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SAMSUNG ENGINEERING CO., LTD.

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1. SCOPE

This manual covers selection procedure for pipe classification.

2. FORMAT

The following forms should be used.

Piping material specification : From No.

Line index : From No.

3. PIPING CLASS SELECTION

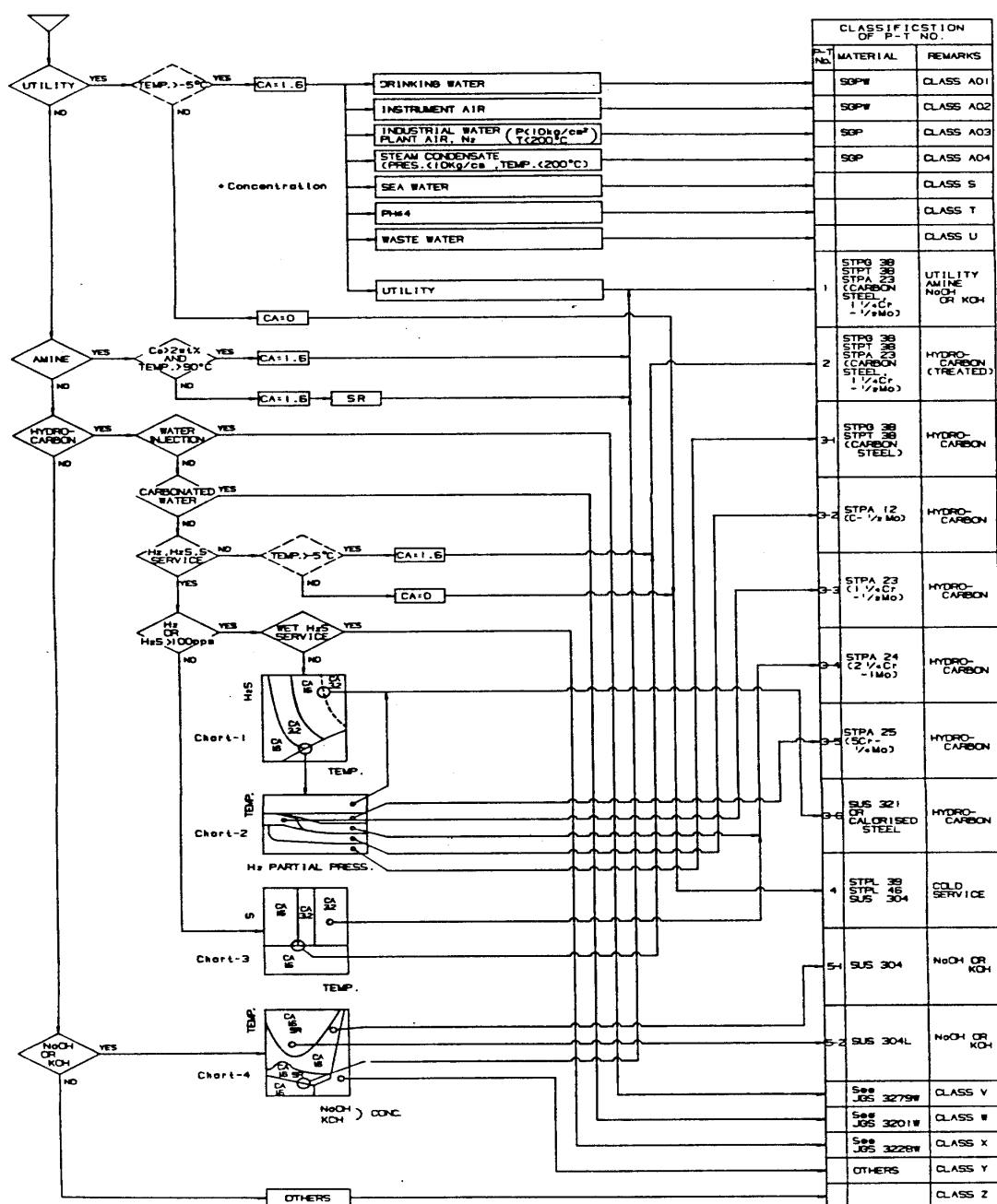
In piping class selection, the pipe class and ratings shall be determined from the fluid type and design pressure and temperature.

Fig. 3-1 shows the general procedures of the piping class selection. Figs. 3-2 to 3-5 give the criteria of the material which can be used under the given conditions.

Figs. 3-6 to 3-16 give the rating of the pipes for each material.

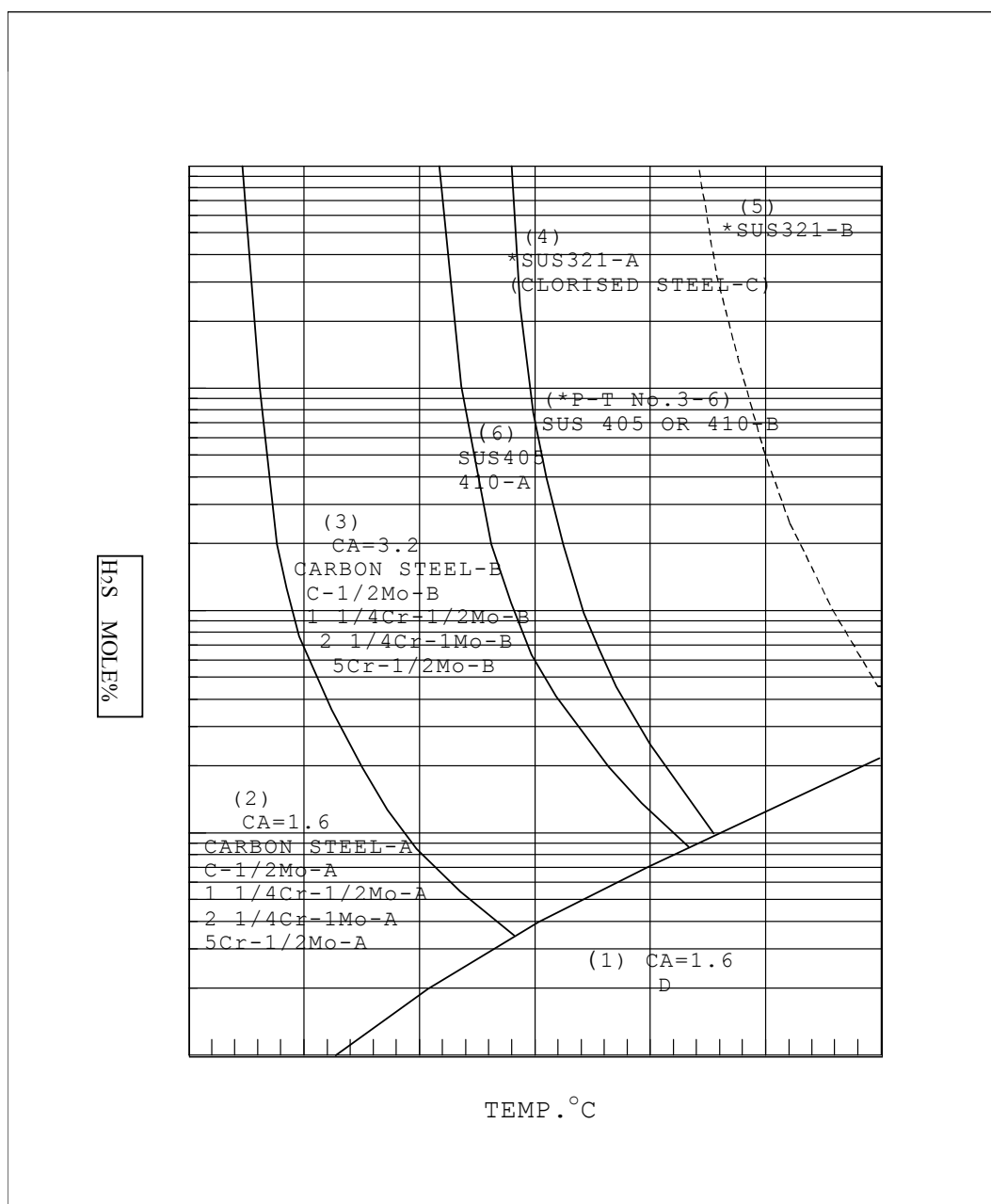
Should any material selection be found to be difficult, it shall be called to the attention of the piping engineers in charge and discussed with them for a final decision.

Fig. 3-1. PIPING CLASS SELECTION CHART



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Fig. 3-2. Chart 1. Selection of Corrosion Allowance for Carbon Steel and Low Alloy Steels in Hydrogen Sulfide Service, and Operating Limits for Stainless Steels and Calorized Steels



NOTE A : Corrosion allowance = 1.6 mm

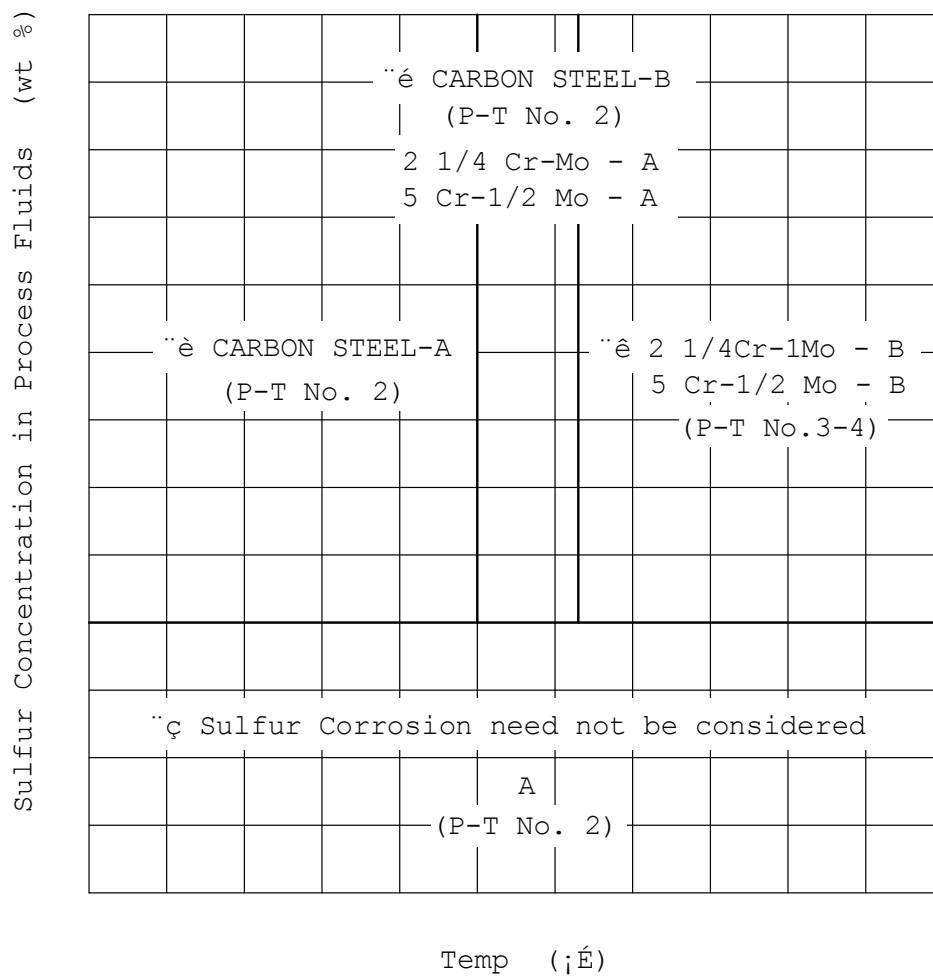
B : Corrosion allowance = 1.6 mm

C : Parent metals shall be selected on the basis of chart 2 (Nelson Chart)

C : Materials shall be selected directly from among those given chart 2 (Nelson Chart)

LEGEND								
SURFACE DECARBURIZATION								
INTERNAL DECARBURIZATION								
	LOW CARBON	0.5 0.5 Me	1.0 Cr 0.5 Me	2.0 Cr 0.5 Me	2.25 Cr 1.00 Me	3.0 Cr 0.5 Me	8.0 Cr 0.5 Me	
SATISFACTORY	○	○	○	△	□	◇	◇	▽
HYDROGEN ATTACK		○	○	△	□	◇	◇	▽
DECARBURIZATION	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
SEE FOOTNOTES	●	●	●	△	□	◇	◇	▽

