



GS 142-7

SUPPLY OF GASKETS AND JOINT RINGS FOR BOLTED FLANGED JOINTS

September 1992

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BP GROUP RECOMMENDED PRACTICES AND SPECIFICATIONS FOR ENGINEERING											
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Document Title SUPPLY OF GASKETS AND JOINT RINGS FOR BOLTED FLANGED JOINTS (Replaces BP Engineering Standard 173)											
APPLICABILITY Regional Applicability: International Business Applicability: All Businesses											
SCOPE AND PURPOSE This document provides information and a data sheet to facilitate placing enquiries and purchase orders for gaskets and joint rings for bolted flanged joints. Section 5 refers to British Standards <i>Appendix C provides guidance on selection</i>											
AMENDMENTS <table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">Amd</td> <td style="width: 25%;">Date</td> <td style="width: 25%;">Page(s)</td> <td style="width: 35%;">Description</td> </tr> <tr> <td colspan="4"> </td> </tr> </table>				Amd	Date	Page(s)	Description				
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CONTENTS

Section	Page
FOREWORD	iii
1. GENERAL.....	1
1.1 Scope.....	1
1.2 Data Sheet	1
1.3 Health, Safety and Environmental Requirements.....	1
1.4 Quality System.....	1
2. NON METALLIC FLAT GASKETS.....	1
3. METALLIC AND SEMI METALLIC GASKETS AND JOINT RINGS	2
3.1 Metal Jacketed Gaskets	2
3.2 Spiral Wound Gaskets.....	2
4. SOLID METAL JOINT RINGS.....	2
5. REGIONAL ANNEXES	2
5.1 United Kingdom.....	2
5.1.1 CAF Flat Gaskets.....	2
5.1.2 Spiral Wound Gaskets.....	3
DATA SHEET.....	4
APPENDIX A.....	5
DEFINITIONS AND ABBREVIATIONS	5
APPENDIX B.....	6
LIST OF REFERENCED DOCUMENTS	6
APPENDIX C.....	7
SUPPLEMENTARY COMMENTARY	7
C1 Bolted Flanged Joints.....	7
C2 Guidance on Selection of Joint Type and Materials.....	7
C3 General Comments on Asbestos Usage.....	7
C4 Non-Metallic Flat Gaskets.....	9
C5 Spiral Wound and Metal Jacketed Gaskets	12
C5.1 Spiral Wound (SW) Gaskets.....	12
C6 Solid Metal Joint Rings	15
APPENDIX D.....	17
EXAMPLE DATA SHEETS	17



FOREWORD

Introduction to BP Group Recommended Practices and Specifications for Engineering

The Introductory Volume contains a series of documents that provide an introduction to the BP Group Recommended Practices and Specifications for Engineering (RPSEs). In particular, the 'General Foreword' sets out the philosophy of the RPSEs. Other documents in the Introductory volume provide general guidance on using the RPSEs and background information to Engineering Standards in BP. There are also recommendations for specific definitions and requirements.

Value of this Guidance for Specification

This document sets out information required for the selection and purchase of gaskets and joint rings for bolted flanged joints for use in existing facilities or for new projects and is applicable to onshore or offshore requirements.

Application

This Guidance for Specification is intended as a basis for a purchaser to create a fit-for-purpose specification.

Text in *italics* is Commentary. Commentary provides background information which supports the requirements of the Specification, and may discuss alternative options.

This document may refer to certain local, national or international regulations but the responsibility to ensure compliance with legislation and any other statutory requirements lies with the user. The user should adapt or supplement this document to ensure compliance for the specific application.

Specification Ready for Application

A Specification (BP Spec 142-7) is available which may be suitable for enquiry or purchasing without modification. It is derived from this BP Group Guidance for Specification by retaining the technical body unaltered but omitting all commentary, omitting the data page and inserting a modified Foreword.

Principal Changes from Previous Edition

This specification uses a 'zero-based' approach to define BP's essential requirements.



Feedback and Further Information

Users are invited to feed back any comments and to detail experiences in the application of BP RPSE's, to assist in the process of their continuous improvement.

For feedback and further information, please contact Standards Group, BP Engineering or the Custodian. See Quarterly Status List for contacts.



1. GENERAL

1.1 Scope

This Specification covers requirements for supply of gaskets and joint rings for use with bolted flanged joints, primarily in piping systems and for connections of piping to equipment.

