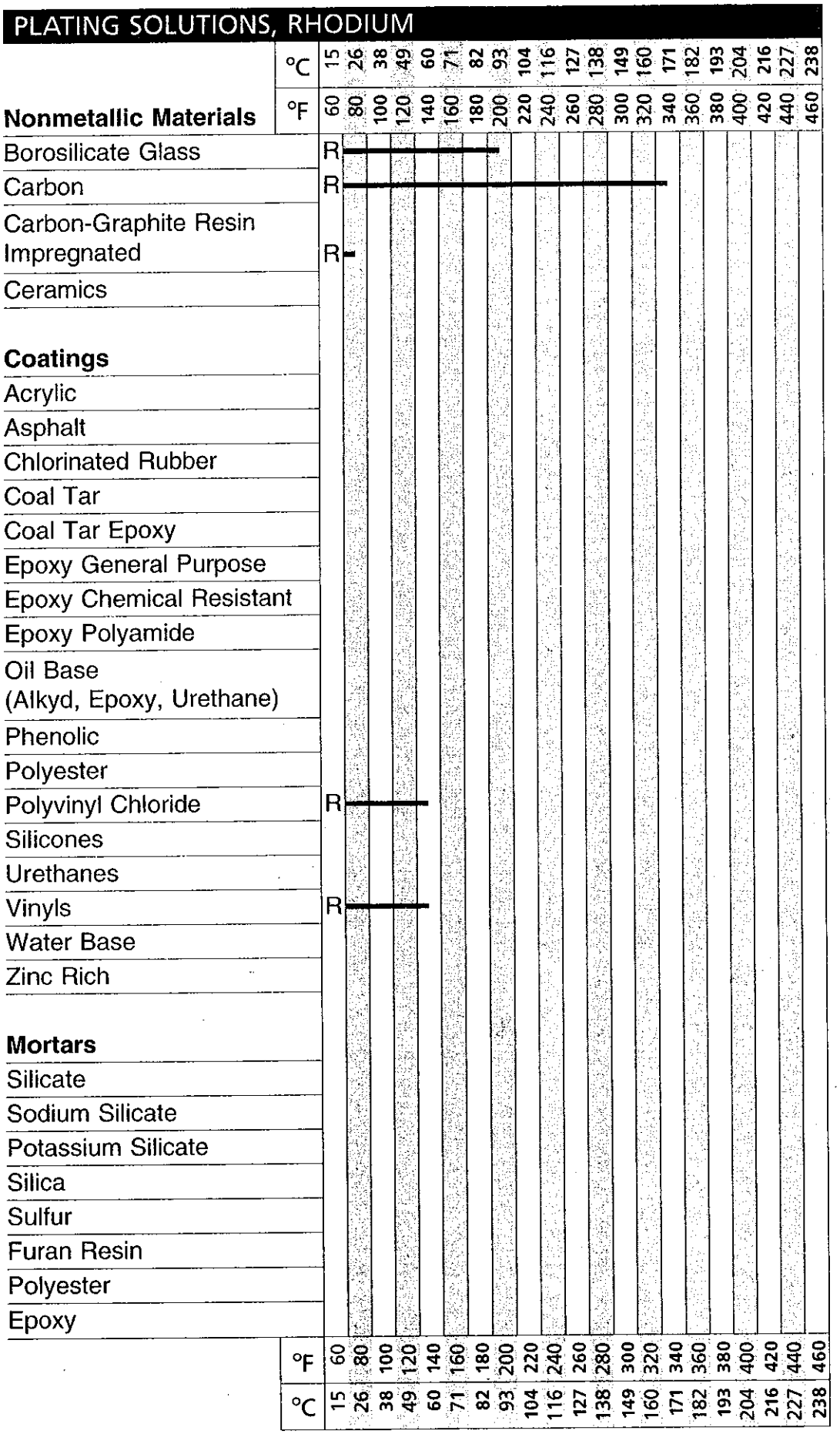
# PLATING SOLUTIONS, RHODIUM



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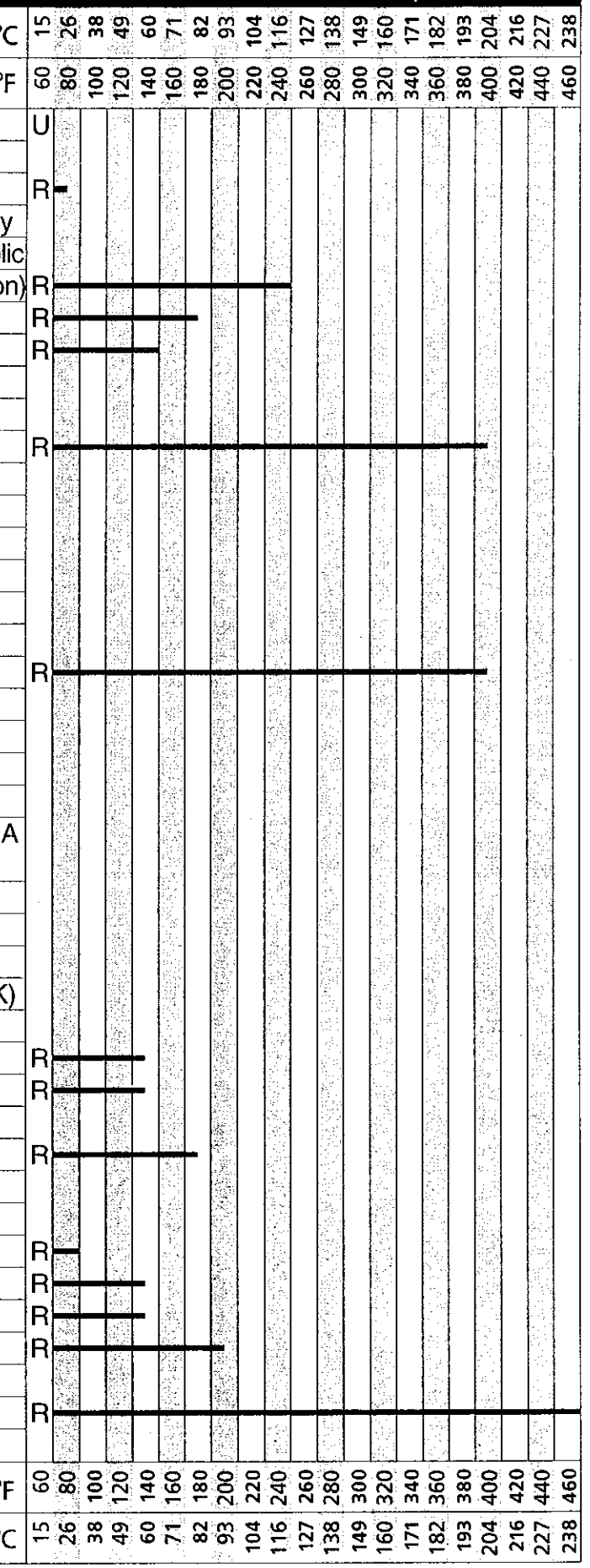


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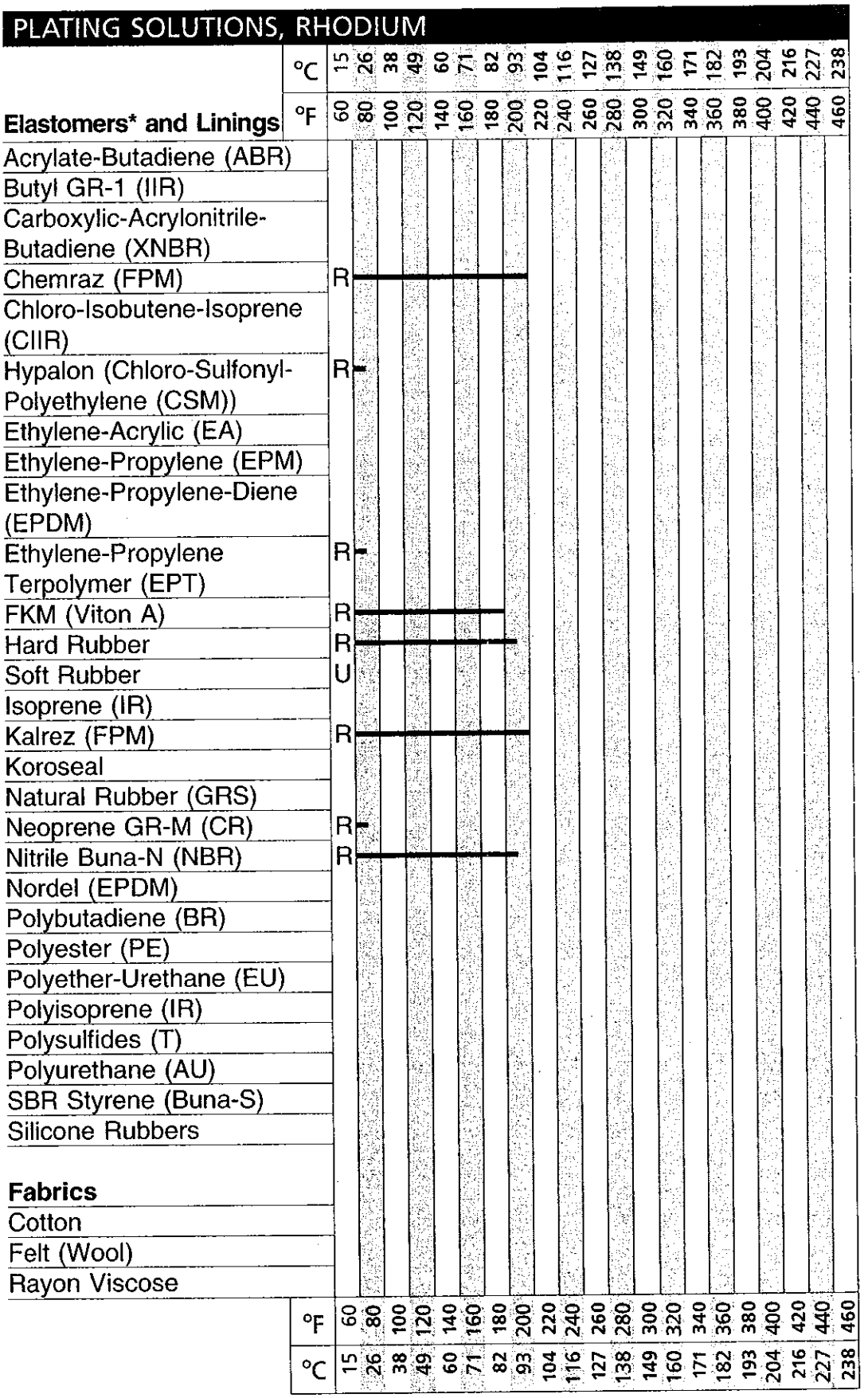
## PLATING SOLUTIONS, RHODIUM

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| SEE APPENDIX 3 **Metals** | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | E | — | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | G | — | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | E | — | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | E | — | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | E | — | — | — | — | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | E | — | — | — | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

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## PLATING SOLUTIONS, SILVER

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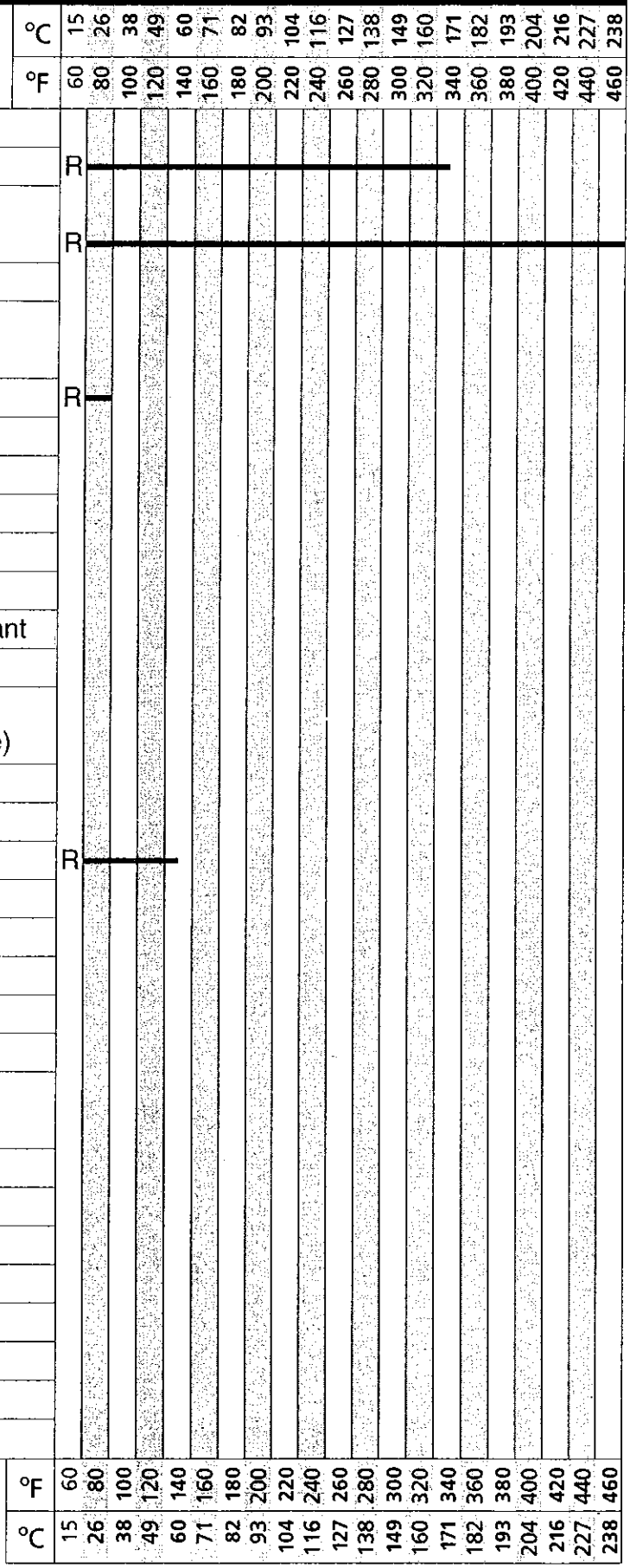
**Nonmetallic Materials**



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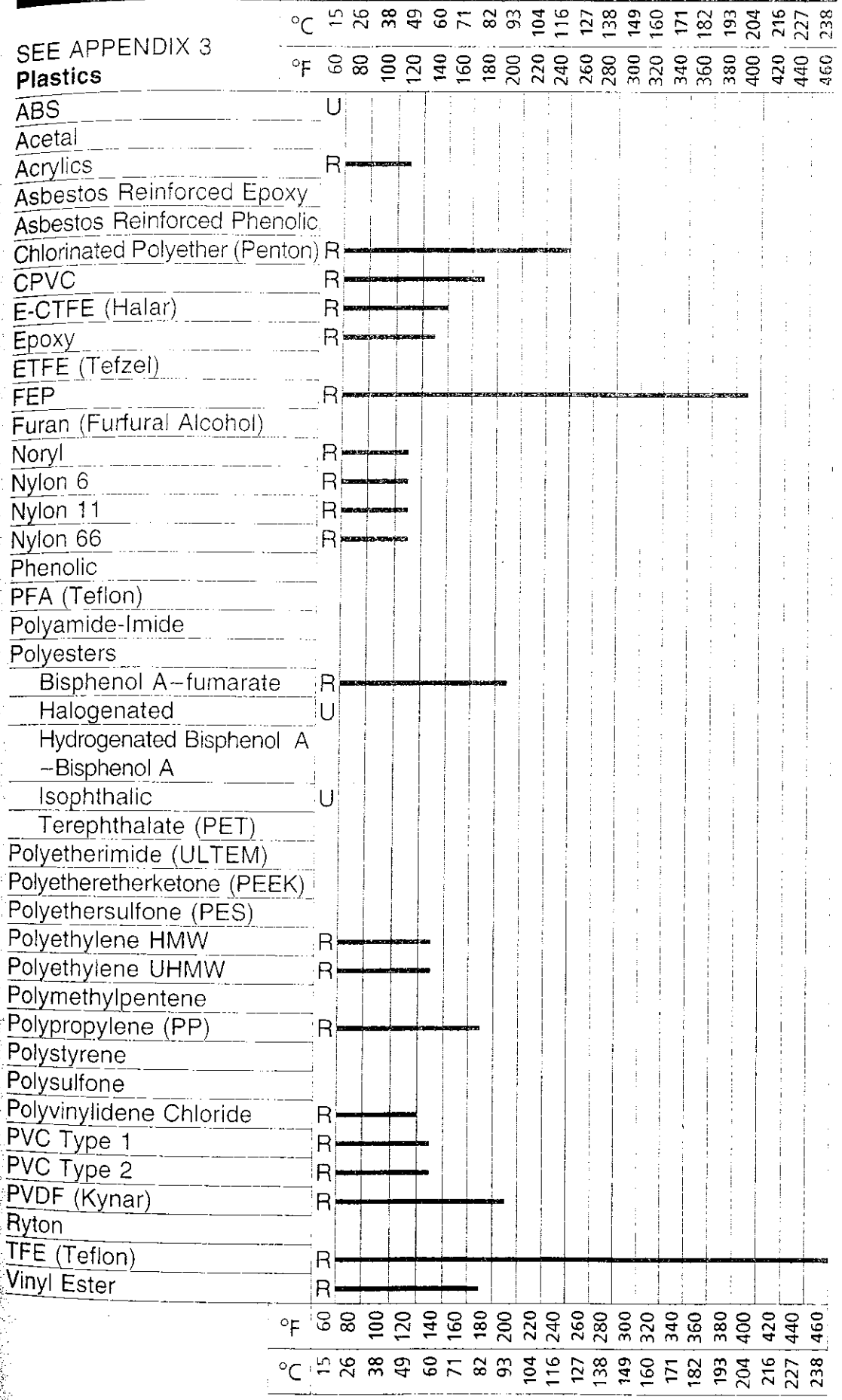
**Plastics**

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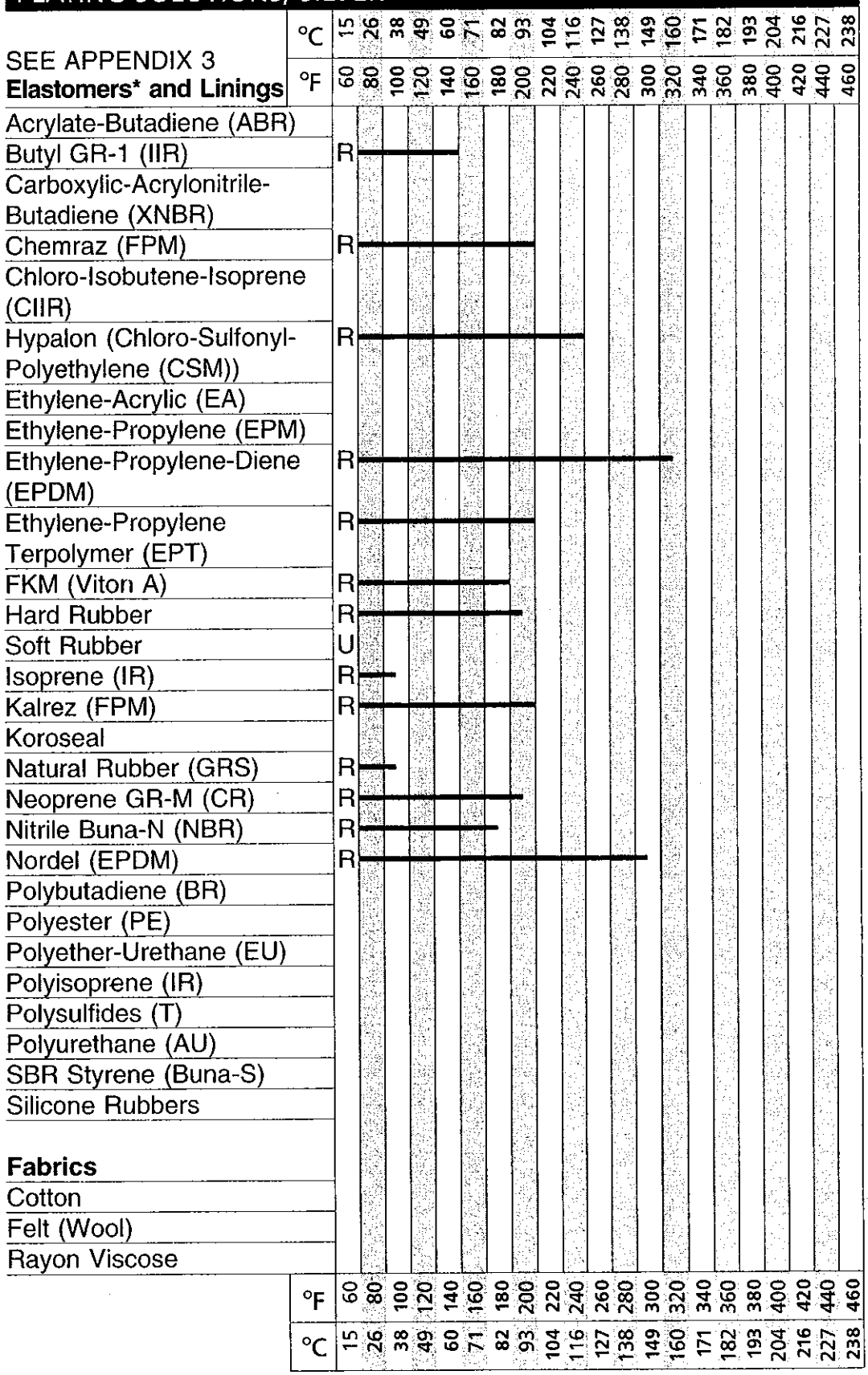
## PLATING SOLUTIONS, SILVER

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | S | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | U | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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FOR METALS

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FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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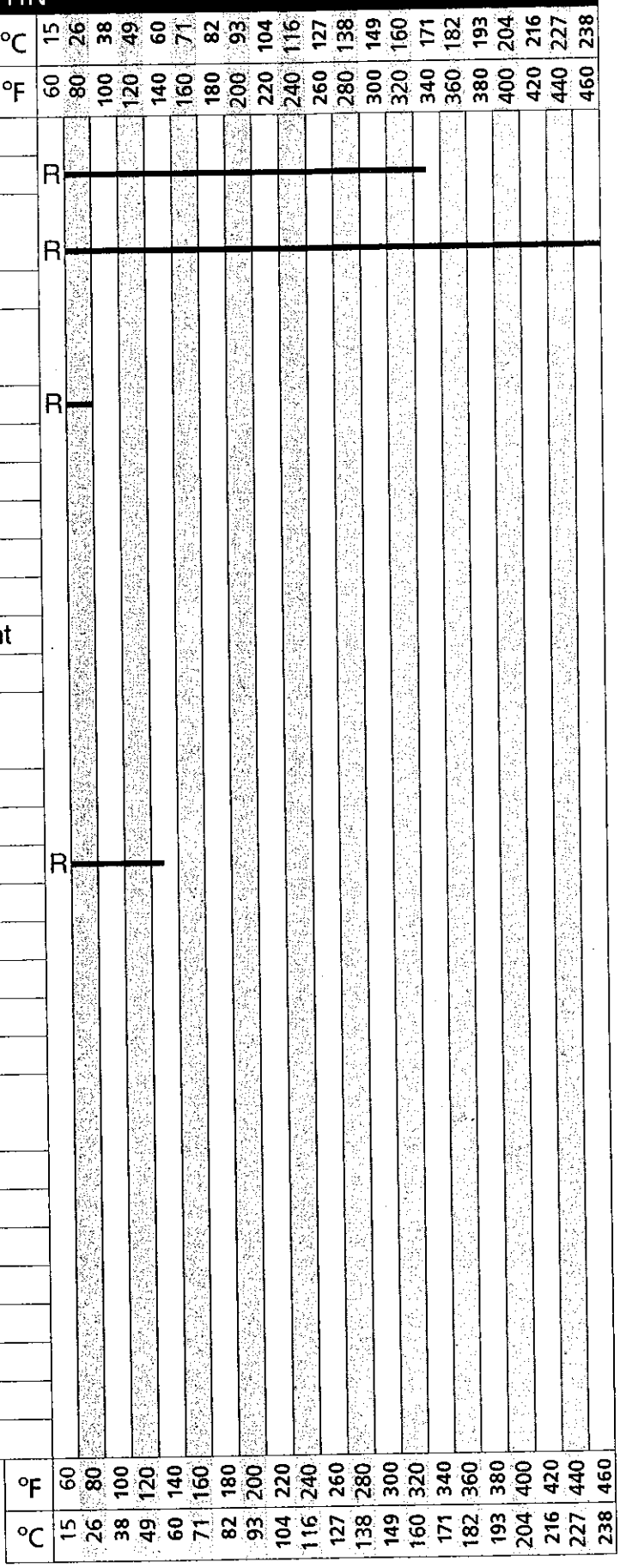
# PLATING SOLUTIONS, TIN

SEE APPENDIX 3
**Nonmetallic Materials**



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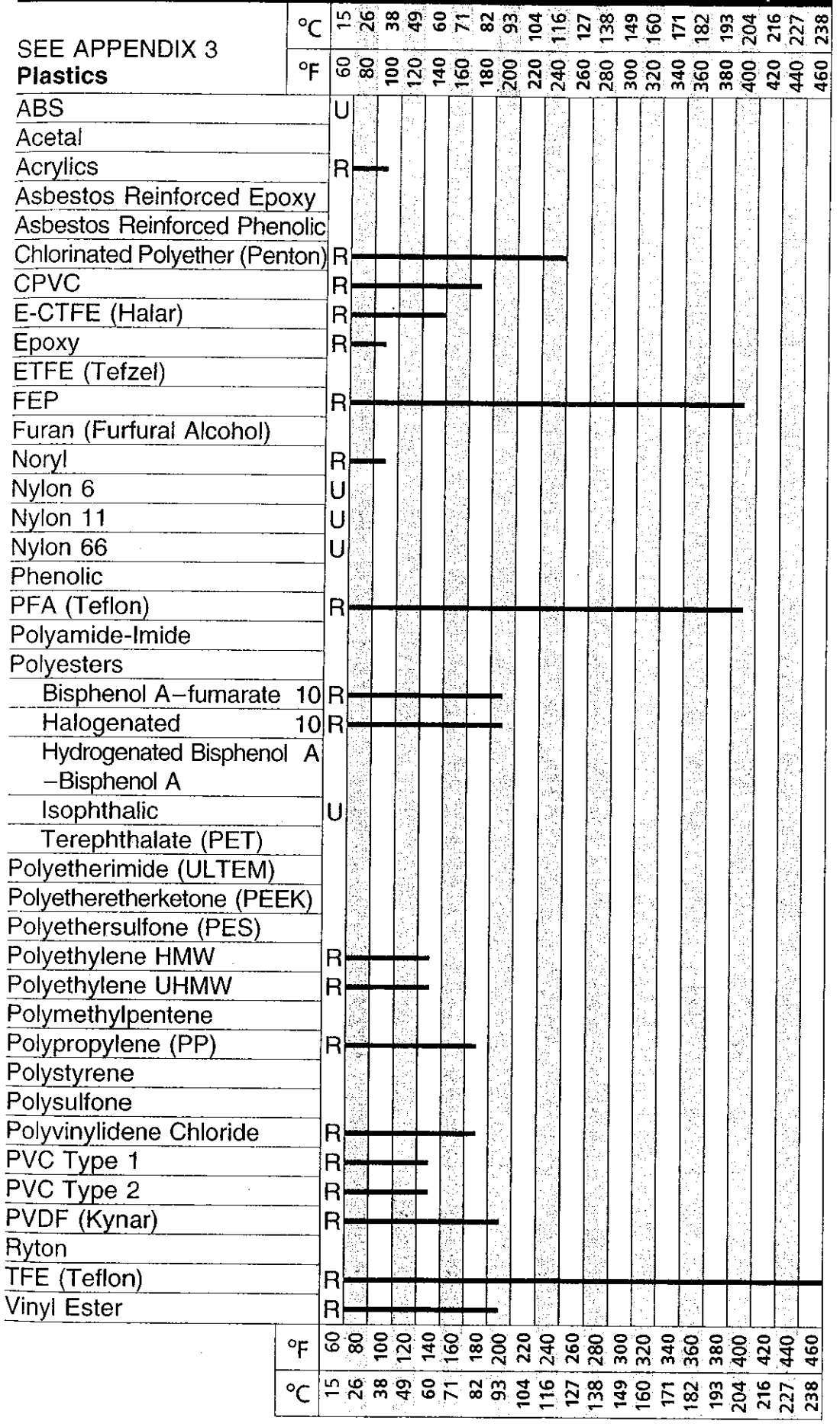
# PLATING SOLUTIONS, TIN

SEE APPENDIX 3
**Plastics**

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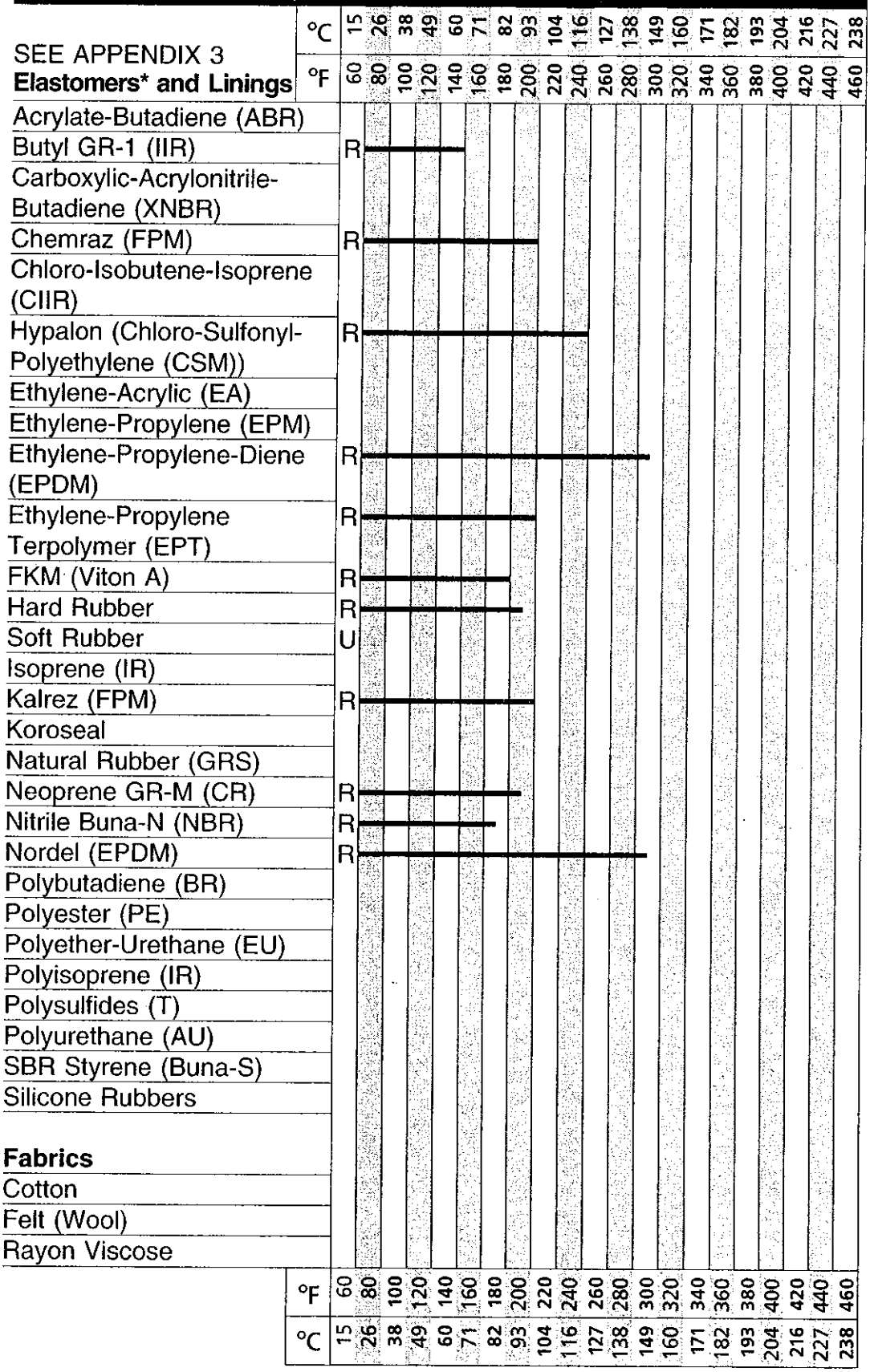


*See also Nylon 11 under PLASTICS



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SEE APPENDIX 3

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | G | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | E | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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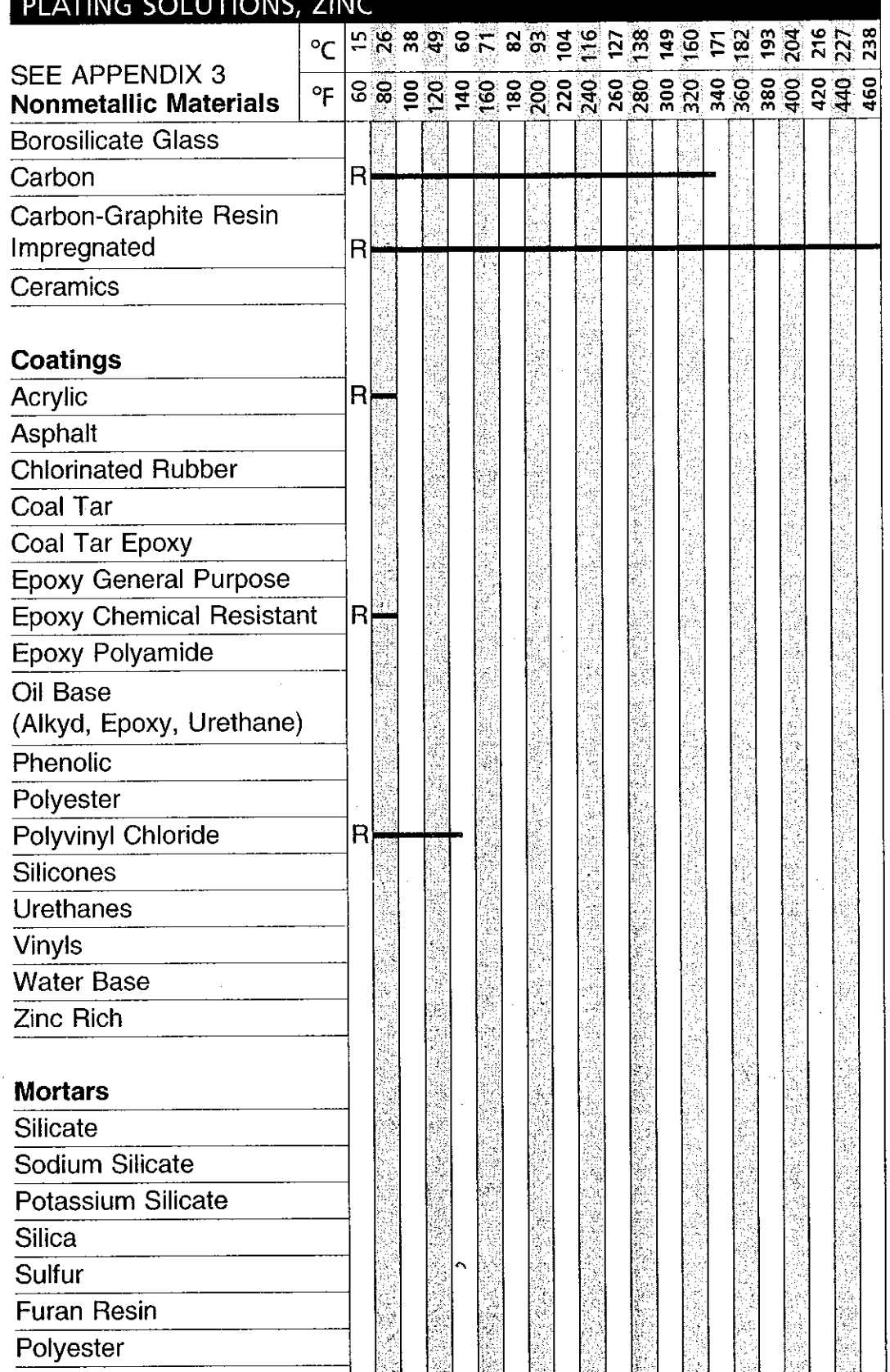




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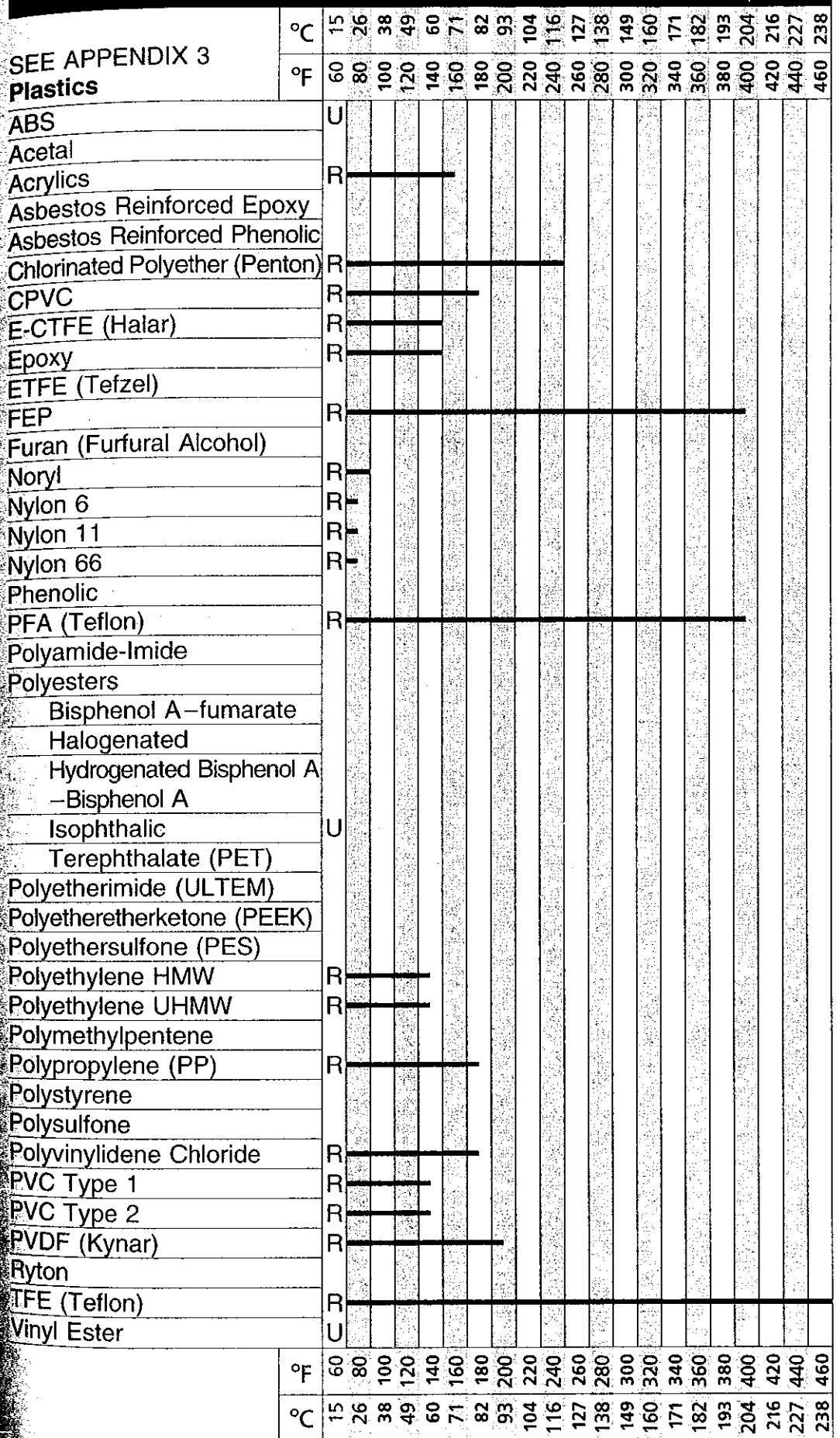
SEE APPENDIX 3
**Plastics**

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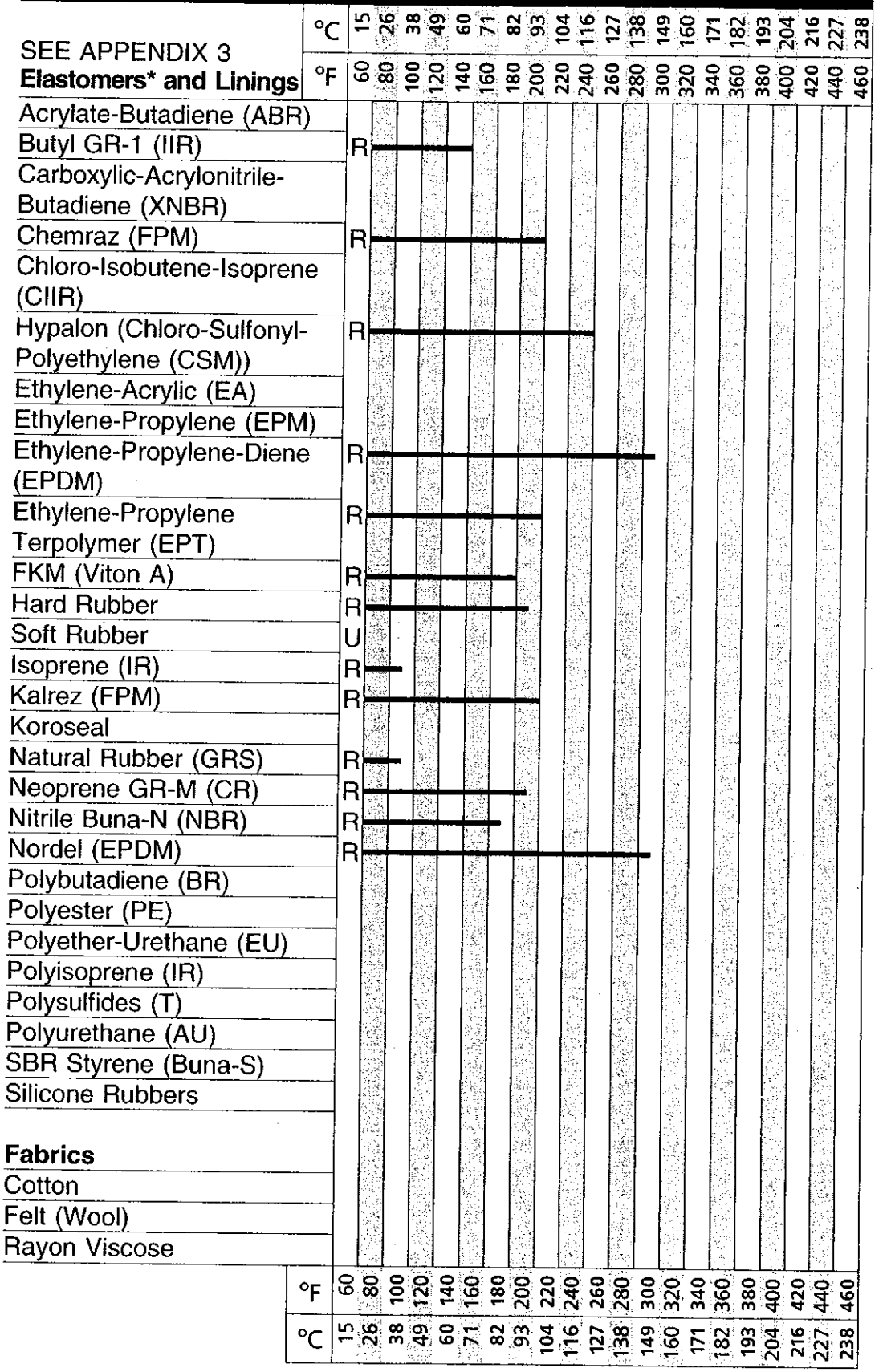


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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | G | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | G | — | — | — | — | — | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | G | — | — | — | — | — | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | G | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

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# POLYSULFIDE LIQUOR

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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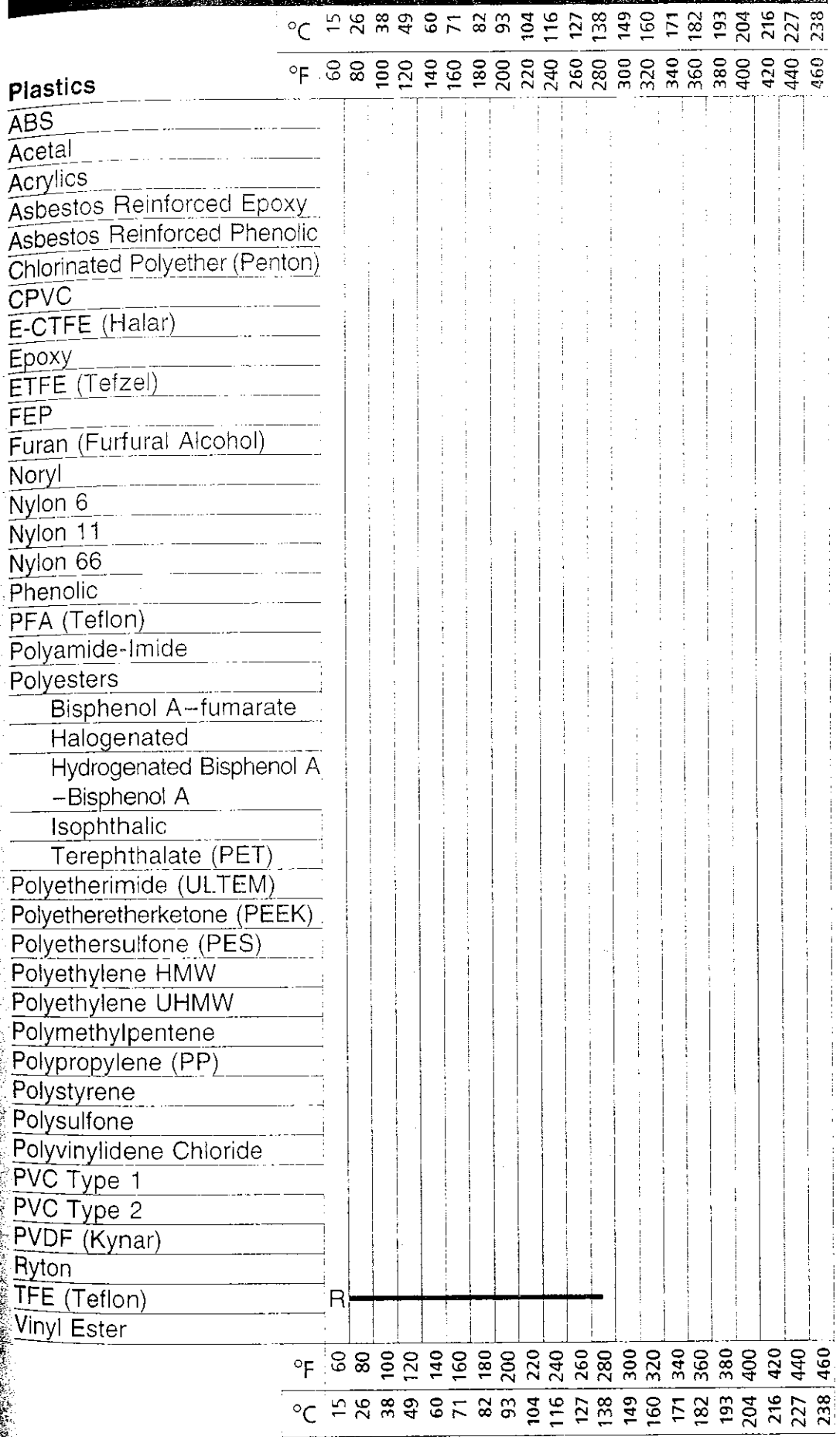


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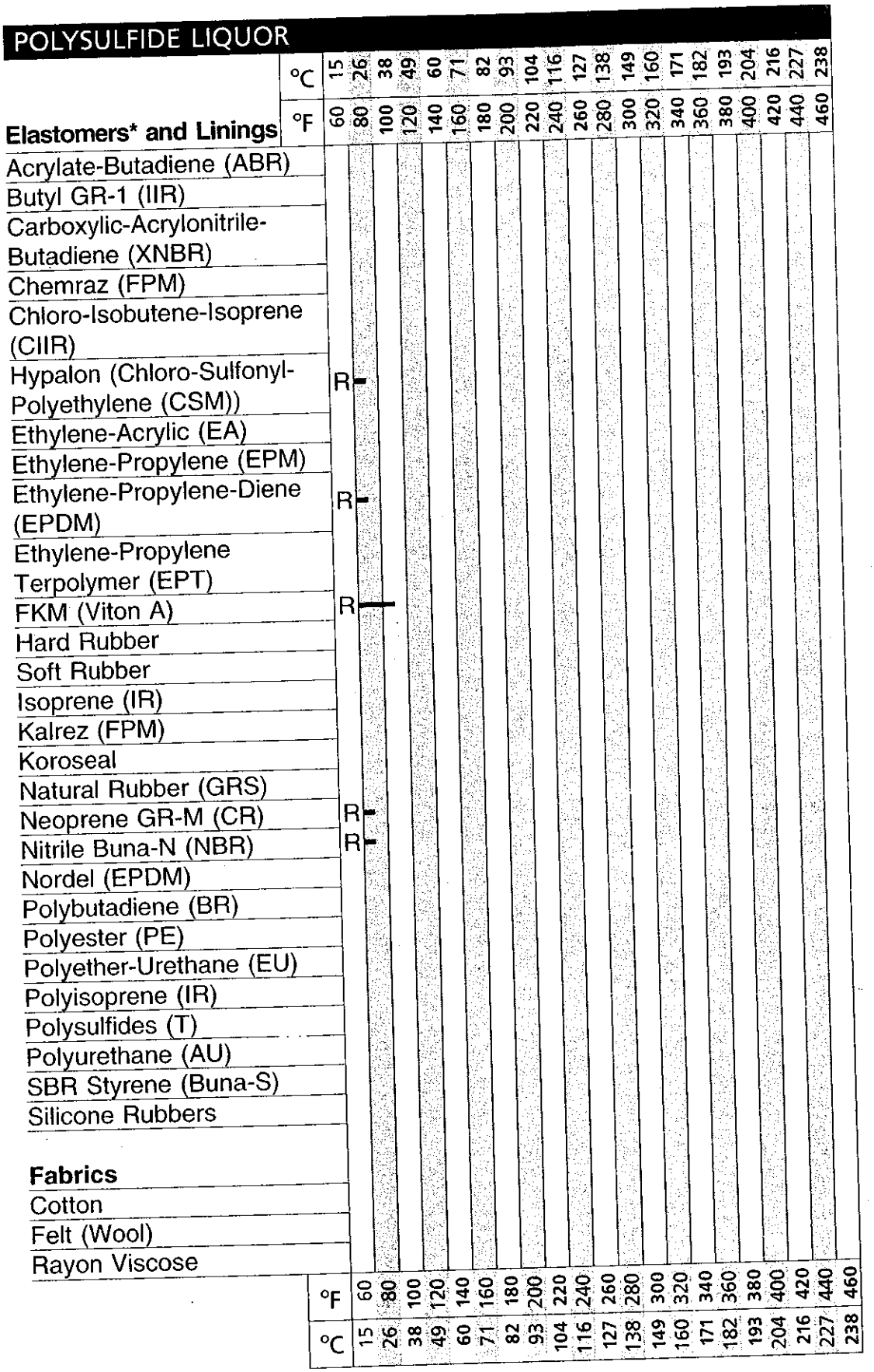


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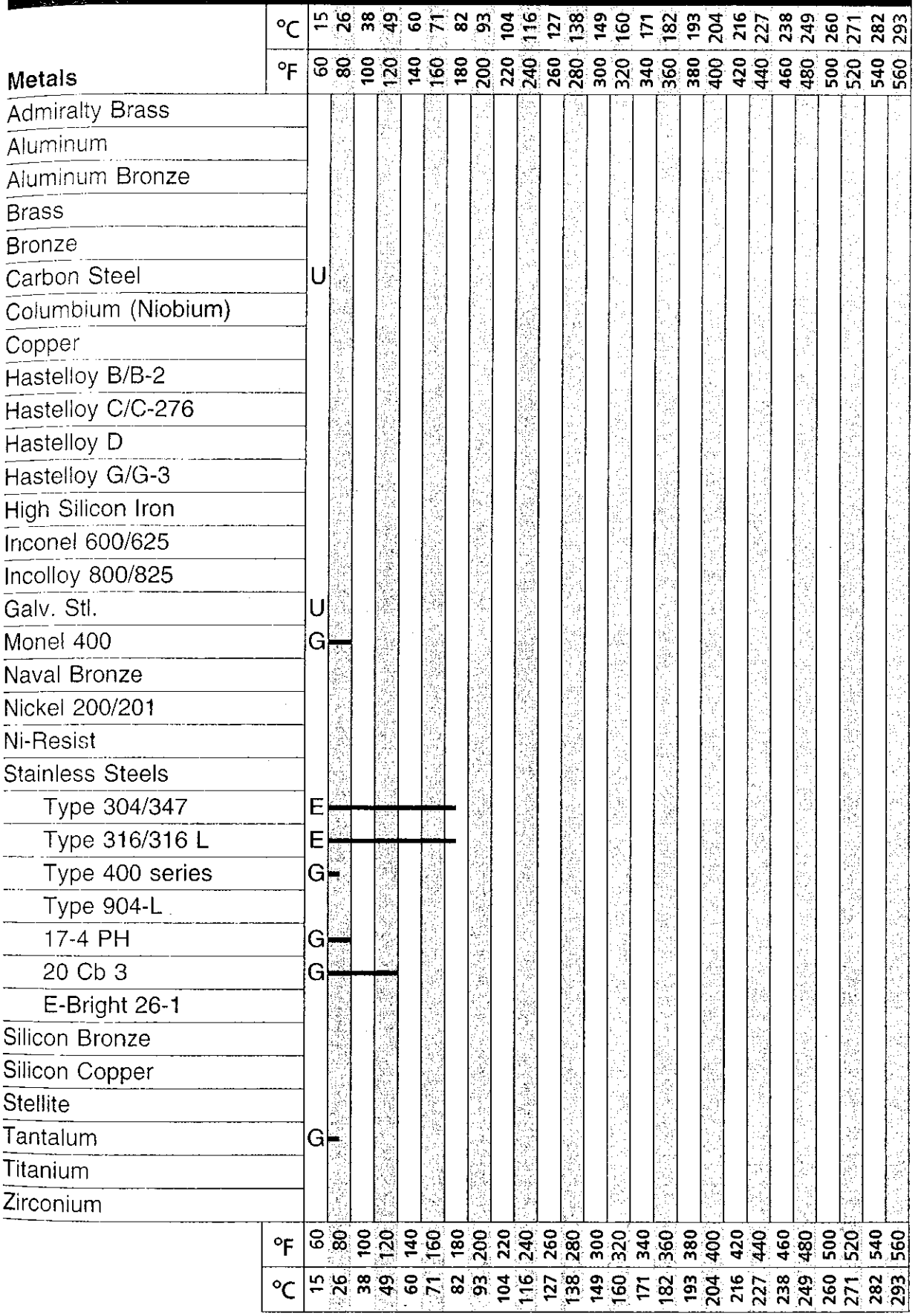


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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

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# POLYVINYL ACETATE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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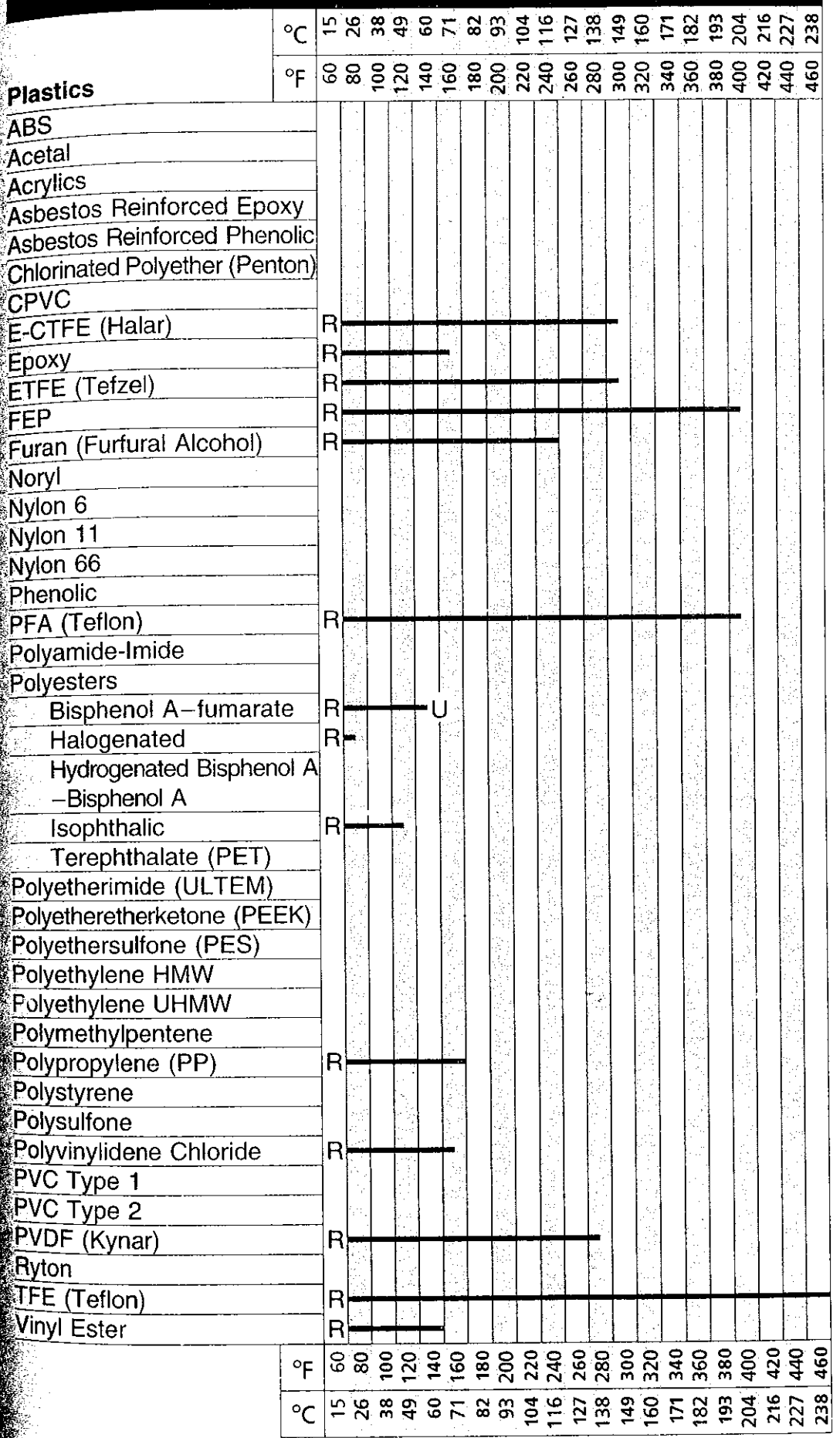


