

STATIC SEALING

SELECTION CRITERIA



**CALVOSEALING**

✦ Global Business Group

The fluid sealing **specialist**





[www.calvosealing.com](http://www.calvosealing.com)

# TABLE OF CONTENTS

## INTRODUCTION

Company Information.....	4
--------------------------	---

## CHAPTER 1: GASKET SELECTION

### SECTION 1: NON- METALLIC GASKETS

Rubber Sheet.....	8
Cork-rubber / Oil Paper Sheet.....	18
Compressed Fibre Sheet.....	21
Expanded Graphite Sheet.....	30
MICA Sheet.....	34
PTFE Sheet.....	37
GORE® Products.....	42
Flange Insulation Sets.....	59

### SECTION 2: SEMI-METALLIC GASKETS

Spiral Wound Gaskets.....	68
Camprofile Gaskets.....	72
Metal Jacketed Gaskets.....	76
G-ST Gaskets.....	80

### SECTION 3: METALLIC GASKETS

Ring Type Joints.....	84
-----------------------	----

## CHAPTER 2: TECHNICAL & DESIGN INFORMATION

Introduction.....	88
Type of Flanges.....	89
Type of Gaskets.....	90
Method of calculation	
ASME VII.....	92
PVRC.....	97
Gasket Installation.....	99
Bolt Torque.....	101
Chemical Resistance of materials.....	105

## CHAPTER 3: DIMENSIONAL DATA

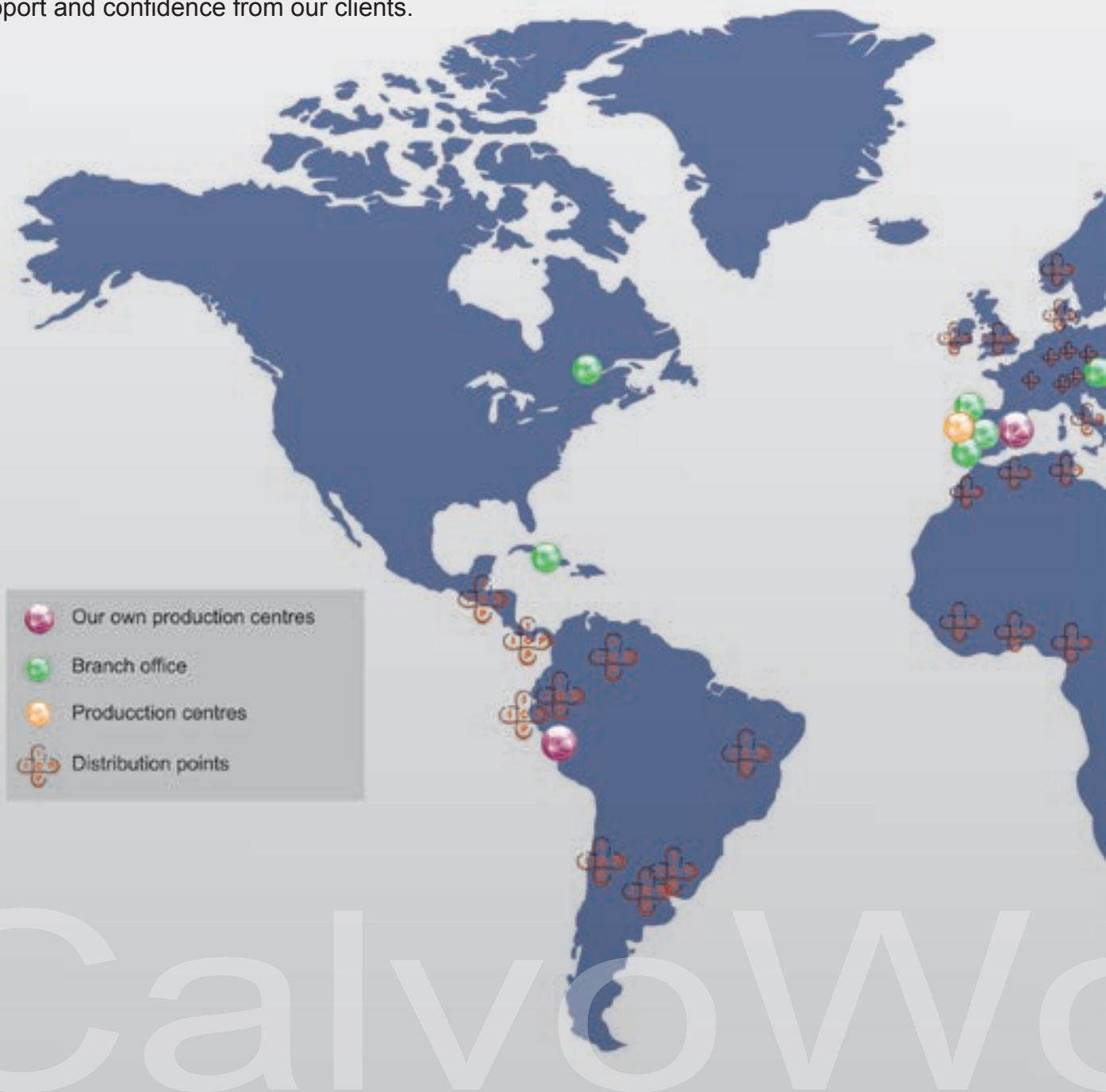
Non-metallic Sheet . G-ST Gaskets . Flange Insulation Sets Spiral Wound Gaskets . Camprofile Gaskets . Metal Jacketed Gaskets . Ring Type Joints.....	113
---	-----

**CALVOSEALING, S.L.** is a Spanish company with more than fifty years of experience in manufacturing sealing and thermal insulations products.

**CALVOSEALING S.L.** is active partner and braider of **W.L. Gore & Associates, Inc.**

Since our foundation in 1962, we remain committed to service and sealing quality. This values now updated with the latest technologies, qualified staff and larger facilities, makes us feel proud from support and confidence from our clients.

**CALVOSEALING S.L.** manufactures and markets from facilities located in Barcelona (Spain), which operate under the accreditation ISO 9001, ISO 14001 and OSHAS 18001. It is dedicated to manufacture gaskets, packings, mechanical seals and thermal insulation material. All of this, aimed at offering our customers a complete range of products and personal service for all types of applications.



CalvoW





**CALVOSEALING's branch offices:**

**CALVOSEALING SOUTH**  
SEVILLA

**CALVOSEALING CENTRE**  
MADRID

**CALVOSEALING NORTH**  
LUGO

**CALVOSEALING HUNGARY**  
BUDAPEST



**CALVOSEALING**

Global Business Group

Intro

**CALVOSEALING CUBA**

**CALVOSEALING SINGAPORE**



Worldwide



# NON-METALLIC GASKETS



## Introduction

**CALVOSEALING** produces sheets and cut joints in a wide range of non-metallic materials. Cut joints are available in most common flange sizes (ASME, DIN, JIS, BS) and can be easily produced to the customer's requirements.

## Non-metallic gasket materials

- Elastomers
- Cork - Rubber
- Compressed Fibre sheet
- PTFE
- Expanded graphite
- MICA

## Features

- Exceptionally for a wide temperature range
- High level of joint stability
- Fully compatible with steam, air and water
- Excellent chemical and mechanical resistance
- Fire safe



**CALVOSEALING**

✦ Global Business Group

**Rubber**

**Cork  
Rubber**

**Compressed  
Fibre**

**Expanded  
Graphite**

**MICA**

**PTFE**



**Gasket Selection**

# Rubber Sheet



## Elastomer:

**CALVOSEALING** offers a wide range of rubber types for use in general industry. Our company is able to offer 10 types of elastomers where each one offering its quality and guarantees a reliable and durable seal.

The application of these elastomers depends on its chemical and thermal resistance for use in a wide range of services. The most widely used application is on pipes to seal water, acids, oils, etc.

DESCRIPTION		ASTM 1418	ISO/DIN 1629
SBR	Styrene Butadiene Rubber	SBR	SBR
NR	Natural Rubber	NR	NR
Neoprene®	Chloroprene Rubber	CR	CR
NBR	Acrylonitrile Butadiene Rubber	NBR	NBR
EPDM	Ethylene Propylene Diene Rubber	EPDM	EPDM
IIR	Butyl Rubber	IIR	IIR
HYPALON®	Chlorosulfonated Polyethylene Rubber	CSM	CSM
Silicone	Silicone Rubber	VMQ	VMQ
VITON®	Fluorocarbon Rubber	FKM	FPM
KALREZ®	Perfluorinated Rubber	FFKM	FFPM

\* **HYPALON®**, **VITON®** and **KALREZ®** are trademarks registered by **DUPONT DOW ELASTOMERS**.

## Description:

- Hardness between 30 to 90 Shore A
- Smooth finish on both sides
- A smooth face and a cloth impression face
- Cloth impression on both sides
- Special finish on one or both sides
- A textile insert options increases the resistance to tearing



Standard textile and metallic insert types:

- Polyester
- Polyester/ Nylon
- Nylon
- Cotton
- Glass Fibre
- Metallic  
(Steel or Brass)





## Product dimensions:

THICKNESS	LENGTH
0.3 mm to 2 mm	20 m rolls
3 mm to 10 mm	10 m rolls
12 mm to 60 mm	5 m rolls
65 mm to 150 mm	2.2 m rolls
WIDTH	
Standards: 1,200 mm 1,400 mm	
Specials: 1,500 mm 2,000 mm	

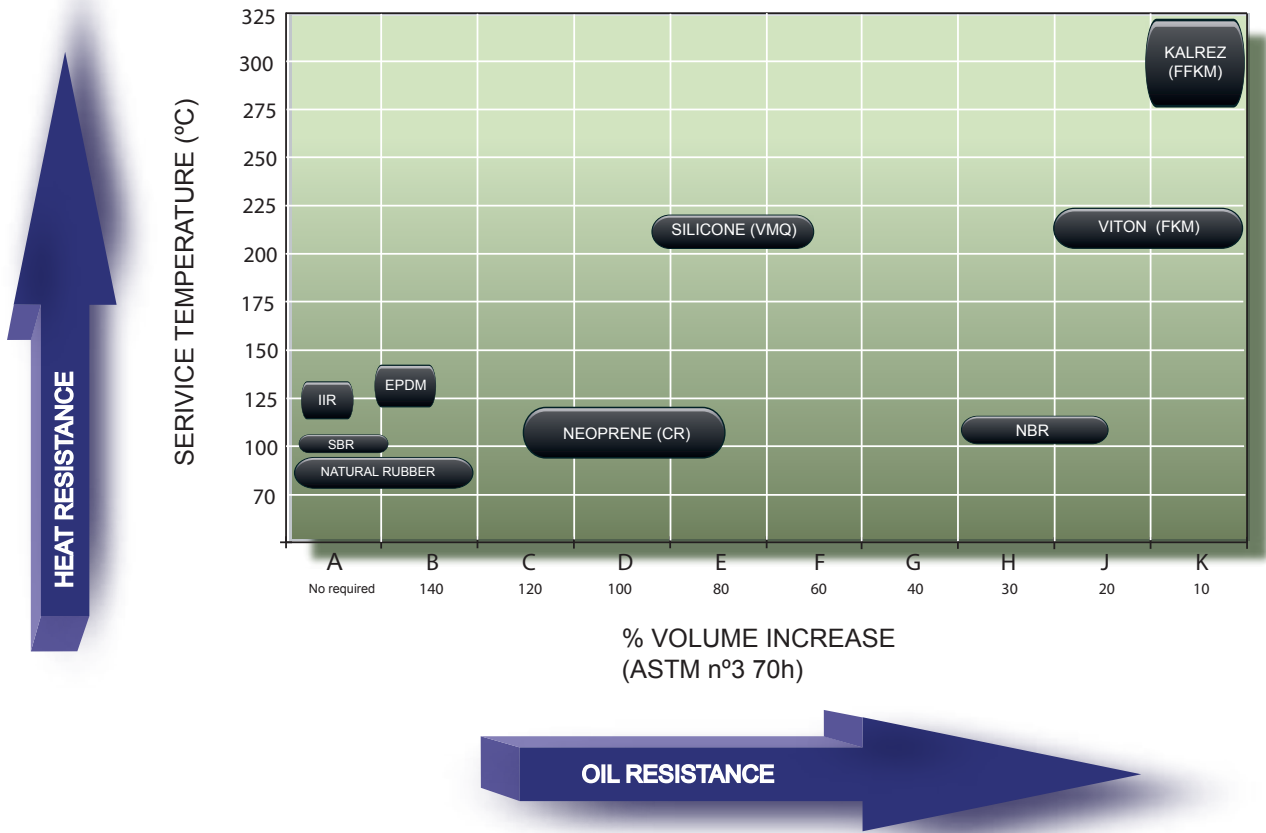


# Product Properties:

	SBR	NR	Neoprene®	NBR	EPDM	IIR	HYPALON®	Silicone	VITON®	KALREZ®
DESCRIPTION	Styrene Butadiene Rubber	Natural Rubber	Chloroprene Rubber (CR)	Nitrilic Rubber	Ethylene Propylene Diene Rubber	Butyl Rubber	Chlorosulfonated Polyethylene Rubber (CSM)	Silicone Rubber (VMQ)	Fluorocarbon Rubber (FKM)	Perfluorinated Rubber (FFKM)
TEMPERATURE RANGE	-50°C to 110°C	-50°C to 90°C	-25°C to 125°C	-30°C to 120°C	-40°C to 120°C	-40°C to 135°C	-35°C to 140°C	-70°C to 220°C	-30°C to 250°C	-15°C to 310°C
HARDNESS RANGE (SHORE A)	35 - 95	30 - 90	30 - 90	30 - 95	30 - 90	30 - 80	45 - 90	30 - 85	45 - 95	40 - 90
<b>PHYSICAL PROPERTIES</b>										
FLEXIBILITY	Very Good	Excellent	Very Good	Very Good	Good	Very Good	Good	Good	Good	Good
TENSILE STRENGTH RESISTANCE	Very Good	Excellent	Very Good	Very Good	Good	Good	Good	Good	Good	Good
TEAR RESISTANCE	Good	Very Good	Very Good	Good	Good	Good	Fair	Poor	Good	Good
GAS IMPERMEABILITY	Fair	Very Good	Good	Good	Fair	Poor	Good	Excellent	Fair	Very Good
AGEING RESISTANCE	Good	Good	Very Good	Good	Excellent	Very Good	Very Good	Excellent	Excellent	Excellent
FLAME RESISTANCE	Fair	Fair	Good	Poor	Good	Poor	Good	Good	Excellent	Excellent
ABRASION RESISTANCE	Very Good	Very Good	Very Good	Very Good	Good	Good	Good	Fair	Fair	Good
<b>CHEMICAL PROPERTIES</b>										
RESISTANCE TO OZONE / OXYGEN	Fair	Fair	Very Good	Good	Excellent	Very Good	Very Good	Excellent	Excellent	Excellent
RESISTANCE TO PETROLEUM OILS AND FUELS	Poor	Poor	Very Good	Excellent	Poor	Poor	Very Good	Poor	Excellent	Excellent
RESISTANCE TO HYDRAULIC OILS AND GREASE	Poor	Poor	Very Good	Excellent	Poor	Poor	Very Good	Good	Excellent	Excellent
RESISTANCE TO ACIDS	Poor	Poor	Very Good	Fair	Excellent	Very Good	Very Good	Poor	Excellent	Excellent
ALKALI RESISTANCE	Good	Good	Very Good	Very Good	Very Good	Good	Very Good	Poor	Excellent	Excellent
RESISTANCE TO HOT WATER	Very Good	Good	Good	Good	Excellent	Excellent	Good	Poor	Very Good (until 150°C)	Excellent

# Rubber resistance:

The following graph shows the increase in volume of all Calvo Sealing's elastomers to attacked by oils.



## SBR (Styrene Butadiene Rubber):



SPECIFICATIONS	
Colour	Black
Density	1.6 g/cm <sup>3</sup>
Hardness (Shore A)	65 °
Elongation	400 %
Tensile Strength	8 N/mm <sup>2</sup>
Temperature Range	-50 °C to 110 °C (-58 °F to 230 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Similar properties to NR, improving properties such as ageing resistance and temperature resistance.</li> <li>• Moderate resistance to tearing, ozone and weather.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Water, weak organic acids and moderate chemicals.</li> </ul>	

## NR (Natural Rubber):

SPECIFICATIONS	
Colour	Beige
Density	1.1 g/cm <sup>3</sup>
Hardness (Shore A)	45 °
Elongation	625 %
Tensile Strength	19 N/mm <sup>2</sup>
Temperature Range	-50 °C to 90 °C (-58 °F to 194 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Excellent mechanical properties such as break strength, resilience and tear resistance.</li> <li>• Excellent electrical insulating properties.</li> <li>• High impact strength, excellent dynamic properties and low residual deformation.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Resistant to oils, fuels and moderate acids and alkalis.</li> </ul>	



## Neoprene® CR (Chloroprene Rubber):

SPECIFICATIONS	
Colour	Black
Density	1.37 g/cm <sup>3</sup>
Hardness (Shore A)	50 °
Elongation	300 %
Tensile Strength	8 N/mm <sup>2</sup>
Temperature Range	-25 °C to 125 °C (-13 °F to 257 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• High mechanical properties and resistance to abrasion.</li> <li>• Self-extinguishing and good adhesion to metal.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Oils, fuels and moderate acids and alkalis.</li> <li>• Weather and ozone resistant.</li> </ul>	

## NBR (Acrylonitrile Butadiene Rubber):

SPECIFICATIONS	
Colour	Black
Density	1.5 g/cm <sup>3</sup>
Hardness (Shore A)	70 °
Elongation	400 %
Tensile Strength	6 N/mm <sup>2</sup>
Temperature Range	-30 °C to 120 °C (-22 °F to 248 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Good mechanical properties such as tensile strength, compressive strength and bending.</li> <li>• Moderate ageing resistance.</li> <li>• Good adhesion to metal.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Oils and solvents, aromatic and aliphatic hydrocarbons and alcohols and animal fats.</li> </ul>	



## EPDM (Ethylene Propylene Rubber):

SPECIFICATIONS	
Colour	Black
Density	1.5 g/cm <sup>3</sup>
Hardness (Shore A)	70 °
Elongation	500 %
Tensile Strength	7 N/mm <sup>2</sup>
Temperature Range	-40 °C to 120 °C (-40 °F to 248 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Good mechanical properties and resistant to ageing, ozono and UV, oxygen, steam and water.</li> <li>• Excellent electrical insulating properties.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Hot water / steam and polar solvents such as acetone, methanol or esters.</li> </ul>	

## IIR (Butyl Rubber):

SPECIFICATIONS	
Colour	Black
Density	1.27 g/cm <sup>3</sup>
Hardness (Shore A)	60 °
Elongation	400 %
Tensile Strength	9 N/mm <sup>2</sup>
Temperature Range	-40 °C to 135 °C (-40 °F to 275 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Impermeable to gas and air.</li> <li>• Excellent resistance to oxidation and ozone.</li> <li>• Low resilience, that provides outstanding impact damping capacity.</li> <li>• Good electrical resistance.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Where an excellent gas-tightness is required.</li> <li>• Resistant to most chemicals, including mineral acids.</li> <li>• It is not suitable for use with oils and hydrocarbonated solvents.</li> </ul>	

## HYPALON® (Chlorosulfonated Polyethylene Rubber):

SPECIFICATIONS	
Colour	Black
Density	1.36 g/cm <sup>3</sup>
Hardness (Shore A)	60 °
Elongation	225 %
Tensile Strength	8 N/mm <sup>2</sup>
Temperature Range	-35 °C to 140 °C (-31 °F to 284 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Excellent resistance to oxidation, weather and ozone.</li> <li>• Good resistance to hydrocarbonated solvents.</li> <li>• Flame resistant.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Acids, oils and non-aromatic benzenes.</li> </ul>	

## Silicone Rubber (VMQ):

SPECIFICATIONS	
Colour	Translucent
Density	1.16 g/cm <sup>3</sup>
Hardness (Shore A)	60 °
Elongation	225 %
Tensile Strength	8 N/mm <sup>2</sup>
Temperature Range	-70 °C to 220 °C (-94 °F to 428 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Completely unalterable by ozone, weathering and ultraviolet radiation.</li> <li>• Good electrical insulating properties.</li> <li>• Physiologically inert, ideal for field of medicine applications.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Where oils, water and ozone resistance is required.</li> <li>• This material offers excellent properties to high and low temperatures.</li> </ul>	

## VITON® (Fluorocarbon Rubber) :

SPECIFICATIONS	
Colour	Black
Density	2.03 g/cm <sup>3</sup>
Hardness (Shore A)	70 °
Elongation	165 %
Tensile Strength	5 N/mm <sup>2</sup>
Temperature Range	-30 °C to 250 °C (-22 °F to 482 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Exceptional resistance to temperature.</li> <li>• Excellent resistance to acids and alkalis (even oxidisers)</li> <li>• Weak resistance to esters and ketones.</li> <li>• Excellent resistance to ozone and weather.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Resistant to acids and alkalis, aliphatic, aromatic and chlorated hydrocarbons, oils and ozone.</li> </ul>	

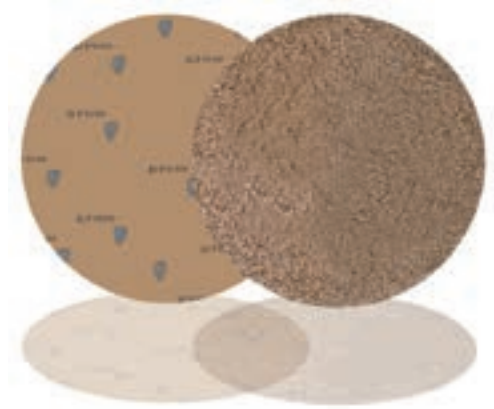


## KALREZ® (Perfluorinated Rubber):



SPECIFICATIONS	
Colour	Black
Density	1.9 g/cm <sup>3</sup>
Hardness (Shore A)	74 °
Elongation	220 %
Tensile Strength	16 N/mm <sup>2</sup>
Temperature Range	-15 °C to 310 °C (5 °F to 590 °F)
PROPERTIES	
<ul style="list-style-type: none"> <li>• Chemical resistance to almost all chemicals.</li> <li>• Excellent thermal stability.</li> <li>• Excellent elastic recovery and low compression set properties.</li> </ul>	
APPLICATIONS	
<ul style="list-style-type: none"> <li>• Isolation valves.</li> <li>• O-ring kit for mechanical seals.</li> </ul>	

# Cork-Rubber / Oil Paper Sheet



**CALVOSEALING** produces a wide range of high quality cork-rubber and oil paper products. Specially designed for use in automobile industry where high pressures and temperatures are not required.

## PROPERTIES

- Compressible material suitable for low pressures, high flexibility and resistance.
- The physical characteristics along with oil and fuel resistance make this a qualified material for automotive and general industry.
- Good sealing at competitive prices.

## APPLICATIONS

- Automobile Industry
- Shipbuilding Industry





# ICP 9050

## Description

Cork based material mixed with synthetic NBR rubber.



## Applications:

- Compressible material suitable for low pressures, high flexibility and resistance.
- Good electrical insulator.
- The physical characteristics along with oil and fuel resistance make this a qualified material for automotive and general industry.

## Available Sizes

- Thickness (mm): 1.0, 2.0, 3.0, 4.0, 5.0, 6.0
- Sheet Size (mm): 1015 x 1015

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## Physical Parameters:

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	0.7 g/cm <sup>3</sup>
Compressibility	ASTM F 36	20-40 %
Recovery (min.)	ASTM F 36	70 %
Hardness	ASTM D 1415	75° Shore A
Tensile Strength	DIN 52910	1.02 MPa
Fluid Resistance		
Volumetric variations:	ASTM F 146	
ASTM Oil n° 1	70h / 100°C	-5% to +15%
ASTM Oil n°3	70h / 100°C	+15% to + 50%
ASTM Fuel A	22h / 23°C	-5% to +15%
<b>* Maximum operating conditions:</b>		
Maximum Temperature		110 °C / 230 °F
Minimum Temperature		-30 °C / - 22 °F
Pressure		20 bar / 290 psi

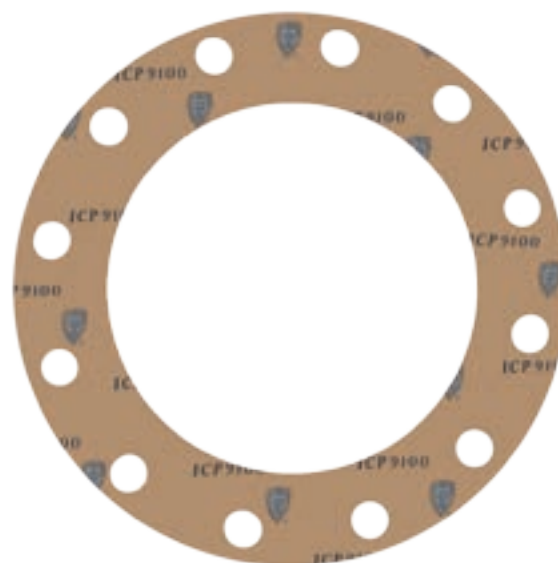




# ICP 9100

## Description:

Cellulose based material impregnated with plasticised gelatin.