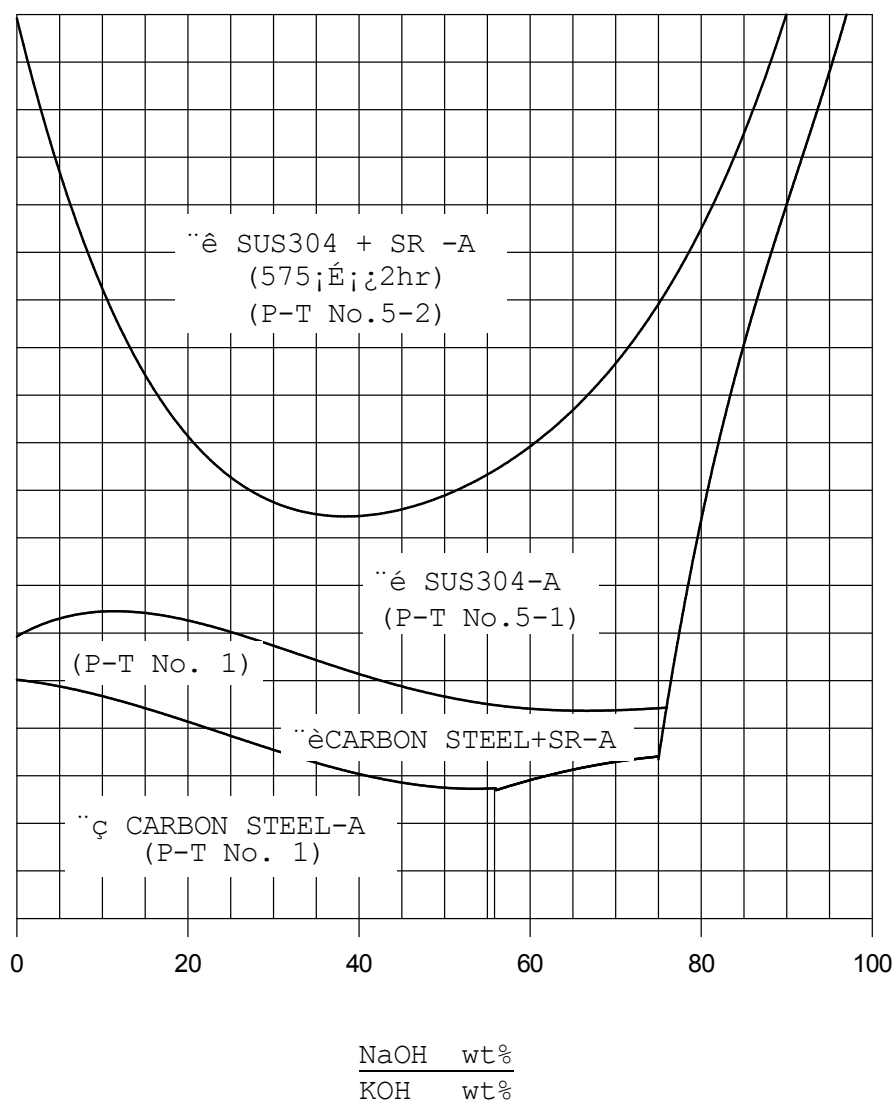
Fig 3-4. Chart 3. Operating Limits for Carbon Steels
and Low Alloy Steels in Sulfur Service



NOTES A ; Corrosion allowance = 1.6 mm
 B ; Corrosion allowance = 3.2 mm

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Fig. 3-5 Chart 4. Operating limits for Carbon Steels
and Stainless Steels in NaOH and KOH Services



NOTE A; Corrosion allowance = 1.6 mm

Fig. 3-6-1. Selection Chart No. 1 (JIS)

SERVICE UTILITY

MATERIALS STPG 38, STPT38, STPA23

MATERIAL GROUP 1.1, 1.9

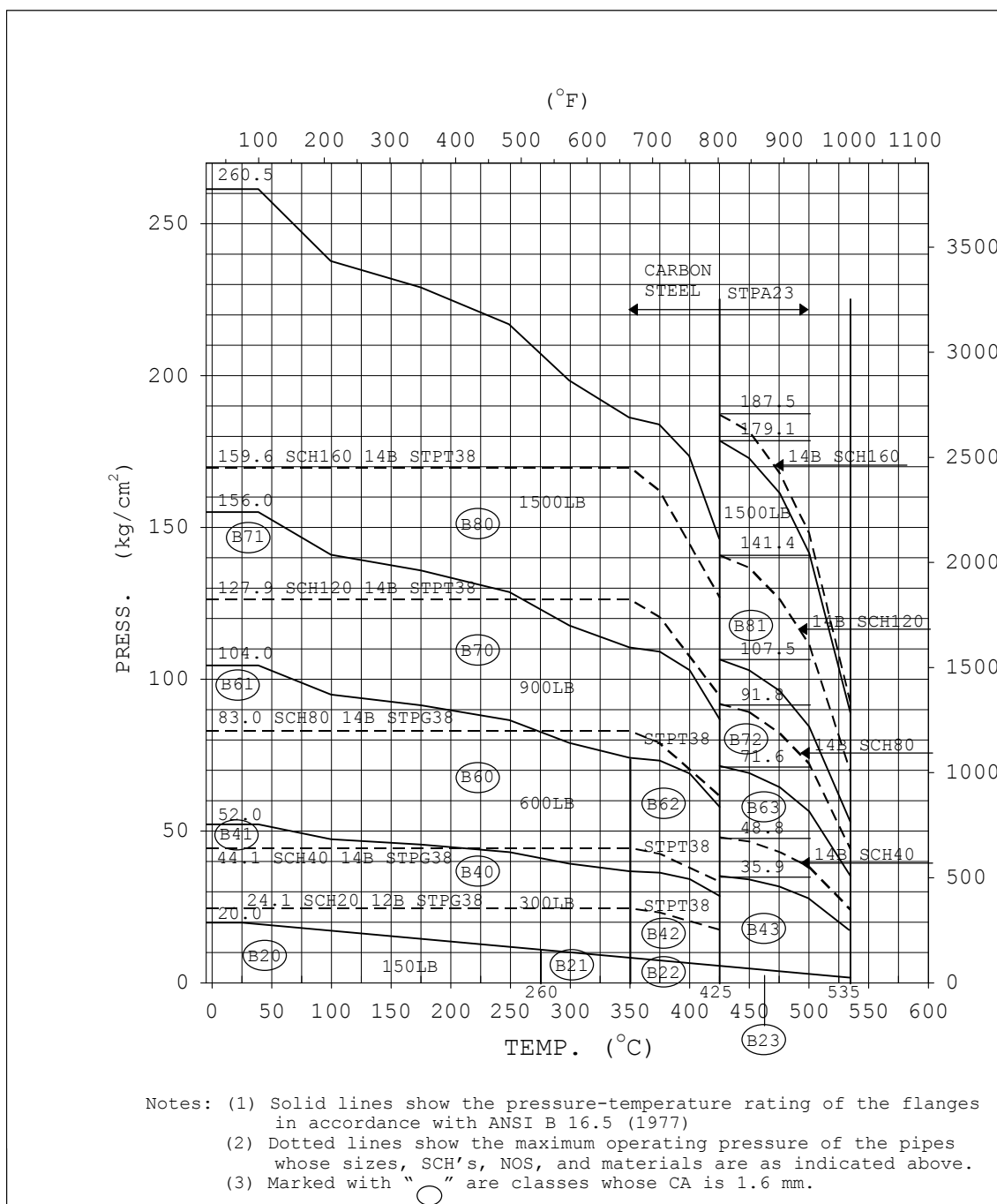


Fig. 3-6-2. Selection Chart No. 1 (ASTM)

SERVICE UTILITY

MATERIALS ASTM A53GrA, A106GrA, A335GrP11

MATERIAL GROUP 1.1, 1.9

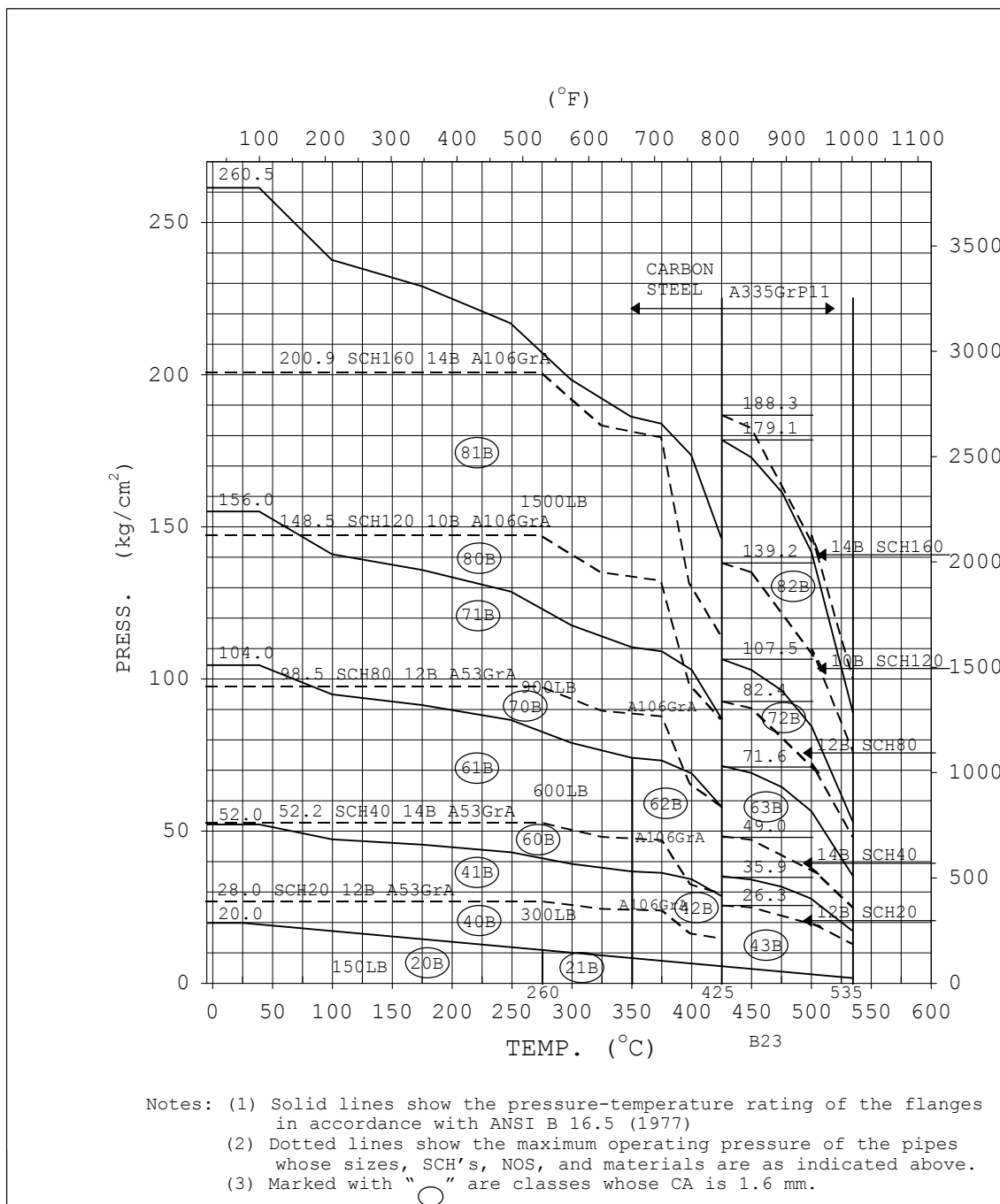


Fig. 3-7-1. Selection Chart No. 2 (JIS)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPG38, STPT38, STPA23