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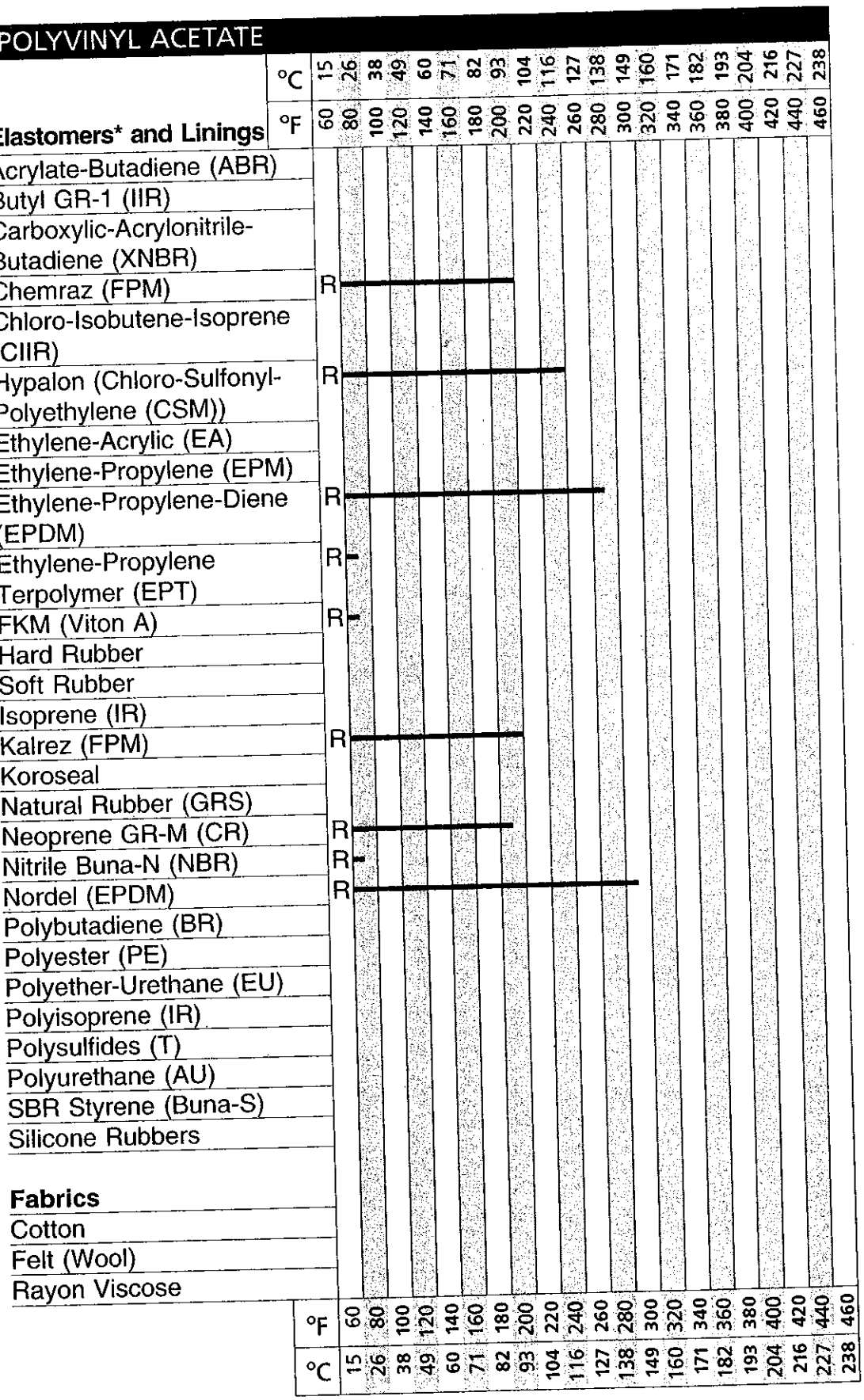


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| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | S | U | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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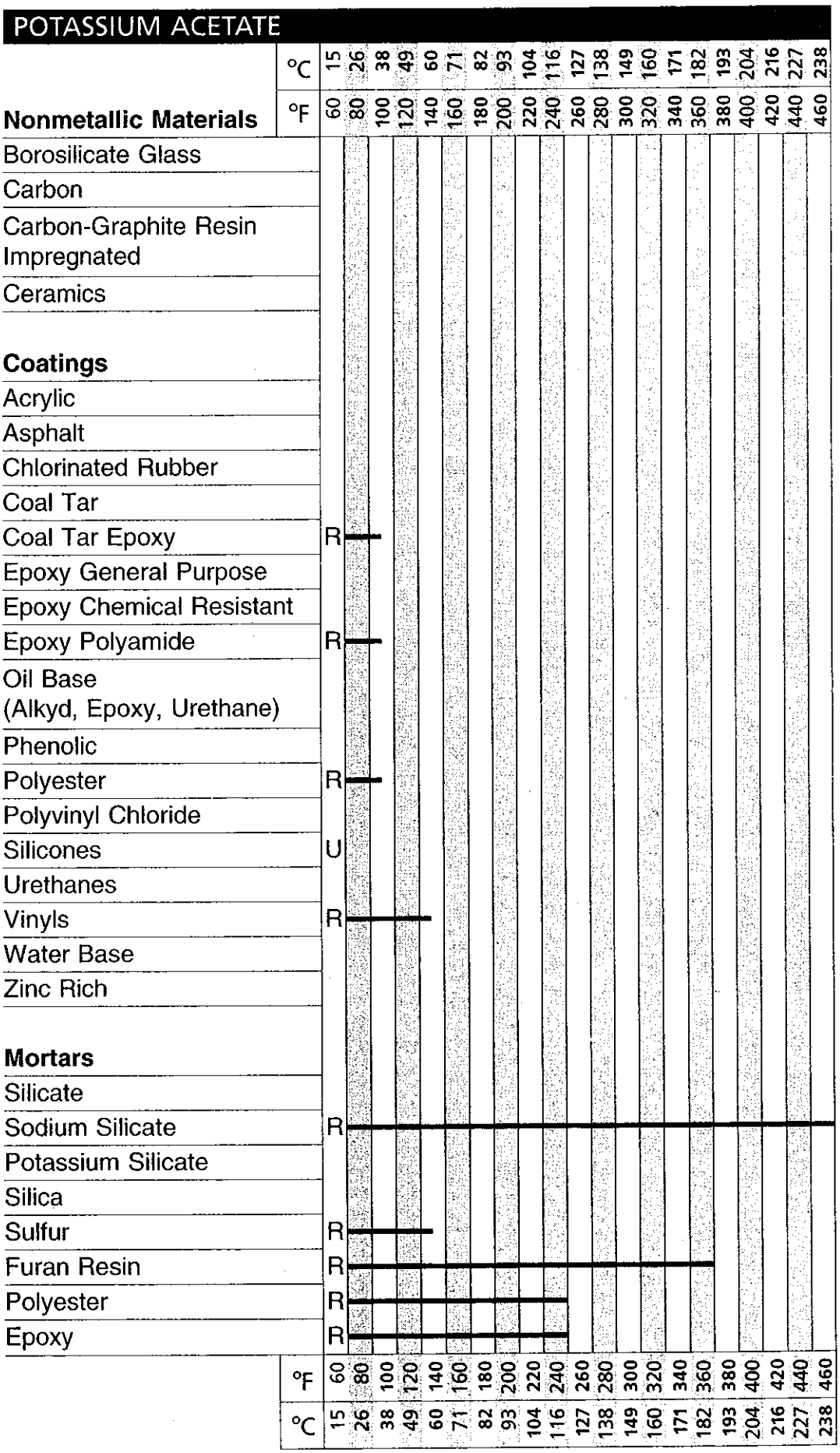
## POTASSIUM ACETATE



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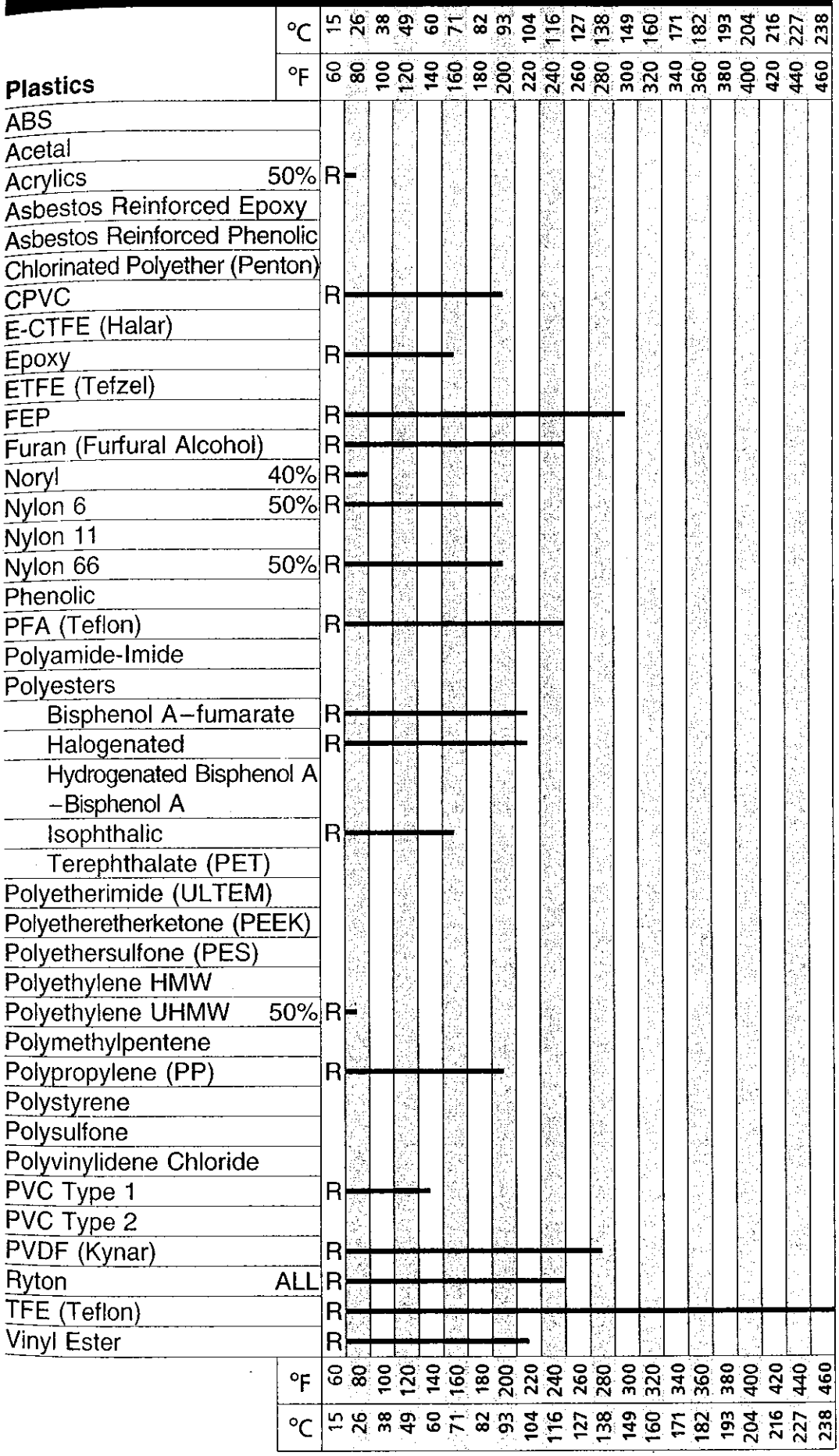


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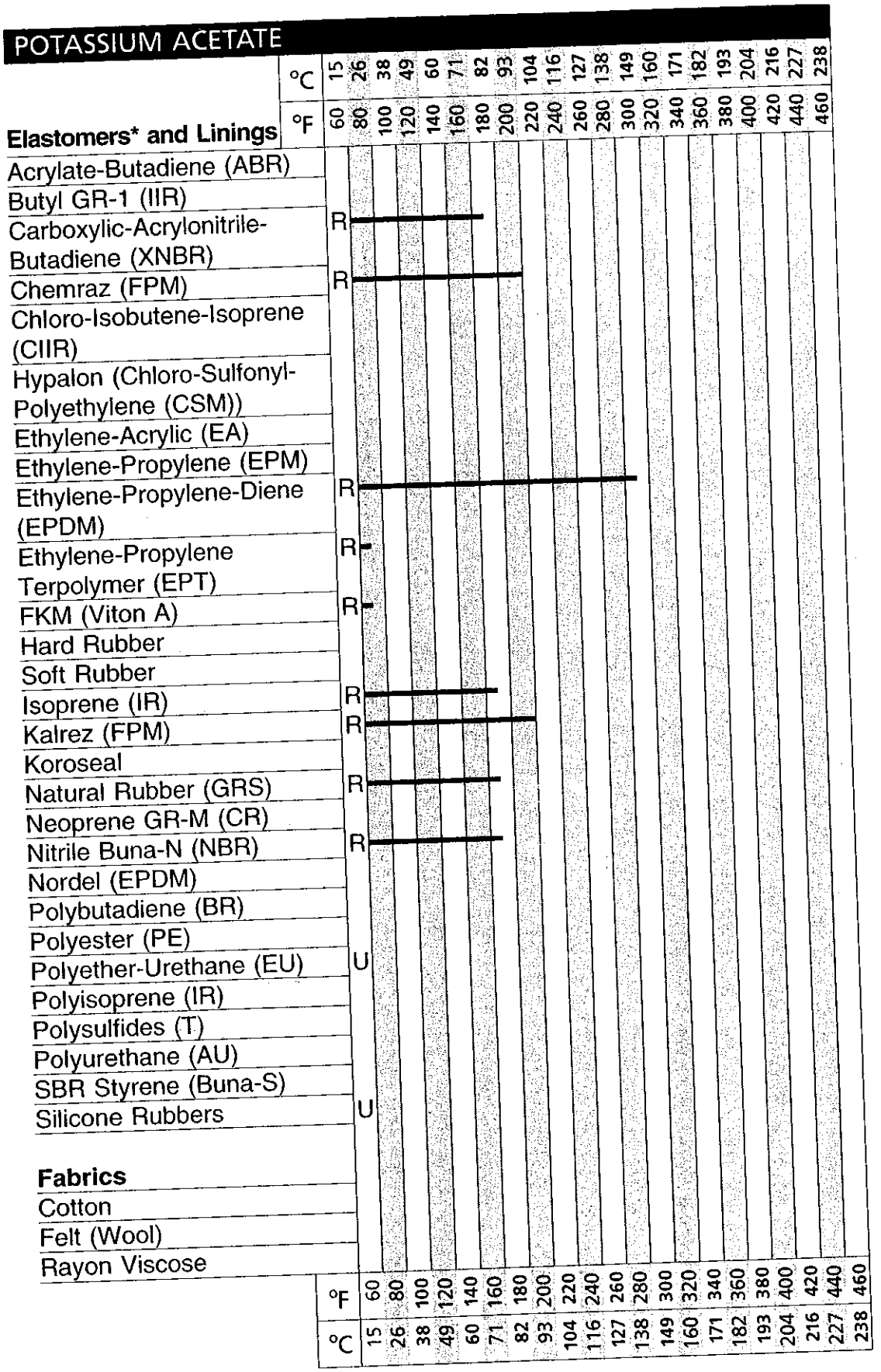


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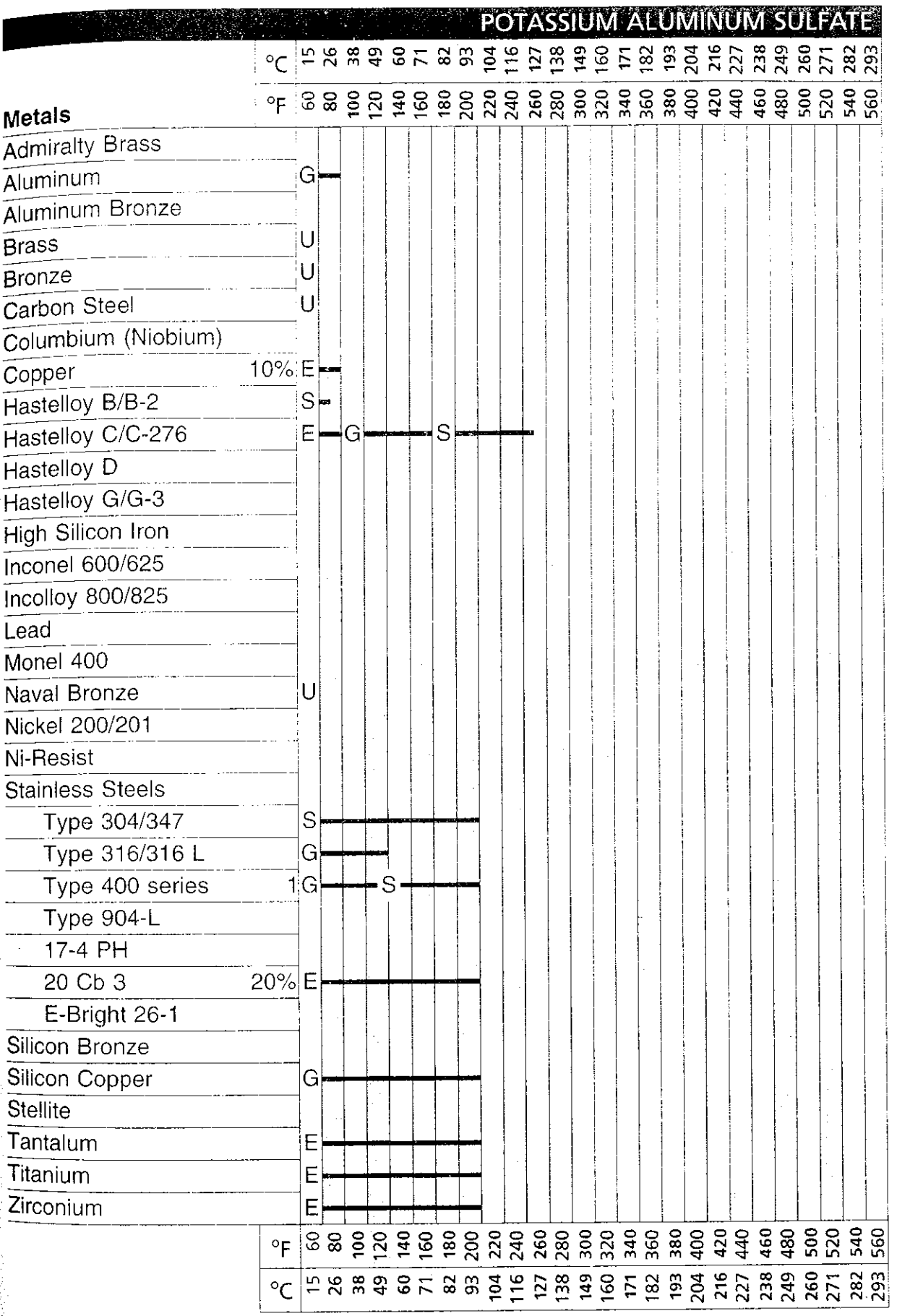


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

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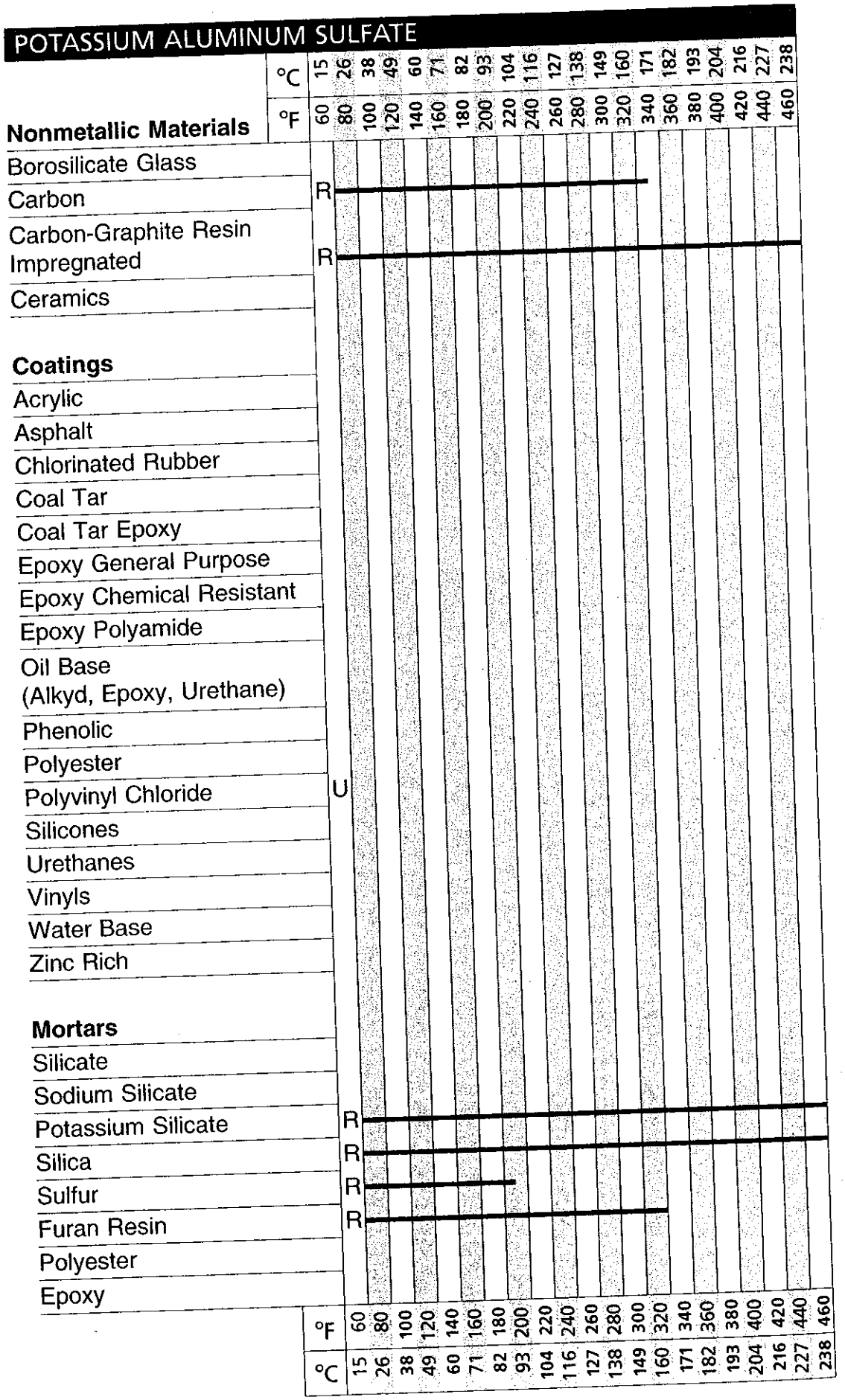






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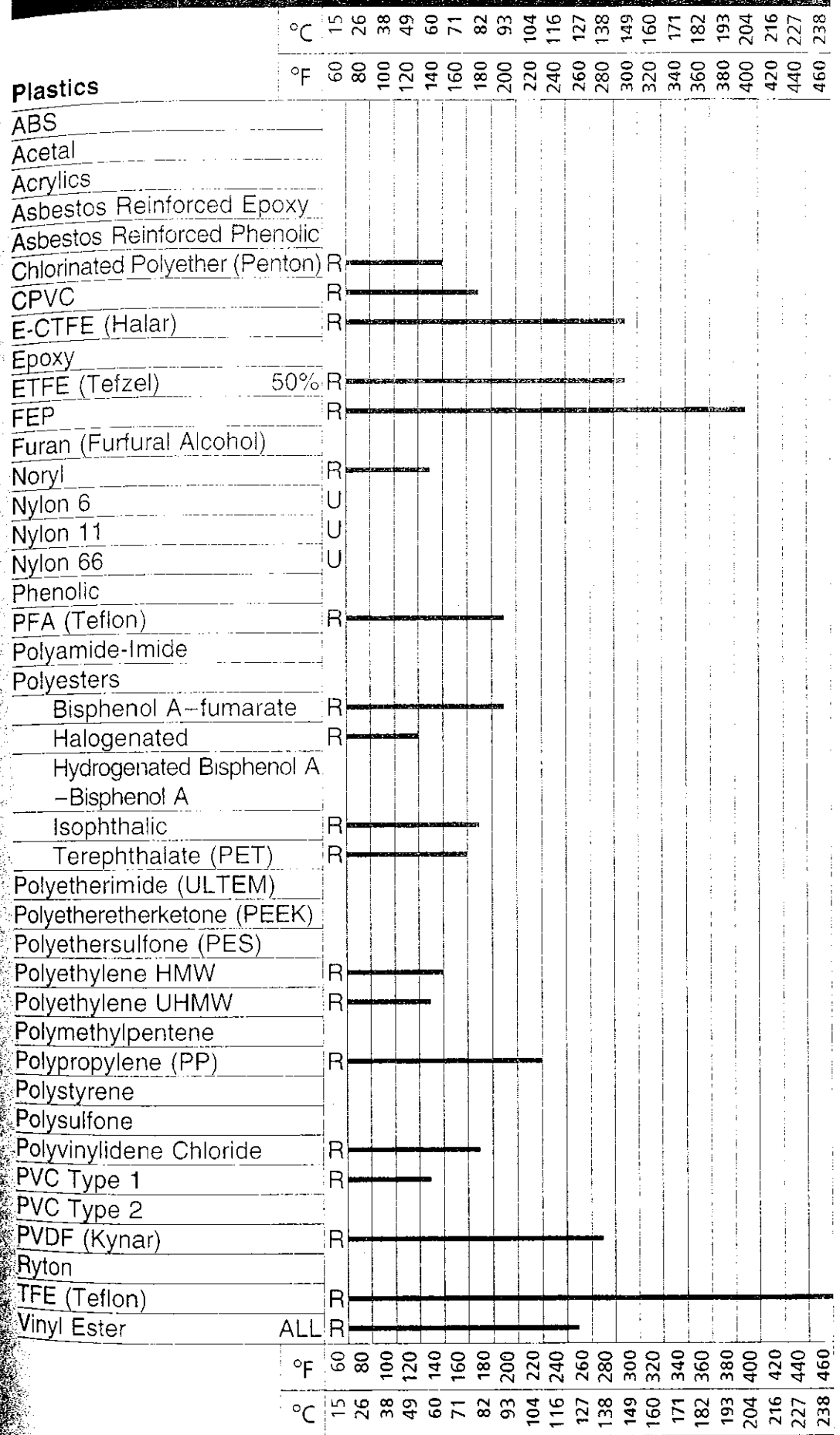


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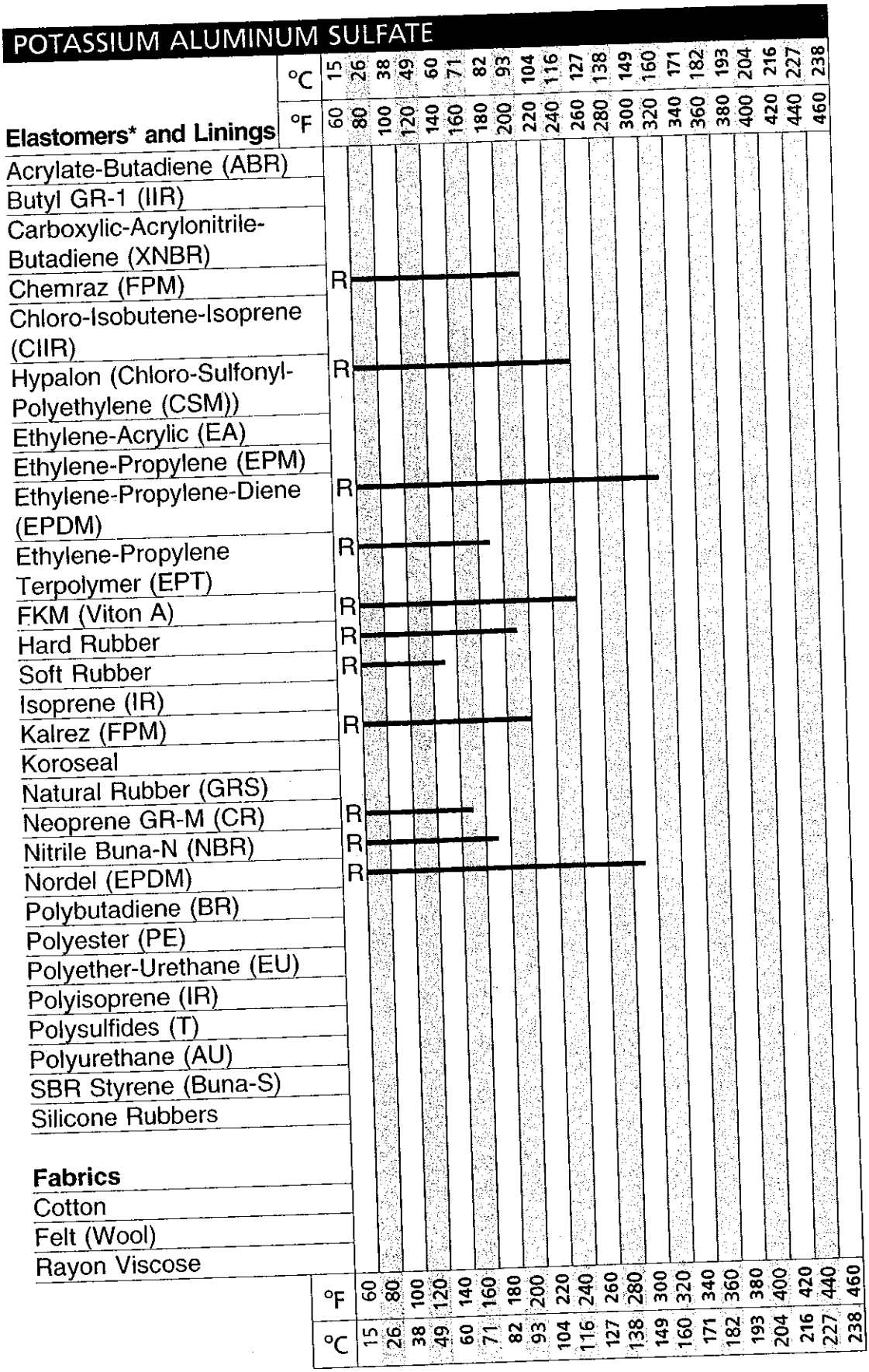


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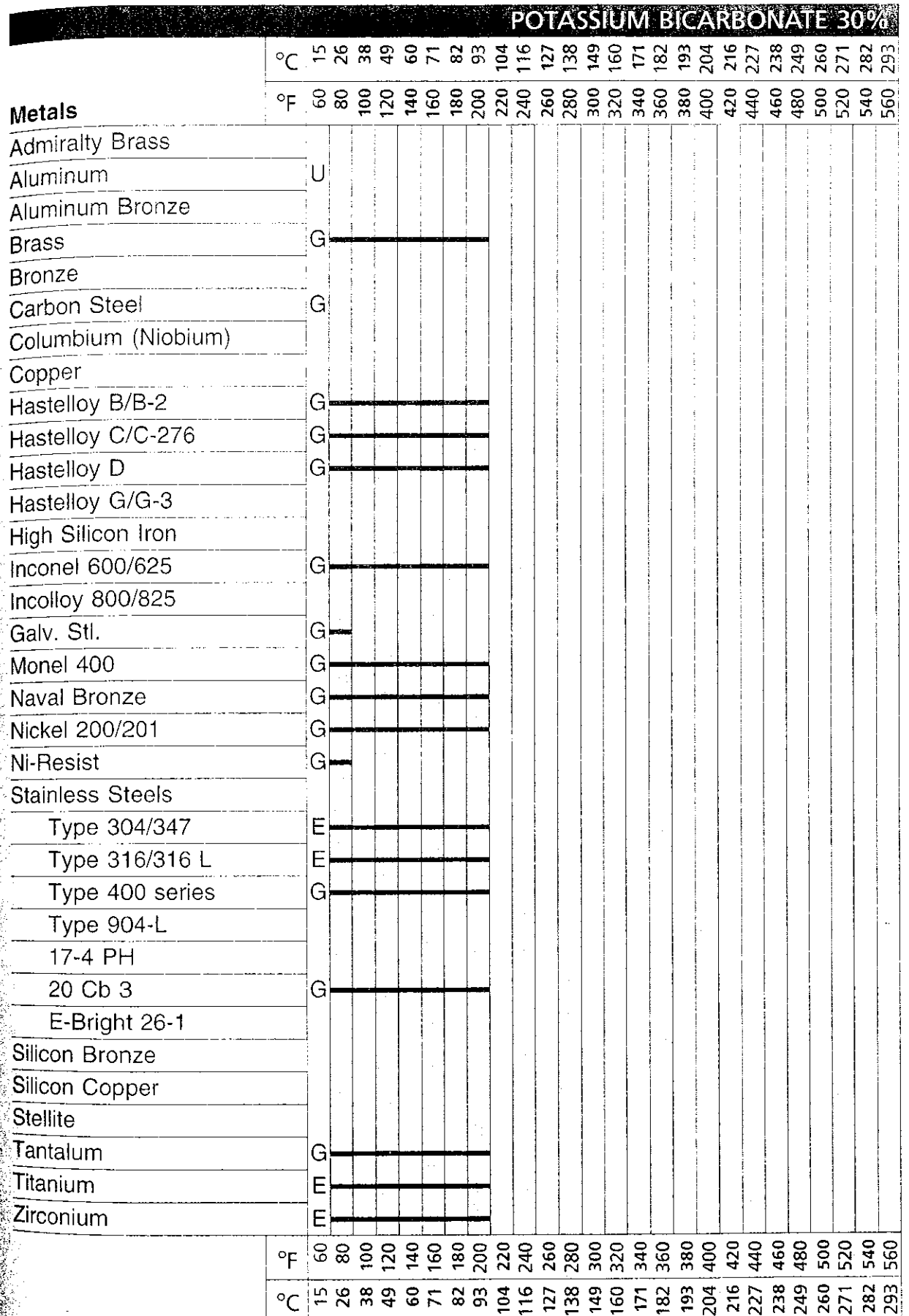
# POTASSIUM BICARBONATE 30%




FOR METALS
E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year
S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS
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U = Unsatisfactory

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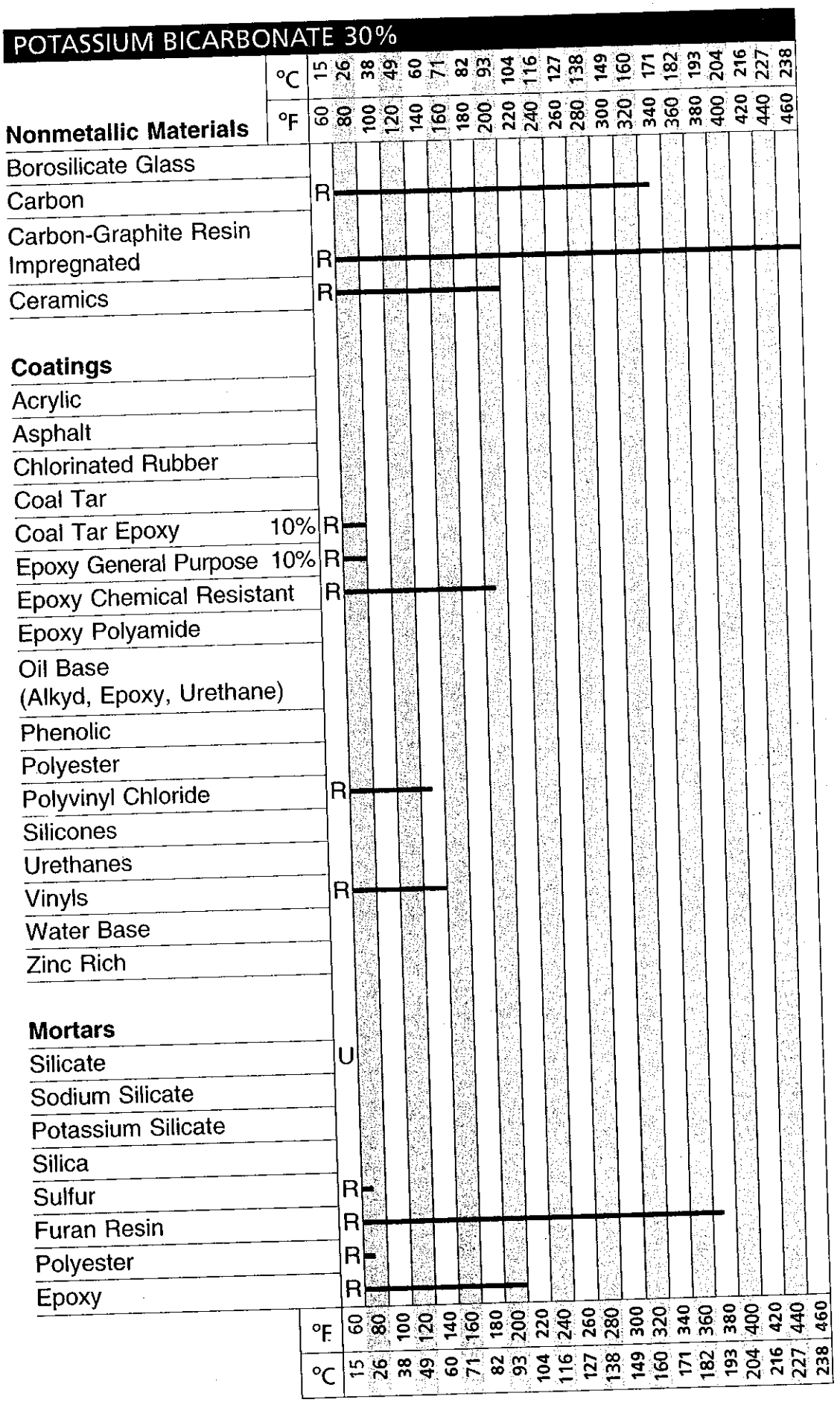
## POTASSIUM BICARBONATE 30%



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## POTASSIUM BICARBONATE 30%

| Plastics | °C | °F |
|---|---|---|
| ABS | R | |
| Acetal | | |
| Acrylics | R | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | R | |
| CPVC | R | |
| E-CTFE (Halar) | | |
| Epoxy | R | |
| ETFE (Tefzel) | R | |
| FEP | R | |
| Furan (Furfural Alcohol) | R | |
| Noryl | R | |
| Nylon 6 | R | |
| Nylon 11 | R | |
| Nylon 66 | R | |
| Phenolic | | |
| PFA (Teflon) | R | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate 10% | R | U |
| Halogenated | R | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | R | |
| Terephthalate (PET) | R | |
| Polyetherimide (ULTEM) | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | R | |
| Polyethylene UHMW | R | |
| Polymethylpentene | | |
| Polypropylene (PP) | R | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | R | |
| PVC Type 1 | R | |
| PVC Type 2 | R | |
| PVDF (Kynar) | R | |
| Ryton | R | |
| TFE (Teflon) | R | |
| Vinyl Ester | R | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460


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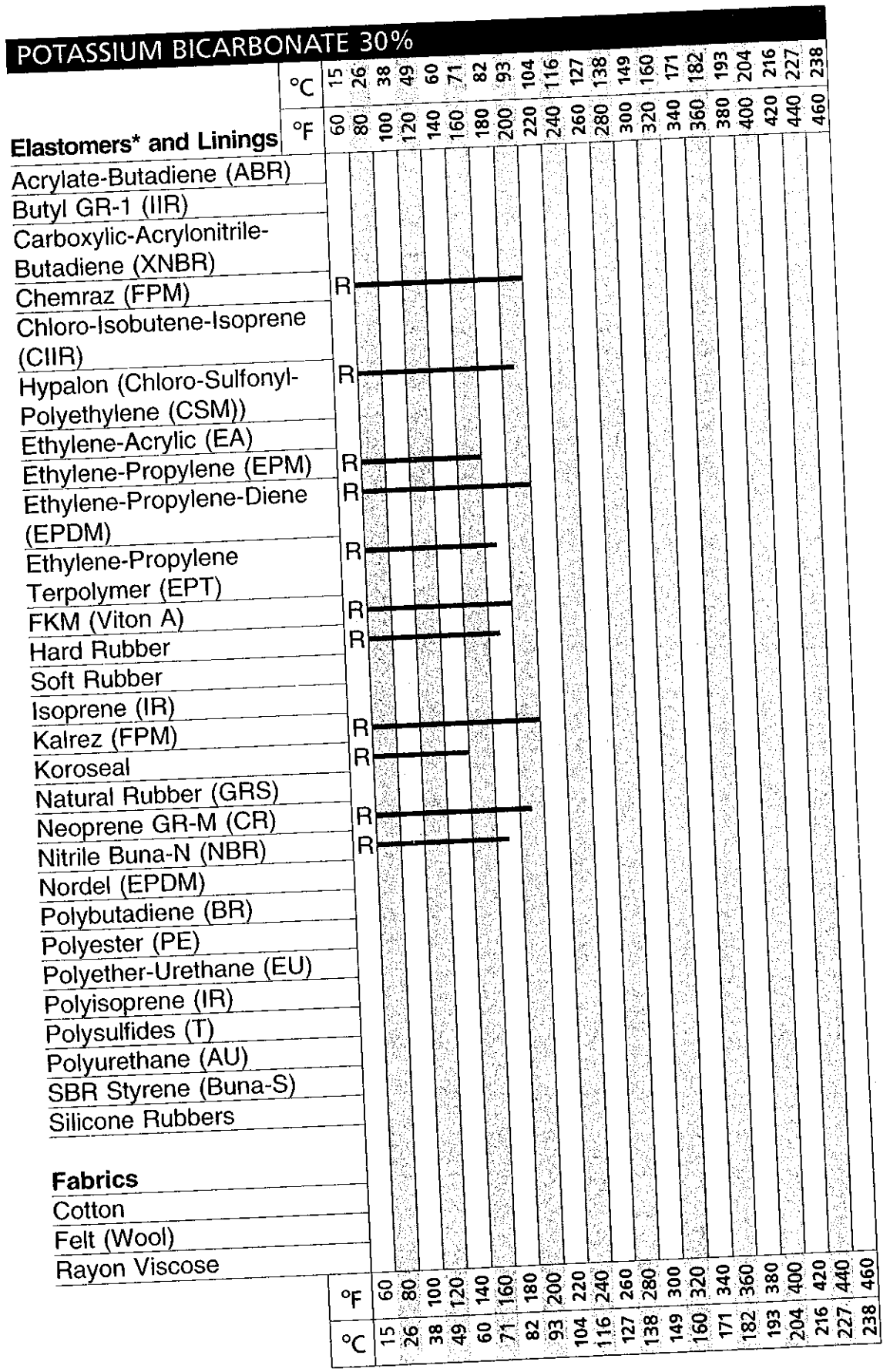
## POTASSIUM BICARBONATE 30%

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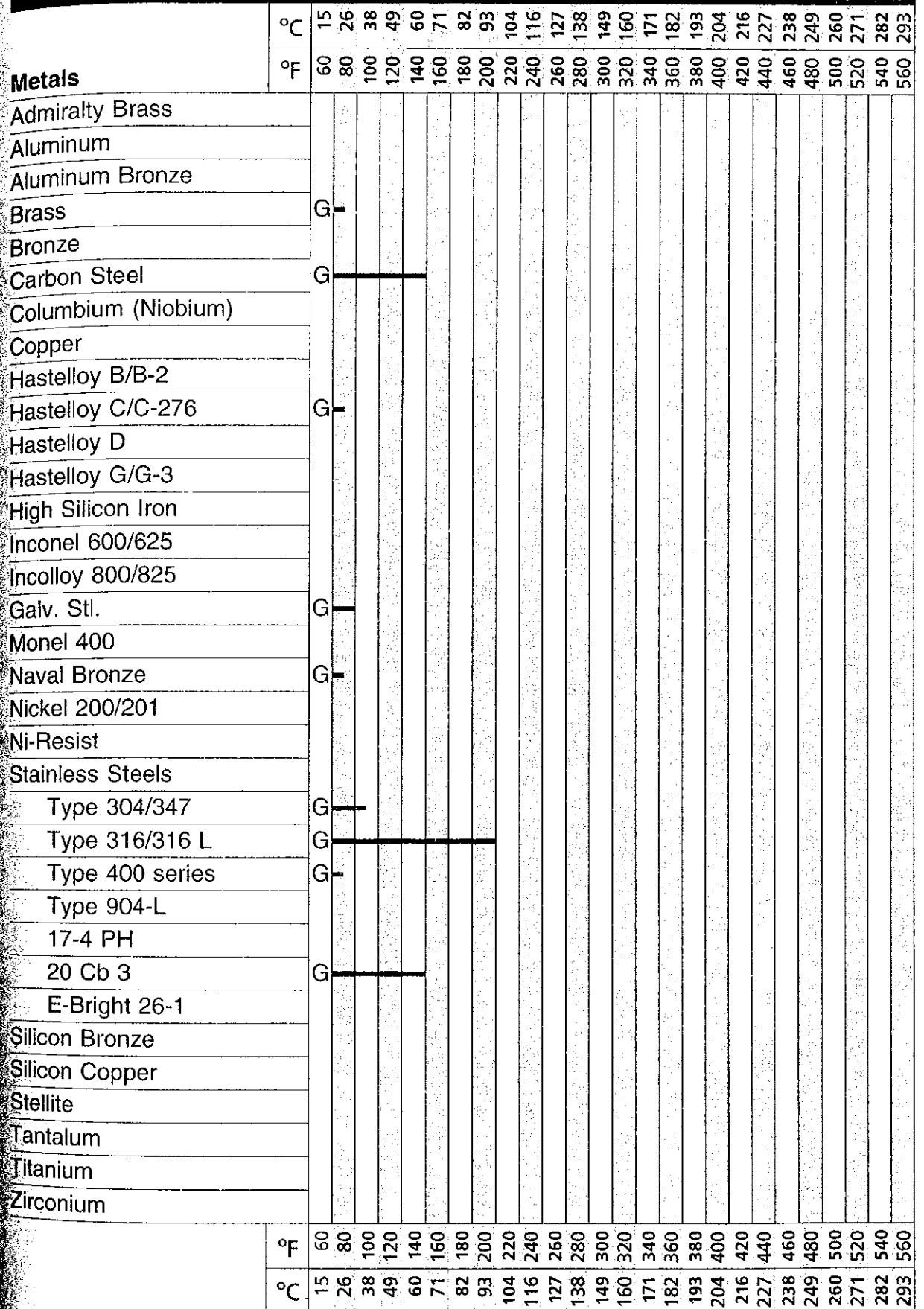
# POTASSIUM BICARBONATE (SAT.)




FOR METALS

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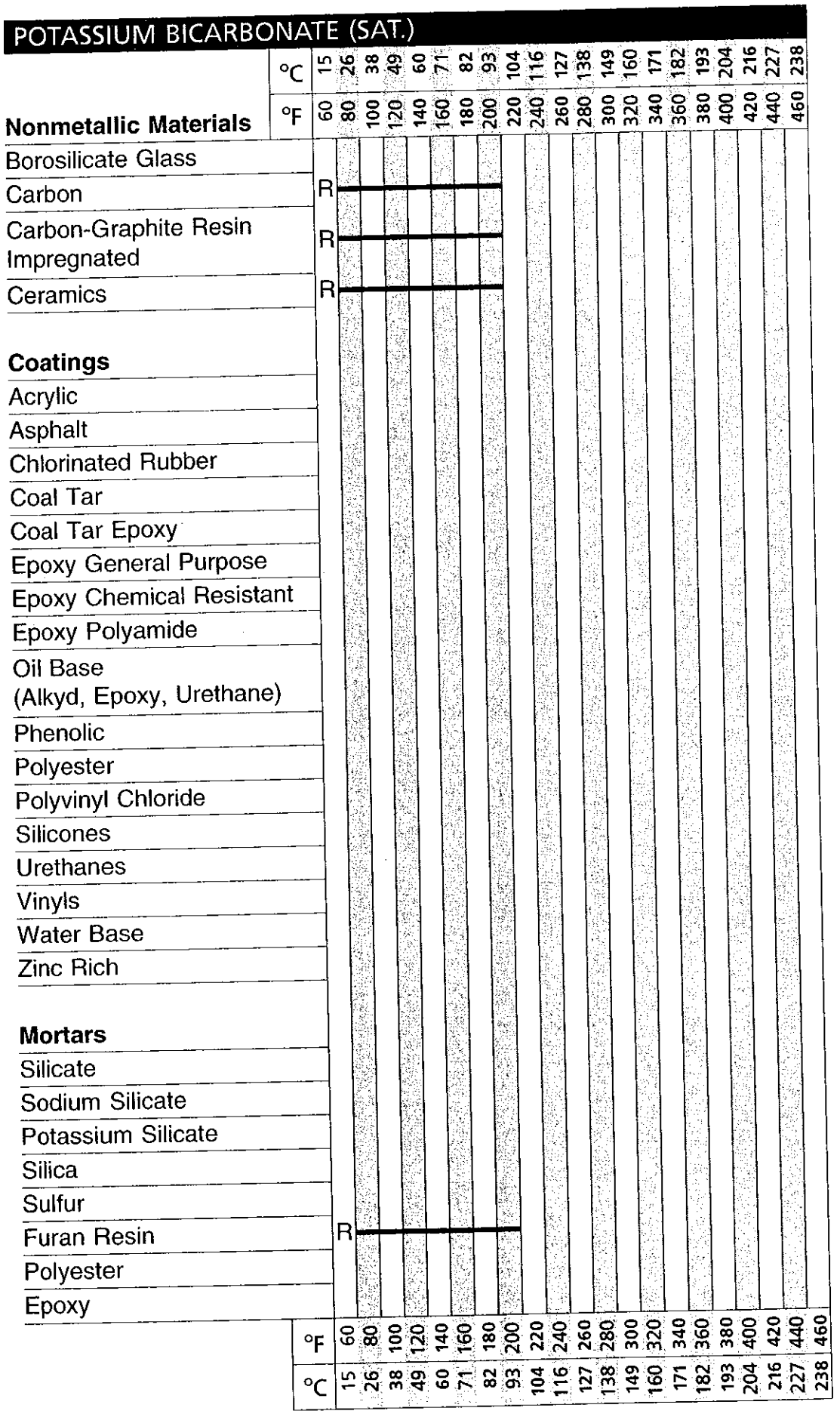
## POTASSIUM BICARBONATE (SAT.)





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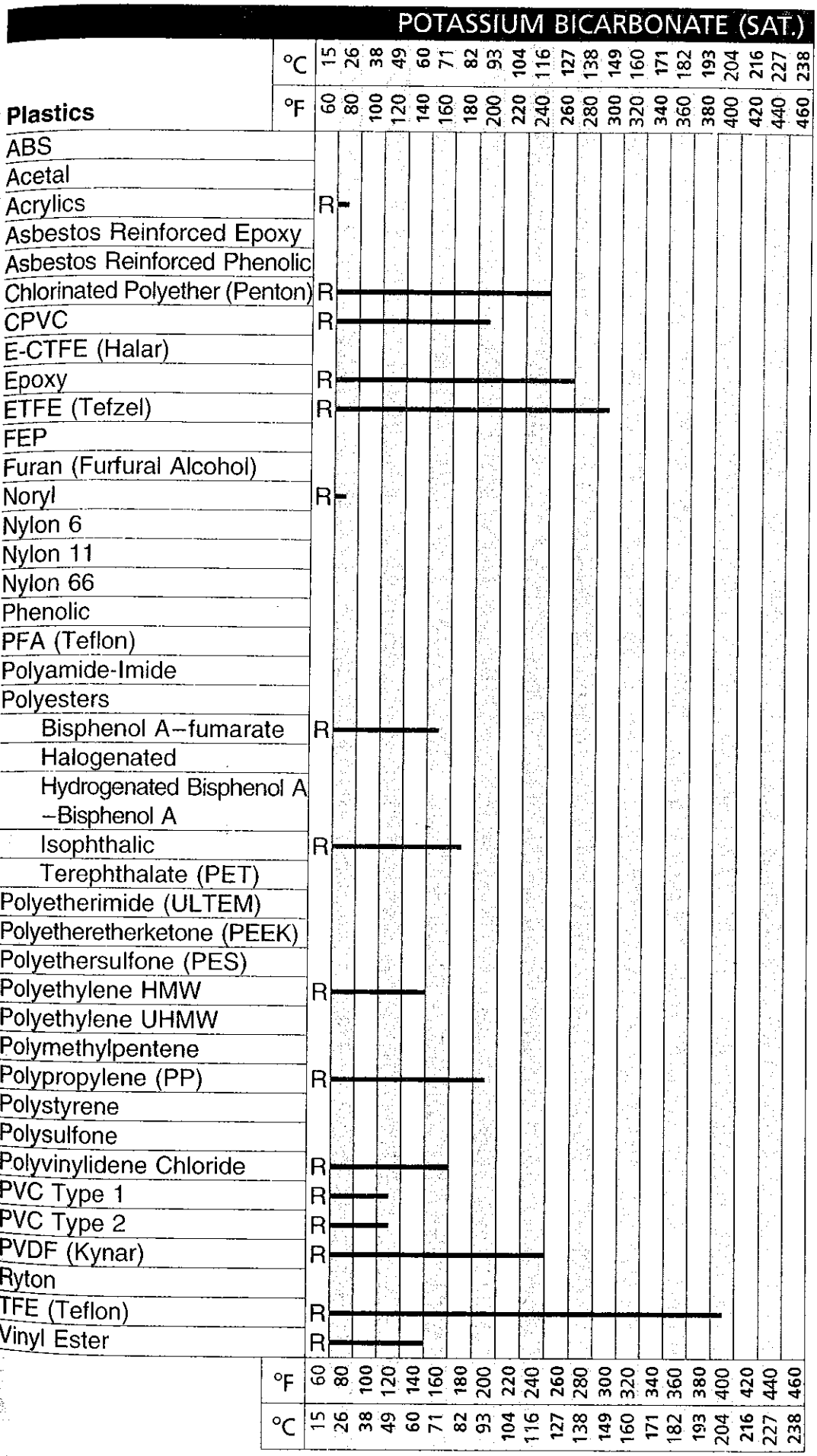


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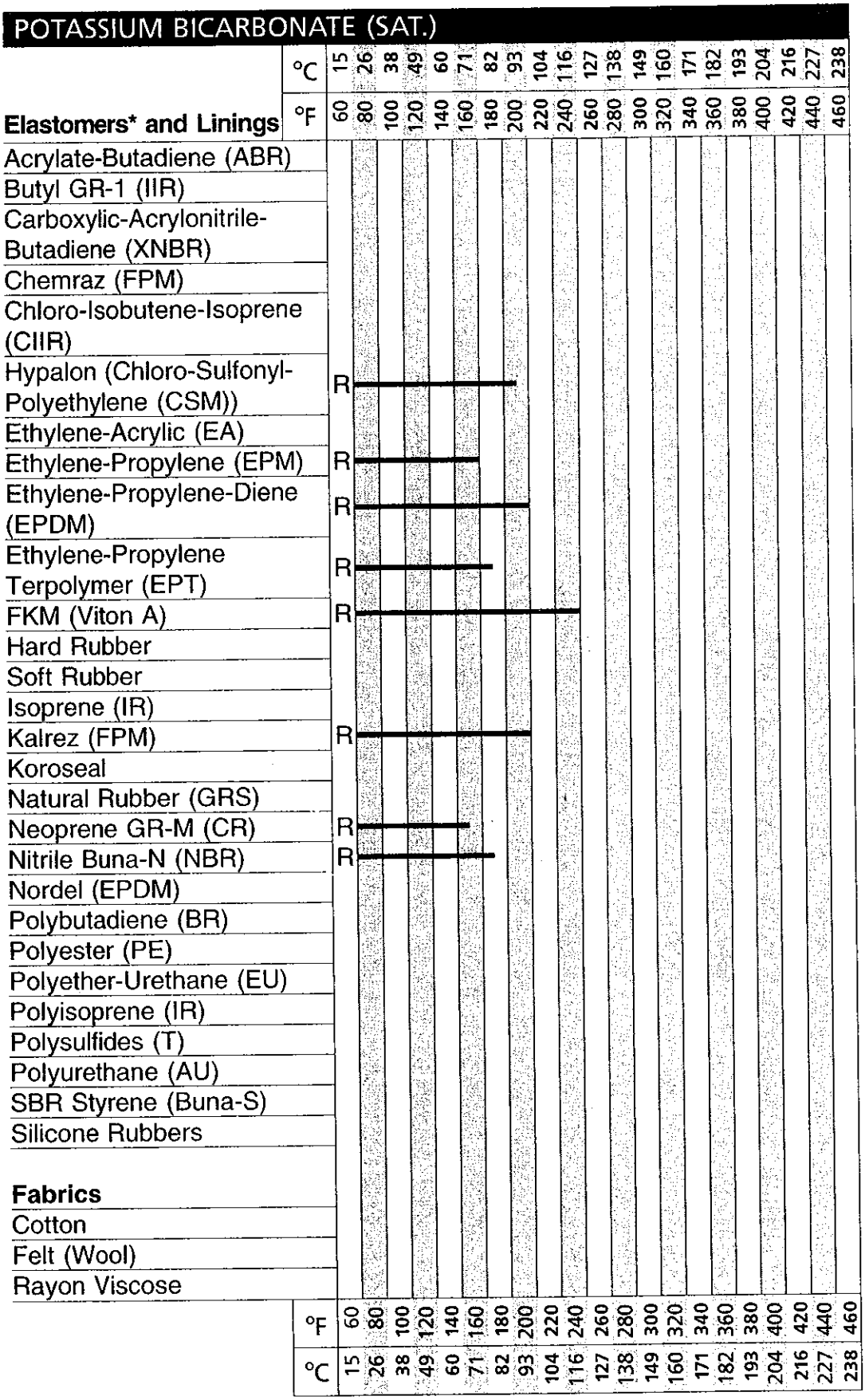
## POTASSIUM BICARBONATE (SAT.)