Guidance on the selection and specification of joint type and materials is provided in Appendix C. Table C1 summarises suitable jointing for piping flanges for various services. This guidance is also generally applicable to non-standard bolted joints e.g. valve bonnets.

1.2 Data Sheet

The data sheet attached to this Specification covers joint requirements for purchase.

Examples of typical completed data sheets are given in Appendix D.

1.3 Health, Safety and Environmental Requirements

Legislative requirements, and BP Group or local guidelines regarding Health, Safety and the Environment may apply to gasket selection. See further commentary in Appendix C1.

1.3.1 Material safety data sheets shall be available for all jointing materials.

1.3.2 The supplier shall provide details of any necessary protective equipment to be used when handling jointing materials.

Any jointing containing Compressed Asbestos Fibre shall be suitably packaged and labelled both on the packaging and gasket materials 'Contains Asbestos'.

1.4 Quality System

Verification of the vendor's quality system is normally part of the pre-qualification procedure, and is therefore not specified in the core text of this Specification. If this is not the case, clauses should be inserted to require the vendor to operate and be prepared to demonstrate the quality system to the purchaser.

Further suggestions may be found in the BP Group RPSEs Introductory Volume.

2. NON METALLIC FLAT GASKETS

Non-metallic flat gaskets for flanges to [ANSI B16.5](#), [API 605](#), [MSS SP-44](#) and [ANSI B16.1](#) shall be to [ANSI B16.21](#).



Non-metallic flat gaskets for use with raised face flanges should be either self-centring within the flange bolts or full face type.

Gaskets with outside diameter matching the raised face of flanges should not be used.

Full face gaskets are recommended for raised face flanges smaller than 2 inch NB to avoid potential problems of incorrect size gaskets being fitted. For 2 inch NB and above self-centring gaskets should be used for raised face flanges.

Non-metallic flat gaskets for use with flat face flanges should be full face.

3. METALLIC AND SEMI METALLIC GASKETS AND JOINT RINGS

3.1 Metal Jacketed Gaskets

Metal jacketed gaskets for [ANSI B16.5](#), [API 605](#) and [MSS SP-44](#) flanges shall be of the double jacket type and shall comply with the requirements and dimensions of [API 601](#).

3.2 Spiral Wound Gaskets

Spiral wound gaskets for [ANSI B16.5](#), [API 605](#) and [MSS SP-44](#) flanges shall comply with the requirements and dimensions of [API 601](#).

4. SOLID METAL JOINT RINGS

4.1 Solid metal joint rings for wellhead equipment to [API 6A](#) shall comply with the requirements of [API 6A](#).

4.2 Solid metal joint rings for piping and pipeline flanges to [ANSI B16.5](#) and [MSS SP-44](#) shall comply with [ANSI B16.20](#).

4.3 When specified, Monel 400 joint rings shall have a maximum Brinell Hardness of 135, and be identified by the material symbol M400.

5. REGIONAL ANNEXES

This section supplements the foregoing international requirements, to assist with application in the particular regions identified.

5.1 United Kingdom

5.1.1 CAF Flat Gaskets

CAF gaskets for oil refinery and chemical plant use shall comply with [BS 1832](#)



CAF gaskets for aviation fuels, di-ester type synthetic lubrication oils and similar duties shall comply with [BS F125](#)

5.1.2 Spiral Wound Gaskets

Spiral wound gaskets to [BS 3381](#) may be used with flanges to [BS 1560](#).

SW gaskets to [BS 3381](#) are also suitable for use with flanges to [ANSI B16.5](#), [API 605](#) and [MSS SP-44](#).



DATA SHEET

Project:	Enq/Order No.	
Service:	Pressure Rating:	
Flange Std.	Design Temp.	
Gasket Std.	Gasket Type	
Material		
Flat Joints: Basic Material Graphited Jacket/Envelope		
Spiral Wound: Filler/Winding Centring Ring Inner Ring		
Metallic Joint Rings: Material Hardness		
Dimensions:		
Nominal Size Full Face Inside Bolts Ring No/Type (Oval or Oct) Thickness		
Additional Requirements:		
Data Sheet No.	Date	Rev



DEFINITIONS AND ABBREVIATIONS**Definitions**

Standardised definitions may be found in the BP Group RPSEs Introductory Volume.