MATERIAL GROUP 1.1, 1.9

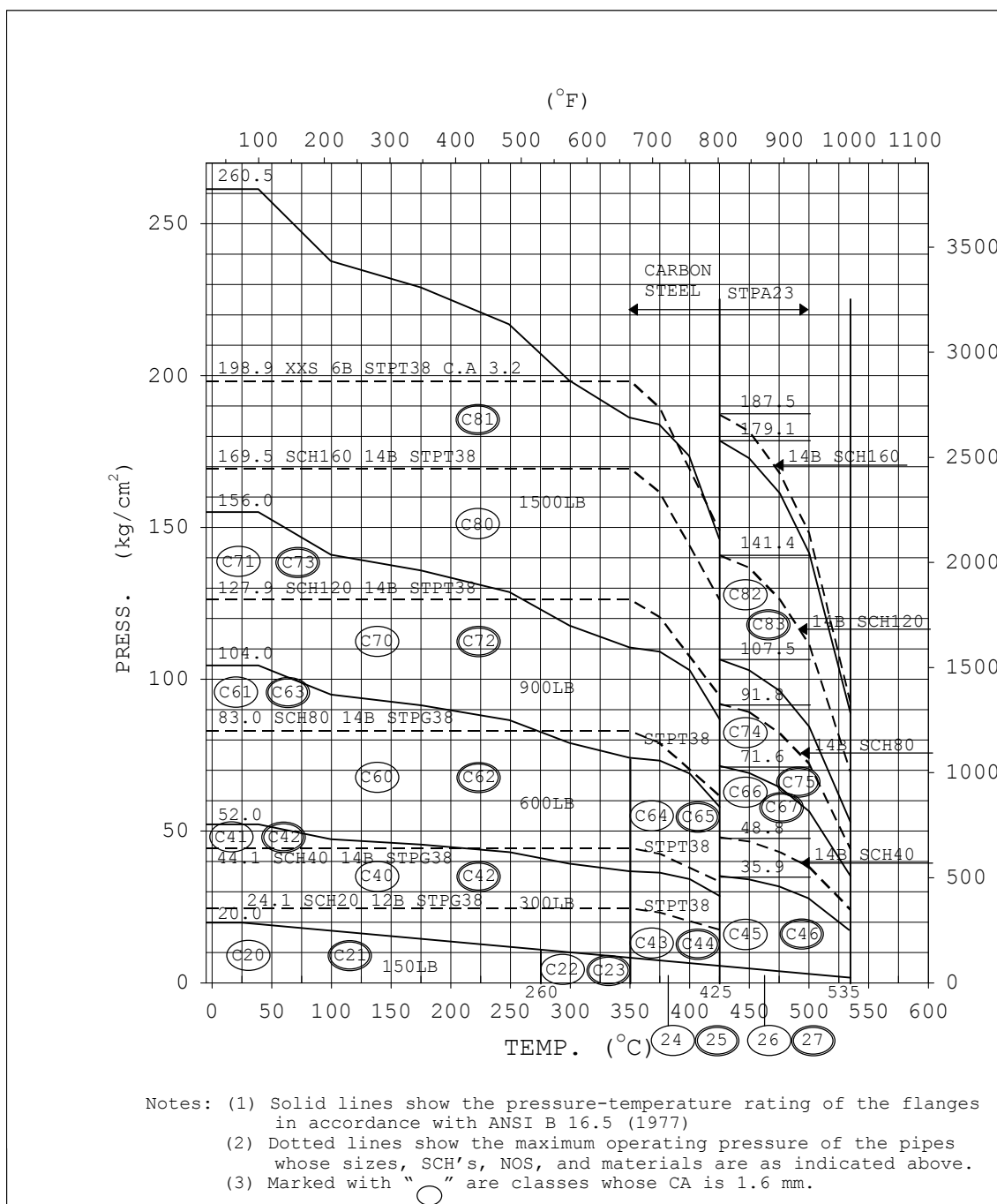


Fig. 3-7-2. Selection Chart No. 2 (ASTM)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPG38, STPT38, STPA23

MATERIAL GROUP 1.1, 1.9

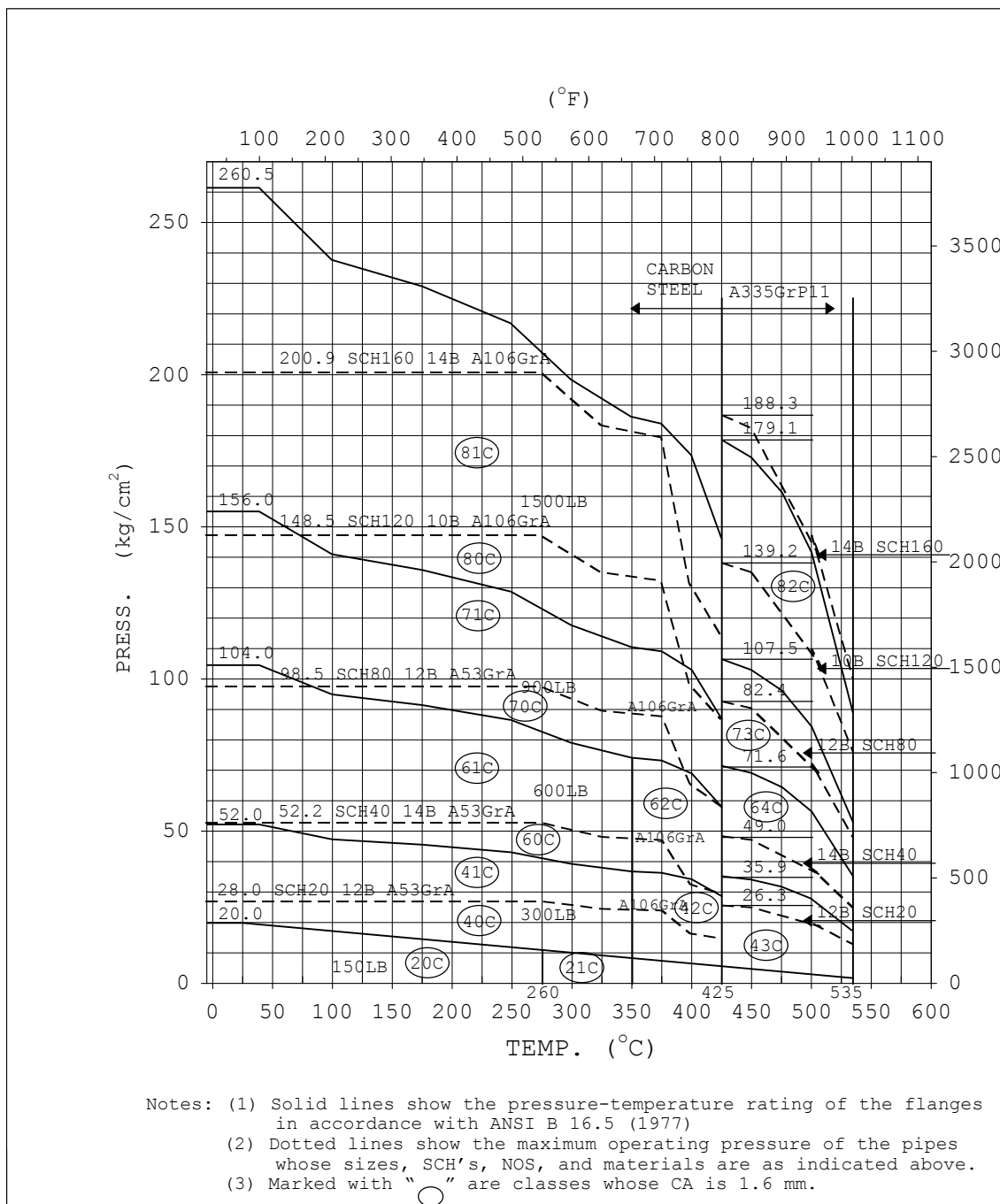


Fig. 3-8-1. Selection Chart No. 3-1 (JIS)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPG38, STPT38

MATERIAL GROUP 1.1

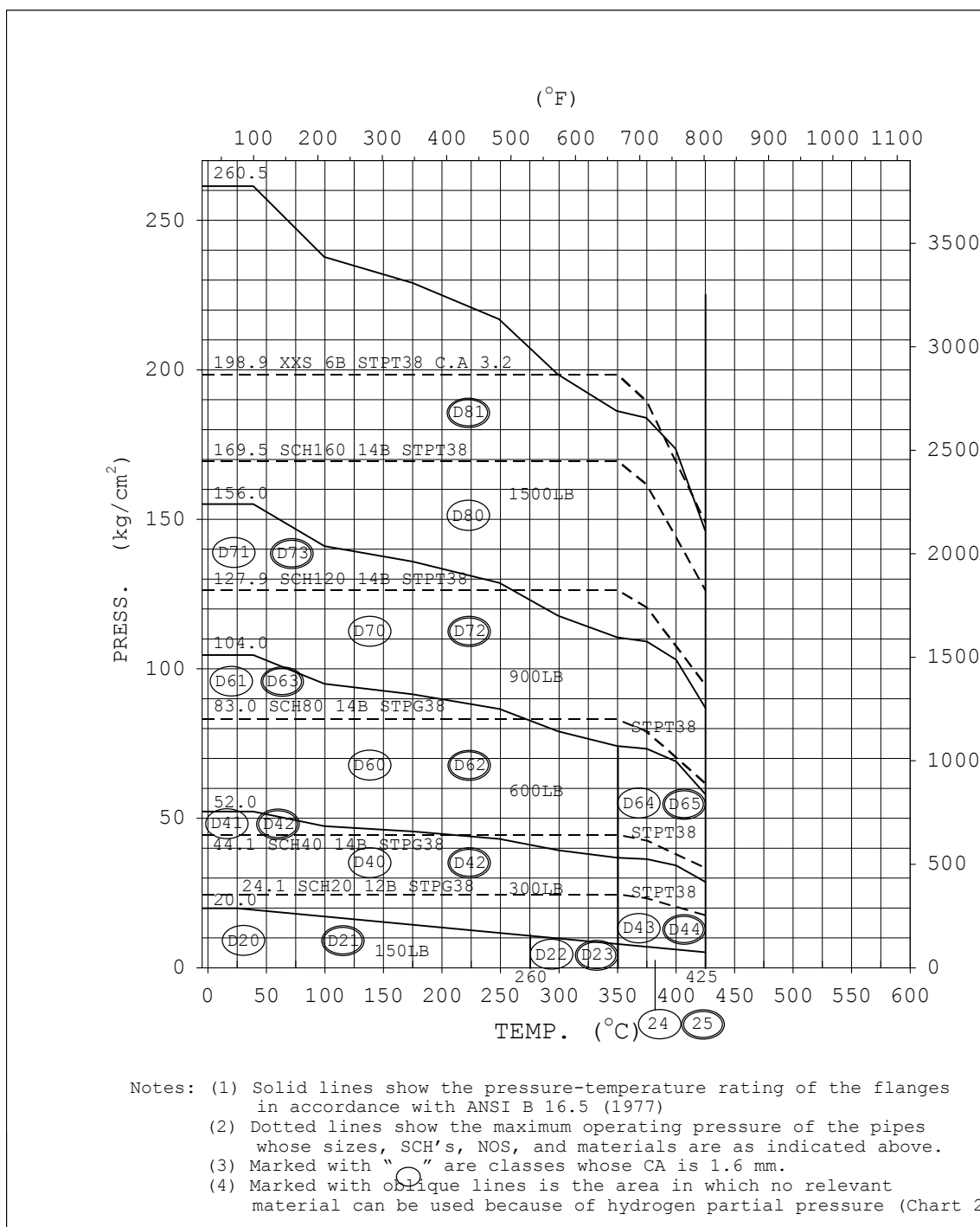


Fig. 3-8-2. Selection Chart No. 3-1 (ASTM)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS A53GrA, A106GrA