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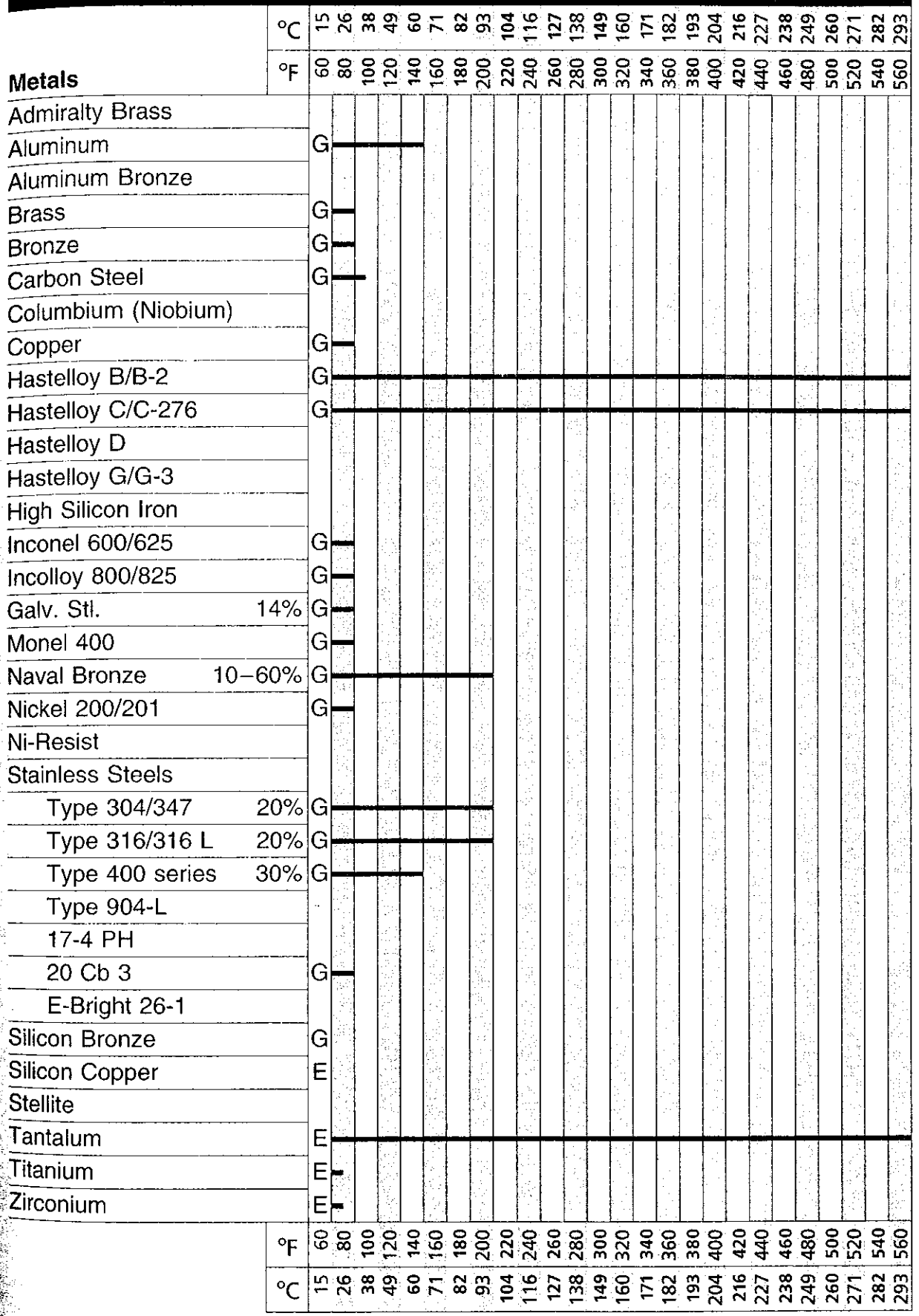


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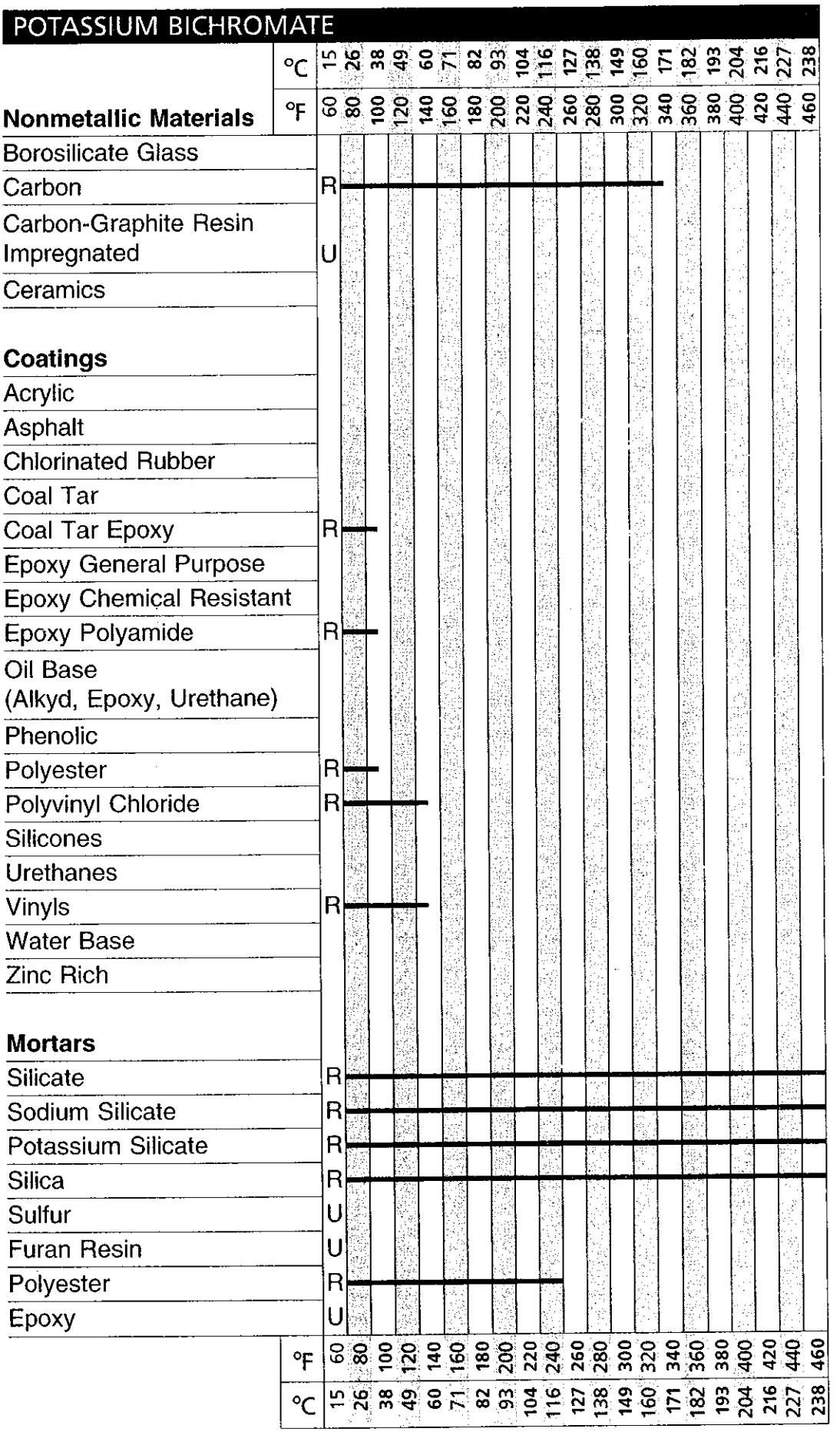
# POTASSIUM BICHROMATE





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# POTASSIUM BICHROMATE

| Plastics | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| ABS | | | R | | | | | | | | | | | | | | | | | | | | |
| Acetal | | | | | | | | | | | | | | | | | | | | | | | |
| Acrylics | | | R | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Epoxy | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos Reinforced Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Polyether (Penton) | | | R | | | | | | | | | | | | | | | | | | | | |
| CPVC | | | R | | | | | | | | | | | | | | | | | | | | |
| E-CTFE (Halar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Epoxy | 10% | | R | | | | | | | | | | | | | | | | | | | | |
| ETFE (Tefzel) | | | | | | | | | | | | | | | | | | | | | | | |
| FEP | | | R | | | | | | | | | | | | | | | | | | | | |
| Furan (Furfural Alcohol) | | | U | | | | | | | | | | | | | | | | | | | | |
| Noryl | | | R | | | | | | | | | | | | | | | | | | | | |
| Nylon 6 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 11 | | | U | | | | | | | | | | | | | | | | | | | | |
| Nylon 66 | | | U | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | | |
| PFA (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyamide-Imide | | | | | | | | | | | | | | | | | | | | | | | |
| Polyesters | | | | | | | | | | | | | | | | | | | | | | | |
| Bisphenol A–fumarate | | | R | | | | | | | | | | | | | | | | | | | | |
| Halogenated | | | R | | | | | | | | | | | | | | | | | | | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | | | | | | | | | | | | | | | | | | | | | |
| Isophthalic | | | R | | | | | | | | | | | | | | | | | | | | |
| Terephthalate (PET) | | | U | | | | | | | | | | | | | | | | | | | | |
| Polyetherimide (ULTEM) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyetheretherketone (PEEK) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethersulfone (PES) | | | | | | | | | | | | | | | | | | | | | | | |
| Polyethylene HMW | | | R | | | | | | | | | | | | | | | | | | | | |
| Polyethylene UHMW | 5% | | R | | | | | | | | | | | | | | | | | | | | |
| Polymethylpentene | | | | | | | | | | | | | | | | | | | | | | | |
| Polypropylene (PP) | | | R | | | | | | | | | | | | | | | | | | | | |
| Polystyrene | | | | | | | | | | | | | | | | | | | | | | | |
| Polysulfone | | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinylidene Chloride | | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 1 | | | R | | | | | | | | | | | | | | | | | | | | |
| PVC Type 2 | | | R | | | | | | | | | | | | | | | | | | | | |
| PVDF (Kynar) | | | R | | | | | | | | | | | | | | | | | | | | |
| Ryton | | | | | | | | | | | | | | | | | | | | | | | |
| TFE (Teflon) | | | R | | | | | | | | | | | | | | | | | | | | |
| Vinyl Ester | | | R | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |

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## POTASSIUM BICHROMATE

| Elastomers* and Linings | °C | °F |
|---|---|---|
| Acrylate-Butadiene (ABR) | | |
| Butyl GR-1 (IIR) | | |
| Carboxylic-Acrylonitrile-Butadiene (XNBR) | | |
| Chemraz (FPM) | R | |
| Chloro-Isobutene-Isoprene (CIIR) | | |
| Hypalon (Chloro-Sulfonyl-Polyethylene (CSM)) | | |
| Ethylene-Acrylic (EA) | | |
| Ethylene-Propylene (EPM) | | |
| Ethylene-Propylene-Diene (EPDM) | R | |
| Ethylene-Propylene Terpolymer (EPT) | R | |
| FKM (Viton A) | R | |
| Hard Rubber | | |
| Soft Rubber | | |
| Isoprene (IR) | | |
| Kalrez (FPM) | R | |
| Koroseal | | |
| Natural Rubber (GRS) | | |
| Neoprene GR-M (CR) | | |
| Nitrile Buna-N (NBR) | R | |
| Nordel (EPDM) | | |
| Polybutadiene (BR) | | |
| Polyester (PE) | | |
| Polyether-Urethane (EU) | | |
| Polyisoprene (IR) | | |
| Polysulfides (T) | | |
| Polyurethane (AU) | | |
| SBR Styrene (Buna-S) | | |
| Silicone Rubbers | | |
| **Fabrics** | | |
| Cotton | | |
| Felt (Wool) | | |
| Rayon Viscose | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

*See also Nylon 11 under PLASTICS



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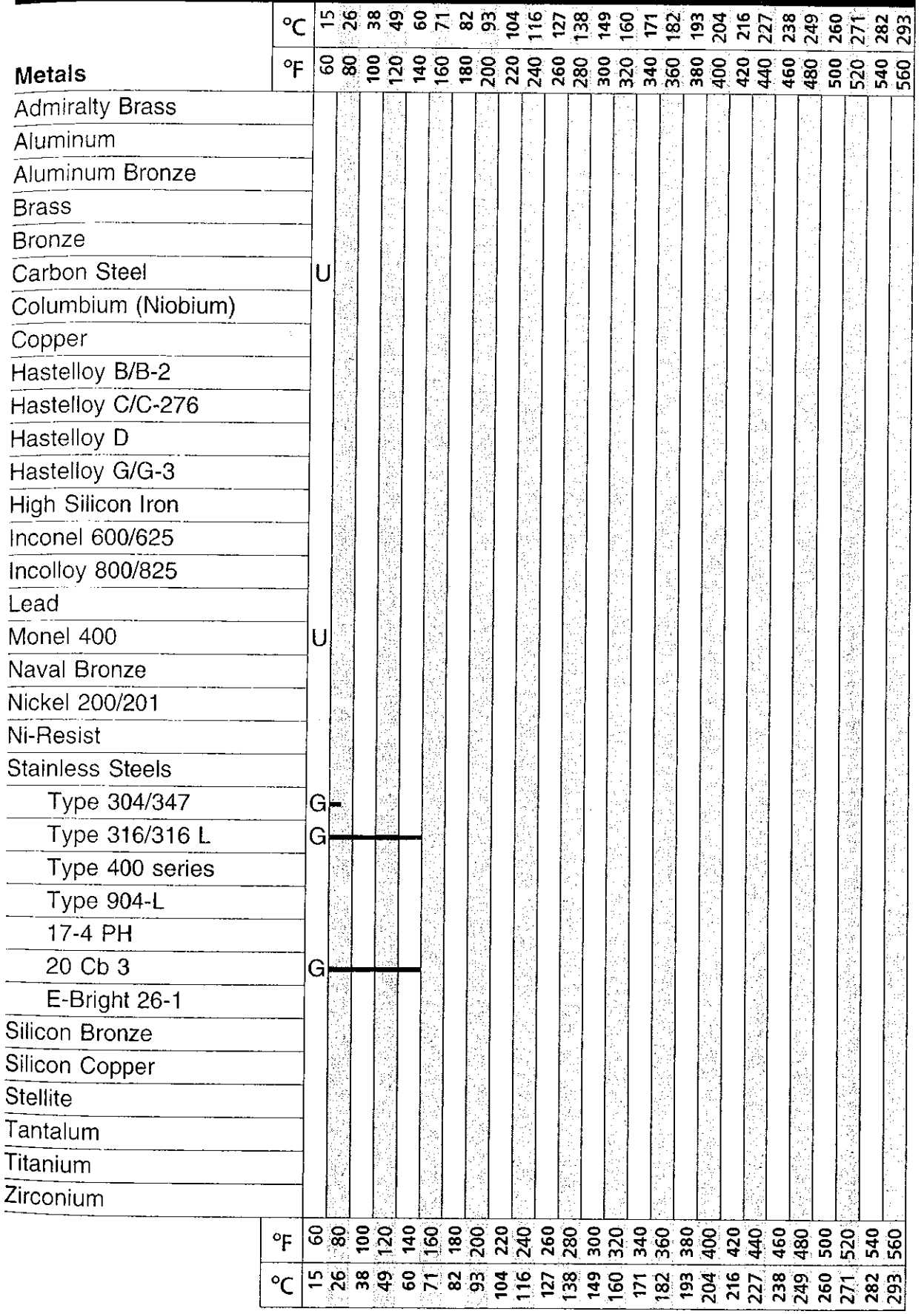


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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## POTASSIUM BISULFATE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | R | — | — | — | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |





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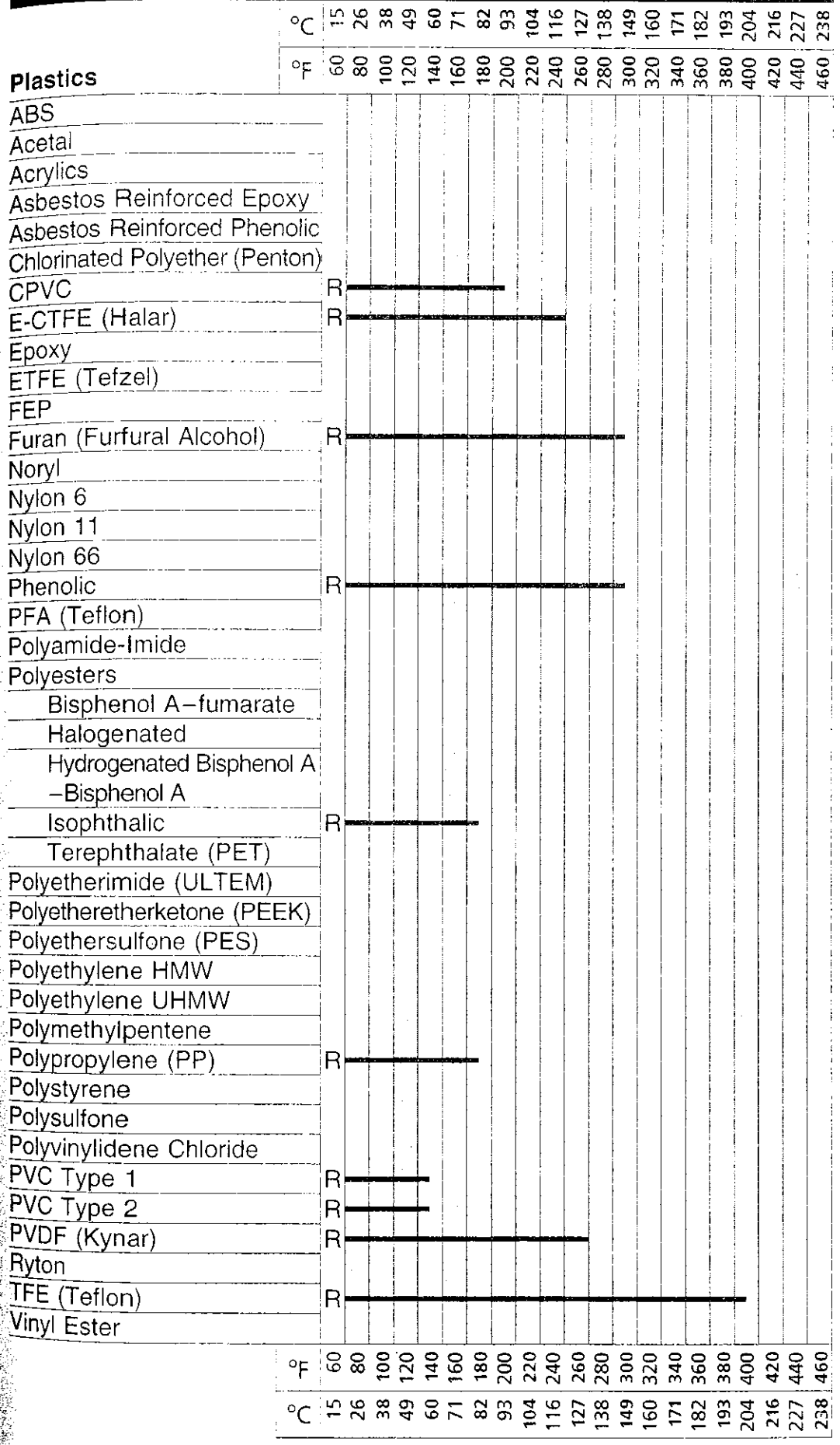


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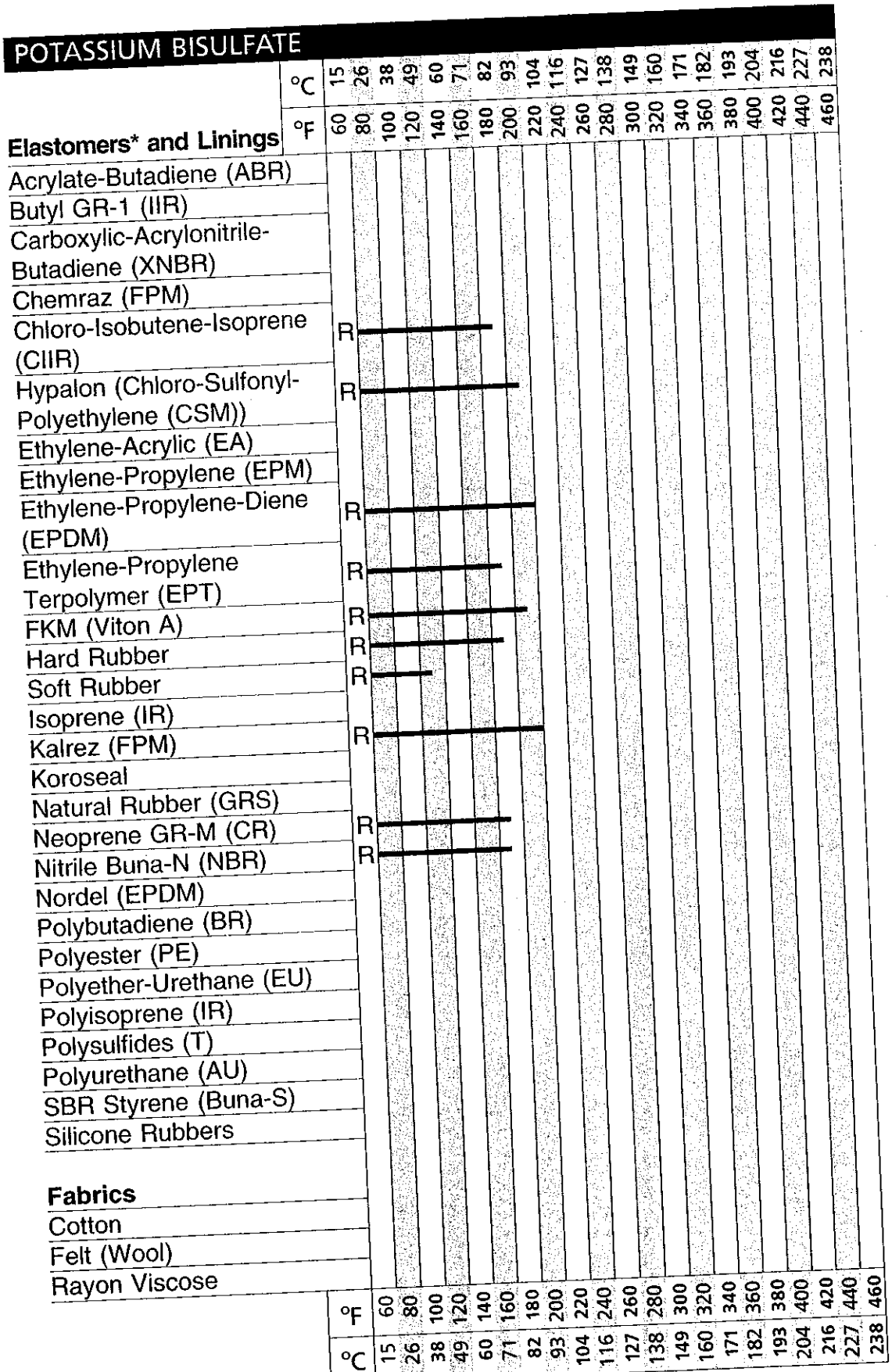
## POTASSIUM BISULFATE

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# POTASSIUM BORATE

| Metals | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | G | G | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | G | G | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | G | G | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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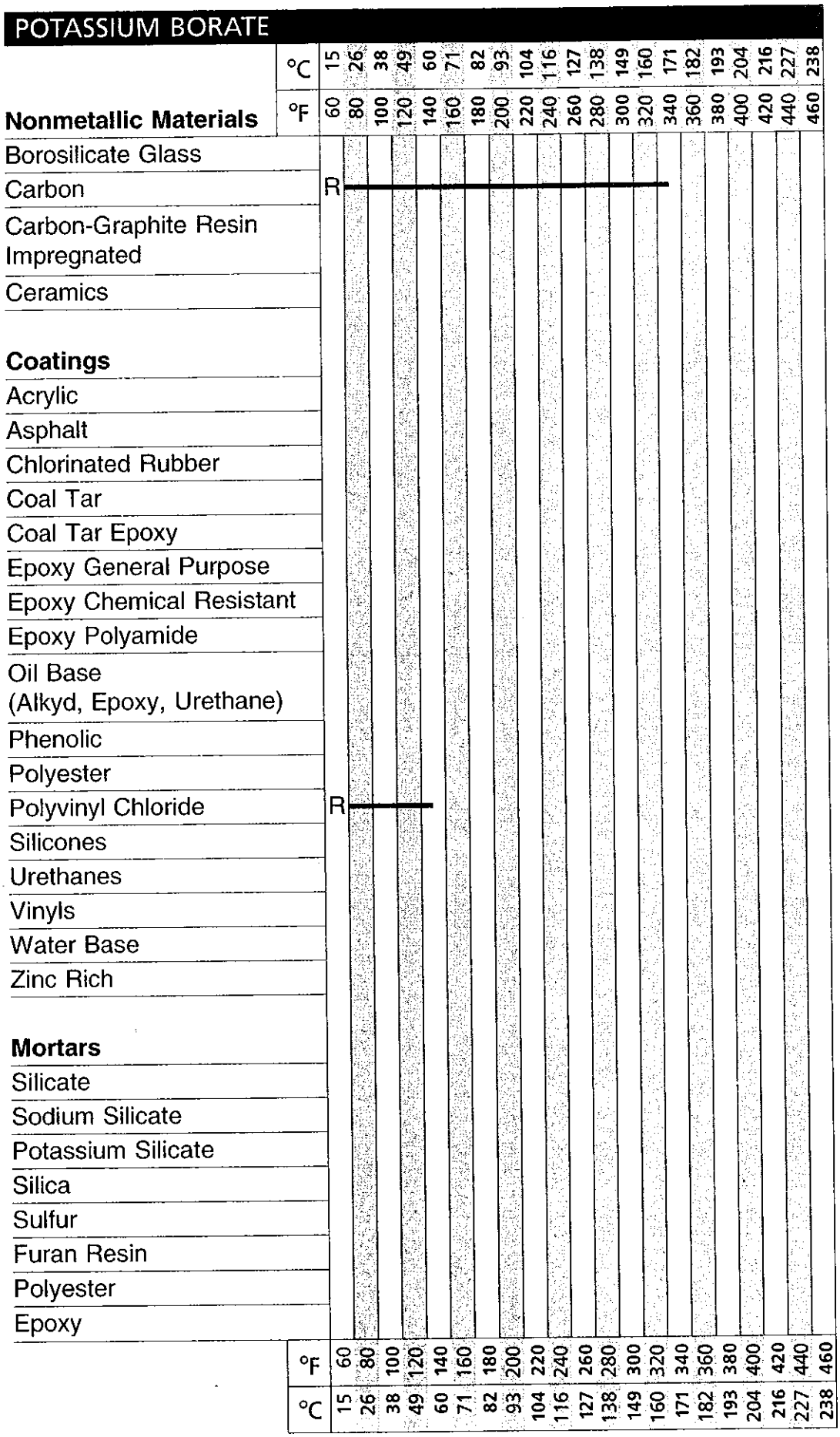






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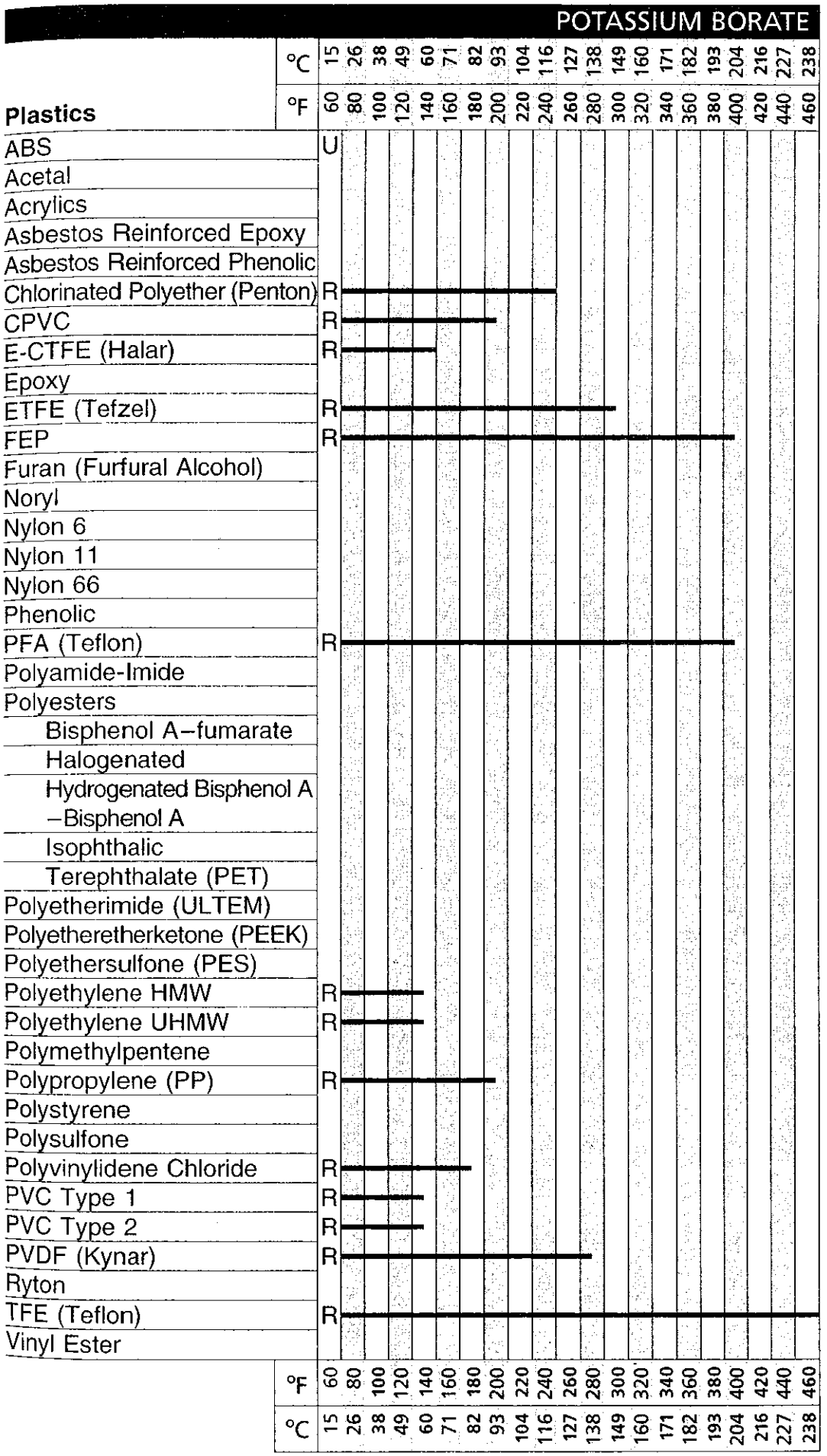



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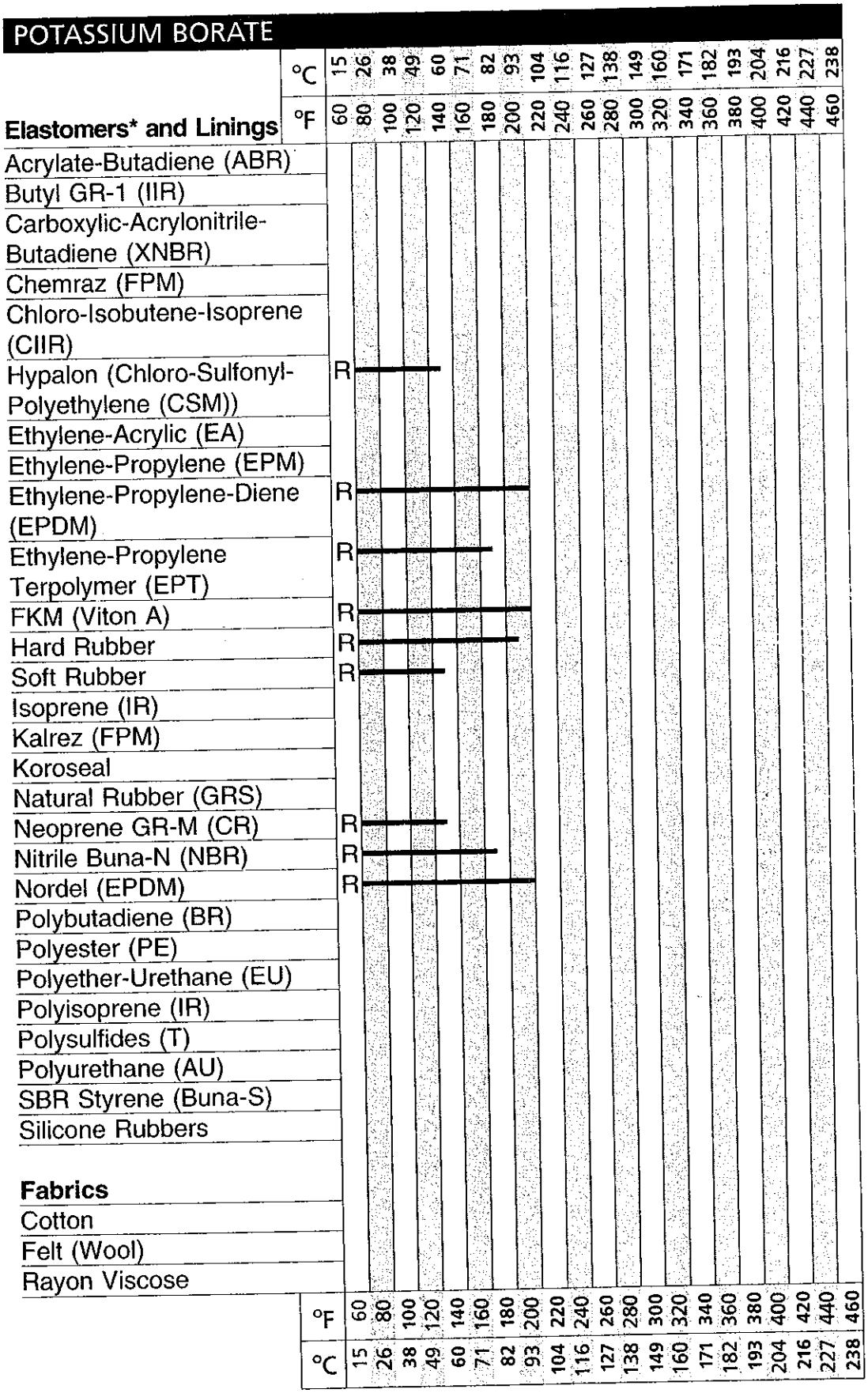


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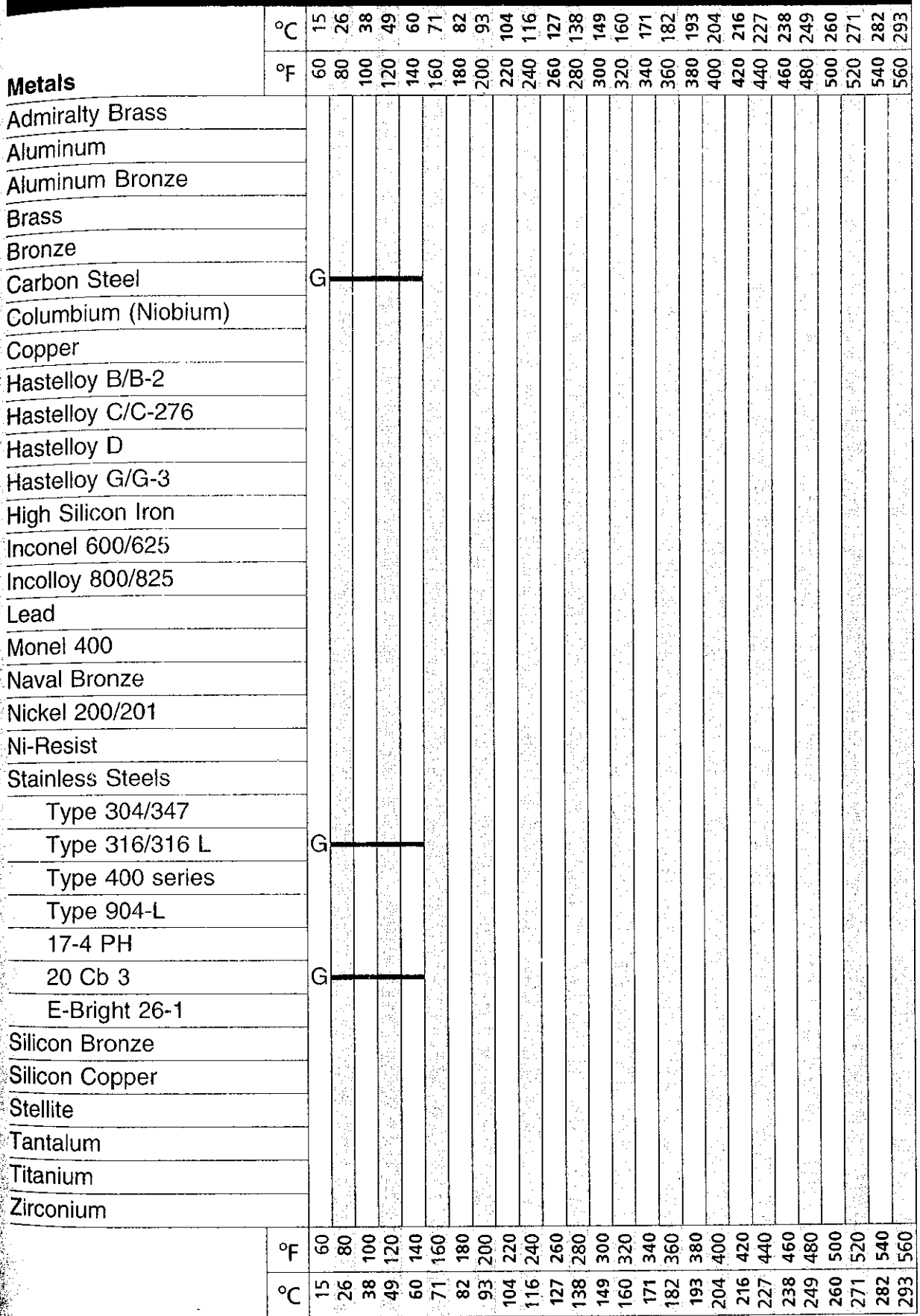


FOR METALS

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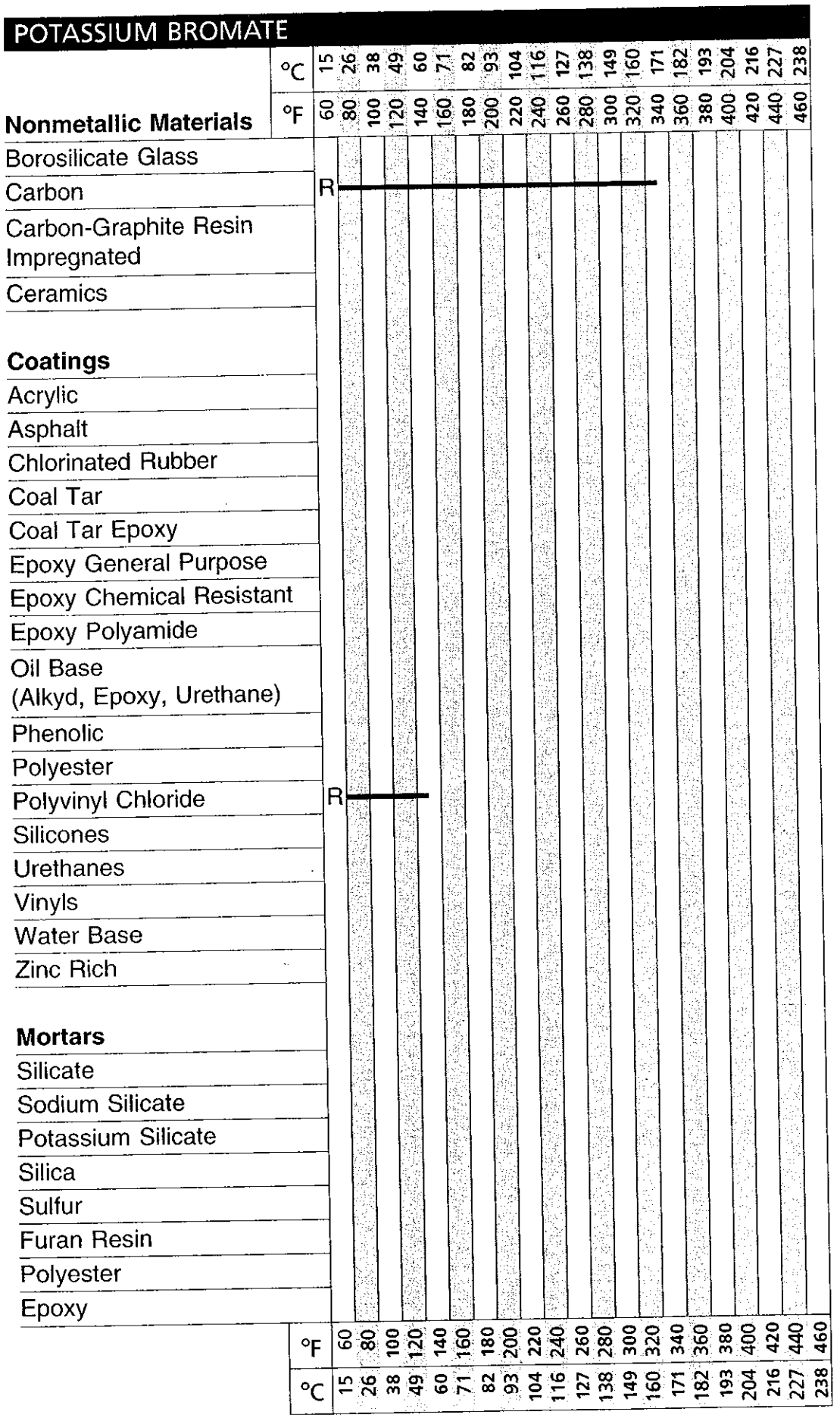




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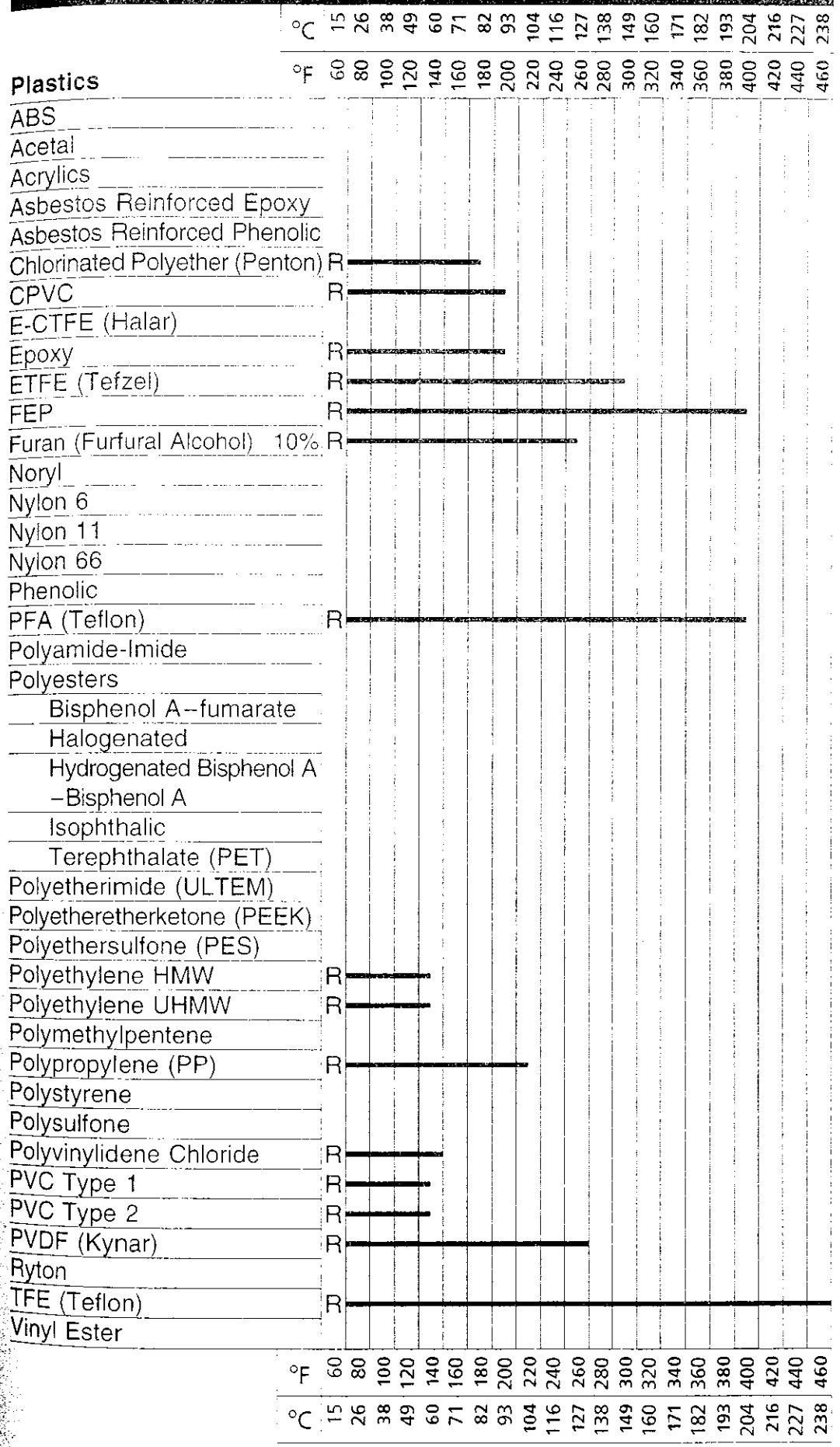


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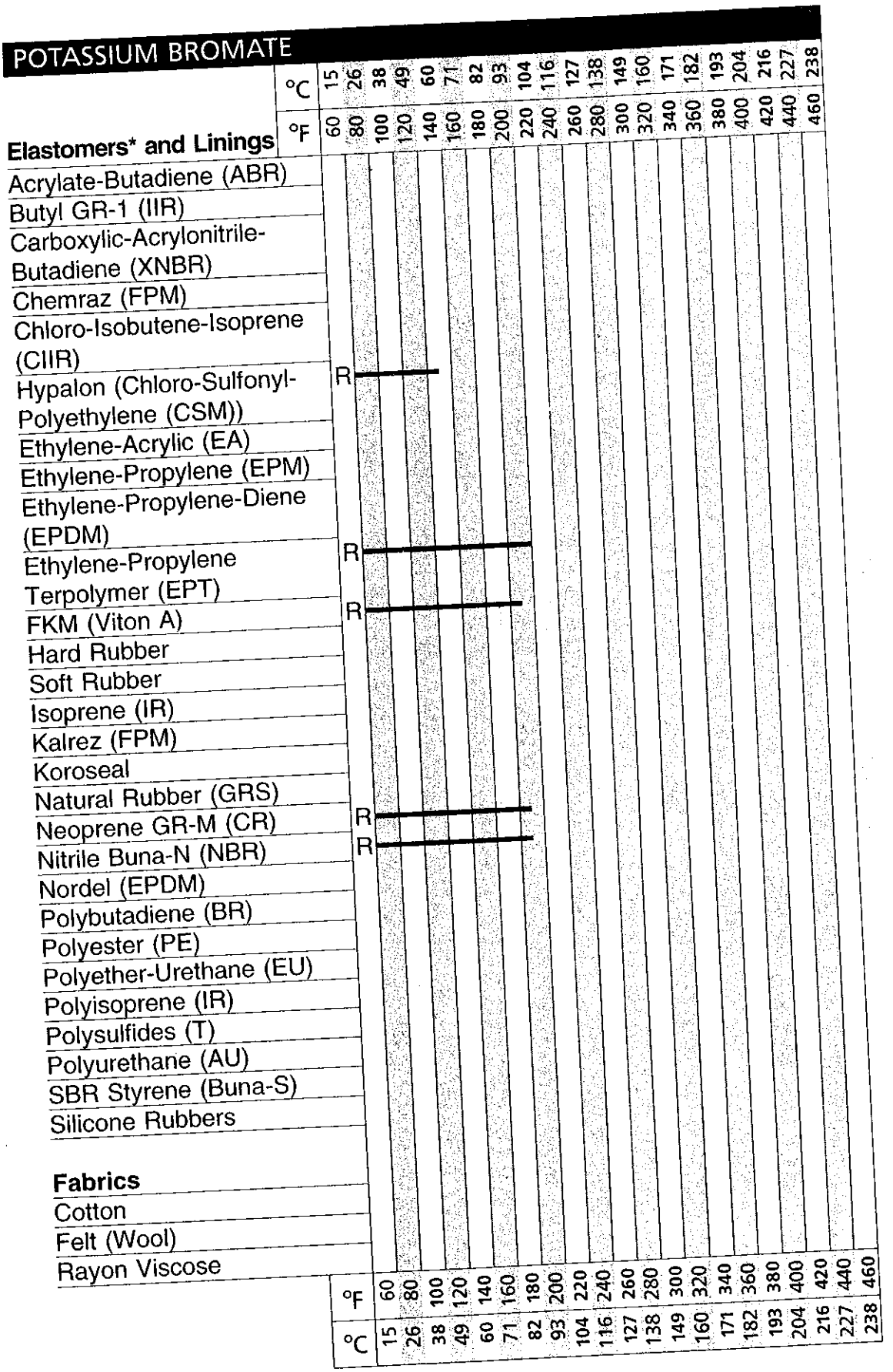


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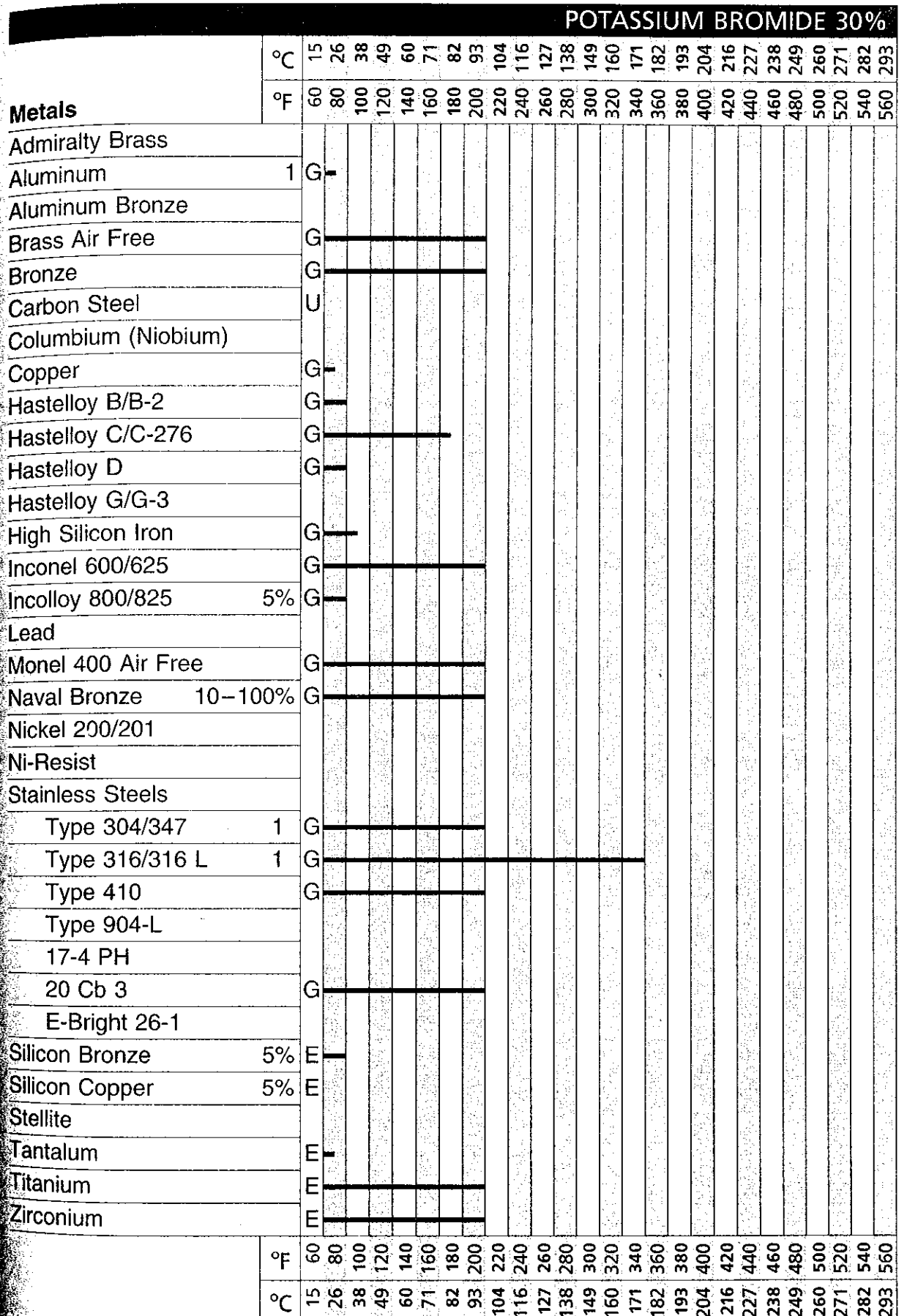
# POTASSIUM BROMIDE 30%




FOR METALS

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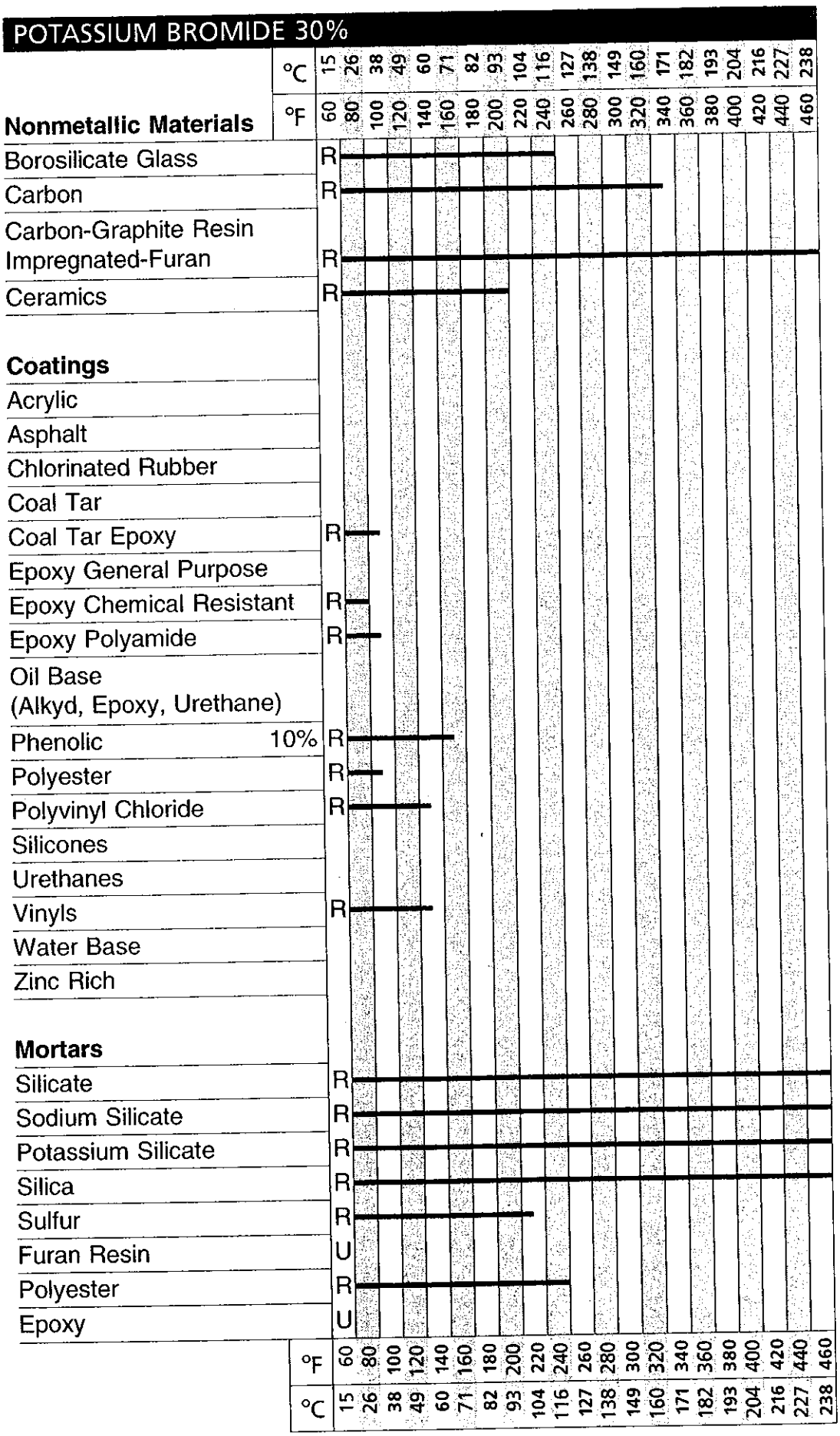
## POTASSIUM BROMIDE 30%