Abbreviations

ANSI	American National Standards Institute
API	American Petroleum Institute
BS	British Standard
CAF	Compressed Asbestos Fibre
MSS	Manufacturers' Standardization Society (USA)
<i>NB</i>	<i>Nominal Bore (Pipe Size)</i>
<i>PTFE</i>	<i>Polytetrafluorethylene</i>
<i>RF</i>	<i>Raised Face</i>
<i>RTJ</i>	<i>Solid Metal Ring Joint</i>
<i>SW</i>	<i>Spiral Wound</i>



LIST OF REFERENCED DOCUMENTS

A reference invokes the latest published issue or amendment unless stated otherwise.

Referenced standards may be replaced by equivalent standards that are internationally or otherwise recognised provided that it can be shown to the satisfaction of the purchaser's professional engineer that they meet or exceed the requirements of the referenced standards.

American Documents

ANSI B16.5:	Steel Pipe Flanges and Flanged Fittings
ANSI B16.1:	Cast Iron Pipe Flanges and Flanged Fittings
ANSI B16.20:	Ring-Joint Gaskets and Grooves for Steel Pipe Flanges
ANSI B16.21:	Nonmetallic Flat Gaskets for Pipe Flanges
API 601:	Metallic Gaskets for Raised-Face Pipe Flanges and Flanged Connections.
API 605:	Large-Diameter Carbon Steel Flanges
API 6A:	Specification for Valves and Wellhead Equipment
MSS SP-44:	Manufacturers' Standardization Society - Steel Pipe Line Flanges

British Documents

BS 1560:	Circular Flanges for Pipes, Valves and Fittings
BS 3381:	Spiral Wound Gaskets for Steel Flanges to BS 1560
BS 1832:	Oil Resistant Compressed Asbestos Fibre Jointing
BS F125:	Rubber Bonded Compressed Asbestos Fibre Jointing



SUPPLEMENTARY COMMENTARY

C1 Bolted Flanged Joints

The gasket or joint ring is but one component of a bolted flanged joint. The suitability of a particular gasket or joint ring must be established from consideration of the type and material of the flanges, flange facing and finish, quantity and type of bolting, service conditions, any specific requirements regarding leak tightness for Health, Safety or Environmental reasons, and any limitations on gasket materials e.g., use of asbestos.

Due consideration should be given to control of fugitive emissions from the completed joint by appropriate gasket selection.

For many applications joint selection will be specified in the piping or vessel specification.

Proper bolting up procedures, using appropriate equipment, are essential to ensure the correct and satisfactory joint assembly.

C2 Guidance on Selection of Joint Type and Materials

The following guidance applies where pre-selection has not been carried out.

Table C1 summarises suitable jointing for piping flanges for various services. Use of jointing outside the ranges given may be acceptable but should be evaluated for each application. Additional guidance is given in sections C.4, C.5 and C.6.

Joint design maximum and minimum temperatures should be taken to be the same as the process design temperatures.

C3 General Comments on Asbestos Usage

Before asbestos is selected as jointing or filler material, any restrictions imposed by health or environmental regulations in the country of use should be established. However, any perception of increased health risk in handling the material should be balanced against proven plant operational safety in those applications identified in this standard.

Asbestos in whatever form must be handled, stored and disposed of under specific site procedures which may be based on BP Group Occupational Health guidance.

Disposal costs should be assessed as part of the whole life cost in selecting appropriate materials.



TABLE C1

Service	Flange Design Conditions		Flange Facing	Gasket Selection
	Pressure Class	Temp °C		
General Hydrocarbon, Steam/Condensate, Boiler Feed Water, General Utilities [3] [4]	150 300	-200/+500	RF	Flex. Graphite Sheet [7]
		-40/+400	RF	Flat CAF [1]
		-200/+500	RF	Spiral Wound [5] [6] (Flex. Graphite Filler)
		-40/+500	RF	Spiral Wound [1] [5] [6] (Asbestos Filler)
General Hydrocarbon, Steam/Condensate, Boiler Feed Water	600 900	- 40/+500	RF	Spiral Wound [1] [6] (Asbestos Filler)
		-200/+500	RF	Spiral Wound [6] (Flex. Graphite Filler)
General Hydrocarbon, Steam, Boiler Feed Water	1500 2500	per flange material	RTJ	Metal Joint Ring [4]
Hydrogen	150 300 600	-200/+500	RF	Spiral Wound [5] [6] (Flex. Graphite Filler)
	900 1500 2500	per flange material	RTJ	Metal Joint Ring [4]
Chemical Oxidisers/ HF Acid	150	-40/+250	RF	PTFE (reinforced or envelope)
	150 300 600	- 200/+250	RF	Spiral Wound [6] (PTFE Filler)

Notes to Table C1

1. Local limitations may apply to the use of asbestos (see C3).
2. Other non-asbestos flat sheet gaskets may be considered for utility service, guidance is given in C4.4.
3. Flat face flanges may be used for Class 150 water services. Flat faced flanges should be used for rubber or plastic lined pipe (a gasket may not be required where the lining extends over both flange faces).