## Physical Parameters:

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	0.8 g/cm <sup>3</sup>
Recovery	ASTM F 36 J	40 %
Compressibility	ASTM F 36 J	25% – 40%
Tensile Strength	ASTM F 152	12 MPa
ASTM OIL n°1 Mass increase Thickness increase	5h/150°C	≤ 15% ≤ 5%
ASTM FUEL B Mass increase Thickness increase	5h/23°C	≤ 15% ≤ 5%
ASTM Water / Coolant Mass increase Thickness increase	5h/100°C	≤ 90% ≤ 30%
<b>* Maximum operating conditions:</b>		
Maximum temperature		100 °C / 212 °F
Minimum temperature		-20 °C / -4 °F
Pressure		12 bar / 174 psi

## Applications:

- Good sealing at competitive prices.
- Good behaviour against oils and fuel.
- Specially designed for applications with low temperatures and non-aggressive means, as gearboxes, carburetors, water pumps, etc.
- Recommended for the automotive industry.

## Available sizes:

- Thickness (mm): 0.15, 0.20, 0.25, 0.3, 0.5, 0.8, 1.0, 1.5, 2.0, 3.0
- Roll size : 25 m x 1000 mm  
50 m x 1000 mm

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

# Compressed Fibre Sheet



**CALVOSEALING** produces a wide range of compressed fibre products composed of different qualities and materials. They can be used in all types of industries where high pressures and temperatures are not required.

## PROPERTIES

- Excellent tensile strength, outstanding sealing with gas, as well as very good ageing resistance with mild temperatures and pressures.
- Compressible material suitable for low pressures, high flexibility and resistance.
- Material with an outstanding performance offering excellent mechanical properties.

## APPLICATIONS

- Automobile Industry
- Chemical Industry
- Shipbuilding industry
- Power plants





# ICP 9150RR

## Description:

Manufactured of a pegged steel core, which contains aramide fibres, inorganic fillers and high-grade binder elastomers, where is applied to both sides of the core.



## Applications:

- Material with an outstanding performance where offers high mechanical properties.
- Suitable to be used as cylinder head gasket in internal combustion engines.
- Resistant to high temperatures and pressures.
- Material resistant to oils, fuel, mixtures of water and antifreeze or corrosion inhibitors.

## Available sizes:

- **Thickness (mm):** 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0
- **Sheet size (mm):** 1000 x 508  
1000 x 520
- **Rolls:** 30 m x 508 mm  
30 m x 520 mm

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## Physical Parameters:

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Weight m <sup>2</sup>	0.8 Thick	2.6 Kg/m <sup>2</sup>
	1.0 Thick	2.9 Kg/m <sup>2</sup>
	1.2 Thick	3.15 Kg/m <sup>2</sup>
	1.4 Thick	3.39 Kg/m <sup>2</sup>
	1.6 Thick	4.0 Kg/m <sup>2</sup>
	1.8 Thick	4.3 Kg/m <sup>2</sup>
Recovery	ASTM F 36 A	≥ 40 %
Compressibility	ASTM F 36 A	10 - 20 %
Fluid resistance	ASTM F 146	
ASTM IRM 903 Oil	5h / 150°C	≤ 15 % ≤ 10 %
Mass increase Thickness increase		
<b>* Maximum operating conditions:</b>		
Peak temperature	400 °C / 752 °F	
Continuous temperature	300 °C / 572 °F	
Maximum Surface pressure at 300°C	110 N/mm <sup>2</sup>	

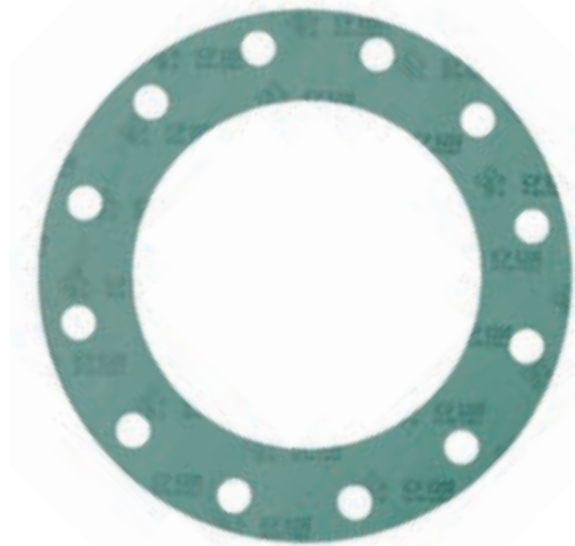




# ICP 9200

## Description:

Compressed fibre sheet material based on a blend of organic and mineral fibre mixed with NBR rubber.



## Applications:

- Suitable to be used with water applications and low temperatures.
- This gasket is recommended mainly to be used in plumbing and fire sprinkler systems, such as economic filler in sandwich gaskets.
- Also for automotive applications as sprinkler system and other general applications.  
(No suitable to use with oil and gasoline)

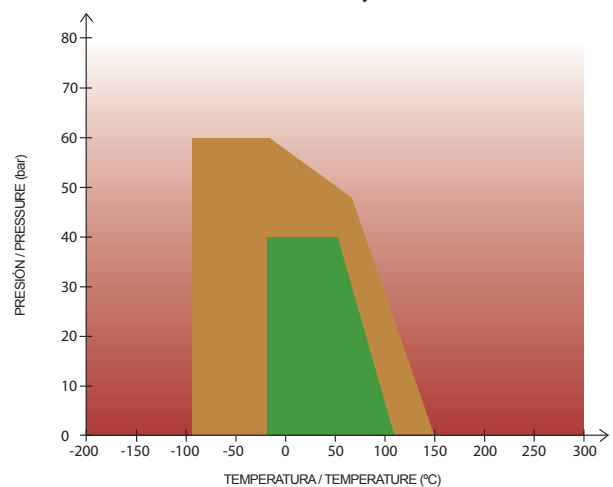
## Available sizes:

- Thickness (mm): 0.5, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.80 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	≥ 40 %
Compressibility	ASTM F 36 A	7-15 %
Tensile Strength	ASTM F 152 DIN 52910	6 MPa 5 MPa
Fluid resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 15 % ≤ 10 %
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	≤ 10 % ≤ 10 %
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 15 % ≤ 5 %
Ignition Loss	DIN 52911	≤ 40 %
Gas permeability	DIN 3535	≤ 0.5 cm <sup>3</sup> /min
<b>* Maximum operating conditions:</b>		
Minimum temperature		- 20 °C / - 4 °F
Peak temperature		150 °C / 302 °F
Continuous temperature		110 °C / 230 °F
Pressure		60 bar / 870 psi

ICP 9200, 2 mm



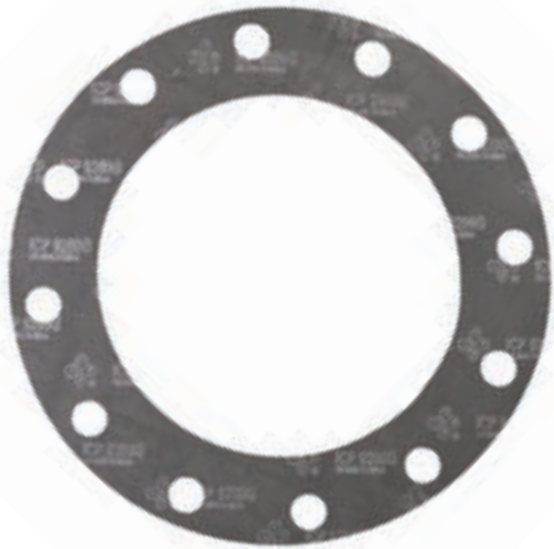
- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

# ICP 9200G

## Description:

Compressed sheet material based on a blend of organic fibre and mineral fibre mixed with NBR rubber.

Sheet made of anti-stick surfaces, finished with graphite on both sides.



PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.9 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	≥ 40 %
Compressibility	ASTM F 36 A	7 - 15 %
Tensile Strength	ASTM F 152 DIN 52910	≥ 7 MPa ≥ 5 MPa
Fluid Resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 15 % ≤ 10 %
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	≤ 10 % ≤ 10 %
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 15 % ≤ 5 %
Ignition Loss	DIN 52911	≤ 40 %
Gas permeability	DIN 3535	≤ 1 cm <sup>3</sup> /min
<b>* Maximum operating conditions:</b>		
Minimum temperature	- 20 °C / - 4 °F	
Peak temperature	150 °C / 302 °F	
Continuous temperature	110 °C / 230 °F	
Pressure	60 bar / 870 psi	

## Applications:

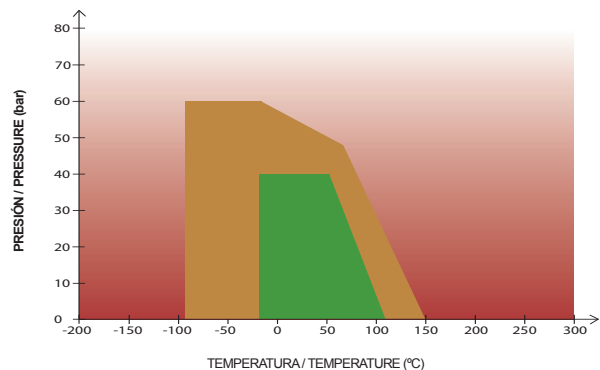
- Suitable to be used with water applications and low temperatures.
- This gasket is mainly recommended to be used in plumbing and fire sprinkler systems, such as economic filler in sandwich gaskets.
- Also for automotive applications as sprinkler system and other general applications.  
(No suitable to use with oil and gasoline)

## Available sizes:

- Thickness (mm): 0.5, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## ICP 9200G, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

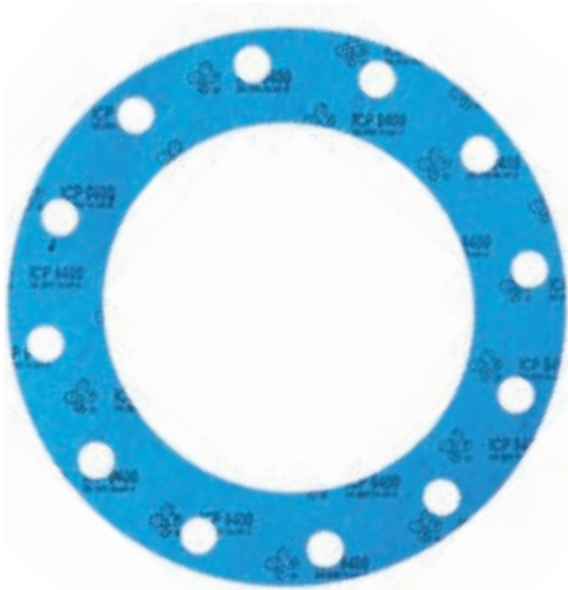


# ICP 9400



## Description:

Compressed sheet material based on a blend of aramid fibre and a high temperature mineral fibre mixed with a nitrile rubber.



## Applications:

- High compressive strength, high tensile strength and low gas permeability, which make it an excellent characteristics gasket for many industrial applications.
- Material suitable to be used with air, water, oils, hydrocarbons, gases and mild chemicals.
- Universal material especially recommended to be used in pumps, oil pans, water, diesel and petrol engines, compressors, hydraulic systems and shipbuilding.

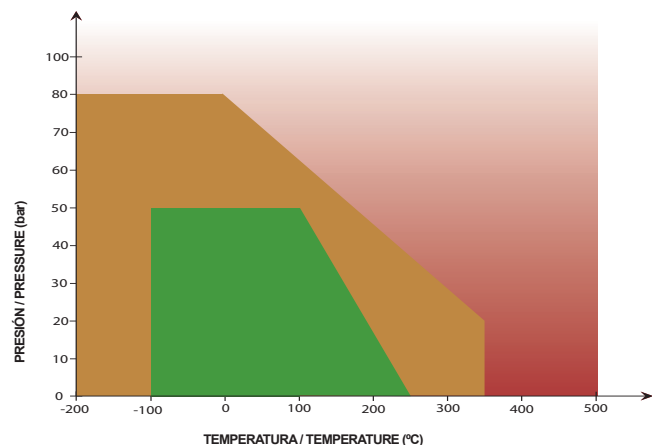
## Available sizes:

- Thickness (mm): 0.5, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.65 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	≥ 50 %
Compressibility	ASTM F 36 A	7 - 15%
Tensile Strength	ASTM F 152 DIN 52910	8 MPa 5 MPa
Fluid Resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 15 % ≤ 10%
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	≤ 10 % ≤ 10 %
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 15 % ≤ 5 %
Ignition Loss	DIN 52911	≤ 35 %
Gas permeability	DIN 3535	≤1 cm <sup>3</sup> /min
Residual Stress	DIN 52913 (50MPa) 16h / 300°C 16h / 175°C	~ 20 MPa ~ 28 MPa
<b>* Maximum operating conditions:</b>		
Minimum temperature	-100 °C / -148 °F	
Peak temperature	350 °C / 662 °F	
Continuous temperature	250 °C / 482 °F	
Pressure	80 bar / 1160 psi	

## ICP 9400, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

# ICP 9400M

## Description:

Compressed sheet material based on a blend of aramid fibre and a high temperature mineral fibre mixed with a nitrile rubber and an insertion of 304 stainless steel wire mesh.

Non-stick surfaces, with graphite impregnation to both surfaces.



PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	2.1 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	50 %
Compressibility	ASTM F 36 A	9 %
Tensile Strength	ASTM F 152 DIN 52910	≥ 18 MPa ≥ 16 MPa
Fluid Resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 15 % ≤ 10 %
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	≤ 10 % ≤ 10 %
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 15 % ≤ 5 %
Ignition Loss	DIN 52911	≤ 32 %
Gas permeability	DIN 3535	≤ 1 cm <sup>3</sup> /min
Residual Stress	DIN 52913 16h / 300°C 16h / 175°C	~ 29 MPa ~ 37 MPa
<b>* Maximum operating conditions:</b>		
Minimum temperature	-100 °C / -148 °F	
Peak temperature	350 °C / 662°F	
Continuous temperature	250 °C / 482 °F	
Pressure	100 bar / 1450 psi	

## Applications:

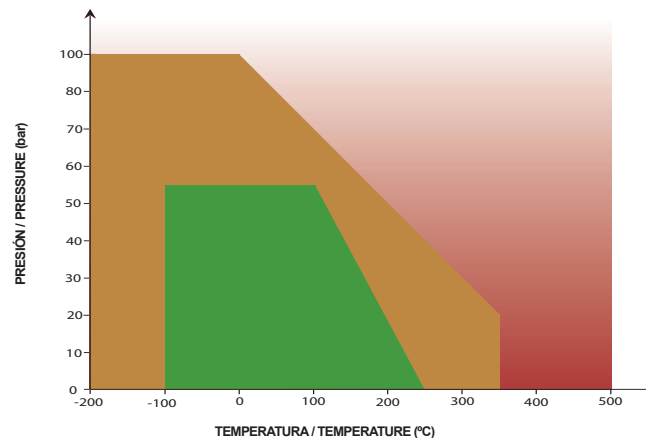
- Material suitable to be used in a wide range of applications, including hot and cold water, steam, oils, fuels, gases and a wide range of general chemicals.
- Universal material suitable to be used in pumps, oil pans, water, diesel and petrol engines, compressors, hydraulic systems and shipbuilding.

## Available sizes:

- Thickness (mm): 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## ICP 9400M, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory



# ICP 9600



## Description:

Compressed sheet material composed of mineral fibres for high temperature and aramid fibres, mixed with high quality NBR elastomer.



## Applications:

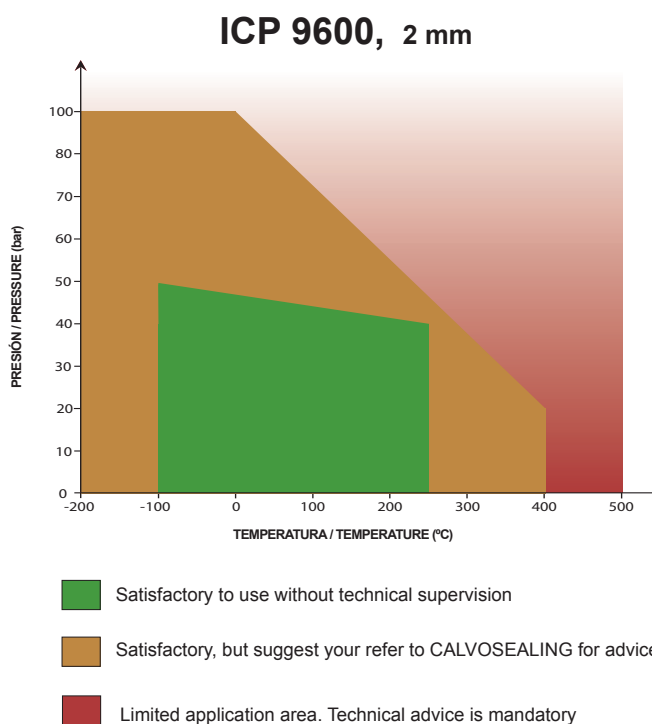
- The material offers excellent tensile strength, excellent outstanding gas permeability, as well as a high resistance to creep under elevated temperatures and pressures.
- It is especially recommended to be used across a wide range of media including low and intermediate pressure steam, oils, lubricant, gases, fuel, water, refrigerants, solvents and mild chemicals.
- Ideal to use in compressors, pipelines, gas meters and internal combustion engines, pumps, etc.

## Available sizes:

- Thickness (mm): 0.5, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0
- Sheet size (mm): 1500 x 1500

Possibility of supplying different sheet sizes under request (minimum quantities are required)

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.9 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	≥ 50 %
Compressibility	ASTM F 36 A	7 - 17 %
Tensile Strength	ASTM F 152 DIN 52910	14 MPa 11 MPa
Fluid Resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 10 % ≤ 8 %
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	≤ 10 % ≤ 7%
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 15 % ≤ 5 %
Ignition Loss	DIN 52911	≤ 35 %
Gas permeability	DIN 3535	≤ 0.5 cm <sup>3</sup> /min
Residual Stress	DIN 52913 16h / 300°C 16h / 175°C	~ 25 MPa ~ 36 MPa
<b>* Maximum operating conditions:</b>		
Minimum temperature	-100 °C / -148 °F	
Peak temperature	400°C / 752°F	
Continuous temperature	250°C / 482°F	
Pressure	100 bar / 1450 psi	



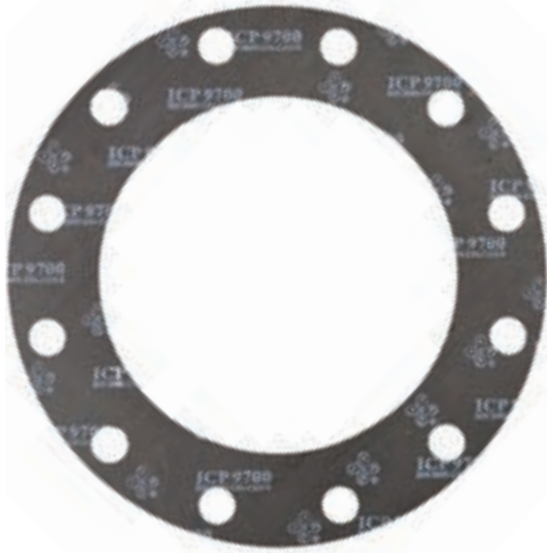


# ICP 9700



## Description:

Compressed sheet material based on a high purity graphite, reinforced with aramid fibres and a high quality rubber.



PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.6 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	≥ 50 %
Compressibility	ASTM F 36 A	7 - 12 %
Tensile Strength	ASTM F 152 DIN 52910	8 MPa -
Fluid Resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 10 % ≤ 8 %
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	≤ 10 % ≤ 7 %
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 10 % ≤ 7 %
Ignition Loss	DIN 52911	≤ 30 %
Gas permeability	DIN 3535	≤ 0.5 cm <sup>3</sup> /min
Residual Stress	DIN 52913 (50MPa) 16h / 300°C 16h / 175°C	~ 20 MPa ~ 30 MPa
<b>* Maximum operating conditions:</b>		
Minimum temperature		-100 °C / -148 °F
Peak temperature		400 °C / 752 °F
Continuous temperature		300 °C / 572 °F
Pressure		100 bar / 1450 psi

## Applications:

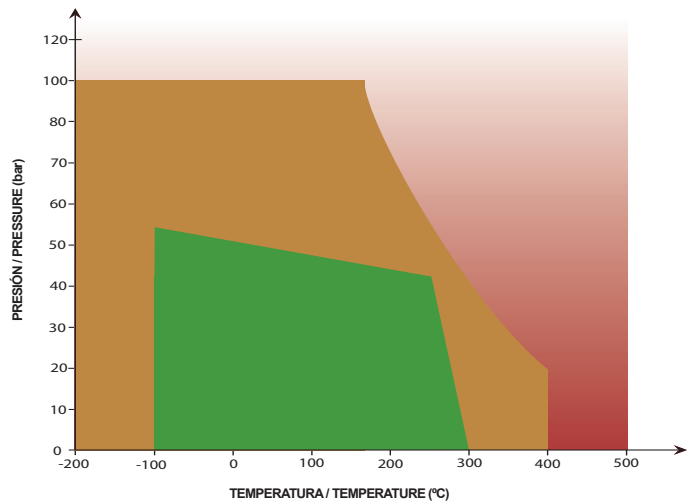
- Excellent heat resistance combining a good adaptability to the irregularities of the flange, providing better service to high temperatures.
- Designed to be used in pipeline systems, air supply, exhaust gas recirculation for motor engines, as well as all kind of applications where high pressures and temperatures are required.
- Material suitable to be used with oils, solvents, high temperature steam and gases. (High resistance to chemical attack)

## Available sizes:

- Thickness (mm): 0.8, 1.0, 1.5, 2.0, 3.0, 4.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

### ICP 9700, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory





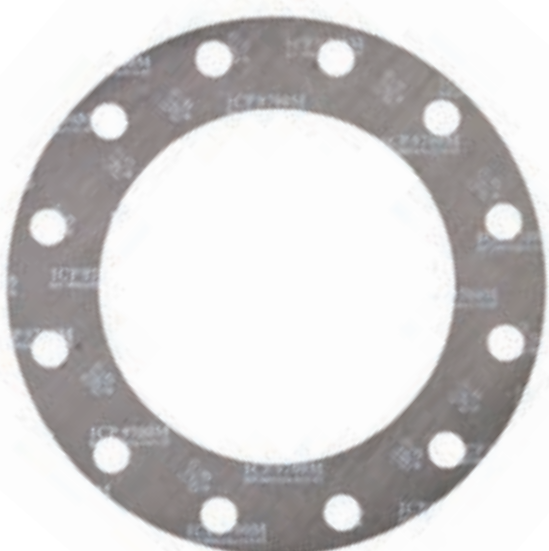


# ICP 9700M



## Description:

Compressed sheet material based on a high purity graphite, reinforced with aramid fibres and a high quality rubber. Reinforced with an insertion of 0.05 mm thick 316 stainless steel wire mesh.