MATERIAL GROUP 1.1

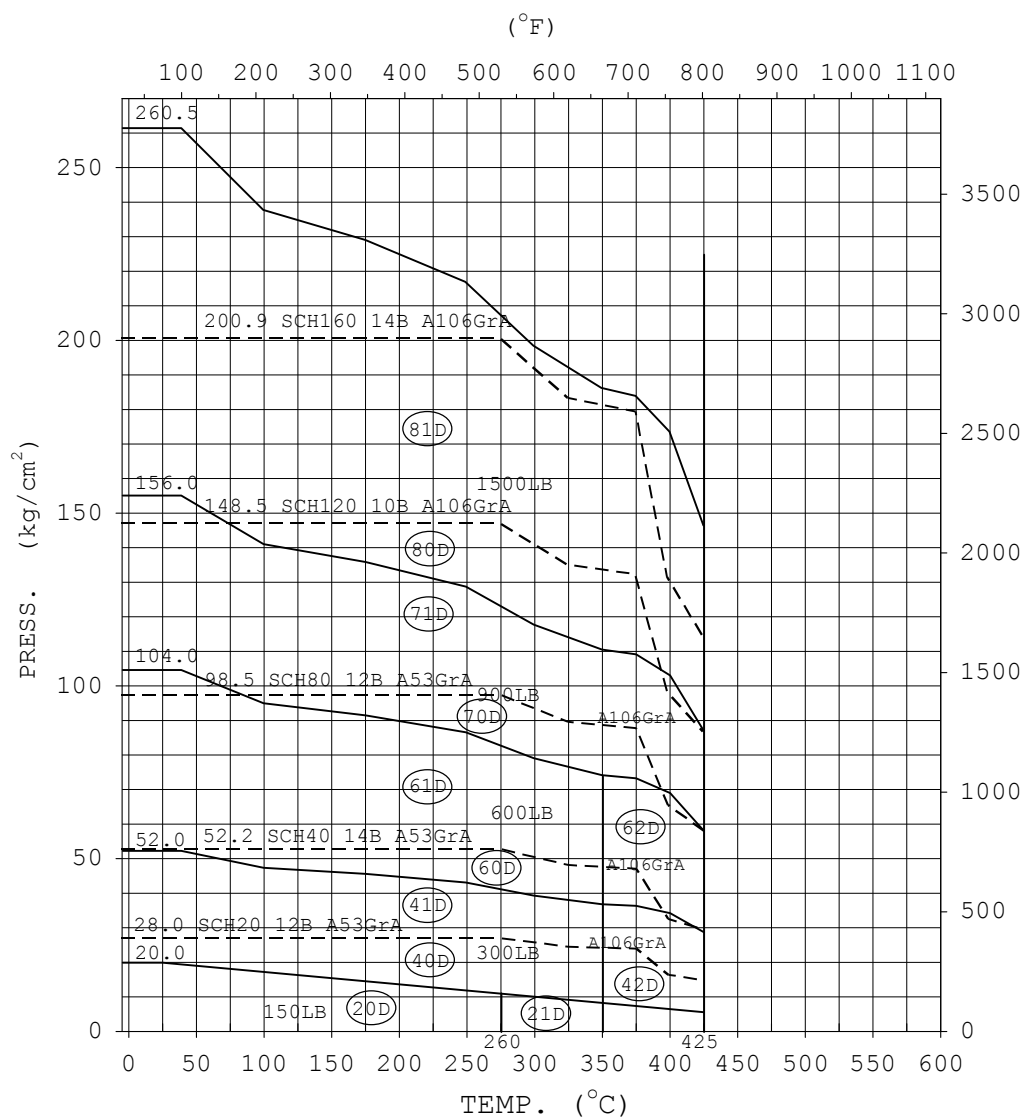


Fig. 3-9-1. Selection Chart No. 3-2 (JIS)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPA12(C-1/2Mo)

MATERIAL GROUP 1.5

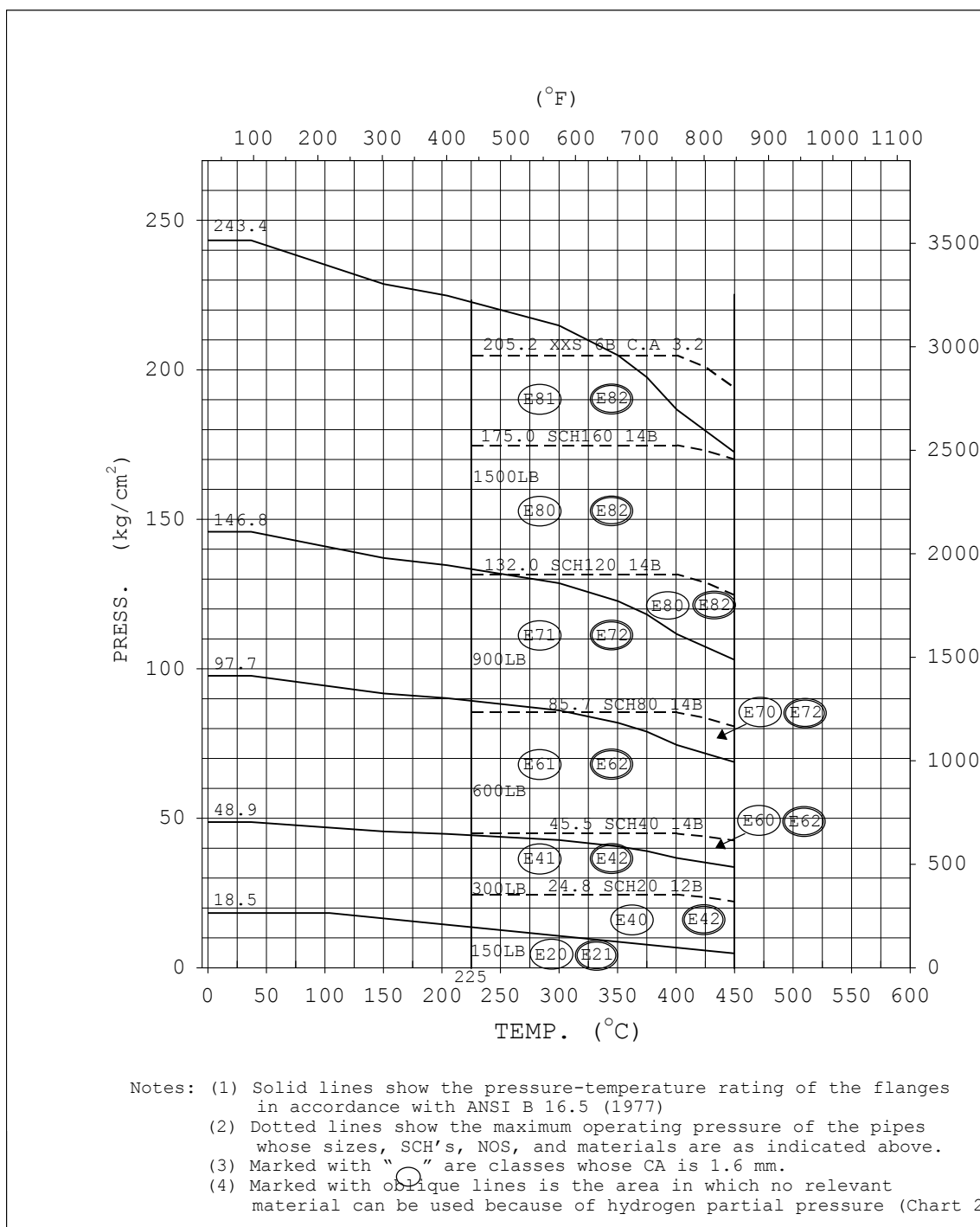
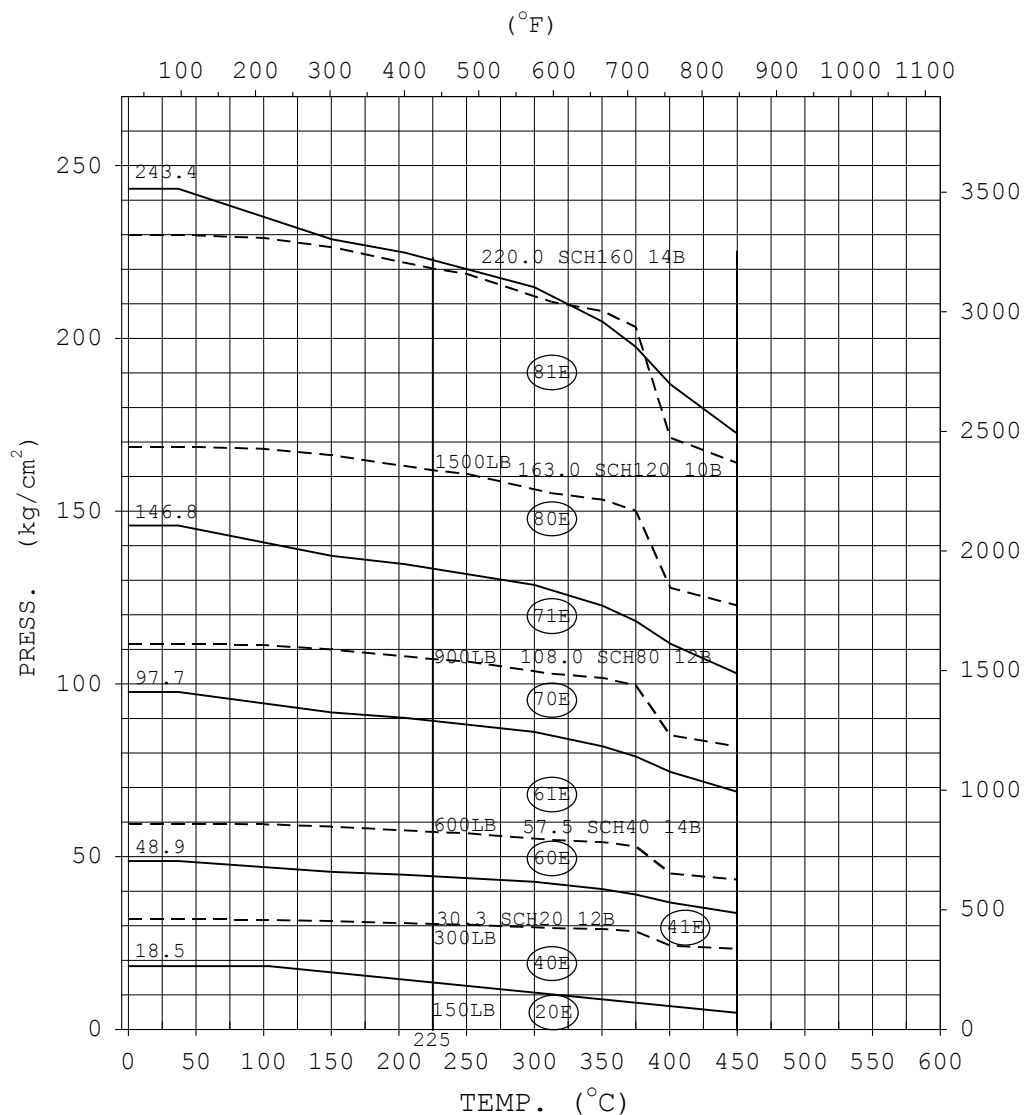


Fig. 3-9-2. Selection Chart No. 3-2 (ASTM)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS A335GrP1

MATERIAL GROUP 1.5



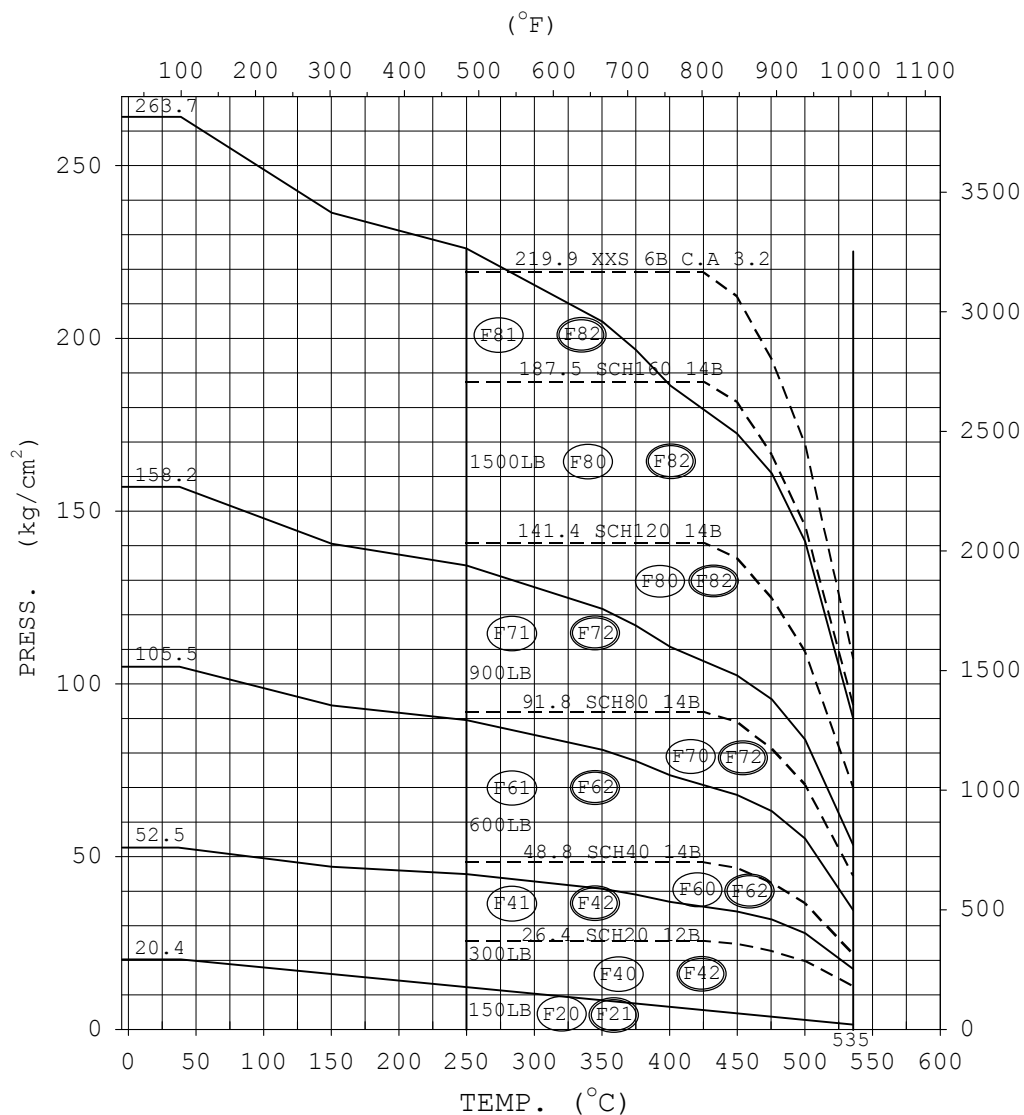
- Notes:
- (1) Solid lines show the pressure-temperature rating of the flanges in accordance with ANSI B 16.5 (1977)
 - (2) Dotted lines show the maximum operating pressure of the pipes whose sizes, SCH's, NOS, and materials are as indicated above.
 - (3) Marked with "○" are classes whose CA is 1.6 mm.
 - (4) Marked with oblique lines is the area in which no relevant material can be used because of hydrogen partial pressure (Chart 2)