4. *Some successful experience has been gained with the use of SW gaskets with flexible graphite filler for these applications, additional advice is given in C5.1(i).*
5. *Use of SW gaskets with Class 150 flanges should be fully assessed, additional advice is given in C5.1.*
6. *Suitable materials should be specified for windings, inner and centring rings.*
7. *Users should consider the robustness of flexible graphite sheet gaskets for their application.*

C4 Non-Metallic Flat Gaskets

C4.1 General

- (a) *Non-metallic flat sheet gaskets are suitable in pressure classes 150 and 300 for all services except hydrogen, subject to the limitations imposed by the individual materials.*
- (b) *Non-metallic flat sheet gaskets are available in numerous materials, including compressed asbestos fibre (CAF), reinforced graphite and PTFE. Many proprietary non-asbestos fibre based gaskets are also now available, however full evaluation of these materials is strongly recommended before their use.*
- *(c) *For flat gaskets, flange faces should be machined to a surface roughness between 3.2 and 12.5 micrometres, except where the manufacturer of a selected proprietary gasket advises otherwise.*

C4.2 Compressed Asbestos Fibre Flat Sheet Gaskets

- (a) *Compressed asbestos fibre (CAF) flat gasket sheet material has a long successful operating history on general use over the temperature range -40°C to +400°C. As the exact minimum and maximum temperatures depend on the selection of filler and binder materials, any proposed use outside this range should be assessed with the manufacturer concerned.*
- (b) *Pre-cut gaskets should be specified. Cutting of gaskets should be avoided.*
- (c) *Unless required with special properties, CAF gaskets should be specified oil resistant to be suitable for oil refinery and chemical plant duty.*



Gaskets should be specified to an appropriate standard when required for aviation fuels, di-ester type synthetic lubrication oils and similar duties where control of swell characteristics is required.

- (d) CAF flat gaskets should be supplied graphited on both sides to help sealing and subsequent removal of the gasket, except where graphite may promote corrosion of the flanges.*

Ungraphited gaskets should be specified for:-

- (i) austenitic stainless steel flanges on aqueous duties*
- (ii) aggressive water duties, e.g. where cement lined pipe is used.*
- (e) CAF flat gaskets should be specified 1.5 mm thick for flanges up to 24 inch NB and 3.00 mm thick for larger flanges. As a general rule, the thinner the gasket the better, but above 24 inch NB, thin gaskets can be difficult to handle. 1.5 mm gaskets are acceptable on larger sizes where they can be handled satisfactorily.*

C4.3 Reinforced Flexible Graphite Flat Gaskets

- (a) Flexible graphite flat gaskets have sealing characteristics which are as good as CAF gaskets. The applicable temperature range is -200°C to +500°C. However these gaskets are soft and prone to damage in handling.*

The handleability of flexible graphite sheet gaskets varies considerably between manufacturers. Graphite sheet may be reinforced with one or two layers of thin metallic sheets or perforated metallic mesh. A choice of reinforcing material will normally be available, typically stainless steel or nickel. The reinforcing material should be appropriate to the service.

- (b) In oxidising environments (including ambient air) flexible graphite can be oxidised at temperatures above 500°C. It is recommended that flexible graphite sheet gaskets are not used above 500°C, unless totally enclosed in a reducing environment.*

C4.4 Non-Asbestos Fibre Flat Gaskets

- (a) Most non-asbestos fibre based gaskets are based on aramid, glass or carbon fibre and use various fillers in addition to the*



binder. These gaskets do not match CAF in terms of allowable coincident pressures and temperature ranges. Some embrittlement with temperature has been reported. Some manufacturers have also advised against retightening joints in service because of the possibility of fracturing the gaskets.