## Applications:

- Excellent heat resistance combining a good adaptability to the irregularities of the flange, providing better service to high temperatures.
- Designed to be used in pipeline systems, air supply, exhaust gas recirculation for motor engines, as well as all kind of applications where high pressures and temperatures are required.
- Material suitable to be used with oils, solvents, high temperature steam and gases. (High resistance to chemical attack)

## Available sizes:

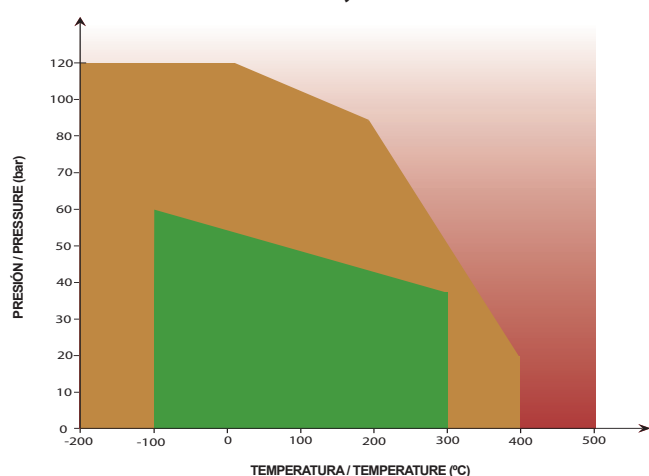
- Thickness (mm): 0.8, 1.0, 1.5, 2.0, 3.0, 4.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.9 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	30 %
Compressibility	ASTM F 36 A	15 %
Tensile Strength	ASTM F 152	15 MPa
Fluid Resistance	ASTM F 146	
ASTM OIL n°3 Mass increase Thickness increase	5h / 150°C	≤ 10 % ≤ 8 %
ASTM FUEL B Mass increase Thickness increase	5h / 23°C	15 % 5 %
ASTM Water / Coolant Mass increase Thickness increase	5h / 100°C	≤ 10 % ≤ 7 %
Ignition Loss	DIN 52911	≤ 30 %
Gas permeability	DIN 3535	≤ 0.5 cm <sup>3</sup> /min
Residual Stress	DIN 52913 (50MPa) 16h / 300°C 16h / 175°C	~ 26 MPa ~ 35 MPa
<b>* Maximum operating conditions:</b>		
Minimum temperature		-100 °C / -148 °F
Peak temperature		400 °C / 752 °F
Continuous temperature		300 °C / 572 °F
Pressure		120 bar / 1740 psi

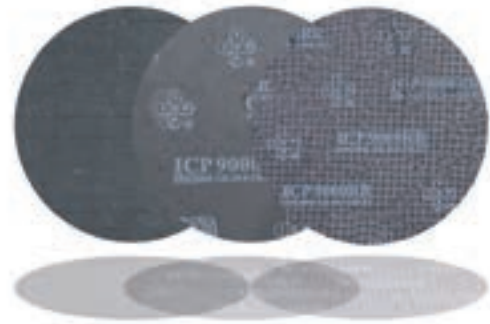
Gasket Selection

## ICP 9700M, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

# Expanded Graphite Sheet



**CALVOSEALING** produces different patterns of expanded graphite sheets (without insertion, stainless steel laminated insertion, etc.). They are mainly used in pipes where high temperatures and pressures are required.

## PROPERTIES

- Excellent chemical resistance and high levels of sealing stability.
- Ideal for a wide range of applications in a variety of conditions at high temperature and pressure, mechanical and thermal shock.

## APPLICATIONS

- Chemical Industry
- Petrochemical Industry
- Power Plants

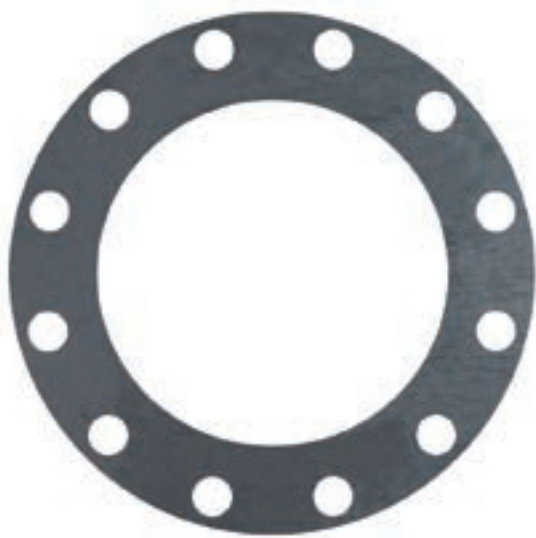




# ICP 9000

## Description:

High quality expanded graphite sheet.  
(98% purity)



## Applications:

- Ideal for a wide range of applications in a variety of conditions at high temperature and pressure, mechanical and thermal shock.
- Excellent chemical resistance, high levels of sealing stability and fire safe.
- It offers low tensile strength, even at high temperatures.
- Exceptionally low leachable chloride to resist corrosion.
- Recommended use in heat exchanger (shell and tubes) and demineralization of water.

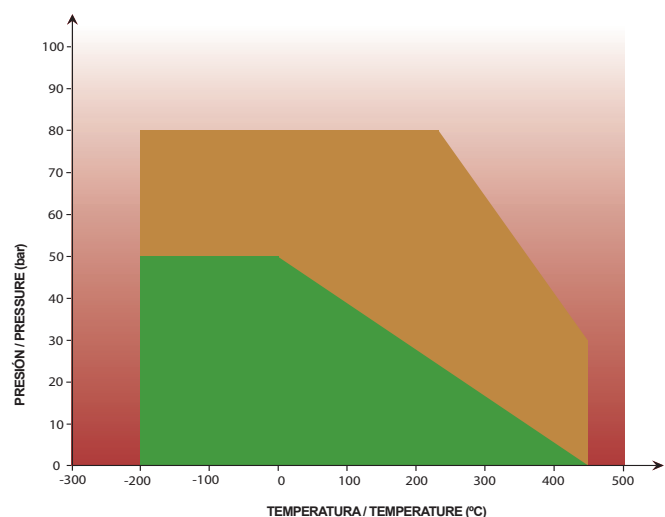
## Available sizes:

- Thickness (mm): 0.5, 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1000 x 1000  
1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.1 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	10 - 15 %
Compressibility	ASTM F 36 A	40 - 50 %
Ash content	DIN 51 903	< 2 %
Leachable chloride	DIN 51 903	> 50 ppm
Gas permeability	DIN 3535	< 0.6 cm <sup>3</sup> /min
Lakeage Rate	DIN 28090-2	0.08 mg/(s/m)
<b>* Maximum operating conditions:</b>		
Continuous temperature		250 °C / 482 °F
Air or oxidizing atmosphere		450 °C / 842 °F
Reducing or inert atmosphere		2500 °C/ 4532 °F
Minimum temperature		-200 °C / -328 °F
Pressure		80 bar / 1160 psi

ICP 9000, 2 mm



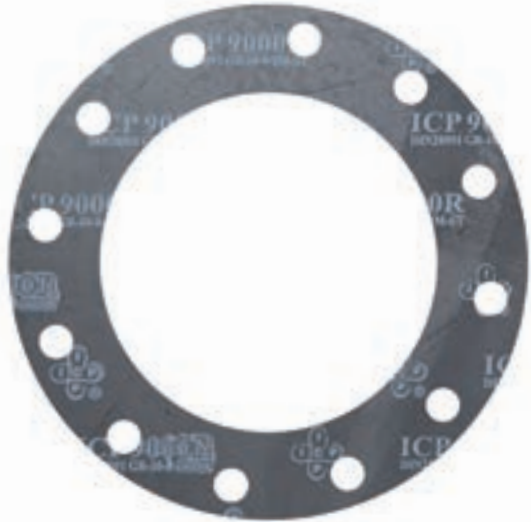
- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory



# ICP 9000R

## Description:

High quality expanded graphite sheet, reinforced with a 0.05 mm thick 316 Stainless steel foil. (98 % purity)



PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.1 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	10 - 15 %
Compressibility	ASTM F 36 A	40 - 50 %
Ash content	DIN 51 903	< 2 %
Leachable chloride	DIN 51 903	< 50 ppm
Gas permeability	DIN 3535	< 0.6 cm <sup>3</sup> /min
Lakeage Rate	DIN 28090-2	0.08 mg/(s/m)
<b>* Maximum operating conditions:</b>		
Air or oxidizing atmosphere		450 °C / 842 °F
Reducing or inert atmosphere		700 °C / 1292 °F
Minimum temperature		-200 °C / -328 °F
Pressure		150 bar / 2175 psi

## Applications:

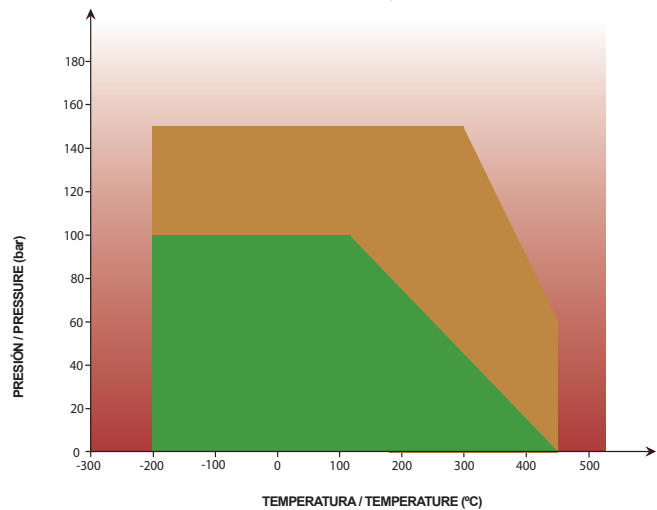
- Recommended for high temperature and high pressure sealing applications.
- The inclusion of steel reinforcing core gives a resistant sheet with excellent handling characteristics and mechanical strength.
- ICP 9000R can be used to seal a broad range of chemicals, with the exception of strong oxidizing agents at extreme temperatures and pressures.
- Recommended use in thermal power plants and petrochemical industry.

## Available sizes:

- Thickness (mm): 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1000 x 1000  
1500 x 1500

*Possibility of supplying different sheet sizes with metallic foils insertion under request (minimum quantities are required)*

**ICP 9000R, 2 mm**



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

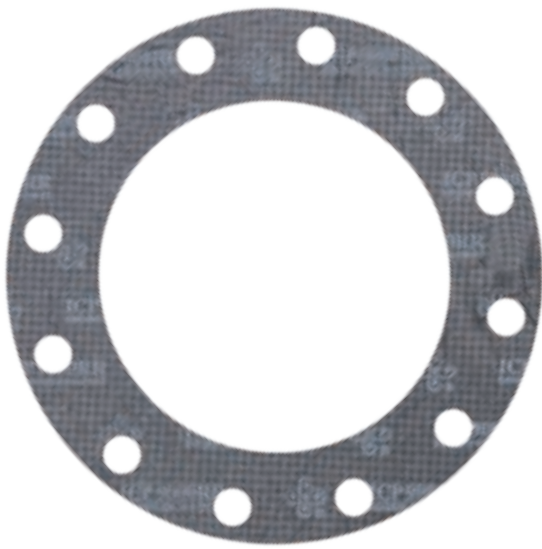




# ICP 9000RR

## Description:

High quality expanded graphite sheet, reinforced with a 0.1 mm thick tanged 316 Stainless steel core. (98% purity)



## Applications:

- Recommended for applications involving high sealing loads where gasket blow out resistance is required.
- The inclusion of tanged metal gives rise to a resistant sheet with excellent handling characteristics and mechanical strength.
- It is used in pipeline and shipbuilding applications.
- Its wide temperature range and excellent tensile strength retention makes it ideal for steam systems and petrochemical and manufacturing industries processes.

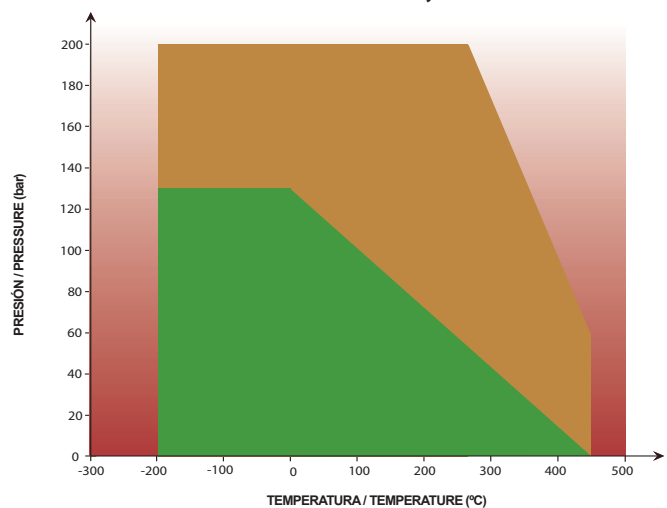
## Available sizes:

- Thickness (mm): 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1000 x 1000  
1500 x 1500

*Possibility of supplying different sheet sizes with metallic foils insertion under request (minimum quantities are required)*

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-2	1.1 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	15 - 20 %
Compressibility	ASTM F 36 A	40 - 50 %
Ash content	DIN 51 903	< 2 %
Leachable chloride	DIN 51 903	< 50 ppm
Gas permeability	DIN 3535	< 0.6 cm <sup>3</sup> /min
Lakeage Rate	DIN 28090-2	0.08 mg/(s/m)
<b>* Maximum operating conditions:</b>		
Air or oxidizing atmosphere		450 °C / 842 °F
Reducing or inert atmosphere		700 °C / 1292 °F
Minimum temperature		-200 °C / -328 °F
Pressure		200 bar / 2900 psi

ICP 9000RR, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

# MICA Sheet

**CALVOSEALING MICA** gasket have been developed for the production of high temperature resistant gaskets up to 1000 °C (1832 °F). It does not contain any asbestos and is inert to most chemical substances.



## PROPERTIES

- Good chemical resistance
- Low thermal conductivity
- Resistant to embrittlement
- Minimum material lost at high temperatures
- Suitable for use in exhaust manifolds, turbines, flange connections, furnaces, air heat exchangers and burner systems.

## APPLICATIONS

- Chemical Industry
- Petrochemical Industry
- Automotive Industry
- Shipbuilding
- Metallurgy



# High temperature gasket material



## ICP 9900RR

### Description:

ICP 9900RR is the brand-new gasket material with extremely high temperature stability. It is based on processed phlogopite mica and thus resists to continuous temperatures of up to 1000 °C (1832 °F).

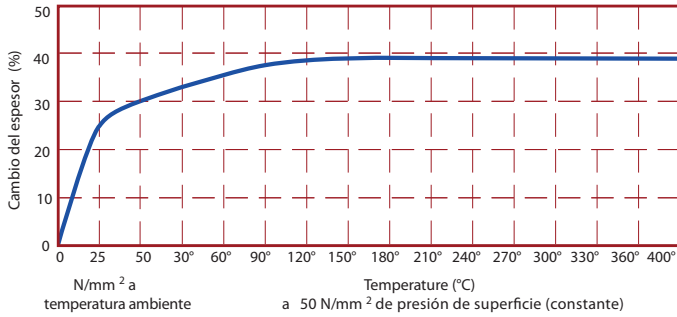
Thanks to tanged metal insertion from stainless steel (AISI 316L/ 1.4404) the ICP 9900RR offers excellent handling and processing characteristics. The combination of tanged metal insert, high-quality phlogopite mica and an optimised low proportion of binder ensures a so far unknown high and long-term sealability of mica gaskets even under high temperatures.

ICP 9900RR is predestined to meet all sealing requirements in hot exhaust systems and in all applications where continuous temperatures of up to 1000 °C (1832 °F) are to withstand.

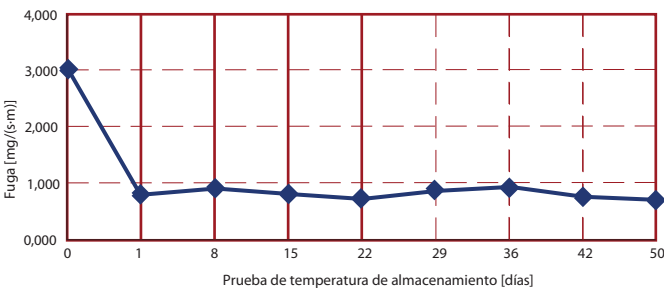
### Applications:

- Ensures the sealing in applications where temperatures up to 1000°C (1832 °F) can be reached.
- Gaskets made of ICP 9900RR are used in automobile exhaust manifolds, gas turbines, gas and oil burners, heat exchangers, refineries, chemical industry, medical industry, petrochemical industry, turbo generators, fuel cells and flange connections.
- It is also used as a filler for Spiral Wound Gaskets.

## Compression set - Temp. Test 2.0 mm

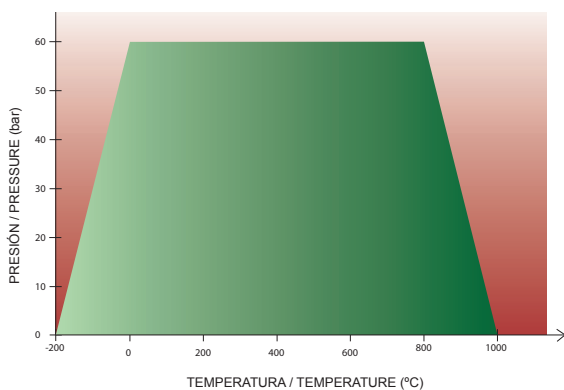


## Long-term leakage at 500°C, 5 bar N<sub>2</sub> acc. to DIN 28 090-1



The material achieves its maximum sealing efficiency at high temperatures.

## ICP 9900RR, 2 mm



- Satisfactory to use without reference
- Limited application area. Technical advice is mandatory

## Physical parameters:

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Binders	Silicone resin	
Colour	Greenish-gold	
Density	DIN 28 090-2	1.60 g/cm <sup>3</sup>
Tensile strength longitudinal transverse	DIN 52 910	35 N/mm <sup>2</sup> 35 N/mm <sup>2</sup>
Residual stress $\sigma_{dE/16}$ 300 °C	DIN 52 913	32 N/mm <sup>2</sup>
Compressibility	ASTM F 36 J	25 %
Recovery	ASTM F 36 J	30 %
Cold compressibility $\epsilon_{KSW}$	DIN 28 090-2	20 %
Cold recovery $\epsilon_{KRW}$	DIN 28 090-2	5 %
Hot creep $\epsilon_{WSW/300}$	DIN 28 090-2	10 %
Hot recovery $\epsilon_{WRW/300}$	DIN 28 090-2	2 %
Recovery R	DIN 28 090-2	0.04 mm
Thermal conductivity (perpendicular)		0.3 W/m.K
Dielectric strength	IEC 243-23 °C	30 kV
Specific leakage rate 20 °C / 5 bar	DIN 28 090-2	3 [mg/(s.m)]
Specific leakage rate 500°C / 5 bar	DIN 28 090-2	0.8 [mg/(s.m)]
<b>* Maximum operating conditions:</b>		
Maximum Continuous Temperature	700 °C / 1292 °F	
Maximum Peak Temperature	1000 °C / 1832 °F	
Minimum Temperature	-200 °C / -328 °F	
Pressure	60 bar / 870 psi	

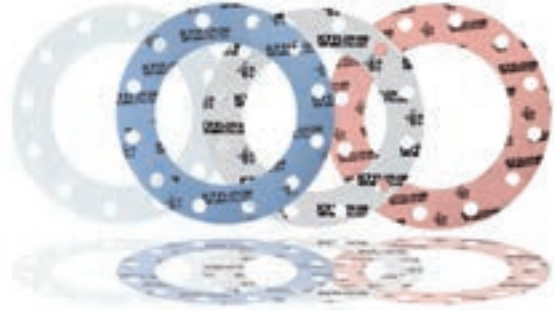
## Available sizes:

- Thickness (mm): 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1000 x 1200

*Possibility of supplying different sheets sizes under request (minimum quantities are required)*



# PTFE Sheet



**CALVOSEALING** offers a wide range of different qualities of PTFE sheets, where you can find from virgin PTFE to modified PTFE.

## PROPERTIES

- Outstanding chemical resistance
- Non-corrosive, non wetting, clean and odorless material
- Excellent electrical and thermal insulation to virgin PTFE sheets.
- Excellent tensile strength and tight sealing, such as high ageing resistance under high pressures.
- Tolerate temperatures from -200 °C to 260 °C (-328 °F to 500 °F).

## APPLICATIONS

- Chemical Industry
- Food Industry
- Pharmaceutical Industry



# ICP PTFE

## Description:

Gasket material made of 100% virgin PTFE.



## Physical parameters:

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-1	2.1 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	35 - 40 %
Compressibility	ASTM F 36 A	10 - 20 %
Tensile Strength	ASTM F 152	20 MPa
Residual Stress	ASTM F38A	15 MPa
Leakage Rate	ASTM F37	0.01 mg/(m.s)
<b>* Maximum operating conditions:</b>		
Continuous temperature		260 °C / 500 °F
Minimum temperature		-200 °C / -328 °F
Maximum pressure		86 bar / 1247 psi
pH		0 - 14

## Applications:

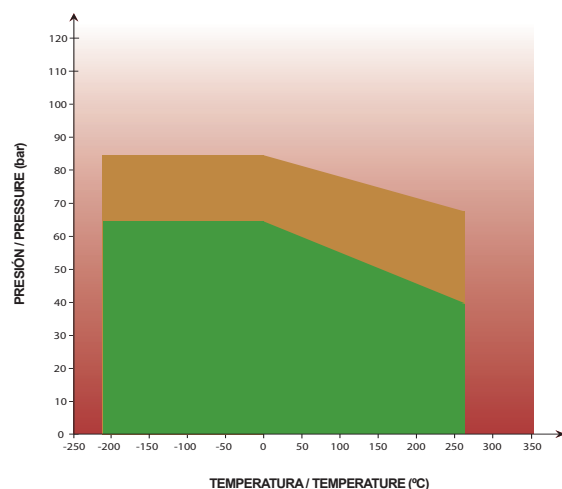
- Compatible with all chemical common products, except strong alkalis, fluorine and fluorine gases, especially with high temperatures and pressures.
- Excellent tensile strength, excellent gas-tight sealing, as well as a very good resistance to the ageing with high pressures and temperatures.
- Simple and very adaptable to irregularities.

## Available sizes:

- Thickness (mm): 0.5, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 6.0, 8.0, 10.0
- Sheet size (mm): 1200 x 1200

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## ICP PTFE, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory

# ICP FLON200

## Description:

Modified PTFE material manufactured with the addition of hollow glass-microspheres.



## Applications:

- The addition of the hollow glass-microspheres improves the creep resistance of the material and reduces the cold flow characteristics, making the material more resistant.
- Suitable for sealing all chemicals with the exception of molten alkali metals, fluorine gas, hydrogen fluoride or materials which may generate these.
- Recommended for applications such as process systems, food and beverage, petrochemical, chemical and pharmaceutical industries.

## Available sizes:

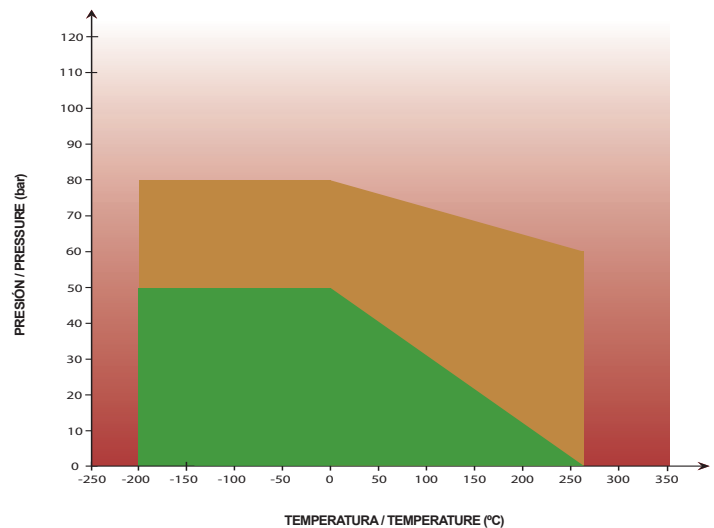
- Thickness (mm): 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## Physical parameters:

PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-1	1.70 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	25 %
Compressibility	ASTM F 36 A	25 - 45 %
Tensile Strength	ASTM F 152	13 MPa
Creep relaxation	ASTM F38A	40 %
Leakage Rate	ASTM F37	≤ 1 x 10 <sup>-4</sup> cm <sup>3</sup> /s
<b>* Maximum operating conditions:</b>		
Maximum temperature		260 °C / 500 °F
Minimum temperature		-200 °C / -328 °F
Maximum pressure		80 bar / 1160 psi
pH		0 - 14

### ICP FLON200, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory







# ICP FLON300

## Description:

Modified PTFE material manufactured with the addition of barium sulphate.



PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-1	2.70 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	40 %
Compressibility	ASTM F 36 A	4 - 10 %
Tensile Strength	ASTM F 152	14 MPa
Creep relaxation	ASTM F38A	11 %
Leakage Rate	ASTM F37	≤ 1 x 10 <sup>-4</sup> cm <sup>3</sup> /s
<b>* Maximum operating conditions:</b>		
Maximum temperature		260 °C / 500 °F
Minimum temperature		-212 °C / -350 °F
Maximum pressure		100 bar / 1450 psi
pH		0 - 14

## Applications:

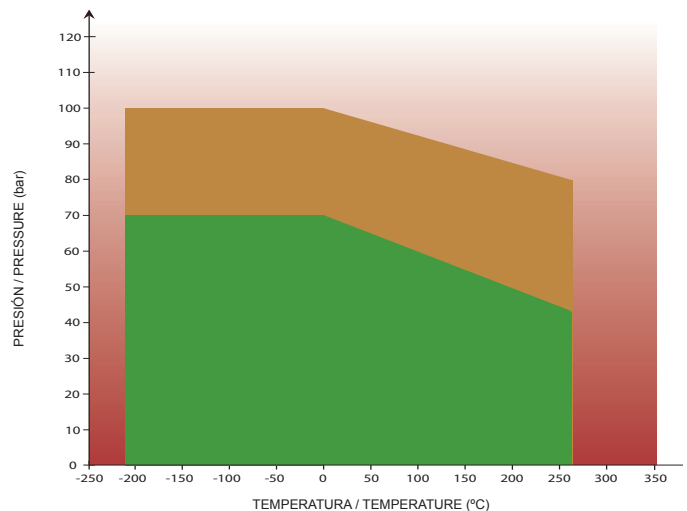
- High density of the material makes ideal for use in steel pipework and equipment where high bolt loads are required.
- Compatible with all chemical common products, except molten alkali metals, fluorine gas, hydrogen fluoride or materials which may generate these.
- Recommended for applications such as process systems, pulp and paper, food and beverage, chemical, petrochemical and pharmaceutical industries.