Fig. 3-10-1. Selection Chart No. 3-3 (JIS)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPA23C1 (1 1/4Cr-1/2Mo)

MATERIAL GROUP 1.9



- Notes:
- (1) Solid lines show the pressure-temperature rating of the flanges in accordance with ANSI B 16.5 (1977)
 - (2) Dotted lines show the maximum operating pressure of the pipes whose sizes, SCH's, NOS, and materials are as indicated above.
 - (3) Marked with "○" are classes whose CA is 1.6 mm.
 - (4) Marked with oblique lines is the area in which no relevant material can be used because of hydrogen partial pressure (Chart 2)

Fig. 3-10-2. Selection Chart No. 3-3 (ASTM)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS ASTM A335GrP11

MATERIAL GROUP 1.9

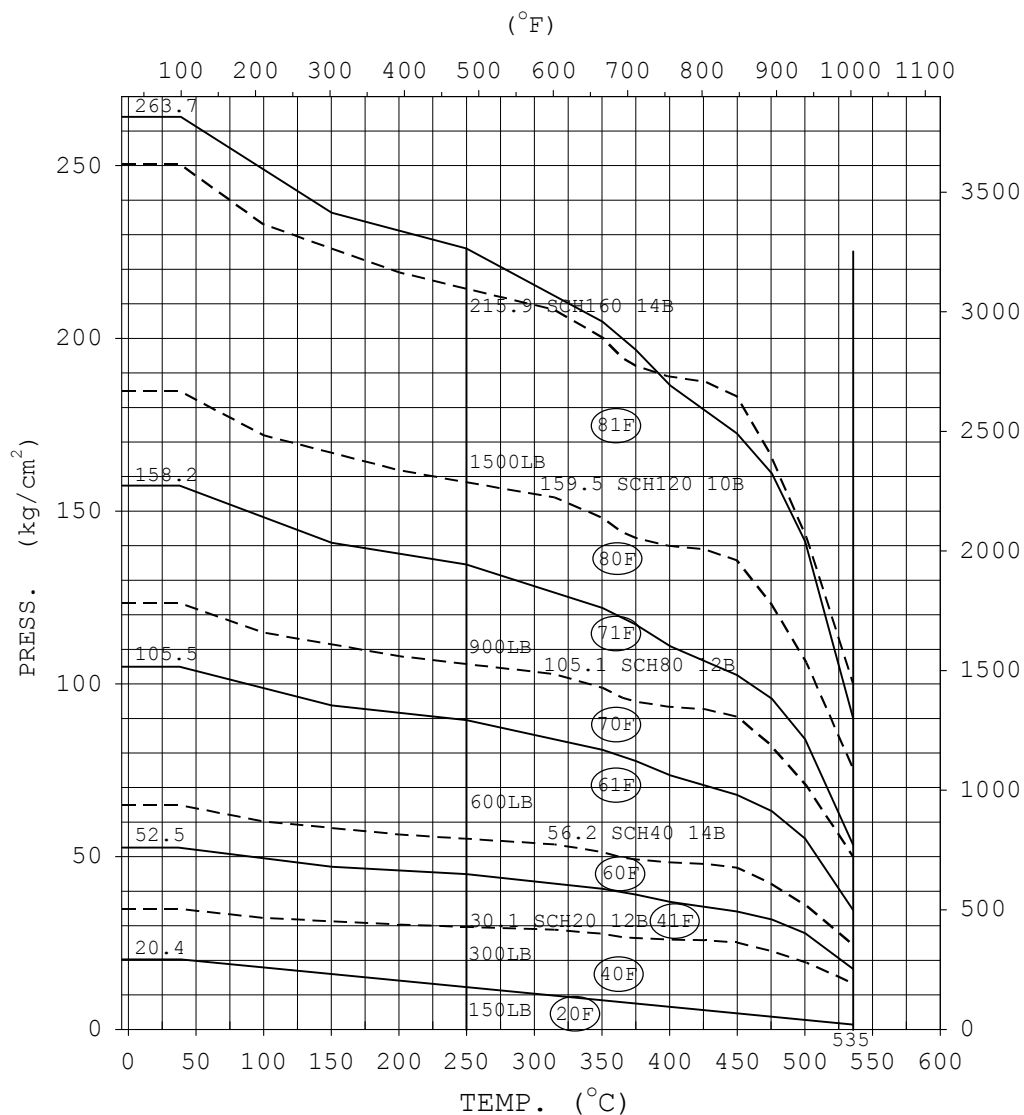
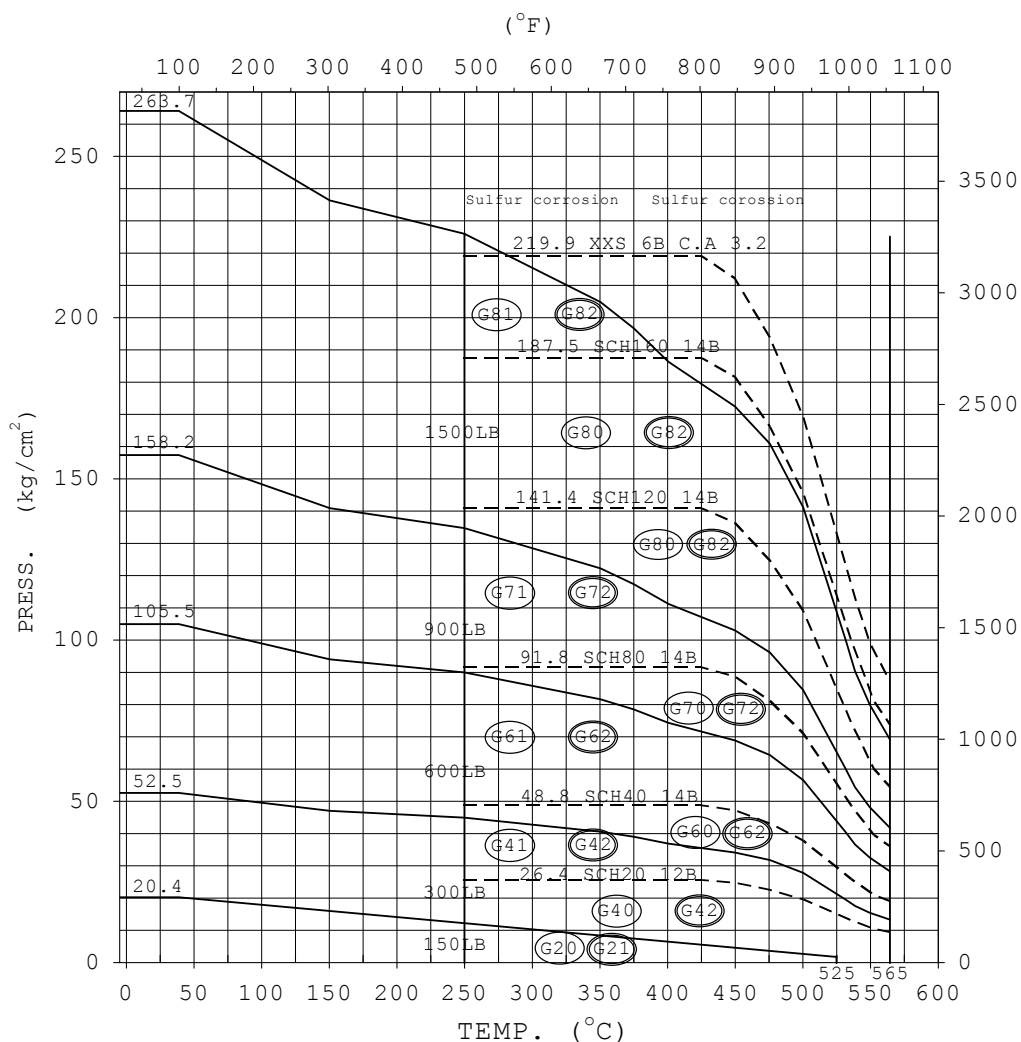


Fig. 3-11-1. Selection Chart No. 3-4 (JIS)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPA (2 1/4Cr-Mo)

MATERIAL GROUP 1.10



- Notes:
- (1) Solid lines show the pressure-temperature rating of the flanges in accordance with ANSI B 16.5 (1977)
 - (2) Dotted lines show the maximum operating pressure of the pipes whose sizes, SCH's, NOS, and materials are as indicated above.
 - (3) Marked with "○" are classes whose CA is 1.6 mm.
 - (4) Shaded portion is the area in which the fluid is of the hydrocarbon type and the relevant materials can be used in proper conditions taking account of the effect of hydrogen partial pressure
 - (5) Marked with oblique lines is the area in which the relevant materials can be used with CA = 1.6 taking account of the effect of sulfur. At temperature exceeding that corresponding to this area, CA is 3.2

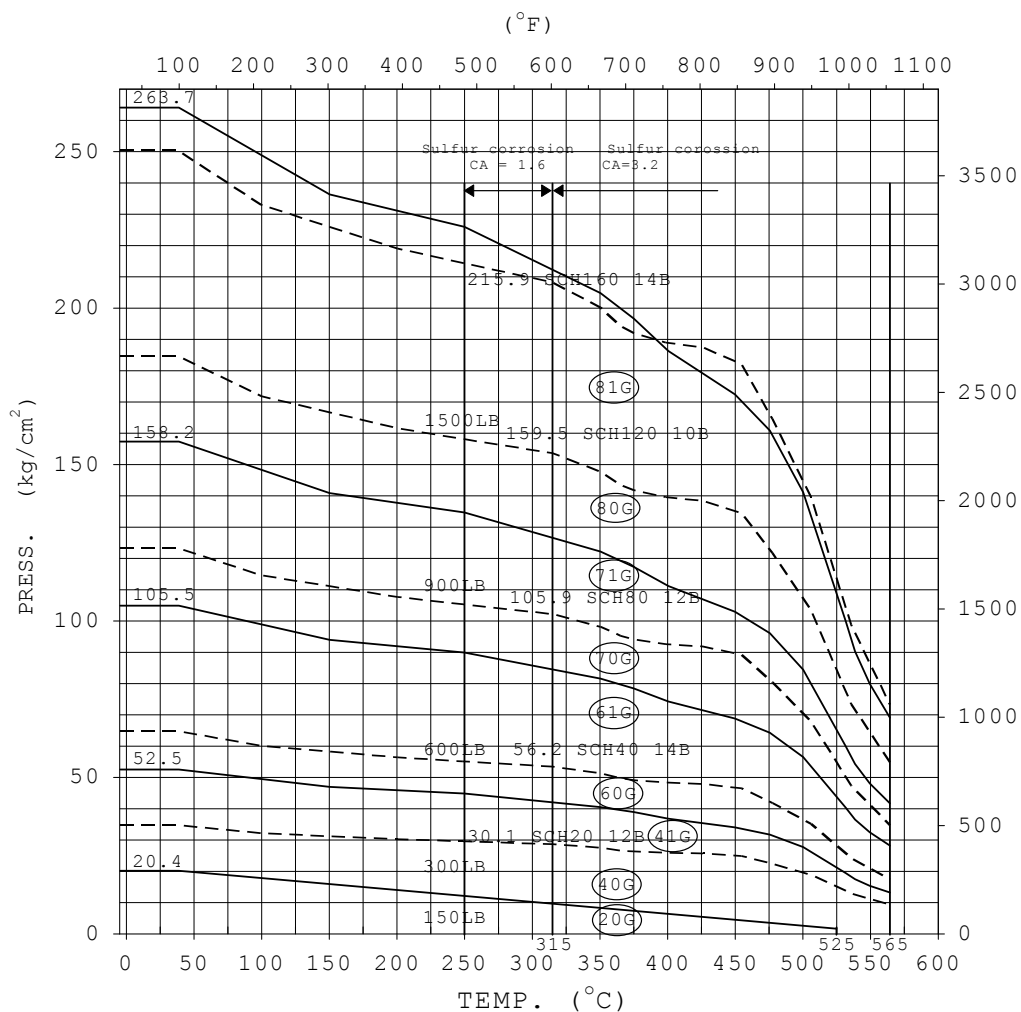
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Fig. 3-11-2. Selection Chart No. 3-4 (ASTM)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS A335GrP22