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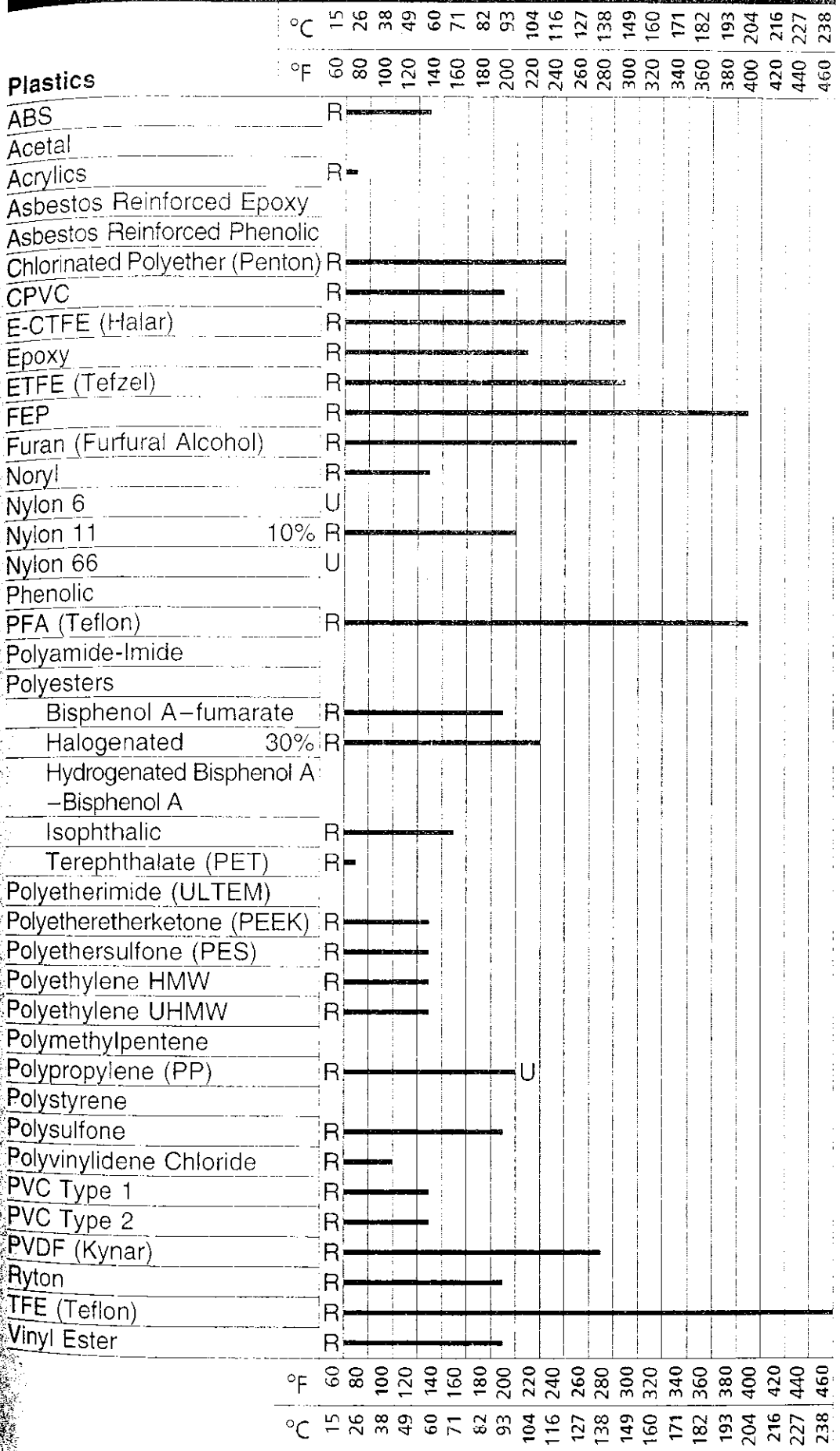


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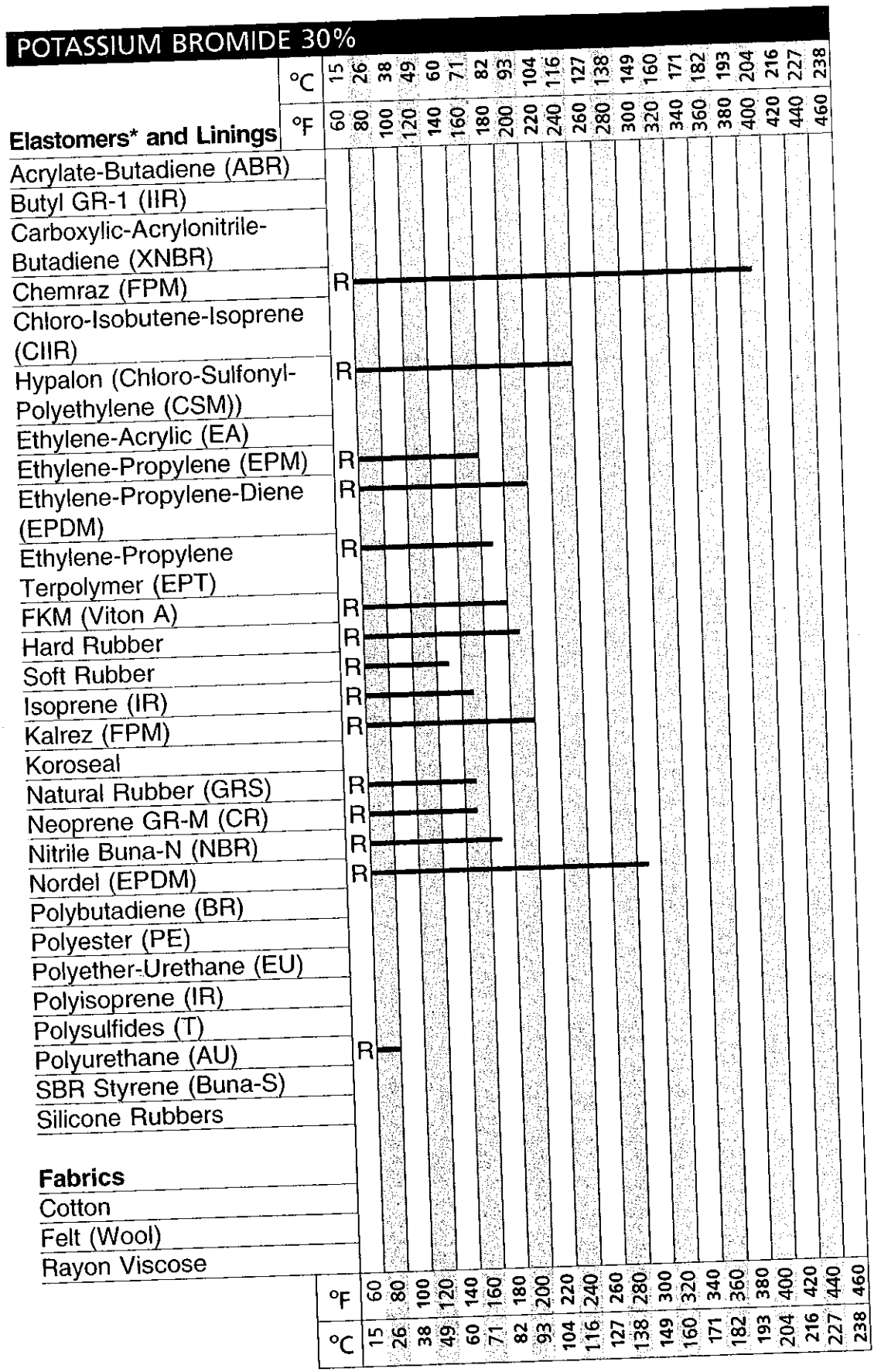


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# POTASSIUM BROMIDE (SAT.)

| Metals | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | Air Free | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | 75% | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | Air Free | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | 90% | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS
E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year
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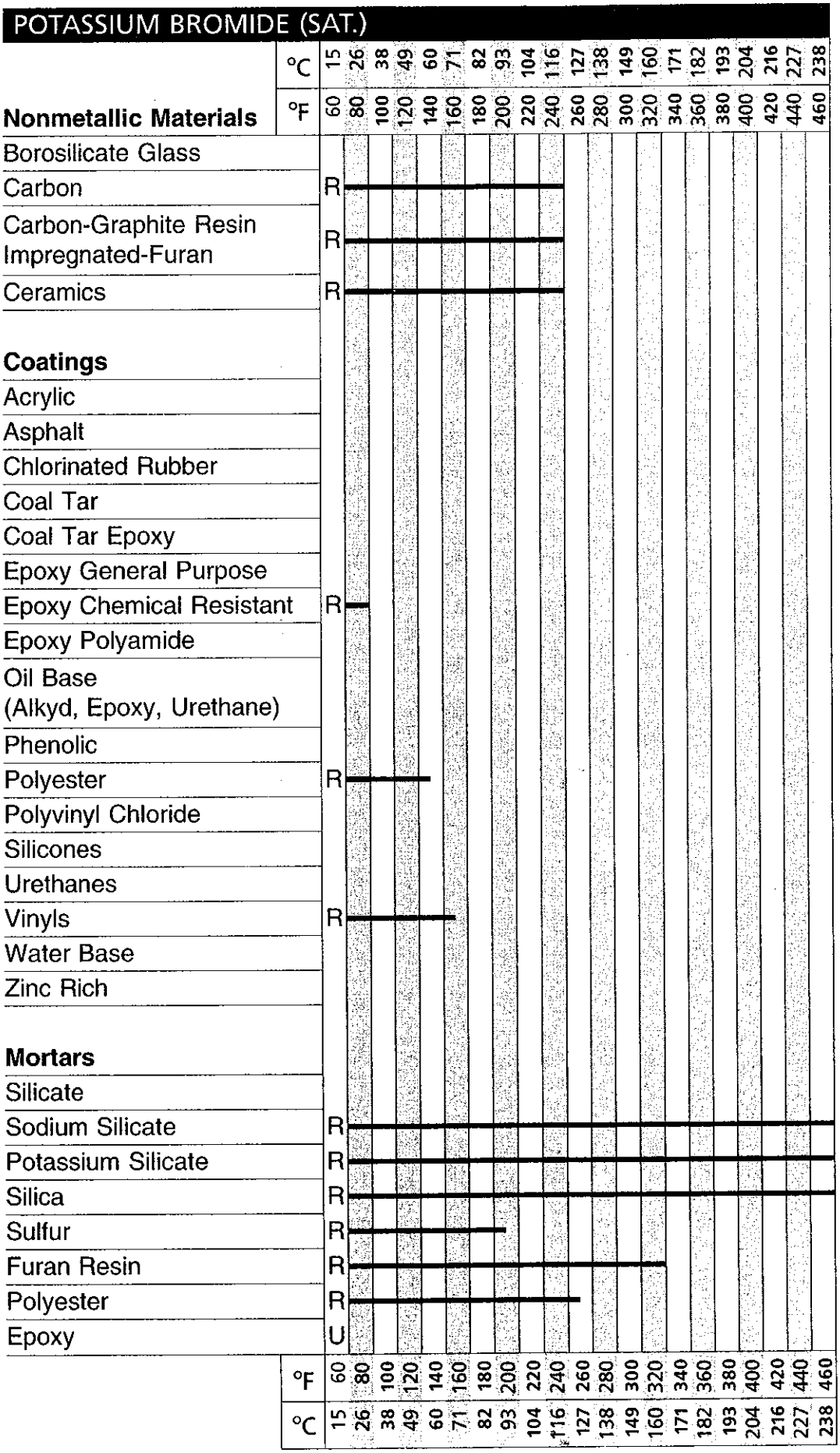
## POTASSIUM BROMIDE (SAT.)





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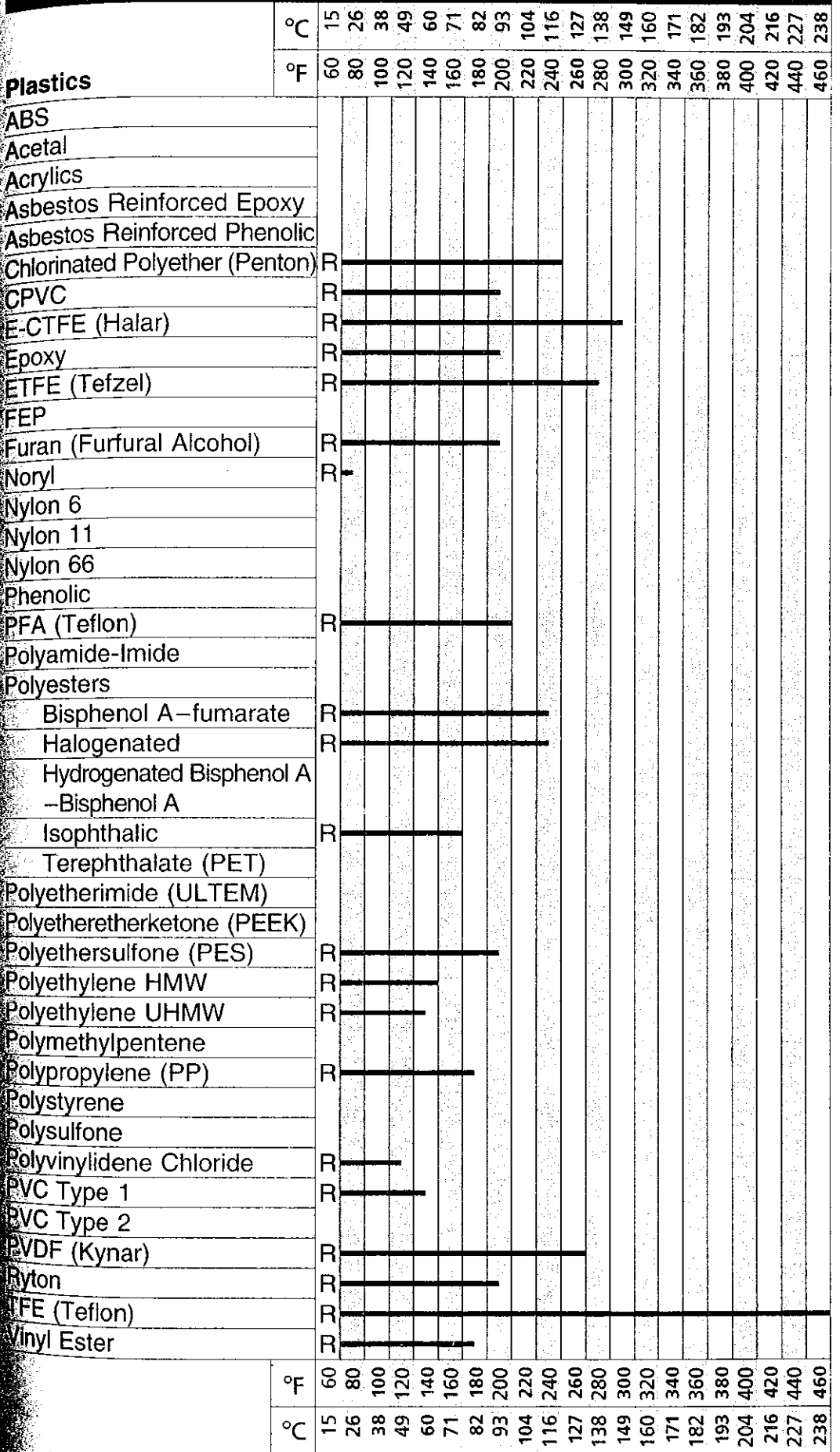
## POTASSIUM BROMIDE (SAT.)

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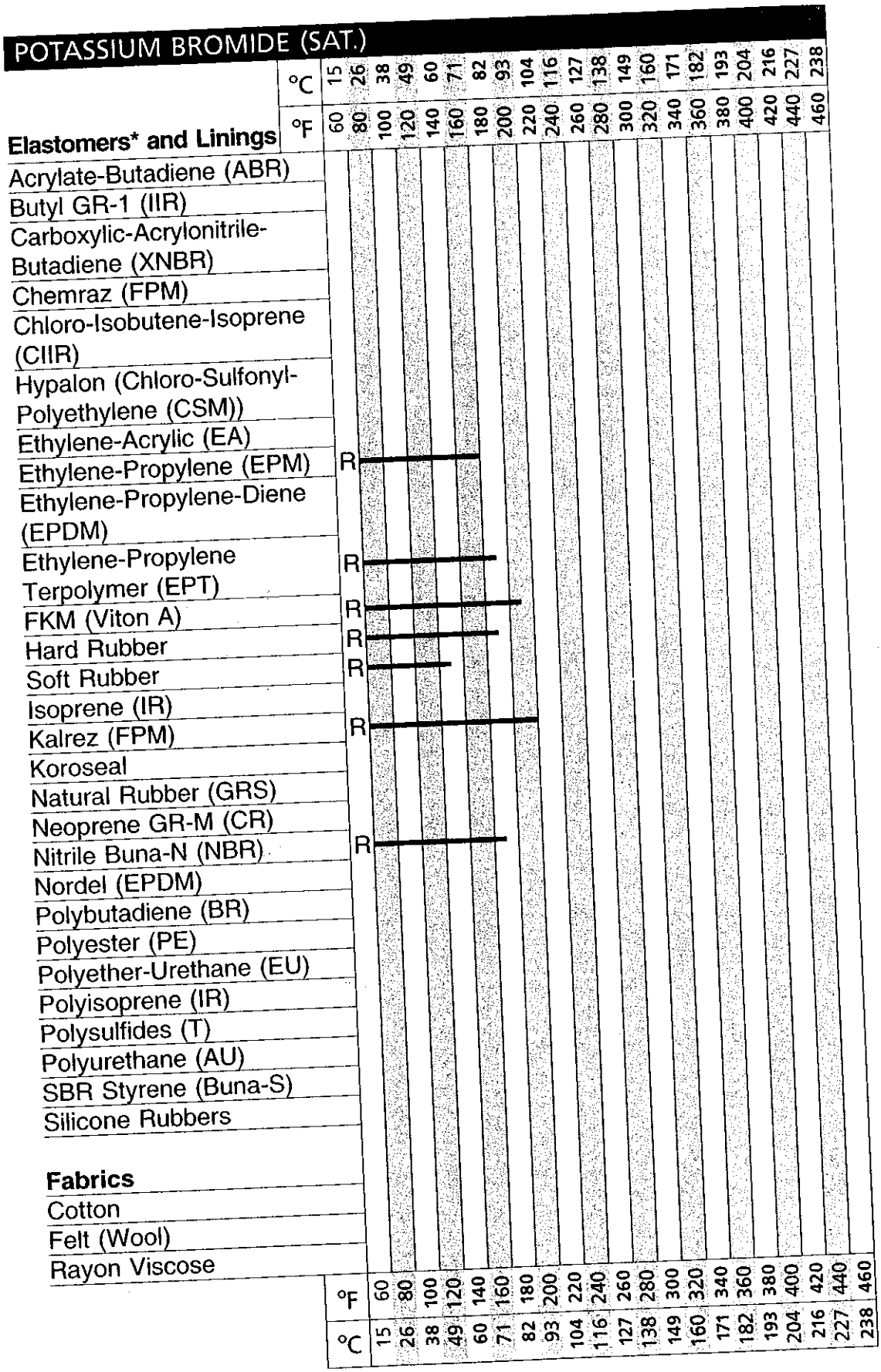


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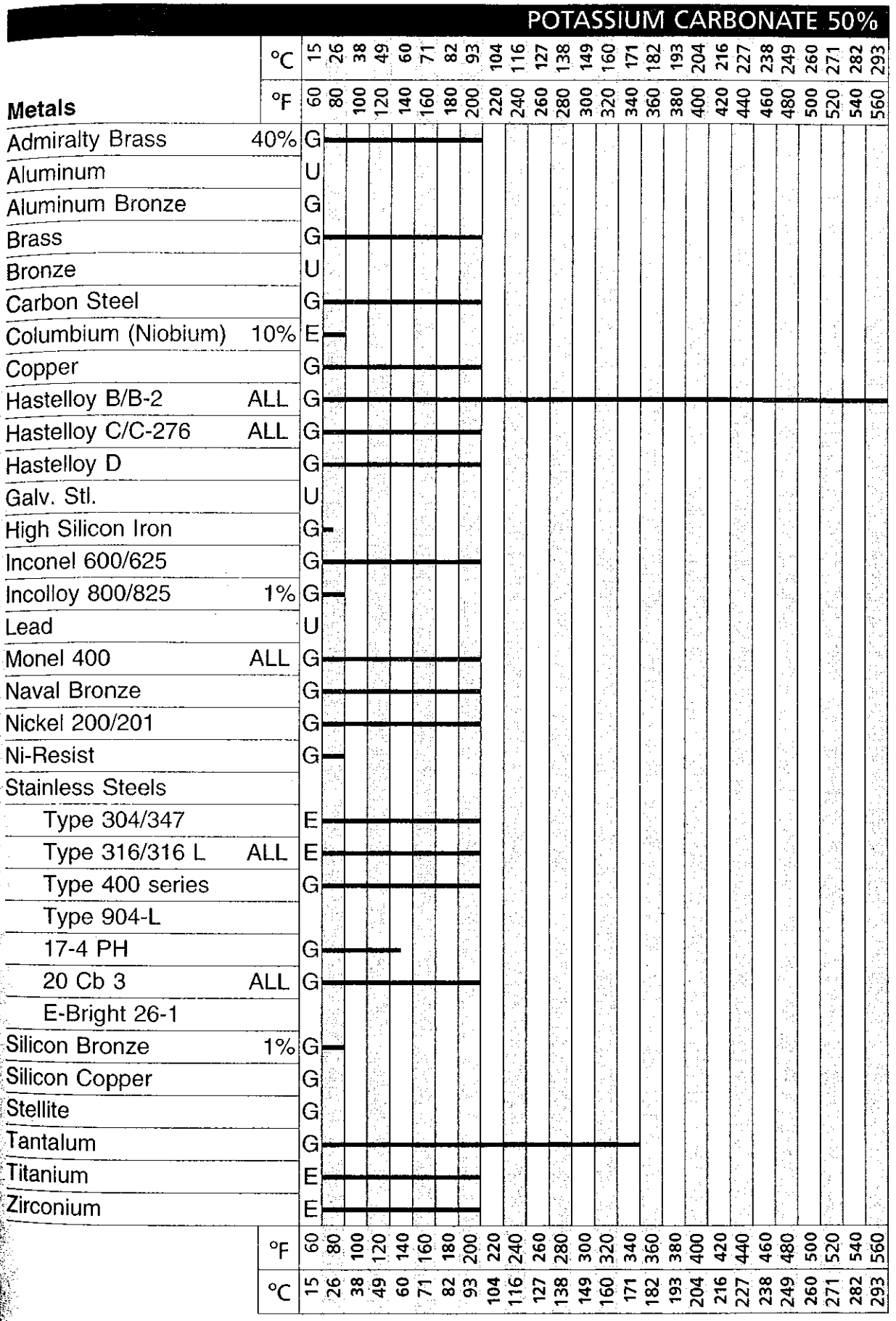
# POTASSIUM CARBONATE 50%




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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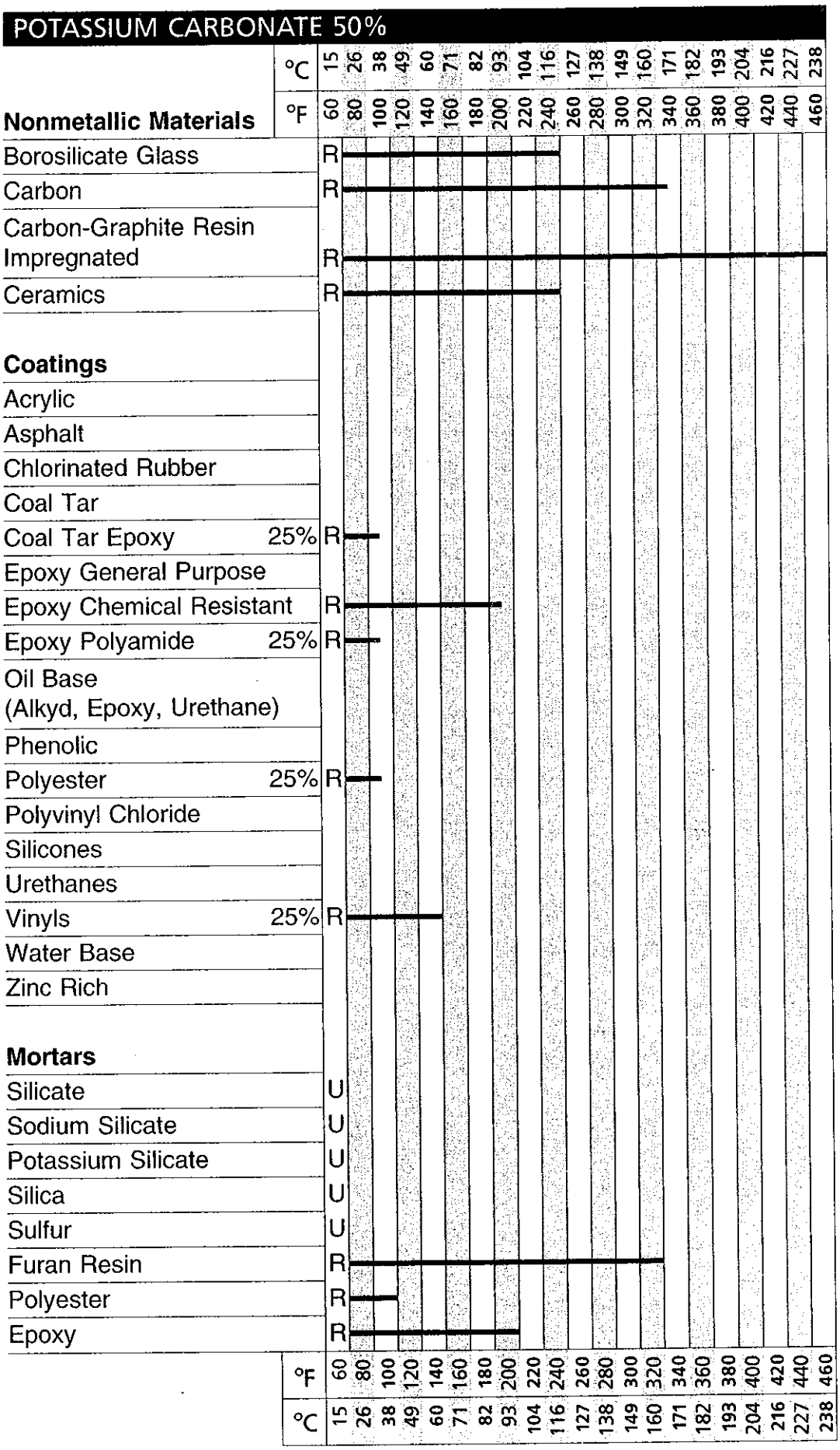






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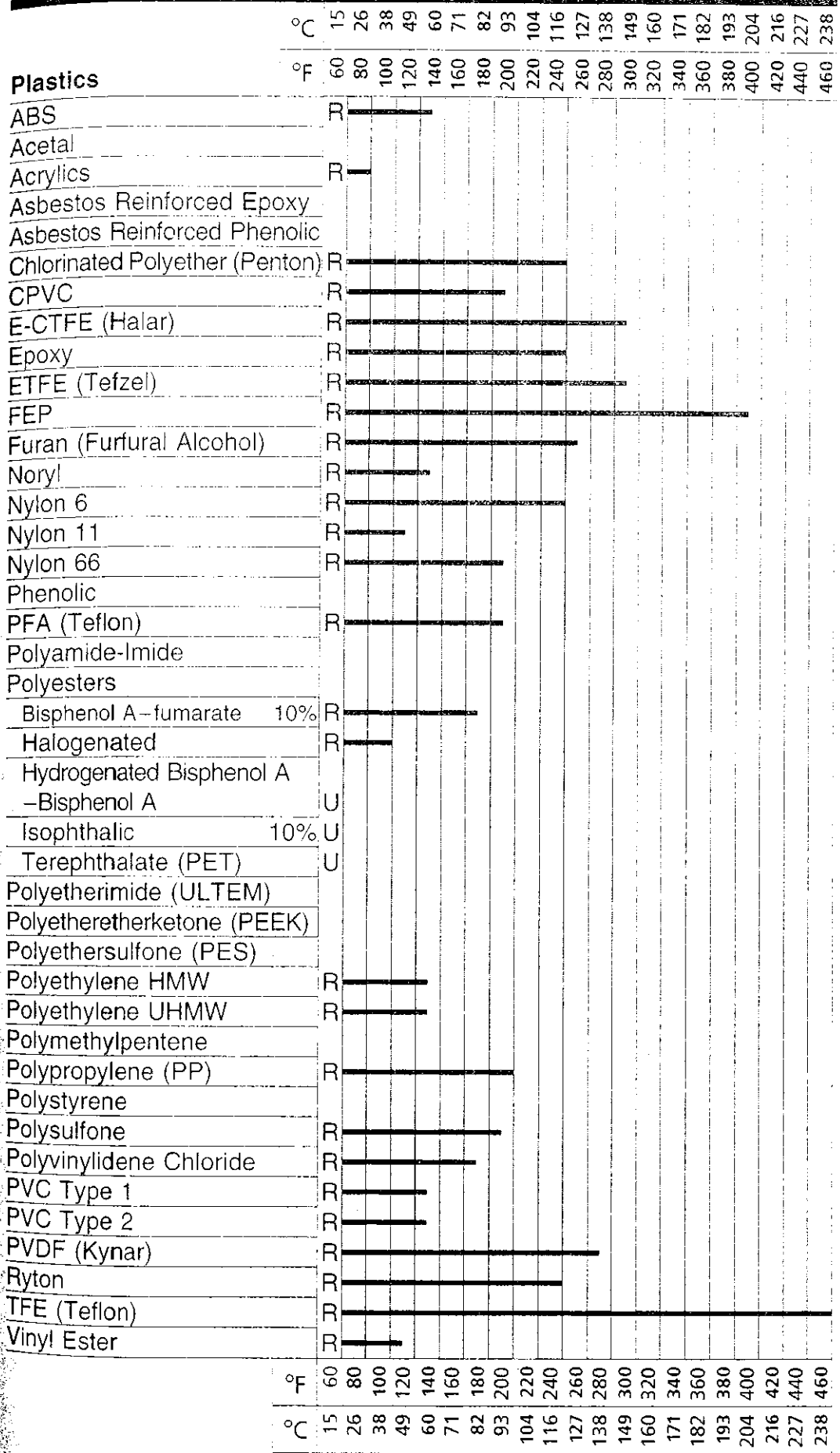


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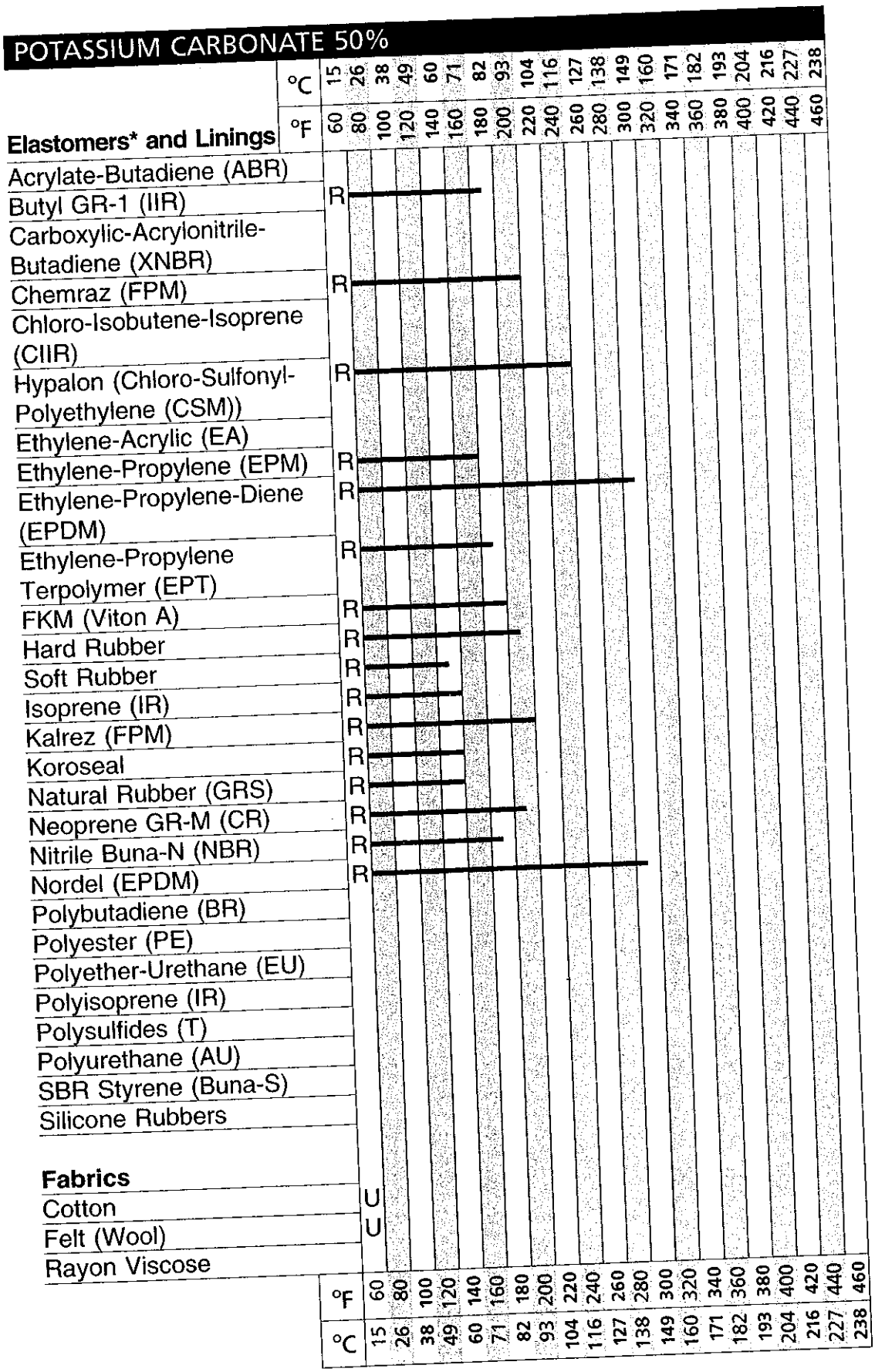


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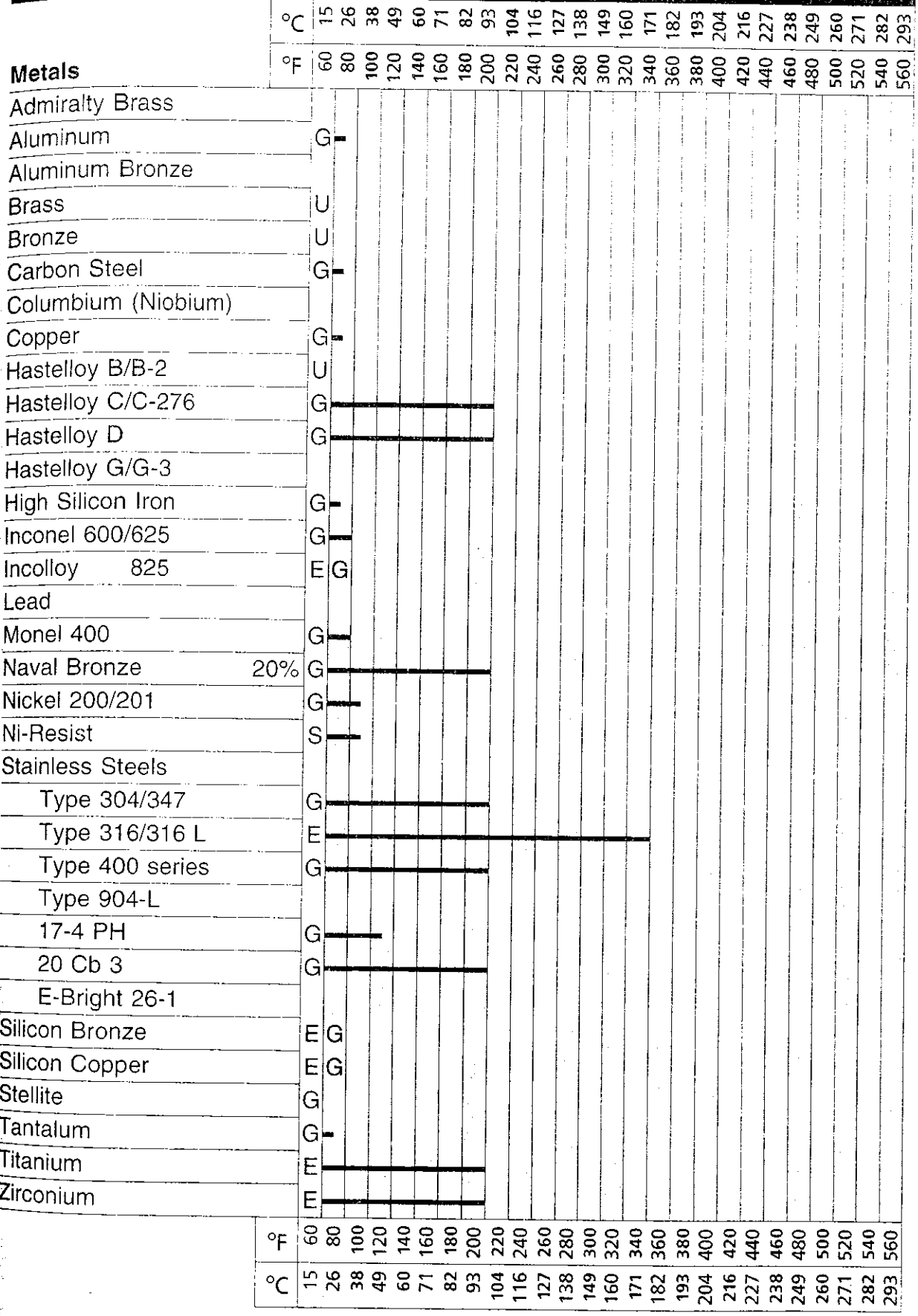


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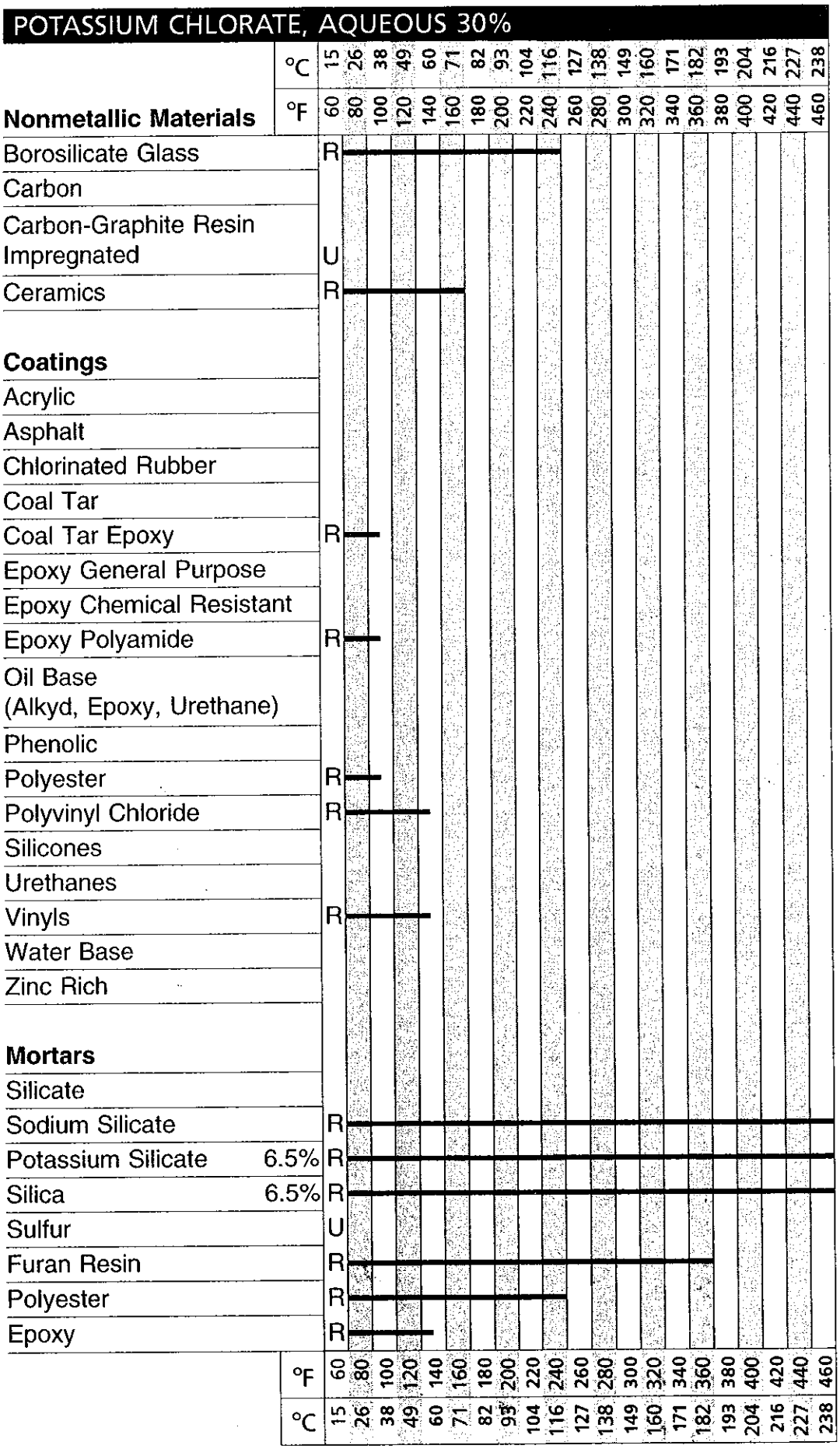






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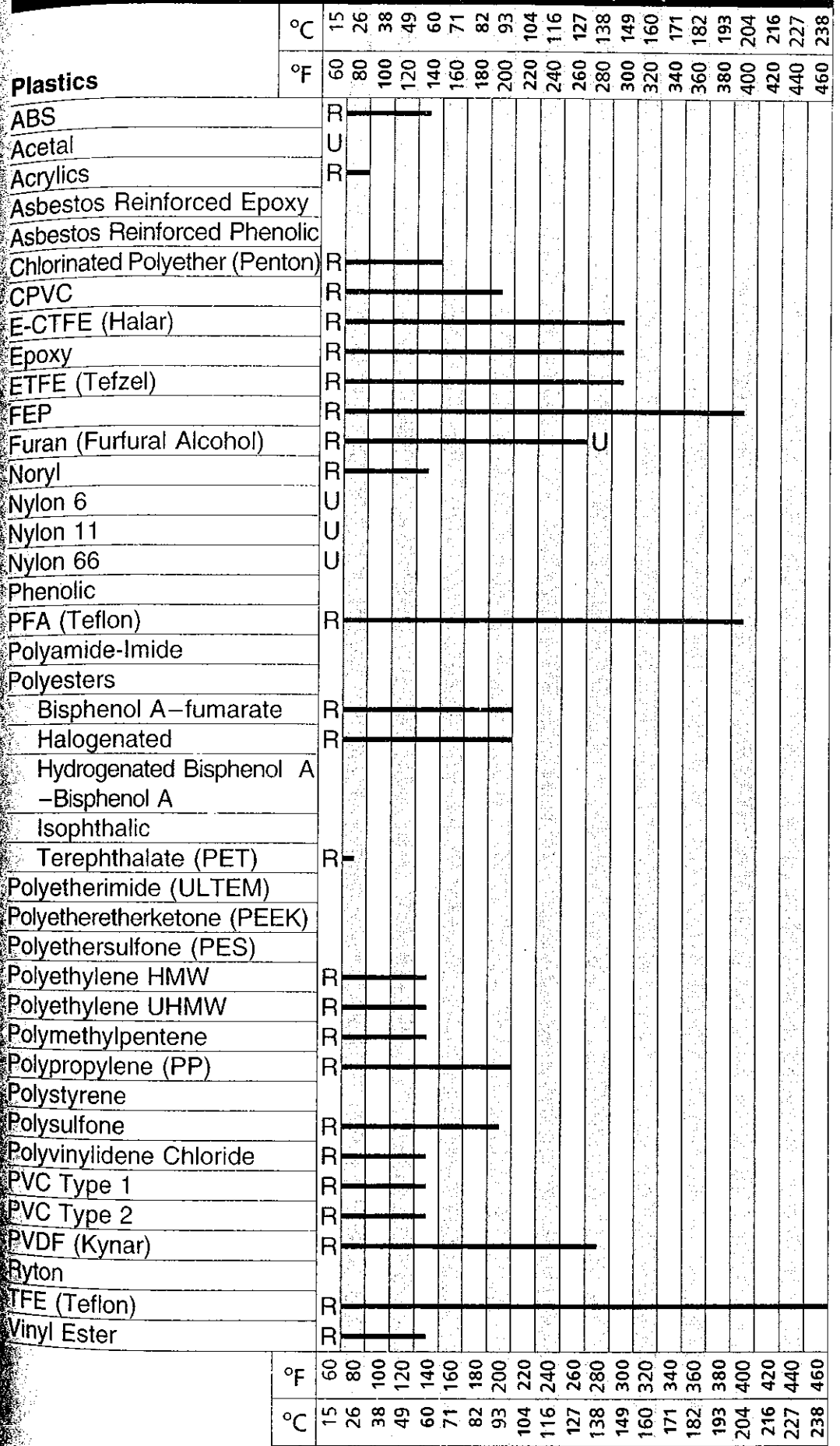


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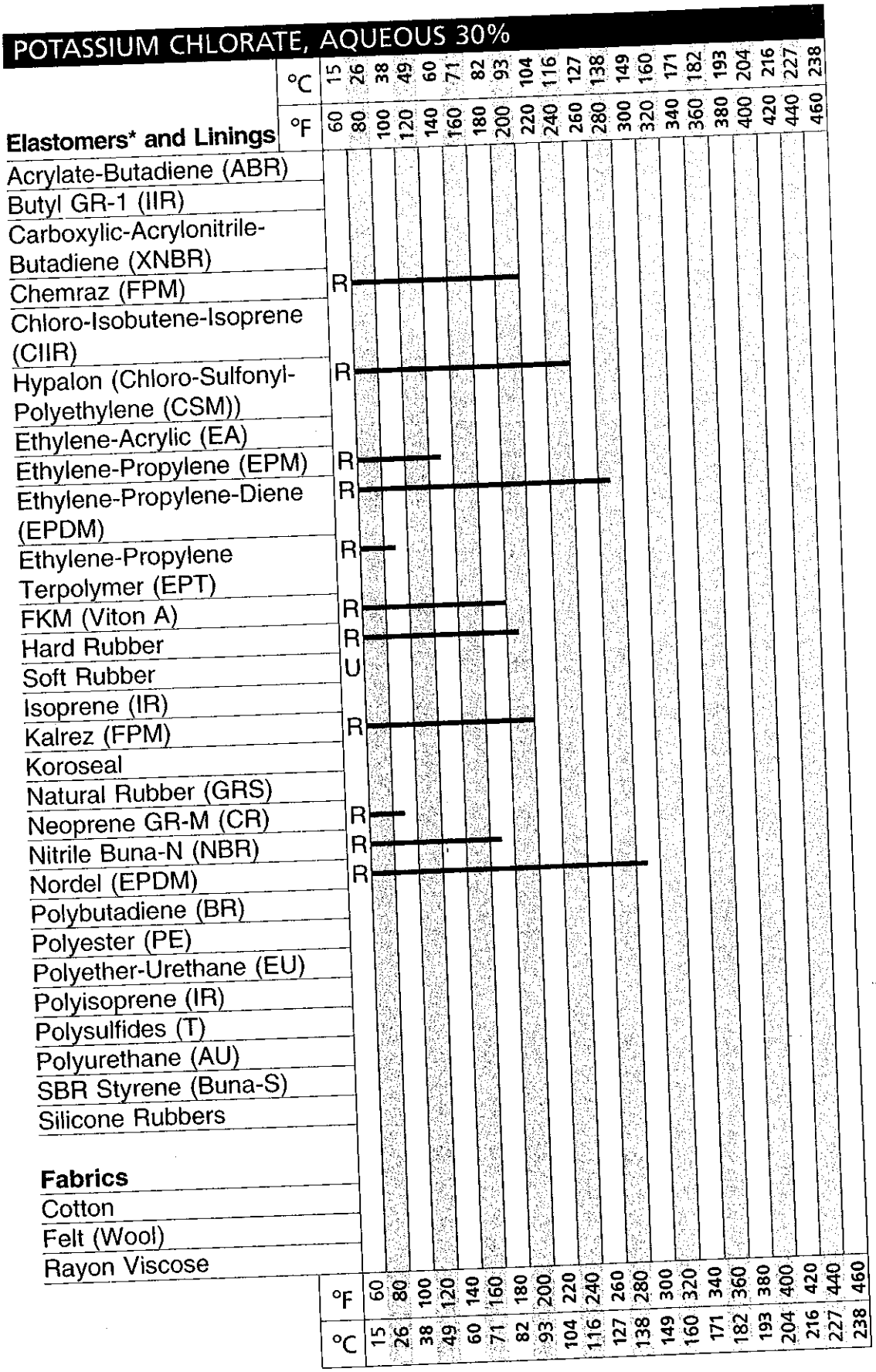


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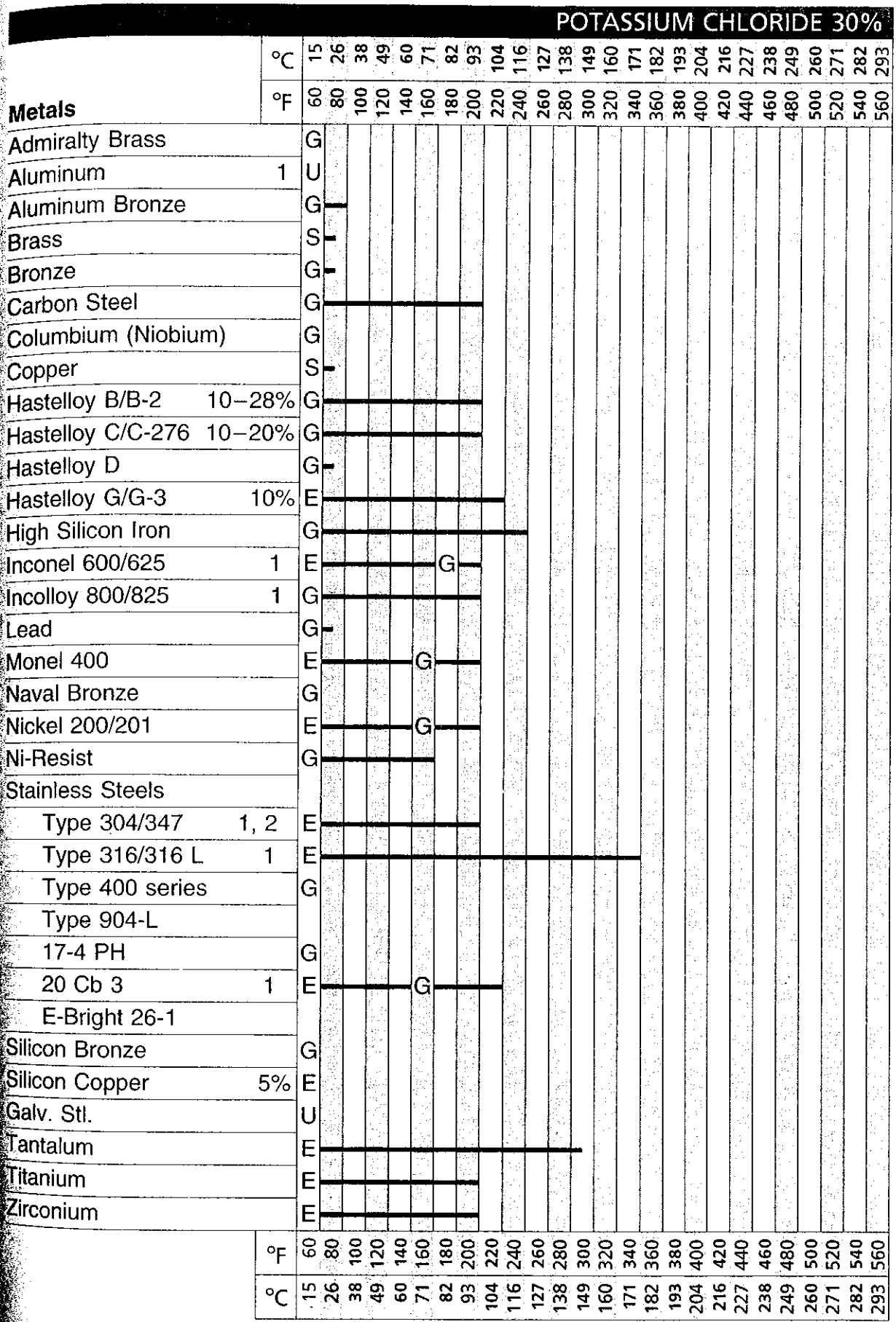


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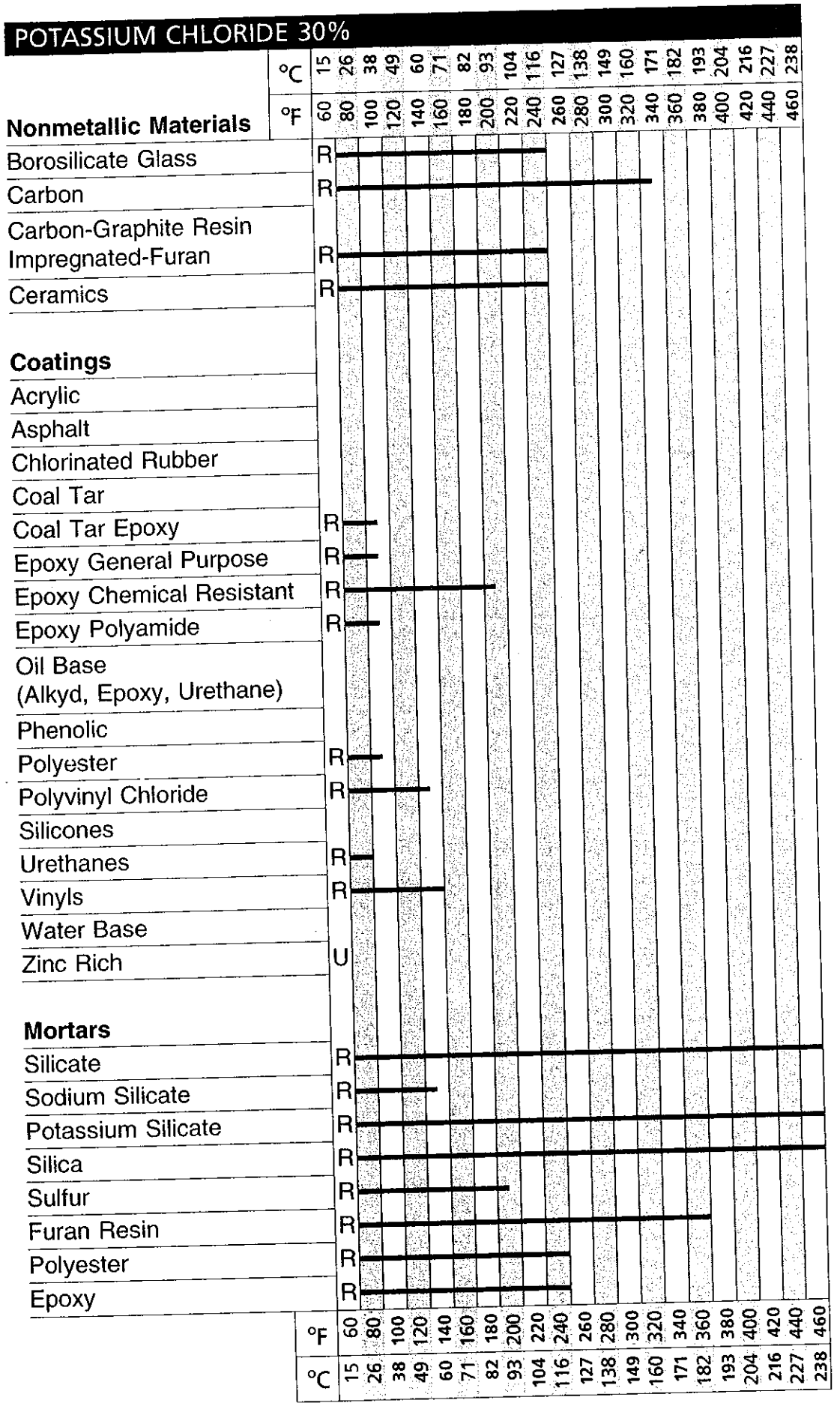