## Available sizes:

- Thickness (mm): 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## ICP FLON300, 2mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory



# ICP FLON400

## Description:

Modified PTFE material manufactured with the addition of silica.



PROPERTIES (Thickness 2 mm)	STANDARD	VALUE
Density	DIN 28090-1	2.1 g/cm <sup>3</sup>
Recovery	ASTM F 36 A	40 %
Compressibility	ASTM F 36 A	7-12 %
Tensile Strength	ASTM F 152	13 MPa
Creep relaxation	ASTM F38A	18 %
Leakage Rate	ASTM F37	≤1 x 10 <sup>-4</sup> cm <sup>3</sup> /s
<b>* Maximum operating conditions:</b>		
Maximum temperature		260 °C / 500 °F
Minimum temperature		-212 °C / -350 °F
Maximum pressure		100 bar / 1450 psi
pH		0 - 14

## Applications:

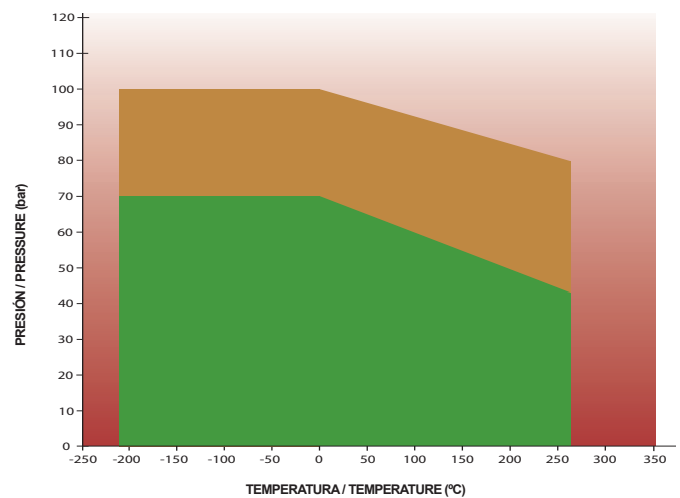
- A general purpose grade for sealing applications across the whole pH range.
- It is particularly suitable for use with strong acids (except hydrofluoric acid) and alkalis. Other applications include solvents, fuels, water, steam and chlorine.
- Recommended for applications such as process systems, pulp and paper, food and beverage, chemical, petrochemical and pharmaceutical industries.

## Available sizes:

- Thickness (mm): 1.0, 1.5, 2.0, 3.0
- Sheet size (mm): 1500 x 1500

*Possibility of supplying different sheet sizes under request (minimum quantities are required)*

## ICP FLON400, 2 mm



- Satisfactory to use without technical supervision
- Satisfactory, but suggest your refer to CALVOSEALING for advice
- Limited application area. Technical advice is mandatory





**Authorized Distributor**

*GORE Sealant Technologies*



**CALVOSEALING**

✦ Global Business Group





## **SOLVING THE MOST CHALLENGING SEALING PROBLEMS**

For nearly 40 years, the Sealant Technologies Group of W. L. Gore & Associates has fostered a solid knowledge of factors that influence the sealing of piping systems, vessels, pumps and valves. Our singular focus has resulted in the development of innovative and top-performing gaskets and packings. We've also established a comprehensive technical services program, specially designed to help customers determine the best solutions for their toughest sealing applications.

## **PRODUCTS THAT SEAL**

Because of its unique combination of properties, GORE® expanded PTFE virtually eliminates the drawbacks of conventional PTFE sealing and fluid handling products. Our gasket configurations provide solutions for flanges that are fragile, warped or misaligned. We also enable users to standardize one gasket material across a wide range of process piping systems. Our packings are among the highest-performing, most universal products on the market today.



**CALVOSEALING**

Global Business Group

**GORE® Universal Pipe  
Gasket (Style 800)**

**GORE® Series 500 Gasket Tape**

**GORE® Series 600 Gasket Tape**

**GORE® Joint Sealant DF**

**GORE® GR Sheet Gasketing**

**PRODURA® Sheet Gasketing**

**PRODURA® Joint Sealant**



**Authorized Distributor**  
GORE Sealant Technologies





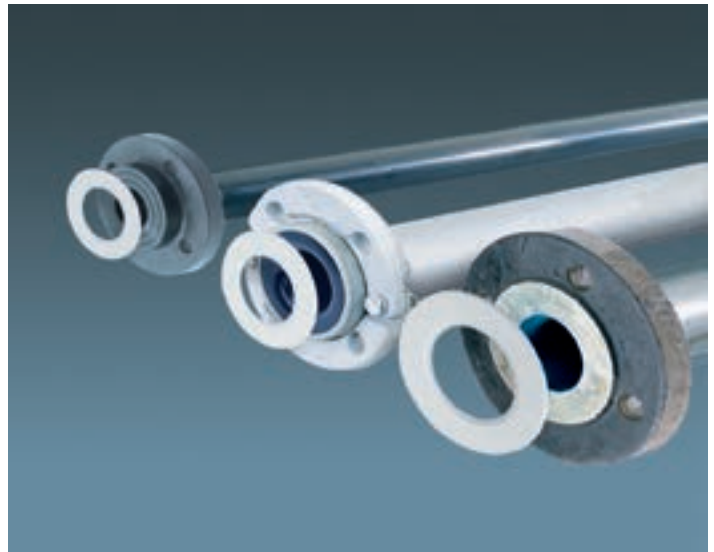
## GORE® Universal Pipe Gasket (Style 800)

### The reliable universal pipe gasket for all standard flanges

**GORE® Universal Pipe Gasket (Style 800)** is used to seal all types of flanges in chemical process piping. Designed to meet the needs of many different piping materials, they are ideal for standardising gasket materials across steel, glass-lined steel and FRP systems, wherever a non-metallic gasket can be used.

Unaffected by even the most aggressive chemicals, Style 800 gasket combines all the properties of expanded PTFE with exceptional sealability. Engineered to deliver superior bolt load retention, these gaskets exhibit outstanding creep resistance for reliable sealing of piping flanges. And due to their unique design, they provide the lowest stress-to-seal for applications in the most fragile of plastic, steel and glass-lined flanges.

Look to **GORE® Universal Pipe Gasket (Style 800)** for superior performance in three important areas: conforming to irregular surfaces, helping to protect flanges and sealing reliably.



Gasket Selection

#### THECNICAL DATA

##### MATERIAL

100% expanded PTFE (ePTFE) with multidirectionally oriented fibril structure.

##### TEMPERATURE RANGE OF THE MATERIAL

-268°C to +315°C / -450°F to +600°F

##### CHEMICAL RESISTANCE

Resistant to all media (pH 0 – 14), except for molten or dissolved alkali metals and elemental fluorine particularly at high temperatures and pressures.

##### STABILITY

Not subject to ageing within the material's temperature range, UV-resistant and can be stored indefinitely.

##### PHYSIOLOGICAL SAFETY

FOR INDUSTRIAL USE ONLY.

Not for use in food, drug, cosmetic or medical device manufacturing, processing or packaging operations.

##### OPERATING RANGE

The maximum applicable pressure as well as the maximum safe operating temperature depend mainly on the equipment. Standard pressures range from full vacuum to 40 bar.

#### KEY FEATURES

- Made from 100 % expanded PTFE (ePTFE)
- Seals at lowest bolt load
- Highly conformable
- High chemical and thermal resistance
- High dimensional stability and creep resistance
- High blow-out resistance

#### KEY BENEFITS

- Seals all types of standard flanges
- Standardisation: only one type of gasket in the piping system
- No misuse of a wrong gasket
- Seals highly permeable and aggressive fluids
- Seals damaged or misaligned flanges
- Seldom needs retorquing
- Superior sealing reliability and long gasket life
- Lowers total sealing cost

#### TYPICAL APPLICATIONS

- Steel flanges
- Plastic flanges
- Glass-lined steel flanges
- Lined flanges

## MECHANICAL DATA

ASTM F-36  
Blow-out safety (VDI 2200) 55%  
Class A/60 bar  
Class B/60 bar  
Class C/25 bar

## SEALABILITY ACCORDING TO 13555

ASTM F-37 ("Y" value) 1,500 psi  
ASTM F-568 ("m" value) 2.4  
"TA-Luft" Yes

Thickness (mm)	P <sub>QR</sub> Data			Q <sub>Smax</sub>	Q <sub>min (0.1)*</sub>	Q <sub>smin*</sub>
	20 °C	150 °C	230 °C	230 °C		
1.5	0.94	0.87	0.84	225 MPa	6 MPa	5 MPa
3.0	0.85	0.72	0.62	150 MPa	6 MPa	5 MPa

\* Q<sub>Smin</sub> and Q<sub>min</sub> tests according to EN 13555 do not provide data < 10 MPa.  
The figures are based on additional tests and experience.

## AVAILABLE SIZES AND SIZE SELECTION

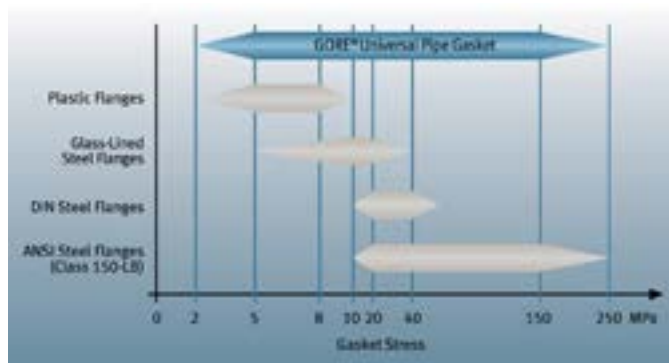
		THICKNESS (mm)						
		1.5	3.0	6.0**				
DN	10	●	●	●	1/2"	●	●	●
	15	●	●	●	3/4"	●	●	●
	20	●	●	●	1"	●	●	●
	25	●	●	●	1 1/4"	●	●	●
	32	●	●	●	1 1/2"	●	●	●
	40	●	●	●	2"	●	●	●
	50	●	●	●	2 1/2"	●	●	●
	65	●	●	●	3"	●	●	●
	80	●	●	●	3 1/2"	●	●	●
	100	●	●	●	4"	●	●	●
	125	●	●	●	5"	●	●	●
	150	●	●	●	6"	●	●	●
	200	●	●	●	8"	●	●	●
	250	●	●	●	10"	●	●	●
	300	●	●	●	12"	●	●	●
	350	●	●	●	14"	●	●	●
	400	●	●	●	16"	●	●	●
	450	●	●	●	18"	●	●	●
	500	●	●	●	20"	●	●	●
	600	●	●	●	24"	●	●	●

- recommended thickness 1.5 for steel piping
- recommended thickness 3.0 for FRP piping
- recommended thickness 6.0 for glass-lined steel piping

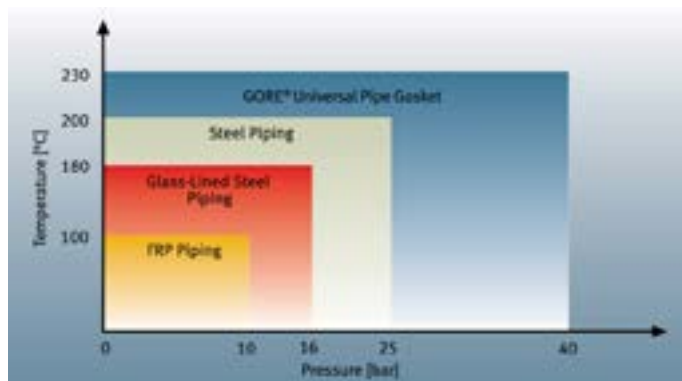
Pressure rating PN 6 - PN 40 Class 150-LB. Ring, Class 300-LB. Ring

\*\* All 6 mm thicknesses (DN size) deviate from EN 1514-1 by having reduced inner diameter.

## MAXIMUM GASKET STRESS OF DIFFERENT FLANGE MATERIALS



## APPLICATION AREAS OF STANDARD PIPING



95% of all chemical processes run at temperatures of up to 200°C and 25 bar. GORE® Universal Pipe Gasket (Style 800) offers the highest performing ePT-FE gasket and largest operating zone.

## QUALITY ASSURANCE

The GORE Quality Management System has been certified by DQS in accordance with ISO 9001.

Component suppliers are also integrated into this system.

## TESTS AND CERTIFICATES

- EN 13555
- DIN 28091-3
- TA Luft ("high quality seal") VDI 2440
- Blow-out resistance VDI 2200 (draft 06-2005)
- US standards: HOBT2-cycling, ARLA, ROTT



## GORE® Series 500 Gasket Tape

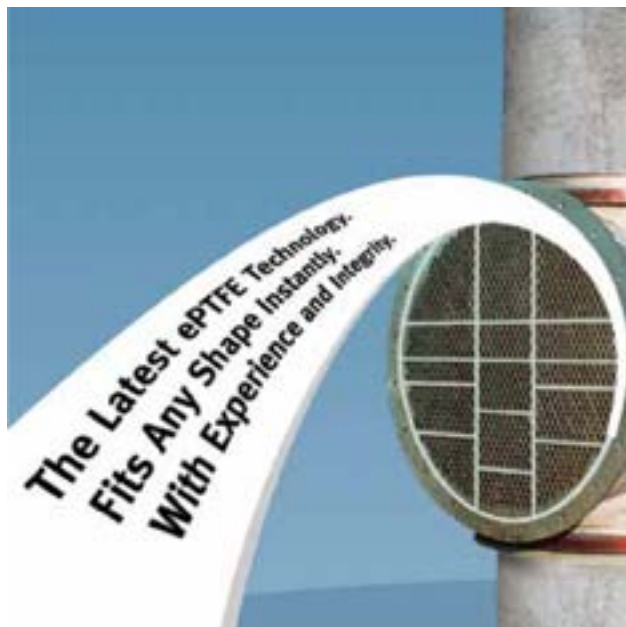
### Saves Your Time, Money and Trouble

GORE® Series 500 Gasket Tape represents the latest advancement in worry-free sealing performance and efficiencies for steel piping and equipment. Based on recently patented \* technology, this cutting-edge product delivers dramatically improved creep resistance to maximize the operational reliability of large steel flanged applications.

GORE® Series 500 Gasket Tape fits any shape instantly. The highly compressible tape forms a very tight seal that is long-lasting while also handling the rigors of virtually any chemical process.

Unlike traditional large gaskets, GORE® Series 500 Gasket Tape is formed in place quickly and easily. Customization at the time of installation eliminates the long lead times for ordering pre-cut gaskets and minimizes the need for extensive gasket inventories.

GORE® Series 500 Gasket Tape is brought to you by the leader in ePTFE technology, delivering knowledge, integrity and proven results - along with decades of experience working with processing plants throughout the world.



Gasket Selection

#### TECHNICAL DATA

##### MATERIAL

100 % expanded PTFE (ePTFE), with multidirectionally oriented fibril structure.

##### TEMPERATURE RANGE OF THE MATERIAL

-268°C to +315°C / -450°F to +600°F

##### CHEMICAL RESISTALNCE

Resistant to all media (pH 0 -14), except for molten or dissolved alkali metals and elemental fluorine particularly at high temperatures.

##### OPERATING PRESSURE

In general, vacuum to 40 bar (580 psi). The specific application governs the operating range of the installed gasket due to the strong influence of many factors, such as operating temperature, flange size, gasket stress, and installation practices.

##### SHELF LIFE

The ePTFE gasket is not subject to aging and can be stored indefinitely. To minimize adhesive degradation store the product in ambient conditions.

##### PHYSIOLOGICAL SAFETY

FOR INDUSTRIAL USE ONLY.  
Not for use in food, drug, cosmetic or medical device manufacturing, processing or packaging operations.

#### KEY FEATURES

- Gasket tape on a spool
- 100 % ePTFE
- Resists creep & cold flow
- Chemically inert
- Highly conformable

#### KEY BENEFITS

- Fits any shape instantly
- Eliminates long lead times to prefabricate large, one-piece gaskets
- Easy to handle
- Can be used with virtually any media to enabl gasket consolidation
- Overcomes flange deviation
- Enhances system reliability & safety

## TYPICAL PROPERTIES

Thickness	3 mm (1/8")	6 mm (1/4")
-----------	-------------	-------------

### Creep Relaxation \*

P <sub>QR</sub> , 23 °C (73 °F)	0.95	0.9
P <sub>QR</sub> , 169 °C (336 °F)	0.57	0.46

### Sealability \*

Q <sub>min</sub> (0,1)	19 MPa (2,755 psi)	23 MPa (3,335 psi)
m & y	2.5 & 2,750 psi	2.5 & 3,350 psi

### Maximum Surface Stress (Crush)\*

Q <sub>Smax</sub> Ambient Temperature	170 MPa (25,000 psi)	160 MPa (23,000 psi)
--	-------------------------	-------------------------

### Compressibility

ASTM F-36	54 %	44 %
-----------	------	------

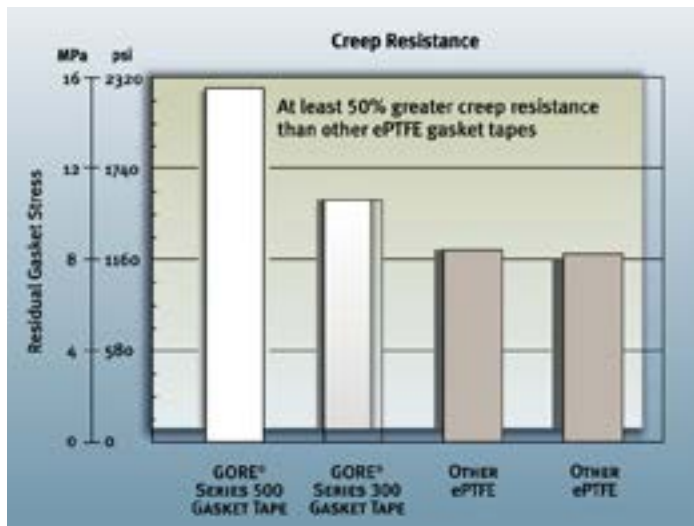
### Recovery

ASTM F-36	16 %	27 %
-----------	------	------

\* Recognizing the absence of standard tests for form-in-place gaskets, GORE has leveraged the latest industry test methods to characterize the performance of **GORE® Series 500 Gasket Tape**. Creep relaxation, sealability, and crush data is based on EN13555, a European test standard for ring gaskets that defines parameters for flange design. These tests were conducted with a fixture stiffness of 500KN/mm. Creep relaxation was measured at the corresponding minimum stress to seal using 30 mm wide strips.

## QUALITY ASSURANCE

The GORE Quality Management System has been certified by DQS in accordance with ISO 9001. Component suppliers are also integrated into this system.



Creep resistance data based on EN13555 using 15mm x 3mm tape formed into a 150 mm skived ring. P<sub>QR</sub> values were obtained at 30 MPa initial gasket stress at 150 °C.

## AVAILABLE SIZES

Width (mm)	Thickness (mm)	
	3	6
10	●	
15	●	●
20	●	●
25	●	●
30	●	●

Available on 5, 10 y 20 m spools

## INSTALLATION

Please refer to the detailed installation instructions supplied on request by **CALVO SEALING**.







## GORE® Series 600 Gasket Tape

### For glass-lined steel equipment flanges

**GORE® Series 600** gasket tape is a form-in-place gasket for glass-lined equipment that guards against premature gasket failure.

Unlike PTFE envelope gaskets, it will not degrade due to chemical attack, and will ensure a tight and long-lasting seal. **GORE® Series 600** gasket tape is the ideal choice for sealing large diameter flanges.

Made from 100 % multi-directionally expanded PTFE, the entire gasket is chemically inert. As a result, the user will not experience the sealing problems associated with aggressive media or outside environment. This unique gasket tape conforms to the imperfections common in glass-lined flange surfaces, while maintaining dimensional stability for superior sealing reliability. This gasket tape can be installed easily and quickly, yielding initial savings. And since it minimizes unexpected process upsets, process productivity gains are also achieved.

#### THECNICAL DATA

##### MATERIAL

100% expanded PTFE (ePTFE) with multidirectionally oriented fibril structure.

##### TEMPERATURE RANGE OF THE MATERIAL

-268°C to +315°C / -450°F to +600°F

##### CHEMICAL RESISTANCE

Resistant to all media (pH 0 – 14), except for molten or dissolved alkali metals and elemental fluorine particularly at high temperatures and pressures.

##### STABILITY

Not subject to ageing within the material's temperature range, UV-resistant and can be stored indefinitely. Storage of more than 12 months after delivery of the product may result in a decline of adhesive strength.

##### PHYSIOLOGICAL SAFETY

FOR INDUSTRIAL USE ONLY.

Not for use in food, drug, cosmetic or medical device manufacturing, processing or packaging operations.

##### OPERATING RANGE

The maximum applicable pressure as well as the maximum safe operating temperature depend mainly on the equipment. Standard pressures range from full vacuum to 40 bar.



#### KEY FEATURES

- Made from 100 % expanded PTFE (ePTFE)
- Resists creep and cold flow
- Wide temperature range
- Easy to install and overlay
- Dimensionally stable
- Highly conformable
- Physiologically harmless

#### KEY BENEFITS

- Superior sealing reliability in operation
- Reduces installation costs
- Can be used with virtually any media
- Retains stress for minimum retorque

#### TYPICAL APPLICATIONS

- Glass-lined mixer vessels
- Glass-lined columns
- Glass-lined storage tanks and receiver tanks

## TYPICAL PROPERTIES\*\*

• AD code of practice B7

$$k_o * k_o = 24.5 * b_o$$

$$k_i = 2.5 * b_o$$

• DIN 28090

### Minimum stress to seal

Parameter*	
DIN $\sigma_{vU}$ (40 bar 0.01 mg(m*s))	24.5 MPa
DIN $\sigma_{vU}$ (6 bar 0.01 mg(m*s))	20 MPa
DIN $\sigma_{bU}$	5 MPa

\* Other parameters available on request

\*\* Above properties refer to 3 mm thickness

### Maximum stress to seal

$$DIN \sigma_{vO} = 150 \text{ MPa}$$

• ASTM and PVRC paramters (design codes) are available on request.

## AVAILABLE SIZE AND SIZE SELECTION

Width (mm) \ Thickness (mm)	Thickness (mm)		
	3	6	9
40	●	●	●
55	●	●	●
65	●	●	●

available on 2.5 and 5 m spools

available on 5, 10 and 15 m spools

The gasket width selected should be such that after installation the inside of the gasket tape ends roughly in line with the inside of the equipment. Along the outside diameter of the flange the tape should protrude at least 3 mm.

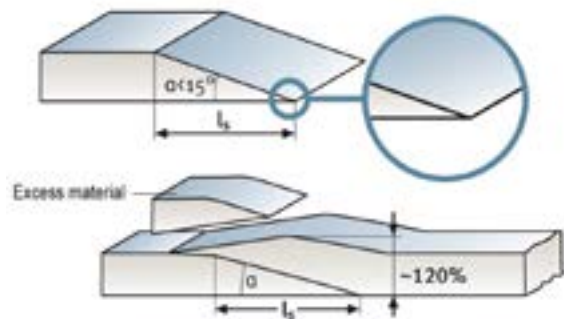
For equipment measuring up to 800 mm in diameter, we recommend 6 mm thick **GORE® Series 600** gasket tape and for even larger equipment 9 mm thick gasket tape. If any irregularities are > 1 mm, the 9 mm thickness must always be used and then shimmed. In the case of irregularities over 1 mm, every additional mil limetre of irregularity needs to be compensated using 3 mm thick tape.

## INSTALLATION

The gasket tape has an adhesive strip for easy installation.

To ensure optimum adhesion, the sealing surfaces must be totally free of grease and other residue.

The end of the gasket tape is cut using the skiving technique shown in the figure below. The tape is then fitted round the circumference of the flange. The other end is placed over the skived end and any excess cut off at an angle so that at the overlap the total thickness is approximately 120% of the original gasket thickness.



## TORQUING

The torque values recommended by the manufacturer of the glasslined equipment must be followed at all times. It is recommended that the bolts/clamps are retorqued once after the first temperature cycle. Retorquing should only be performed after the flange has cooled down to ambient temperature.