- (b) Any potential health risk of substitute fibre materials should be assessed.*
- (c) It is recommended that non-asbestos fibre based gaskets should not be specified for hydrocarbon or steam service unless suitably tested, or experience in similar service is available.*

General use on non-essential utility services at Class 150 in the temperature range -20 to +65°C is considered acceptable.

- (d) The manufacturer should be consulted as to the required thickness of the non-asbestos fibre gasket.*
- (e) Any proposed use of jointing compounds should be checked with the gasket manufacturer before use. Some compounds may adversely affect gaskets' characteristics.*
- (f) Non-asbestos fibre gaskets should be specified as oil resistant and have a chloride content of less than 100ppm unless agreed otherwise.*

C4.5

Rubber, Elastomeric and Polymeric Flat Gaskets - General

- (a) It is recommended that the advice of materials specialists and manufacturers is sought when selecting and specifying these materials except for the application of PTFE which is given below.*

BP Group Research and Engineering at Sunbury can provide specialist advice.

- (b) Jointing materials for water services should not support Legionella growth.*
- (c) Jointing materials for potable water must not taint the water.*

C4.6

PTFE Flat Gaskets

- (a) PTFE gaskets may be suitable where conditions are too corrosive for CAF or flexible graphite.*



PTFE is resistant to most fluids except molten alkali metals, fluorine and some fluorine compounds.

- (b) PTFE has limited temperature and stress relaxation properties. Stress relaxation properties are improved by additives such as carbon or glass fibres or by envelope construction where the PTFE has an inner core of resilient material.*
- (c) Virgin PTFE is suitable for use at a minimum temperature of -200°C. The allowable minimum temperature for PTFE envelope and reinforced gaskets is determined by the filler. Stainless steel inserts are suitable at -200°C but certain fillers may limit the minimum temperature to -40°C.*
- (d) It is recommended that PTFE joints are limited to the following temperature ranges. These should be confirmed as suitable by the manufacturer:-*
 - (i) -200°C to +200°C for virgin PTFE*
 - (ii) -40°C to +250°C for PTFE envelope or reinforced joints.*

Excess temperatures may lead to generation of toxic decomposition products.

- (e) Envelope construction joints should use virgin PTFE*
- (f) Fibre reinforced PTFE joints should be 3 mm thick*
- (g) PTFE is generally suitable for sour service.*

C5 Spiral Wound and Metal Jacketed Gaskets

C5.1 Spiral Wound (SW) Gaskets

- (a) The standard of SW gaskets can vary considerably between manufacturers, it is recommended that gaskets be obtained only from reputable suppliers.*
- (b) SW gaskets are recommended for hydrogen service in Class 150 and 300, all services in Class 600, and for all services except hydrogen in Class 900. SW gaskets are also suitable for services other than hydrogen in Class 150 and 300, where their use has benefits over flat gaskets, or where CAF flat gaskets are not acceptable and flexible graphite flat gaskets are not preferred.*



Where SW gaskets are used with standard Class 150 flanges and smaller sizes of standard Class 300 flanges, the higher seating load requirements and low bolting availability necessitates use of high strength bolting and proper bolting up procedures. The use of gaskets with inner rings also increases the required bolting load.

Use of SW gaskets in Class 150 joints should be fully assessed with the gasket supplier.

- (c) It is recommended that SW gaskets for use with standard flanges are supplied with both outer and inner support rings in all cases where not fully constrained within a groove. Inner rings increase the recovery characteristics and prevent unwinding of the gasket. Use of inner rings increases the bolt load required to compress the gasket.

Inner rings are particularly recommended where:

- (i) mechanical or thermal shock loading may occur
- (ii) temperature cycling may occur
- (iii) graphite or PTFE filler is used
- (iv) pressure exceeds 64 barg (900 psig).

Inner rings and windings should be in a corrosion resistant material. Type 304 or 316 stainless steel is recommended for windings and inner rings for temperatures up to 800°C. Higher alloys should be specified for higher temperatures and highly corrosive media.

Centring rings should normally be coated carbon steel for service between -40°C and +500°C. Outside this range up to +800°C, centring rings should be stainless steel. Above +800°C, nickel alloy centring rings should be specified.

- (d) Flexible graphite is suitable as filler for SW gaskets because of its excellent sealing characteristics, except for use with martensitic stainless steel flanges where pitting corrosion has occurred in certain tests.

It is recommended that flexible graphite be normally limited to a maximum service temperature of 500°C, because of possible oxidation in ambient air. Oxidation of flexible graphite by



strong acids may occur at temperatures below 500°C and the maximum allowable temperature for such services should be established with the manufacturer. If totally contained within a reducing environment, flexible graphite may be used at temperatures in excess of 1000°C.