MATERIAL GROUP 1.10



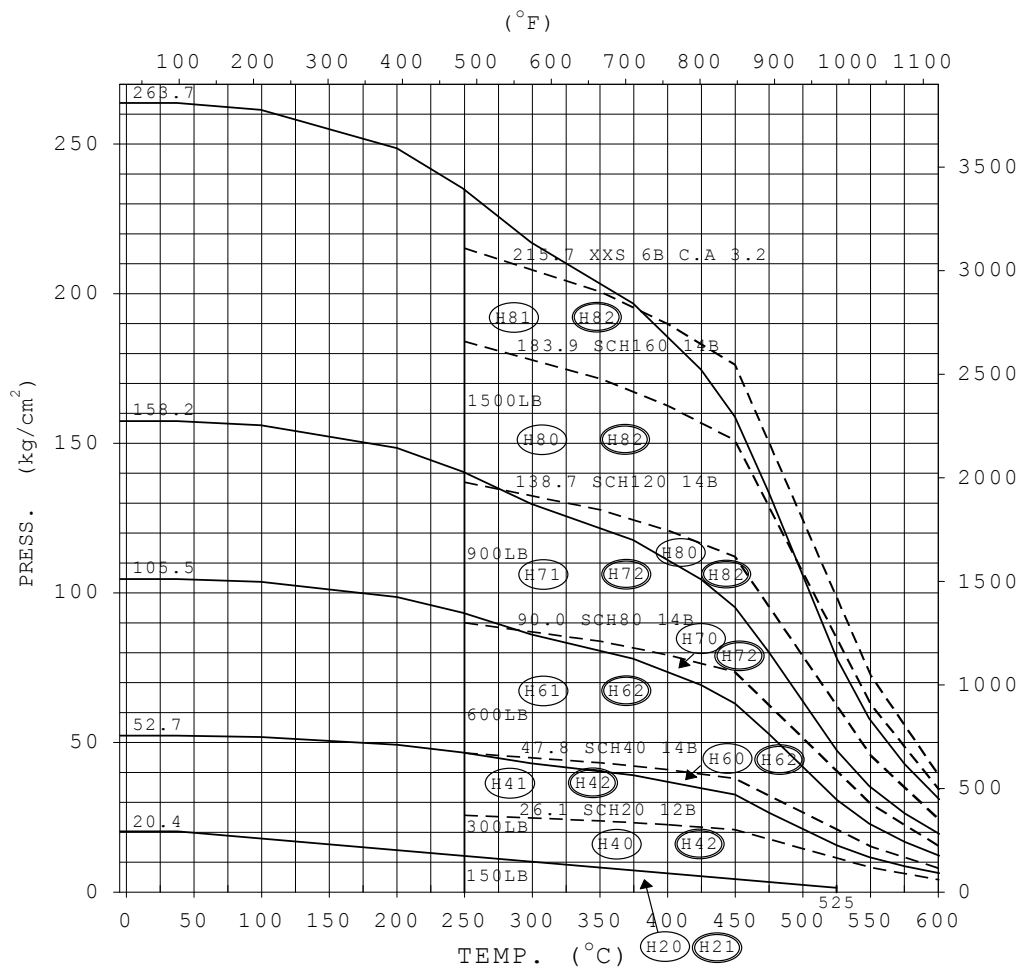
- Notes: (1) Solid lines show the pressure-temperature rating of the flanges in accordance with ANSI B 16.5 (1977)
- (2) Dotted lines show the maximum operating pressure of the pipes whose sizes, SCH's, NOS, and materials are as indicated above.
- (3) Marked with "O" are classes whose CA is 1.6 mm.
- (4) Shaded portion is the area in which the fluid is of the hydrocarbon type and the relevant materials can be used in proper conditions taking account of the effect of hydrogen partial pressure
- (5) Marked with oblique lines is the area in which the relevant materials can be used with CA = 1.6 taking account of the effect of sulfur. At temperature exceeding that corresponding to this area, CA is 3.2

Fig. 3-12-1. Selection Chart No. 3-5 (JIS)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS STPA25 (5Cr-1/2Mo)

MATERIAL GROUP 1.13



- Notes:
- (1) Solid lines show the pressure-temperature rating of the flanges in accordance with ANSI B 16.5 (1977)
 - (2) Dotted lines show the maximum operating pressure of the pipes whose sizes, SCH's, NOS, and materials are as indicated above.
 - (3) Marked with "○" are classes whose CA is 1.6 mm.
 - (4) Marked with oblique lines is the area in which no relevant materials can be used because of hydrogen partial pressure (Chart 2)

Fig. 3-12-2. Selection Chart No. 3-5 (ASTM)

SERVICE HYDRO-CARBON (where 100ppm or less of H_2 or H_2S is contained)

MATERIALS ASTM A335GrP5

MATERIAL GROUP 1.13

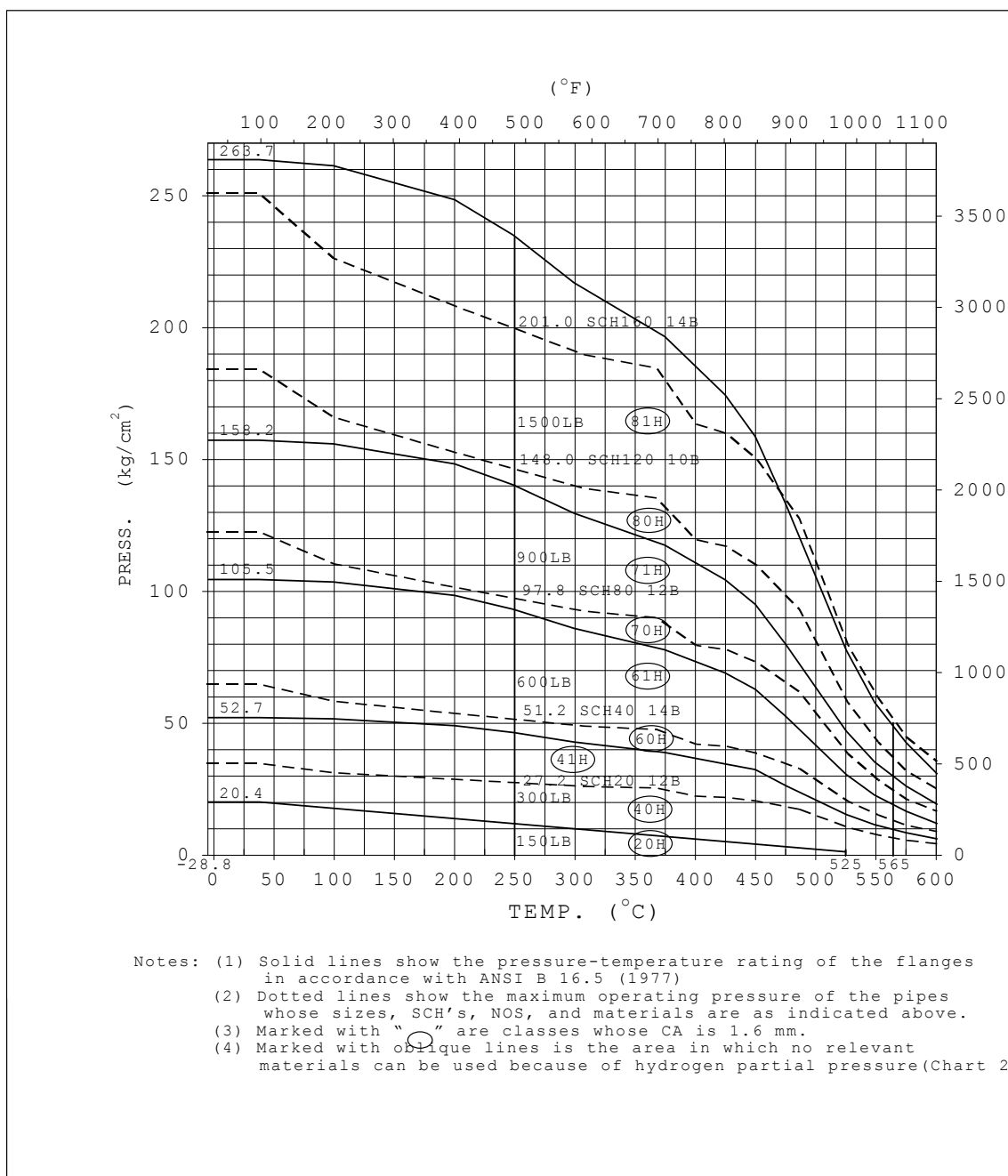
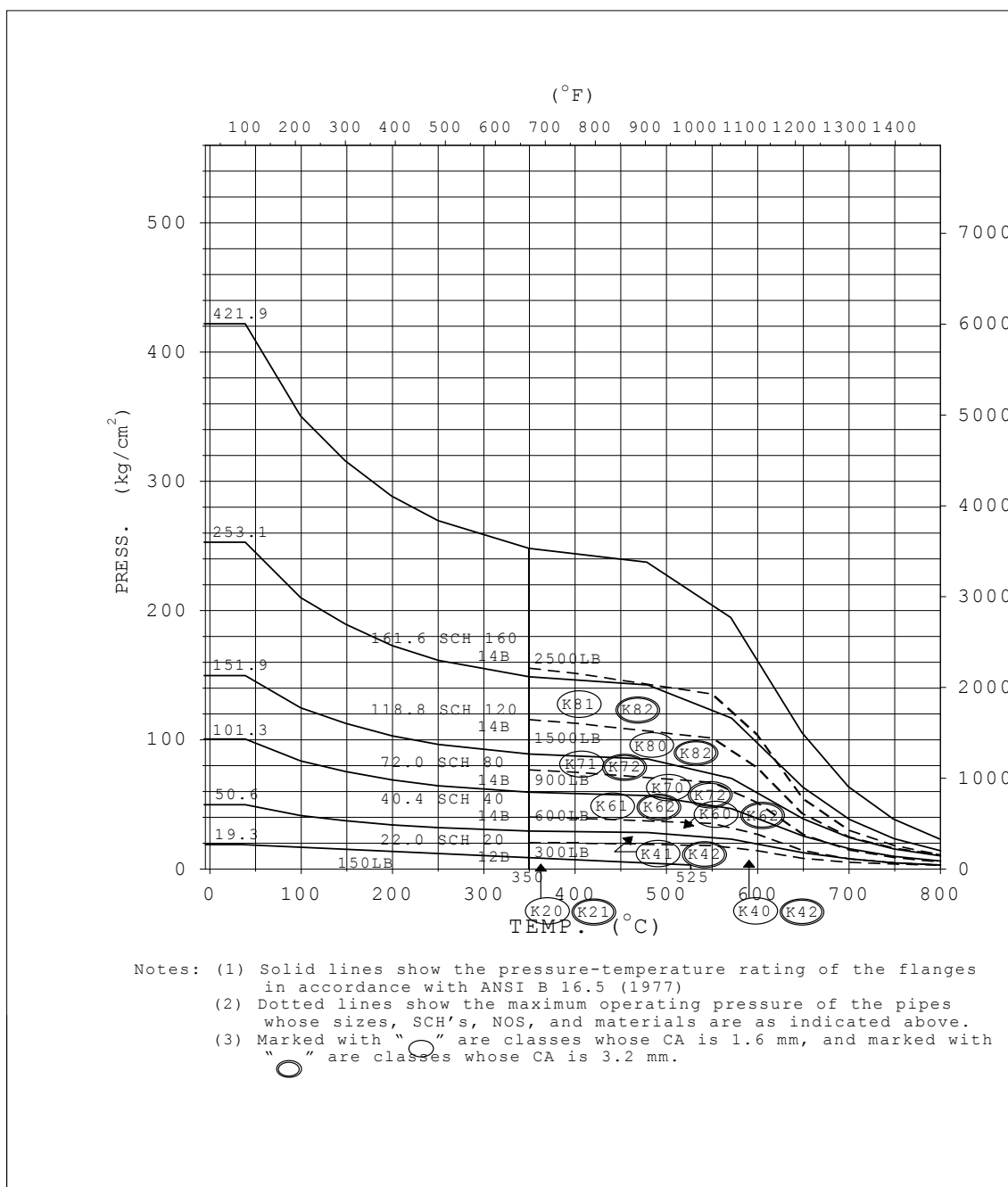