**Should you require more detailed information we would advise you to look at our separate installation instructions.**

## QUALITY ASSURANCE

The GORE Quality Management System has been certified by DQS in accordance with ISO 9001.

Component suppliers are also integrated into this system.

## TEST AND CERTIFICATES

• Ta Luft



## GORE® Joint Sealant DF

### Gasket for large diameter flanges

#### OUTSTANDING SEALING RELIABILITY

GORE® Joint Sealant DF is engineered for the reliable sealing of large, complex or damaged flanges.

GORE® Joint Sealant DF is made from virgin, mono-directionally expanded PTFE (ePTFE). After compression this gasketing material forms a thin sealing film that is highly resistant to creep and cold flow. This produces a durable gasket which reduces the risk of leakage, unplanned downtime and loss of output.

Installation of GORE® Joint Sealant DF is extremely easy. The gasket is simply stuck onto the flange surface with the ends overlapped. Time spent on installation is thus reduced to a minimum.

The GORE® Joint Sealant DF ensures an effective, enduring, and cost-effective seal, making a valuable contribution towards keeping your production and manufacturing processes optimised.

#### TECHNICAL DATA

##### MATERIAL

100% expanded PTFE (ePTFE) with multidirectionally oriented fibril structure.

##### TEMPERATURE RANGE OF THE MATERIAL

-268°C to +315°C / -450°F to +600°F

##### CHEMICAL RESISTANCE

Resistant to all media (pH 0 – 14), except for molten or dissolved alkali metals and elemental fluorine particularly at high temperatures and pressures.

##### STABILITY

Not subject to ageing within the material's temperature range, UV-resistant and can be stored indefinitely. Storage of more than 12 months after delivery of the product may result in decline of adhesive strength.

##### PHYSIOLOGICAL SAFETY

Physiologically harmless within temperature range of material. FOR INDUSTRIAL USE ONLY.

Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

##### OPERATING RANGE

The maximum applicable pressure as well as the maxi-



#### KEY FEATURES

- 100% expanded PTFE (ePTFE)
- Chemically resistant
- Temperature resistant
- Resistant to creep and cold flow

#### KEY BENEFITS

- Reliable sealing performance
- Supports process optimization
- Wide range of applications, can be used with virtually any media
- Easy to install
- No wasteful scrap

#### TYPICAL APPLICATIONS

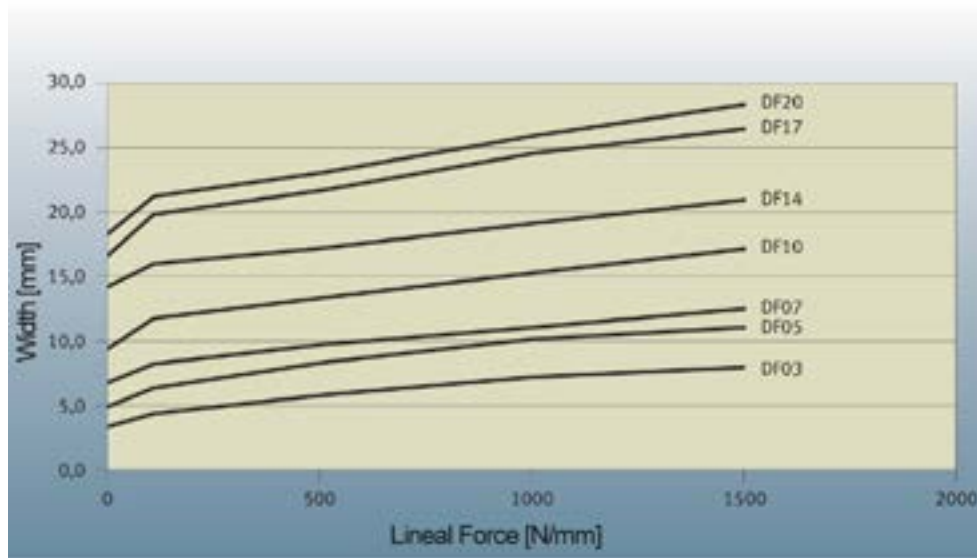
- Large and complex flange dimensions
- Damaged flanges
- Aggressive media

imum safe operating temperature depend mainly on the equipment. Standard pressures range from full vacuum to 40 bar.

#### TESTS AND CERTIFICATES

- EN 13555
- BAM
- TA Luft
- DVGW

## COMPRESSION CURVES AT ROOM TEMPERATURE



## INSTALLATION LINE FORCE FOR LEAKAGE CLASS L<sub>0,1</sub>

TYPE	DF03	DF05	DF07	DF10	DF14	DF17	DF20
Q* <sub>min(0.1)</sub> [N/mm]	95	139	181	252	336	418	431

Test following EN 13555.  
Our technical bulletins about the product provide further details.

In order to get the required installation force, simply multiply the line force with the length of the **GORE® Joint Sealant DF**.

## OTHER TESTS

**GORE® Joint Sealant DF** has been tested by BAM (Bundesanstalt für Materialforschung und -prüfung) for application with oxygen. It is suitable for use in applications with gaseous oxygen at a maximum pressure of 40 bar and a maximum temperature of 60°C.

The gasket has also been tested by DVGW (Deutscher Verein des Gas- und Wasserfaches e.V.).

Gasket Parameters/USA

m = 1.5  
Y = 2,500 psi

## AVAILABLE SIZES AND SIZES SELECTION

TYPE	Nominal Width (mm)	Length per Spool (m)				For effective sealing width (mm)
		5	10	25	50	
DF01*	1			●	●	
DF03	3		●	●	●	3 - 7
DF05	5		●	●	●	7 - 10
DF07	7		●	●	●	10 - 17
DF10	10		●	●	●	17 - 25
DF14	14		●	●	●	25 - 40
DF17	17	●	●	●		40 - 50
DF20	20	●	●	●		50 - 65
DF25	25	●	●			65+

\* Not supplied with an adhesive backing strip.

## QUALITY ASSURANCE

The GORE Quality Management System has been certified by DQS in accordance with ISO 9001. Component suppliers are also integrated into this system.





## GORE® GR Sheet Gasketing

### Increased residual gasket stress and greater blow-out resistance

**GORE® GR** sheet gasketing has been developed for a secure flange connection offering an enduring seal for all pipeline and apparatus flange connections made of steel. It consists of pure, high quality expanded PTFE (ePTFE) that guarantees an almost unlimited chemical resistance of the seal.

**GORE® GR** sheet gasketing is distinguished by its minimum loss of gasket stress (high PQR value according to EN 13555). This is particularly beneficial when gasketing material is subjected to the stress of temperature cycling, high temperatures and external forces, which can lead to leakage and/or blow-out.

The high strength of the material results in increased pressure and blow-out resistance. The higher rigidity of the material simplifies installation of the gasket. **GORE® GR** sheet gasketing offers a long lasting seal on an extremely wide range of steel flange geometries.



Gasket Selection

#### TECHNICAL DATA

##### MATERIAL

100% expanded PTFE (ePTFE) with multi-directionally oriented fibril structure.

##### TEMPERATURE RANGE OF THE MATERIAL

-268°C to +315°C / -450°F to +600°F

##### CHEMICAL RESISTANCE

Resistant to all media (pH 0 – 14), except for molten or dissolved alkali metals and elemental fluorine particularly at high temperatures and pressures.

##### STABILITY

Not subject to ageing within the material's temperature range, UV-resistant and can be stored indefinitely.

##### PHYSIOLOGICAL SAFETY

FOR INDUSTRIAL USE ONLY.

Not for use in food, drug, cosmetic or medical device manufacturing, processing or packaging operations.

##### OPERATING RANGE

The maximum applicable pressure as well as the maximum safe operating temperature depend mainly on the equipment. Standard pressures range from full vacuum to 40 bar.

#### KEY FEATURES

- Made from 100 % expanded PTFE (ePTFE)
- High chemical and thermal resistance
- Resistant to ageing
- Physiologically safe
- High strength

#### KEY BENEFITS

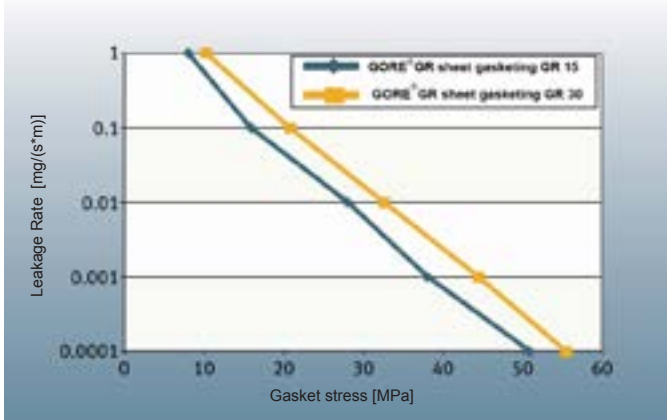
- Increased residual gasket stress
- Greater blow-out resistance
- High operating safety
- Wide spectrum of applications
- Reliably seals practically all media in the pH range 0 – 14
- Highly conformable to the sealing surface
- Straightforward installation

#### TYPICAL APPLICATIONS

- Steel flanges
- Complex flange shapes
- Aggressive media

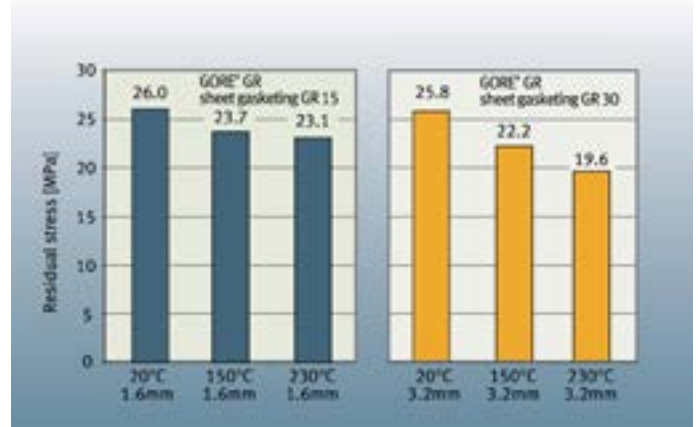
## LEAKAGE RATES

Leakage test according to EN 13555 (interior pressure 40 bar helium; DN40/PN40)



## RESIDUAL STRESS

Creep relaxation test according to EN 13555 (stiffness 500 kN/mm, initial gasket stress 30 MPa, DN40/PN40)



## INSTALLATION INSTRUCTIONS

The seals must be installed according to the current ESA guidelines. These guidelines, as well as the torque tables for standard flanges, are available on request.

## AVAILABLE SIZES AND SIZE SELECTION

GORE® GR sheet gasketing is available in the following sizes:

TYPE	Length x Width (mm)	Thickness (mm)
Plancha GORE® GR 05	1,524 x 1,524	0.5
Plancha GORE® GR 10	1,524 x 1,524	1.0
Plancha GORE® GR 15	1,524 x 1,524	1.6
Plancha GORE® GR 20	1,524 x 1,524	2.0
Plancha GORE® GR 30	1,524 x 1,524	3.2
Plancha GORE® GR 50	1,524 x 1,524	5.0
Plancha GORE® GR 60	1,524 x 1,524	6.4

Gasket	P <sub>QR</sub> data			Q <sub>Smax</sub>	Q <sub>min (0.1)</sub>	Q <sub>Smin</sub>
	20 °C	150 °C	230 °C	230 °C		
GR 15	0.95	0.85	0.77	120 MPa	17 MPa	10 MPa
GR 30	0.89	0.74	0.65	120 MPa	21 MPa	10 MPa

Test according to EN 13555

## QUALITY ASSURANCE

The GORE Quality Management System has been certified by DQS in accordance with ISO 9001.

Component suppliers are also integrated into this system.

## TESTS AND CERTIFICATES

- EN 13555
- DIN 28091-3
- TA Luft ("high quality seal") VDI 2440
- Blow-out resistance VDI 2200 (draft 06-2005)
- US standards: HOBT2-cycling, ARLA, ROTT



## PRODURA® Sheet Gasketing

### For a tight and reliable seal

**PRODURA®** Sheet Gasketing has been developed for a secure flange connection offering an enduring seal for pipeline and apparatus flange connections made of steel.

It consists of pure, high-quality expanded PTFE (ePTFE) that guarantees an almost unlimited chemical resistance of the seal.

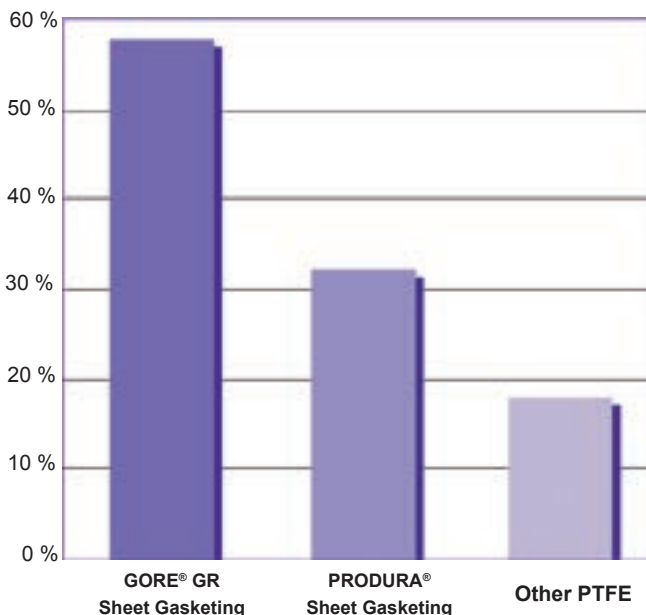
The excellent conformability of the gasketing material effectively compensates for irregularities and scratches in the sealing surfaces.



Gasket Selection

### ARLA Residual Stress

Ageing at 600 °F (315 °C) / 4 days



#### KEY FEATURES

- Multi-directionally oriented ePTFE
- Manufactured from 100% pure PTFE
- High chemical and thermal resistance
- Resistant to ageing
- Physiologically safe
- High strength

#### KEY BENEFITS

- High residual gasket stress
- Inherent strength against blow-out
- Wide operating range
- Reliably seals practically all media in the pH range 0 – 14
- Highly conformable to the sealing surface

#### TYPICAL APPLICATIONS

- Steel flanges
- Complex flange shapes

#### TESTS AND CERTIFICATES

- EN 13555
- DIN 28091-3
- TA-Luft ("high-quality seal"), VDI 2440,
- Blow-out resistance VDI 2200 (draft 06-2005)
- US standards: ARLA



## EN 13555 PARAMETERS, Eg

### 1.6 mm thick DN40 PN40

Temperature (°C)	20	230
EG20MP [MPa]	274	479
EG30MP [MPa]	443	559
EG40MP [MPa]	664	538
EG50MP [MPa]	914	514
EG60MP [MPa]	1083	638
EG80MP [MPa]	1627	701
EG100MP [MPa]	1621	754
EG120MP [MPa]	1700	583
EG140MP [MPa]	1674	451
EG160MP [MPa]	1518	506

### 3.2 mm thick DN40 PN40

Temperature (°C)	20	230
EG20MP [MPa]	174	80
EG30MP [MPa]	281	369
EG40MP [MPa]	543	528
EG50MP [MPa]	815	478
EG60MP [MPa]	1061	718
EG80MP [MPa]	1255	654
EG100MP [MPa]	1573	967
EG120MP [MPa]	2254	
EG140MP [MPa]	2669	
EG160MP [MPa]	2443	

### 6.4 mm thick DN40 PN40

Temperature (°C)	20	230
EG20MP [MPa]	336	343
EG30MP [MPa]	570	440
EG40MP [MPa]	933	693
EG50MP [MPa]	1222	713
EG60MP [MPa]	1301	841
EG80MP [MPa]	1873	879
EG100MP [MPa]	2470	1292
EG120MP [MPa]	2634	
EG140MP [MPa]	2380	
EG160MP [MPa]	2953	

## EN 13555 PARAMETERS, LEAKAGE

1.6 mm thick DN40 PN40 (Test medium He; Interior pressure 40 bar)

Leakage Class	L <sub>0.1</sub>		L <sub>0.01</sub>	
	Q <sub>v</sub> [N/mm <sup>2</sup> ]	Q <sub>min</sub> [N/mm <sup>2</sup> ]	Q <sub>v</sub> [N/mm <sup>2</sup> ]	Q <sub>min</sub> [N/mm <sup>2</sup> ]
20	15	<10	x	x
40	15	<10	23	<10
60	15	<10	23	<10

3.2 mm thick DN40 PN40 (Test medium He; Interior pressure 40 bar)

Leakage Class	L <sub>0.1</sub>		L <sub>0.01</sub>	
	Q <sub>v</sub> [N/mm <sup>2</sup> ]	Q <sub>min</sub> [N/mm <sup>2</sup> ]	Q <sub>v</sub> [N/mm <sup>2</sup> ]	Q <sub>min</sub> [N/mm <sup>2</sup> ]
20	17	<10	x	x
40	17	<10	26	<10
60	17	<10	26	<10

6.4 mm thick DN40 PN40 (Test medium He; Interior pressure 40 bar)

Leakage Class	L <sub>0.1</sub>		L <sub>0.01</sub>	
	Q <sub>v</sub> [N/mm <sup>2</sup> ]	Q <sub>min</sub> [N/mm <sup>2</sup> ]	Q <sub>v</sub> [N/mm <sup>2</sup> ]	Q <sub>min</sub> [N/mm <sup>2</sup> ]
20	x	x	x	x
40	23	<10	35	14
60	23	<10	35	<10

## EN 13555 PARAMETERS, P<sub>QR</sub>, Q<sub>Smax</sub>

TYPE	P <sub>QR</sub> data (Rigidity 500 kN/mm)			Q <sub>Smax</sub> [N/mm <sup>2</sup> ]	
	20 °C	150 °C	230 °C	20 °C	230 °C
PSG16, Thickness 1.6 mm	0.92	0.77	0.64	150	150
PSG32, Thickness 3.2 mm	0.89	0.58	0.46	150	100
PSG64, Thickness 6.4 mm	0.78	0.47	0.35	150	100

## AVAILABLE SIZES

TYPE	Length x Width [mm]	Thickness [mm]
PRODURA® Sheet Gasketing PSG10	1,524 x 1,524	1.0
PRODURA® Sheet Gasketing PSG16	1,524 x 1,524	1.6
PRODURA® Sheet Gasketing PSG20	1,524 x 1,524	20.
PRODURA® Sheet Gasketing PSG32	1,524 x 1,524	3.2
PRODURA® Sheet Gasketing PSG64	1,524 x 1,524	6.4

## TECHNICAL DATA

### MATERIAL

100% expanded PTFE with multidirectionally oriented fibril structure.

### RECOMMENDED OPERATING RANGE

- Vacuum up to 40 bar
- -240 °C to +230 °C

### TEMPERATURE RANGE OF PTFE

-268 °C to +270 °C / -450 °F to 518 °F  
Intermittent up to +315 °C / 599 °F

### CHEMICAL RESISTANCE

Resistant to all media in the range of pH 0 – 14, except for molten or solute alkali metals and elementary fluorine, particularly at elevated temperatures and pressures.

### AGEING RESISTANCE

The product is not susceptible to ageing in the permitted application range and can be stored indefinitely.

### PHYSIOLOGICAL SAFETY

FOR INDUSTRIAL USE ONLY.  
Not for use in food, drug, cosmetic or medical device manufacturing, processing or packaging operations.





## PRODURA® Joint Sealant

### Universal PTFE Joint Sealant

**PRODURA®** universal joint sealant is a chemically inert cord sealant made from 100% expanded PTFE. It is an ideal form-in-place sealant for industrial gasketing users who, for standard applications, wish to balance sealing reliability with cost.

With greater strength than similarly priced joint sealants, **PRODURA®** universal joint sealant provides outstanding sealing reliability. Mechanically altered to decrease creep relaxation, its fibrous structure is both strong and very conformable, which means it will fill areas of significant compare the tensile strength pitting and corrosion.

### COMPARE THE TENSILE STRENGTH

Tensile strength has been identified as a key parameter in relation to a gasket's ability to resist gross leakage (or blow out) while in service.

With higher tensile strength than other typical competitors in its class, **PRODURA®** universal PTFE joint sealant retains torque and is hard to overcompress.

#### FEATURES

- Inherent strength against blowout
- Resists cold flow and creep relaxation
- Highly reliable seal; low emissions
- Low stress to seal
- Supports complex sealing configurations
- Compatible with all common chemicals
- Wide operating range
- Easily peeled, self-adhesive backing
- Easy to be removed

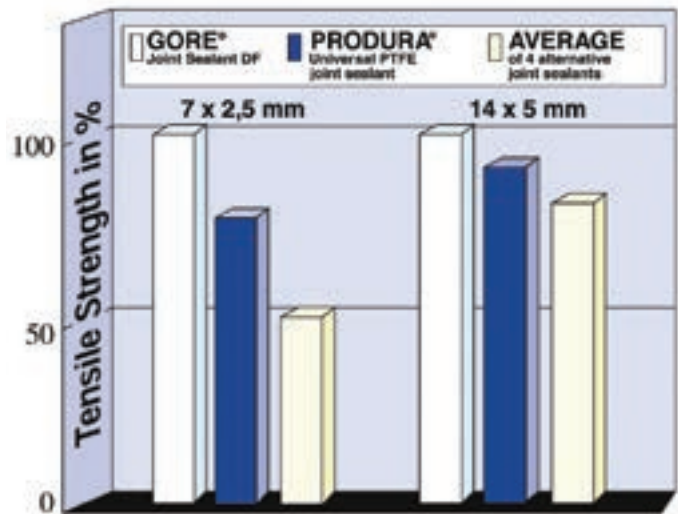
#### TECHNICAL INFORMATION

##### Temperature Range

-268 °C to 315 °C / -450 °F to 599 °F

##### Pressure Range

Vacuum to 210 bar / 3045 psi



Tensile strength testing: free clamping length: 100mm; velocity: 90 mm / min.

### CHEMICAL COMPATIBILITY

Resistant to all media in the range of pH 0 – 14, except for molten or dissolved alkali metals and elemental fluorine at high temperatures and pressures.

### PHYSIOLOGICAL SAFETY

FOR INDUSTRIAL USE ONLY.

Not for use in food, drug, cosmetic or medical device manufacturing, processing or packaging operations.

## AVAILABLE SIZES

Nominal Dimensions (width x height)	Spool Length			
	5 m	10 m	25 m	50 m
3 x 1.5 mm	-	●	●	●
5 x 2.0 mm	-	●	●	●
7 x 2.5 mm	-	●	●	●
10 x 3.0 mm	-	●	●	●
14 x 5.0 mm	-	●	●	●
17 x 6.0 mm	●	●	●	●
20 x 9.0 mm	●	●	●	-
25 x 9.0 mm	●	●	-	-

## INSTALLATION GUIDELINES

1. Select the correct **PRODURA®** joint sealant size using the selection guidelines, or a size 25% - 30% of the width of the sealing surface.
2. Remove the adhesive release paper and apply the joint sealant inside the bolt circle.
3. Overlap the ends at a bolt hole.
4. Tighten the bolts in a sequential cross-bolt pattern.
5. Torque bolts in a star pattern sequence in at least three successive passes up to the required boltforce.

## SIZE SELECTION

Nominal Dimensions (w x h)	Nominal Bore
3 x 1.5 mm	< NW 50
5 x 2.0 mm	< NW 200
7 x 2.5 mm	< NW 600
10 x 3.0 mm	< NW 1500
14 x 5.0 mm	< NW 1500
17 x 6.0 mm	If severe flange irregularities or damage
20 x 9.0 mm	
25 x 9.0 mm	



# FLANGE INSULATION SETS

## Description:

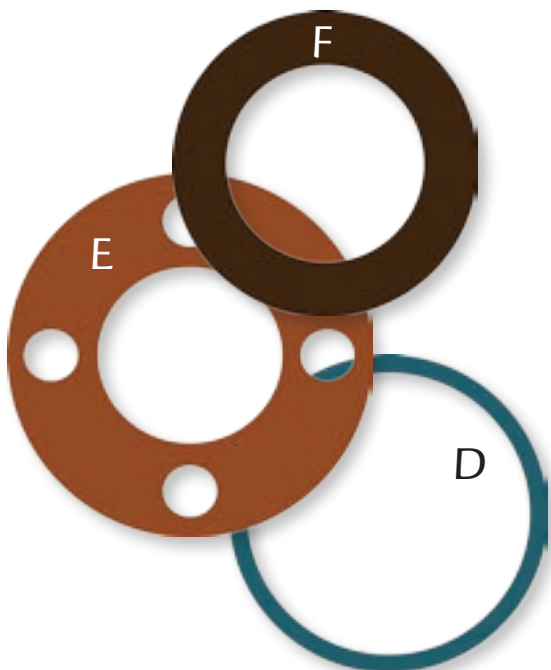
Flange insulation sets provide the most effective electrical insulation, acting as a non-conductive interface between two metallic elements. This eliminates corrosion caused by contact between metals and the induced current by the metallic components of the pipe.