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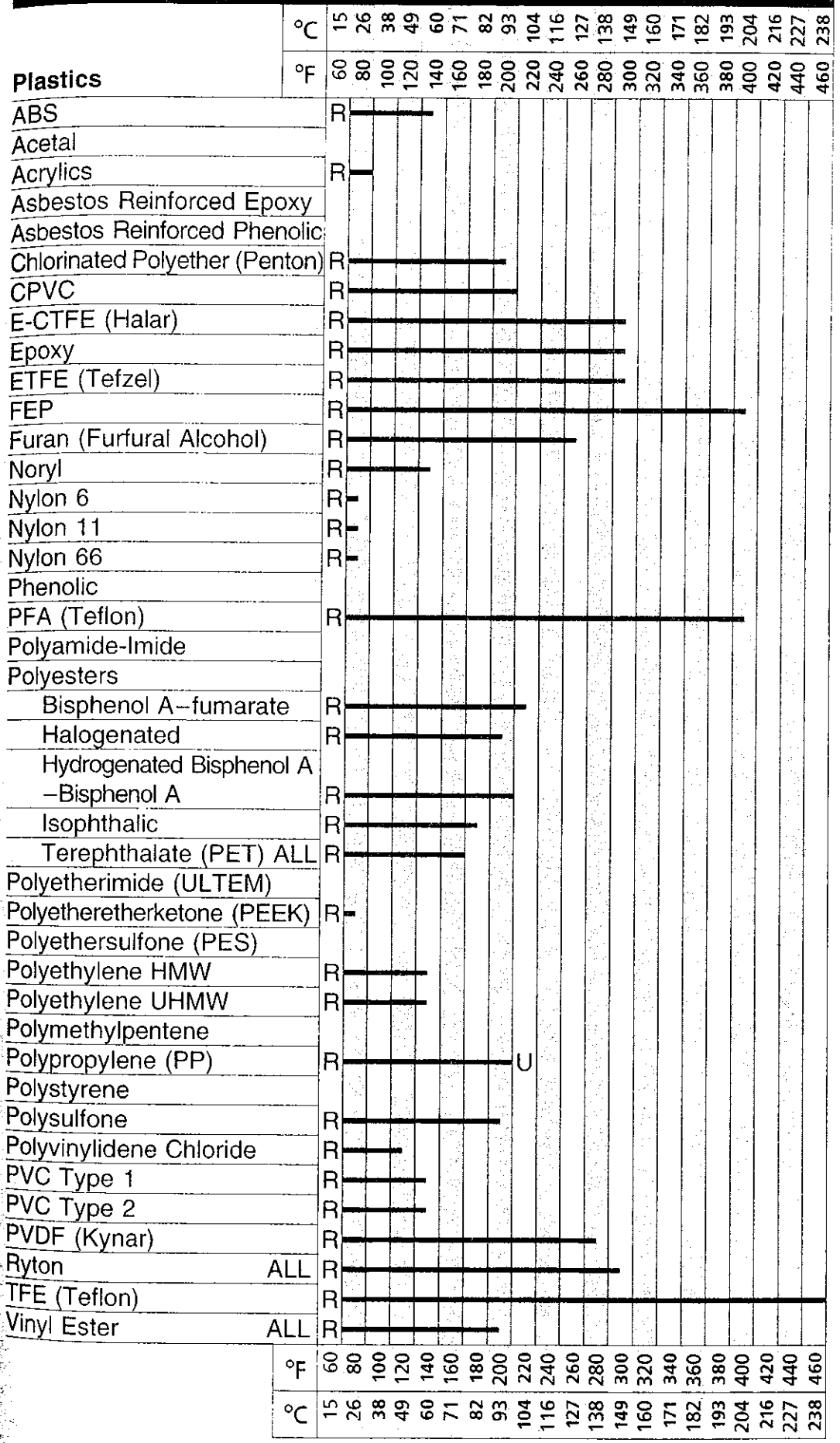


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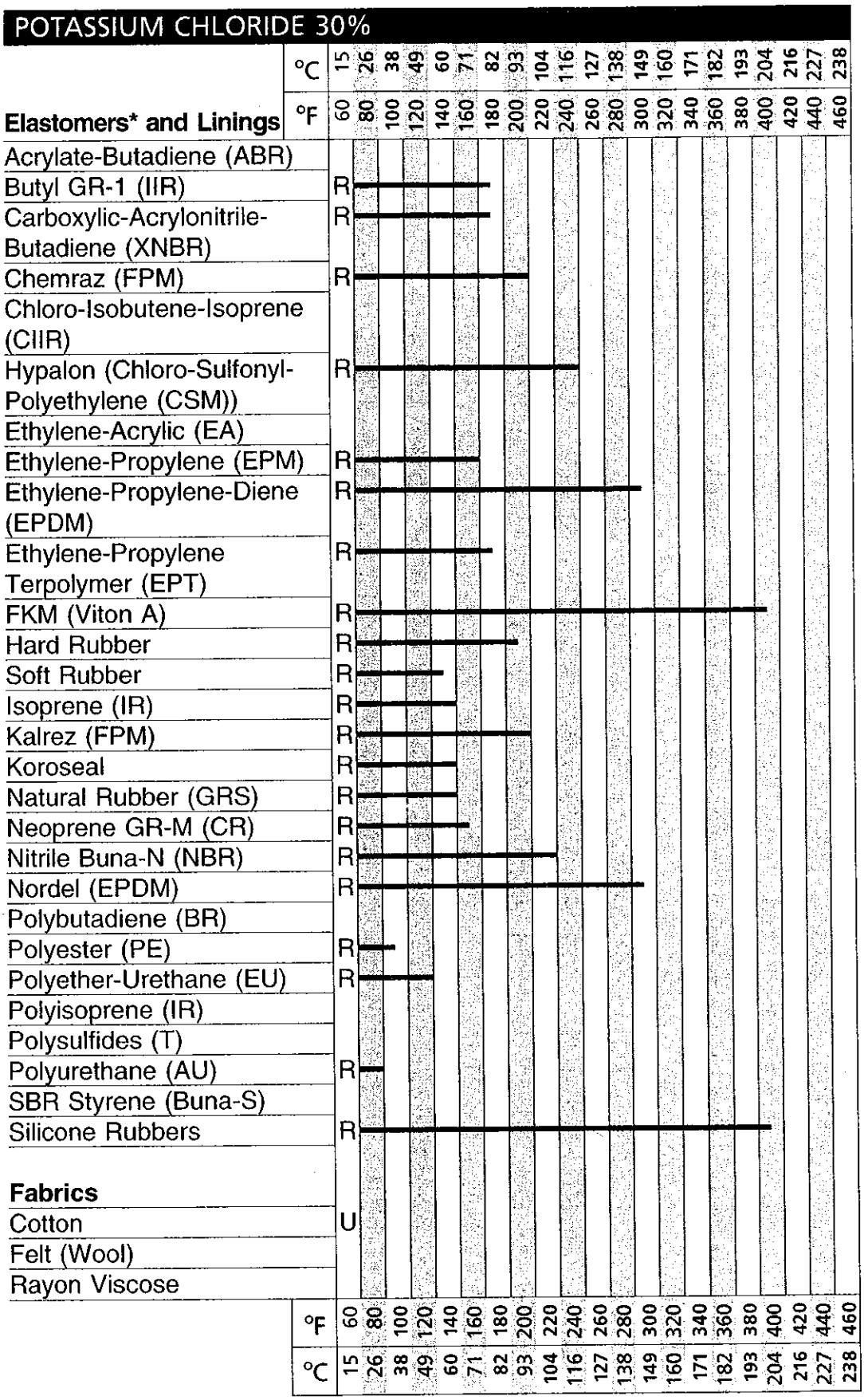


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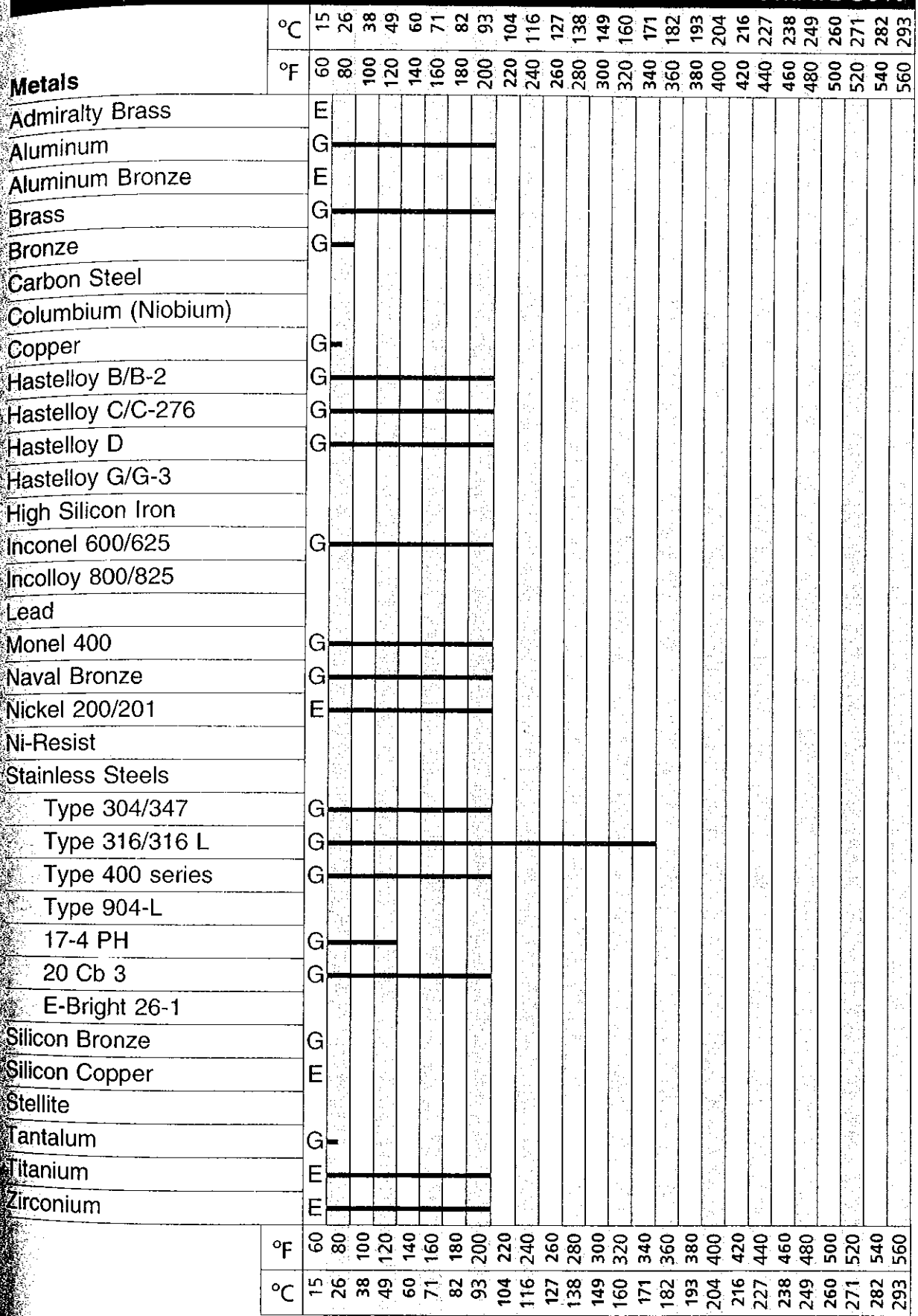


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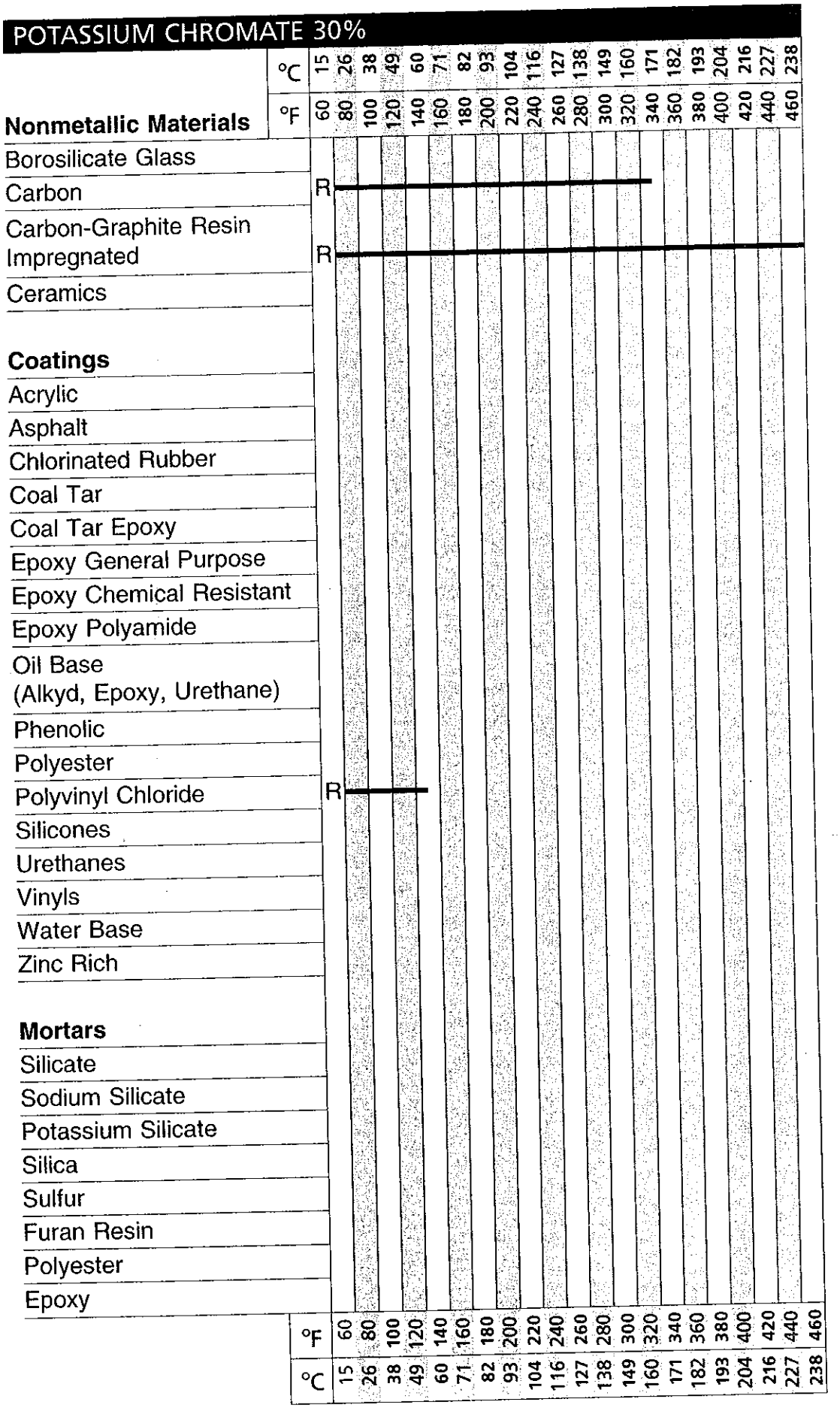




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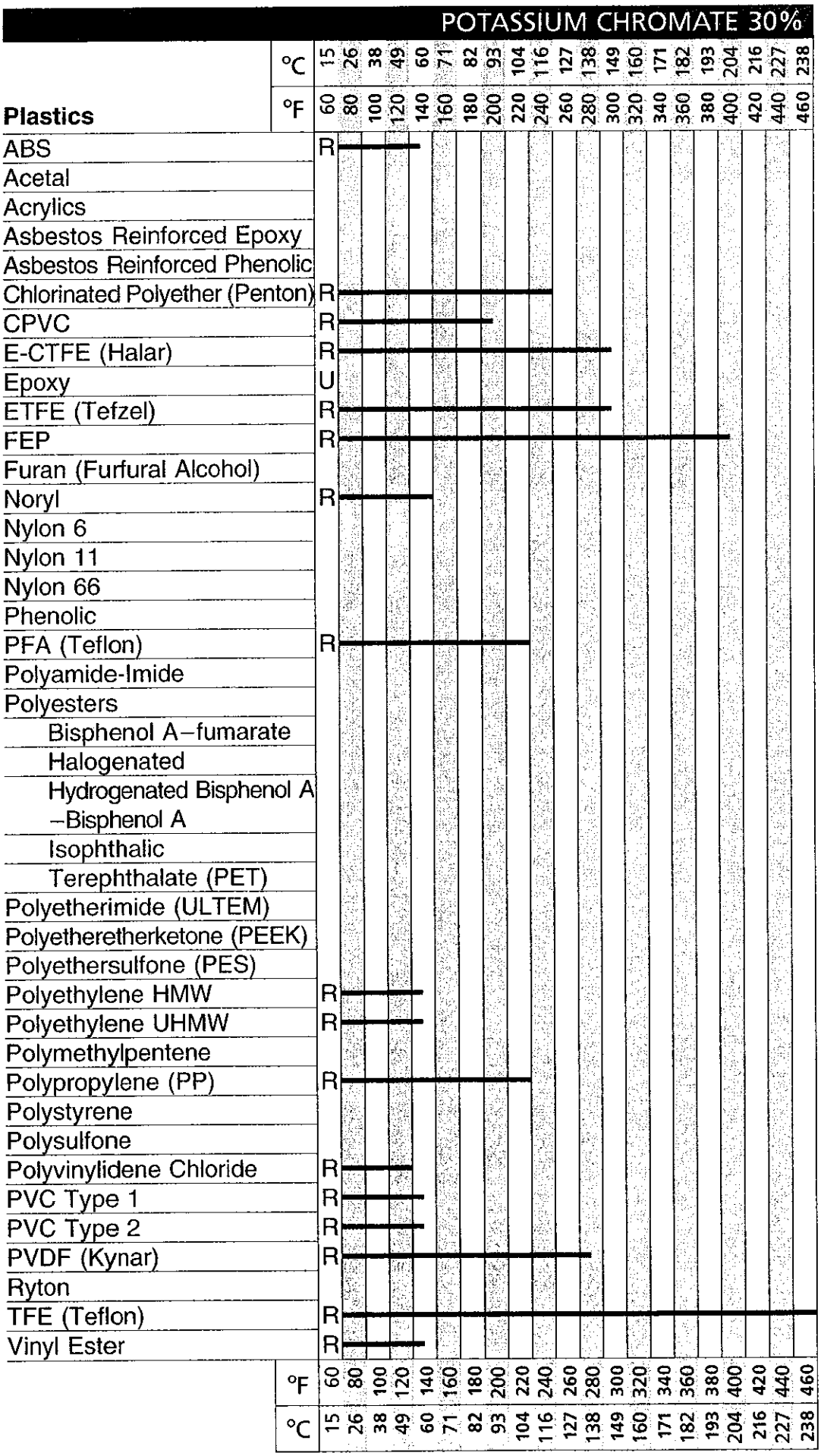



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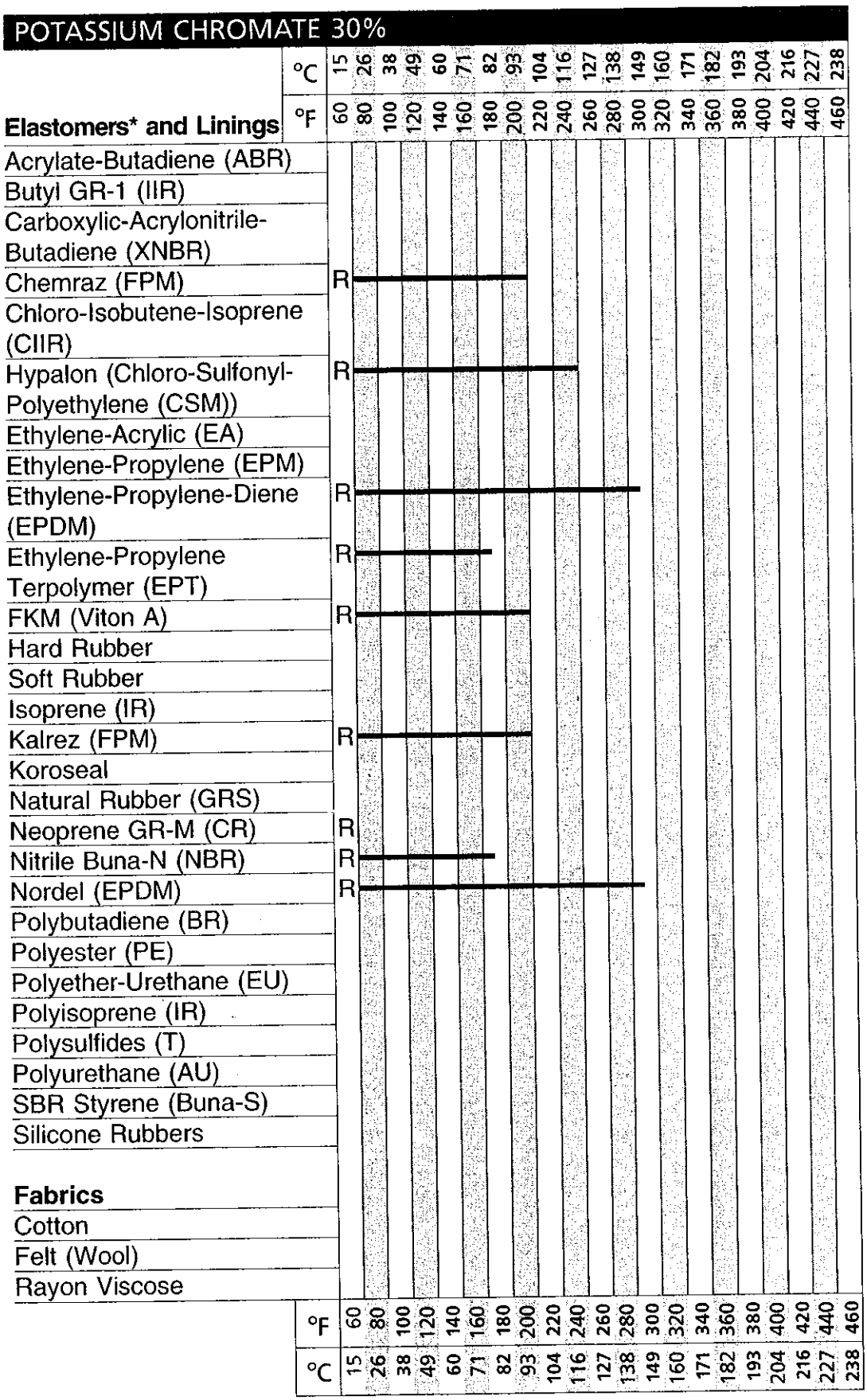


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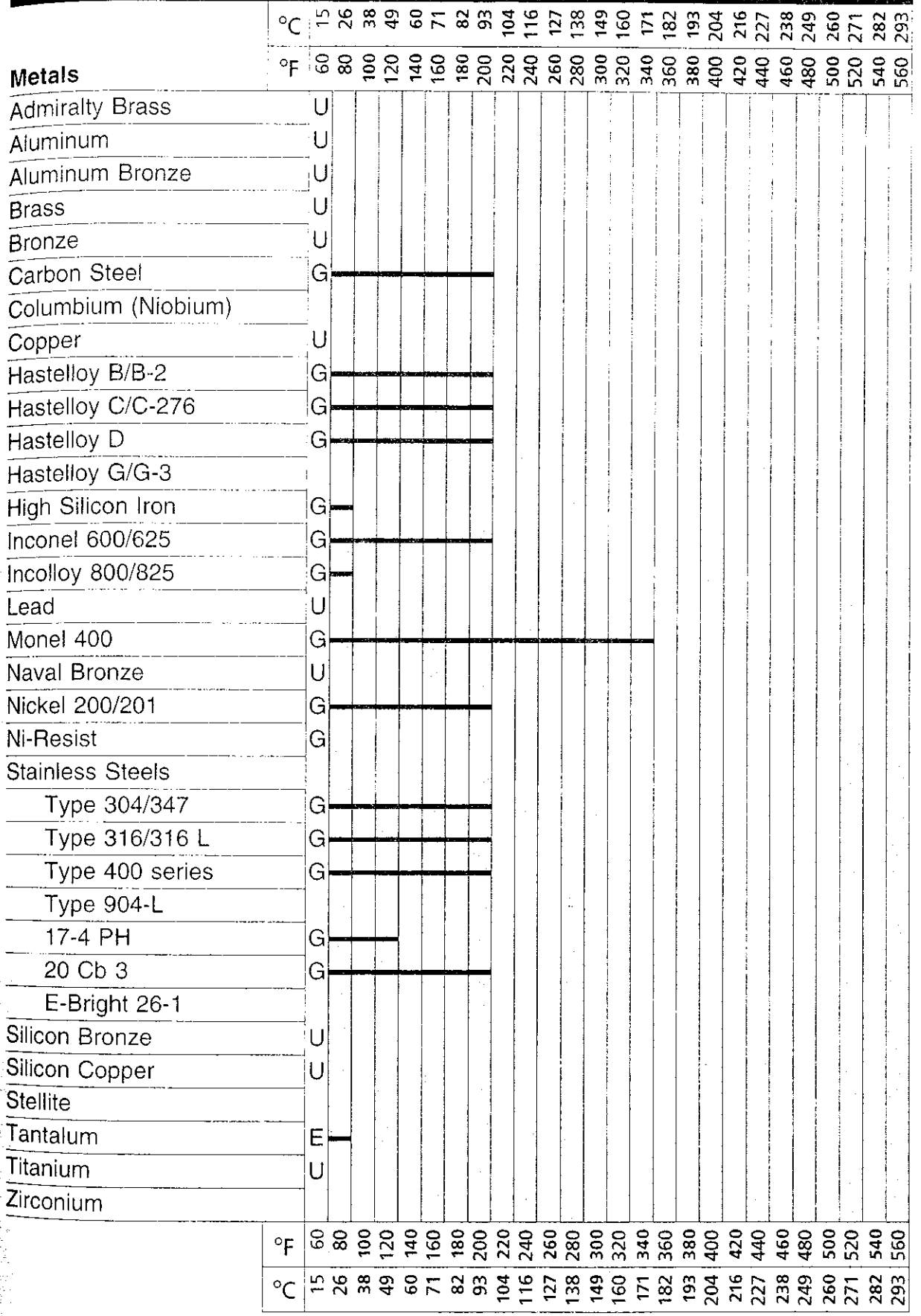


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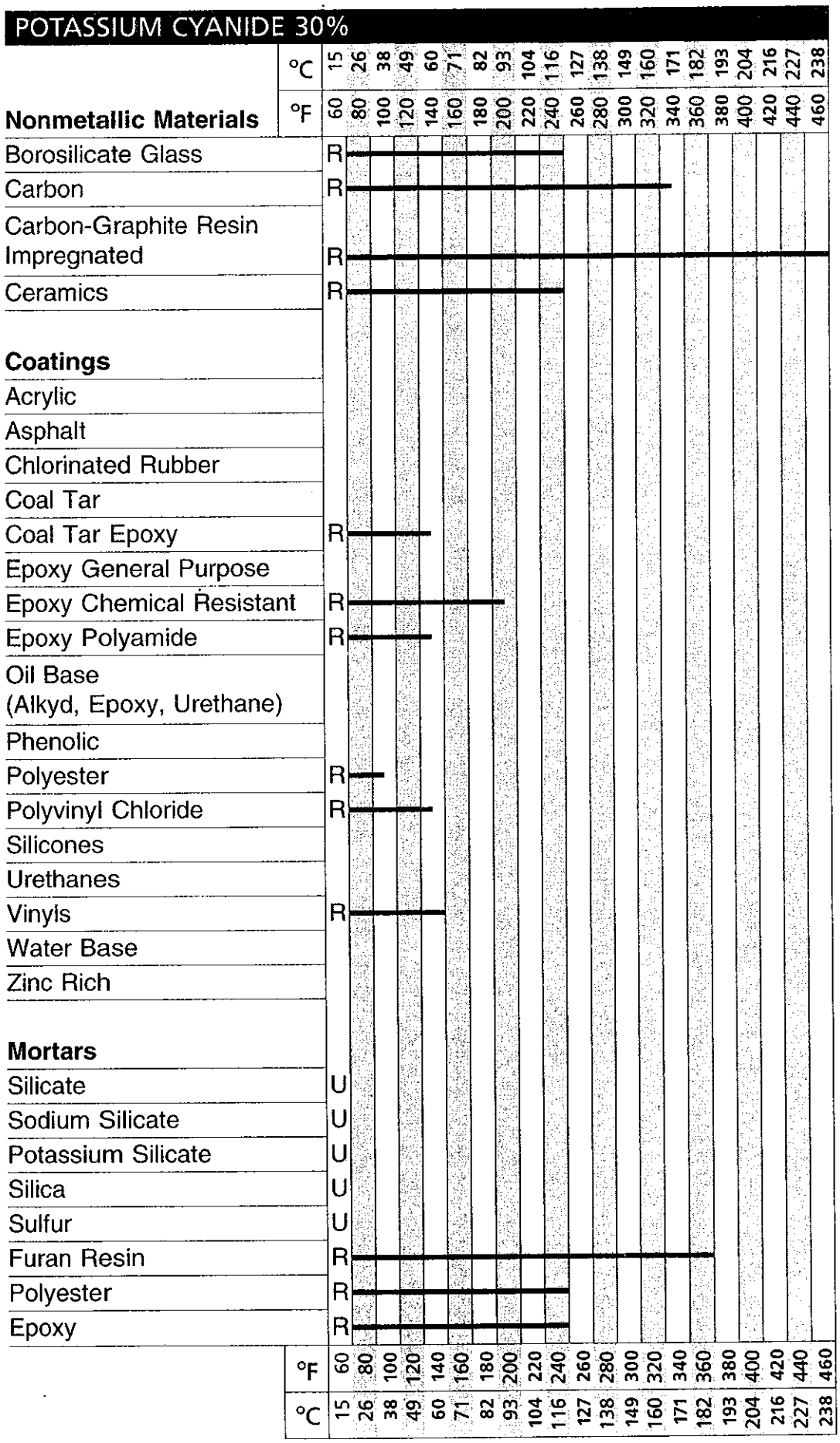




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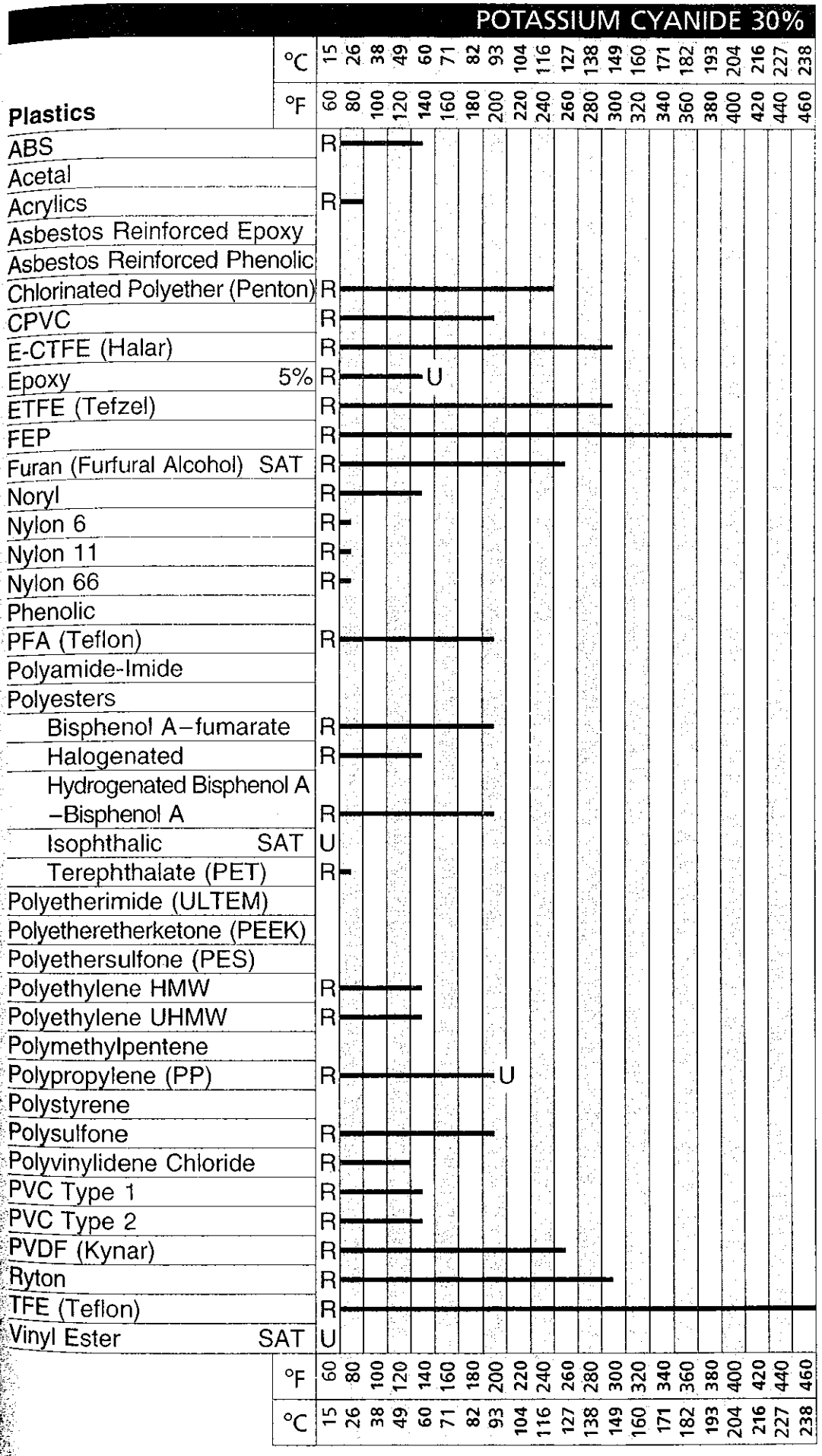


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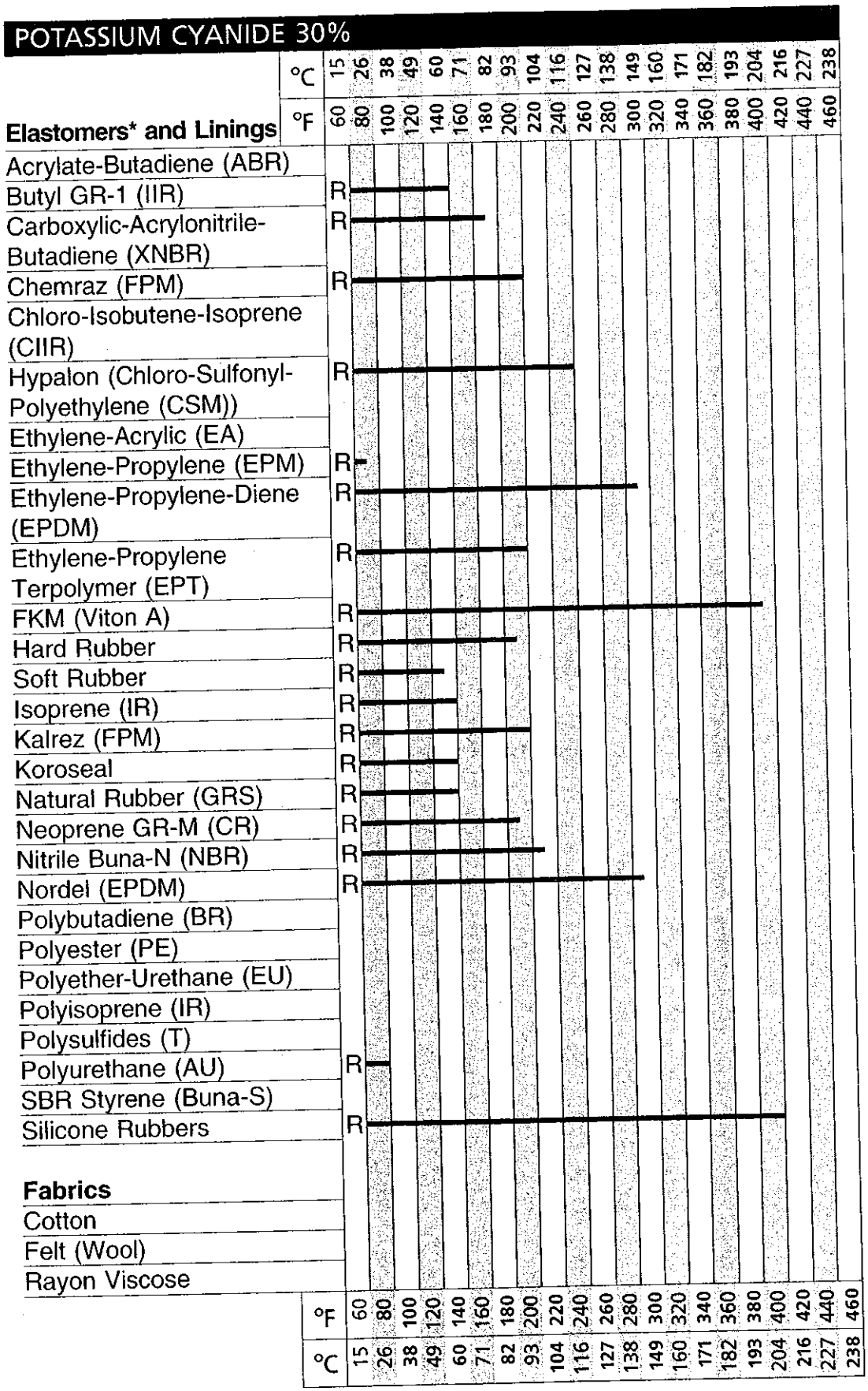


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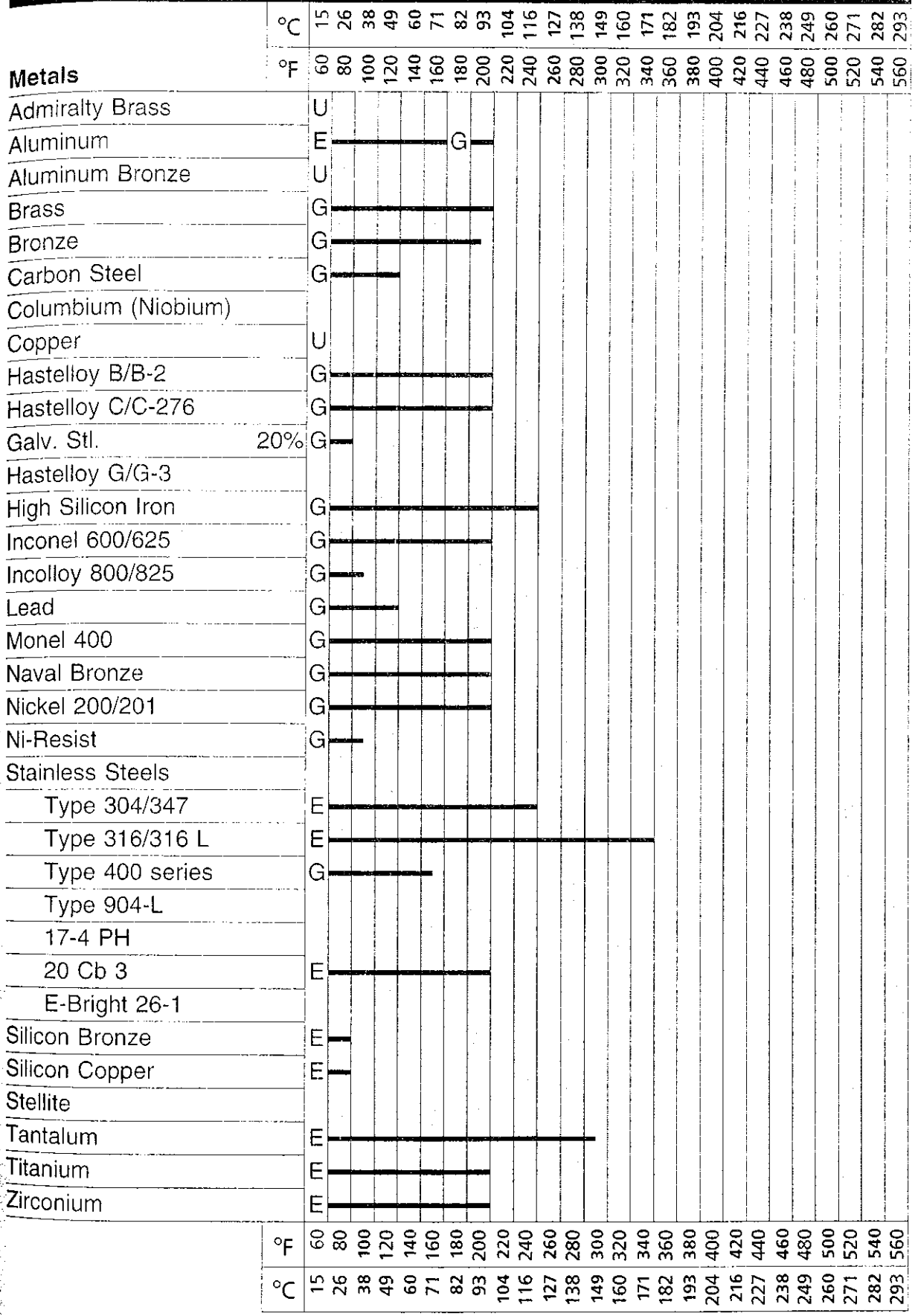


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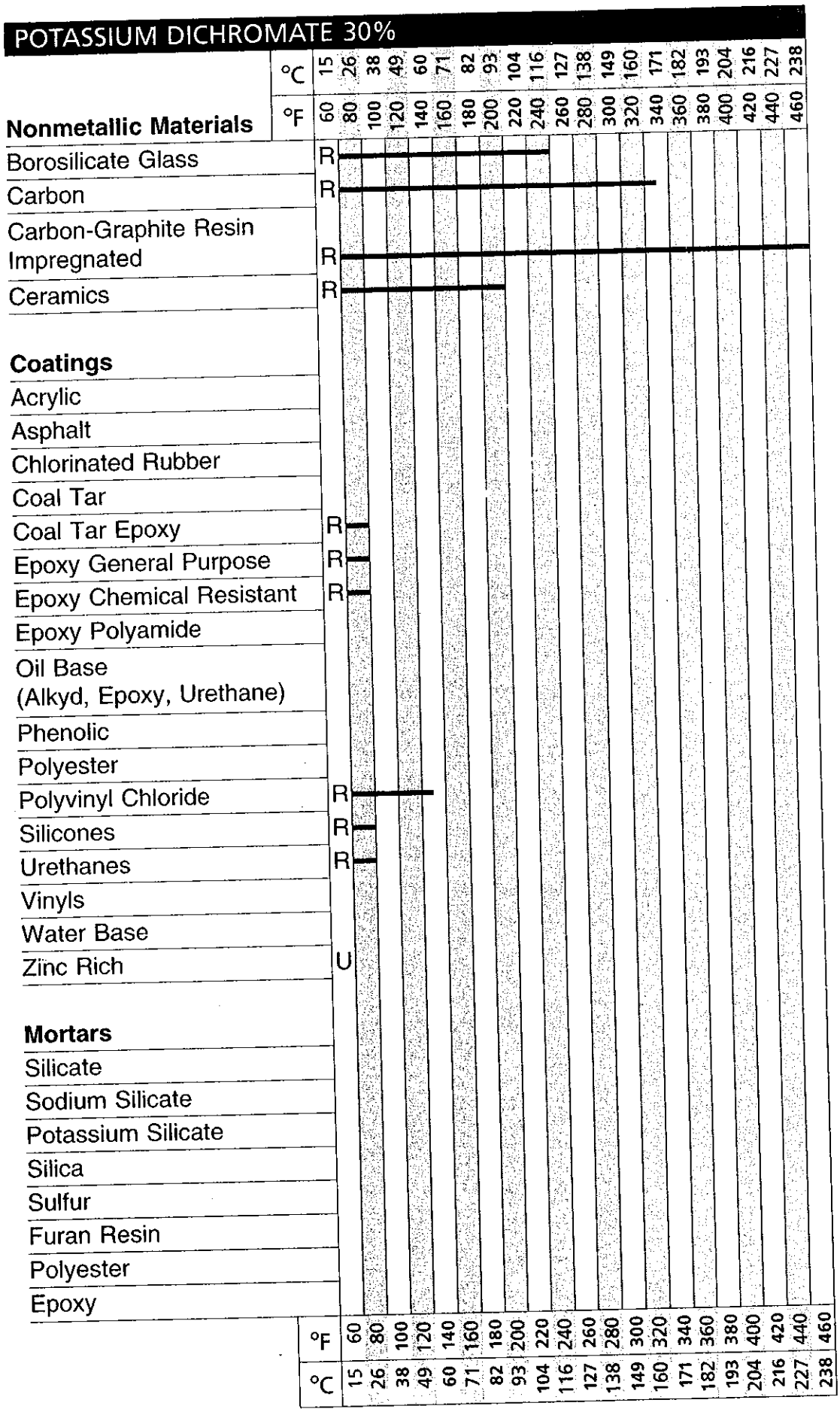




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## POTASSIUM DICHROMATE 30%

| Plastics | | °C | °F |
|---|---|---|---|
| ABS | R | 15–238 | 60–460 |
| Acetal | | | |
| Acrylics | R | | |
| Asbestos Reinforced Epoxy | R | | |
| Asbestos Reinforced Phenolic | R | | |
| Chlorinated Polyether (Penton) | R | | |
| CPVC | R | | |
| E-CTFE (Halar) | R | | |
| Epoxy | R | | |
| ETFE (Tefzel) | R | | |
| FEP | R | | |
| Furan (Furfural Alcohol) 10% | R | | |
| Noryl 40% | R | | |
| Nylon 6 | U | | |
| Nylon 11 | U | | |
| Nylon 66 | U | | |
| Phenolic | U | | |
| PFA (Teflon) | R | | |
| Polyamide-Imide | | | |
| Polyesters | | | |
| Bisphenol A–fumarate SAT | R | | |
| Halogenated ALL | R | | |
| Hydrogenated Bisphenol A –Bisphenol A | | | |
| Isophthalic | R | | |
| Terephthalate (PET) | R | | |
| Polyetherimide (ULTEM) | | | |
| Polyetheretherketone (PEEK) | | | |
| Polyethersulfone (PES) | | | |
| Polyethylene HMW | R | | |
| Polyethylene UHMW | R | | |
| Polymethylpentene | | | |
| Polypropylene (PP) | R | | |
| Polystyrene | | | |
| Polysulfone | R | | |
| Polyvinylidene Chloride | R | | |
| PVC Type 1 | R | | |
| PVC Type 2 | R | | |
| PVDF (Kynar) | R | | |
| Ryton ALL | R | | |
| TFE (Teflon) | R | | |
| Vinyl Ester ALL | R | | |


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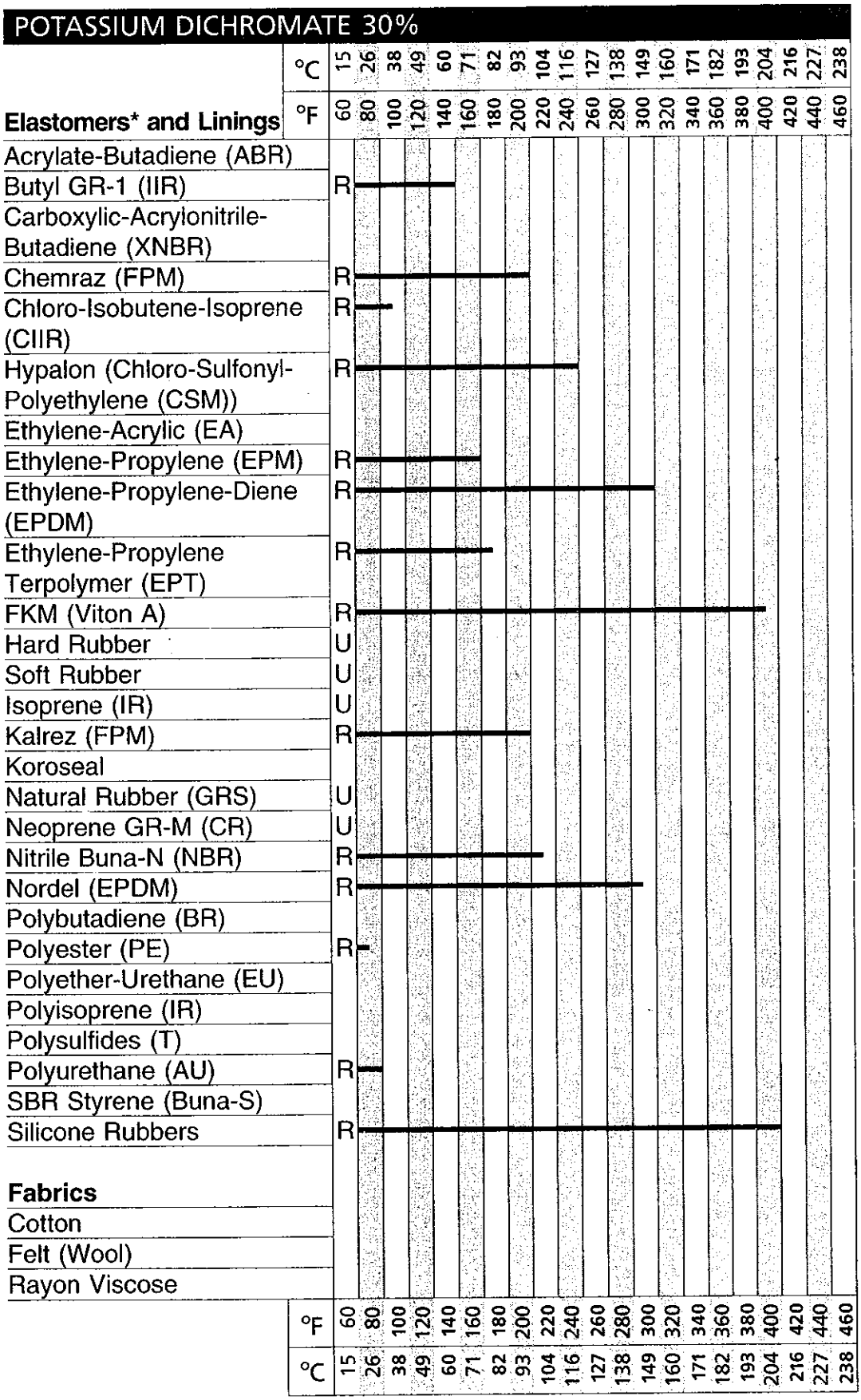


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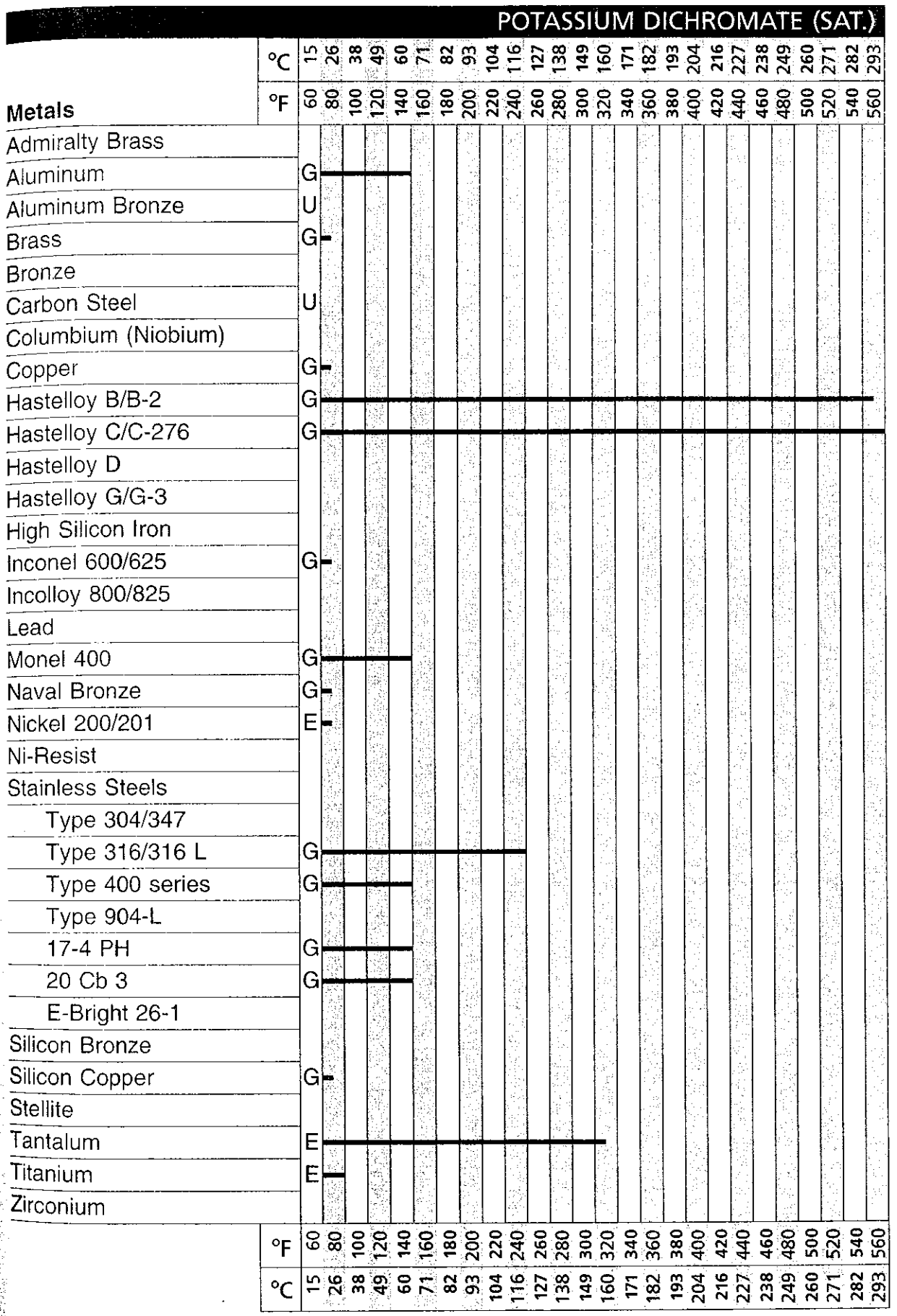


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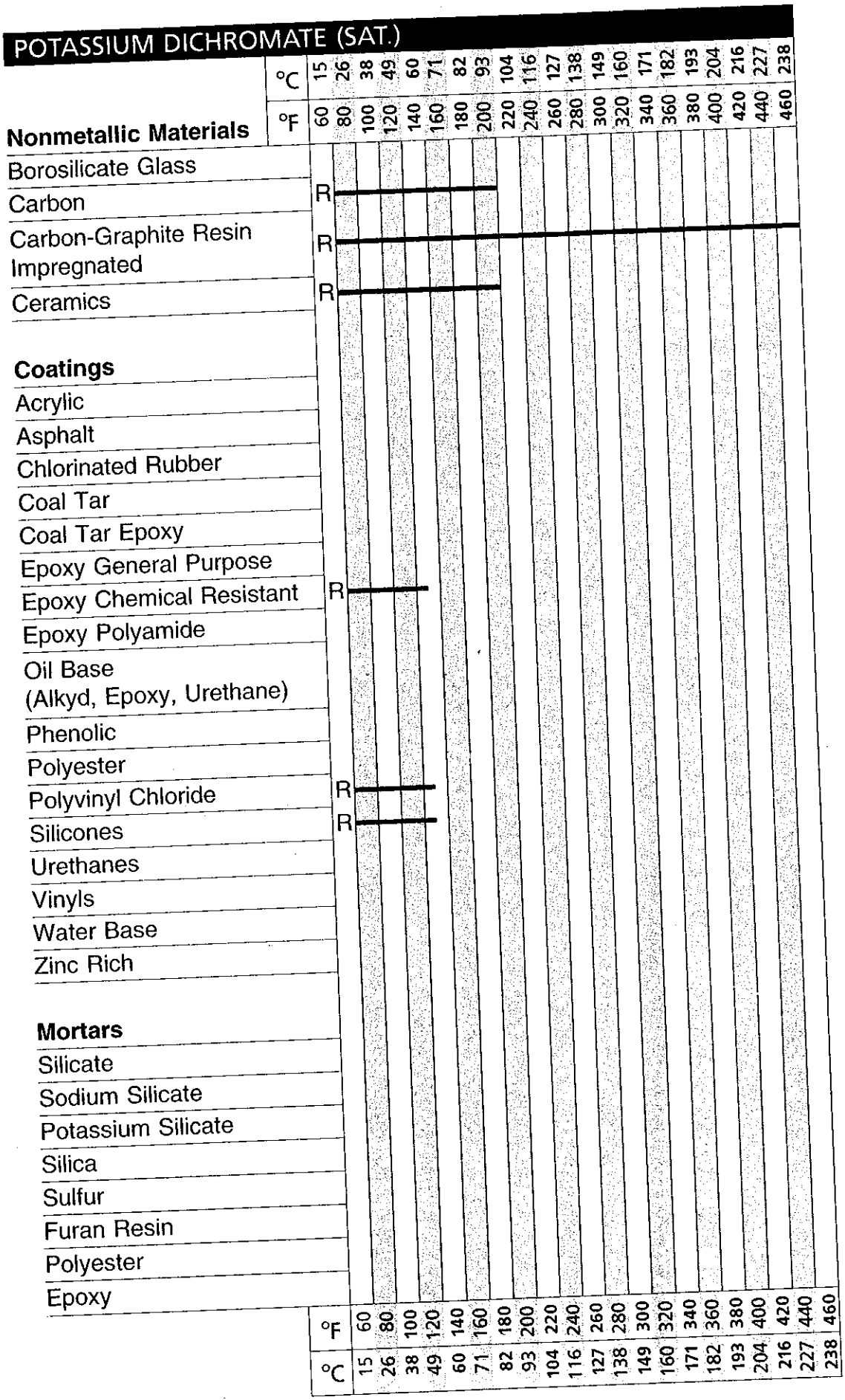