Fig. 3-13-1. Selection Chart No. 3-6 (JIS)

SERVICE HYDRO-CARBON
MATERIALS SUS321
MATERIAL GROUP 2.4



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Fig. 3-13-2. Selection Chart No. 3-6 (ASTM)

SERVICE HYDRO-CARBON
MATERIALS ASTM A312TP321
MATERIAL GROUP 2.4

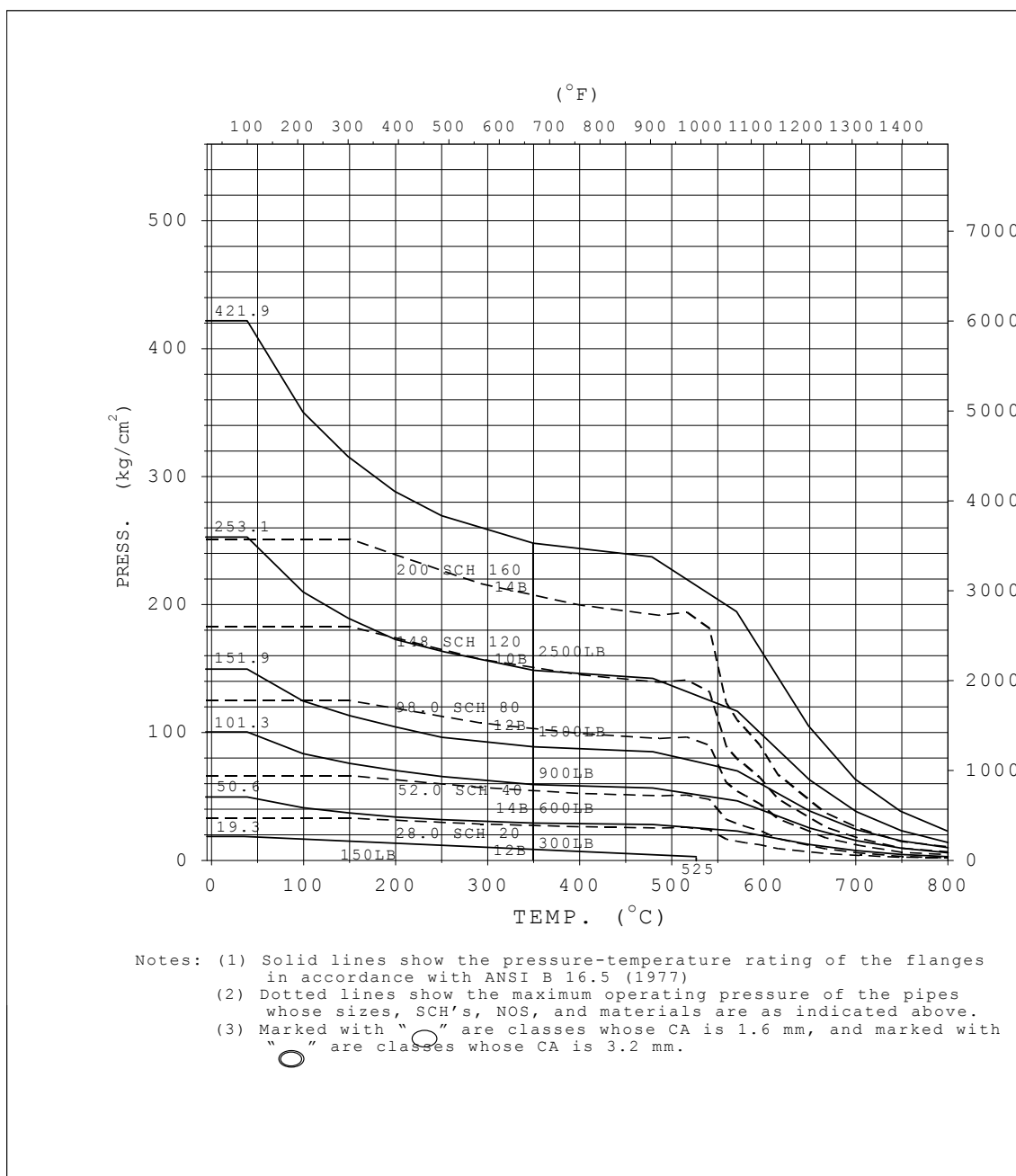
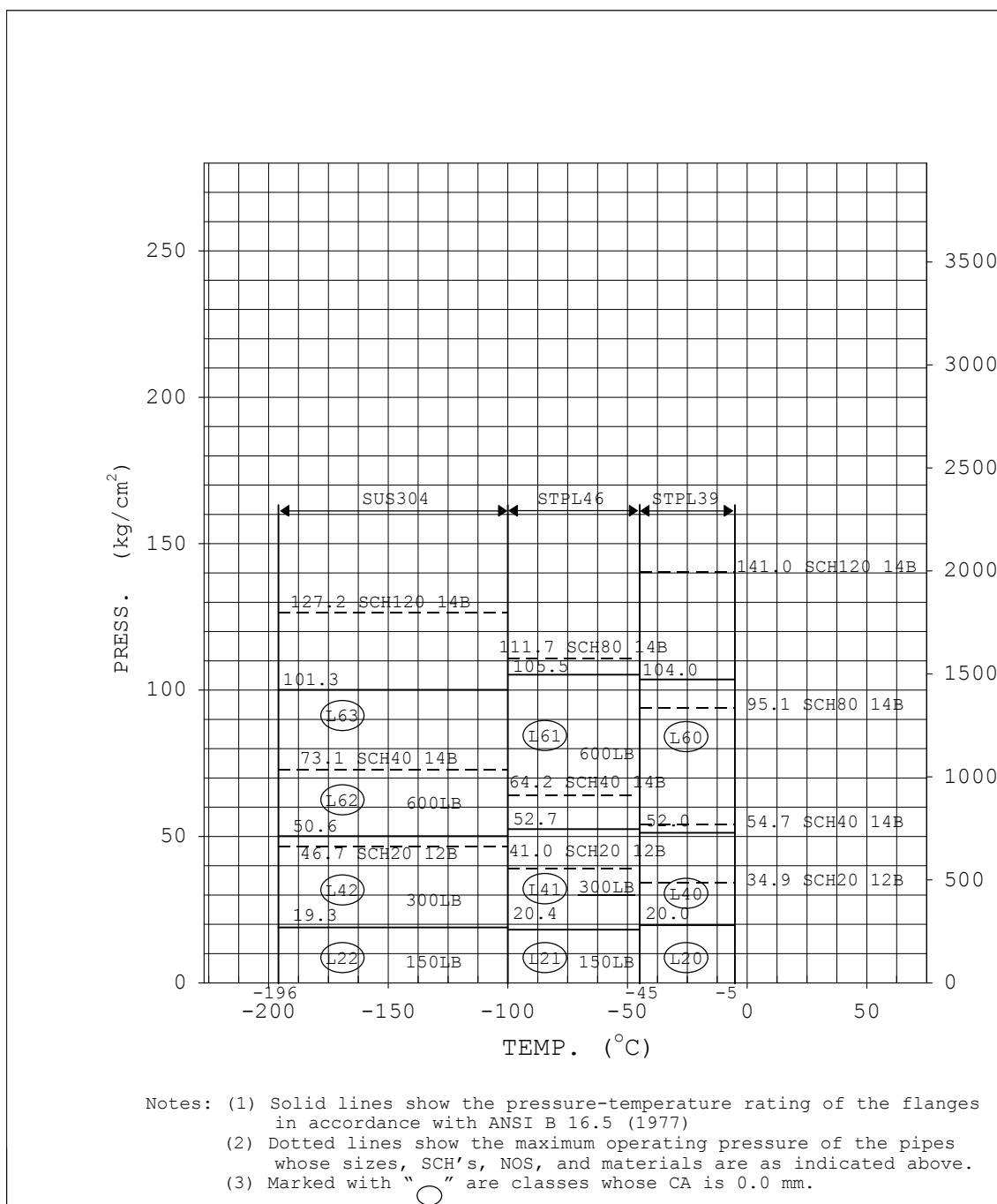


Fig. 3-14-1. Selection Chart No. 4 (JIS)

SERVICE LOW TEMPERATURE
MATERIALS SUS304, STPL46, STPL39



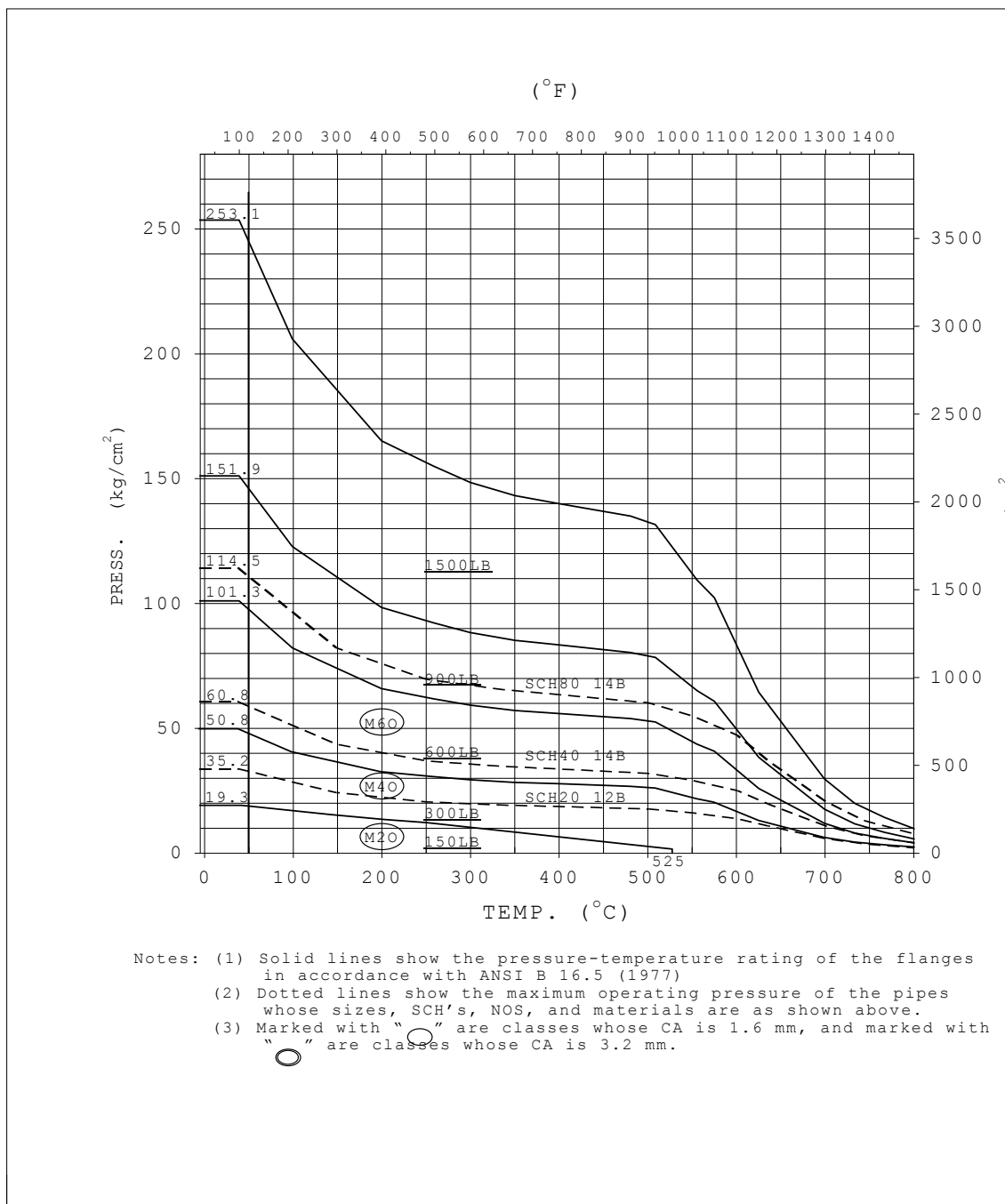
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Fig. 3-15-1. Selection Chart No. 5-1 (JIS)