Flexible graphite filler will provide a fire resistant joint.

- (e) *Other acceptable filler materials include asbestos compounds, PTFE and Flexite Super, a proprietary compound from Flexitallic Co.*

The range of application of PTFE and proprietary fillers should be determined in conjunction with the manufacturer.

- (f) *Asbestos fillers have provided long successful operational history for a range of services and conditions. Asbestos fillers are suitable for the temperature range -40°C to +500°C.*
- (g) *Where asbestos compounds are permitted, SW gaskets with asbestos filler may be considered in place of CAF flat gaskets because the asbestos compound is better contained within the SW gasket windings.*
- (h) *SW gaskets with flexible graphite filler may also be considered for joints in Class 1500 and 2500 in place of metal joint rings. The quality of manufacture is critical in such applications.*

Successful experience has been obtained by some refineries where SW gaskets with flexible graphite filler have been used on hydrocrackers. One refinery reported a problem of differential expansion causing ring groove cracking of RTJ flanges and these were successfully replaced by RF flanges and SW gaskets.

- (i) *Flange facings for used with SW gaskets should be machined to a surface roughness between 3.2 and 6.3 micrometres.*
- (j) *Attention is drawn to clauses 1.2.2 and 1.2.4 of [API 601](#) regarding the non-suitability of SW gaskets on [ANSI B16.5](#) slip-on flanges below 1 1/2 inch NB and on all slip-on flanges to [MSS SP-44](#).*

C5.2 Metal Jacketed Gaskets

- (a) *Metal jacketed gaskets have been predominantly used on heat exchanger flanges where they seal successfully under*



temperature swings. They could be considered for more general use where a flexible gasket is required but where the filler must be isolated from the process. Otherwise they do not have benefits over SW gaskets for general piping applications.

- (b) Jacket and filler material should be selected to suit the process fluid and conditions. Attention is drawn to clause 2.3.2 of [API 601](#) which limits the choice of jacket and filler material for particular flange standards.
- (c) Attention is also drawn to clause 1.2.3 of [API 601](#) which specifies that metal jacketed flanges cannot be used with slip-on flanges to [MSS SP-44](#).
- (d) Flange facings for use with metal jacketed gaskets should be machined to a maximum surface finish of 2.5 micrometres.

C6 Solid Metal Joint Rings

- (a) This section does not apply to flat solid metal joints which are normally specially designed.
- (b) Solid metal joint rings (RTJ) are recommended for all services in Class 1500 and 2500 flange ratings. Solid metal joint rings have excellent tightness and tolerance to temperature and pressure changes once correctly bolted up. Very close attention must be given to their bolting up. Rings and groove faces must be free of imperfections.
- (c) Materials for joint rings should be compatible with the flange material and process conditions.

Typical selections for ring materials are:-

- (i) carbon steel flange - soft iron or carbon steel ring
- (ii) low alloy steel flange - 5% Cr, 1/2% Mo ring
- (iii) stainless steel flange - similar grade stainless steel ring.

Where the corrosion allowance for carbon steel flanges is greater than 1.5 mm a more corrosion-resistant ring should be specified eg stainless steel.

Consideration should be given to the specification of zinc or cadmium plated soft iron or carbon steel rings which offer



improved corrosion protection whilst in storage and enhanced protection from external corrosion due to weather.

- (d) *Ring hardness should be less than flange hardness. If this cannot be achieved by acceptable materials then SW gaskets should be considered.*

- (e) *Metal joint rings to [ANSI B16.20](#) can be octagonal or oval.*

Oval rings were the original style, and because of line contact may give better sealing. Octagonal rings have a wider contact area so are less likely to damage flange groove faces.

[ANSI B16.5](#), [ANSI B16.20](#) and [API 6A](#) all now specify flat bottom ring grooves in flanges. Earlier round bottom grooves required oval rings to be used. Oval or octagonal rings can be used in flat bottom grooves.

- (f) *[ANSI B16.20](#) and [API 6A](#) type R gaskets are equivalent and interchangeable.*

- (g) *[API 6A](#) type R and RX gaskets can be used in the same grooves. Type RX rings are pressure energised and will potentially give a better seal. However, type RX rings give greater height than type R rings, requiring more installation space and longer bolts.*



EXAMPLE DATA SHEETS

The following examples (Data Sheet Nos. 001-004) illustrate the method of use and information which may be given on data sheets.