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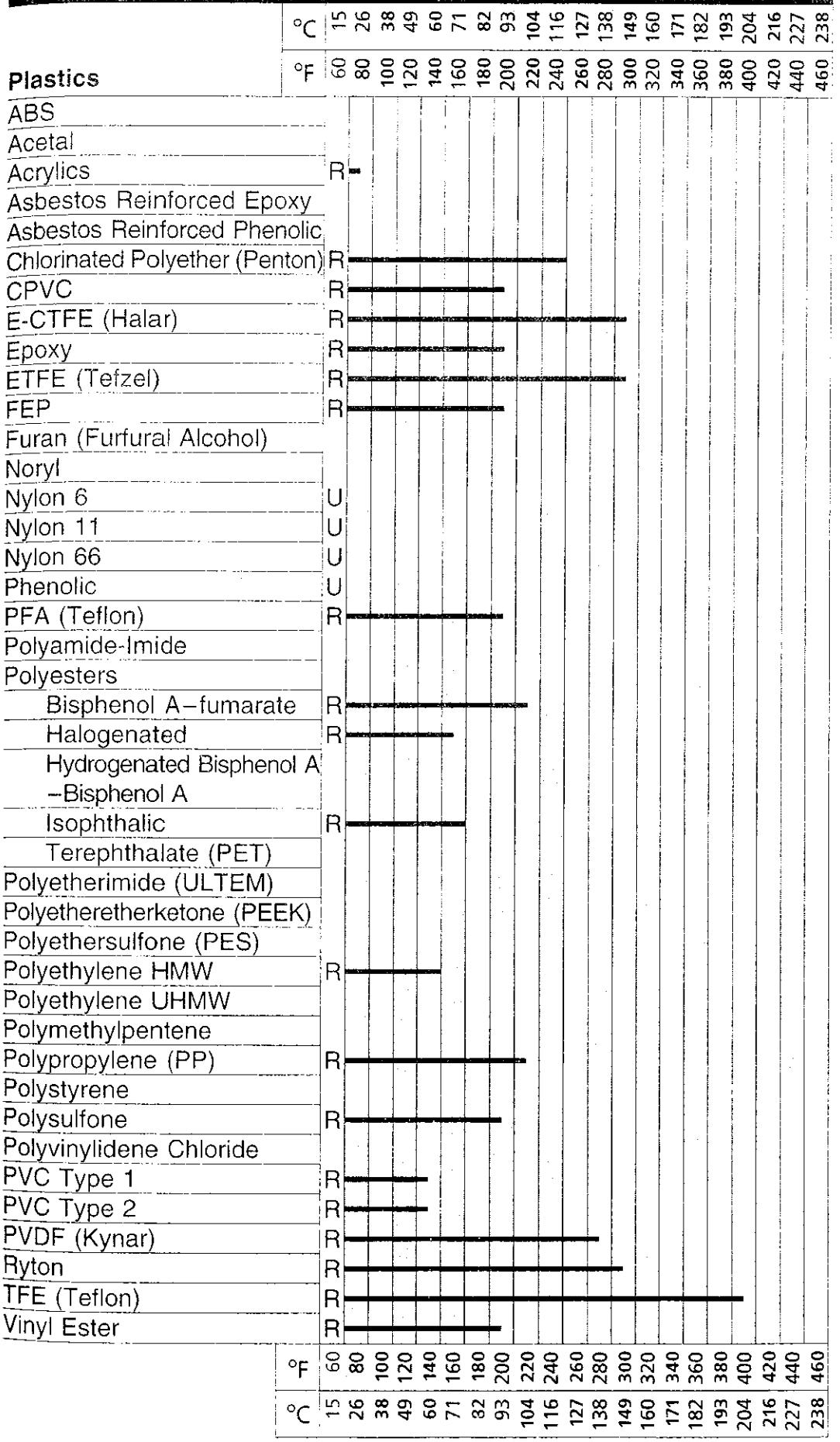



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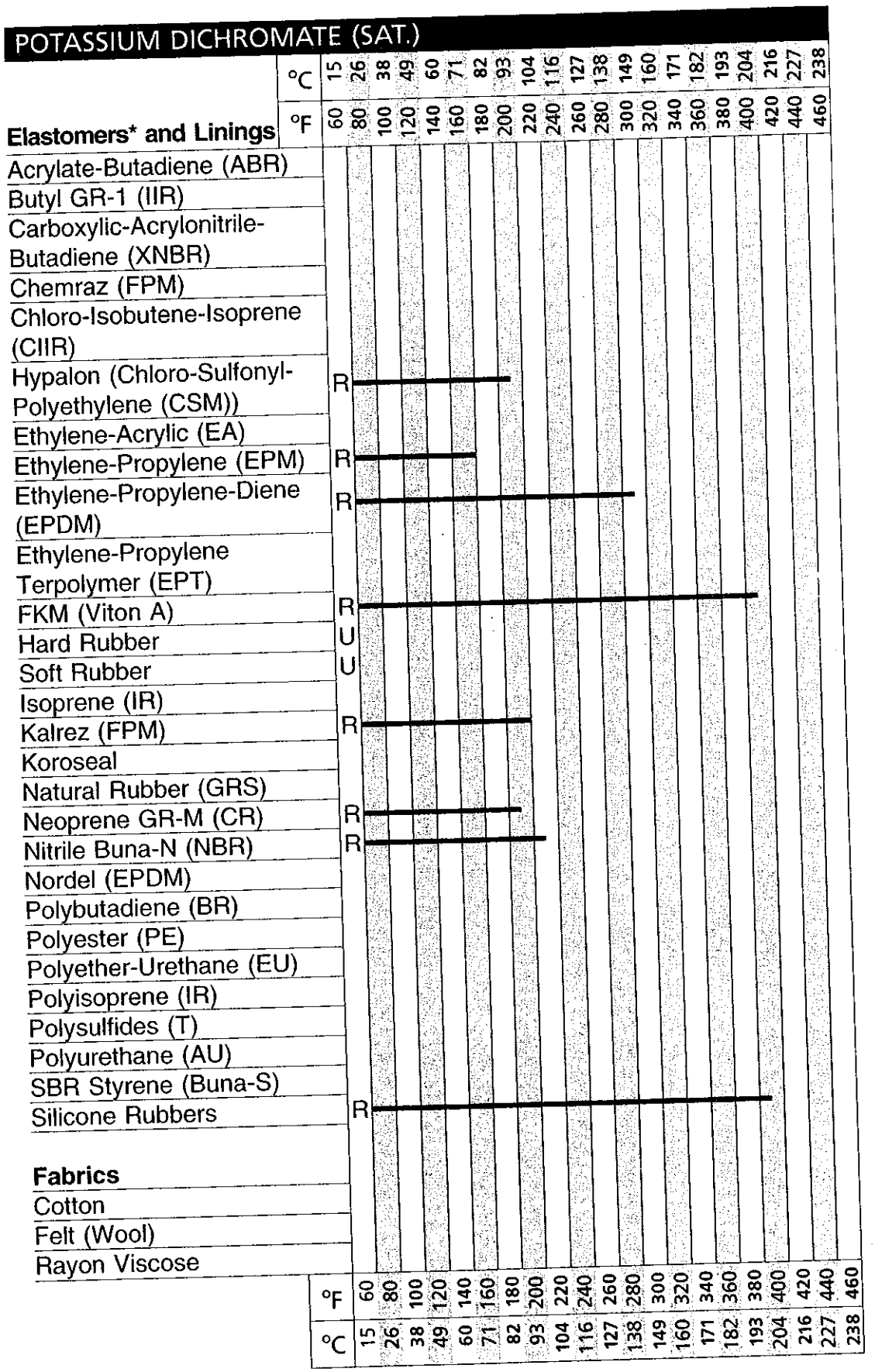


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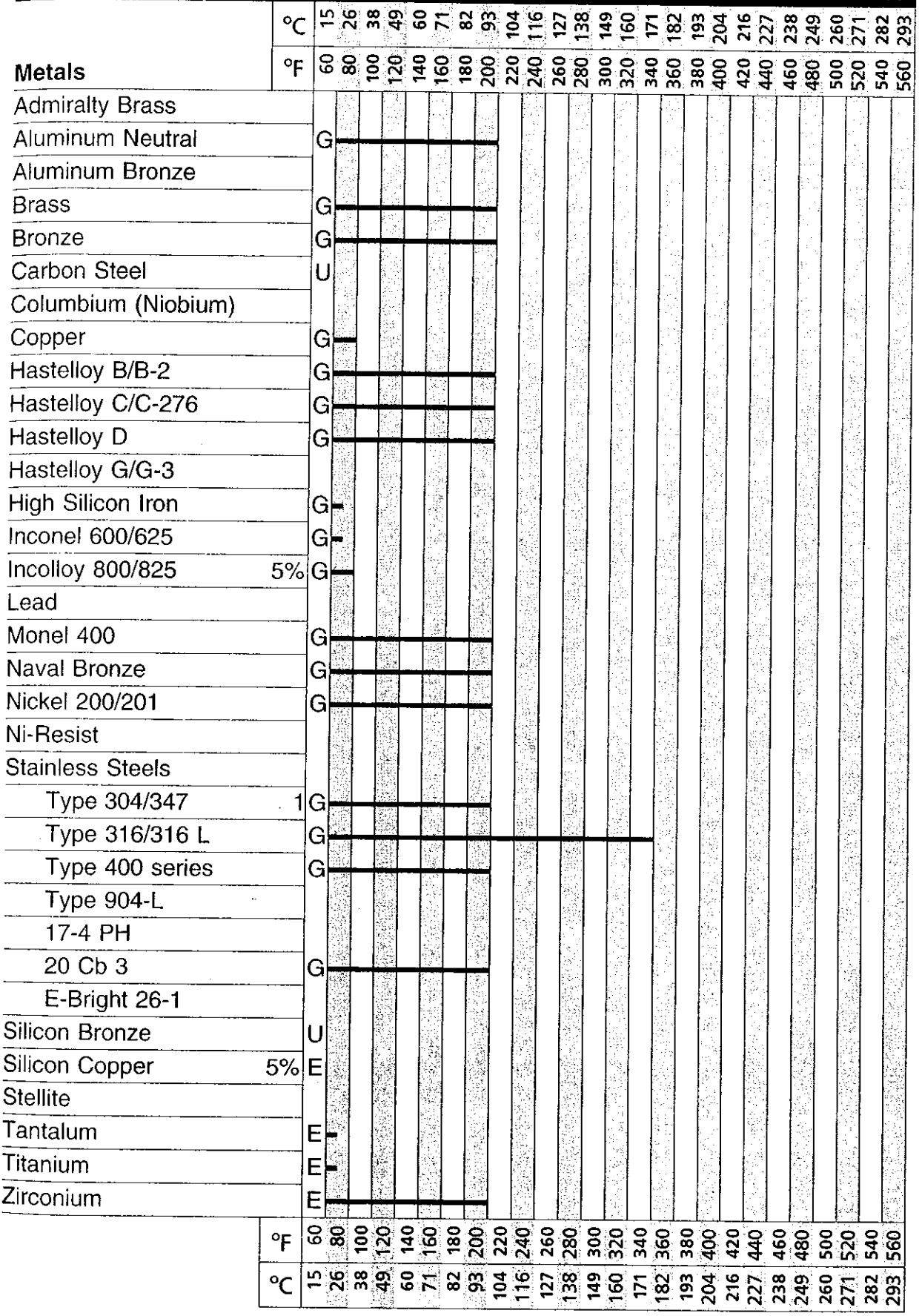


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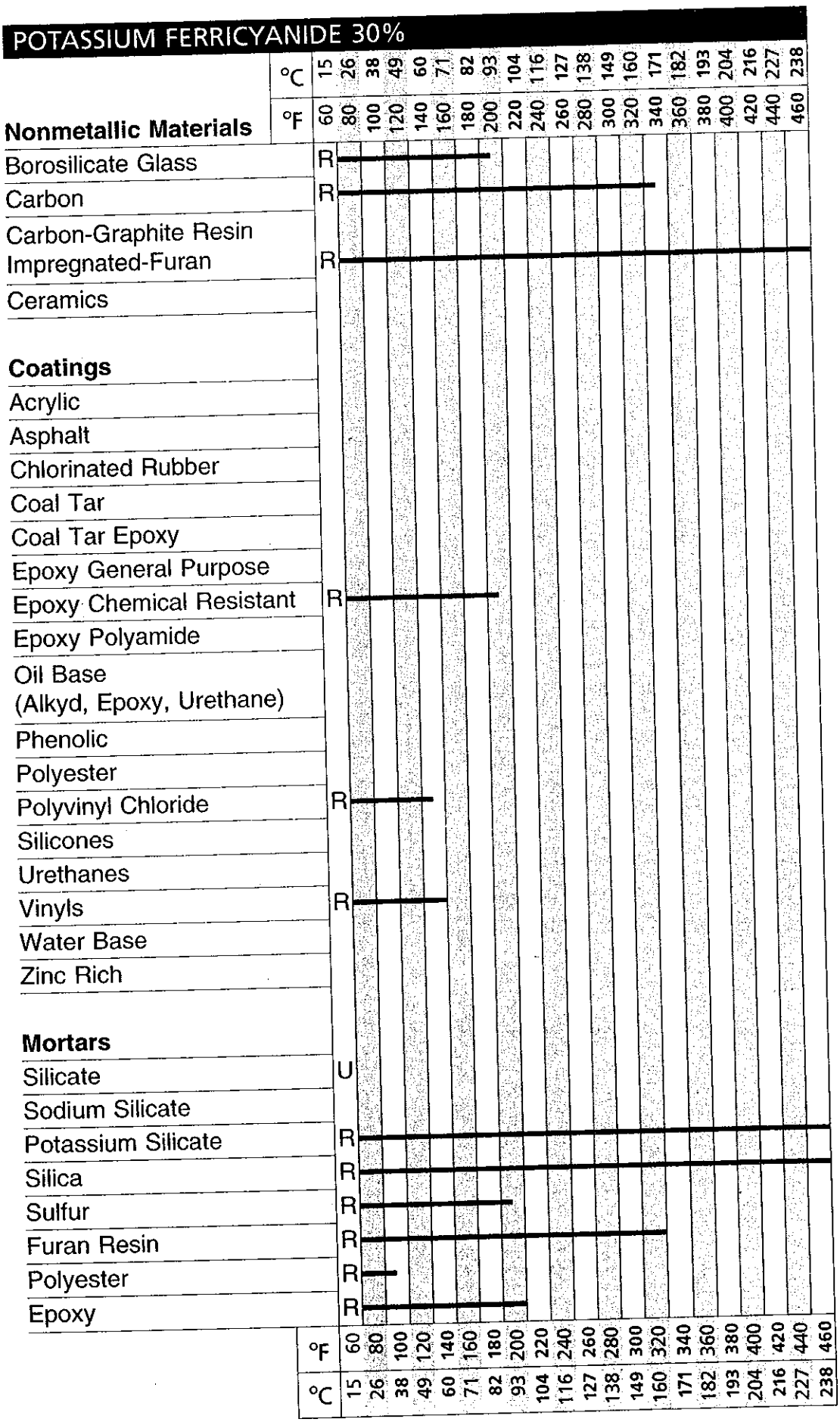




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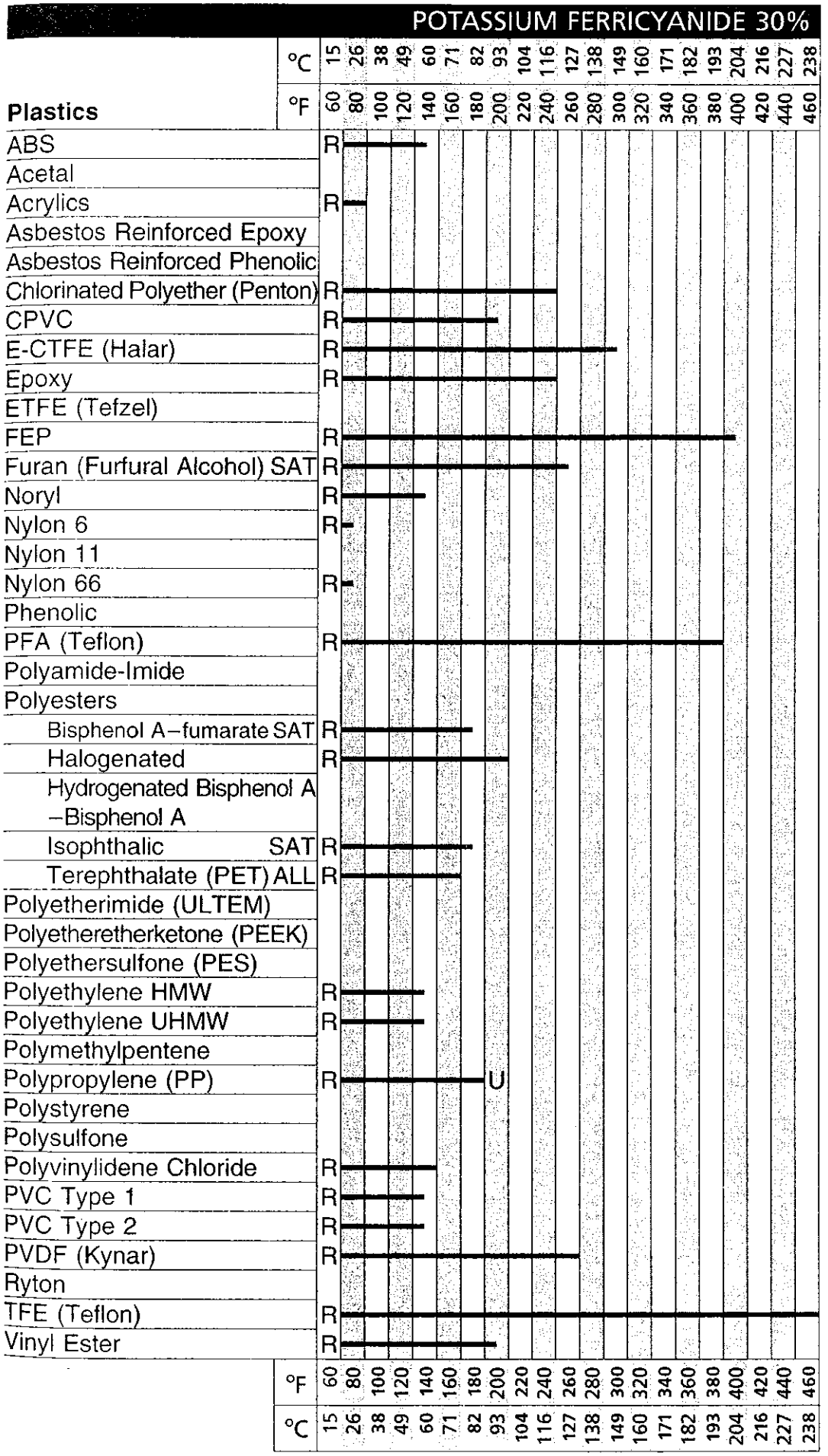


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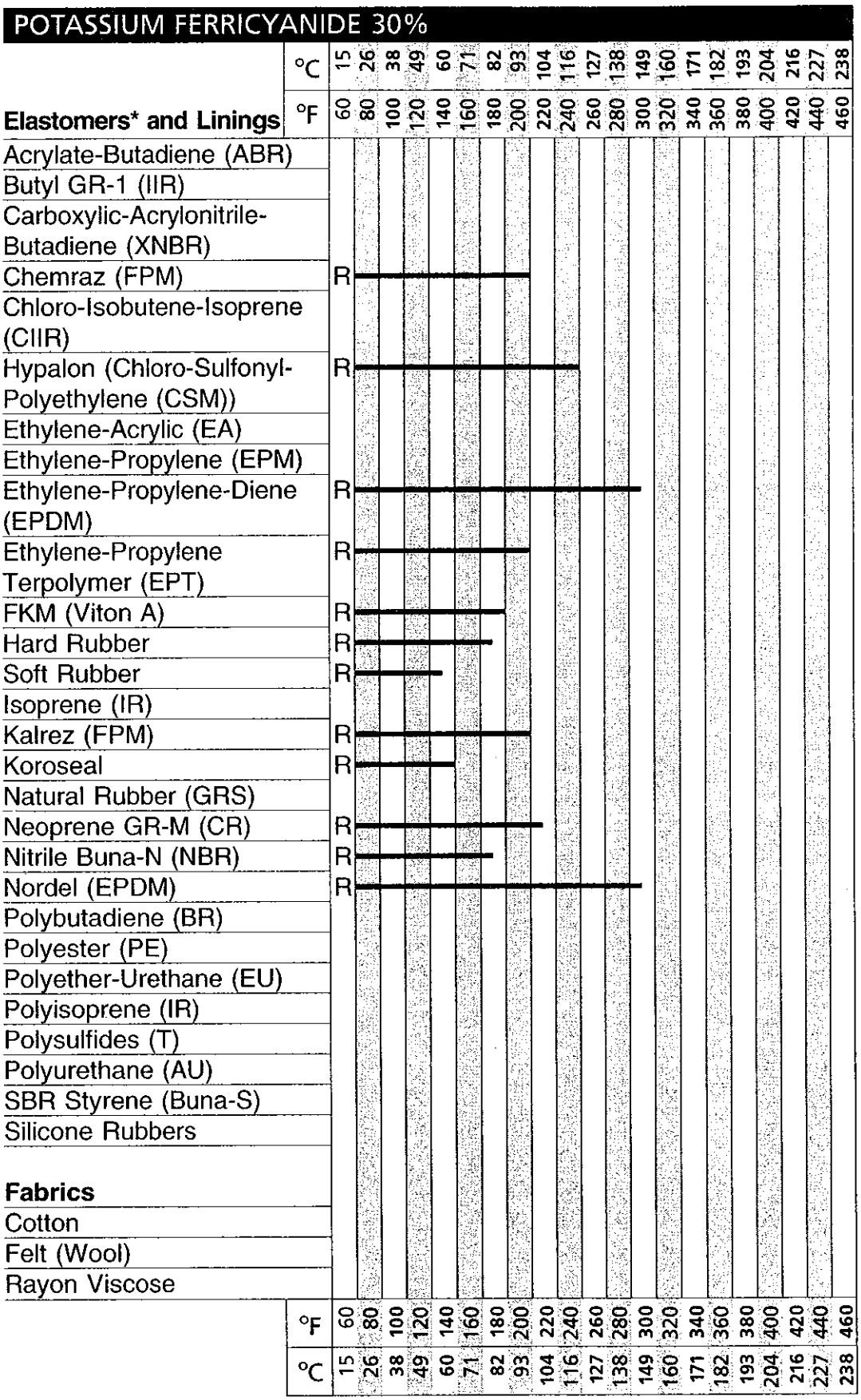


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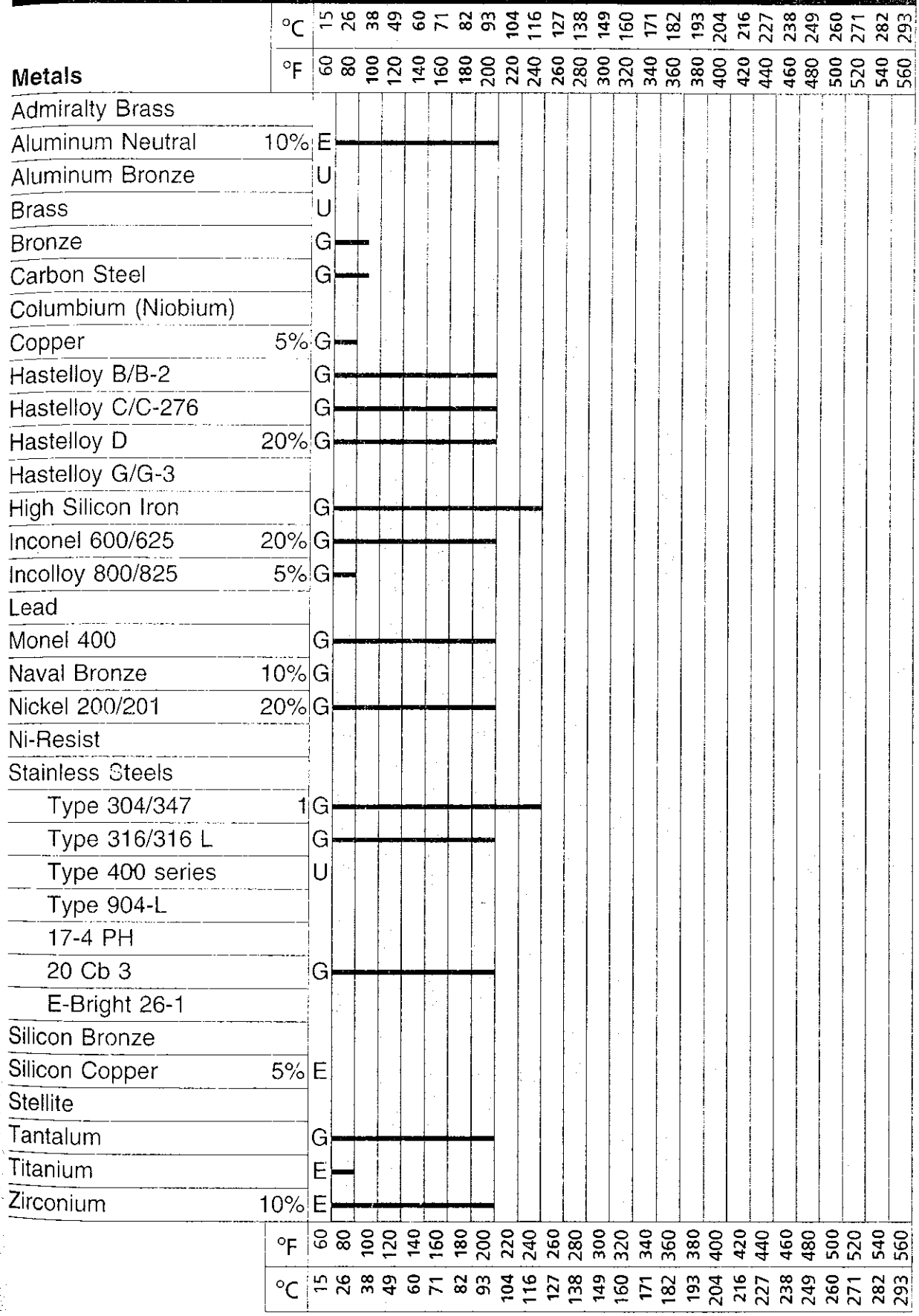


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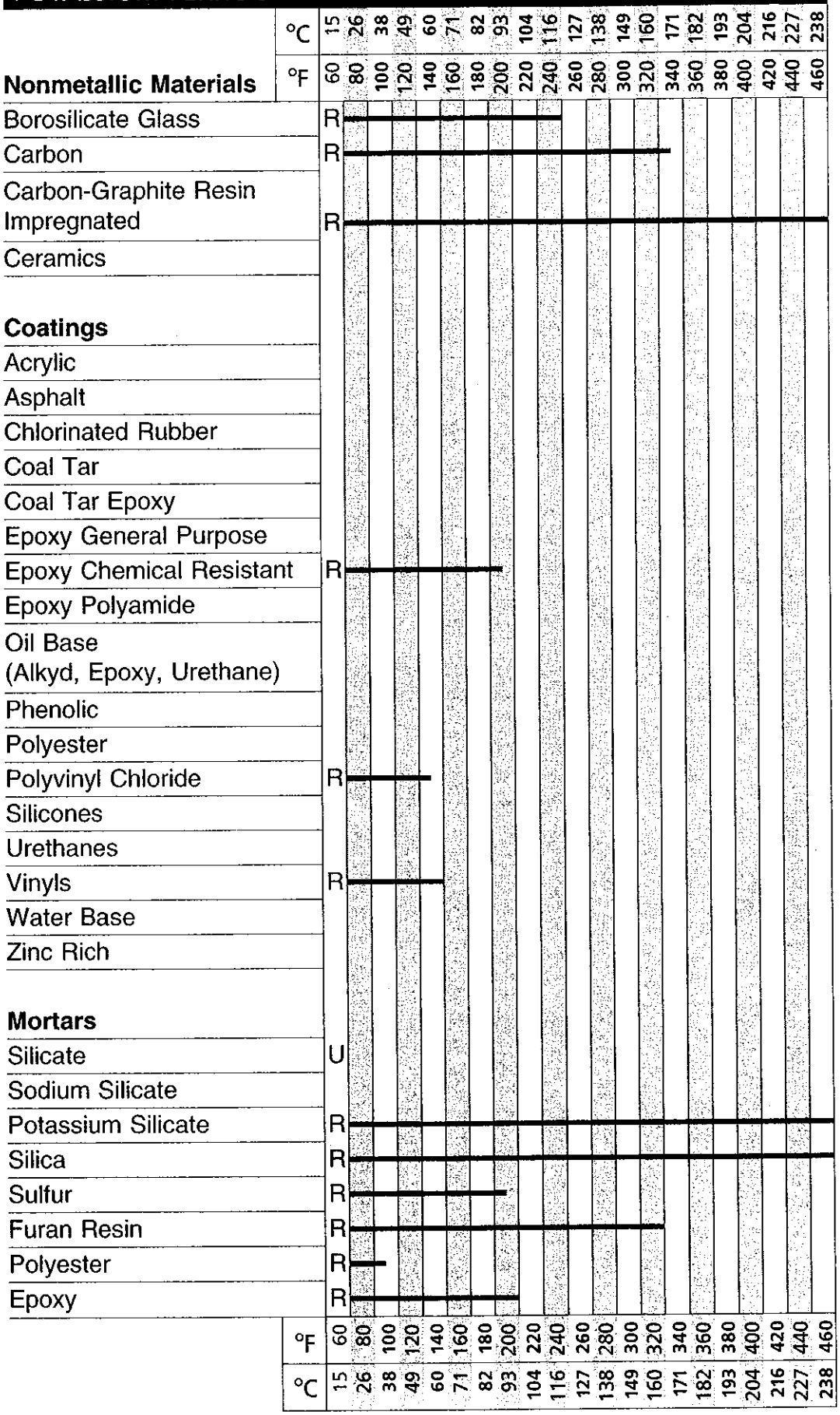




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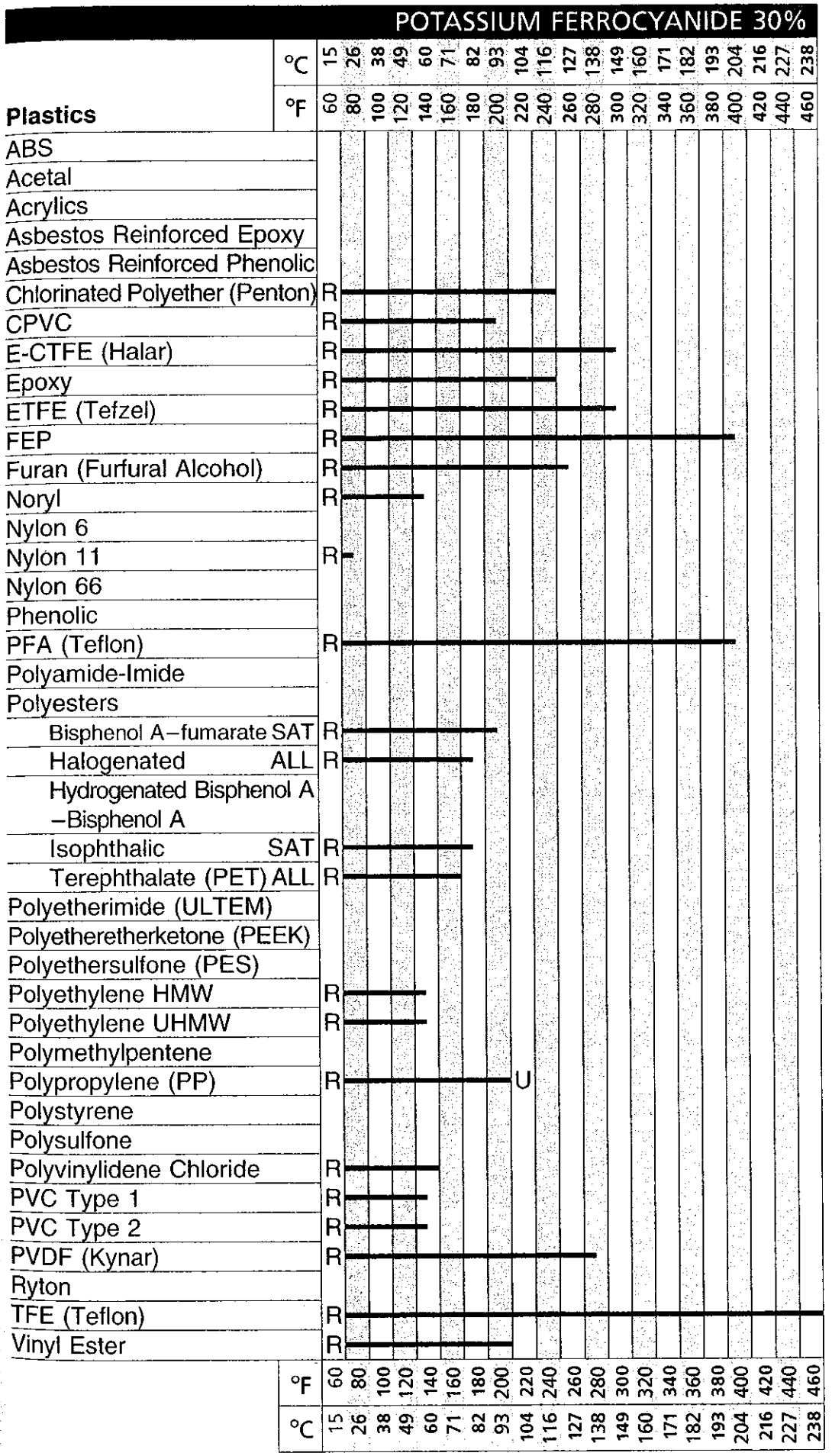
## POTASSIUM FERROCYANIDE 30%

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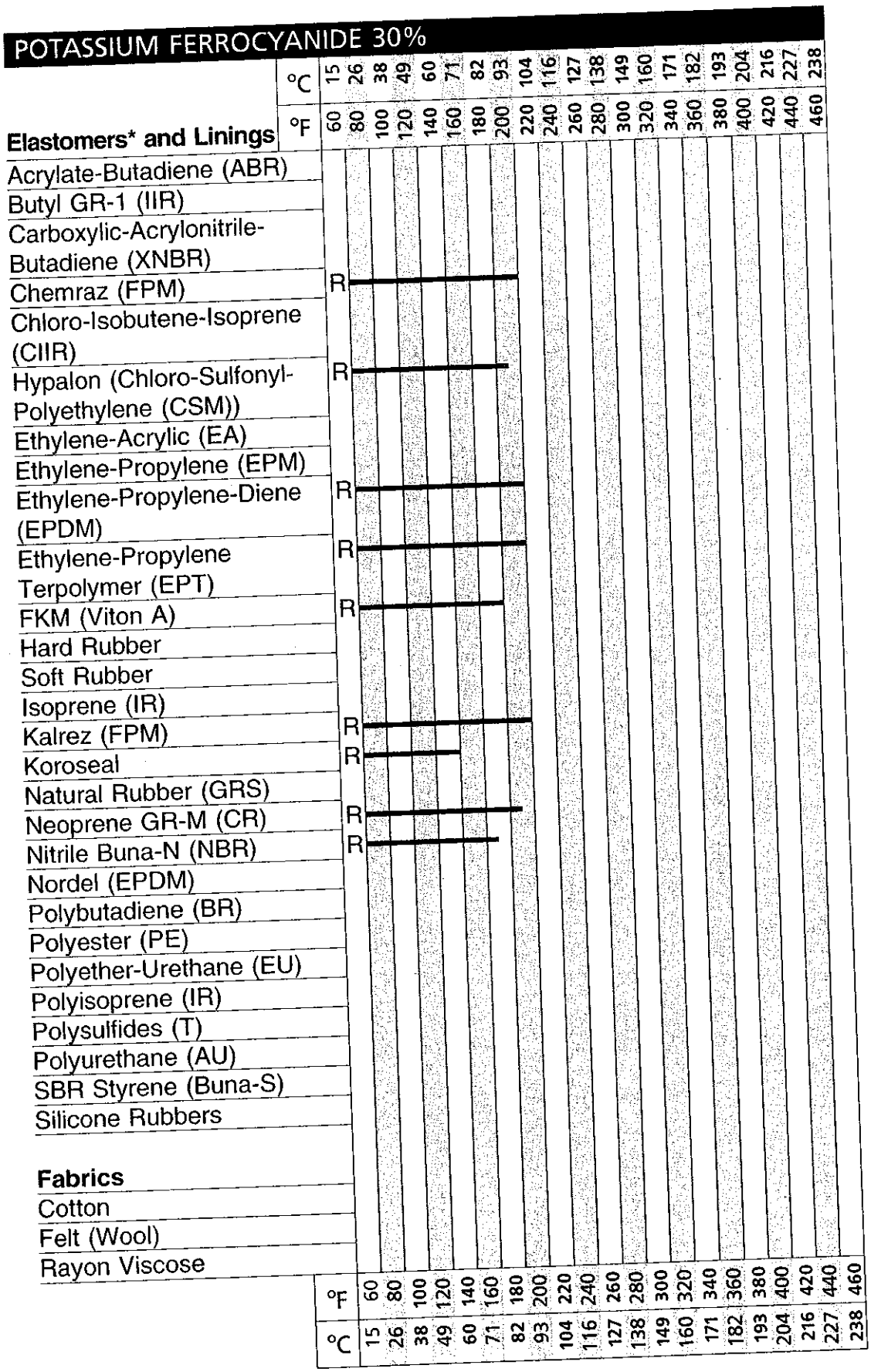
## POTASSIUM FERROCYANIDE 30%

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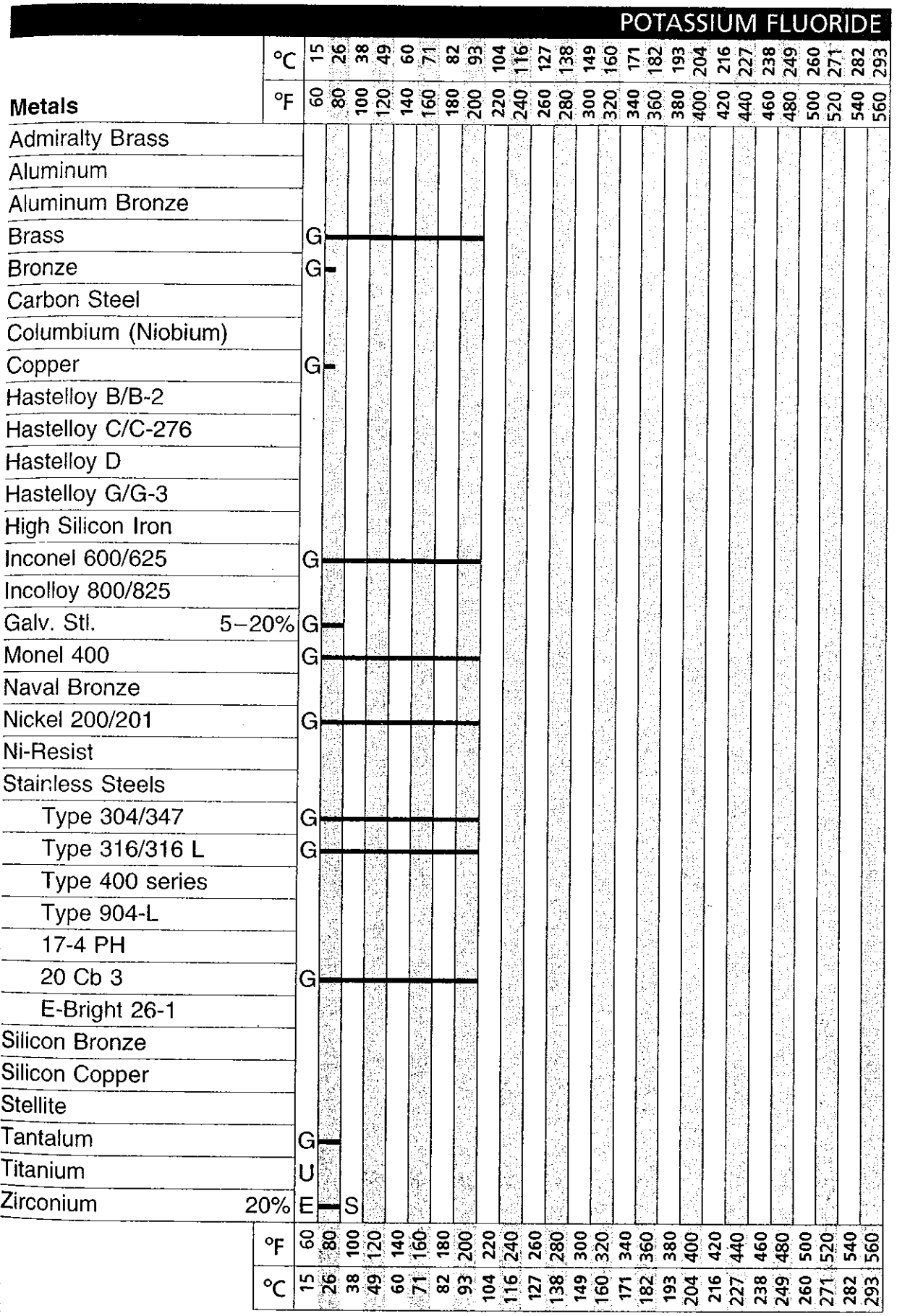


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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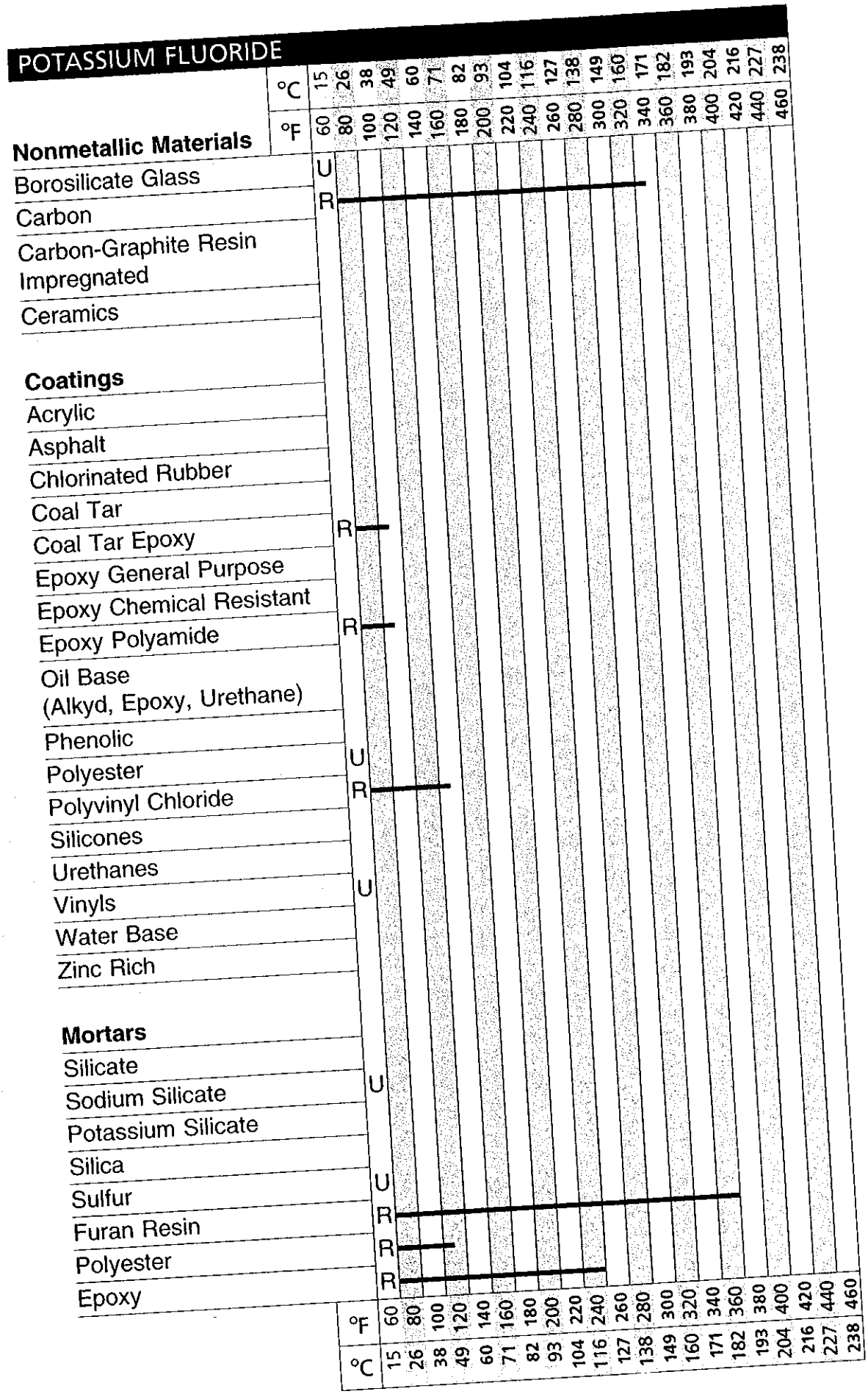
# POTASSIUM FLUORIDE



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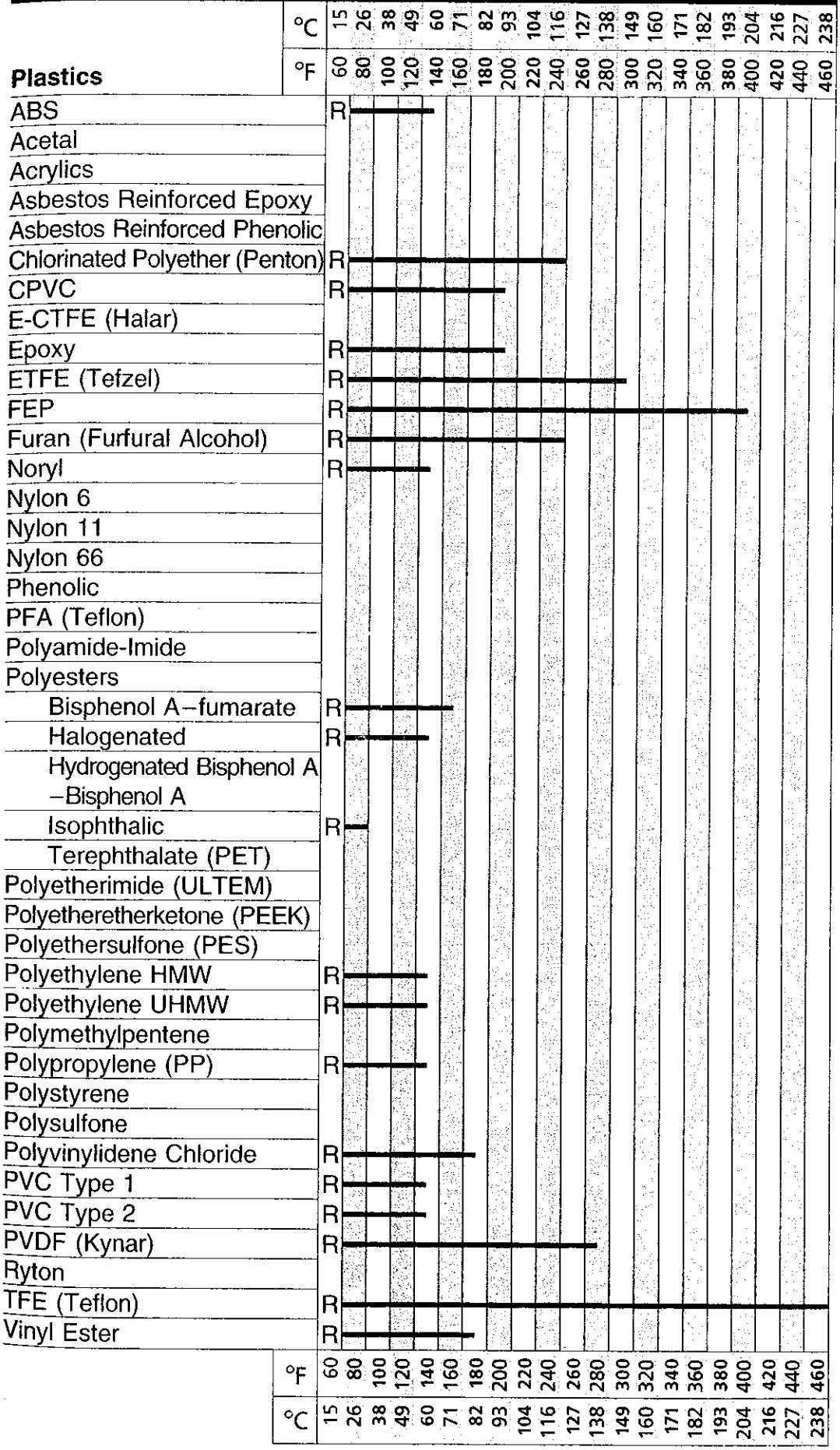


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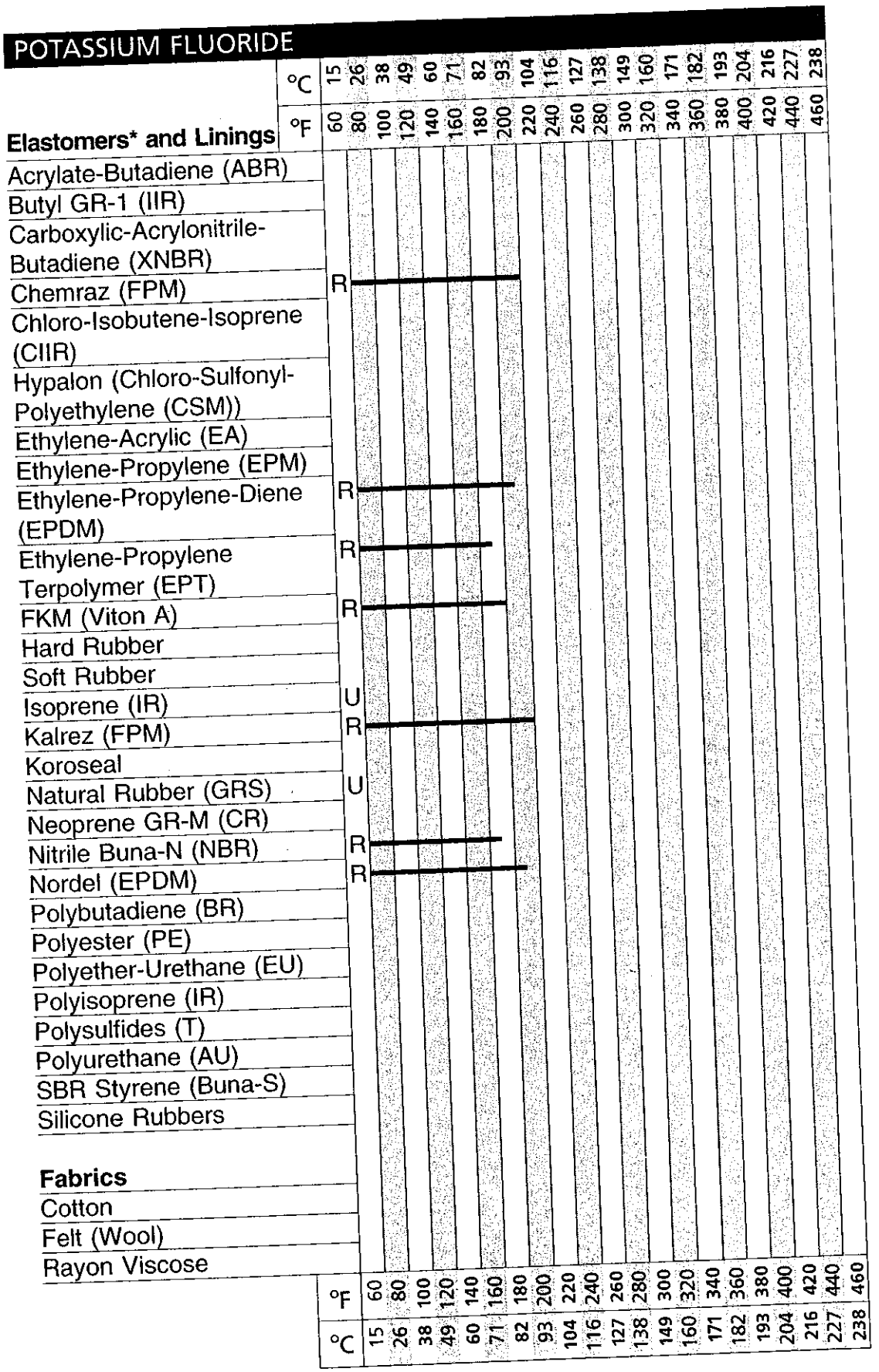
## POTASSIUM FLUORIDE

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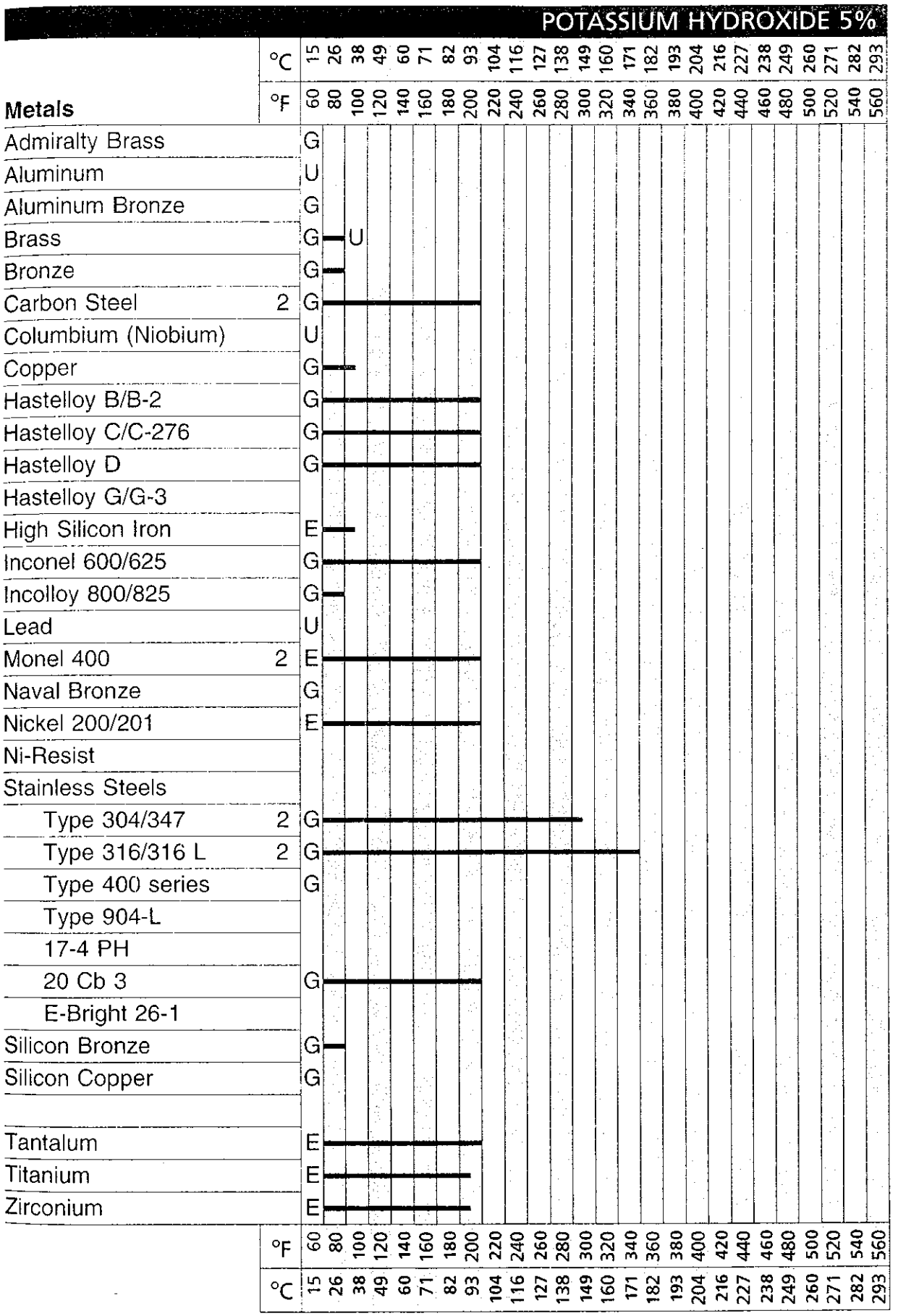
# POTASSIUM HYDROXIDE 5%