The sets are composed as follows:

- Insulating Gasket
- Insulating Sleeves
- Insulating Washers
- Steel Washers



In the following section will be described the different types of seals which are used to break the electric conductivity in pipes with cathodically protected systems.



### Type F

Type F gaskets are made to fit the raised-face (RF) flanges. The inside diameter of the bolt hole circle is slightly smaller than the outside diameter of the gasket, assuring an exact automatic positioning of the gasket.

### Type E

Type E is a full-faced (FF) gasket with the same outside diameter as the flange and precision cut bolt holes.

### Type D

Type D gaskets are specifically designed to fit into the ring groove of ring-type-joint (RTJ) flanges.

## AVAILABLE INSULATING GASKETS

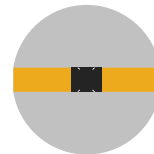
### ICP KD01



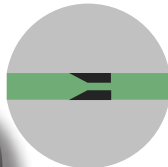
3 mm thick insulating material is coated on both sides with 1.5 mm thick non asbestos material. The insulating material may be Micarta (phenolformaldehyde with reinforcing fabric) or others listed in the table of materials. The sealing material is resistant to hydrocarbons and is used in general applications, although materials may be obtained for special applications. The sealing material also can be directly vulcanized Neoprene CR insulating material, in which case the thickness is 3.2 mm.

Considered as one of the most effective methods of sealing and insulation for all types of flanges. Consist of two semi O'Ring mounted into slots on each side of a board. The semi O'Ring eliminates the need for a traditional O'Ring. To evaluate the maximum allowable temperature must take into account the limits of both materials. Standard materials are G10 with nitrile or PTFE.

### ICP KD02



### ICP KD03



The ICP KD03 seal is formed by a patented rectangular sealing element, referred to as a "quad" ring, in combination with an unique groove design to effectively seal and isolate flanges of all types. Materials such as PTFE and KALREZ® may therefore be used as sealing elements which dramatically increases the options available for matching gasket materials to service and environmental conditions.

Flat gaskets are used in special applications such as elevated temperatures that often require materials such as non asbestos aramid gaskets.

### ICP KD04





# SLEEVES AND WASHERS

## INSULATING SLEEVES

Insulating sleeves are available in the following materials:

- Mylar
- Polyethylene
- Phenolic
- Nomex®
- G-7 Silicon Glass
- G-10 Epoxy Glass
- G-11 Epoxy Glass

Insulating sleeves have a wall thickness of 1/32 " (0.79 mm) and are used with separate insulating and steel washers. They are available for standard American bolt sizes from 1/2" (12.7 mm) to 3 1/2" (88.9 mm) as well as metric bolt sizes from 12 mm and larger.

## INSULATING WASHERS - Standard 1/8" Thick

Insulating washers are available in the following materials:

- G-3 High temperature Phenolic
- G-7 Silicon Glass
- G-10 Epoxy Glass
- G-11 Epoxy Glass

Insulating washers are available for bolt sizes from 1/2" (12.7 mm) through 3 1/2" (88.9 mm) and are made to fit over the insulating sleeves.

## STEEL WASHERS

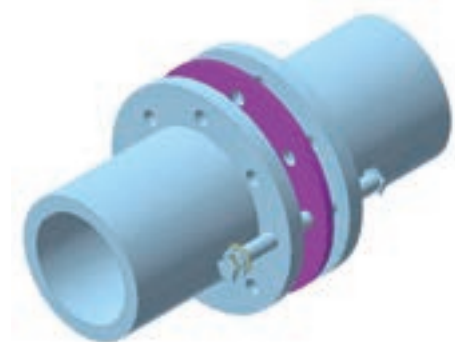
Steel washers are designed to fit over the insulating sleeve or the retainer ring on the one-piece sleeves and washers. The outside diameter is sized to fit within the bolt facing on ANSI standard flanges. They are made of 1/8" (3.2 mm) thick plated hot-rolled steel.

## ONE-PIECE SLEEVES AND WASHERS

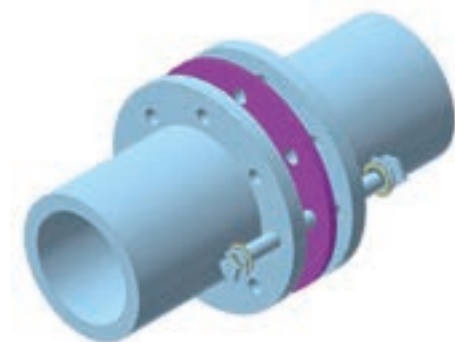
Molded from acetal resin and available for bolt diameters from 1/2" to 1 1/2" (12.7 a 38.1 mm), one-piece sleeves and washers are structurally tough but limited to applications where the flange temperature does not exceed 80 °C (180 °F) and compressive loads do not exceed 1,241 bar (18,000 psi).

They are generally used as single washer sets because they are molded to specific lengths and, in many instances, are longer than the thickness of a single flange. There are great advantages as minimize the possibility of losing pieces and the detection time of correct insulation.

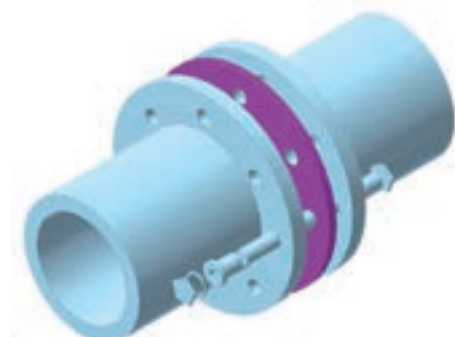
## SIMPLE Washer Set



## DOUBLE Washer Set



## ONE - PIECE



## SUGGESTED FLANGE INSULATION MATERIAL COMPATIBILITY

MEDIUM	RETAINER	SEAL	SLEEVE	WASHER	T <sup>a</sup> RANGE (°C / °F)	
					Min.	Max.
Acetone	Phenolic	EPDM	Mylar	Phenolic	0 / 32	27 / 80
Air	G-10	Nitrile	Mylar	Phenolic	-40 / -40	107 / 225
Ammonia Dry	G-10	PTFE	Mylar	G-10	-54 / -65	104 / 220
Ammonia Wet	G-10	PTFE	Mylar	G-10	0 / 32	38 / 100
Bleach	G-10	PTFE	Mylar	G-10	0 / 32	27 / 80
Butylene (Butadiene)	G-10	PTFE	G-10	G-10	0 / 32	38 / 100
Carbon Dioxide	G-10	Nitrilo	Mylar	G-10	-184 / -300	138 / 280
Cryogenic	G-10	PTFE	G-10	G-10	-184 / -300	138 / 280
Ethanol	G-10	EPDM	Mylar	G-10	0 / 32	38 / 100
Ethylene (Ethene)	G-10	PTFE	G-10	G-10	0 / 32	27 / 80
Fuel Oil	G-10	Viton	Mylar	G-10	-29 / -20	138 / 280
Gas, Natural	Phenolic or G-10	Nitrile	Mylar	Phenolic or G-10	-40 / -40	104 / 220
Gasoline	G-10	PTFE	Mylar	G-10	-54 / -65	107 / 225
Hydrogen	G-10	Nitrile	Mylar	G-10	-40 / -40	121 / 250
LNG	G-11	PTFE	G-10	G-10	-184 / -300	38 / 100
Methanol	G-10	PTFE	Mylar	G-10	0 / 32	38 / 100
MTBE	G-10	Special Nitrile	G-10	G-10	0 / 32	27 / 80
Nitrogen	Phenolic	Nitrile	Mylar	Phenolic	-40 / -40	104 / 220
Oil, Crude	G-10	Viton	Mylar	G-10	-29 / -20	138 / 280
Oxygen	G-10	PTFE	G-10	G-10	-54 / -65	121 / 250
Pentane	G-10	PTFE	G-10	G-10	0 / 32	27 / 80
Propane	G-10	Nitrile or PTFE	G-10	G-10	0 / 32	27 / 80
Propylene	G-10	Viton	G-10	G-10	0 / 32	27 / 80
Sewage	G-10	Viton	Mylar	G-10	-29 / -20	138 / 280
Steam	Consult CALVOSEALING Technical Department					
Styrene	G-10	PTFE	G-10	G-10	0 / 32	27 / 80
Sulphur (Molten)	G-10	PTFE	G-10	G-10	0 / 32	138 / 280
Toluene	G-10	Viton or PTFE	G-10	G-10	0 / 32	66 / 150
Water (hot)	G-10	EPDM	Mylar	G-10	79 / 175	138 / 280
Water (potable)	G-10	EPDM	Mylar	G-10 or Phenolic	0 / 32	138 / 280
Water (Sea)	Phenolic or G-10	EPDM	Mylar	G-10 or Phenolic	0 / 32	138 / 280
White Liquor	G-10	PTFE	G-10	G-10	27 / 80	138 / 280

### Note:

- For pipe diameters over 24" o ANSI Class pressure ratings of 600 Class or greater, use G-10 sleeves and G-10 washers where temperatures and other conditions permit.

# MATERIAL PHYSICAL PROPERTIES

## INSULATION SLEEVES

ASTM	Test Method	Polyethylene	Mylar	Nomex	Phenolic	G-7	G-10	G-11	One piece molded Acetal
D149	Dielectric Strength Volt/Mil (Short Time)	400	4000	400	400	350	400	400	1,200
D695	Compressive Strength psi	-	-	-	-	-	-	-	18,000
D229	Water Absorption (%)	0.01	0.8	-	1.6	0.10	0.10	0.10	0.22
	Operating Temperature (°C)	-34 to 82	-59 to 149	-54 to 232	-29 to 107	Cryogenic to 232	Cryogenic to 138	Cryogenic to 160	-34 to 82
	(°F)	-30 to 180	-75 to 300	-65 to 450	-20 to 225	Cryogenic to 450	Cryogenic to 280	Cryogenic to 320	-30 to 180
D790	Flexural Strength (psi)	7,000	13,000	20,000	16,000	20,000	55,000	55,000	1,400
	Cut Through Resistance ft.lb	1,800	3,500	4,000	-	-	16,000	-	3,400

## 1/8" INSULATING WASHERS

ASTM	Test Method	G-3	G-7	G-10	G-11	One piece Molded Acetal
D149	Dielectric Strength Volt/Mil (Short Time)	550	350 - 400	550	550	1,200
D695	Compressive Strength psi	50,000	40,000	50,000	50 - 80,000	18,000
D229	Water Absorption (%)	0.7	0.07	0.10	0.10	0.22
	Operating Temperature (°C)	-54 to 200	Cryogenic to 232	Cryogenic to 138	Cryogenic to 177	-34 to 82
	(°F)	-65 to 392	Cryogenic to 450	Cryogenic to 280	Cryogenic to 350	-30 to 180



# SEMI-METALLIC & METALLIC



Semi-Metallic and metallic gaskets are designed to feature soft and pliable sealing materials, using materials which improve tightness with lower load requirements. Due to this configuration, this type of gaskets are most popular and are available in a wide variety of styles and sizes.

Typically can be manufactured from all type of metals, a thin strip or sheet, which can be welded. Therefore, they can be used virtually against any corrosive medium depending on the choice of the metal and filler/facing material.

Semi-metallic gaskets can operate in a temperature range since cryogenic temperatures to approximately 1090 °C (1994 °F).

Are highly resistant, offering an excellent sealing against movements can occur due to temperature gradients, variations of pressure and vibrations.

## Introduction

Semi-metallic & metallic gaskets can be used in the following applications:

### VAPOR

- Boilers
- Water and steam feed pipes
- Feed water heaters
- Petrochemical autoclaves
- Fluid catalytic cracking plant
- Vessel closures
- Pipeline
- Heat exchanger
- Valve bodies

### SHIPBUILDING

- Boilers
- Aerator
- Feed pumps
- Steam lines
- LP and HP feed water heater
- Air extractors
- Water heater
- Diesel engines

### NUCLEAR

- Cooling cycle
- High temperature gas lines
- Pressure vessels
- Valves

### HYDRAULIC

- High pressure flanges
- Pumps and valves





**Spiral Wound  
Gaskets**

**Camprofile  
Gaskets**

**Metal Jacketed  
Gaskets**

**G-ST  
Gaskets**

**Ring Type  
Joint**

# SELECTION GUIDE

To help you make an informed choice on gasket selection the table below lists the advantages of each gasket under several conditions.

This table should be used only as a general guide for selection:



## SPIRAL WOUND GASKETS

Spiral wound gaskets consist of a V-shaped metal strip spirally wound in combination with a soft, filler material.

The metal strip provides strength and resiliency, while the flexible filler guarantees an excellent sealing.



## CAMPROFILE GASKETS

Camprofile Gasket consist of a metal core serrated on both sides , generally made from stainless steel. Is covered with a soft conforming sealing material that is bonded to each face, where depending on the material performance will be made from PTFE or graphite.

TIGHTNESS	EXCELLENT	EXCELLENT
THERMAL CYCLING	GOOD	EXCELLENT
LOW SEATING STRESS	FAIR	EXCELLENT
HIGH SEATING STRESS	EXCELLENT	EXCELLENT
RECYCLING	NO	YES
EMISSION	EXCELLENT	EXCELLENT
HANDLING	FAIR	EXCELLENT



### METAL JACKETED GASKETS

Metal Jacketed gaskets consist of a metallic outer shell with either a metallic or non-metallic compressed fibre filler. The filler material gives the gasket resilience, while the metal jacket protects the filler and resists pressures, temperatures and corrosion.



### G-ST GASKETS

G-ST Gaskets have been used successfully for many years such as general services in pipelines. Irregularities and grooves, even the slight misalignments are compensated.

The most common applications are steel mills, power plants, petrochemical, pharmaceutical industries as well as numerous gas and water companies.



### RING TYPE JOINT

Ring Type Joints are metal ring to be used with elevated pressure and temperature applications. The sealing contact area results very reliability. Sealing gasket contact surface, as well as flange surface, have to be machined and finished.

Used primarily in the petroleum fields, drilling equipment and terminating equipment.

FAIR

FAIR

EXCELLENT

GOOD

NO

FAIR

EXCELLENT

FAIR

FAIR

EXCELLENT

GOOD

NO

EXCELLENT

EXCELLENT

EXCELLENT

FAIR

FAIR

EXCELLENT

NO

EXCELLENT

EXCELLENT

# SPIRAL WOUND GASKETS

## DESCRIPTION

Spiral Wound Gaskets consist of a V-shaped metal strip spirally wound in combination with a soft, filler material. The metal strip provides strength and resiliency, while the flexible filler guarantees an excellent sealing.



The combination of these materials provides an excellent sealing properties to the spiral wound gaskets under fluctuating temperature and pressure conditions.

Depending on the application, the spiral wound gaskets can be manufactured with outer and/or inner rings.

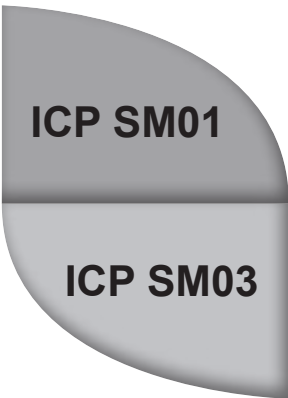
## FEATURES

- Spiral Wound Gaskets can be used to seal fluid pressures up to 250 bar (3,625 psi) and from cryogenic temperatures up to elevated temperatures of 1090°C (1994 °F).
- By combining different winding materials and metals, the gasket can be tailored to suit a wide variety of operating conditions.
- The gasket is easily removed and will not damage flange surfaces.
- The outer guide ring simplifies assembly and prevents blow out of the gasket.



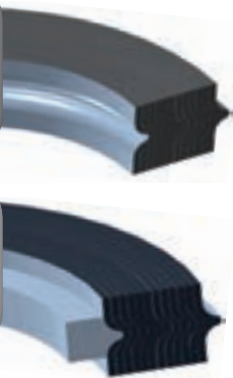
# TYPES OF SPIRAL WOUND GASKET

CALVO SEALING'S Spiral Wound Gaskets are available in the following formats:



The gasket is composed of "V" shape metal strip with different kind of soft fillers.

The gasket contains a solid metal inner ring, where the insertion facilitates the installation and prevents gasket blow-out.



The gasket consists of a solid metal outer ring which is used as centering device and stop. Designed for use in general services.

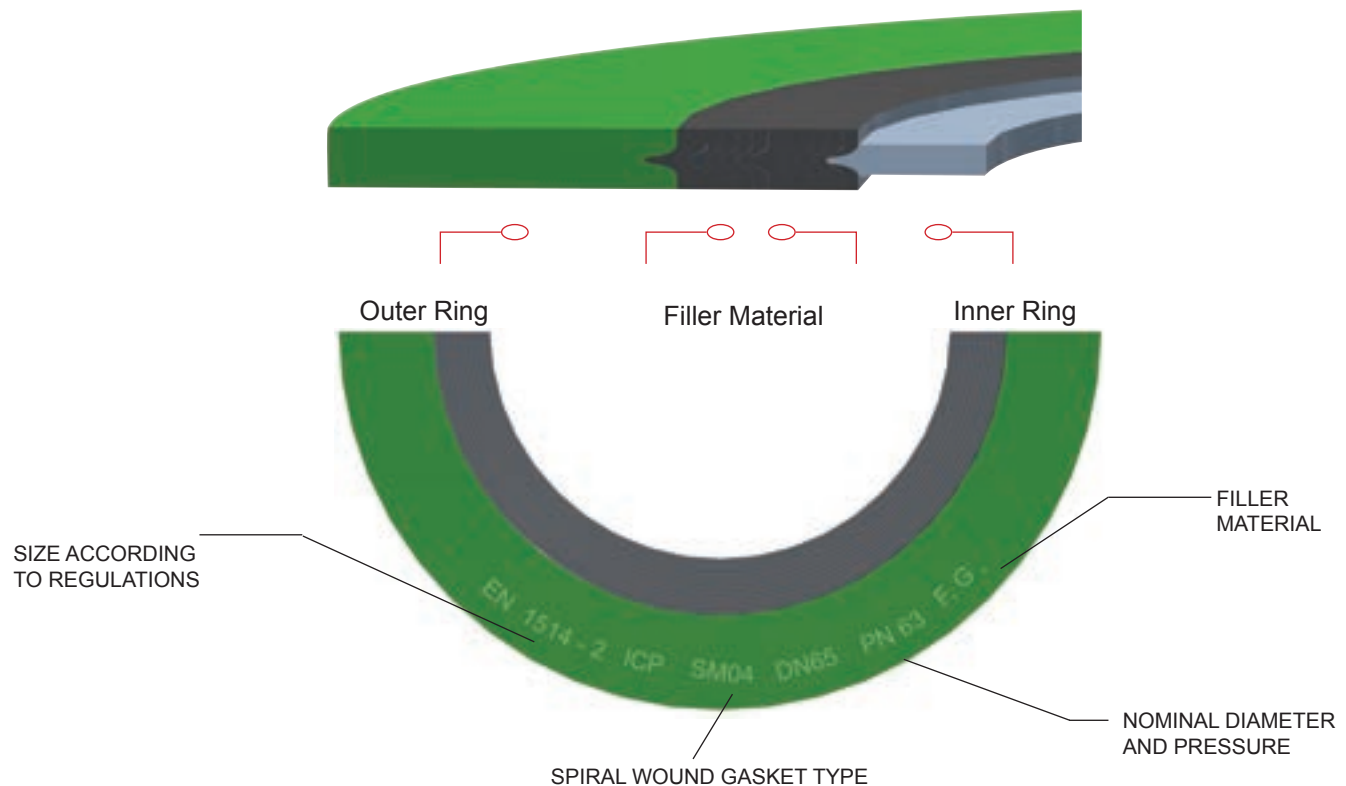
The gasket contains a solid metal outer and inner ring, where the inner ring insertion acts like additional compression limiter. Specially designed for resist high pressure and temperature services and aggressive media.



# CHARACTERISTICS OF METALLIC MATERIALS

MATERIAL	IDENTIFICATION	DIN ESPECIFICATION	DIN N.	B.S.	AISA, ASTM, UNS	TEMPERATURE (°C / °F)	
						Min.	Max.
Low Carbon Steel	CRS	R St 3.72	-	-	-	-40 / -40	540 / 1,004
Stainless Steel 304	S304	X5 Cr Ni 18	1.4301	304S15/16/13	304	-250 / -418	540 / 1,004
Stainless Steel 304 L	S304L	X2 Cr Ni 18 9	1.4306	304S11	304L	-250 / -418	540 / 1,004
Stainless Steel 309	S309	X15 Cr Ni Si 20 12	1.4828	309S24	309	-100 / -148	1000 / 1,832
Stainless Steel 316	S316	X5 Cr Ni Mo 18 1vz0	1.4401	316S16	316	-100 / -148	760 / 1,400
Stainless Steel 316 L	S316L	X2 Cr Ni Mo18 10	1.4404	316S11/13	316L	-100 / -148	760 / 1,400
Stainless Steel 316 Ti	316Ti	X10 Cr Ni Mo Ti 18 10	1.4571	320S31	316Ti	-100 / -148	760 / 1,400
Stainless Steel 321	S321	X10 Cr Ni Ti 18 9	1.4541	321S12/49/87	321	-250 / -418	760 / 1,400
Stainless Steel 347	S347	X10 Cr Ni Nb 18 9	1.4550	347S31	347	-250 / -418	815 / 1,499
Duplex	2205	X2 Cr Ni Mo N 22 5 3	1.4462	318S13	S31803/32205	-40 / -40	300 / 572
Aluminium	AL 1050	A1 99 5	3.0255	1B	A91050	-250 / -418	425 / 797
Nickel 200	Ni	Ni 99 2	2.4066	3072-76 NA11	N02200	-250 / -418	760 / 1,400
Monel 400	MON	Ni Cu 30 Fe	2.4360	3072-76 NA 13	N04400	-125 / -193	820 / 1,508
Inconel 600	INC 600	Ni Cr 15 Fe	2.4816	3072-76 NA14	N06600	-100 / -148	1090 / 1,994
Inconel 625	INC 625	Ni Cr 22 Mo 9 Mb	2.4856	3072-76NA21	N06625	-50 / -58	1090 / 1,994
Incoloy 800	IN 800	X10 Ni Cr A1 Ti 3220	1.4876	3072-76NA15	N08800	-100 / -148	870 / 1,598
Incoloy 825	IN 825	Ni Cr 21 Mo	2.4858	3072-76NA16	N08825	-100 / -148	870 / 1,598
Hastelloy B2	HAST B	Ni Mo 28	2.4617	-	N10665	-200 / -328	1090 / 1,994
Hastelloy C276	HAST C	Ni Mo 16 Cr 15 W	2.4819	-	N10276	-200 / -328	1090 / 1,994
Titanium	Ti	Ti 99 8	3.7025	TA2	R50400	-250 / -418	1090 / 1,994

## IDENTIFICATION



# CHARACTERISTICS OF FILLER MATERIALS

## FLEXIBLE GRAPHITE

High purity flexible graphite with no binders or fillers. This provides an excellent sealability and excellent resistance to a wide range of chemicals. Its unique combination of low permeability, inherent lubricity and compressibility makes this material be suitable for critical gas and vacuum services. Suitable for the nuclear industry or services with grades of inhibited corrosion.

## POLYTETRAFLUORETHYLENE (PTFE)

PTFE is used as a filler material in gaskets where extreme chemical inertness is required. PTFE is unaffected by any known chemicals except molten alkali metals and fluorine precursors. Because of its low permeability, PTFE is also frequently used as a filler material on CALVOSEALING gaskets in vacuum applications. Spiral Wound Gaskets with PTFE should be fully confined, either by fitting in a groove or providing both an external and internal ring.

## CERAMIC

Consist of an aluminum silicate fiber with an organic binder. This material possesses a lower sealability compared to other filler materials, however it has excellent high temperature stability of 1260 °C (2300 °F). Resists attack from most corrosive agents (except hydrofluoric and phosphoric acids) as well as concentrated alkalis. Recommended only where conditions preclude the use of exfoliated vermiculite.

## EXFOLIATED VERMICULITA

Chemically and thermally composed by exfoliated vermiculite makes it an excellent filler material for use in Spiral Wound Gaskets. This natural mineral has an structure that simulates to exfoliated graphite, with one notable exception – it maintains sealing integrity through a wide range of extreme temperatures. It exhibits exceptional chemical resistance.