DATA SHEET (EXAMPLE)

Project: XYZ	Enq/Order No. 123										
Service: General Hydrocarbons	Pressure Rating: Class 150										
Flange Std. ANSI B16.5	Design Temp. -40 to +400°C										
Gasket Std. ANSI B16.21	Gasket Type Flat Ring										
Material Flat Joints: <table style="width: 100%;"> <tr> <td style="width: 50%;">Basic Material</td> <td>CAF (BS 1832)</td> </tr> <tr> <td>Graphited</td> <td>Yes - both sides</td> </tr> <tr> <td>Jacket/Envelope</td> <td></td> </tr> </table> Spiral Wound: Filler/Winding Centring Ring Inner Ring Metallic Ring Joints: Material Hardness		Basic Material	CAF (BS 1832)	Graphited	Yes - both sides	Jacket/Envelope					
Basic Material	CAF (BS 1832)										
Graphited	Yes - both sides										
Jacket/Envelope											
Dimensions: <table style="width: 100%;"> <tr> <td style="width: 50%;">Nominal Size</td> <td>4 in</td> </tr> <tr> <td>Full Face</td> <td></td> </tr> <tr> <td>Inside Bolts</td> <td>Yes</td> </tr> <tr> <td>Ring No/Type (Oval or Oct)</td> <td></td> </tr> <tr> <td>Thickness</td> <td>0.059 in</td> </tr> </table>		Nominal Size	4 in	Full Face		Inside Bolts	Yes	Ring No/Type (Oval or Oct)		Thickness	0.059 in
Nominal Size	4 in										
Full Face											
Inside Bolts	Yes										
Ring No/Type (Oval or Oct)											
Thickness	0.059 in										
Additional Requirements:											
Data Sheet No. 001	Date 7th July 1992 Rev										



DATA SHEET (EXAMPLE)

Project: XYZ	Enq/Order No. 124
Service: General Hydrocarbons	Pressure Rating: Class 600
Flange Std. ANSI B16.5	Design Temp. -40 to +450°C
Gasket Std. ANSI B16.21	Gasket Type Flat Ring Jacketed
Material	
Flat Joints: Basic Material CAF (BS 1832) Graphited Jacket/Envelope Soft Carbon Steel	
Spiral Wound: Filler/Winding Centring Ring Inner Ring	
Metallic Ring Joints: Material Hardness	
Dimensions:	
Nominal Size	6 in
Full Face	
Inside Bolts	Yes
Ring No/Type (Oval or Oct)	
Thickness	0.125 in
Additional Requirements:	
Data Sheet No. 002	Date 7th July 1992 Rev



DATA SHEET (EXAMPLE)

Project: XYZ	Enq/Order No. 125
Service: General Hydrocarbons	Pressure Rating: Class 600
Flange Std. MSS SP-44	Design Temp. -40 to +500°C
Gasket Std. API 601	Gasket Type Spiral Wound
Material	
Flat Joints: Basic Material N/A Graphited N/A Jacket/Envelope N/A Spiral Wound: Filler/Winding Flexible Graphite/Type 304 SS Centring Ring Carbon Steel (Epoxy coated) Inner Ring Type 304 SS Metallic Ring Joints: Material N/A Hardness N/A	
Dimensions: Nominal Size 26 in Full Face Inside Bolts Ring No/Type (Oval or Oct) Thickness	
Additional Requirements:	
Data Sheet No. 003 Date 7th July 1992 Rev	



DATA SHEET (EXAMPLE)

Project: XYZ	Enq/Order No. 125
Service: General Hydrocarbons (Sour)	Pressure Rating: Class 1500
Flange Std. ANSI B16.5	Design Temp.
Gasket Std. ANSI B16.20	Gasket Type Metal Ring
Material	
Flat Joints: Basic Material N/A Graphited N/A Jacket/Envelope N/A Spiral Wound: Filler/Winding N/A Centring Ring N/A Inner Ring N/A Metallic Ring Joints: Material Type 316 Hardness per ANSI B16.20	
Dimensions:	
Nominal Size 4 in Full Face Inside Bolts Ring No/Type (Oval or Oct) R39/Oct. Thickness	
Additional Requirements:	
Data Sheet No. 004 Date 7th July 1992 Rev	