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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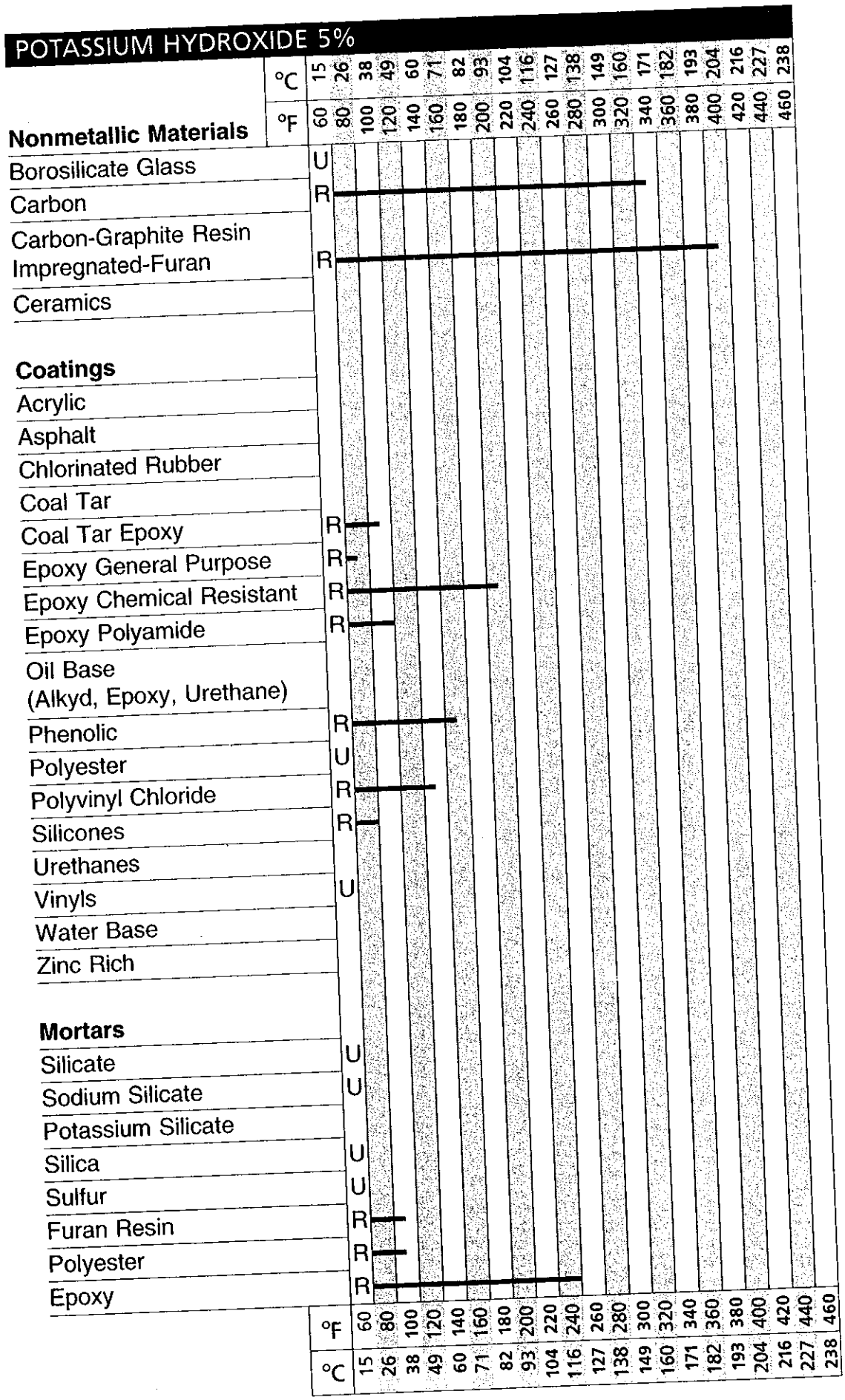
# POTASSIUM HYDROXIDE 5%



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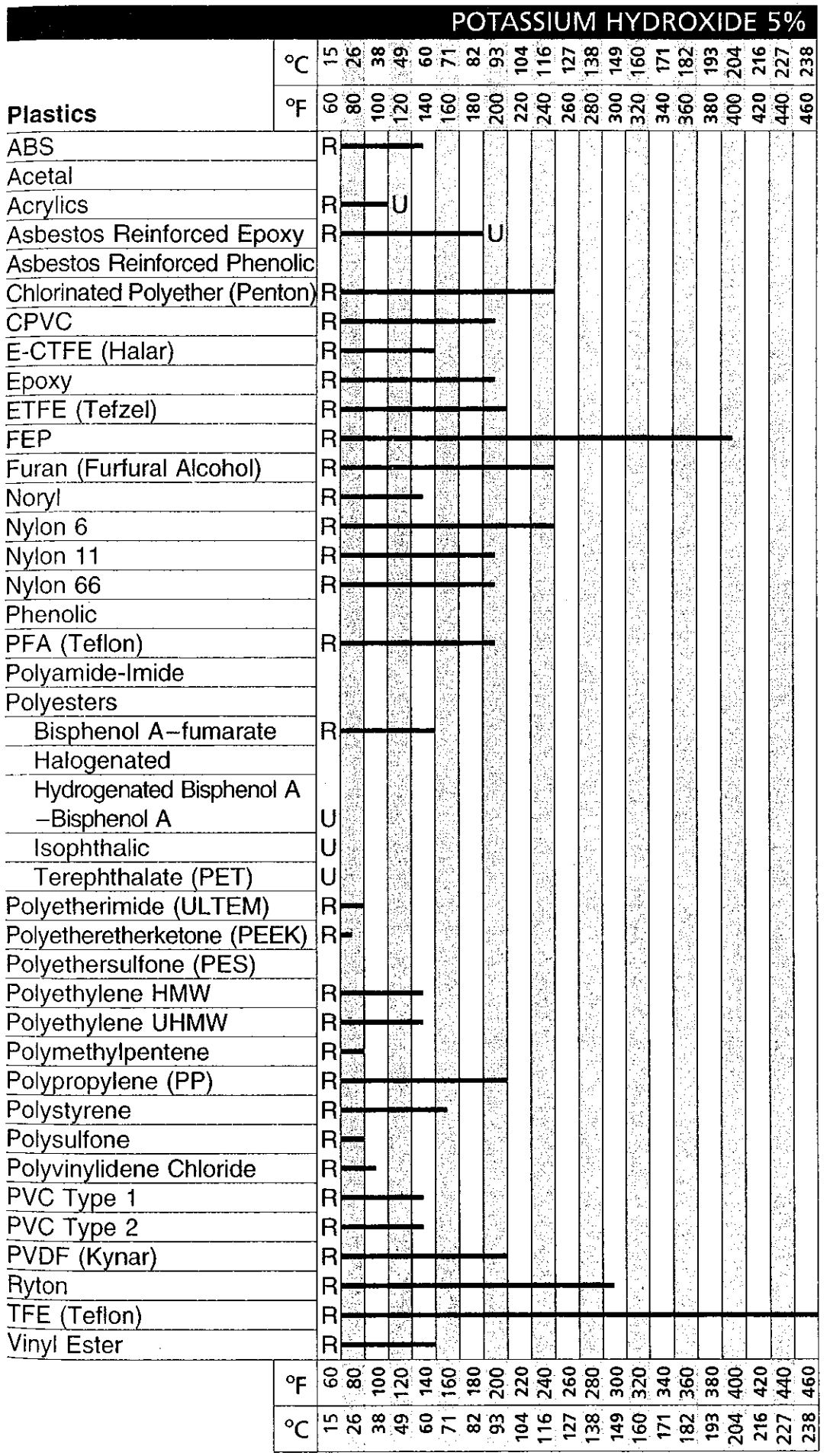



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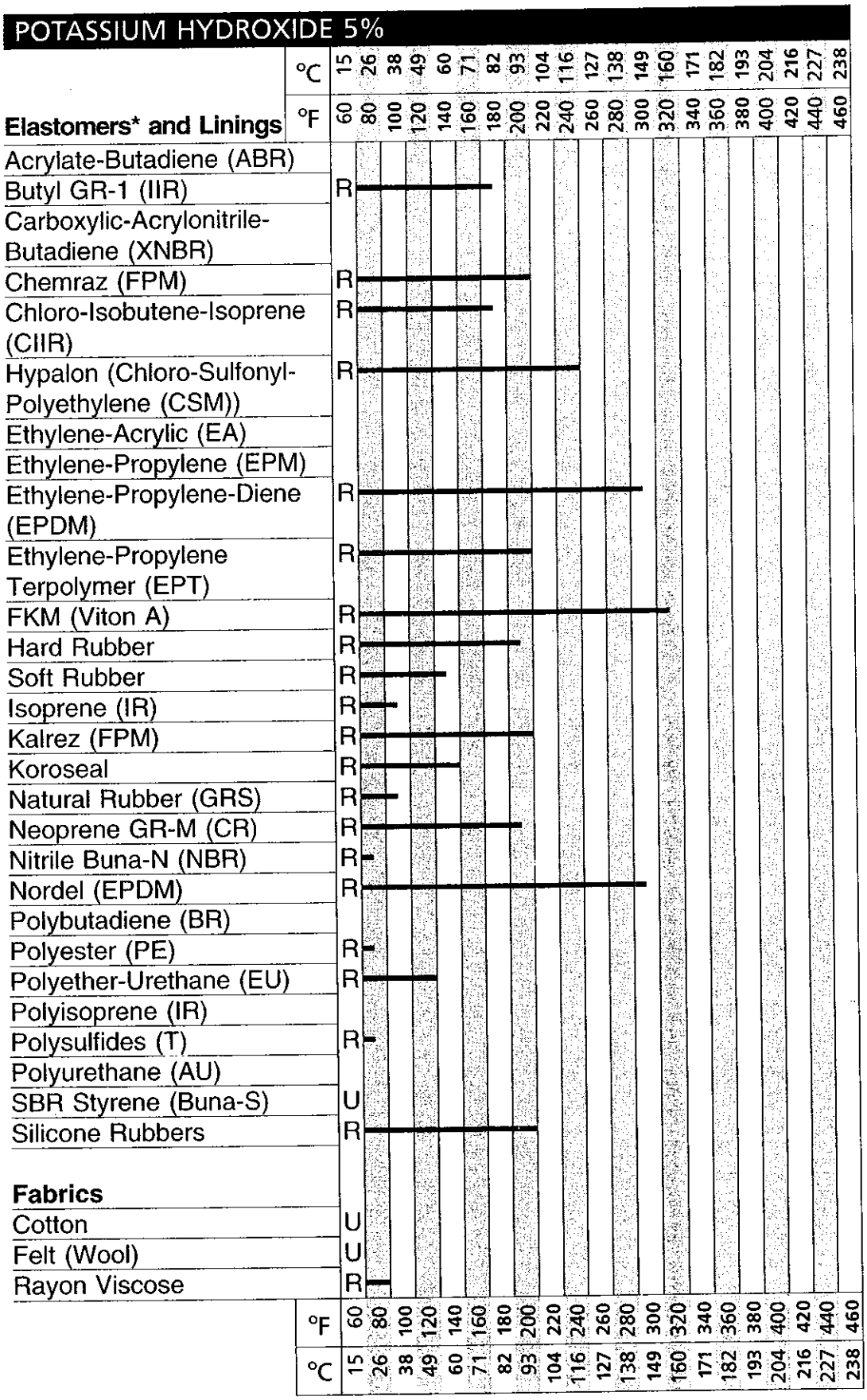


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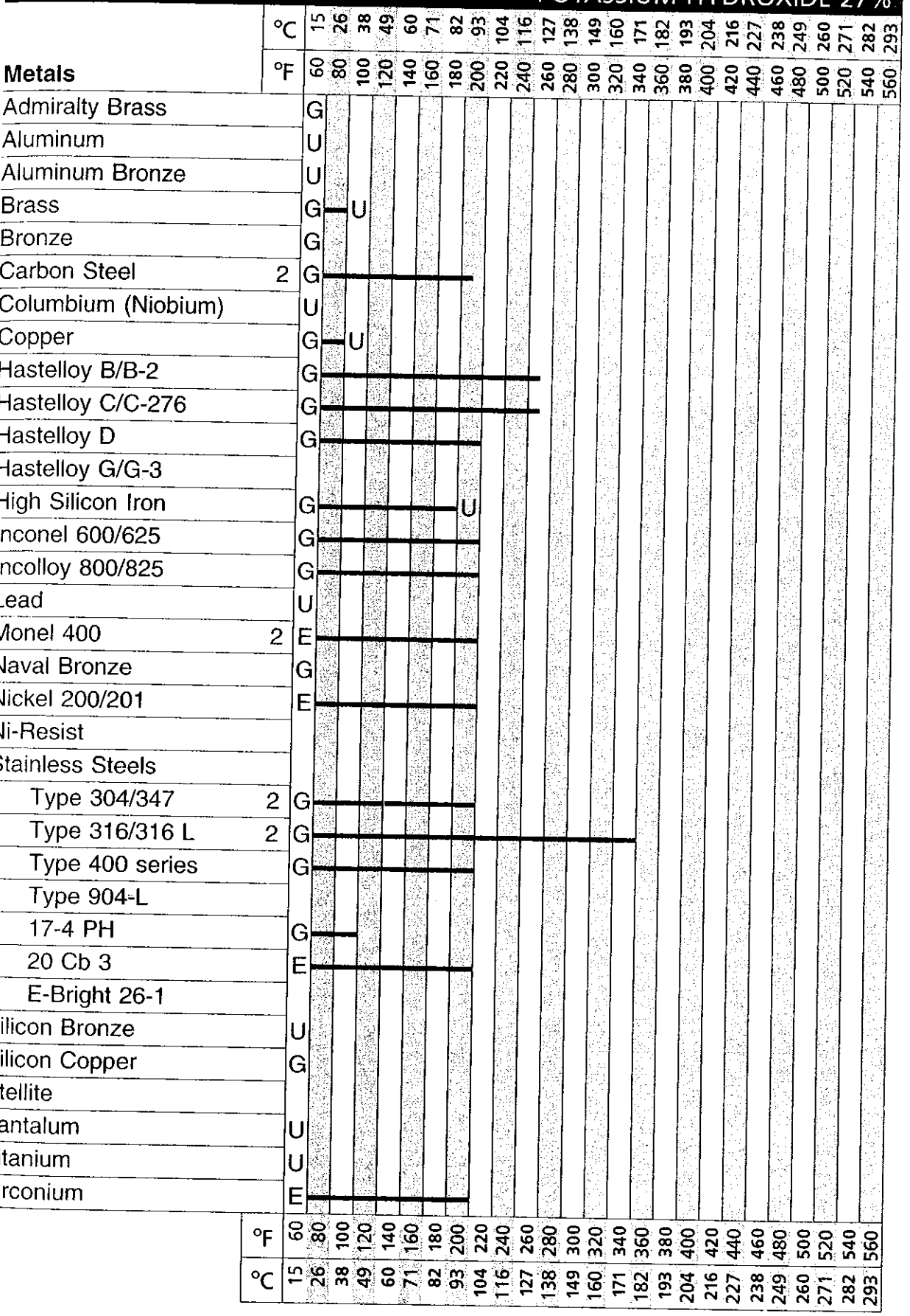
# POTASSIUM HYDROXIDE 27%




FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

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U = Unsatisfactory

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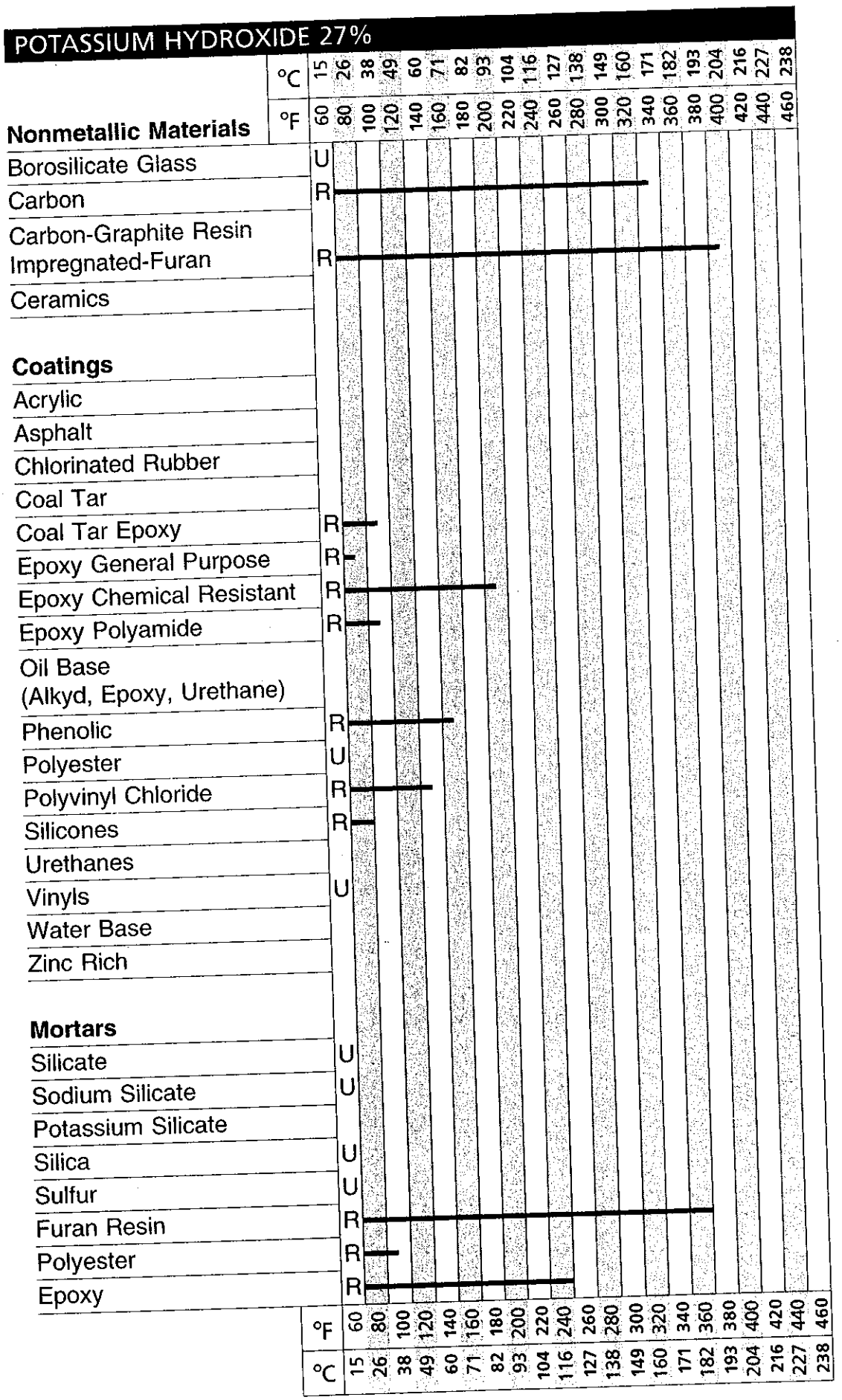




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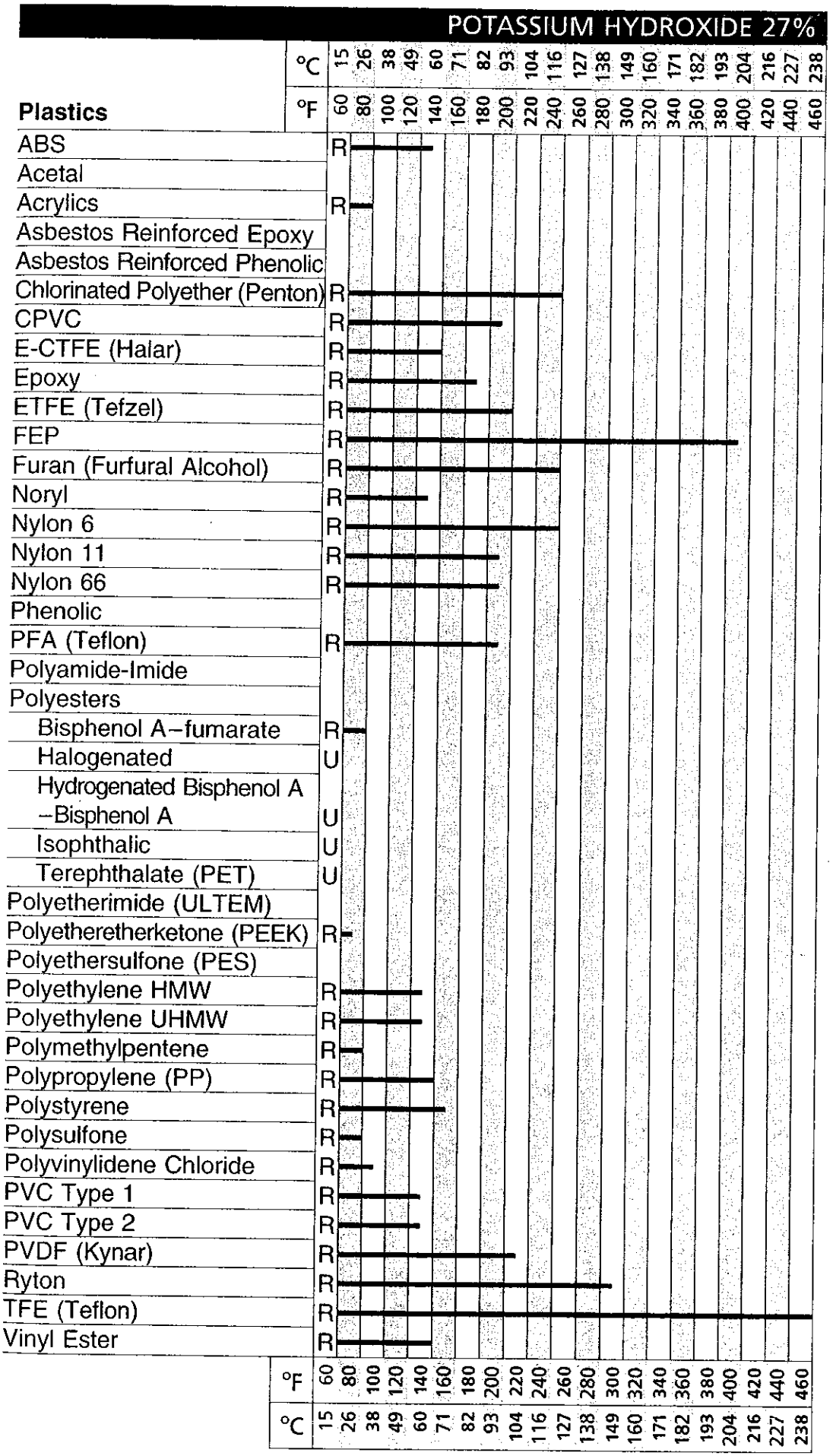


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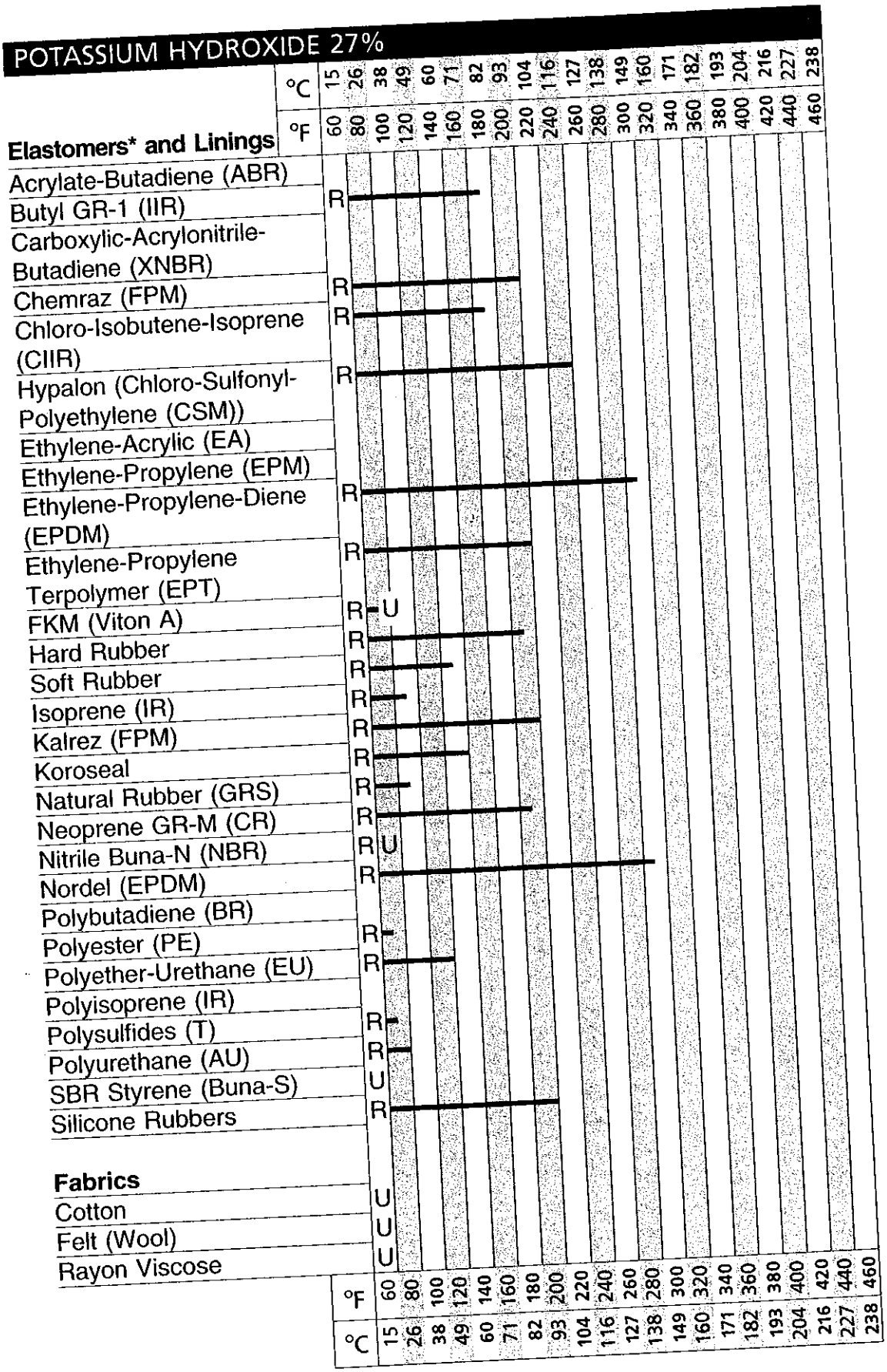


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# POTASSIUM HYDROXIDE 50%

| Metals | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
| Admiralty Brass | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | S | U | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | 2 | | G | U | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | S | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | 2 | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | E | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | 2 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | 2 | | G | | | | | | | | | | | | | | U | | | | | | | | | | | |
| Type 400 series | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | G | | | | | | | | U | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | E | | | | | | U | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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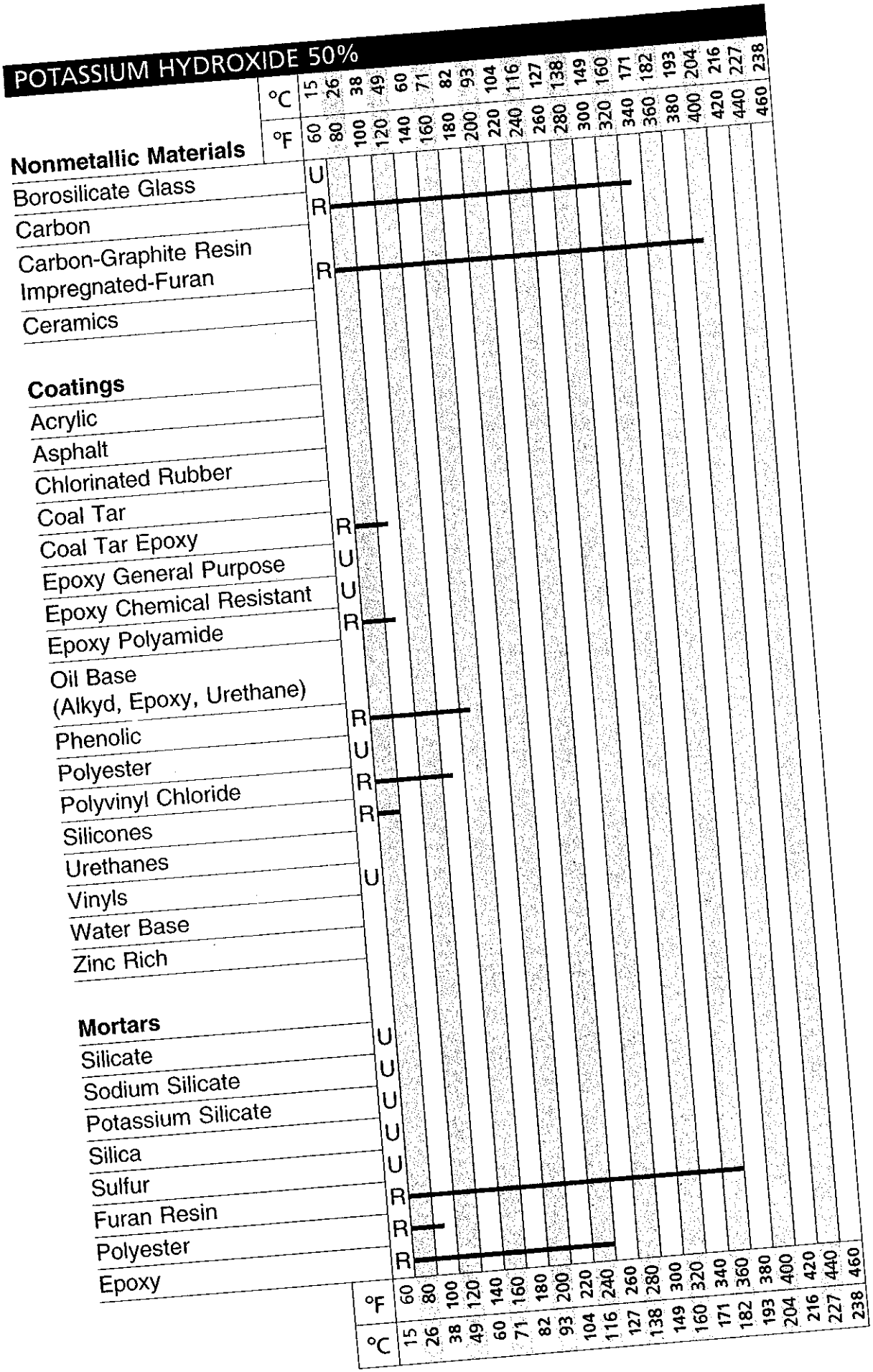
## POTASSIUM HYDROXIDE 50%

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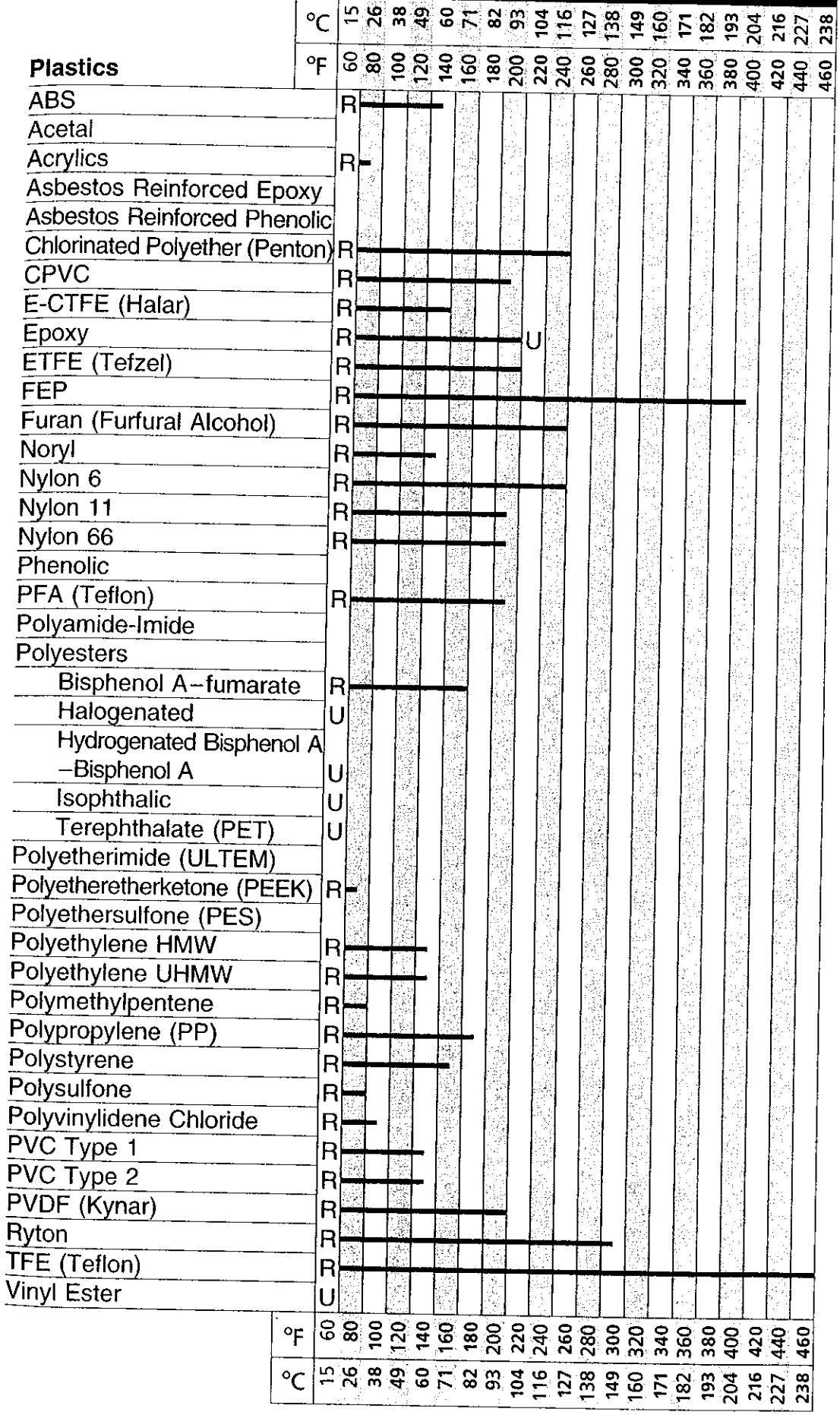
## POTASSIUM HYDROXIDE 50%





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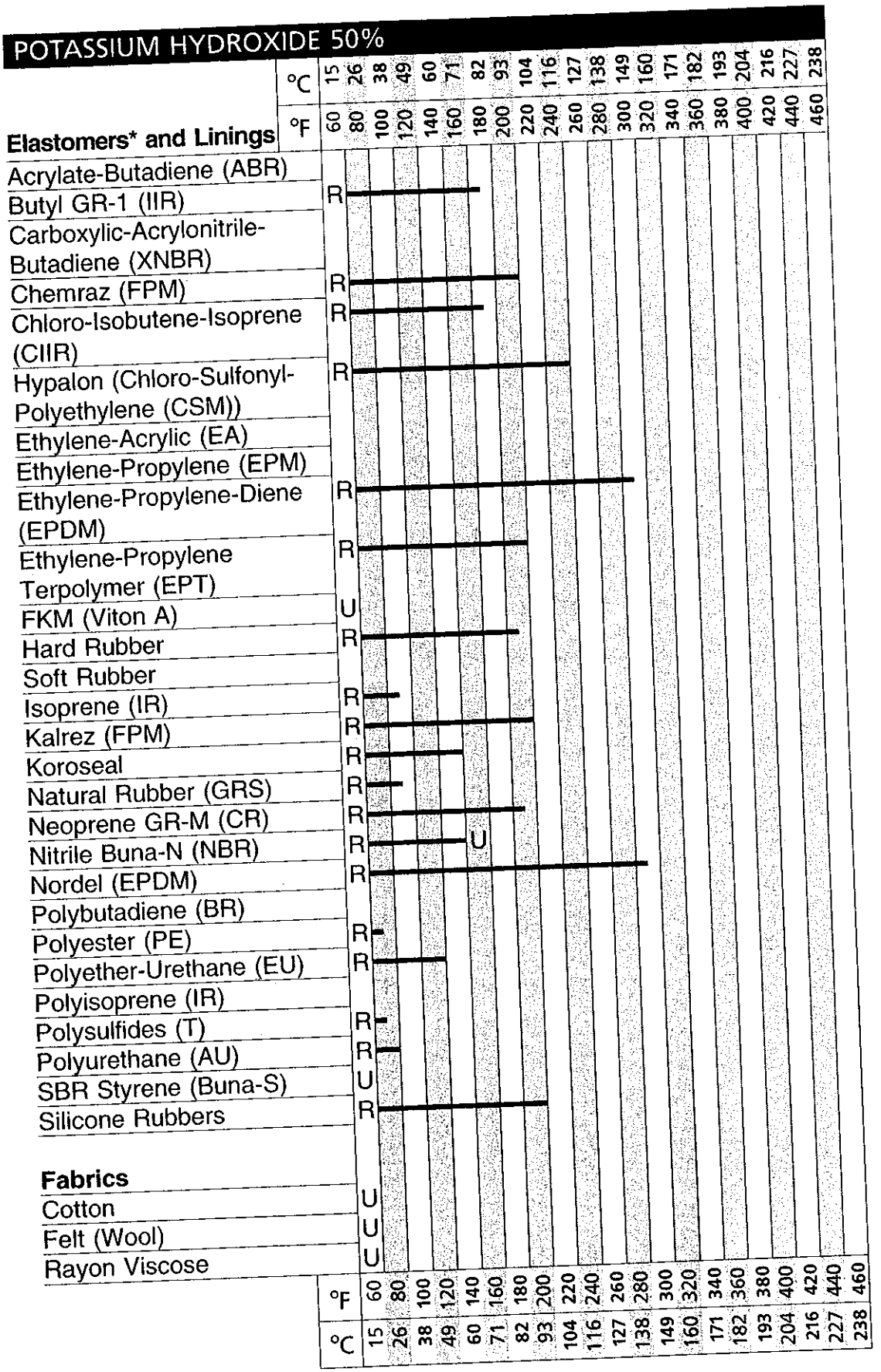
## POTASSIUM HYDROXIDE 50%

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# POTASSIUM HYDROXIDE 90%

| Metals | | °F | °C |
|---|---|---|---|
| Admiralty Brass | G | 60 | 15 |
| Aluminum | U | 80 | 26 |
| Aluminum Bronze | G | 100 | 38 |
| Brass | U | 120 | 49 |
| Bronze | S | 140 | 60 |
| Carbon Steel | 2 G | 160 | 71 |
| Columbium (Niobium) | U | 180 | 82 |
| Copper | S | 200 | 93 |
| Hastelloy B/B-2 | G | 220 | 104 |
| Hastelloy C/C-276 | G | 240 | 116 |
| Hastelloy D | G | 260 | 127 |
| Hastelloy G/G-3 | | 280 | 138 |
| High Silicon Iron | U | 300 | 149 |
| Inconel 600/625 | G | 320 | 160 |
| Incolloy 800/825 | | 340 | 171 |
| Lead | U | 360 | 182 |
| Monel 400 | G | 380 | 193 |
| Naval Bronze | U | 400 | 204 |
| Nickel 200/201 | G | 420 | 216 |
| Ni-Resist | | 440 | 227 |
| Stainless Steels | | 460 | 238 |
| Type 304/347 | U | 480 | 249 |
| Type 316/316 L | 2 G | 500 | 260 |
| Type 400 series | G | 520 | 271 |
| Type 904-L | | 540 | 282 |
| 17-4 PH | | 560 | 293 |
| 20 Cb 3 | U | | |
| E-Bright 26-1 | | | |
| Silicon Bronze | G | | |
| Silicon Copper | G | | |
| Stellite | | | |
| Tantalum | U | | |
| Titanium | U | | |
| Zirconium | G | | |

FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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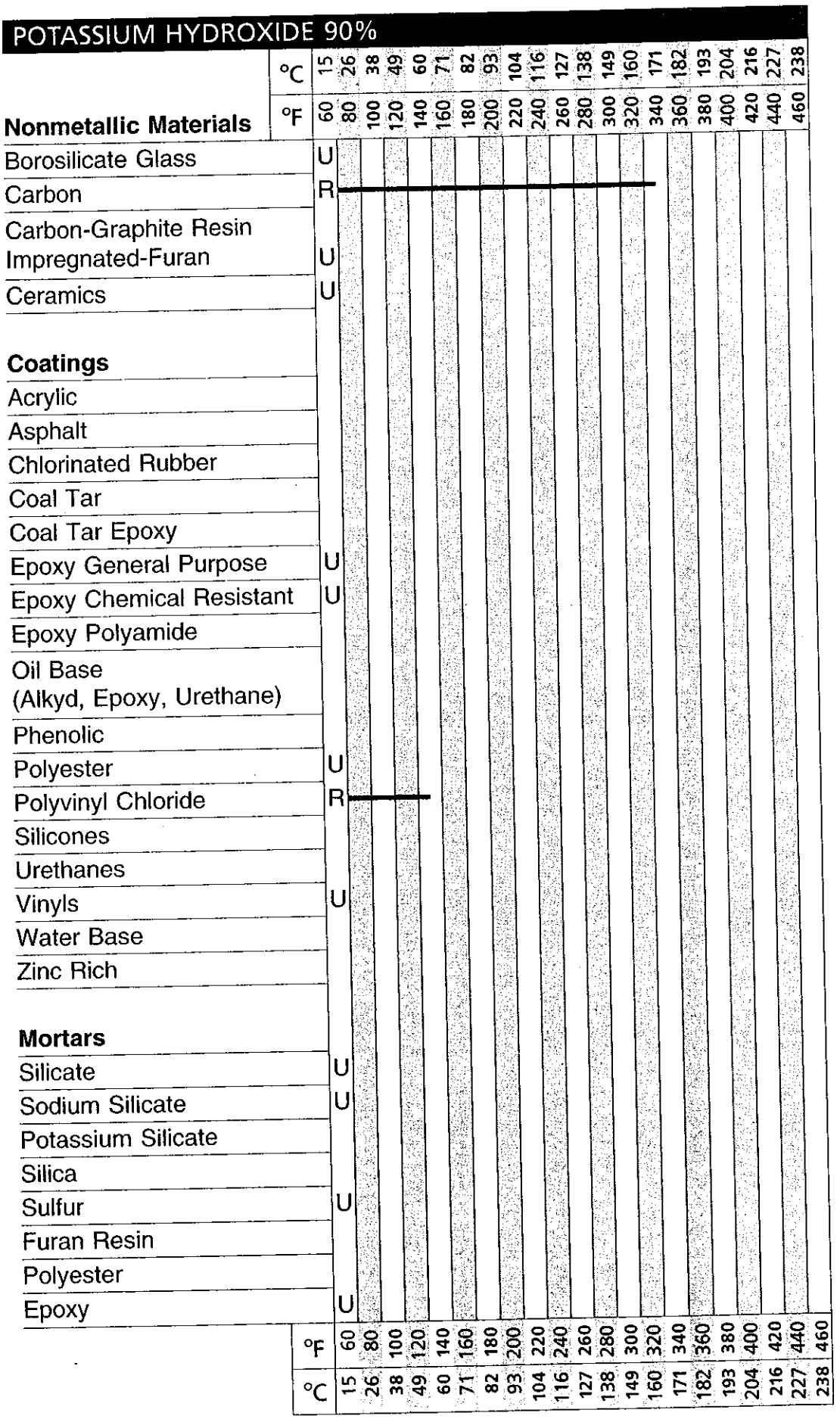
## POTASSIUM HYDROXIDE 90%





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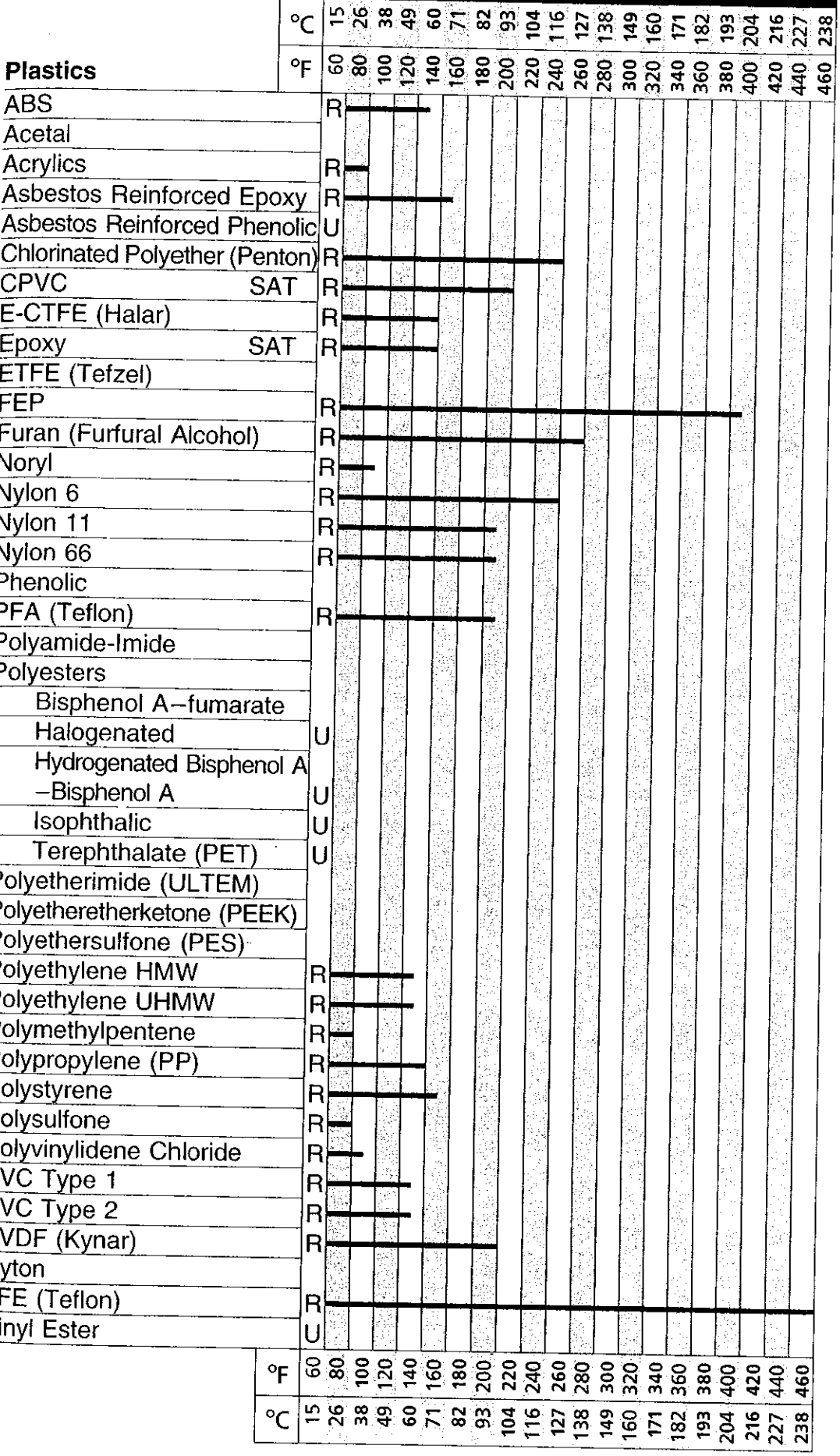
# POTASSIUM HYDROXIDE 90%

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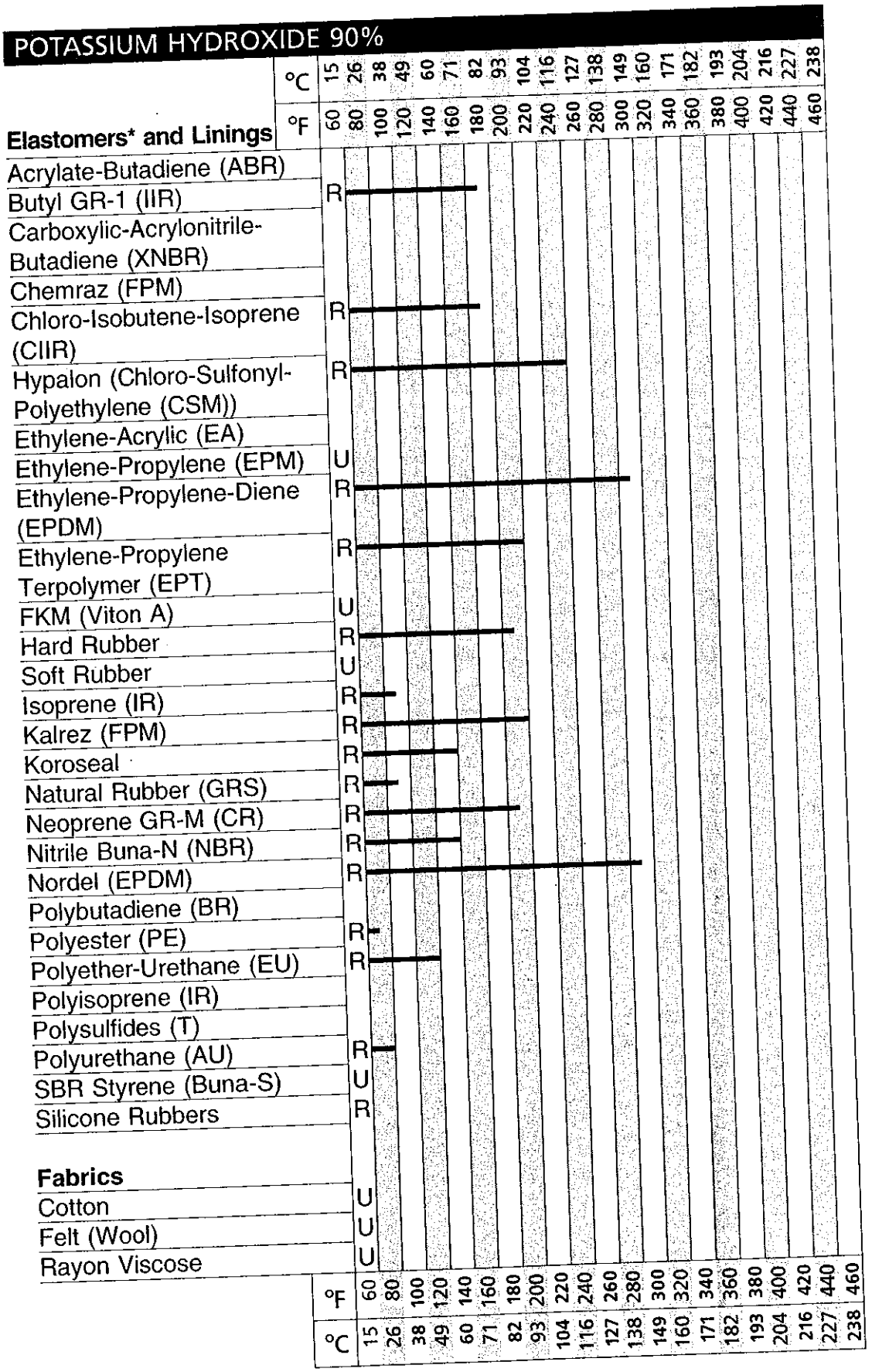


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# POTASSIUM HYPOCHLORIDE

| Metals | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| Admiralty Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aluminum Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Steel | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Columbium (Niobium) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy B/B-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy C/C-276 | | G | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy D | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hastelloy G/G-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Silicon Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inconel 600/625 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Incolloy 800/825 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Monel 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Naval Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel 200/201 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ni-Resist | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stainless Steels | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 304/347 | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 316/316 L | | U | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 400 series | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type 904-L | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-4 PH | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Cb 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E-Bright 26-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Bronze | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silicon Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stellite | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tantalum | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zirconium | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 | 249 | 260 | 271 | 282 | 293 |

FOR METALS

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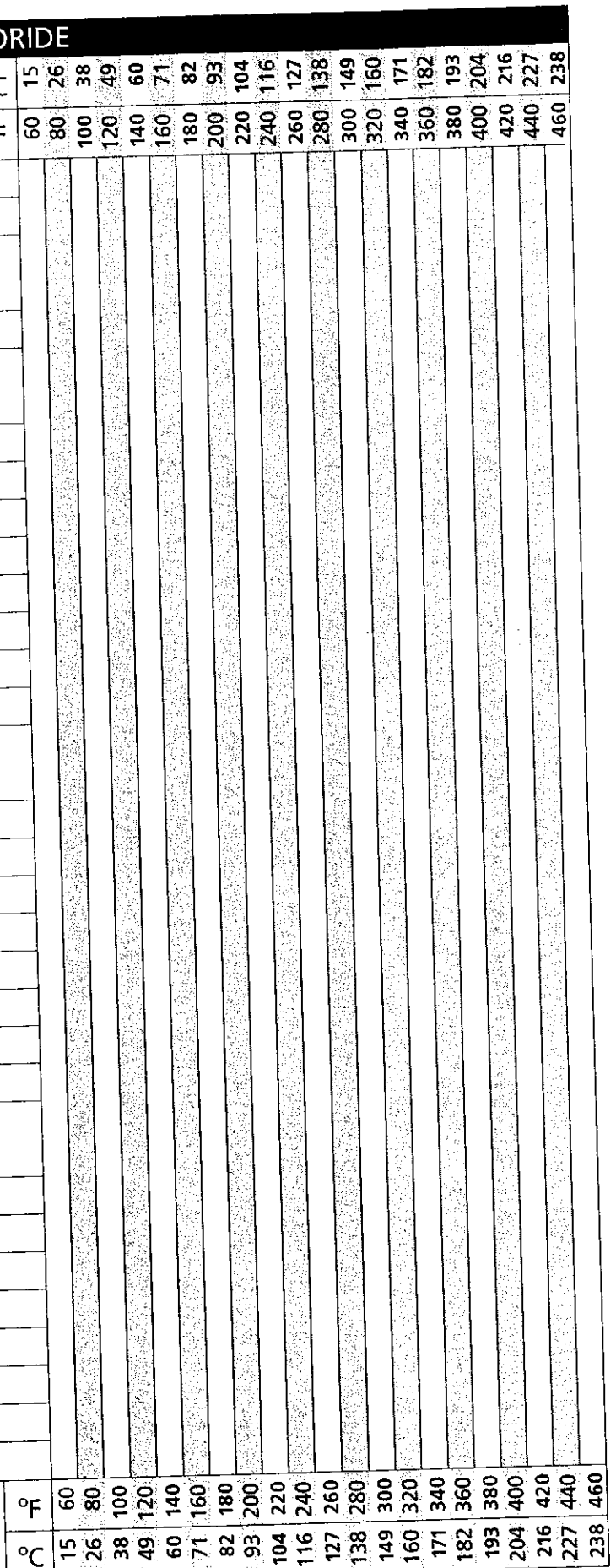






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# POTASSIUM HYPOCHLORIDE

| Plastics | °C | °F |
|---|---|---|
| ABS | | |
| Acetal | | |
| Acrylics | | |
| Asbestos Reinforced Epoxy | | |
| Asbestos Reinforced Phenolic | | |
| Chlorinated Polyether (Penton) | | |
| CPVC | | |
| E-CTFE (Halar) | | |
| Epoxy | | |
| ETFE (Tefzel) | R | |
| FEP | | |
| Furan (Furfural Alcohol) | | |
| Noryl | | |
| Nylon 6 | | |
| Nylon 11 | | |
| Nylon 66 | | |
| Phenolic | | |
| PFA (Teflon) | | |
| Polyamide-Imide | | |
| Polyesters | | |
| Bisphenol A–fumarate | | |
| Halogenated | | |
| Hydrogenated Bisphenol A –Bisphenol A | | |
| Isophthalic | | |
| Terephthalate (PET) | | |
| Polyetherimide | | |
| Polyetheretherketone (PEEK) | | |
| Polyethersulfone (PES) | | |
| Polyethylene HMW | | |
| Polyethylene UHMW | | |
| Polymethylpentene | | |
| Polypropylene (PP) | | |
| Polystyrene | | |
| Polysulfone | | |
| Polyvinylidene Chloride | | |
| PVC Type 1 | | |
| PVC Type 2 | | |
| PVDF (Kynar) | | |
| Ryton | | |
| TFE (Teflon) | R | |
| Vinyl Ester | | |