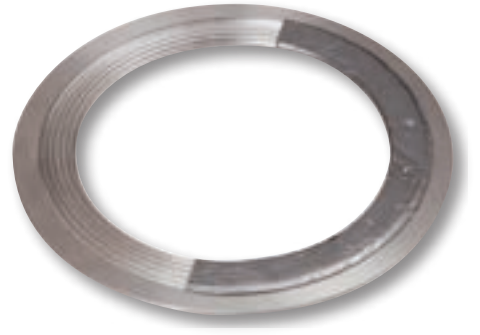
This material is versatile, fire safe and is not susceptible to oxidation.

MATERIAL	TEMPERATURE		MAX. OPERATIVE PRESSURE	GAS TIGHTNESS	APPLICATION
	Min.	Max.			
Flexible Graphite	-240 °C / 400 °F	510 °C / 950 °F	250 bar / 3,625 psi	Good	Aggressive media
PTFE	-200 °C / -328 °F	260 °C / 500 °F	100 bar / 1,450 psi	Good	Aggressive media
Ceramic	-101 °C / -150 °F	1260 °C / 2300 °F	100 bar / 1,450 psi	Low	High temperature
Exfoliated Vermiculita	-240 °C / 400 °F	1100 °C / 2012 °F	100 bar / 1,450 psi	Low	High temperature

## SELECTION GUIDE

FLANGE FACE	Flat Face (FF) 	Raised Face (RF) 	Male & Female 	Tongue and groove 	Flat face to recess 
Normal Conditions	 ICP SM04	 ICP SM04	 ICP SM01	 ICP SM01	 ICP SM01
<ul style="list-style-type: none"> <li>High pressure</li> <li>High temperature</li> <li>PTFE filled gasket</li> <li>Aggressive media</li> </ul>	 ICP SM05	 ICP SM05	 ICP SM03	 ICP SM03	 ICP SM03

# CAMPROFILE GASKETS



## DESCRIPTION

Camprofile Gaskets consist of a metal core serrated on both sides, generally made from stainless steel. It is covered with a soft conforming sealing material that is bonded to each face, where depending on the material performance will be made from PTFE or graphite.

The result is a gasket which combines the benefits of soft materials with the advantages of seal integrity associated with metallic gaskets.

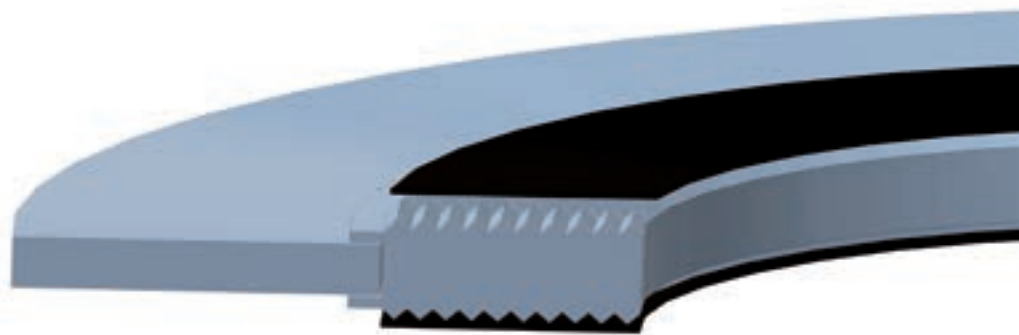
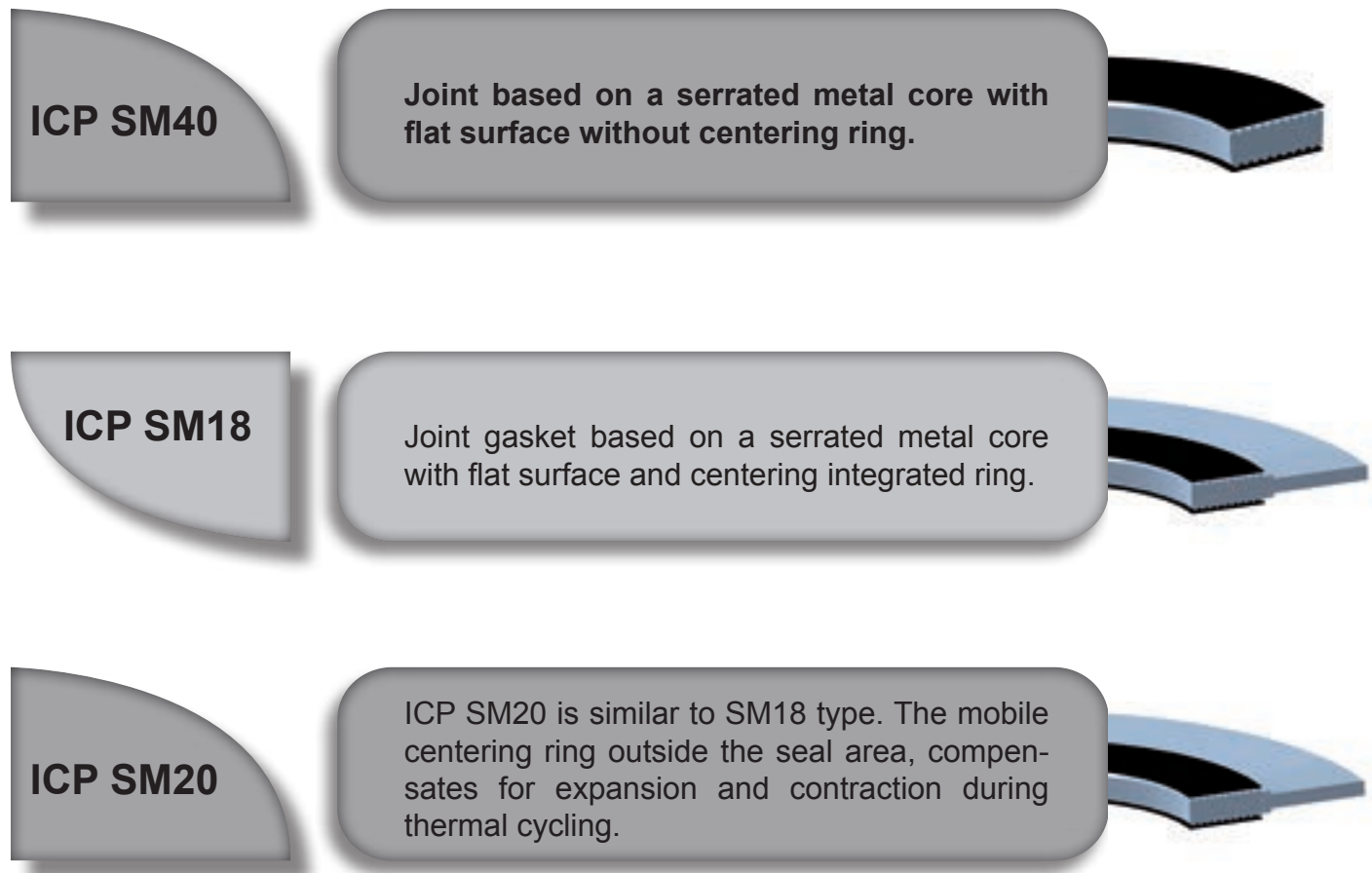
## CHARACTERISTICS

- Temperature resistant up to 1000°C (1832°F), depending the coating material.
- Resistant to pressures up to 250 bar (3625 psi).
- Camprofile gasket provides a high integrity, low seating stress seal and is ideal for heat exchanger applications with limited bolt load or lighter weight flanges.
- Will not damage flange surface and is easily removed.
- Reduces maintenance costs and leakage.



## TYPES OF CAMPROFILE GASKETS

CALVO SEALING's Camprofile Gaskets are available in the following formats:



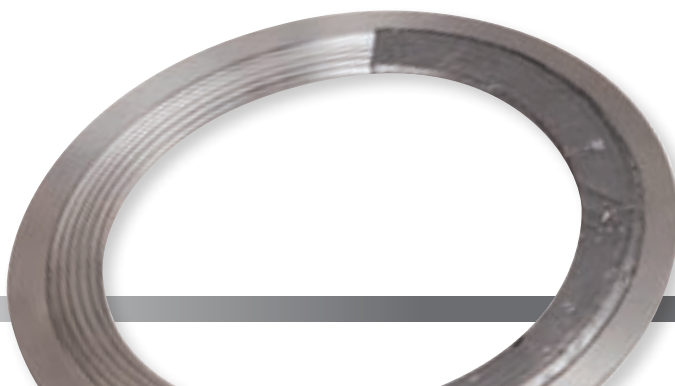
## \* METALLIC MATERIALS

MATERIAL	IDENTIFICATION	DIN ESPECIFICATION	DIN N.	B.S.	AISA, ASTME, UNS	TEMPERATURE (°C / °F)	
						Min.	Max.
Low Carbon Steel	CRS	R St 3.72	-	-	-	-40 / -40	540 / 1,004
Stainless Steel 304	S304	X5 Cr Ni 18	1.4301	304S15/16/13	304	-250 / -418	540 / 1,004
Stainless Steel 304 L	S304L	X2 Cr Ni 18 9	1.4306	304S11	304L	-250 / -418	540 / 1,004
Stainless Steel 309	S309	X15 Cr Ni Si 20 12	1.4828	309S24	309	-100 / -148	1000 / 1,832
Stainless Steel 316	S316	X5 Cr Ni Mo 18 1vz0	1.4401	316S16	316	-100 / -148	760 / 1,400
Stainless Steel 316 L	S316L	X2 Cr Ni Mo 18 10	1.4404	316S11/13	316L	-100 / -148	760 / 1,400
Stainless Steel 316 Ti	316Ti	X10 Cr Ni Mo Ti 18 10	1.4571	320S31	316Ti	-100 / -148	760 / 1,400
Stainless Steel 321	S321	X10 Cr Ni Ti 18 9	1.4541	321S12/49/87	321	-250 / -418	760 / 1,400
Stainless Steel 347	S347	X10 Cr Ni Nb 18 9	1.4550	347S31	347	-250 / -418	815 / 1,499
Duplex	2205	X2 Cr Ni Mo N 22 5 3	1.4462	318S13	S31803/32205	-40 / -40	300 / 572
Aluminium	AL 1050	A1 99 5	3.0255	1B	A91050	-250 / -418	425 / 797
Nickel 200	Ni	Ni 99 2	2.4066	3072-76 NA11	N02200	-250 / -418	760 / 1,400
Monel 400	MON	Ni Cu 30 Fe	2.4360	3072-76 NA 13	N04400	-125 / -193	820 / 1,508
Inconel 600	INC 600	Ni Cr 15 Fe	2.4816	3072-76 NA14	N06600	-100 / -148	1090 / 1,994
Inconel 625	INC 625	Ni Cr 22 Mo 9 Mb	2.4856	3072-76NA21	N06625	-50 / -58	1090 / 1,994
Incoloy 800	IN 800	X10 Ni Cr A1 Ti 3220	1.4876	3072-76NA15	N08800	-100 / -148	870 / 1,598
Incoloy 825	IN 825	Ni Cr 21 Mo	2.4858	3072-76NA16	N08825	-100 / -148	870 / 1,598
Hastelloy B2	HAST B	Ni Mo 28	2.4617	-	N10665	-200 / -328	1090 / 1,994
Hastelloy C276	HAST C	Ni Mo 16 Cr 15 W	2.4819	-	N10276	-200 / -328	1090 / 1,994
Titanium	Ti	Ti 99 8	3.7025	TA2	R50400	-250 / -418	1090 / 1,994

## \* FILLER MATERIALS

Graphite is the most commonly used filler material. In case that higher chemical resistance is needed or the medium not be contaminated by the graphite, PTFE will be chosen as filler material.

MATERIAL	TEMPERATURE		MAX. OPERATIVE PRESSURE	GAS TIGHTNESS	APPLICATION
	Min.	Max.			
<b>Graphite</b>	-240 °C / -400 °F	510 °C / 950 °F	250 bar / 3,625 psi	Good	Aggressive media and high temperature
<b>PTFE</b>	-200 °C / -328 °F	260 °C / 500 °F	100 bar / 1,450 psi	Good	Aggressive media

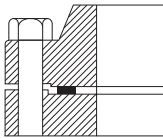
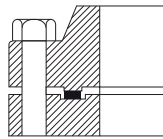
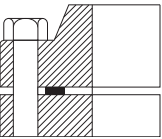
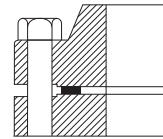





# APPLICATIONS

Recommended applications to use Camprofile gaskets are:

- Heat exchanger and vessel applications
- Damaged flanges
- High and low temperatures
- Pressures up to 250 bar
- Used for a wide range of applications including steam, oil, hydrocarbon and can also be tailored to suit more aggressive chemicals

The following table shows the recommended types for each type of flange:

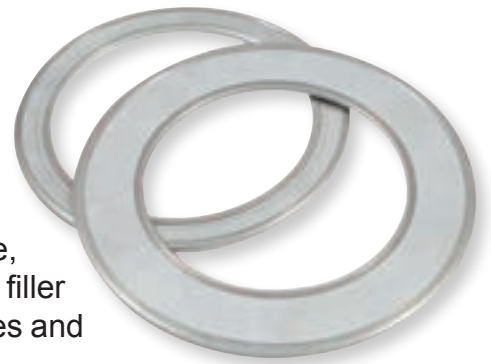
CAMPROFILE TYPE	INNER RING		FLANGE			
	INTEGRAL	FLOATING	Male & Female 	Tongue & groove 	Flat Face (FF) 	Raised Face (RF) 
ICP SM40 			•	•		
ICP SM18 	•				•	•
ICP SM20 		•			•	•



# METAL JACKETED GASKET

## DESCRIPTION

Metal Jacketed Gaskets consist of a metallic outer shell with either a metallic or non-metallic compressed fibre filler. The filler material gives the gasket resilience, while the metal jacket protects the filler and resists pressures, temperatures and corrosion.



## APPLICATIONS

Metal Jacketed Gaskets are suitable to be used on boilers, heat exchangers, narrow surface sealing and applications where the fluid is at high temperature. The metal jacketed gasket increases the stability of the joint and reduces its strength.






With an adequate material selection, offers a high chemical resistance at wide range of fluids.

There is a wide range of available materials to suit specific temperatures and corrosive medium:

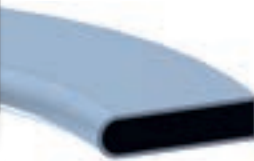





<b>METALLIC</b>	<ul style="list-style-type: none"><li>• Soft Iron</li><li>• Carbon Steel</li><li>• Stainless Steel</li><li>• Inconel</li></ul>	<ul style="list-style-type: none"><li>• Nickel</li><li>• Aluminum</li><li>• Brass</li><li>• Copper</li></ul>
<b>NON METALLIC</b>	<ul style="list-style-type: none"><li>• PTFE</li></ul>	<ul style="list-style-type: none"><li>• Expanded Graphite</li><li>• Ceramic</li></ul>



# TYPES OF METAL JACKETED GASKETS

<b>ICP MJ100</b>	<p>The most basic profile of Metal Jacketed Gasket, with coverage on one face and both edges. Is ideally suited for comparatively narrow flange widths in circular and non circular configurations.</p>	
<b>ICP MJ101</b>	<p>The filler material is completely enclosed on the inside and outside diameters of the gasket and on both contact surfaces. Is ideally suited for high temperature applications as well as boilers, compressors, pumps and diesel and gasoline engines.</p>	
<b>ICP MJ110</b>	<p>Double Jacketed Gasket where the filler material is completely enclosed by a two piece metal jacket, which covers both the inside and outside diameters and both contact surfaces. Suited for high pressures and temperatures for use in boilers and heat exchanger applications.</p>	
<b>ICP MJ112</b>	<p>Double Jacketed Gasket wrapped in two reversed metallic parts. Suited for high pressures and temperatures for use in boilers and heat exchanger applications.</p>	
<b>ICP MJ114</b>	<p>Double Jacketed Corrugated Gasket is an improvement on a flat gasket, where the corrugations provide a higher recovery. It also provides the advantage of reducing the contact area of the gasket, enhancing its compressive characteristics.</p>	

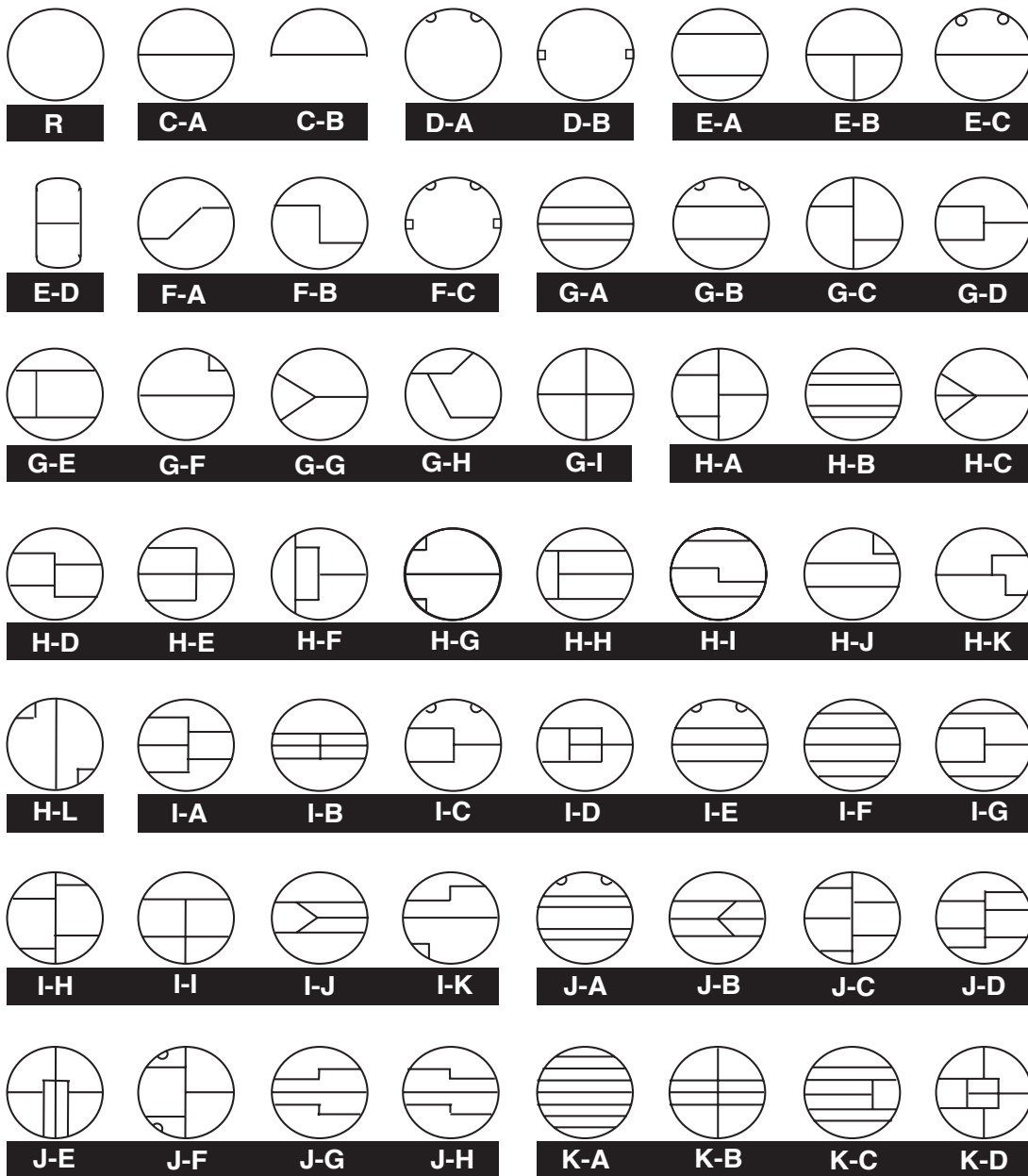
## TYPES OF METAL JACKETED GASKETS

<p><b>ICP MJ120</b></p>	<p>ICP MJ120 Gasket is composed of filler material enclosed in a metal jacket, which covers the inside diameter of the gasket and completely covers the sealing faces on both sides. Ideal for small flanges with narrow diameter, for circular or non-circular applications.</p>	
<p><b>ICP MJ121</b></p>	<p>Identical to ICP MJ120 except the inside diameter of the gasket is protected by overlapped construction of the two-piece metal jacket. It is ideal for wide or irregular-shaped flanges in virtually any diameter.</p>	
<p><b>ICP MJ122</b></p>	<p>Identical to ICP MJ120 except the inside diameter of the gasket is protected by overlapped construction of the three-piece metal jacket. It is ideal for wide or irregular-shaped flanges in virtually any diameter.</p>	
<p><b>ICP MJ130</b></p>	<p>Corrugated Metal Gasket where the corrugations provide a multiple seal across of the gasket. Suited for high temperature applications and applications involving steam, water, gas, oil etc.</p>	
<p><b>ICP MJ131</b></p>	<p>Corrugated Metal Gasket enclosed in a flat metal jacket that covers the inside and outside diameters of the gasket and the contact surface on one side.</p>	
<p><b>ICP MJ132</b></p>	<p>Double Corrugated Metal Gasket enclosed in a flat metal jacket that covers the inside and outside diameters of the gasket and the contact surface on one side.</p>	

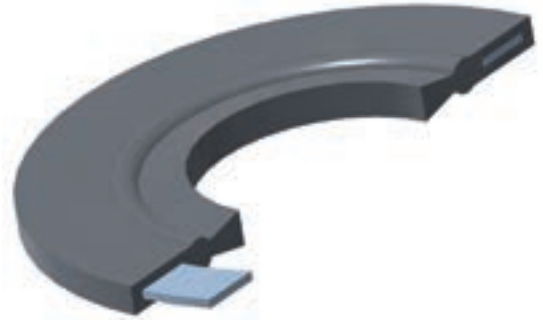
# HEAT EXCHANGER CONFIGURATIONS



**CALVOSEALING** offers the possibility to manufacture the following heat exchanger configurations:



# G-ST GASKETS



The flat steel ring which is protected of corrosion through the vulcanization, absorbs the required pressure tests. Irregularities and grooves, even slight misalignments are compensated.

Likewise, the gasket presents reacts to minimum tightening torques during the installation.

The G-ST Gaskets offer the following advantages:

- Wide sealing surface area.
- Low assembly torque requirement to get the required sealing.








G-ST Gaskets have been successfully used as general services for many years.

The most common applications are steel mills, power plants, petrochemical, pharmaceutical industries as well as many gas and water companies.



# TYPES OF G-ST GASKETS

Several patterns of G-ST Gaskets are available, as shown below:

<b>G-ST</b>	General services	
<b>G-ST P/S</b>	Non-metallic and steel flanges	
<b>G-ST P/K</b>	Plastic flange joints	
<b>G-ST P/KN</b>	Partially coated flanges	
<b>G-ST P/HTB</b>	Steel flanges	
<b>G-ST P/OE</b>	Flexible joint with stainless steel insertion	
<b>G-ST P/GR</b>	Soft rubber lining pipework	

## ELECTRICAL PROPERTIES OF MATERIAL

The surface resistance  $R_o$  and the isolation resistance  $\rho_d$  have been determined according to DIN 53482, arrangement of electrodes style "C".

The disruptive voltage  $U_d$  has been tested according to DIN IEC 243-2/VDE 0303, part 22 with direct current.

The test was performed with 1 and 5 mm thickness gaskets.

MATERIAL	$R_o$ ( $\Omega$ ) 1 mm	$R_o$ ( $\Omega$ ) 5 mm	$\rho_d$ ( $\Omega$ ) 1 mm	$\rho_d$ ( $\Omega$ ) 5 mm	Test Voltage (V)	$U_d$ (kV) 1 mm	$U_d$ (kV) 5 mm
EPDM	$0.45 \times 10^3$	$0.85 \times 10^3$	$0.5 \times 10^3$	$0.6 \times 10^3$	1	-	-
NBR-DUO	$3.30 \times 10^3$	$5.35 \times 10^3$	$1.5 \times 10^3$	$3.2 \times 10^3$	10	-	-
CSM	$2.55 \times 10^{12}$	$1.15 \times 10^{12}$	$5.5 \times 10^{10}$	$8.9 \times 10^{10}$	100	>15	>15
FPM-S	$2.45 \times 10^{11}$	$2.35 \times 10^{10}$	$6.2 \times 10^9$	$7.4 \times 10^9$	100	>6	>15

## GASKET PARAMETERS ACCORDING TO DIN 28 090-1

TYPE			G-ST, P/S P/K, P/OE	G-ST, P/S P/K, P/OE	P/KN	P/KN	G-ST, P/S, P/K, P/OE		
MATERIAL			NBR, CR, NR, EPDM, IIR	FPM-S, CSM	NBR, CR, NR, EPDM, IIR	FPM-S, CSM	NBR, CR, NR, EPDM, IIR, CSM, FPM-S		
Recommended flange face roughness Ra	$\mu\text{m}$	max.	160	160	160	160	Ra	$\mu$ inch	500
Surface pressure limits for 20 °C	N/mm <sup>2</sup>	$\bar{\delta}_{VU/L}$	2	2	2	15	m	-	1.00
		$\bar{\delta}_{VO}$	15	9	450	450	y	psi	200
Surface pressure limits for 150 °C	N/mm <sup>2</sup>	$\bar{\delta}_{BU/L}$	-	2	-	(15)			
		$\bar{\delta}_{BO}$	-	5	-	(435)			

# MATERIAL CHARACTERISTICS



## NR (Natural Rubber)

- Maximum Temperature: -50°C to 90°C / - 58°F to 194°F
- Shore A Hardness: 60 ± 5

## NBR-DUO ( Acrylonitrile Butadiene Rubber)

- Maximum Temperature: -30°C to 120°C / - 22°F to 248°F
- Shore A Hardness: 80 ± 5
- *Drinking Water:*
  1. Test approval by DVGW /TÜV Süddeutschland according to DIN EN 681-1.
  2. KTW recommendation 1.3.13 in the areas D1 and D2, as well as hygienic test in accordance with DVGW code of practice W 270.
  3. FDA, 21 CFR Ch.I (04/2000), S 177.2600.
- *Natural Gas:*
  1. Test approval by DVGW according to DIN EN 682 (substitutes DIN 3535, Part 3).