SERVICE NaOH OR KOH

MATERIALS SUS 304

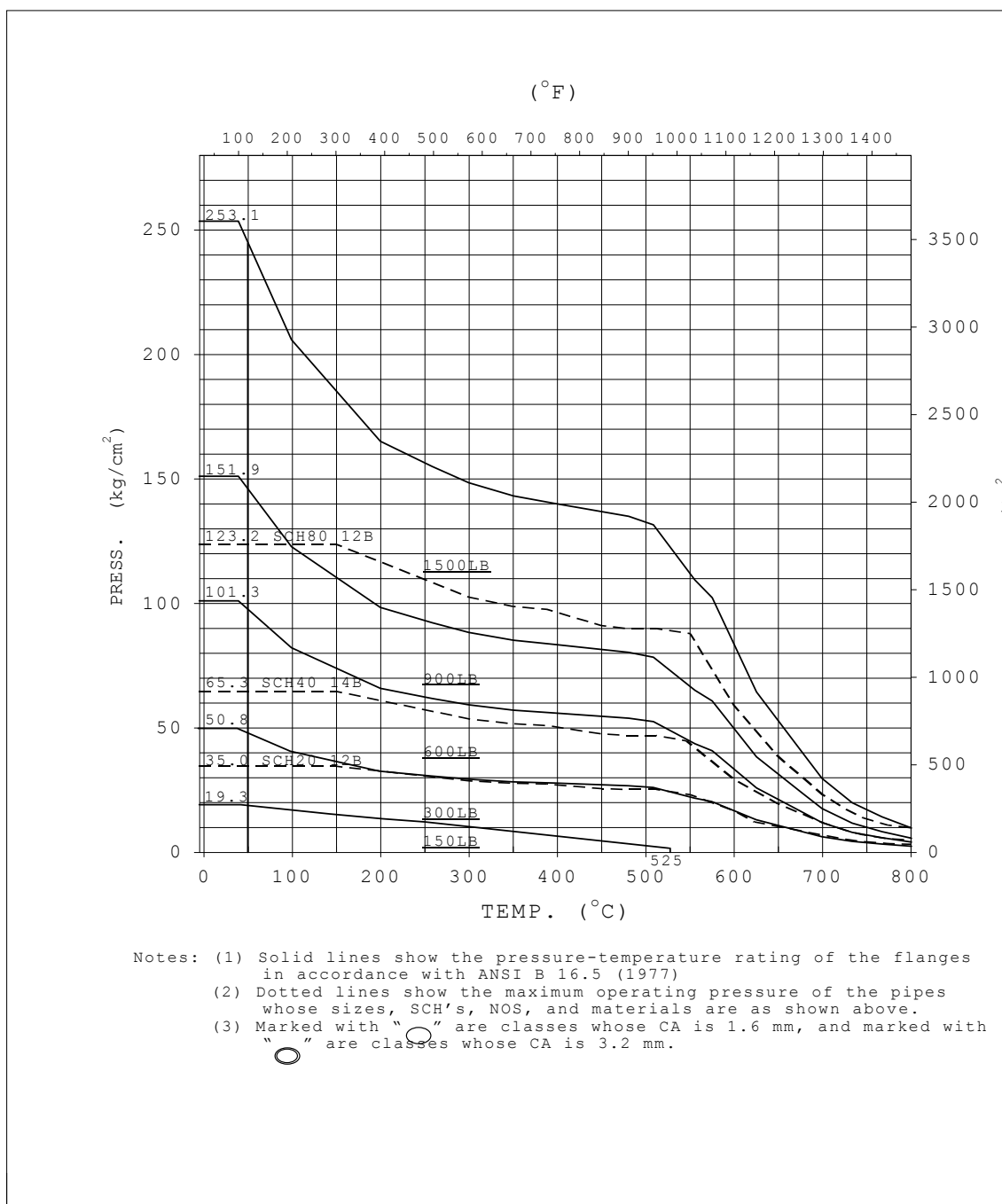
MATERIAL GROUP 2.1



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Fig. 3-15-2. Selection Chart No. 5-1 (ASTM)

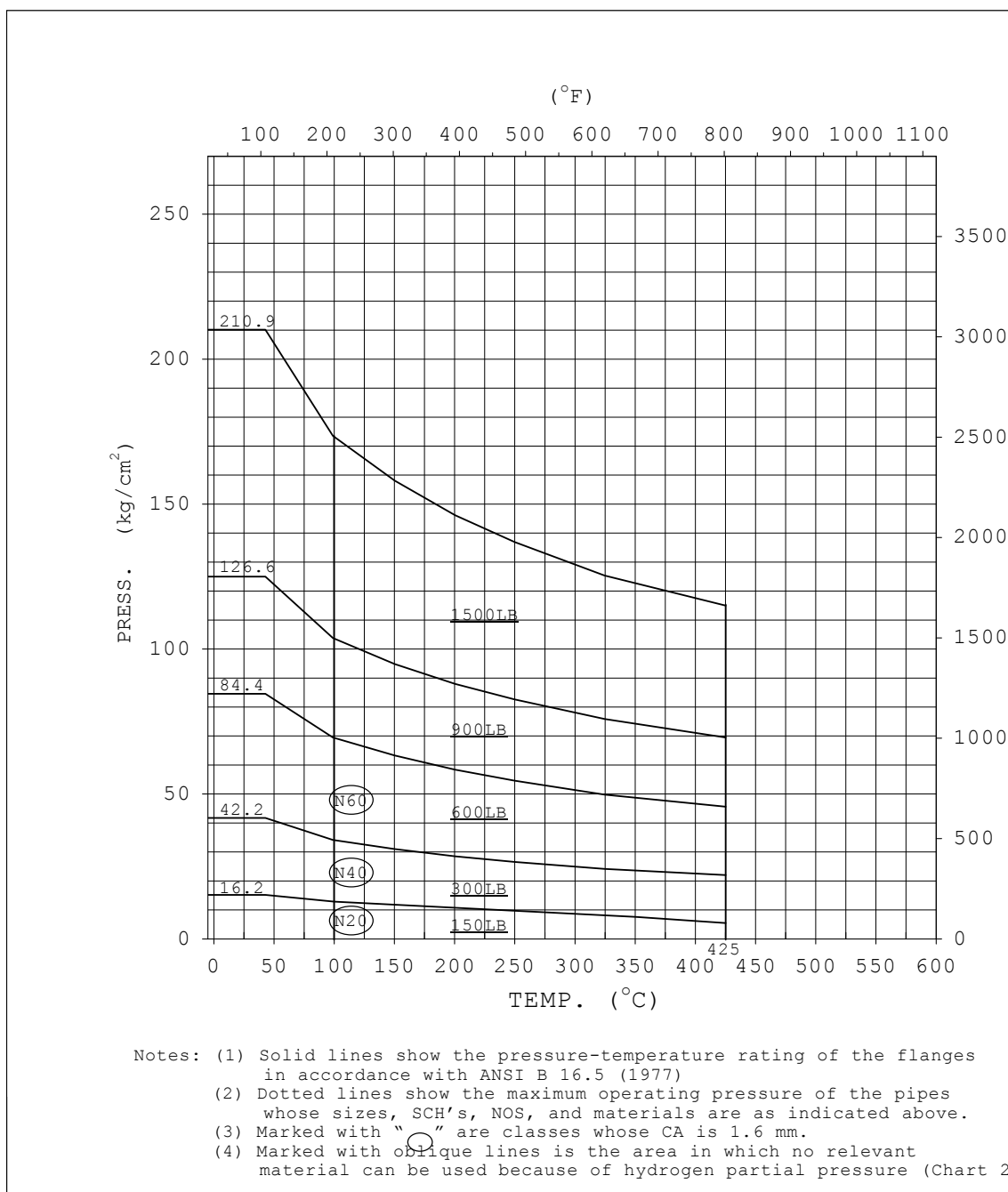
SERVICE
MATERIALS ASTM A312 TP304
MATERIAL GROUP 2.1



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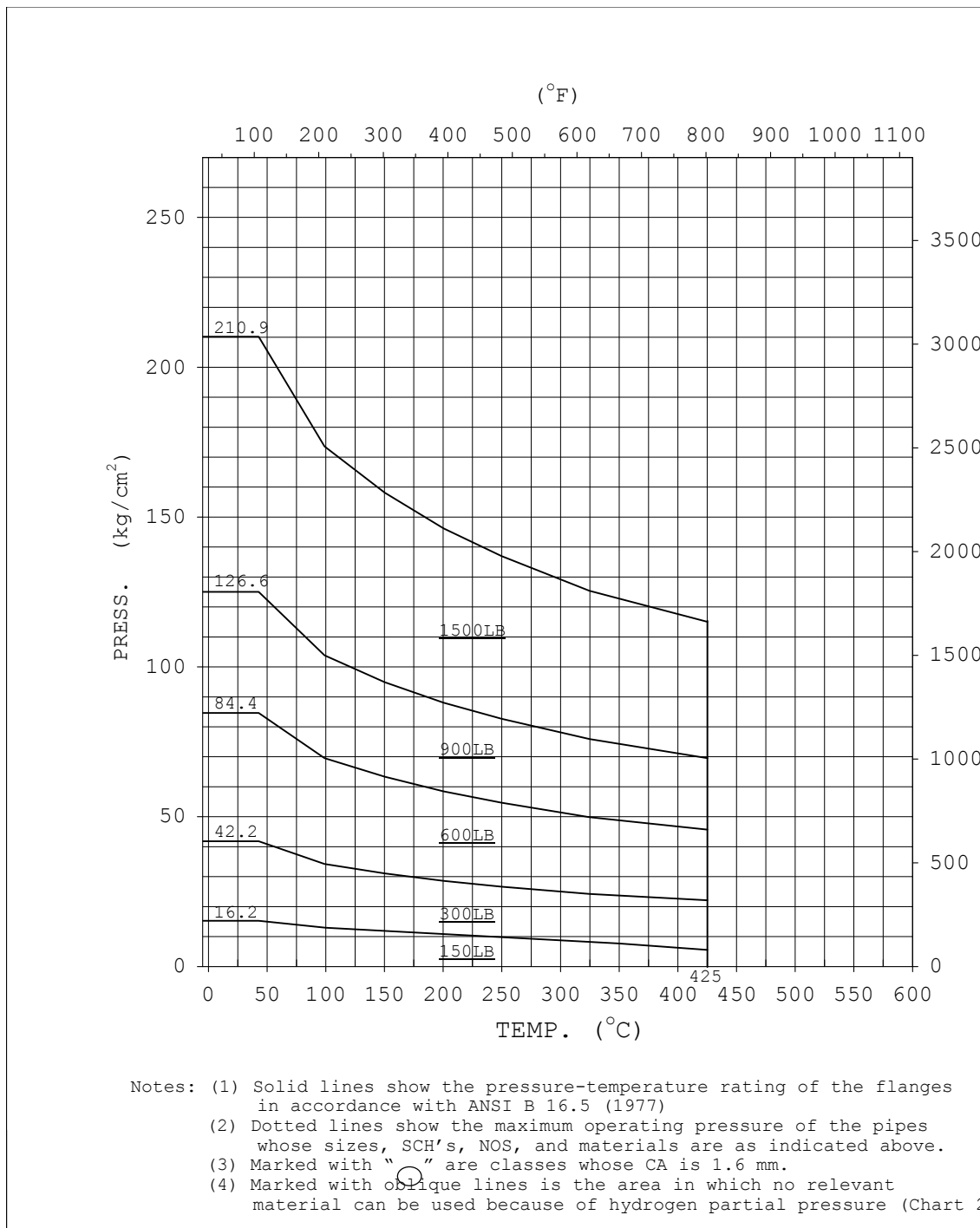
Fig. 3-16-1. Selection Chart No. 5-2 (JIS)

SERVICE NaOH OR KOH
MATERIALS SUS304L
MATERIAL GROUP 2.3



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Fig. 3-16-2. Selection Chart No. 5-2 (ASTM)



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8. 작 성 내 력

개정번호	개 정 일 자	개정 페이지	개 정 사 유
0	98.04.17	전 페이지	신규 제정 - 작성부서 : 공정팀 - 작성자 : 한성현 김인수 - 검토자 : 이봉일 조석범 노재철 - 승인자 : 오성국
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