°C: 15 26 38 49 60 71 82 93 104 116 127 138 149 160 171 182 193 204 216 227 238

°F: 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460

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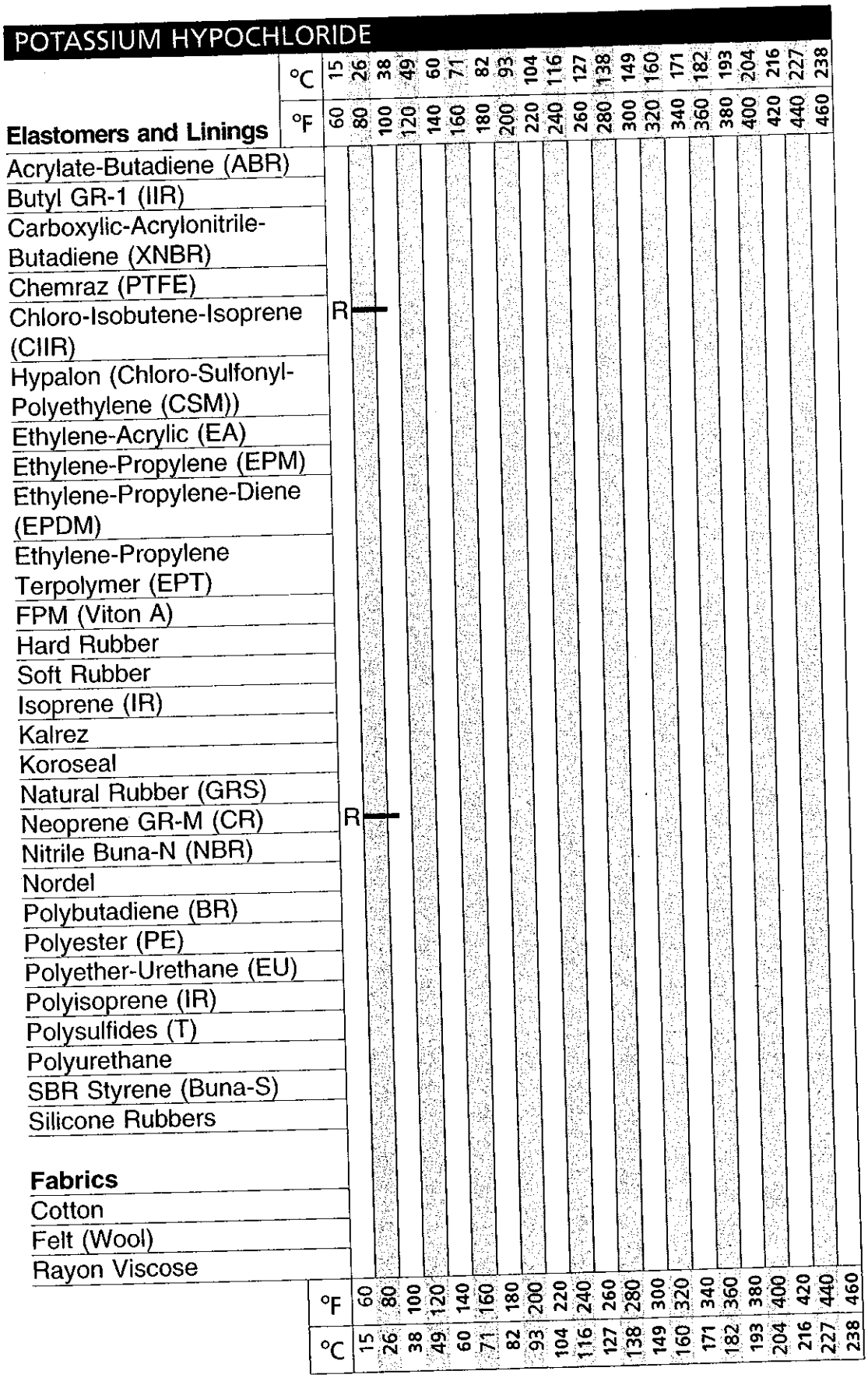




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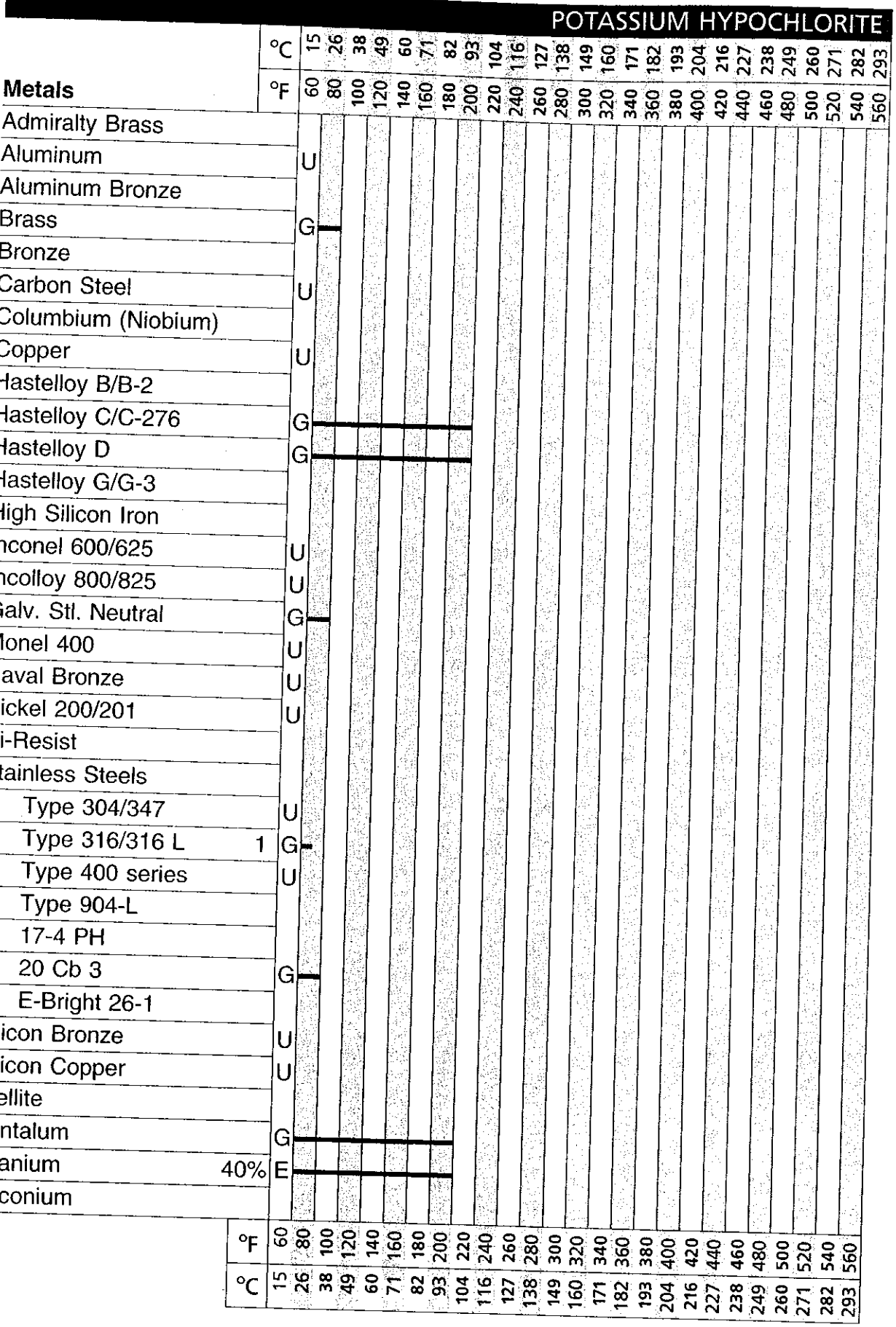


FOR METALS

E = < 2 Mils Penetration/Year; G = < 20 Mils Penetration/Year

S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

FOR NONMETALLICS

R = Resistant

U = Unsatisfactory

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# POTASSIUM HYPOCHLORITE

| Nonmetallic Materials | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| Borosilicate Glass | | U | | | | | | | | | | | | | | | | | | | | |
| Carbon | | U | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |


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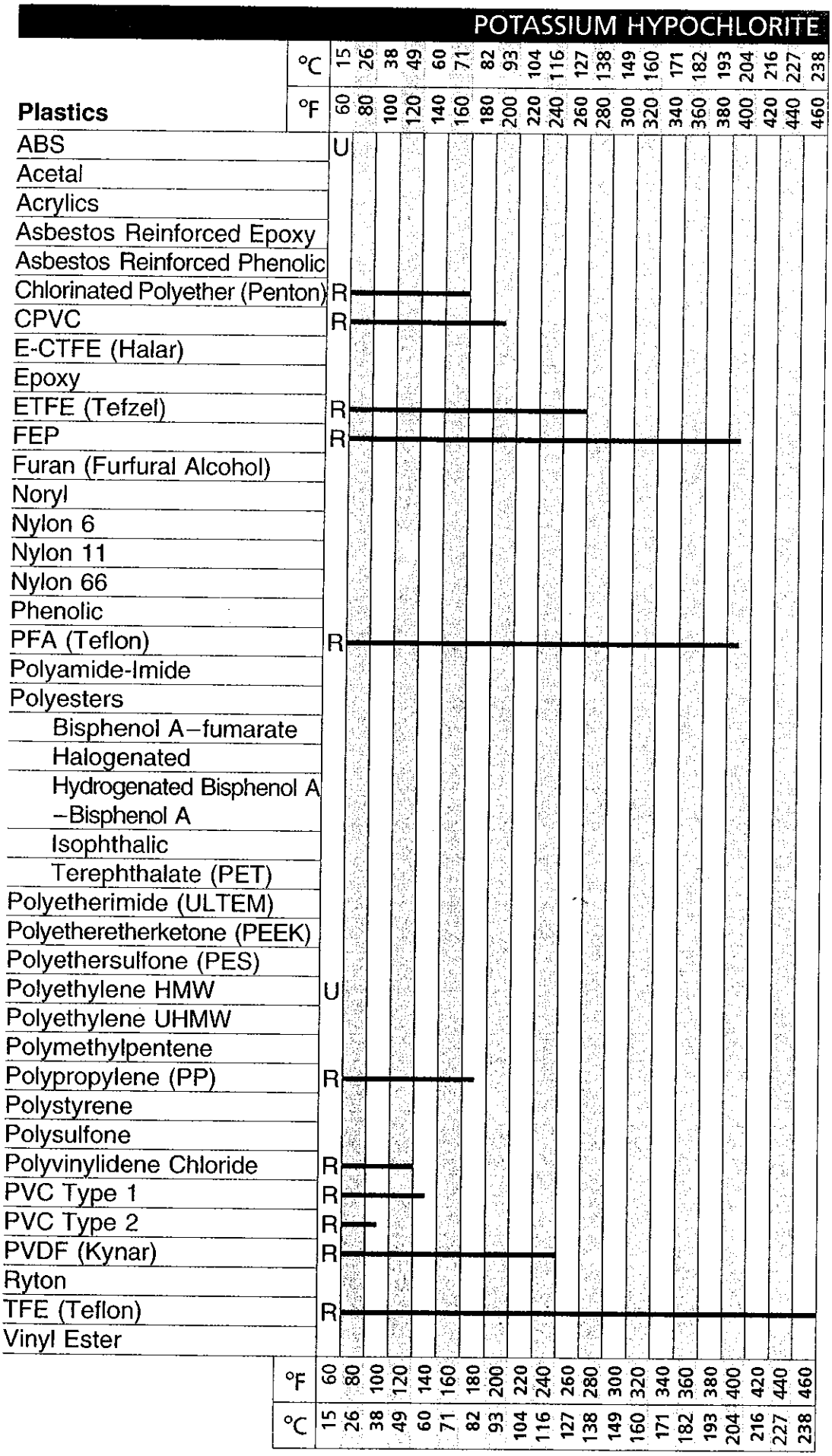


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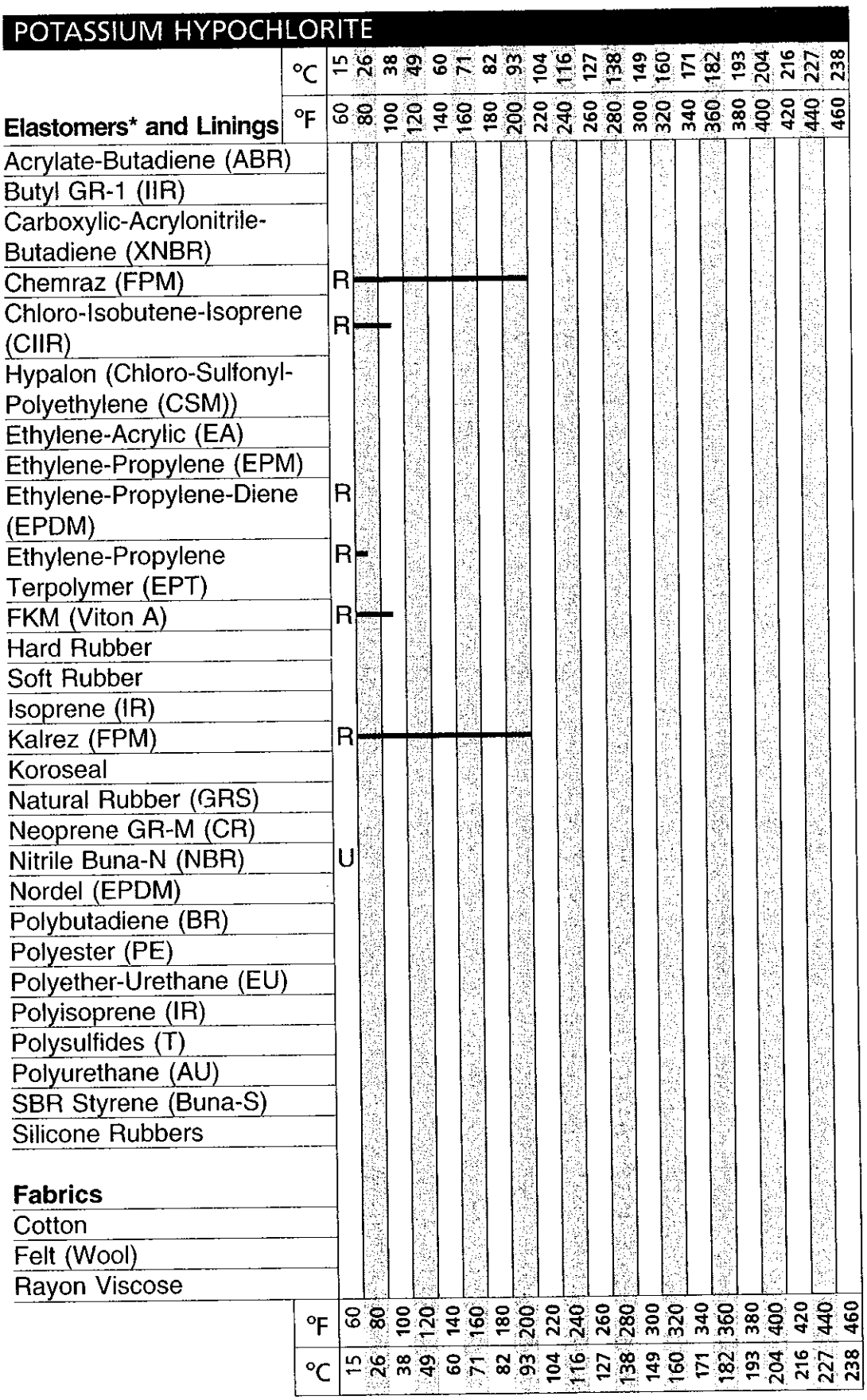


*See also Nylon 11 under PLASTICS





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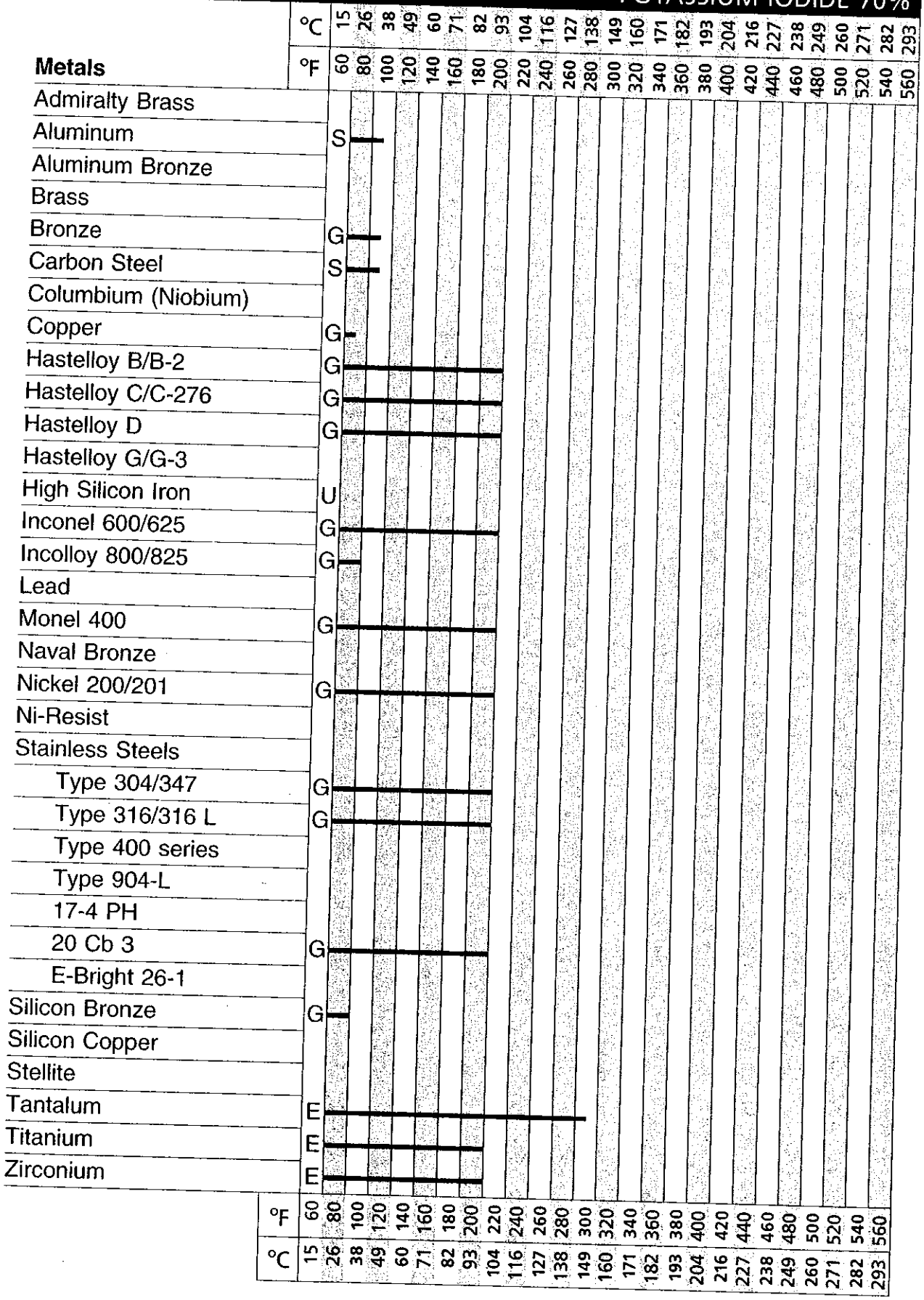
# POTASSIUM IODIDE 70%




FOR METALS

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FOR NONMETALLICS

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U = Unsatisfactory

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## POTASSIUM IODIDE 70%

| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| **Nonmetallic Materials** | | | | | | | | | | | | | | | | | | | | | | |
| Borosilicate Glass | | | | | | | | | | | | | | | | | | | | | | |
| Carbon | | | | | | | | | | | | | | | | | | | | | | |
| Carbon-Graphite Resin Impregnated | | | | | | | | | | | | | | | | | | | | | | |
| Ceramics | | | | | | | | | | | | | | | | | | | | | | |
| **Coatings** | | | | | | | | | | | | | | | | | | | | | | |
| Acrylic | | | | | | | | | | | | | | | | | | | | | | |
| Asphalt | | | | | | | | | | | | | | | | | | | | | | |
| Chlorinated Rubber | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar | | | | | | | | | | | | | | | | | | | | | | |
| Coal Tar Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy General Purpose | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Chemical Resistant | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy Polyamide | | | | | | | | | | | | | | | | | | | | | | |
| Oil Base (Alkyd, Epoxy, Urethane) | | | | | | | | | | | | | | | | | | | | | | |
| Phenolic | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Polyvinyl Chloride | U | | | | | | | | | | | | | | | | | | | | | |
| Silicones | | | | | | | | | | | | | | | | | | | | | | |
| Urethanes | | | | | | | | | | | | | | | | | | | | | | |
| Vinyls | | | | | | | | | | | | | | | | | | | | | | |
| Water Base | | | | | | | | | | | | | | | | | | | | | | |
| Zinc Rich | | | | | | | | | | | | | | | | | | | | | | |
| **Mortars** | | | | | | | | | | | | | | | | | | | | | | |
| Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Potassium Silicate | | | | | | | | | | | | | | | | | | | | | | |
| Silica | | | | | | | | | | | | | | | | | | | | | | |
| Sulfur | | | | | | | | | | | | | | | | | | | | | | |
| Furan Resin | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | |
| Epoxy | | | | | | | | | | | | | | | | | | | | | | |
| | °F | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 |
| | °C | 15 | 26 | 38 | 49 | 60 | 71 | 82 | 93 | 104 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 216 | 227 | 238 |



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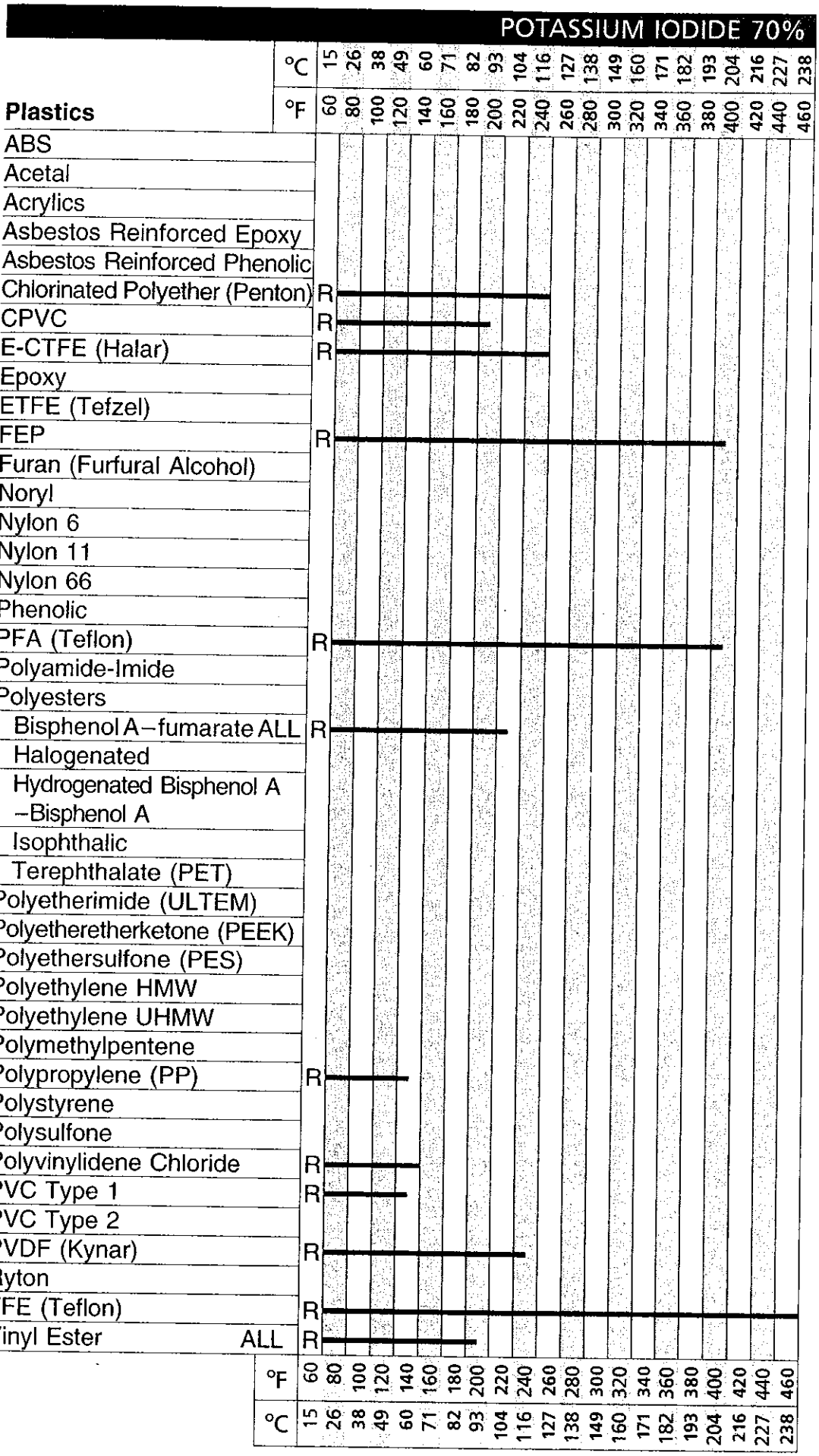



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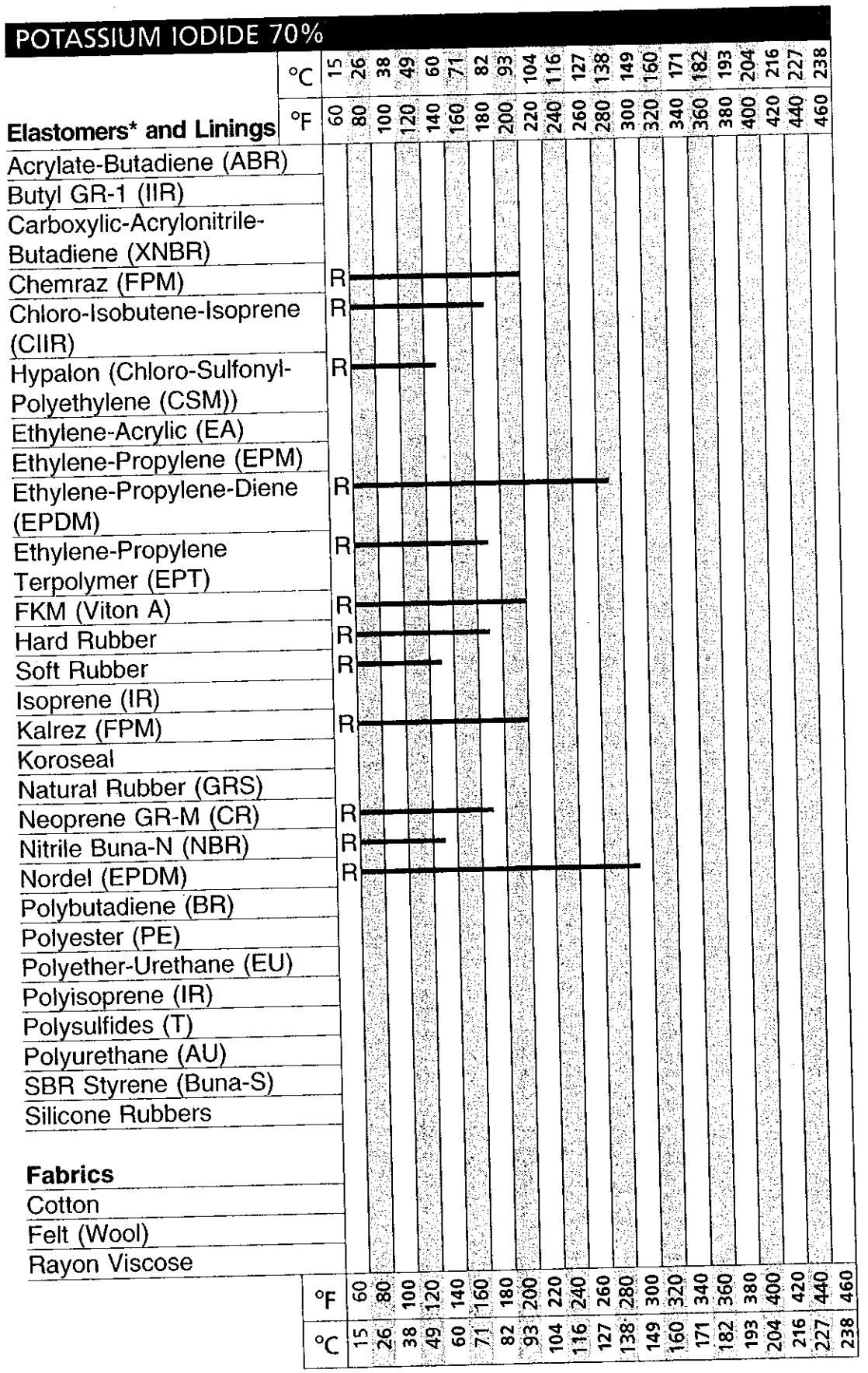
## POTASSIUM IODIDE 70%

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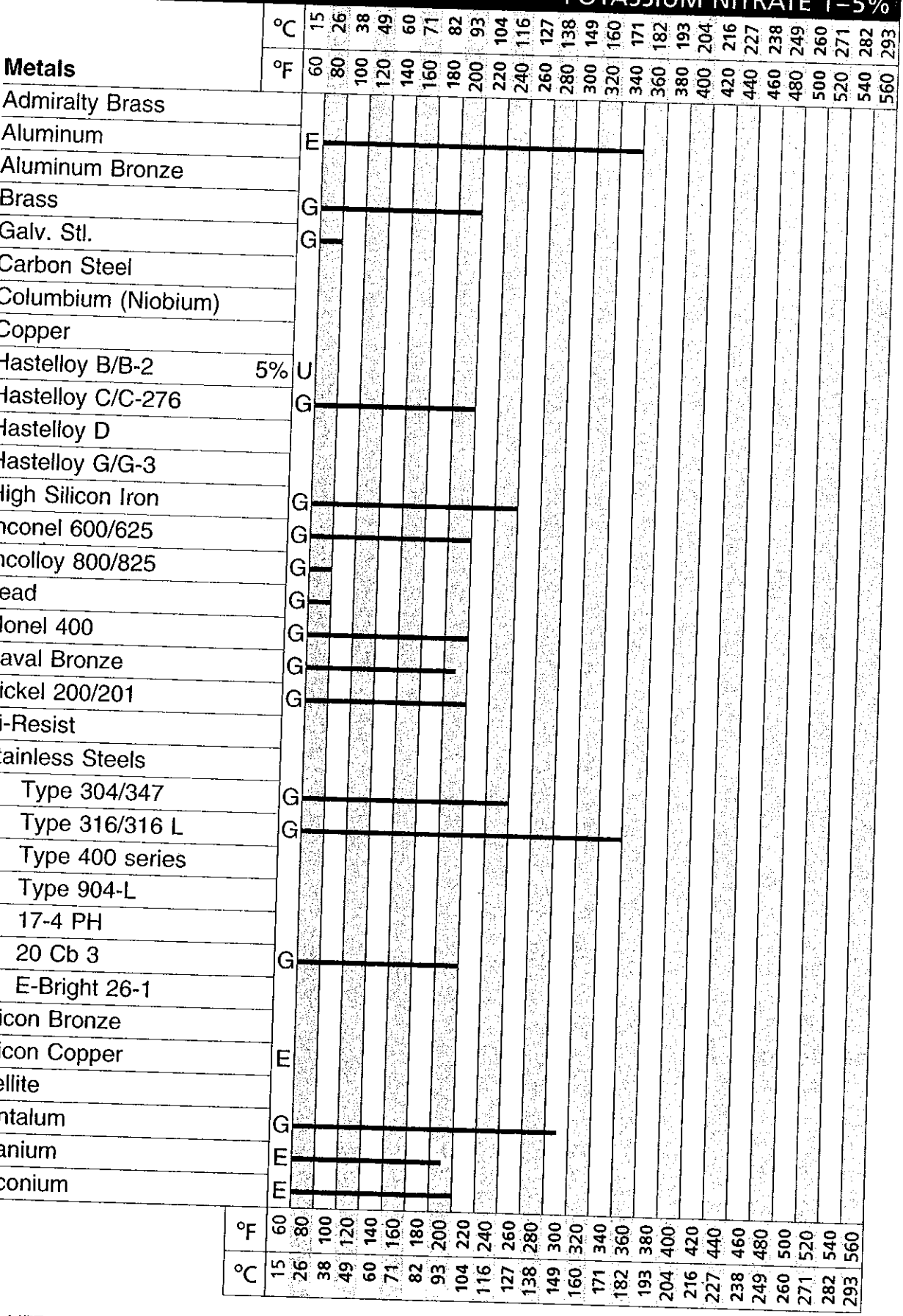
# POTASSIUM NITRATE 1–5%

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S = < 50 Mils Penetration/Year; U = > 50 Mils Penetration/Year

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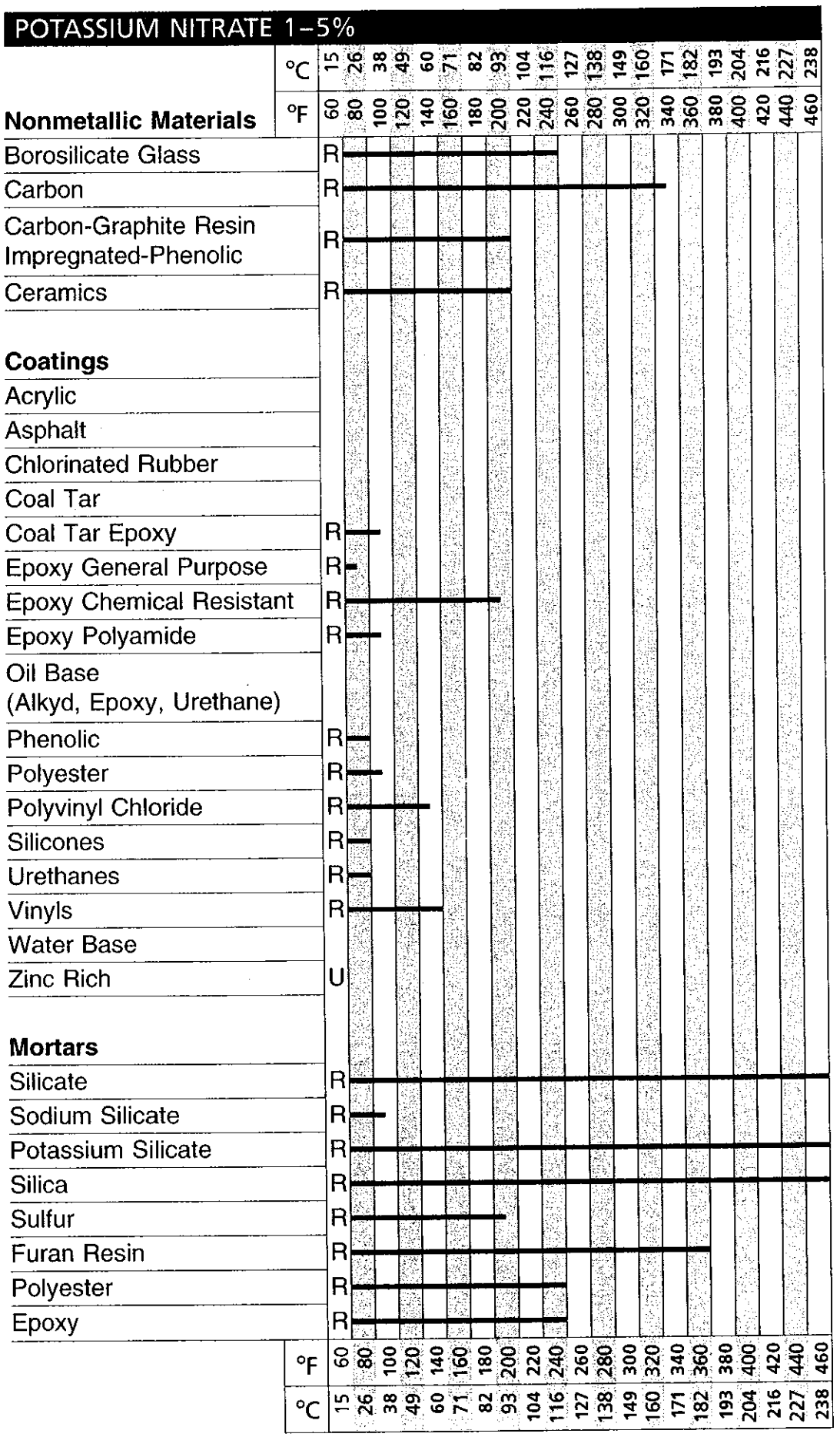
## POTASSIUM NITRATE 1–5%





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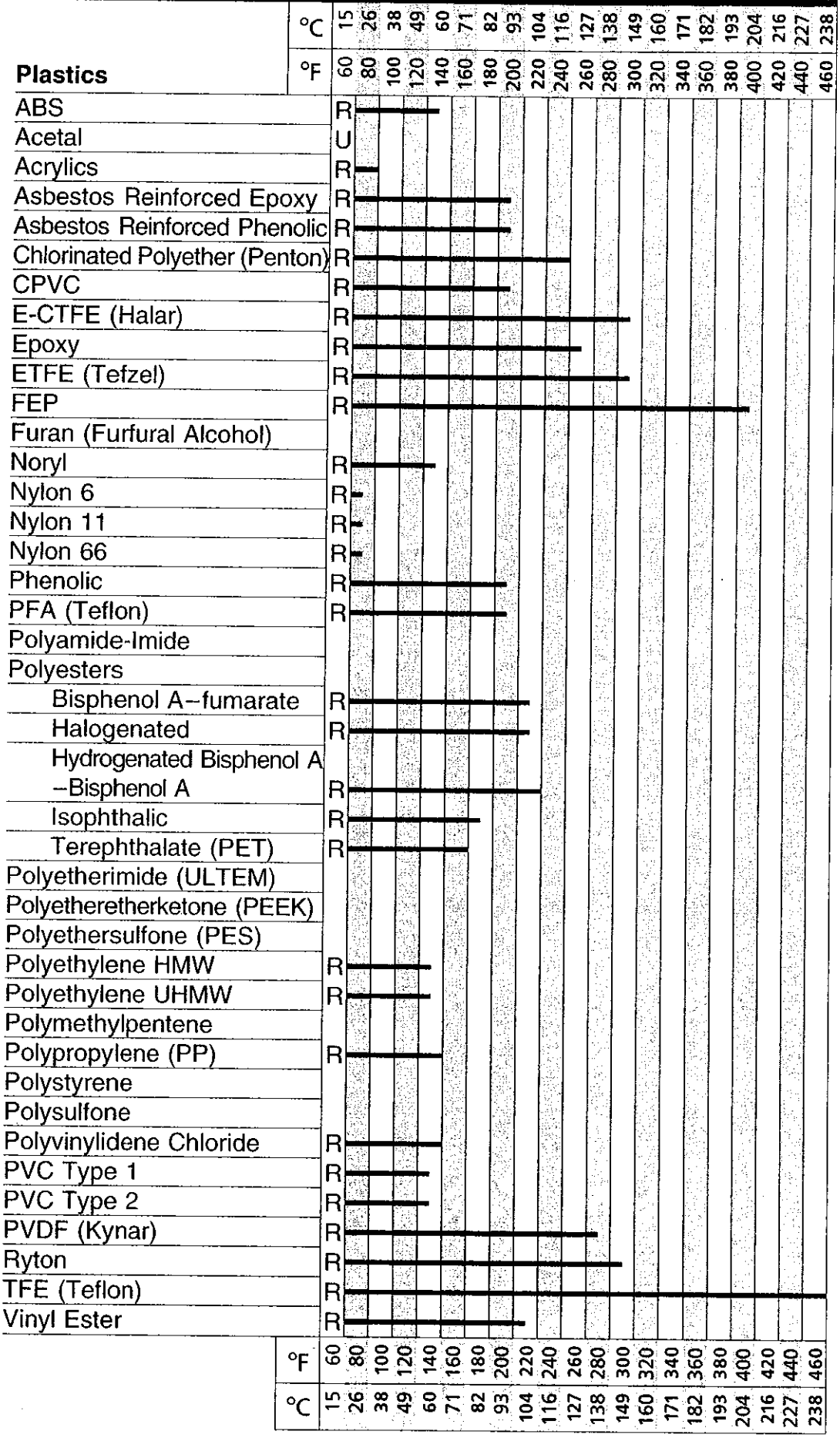



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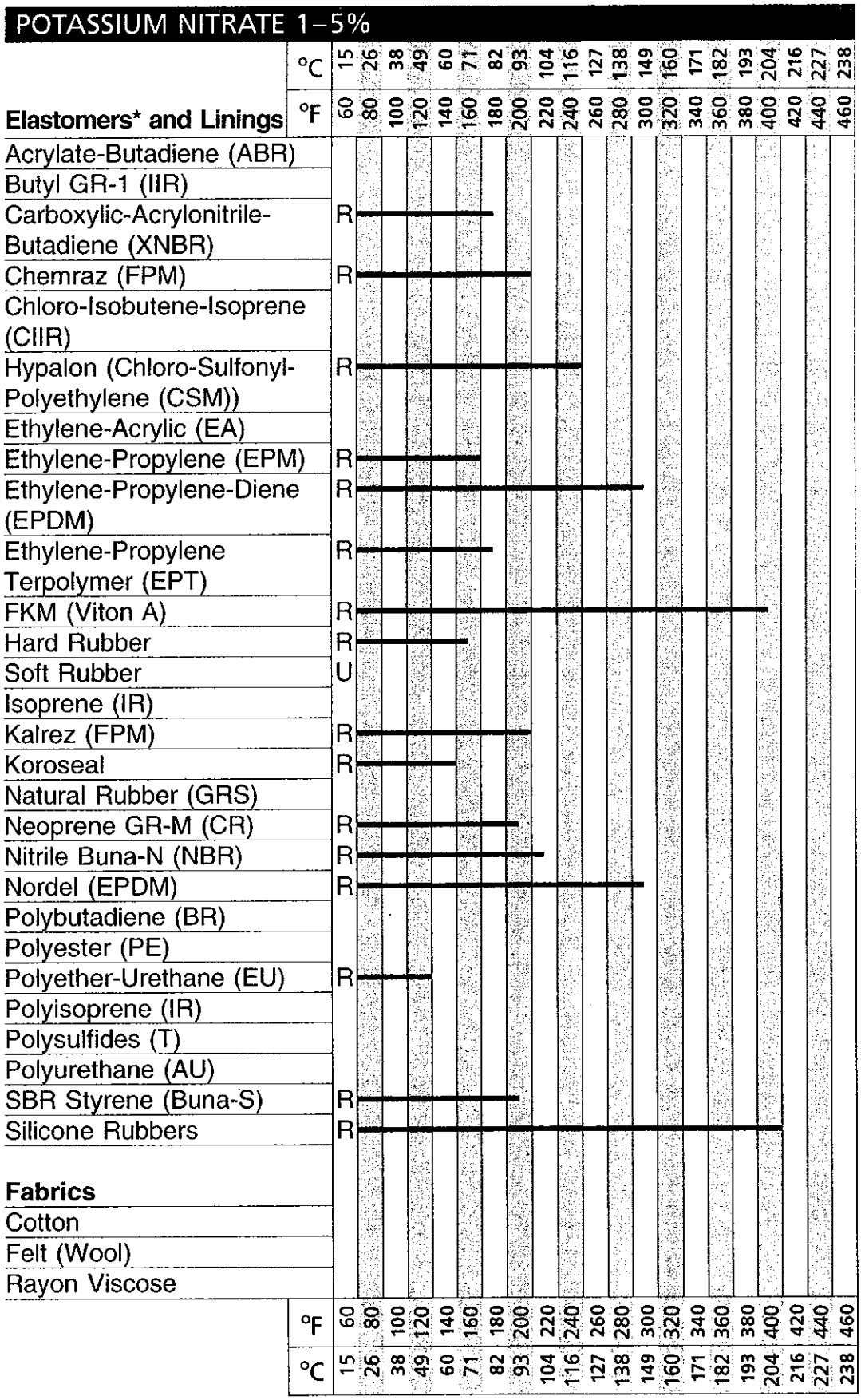


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# Appendix 1: Chemical Synonyms

| Synonym | Listed under |
|---|---|
| Acetic acid amine | Acetamide |
| Acetic acid crude | Pyroligneous acid |
| Acetic ether | Ethyl acetate |
| Acetol | Diacetone alcohol |
| Acetyl benzene | Acetophenone |
| Acetylene tetrachloride | Tetrachloroethane |
| Almond oil | Benzaldehyde |
| Aluminum hydrate | Aluminum hydroxide |
| Aluminum potassium chrome | Chrome alum |
| Alum potash | Aluminum potassium sulfate |
| Amino benzene | Aniline |
| Ammonium fluoride, acid | Ammonium bifluoride |
| Antimony chloride | Antimony trichloride |
| Baking soda | Sodium carbonate |
| Benzene carbonal | Benzaldehyde |
| Benzene carboxylic acid | Benzoic acid |
| Benzine | Petroleum ether |
| Benzol | Benzene |
| Benzyl ether | Dibenzyl ether |
| Boracic acid | Boric acid |
| Bromo-butane | Butyl bromide |
| Bromomethane | Methyl bromide |
| Butanol-1 | Butyl alcohol |
| Butanol-2 | Butyl alcohol, secondary |
| Butanoic acid | Butyric acid |
| Butanone | Methyl ethyl ketone |
| Butanthiol-1 | Butyl mercaptan |
| Butter of antimony | Antimony trichloride |
| Butyl phthalate | Dibutyl phthalate |
| Calcium disulfide | Calcium bisulfide |
| Calcium sulfide | Lime sulfur |
| Carbamide | Urea |
| Carbolic acid | Phenol |
| Carbon oxychloride | Phosgene |
| Carbonyl chloride | Phosgene |

| Synonym | Listed under |
|---|---|
| Caustic potash | Potassium hydroxide |
| Caustic soda | Sodium hydroxide |
| Chlorinated polyphenol | Aroclor |
| Chlorobenzene | Monochlorobenzene |
| 1-Chloro-butane | Butyl chloride |
| Chlorodifluoro-methane | Freon F-22 |
| Chloroethane | Ethyl chloride |
| Chloroethanoic acid | Chloroacetic acid |
| Chloromethane | Methyl chloride |
| Chloropentane | Amyl chloride |
| 3-Chloro-propene-1 | Allyl chloride |
| Chlorotoluene | Benzyl chloride |
| Chromium trioxide | Chromic acid |
| Coal tar | Creosote |
| Corn syrup | Glucose |
| Cupric acetate | Copper acetate |
| Cupric carbonate | Copper carbonate |
| Cupric fluoride | Copper fluoride |
| Cupric nitrate | Copper nitrate |
| Cupric sulfate | Copper sulfate |
| Cuprous chloride | Copper chloride |
| Diacetone | Diacetone alcohol |
| Dibromoethane | Ethylene bromide |
| Dibutyl ether | Butyl ether |
| Dichloroethane | Ethylene dichloride |
| Dichloroethene | Dichloroethylene |
| Dichloromethane | Methylene chloride |
| Diethyl | Butane |
| Diethylene dioxide | Dioxane |
| Diethylene di-imide oxide | Morpholine |
| Dihydroxy benzene | Resorcinol |
| Dihydroxy ethane | Glycol, ethyleneglycol |
| Dimethyl benezene | Xylene |
| Dimethyl polysiloxane | Silicone oil |
| Dimethyl sulfate | Methyl sulfate |
| Diphenyl ether | Diphenyl oxide |
| Dipropyl | Hexane |
| Dipropyl ether | Isopropyl ether |
| Dodecyl chloride | Lauryl chloride |
| Dowtherm | Diphenyl |
| Epsom salt | Magnesium sulfate |
| Ethanal | Acetaldehyde |
| Ethanamide | Acetamide |
| Ethanoic acid | Acetic acid |
| Ethanoic anhydride | Acetic anhydride |
| Ethanonitrile | Acetonitrile |
| Ethanol | Ethyl alcohol |
| Ethanoyl chloride | Acetyl chloride |
| Ethoxy ethanol | Cellosolve |
| Ethylene chloride | Ethylene dichloride |
| Ethyl ether | Diethyl ether |
| Fluorosilicic acid | Hydrofluorosilicic acid |

| Synonym | Listed under |
|---|---|
| Formalin | Formaldehyde |
| Furfuraldehyde | Furfural |
| Furfurol | Furfural |
| Glucose | Dextrose, corn syrup |
| Glycerol | Glycerine |
| Glycol | Ethylene glycol |
| Glycol ether | Diethylene glycol |
| Glycol methyl ether | Methyl cellosolve |
| Hexamethylene | Cyclohexane |
| Hexamethylene tetramine | Hexamine |
| Hexandioic acid | Adipic acid |
| Hexose | Dextrose |
| Hexyl alcohol | Hexanol |
| Hydrogen iodide | Hydriodic acid |
| Hydroxy benzoic acid | Salicylic acid |
| Hypo photographic solution | Sodium thiosulfate |
| Isopropyl benzene | Cumene |
| Ligroin | Petroleum ether |
| Lime | Calcium oxide |
| Lime sulfur | Calcium sulfide |
| Lithic acid | Uric acid |
| Marsh gas | Methane |
| Methanal | Formaldehyde |
| Methane sulfonic acid | Methyl sulfonic acid |
| Methanoic acid | Formic acid |
| Methanol | Methyl alcohol |
| Methyl benzene | Toluene |
| Methyl chloroform | Trichloroethane |
| Methyl cyanide | Acetonitrile |
| Methyl ether | Dimethyl ether |
| Methyl phenol | Cresol |
| Methyl phenol ketone | Acetophenone |
| Methyl phthalate | Dimethyl phthalate |
| Methyl propane-2 | Butyl alcohol, tertiary |
| Methyl sulfonic acid | Methane sulfonic acid |
| Nitrochloroform | Chloropicrin |
| Nitrogen oxide, tri- | Nitrous acid |
| Octanoic acid | Caprylic acid |
| Oil of mirbane | Nitrobenzene |
| Oil of wintergreen | Methyl salicylate |
| Oxalic nitrile | Cyanogen |
| Phenyl amine | Aniline |
| Phenyl bromide | Bromobenzene |
| Phenyl carbinol | Benzyl alcohol |
| Phenyl chloride | Chlorobenzene |
| Phenyl cyanide | Benzonitrile |
| Phenyl ethane | Ethyl benzene |
| Phosphine | Hydrogen phosphide |
| Pimelic ketone | Cyclohexanone |
| Pinene | Dipentene |
| Polyphenylene sulfide | Ryton |
| Propanoic acid | Propionic acid |

| Synonym | Listed under |
|---|---|
| Propanol | Propyl alcohol |
| Propanone | Acetone |
| Propanyl alcohol | Allyl alcohol |
| Propenoic acid | Acrylic acid |
| Propyl acetate | Isopropyl acetate |
| Prussic acid | Hydrocyanic acid |
| Pyrogallol | Pyrogallic acid |
| Red oil | Oleic acid |
| Salammoniac | Ammonium chloride |
| Sodium borate, tetra | Borax |
| Sodium phosphate, dibasic | Disodium phosphate |
| Starch gum | Dextrin |
| Sugar of lead | Lead acetate |
| Sulfoanthraquinone | Anthraquinone sulfuric acid |
| Sulfuric chlorohydrin | Chlosulfonic acid |
| Tannin | Tannic acid |
| Tetrachloroethylene | Perchlorethylene |
| Tetrachloromethane | Carbon tetrachloride |
| Tetrahydronaphthalene | Tetralin |
| Toluol | Toluene |
| Trichloroacetic aldehyde | Chloral hydrate |
| Trichloromethane | Chloroform |
| Trihydroxy benzene | Pyrogallic acid |
| Trihydroxy benzoic acid | Gallic acid |
| Trinitrophenol | Petrolatum |
| Vaseline | Picric acid |
| Vinyl cyanide | Acrylonitrile |
| Water glass | Sodium silicate |

# Appendix 2: Cross-Reference of Trade Names to Generic Names

| Trade name/designation | Generic name |
|---|---|
| Adiprene[a] | Urethane (AU) |
| Bayprene[b] | Polychloroprene (CR) |
| Baysilone[b] | Silicone rubber (SI) |
| Baytec[b] | Urethane (AU) |
| Blue-sil[n] | Silicone rubber (SI) |
| Buna-85 | Polybutadiene (BR) |
| Buna-CB[b] | Polybutadiene (BR) |
| Buna-N | Butadiene-acrylonitrile (NBR) |
| Buna-S | Butadiene-styrene-elastomer (SBR) |
| Chemraz[j] | Perfluoroclastomers (FPM) |
| Cohrplastic[o] | Silicone rubber (SI) |
| Conathane[p] | Urethane (AU) |
| CSM | Chlorosulfonated polyethylene |
| Cycolac[ac] | Acrylonitrile-butadiene-styrene (ABS) |
| Duracryn[a] | Thermoplastic elastomer (TPE) |
| Dutral[i] | Ethylene-propylene-diene (EPDM) |
| Flexsorb[q] | Thermoplastic elastomer (TPE) |
| Fluorel[f] | Fluoroelastomers (FKM) |
| Foraflon[f] | Polyvinylidene fluoride (PVDF) |
| Futura-thane[k] | Urethane (AU) |
| Geolast[r] | Thermoplastic elastomer (TPE) |
| GR-1 | Butyl rubber (IIR) |
| Green-sil[n] | Silicone rubber (SI) |
| GR-S | Butadiene-styrene elastomer (SBR) |
| Halar[j] | ECTFE |
| Halon-ET[i] | Ethylene-tetrafluorethylene (ETFE) |
| Hypalon[a] | Chlorosulfonated polyethylene (CSM) |
| Hytrel[a] | Polyester elastomer (PE) |
| Kalar[s] | Butyl rubber (IIR) |
| Kalrez[a] | Perfluoroelastomer (FPM) |
| Kel-F[f] | Perfluoroelastomer (FPM) |
| Kodapak[t] | Thermoplastic elastomer (TPE) |
| Kodar[t] | Polyester elastomer (PE) |
| Kraton-D[c] | Styrene-butadiene-styrene rubber (SBS) |
| Kraton-G[c] | Styrene-ethylene-butylene-styrene rubber (SEBS) |
| Kynar[g] | Polyvinylidene fluoride (PVDF) |
| Lennite[ad] | Ultra high molecular weight polyethylene (UHMW) |
| Milkon[af] | Polyphenylene sulfide |
| NBR | Butadiene-acrylonitrile rubber |
| Neoprene[a] | Polycloroprene (CR) |
| Nordel[a] | Ethylene-propylene-diene monomer (EPDM) |
| Noryl[aa] | Modified phenylene oxide |
| Nylon[a] | Polyamide |

| Trade name/designation | Generic name |
|---|---|
| Nytek[u] | Butadiene-acrylonitrile (NBR) rubber |
| Parshield[m] | Silicone rubber (SI) |
| Pellethane[v] | Urethane (AU) |
| Perbunan[b] | Butadiene-acrylonitrile (NBR) rubber |
| Plaskon[y] | Polyamide |
| Propylux[ab] | Polypropylene |
| Pure-CMC[n] | Urethane (AU) |
| Rilsan[e] | Polyamide |
| Royalene[h] | Ethylene-propylene-diene (EPDM) rubber |
| Ryton[ac] | Polyphenylene sulfide |
| Santoprene[r] | Thermoplastic elastomer (TPE) |
| Technoflon[i] | Fluoroelastomer (FKM) |
| Tefzel[a] | Ethylene-tetrafluorethylene (ETFE) |
| Texin[b] | Urethane (AU) |
| Thermalux[ag] | Polysulfone |
| Thiokol[d] | Polysulfide (ST) (FA) |
| Ultem[l] | Polyetherimide |
| Urane[w] | Urethane (AU) |
| Vamac[a] | Ethylene-acryllic elastomer (EA) |
| Victrex[z] | Polyether sulfone (PES series) |
| Victrex[z] | Polyetherether ketone (PEEK series) |
| Viton[a] | Fluoroelastomer (FKM) |
| Vydyne[r] | Polyamide |
| Zurcon[x] | Thermoplastic elastomer (TPE) |

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[a] E. I. du Pont.
[b] Mobay Corp.
[c] Shell Chemical Co.
[d] Morton Thiokol Inc.
[e] Atochem Inc.
[f] 3-M Corp.
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[ac] Borg Warner Chemical Co.
[ad] Himont U.S.A.
[ae] Phillips Petroleum Co.
[af] Tribol Industries.
[ag] Amoco Performance Products.

# Appendix 3: Plating Solution Composition

**Brass**
3% Copper, 1% zinc, and 5.6% sodium
3% Cyanide
Sodium carbonate

**Cadmium cyanide**
3% Cadmium oxide
10% Sodium cyanide
1.2% Sodium hydroxide

**Chrome 25%**
25% $CrO_3$
12% Sulfuric acid
Water

**Chrome 40%**
40% $CrO_3$
12% Sulfuric acid
Water

**Copper cyanide**
10.5% Copper
14% Sodium cyanide
6% Rochelle salts

**Gold**
22.8% Potassium ferrocyanide
0.2% Potassium gold cyanide
0.8% Sodium cyanide
Water to make 1 gallon

**Iron**
45% $FeCl_2$
20% $FeSO_4$

**[Iron]**
15% $CaCl_2$
11% $(NH_4)_2SO_4$

**Lead**
8% Lead
0.8% Fluoboric acid
0.4% Boric acid
Water to make 1 gallon

**Nickel**
11% Nickel sulfate
2% Nickel chloride
1% Boric acid
86% Water

**Silver**
4% Silver
7% Potassium cyanide
5% Sodium cyanide
2% Potassium carbonate

**Tin**
7% Tin
18% Stannous fluoborate
9% Fluoboric acid
2% Boric acid

**Zinc**
9% Zinc cyanide
9% Sodium hydroxide
4% Sodium cyanide

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## about the author . . .

PHILIP A. SCHWEITZER, P.E. is a consultant in corrosion prevention, materials of construction, and chemical engineering based in York, Pennsylvania. A former Contract Manager for Chem-Pro Corporation, Fairfield, New Jersey, he is the editor of the *Corrosion Engineering Handbook* and the *Corrosion and Corrosion Protection Handbook, Second Edition*; and the author of the *Encyclopedia of Corrosion Technology, Second Edition; Metallic Materials; Corrosion-Resistant Linings and Coatings; Atmospheric Degradation and Corrosion Control; What Every Engineer Should Know About Corrosion; Corrosion Resistance of Elastomers; Corrosion-Resistant Piping Systems*; and *Mechanical and Corrosion-Resistant Properties of Plastics and Elastomers* (all titles, Marcel Dekker, Inc.). He is a licensed engineer in New Jersey, a member of the American Institute of Chemical Engineers, and editor of the *Corrosion Technology* series (Marcel Dekker, Inc.). Mr. Schweitzer received the B.Ch.E. degree (1950) from the Polytechnic University (formerly Polytechnic Institute of Brooklyn), Brooklyn, New York.

*Printed in the United States of America*

MARCEL DEKKER, INC.
NEW YORK • BASEL

ISBN 0-8247-5675-4

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