## HNBR (Hydrogenated Acrylonitrile Butadiene Rubber)

- Maximum Temperature: -25°C to 150°C / - 13°F to 302°F
- Shore A Hardness: 75 ± 5

## CR ( Chloroprene Rubber)

- Maximum Temperature: -25°C to 125°C / - 13°F to 257°F
- Shore A Hardness: 63 ± 5

## CSM (Chlorosulphonated Monomer Rubber)

- Maximum Temperature: -20°C to 120°C / - 4°F to 248°F
- Shore A Hardness: 70 ± 5

## EPDM\* (Ethylene Propylene Diene Monomer Rubber)

- Maximum Temperature: -40°C to 120°C / - 40°F to 248°F
- Shore A Hardness: 70 ± 5
- KTW recommendation 1.3.13 in the areas D1 and D2.
- FDA, 21 CFR Ch.I (04/2000), S 177.2600.

## FPM-S\* (Fluorinated Rubber Acid Proof)

- Maximum Temperature: -20°C to 200°C / - 4°F to 392°F
- Shore A Hardness : 55 ± 5

## IIR (Butyle Rubber)

- Maximum Temperature: -40°C to 135°C / - 40°F to 275°F
- Shore A Hardness: 55 ± 5

## Steel Insert

- Standard: Carbon Steel
- Optional: Stainless Steel

\* Also available as "HP" (high purity)





# Ring Type Joints

## DESCRIPTION

Ring Type Joints are metal rings used with high pressure and temperature applications. The sealing contact area results very reliability. Sealing gasket contact surface, as well as flange surface, have to be precisely machined and finished.

Ring Type Joint materials should not be forced or laminated, and should not have irregularities. Sealing hardness must be 30 HB less than flanges, ensuring enough gasket deformation without damaging the flange face.

Used primarily in the petroleum fields and drilling equipment. Also commonly used in valve assemblies and pipes, such as high pressures vessels.





Ring Type Joint available shapes:

- **ICP SM71**  
Oval section gasket.
- **ICP SM72**  
Octagonal section gasket, characterized for offering better sealing.
- **ICP SM73**  
Joint with a specially shaped designed for use the internal pressure as auxiliary mode for sealing.
- **ICP SM74**  
Square section gasket with bevelled edges, offering an excellent sealing.



# RING TYPE JOINT TYPES





CALVOSEALING Ring Type Joints are available in the following formats:

<b>ICP SM71</b>	<p>ICP SM71 oval section Ring Type Joint is designed for flanges with ring type grooves. This type of seal is used to seal pressures up to 345 bar (5,000 psi) manufactured according to API6A.</p>	
<b>ICP SM72</b>	<p>ICP SM72 octagonal section Ring Type Joint is designed for flanges with ring type grooves. This type of seal is used to seal pressures up to 345 bar (5,000 psi) manufactured according to API6A.</p>	
<b>ICP SM73</b>	<p>ICP SM73 Ring Type Joint is the most resistant ring to vibrations, peaks of pressure and shock that are produced during the drilling of wells for oil.</p>	
<b>ICP SM74</b>	<p>ICP SM74 Ring Type Joint is designed for pressures up to 1,380 bar (20,000 psi) manufactured according to API6A. The ring type joint has a square cross section with bevelled edges.</p>	

# STANDARD MATERIAL

MATERIAL	BRINELL HARDNESS	TEMPERATURE LIMIT (°C)		IDENTIFICATION
		Min.	Max.	
Soft Iron	90	-60	500	D
Low Carbon Steel	120	-40	540	S
4%-6% Cromo ½ % Molibdeno	130	-125	500	F5
Stainless Steel 304	160	-250	540	S304
Stainless Steel 316	160	-110	760	S316
Stainless Steel 321	160	-250	760	S321
Stainless Steel 347	160	-250	815	S347
Stainless Steel 410	170	-20	850	S410
Inconel 625	150	-100	1090	625
Incoloy 825	150	-100	1090	825
Hastelloy C-276	200	-100	1090	C-276
Titanium	215	-200	1090	TI

## APPLICATIONS

RTJ PROFILE	APPLICATION
	<ul style="list-style-type: none"> <li>Resistant to high temperatures and pressures.</li> <li>Suitable for flat face and male &amp; female flanges.</li> <li>Designed to seal pressures up to 430 bar / 6,250 psi (ASME B16.5) and 345 bar / 5,000 psi (API 6A).</li> </ul>
	<ul style="list-style-type: none"> <li>High sealing capacity at high pressures.</li> <li>Suitable for flat face and male &amp; female flanges.</li> <li>Designed to seal pressures up to 430 bar / 6,250 psi (ASME B16.5) and 345 bar / 5,000 psi (API 6A).</li> </ul>
	<ul style="list-style-type: none"> <li>Designed to seal high pressures where provides an efficient sealing with internal pressure increases.</li> <li>Suitable for male &amp; female flanges.</li> <li>Designed to seal pressures up to 430 bar / 6,250 psi (ASME B16.5) and 345 bar / 5,000 psi (API 6A).</li> </ul>
	<ul style="list-style-type: none"> <li>Designed to seal high pressures where provides an efficient sealing with internal pressure increases.</li> <li>Designed to seal pressures up to 1,380 bar / 20,000 psi (API 6A).</li> </ul>







# INTRODUCTION

## SECTION 1

If it were technically and economically feasible to manufacture perfectly smooth and polished flanges and if we could maintain these surfaces in permanent contact, there would be no need of gaskets. This technical and economic impossibility is caused by:

- Size of the vessel and/or flanges
- Difficulty in maintaining these surfaces perfectly smooth during the handling and/or assembling of the vessel or piping
- Corrosion or erosion of the sealing surfaces

To overcome these difficulties, gaskets are used as a sealing element. When a gasket is seated against the flange surface, it flows, filling the imperfections between them and providing the necessary sealing. Therefore, in order to obtain adequate sealing we must consider four factors:

- **Seating Stress:** Must be provide an adequate way of seating the gasket so it will be able to flow and fill the flange imperfections. The minimum initial seating stress is recommended by ASME (American Society of Mechanical Engineers) Pressure Vessel and Boiler Code, which will be explained later. This seating stress must be limited in order to prevent the destruction of the gasket by an excess of compression.
- **Seal Strength:** A residual stress on the gasket must be maintained, in order to keep it in contact with the flange surfaces, thus avoiding leakage.
- **Material selection:** The gasket material must resist the pressure as well as the fluid to which it is subjected. The correct selection of materials will be covered in several chapters of this book.
- **Surface finish:** There is a recommended flange surface finish for each style of gasket and class of service. The use of surface finish not compatible with the gasket is one of the primary causes of leakage.

The **figure 1.1** shows the operating strengths in a flanged joint:

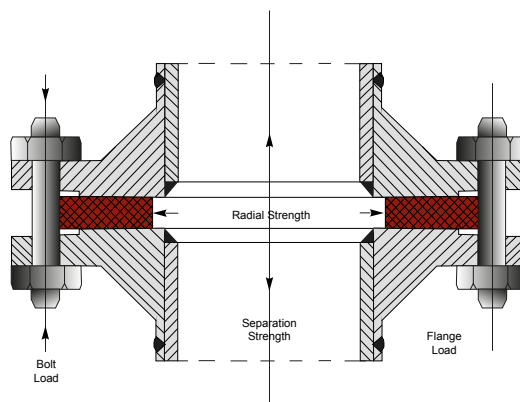


Figure 1.1

- **Radial Strength:** Originated by the internal pressure and tends to the blow out of the gasket.
- **Separation Strength:** Originated by the internal pressure and tends to separate the flanges.
- **Bolt load:** Total load exercised by the torquing of bolts.
- **Flange Load:** Is the strength which compresses the flanges against the gasket. Initially is equal to bolt torquing strength, after the pressurisation of the system is equal to bolt torquing strength minus the separation strength.



# TYPES OF FLANGES

## SECTION 2

There are many common flange standards available, though perhaps the most widely used are ASME, DIN and BS. There are also a large number of other national standards in all countries around the world, though many have their origins in the ASME or DIN series flanges.

There are a wide variety of flange styles, configurations and applicable standards as shown below, though in general industry the raised face (RF) flange is perhaps the most common type regularly employed.

### ASME

The ASME B 16.5 flanges are in widespread use all around the world on chemical plants, refineries and most other major industrial facilities. This standard covers flanges from ½ to 24" nominal bore, which are classified in pressure ratings in pounds per square inch (psi).

Large diameter ASME flanges are covered by the ASME B16.47 standard. This has two main categories (Series A and Series B).

Heat exchangers are commonly produced having male & female flanges of class 150, 300 or 600, but manufactured to TEMA (Tubular Equipment Manufacturers Association) dimensions.

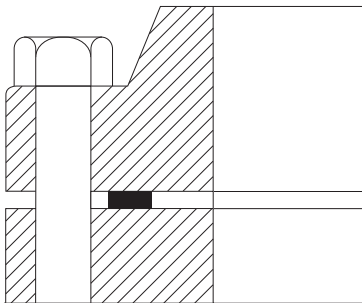
### DIN

By comparison to the ASME flanges, the DIN series are rated with PN numbers which indicate the nominal pressure rating in bar. Unlike the ASME flanges, the pressure ratings relate to ambient temperature. This metric series of flanges are now covered by European standards such as EN1092, etc.

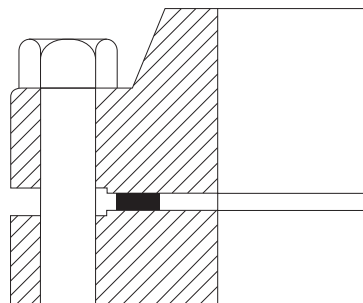
### BS

The BS10 flange standards are rarely used, though of course many of these flanges still remain in service at a large number of industrial sites. These flanges are classified by table system: Table E, Table H, Table J, etc.

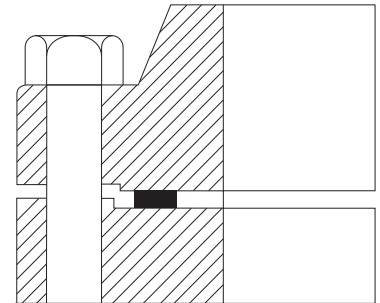
FLAT FACE (FF)



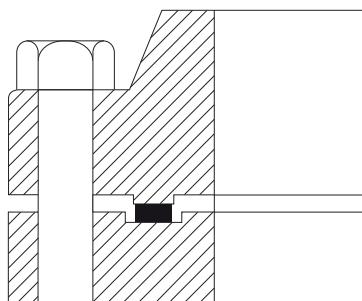
RAISED FACE (RF)



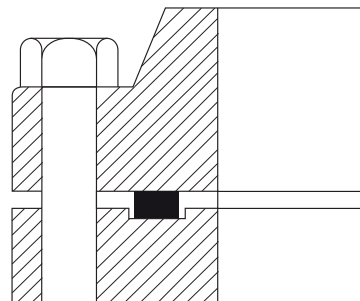
MALE & FEMALE



TONGUE & GROOVE



FLAT FACE TO RECESS



# TYPES OF GASKET

## SECTION 3

The types of gasket can best be described by the materials of construction and classified as non-metallic, semi-metallic and metallic.

### 1. NON-METALLIC

Generally are used with low pressures, a wide range of chemical service including acids and alkalis up to moderate temperatures and miscellaneous low duty applications.

- **Elastomers**

Usually rubber gaskets are only used for relatively low pressure applications since otherwise at high loads, rubber gasket can be extruded between the flanges.

- **Cork - Rubber**

Cork-rubber gaskets are used in low pressure applications, such as automotive and general services, where the bolt torque is relatively low.

- **Compressed Fibre**

Compressed fibre sheets manufactured by aramid fibres, inorganic fibres and graphite fibres.

It is suggested to use this material at relatively low operating conditions such as water, air, oil and low pressure steam.

- **Graphite**

Graphite is a high resistance material to high temperatures and a wide range of chemical resistance. However, it should not be used on oxidizing media (for example nitric and sulphuric acids). Is softer and more compressible than compressed fibre, as well as provides a higher level of sealing. However, graphite is easily damaged, requiring maximum care in handling and storage. In general, is supplied with reinforcing metallic layers to increase its strength and rigidity.

- **MICA**

High temperature gaskets have been developed for the production of high temperature resistant gaskets up to 1000°C (1832°F). It does not contain any asbestos and is inert to most chemical substances.

- **PTFE**

PTFE is generally used because of its outstanding chemical resistance. Note that it can be prone to relaxation and creep. Therefore, is often used a expanded or modified PTFE to enhance these effects. The PTFE can be used as a protective cover around the inner edge of a set of fiber, to produce what is known as a PTFE gasket and be used as

filler in spiral wound gaskets and as surface layer in Cam-profile gaskets.

- **Dielectric Gaskets**

It often requires a insulating gasket system for conditions where a galvanic corrosion cell exists. The material normally used is made of phenolic rubber where it avoids the electrical conduction through the studs, as well as washers and protective sleeves.



## 2. SEMI-METALLICS

Gaskets where the combination of non-metallic filler offers compressibility and the metallic bracket offers strength, resilience and chemical resistance. Used for high temperatures and pressures higher than non-metallic gaskets.

- **Spiral Wound Gasket**

These gaskets are widely used on high pressure joints in general industry. Generally are used for higher temperatures and pressures. A variety of metals are available both for external and for internal rings. The thick of the nominal gasket is 4.5 mm and is compressed to 3.2 / 3.45 mm.

For large diameters (over 1.2 m) usually is used a 7.3 mm thick gasket.

- **Camprofile**

Camprofile Gasket consist of a metal core serrated on both sides, generally made from stainless steel. Is covered with a soft conforming sealing material that is bonded to each face, where depending on the material performance will be made from PTFE or graphite. These gaskets have a high level of sealing tightness and are frequently used to replace metal jacketed joints in heat exchangers.

- **Metal Jacketed Gasket**

Single and Double Jacketed metal gaskets have mostly been traditionally as used for heat exchanger, pumps and valve applications. However the resilience and recovery properties of these gaskets are limited. Metal jacketed gaskets require flanges with smooth surface finishes, high bolt loads and flat flanges in order to seal effectively. Metals such as soft iron, carbon steel and stainless are used to encase a soft filler material, usually compressed fibre.

- **G-ST**

G-ST Gaskets have been used successfully for many years such as general services in pipelines. Irregularities and grooves, even the slight misalignments are compensated. The most common applications are steel mills, power plants, petrochemical, pharmaceutical industries as well as numerous gas and water companies.

## 3. METALLICS

Manufactured from a metal or a combination of more than one metal in a variety of shapes and sizes for use at high temperatures and pressures.

Due to involved high pressures, high tightness is required to cover any flange surface imperfections and to overcome high pressure stresses.

- **Ring Type Joints**

These are commonly used on oilfield applications and these joints details can be found in standards ASME B16.20 and API 6A.



# CALCULATION METHODS

## SECTION 4

This section is designed to enable the design of flanges and gaskets:

1. Calculate a required bolt stress for a particular gasket in a known flange.
2. Modify both gasket and bolting parameters in the relevant calculations to reach at a suitable gasket type and dimension, and bolt pattern to suit a given application.

The ASME VIII and DIN 2505 codes are well established and successfully in use. However, certain limitations in these codes have led to research and development of alternatives, such as the PVRC and CEN methods.

Individual design parameters will dictate the most appropriate method and for further information in gasket selection and requirements of the relevant load sealability, please contact **CALVOSEALING's Technical Support**.

## 1. ASME VIII

The Section VIII Division 2 of the ASME Pressure Vessel and Boiler Code suggests the equations for the design of gaskets and the “m” (gasket factor) and “y” (minimum gasket seating stress) values. These values are not mandatory; however they are based on practical cases with successful results. The designer is free to use different values, as long as the available data justifies the need for doing.

The Appendix 2 of the Section VIII, requires that the calculation of a bolted torquing flange will be made for two independent conditions, operating pressure and minimum seating stress.

### Operating Conditions

This condition determines a minimum bolt load as per the equation:

$$W_{m1} = (\pi G^2 P) / 4 + (2 b \pi G m P) \quad (\text{eq. 2.1})$$

This equation establishes that the required minimum bolt load for the operational conditions are equal to the sum of the pressure forces plus a residual stress on the board multiplied by a factor and internal pressure. To put it another way, this equation establishes that the minimal bolt load should be such that always the residual pressure applied to the gasket will be greater than the internal pressure of the fluid. The ASME Code establishes the minimum values of factor “m” for diverse styles of gaskets as shown in **Table 4.1**.



## Minimum Gasket Seating Stress

The second condition determines a minimum seating gasket stress without the consideration of the working pressure. This force is calculated by the formula:

$$W_{m2} = \pi b G y \quad (\text{eq. 2.2})$$

where “b” is defined as the effective gasket width and “y” is the value of the minimum seating stress, obtained in **Table 4.1**. The “b” value is calculated by:

$$b = b_0 \text{ when } b_0 \text{ is equal to or less than } 6.4 \text{ mm } (\frac{1}{4}'' )$$

$$b = 0.5 (b_0)^{0.5} \text{ when } b_0 \text{ is greater than } 6.4 \text{ mm } (\frac{1}{4}'' )$$

The ASME Code also explains how to calculate  $b_0$  according to the face of the flange as shown in **Tables 4.1 y 4.2**.

## Bolt Area

After  $W_{m1}$  and  $W_{m2}$  are determined, the minimum bolt area  $A_m$  must be calculated as follows :

$$A_{m1} = (W_{m1}) / S_b \quad (\text{eq. 2.3})$$

where  $S_b$  is the maximum permissible bolt stress at working temperature

$$A_{m2} = (W_{m2}) / S_a \quad (\text{eq. 2.4})$$

where  $S_a$  is the maximum permissible bolt stress at room temperature

## Maximum Gasket Stress

The maximum stress on the gasket is calculated by the formula:

$$S_{g(\text{max})} = (W_m) / (\pi) (OD^2 - ID^2) \quad (\text{eq. 2.5})$$

$$S_{g(\text{max})} = (W_m) / (\pi) ((OD - 0.125)^2 - (ID^2)) \quad (\text{eq. 2.6})$$

where  $W_m$  is the greater of the values obtained in **equations 2.1 y 2.2**. The **equation 2.5** may be used for spiral wound gaskets and **equation 2.6** for other types of gaskets.

The  $S_g$  value, calculated by **equations 2.5 o 2.6**, should be lower than the maximum seating stress which the gasket be able to resist. If  $S_g$  exceeds the value, must be used another type of gasket or where this is not possible, increase surface area of the gasket. Inner rings and centering guides for spiral wound gaskets are examples for preventing excessive seating stress.

## SYMBOLISM

$A_b$  = Actual total cross sectional root area of bolts or section of least diameter under stress (inch<sup>2</sup>)

$A_m$  = Total required cross sectional area of bolts, taken as greater of  $A_{m1}$  or  $A_{m2}$  (inch<sup>2</sup>)

$A_{m1}$  = Total required cross sectional area of bolts required for operating conditions (inch<sup>2</sup>)

$A_{m2}$  = Total required cross sectional area of bolts required for gasket seating (inch<sup>2</sup>)

$b$  = Effective seating width of gasket (inch)

$b_0$  = Basic gasket seating width (inch)

$G$  = Diameter of location of gasket load reaction (Table 4.2 inch)

$H_g$  = Gasket load reaction force

$h_g$  = Distance from  $G$  to bolt circle diameter

$m$  = Gasket factor (Table 4.1)

$N$  = Radial flange width of Spiral Wound Component (Table 4.2)

$P$  = Design pressure (psi)

$S_a$  = Allowable bolt stress at atmospheric temperature (psi)

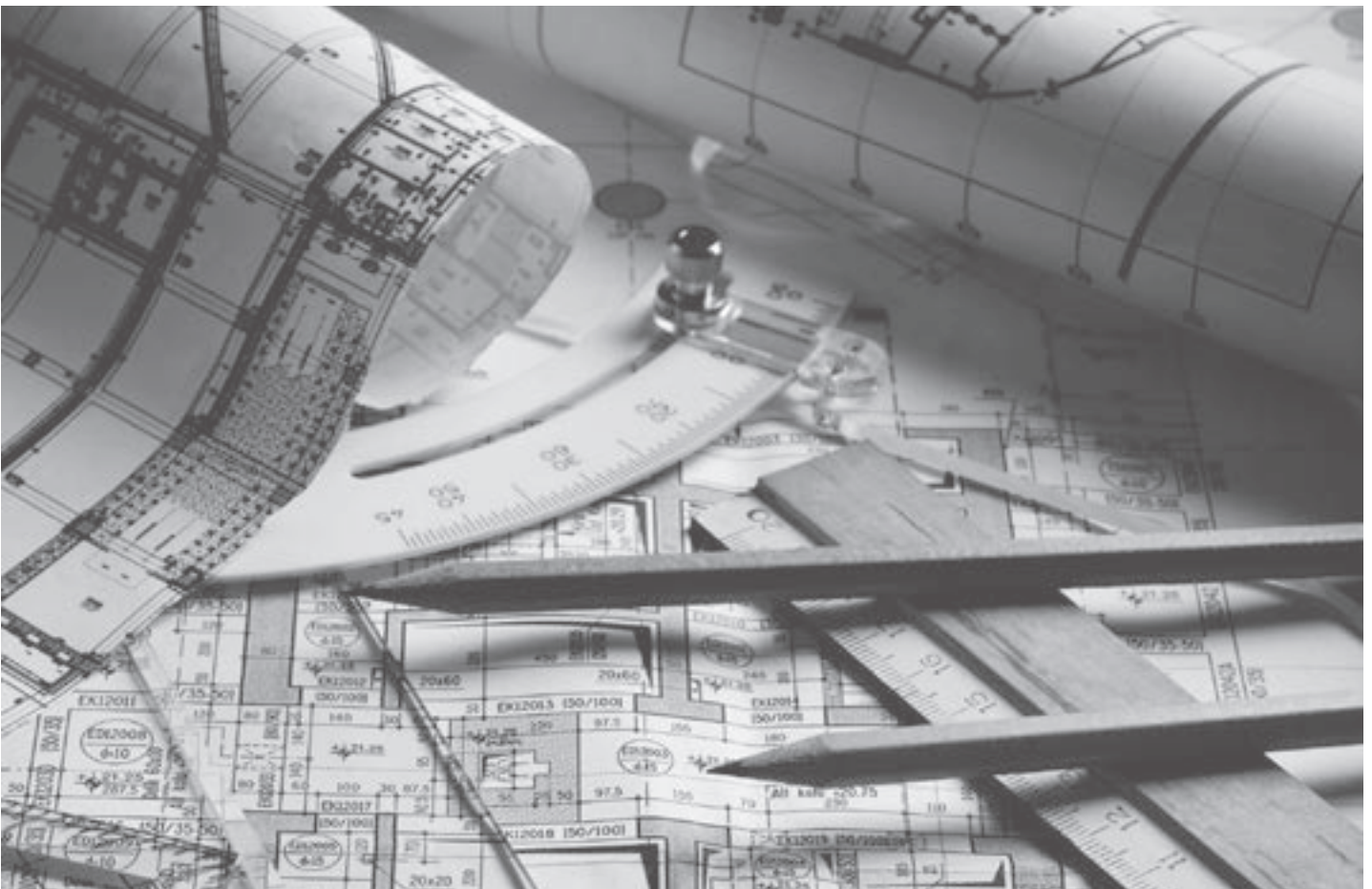
$S_b$  = Allowable bolt stress at design temperature (psi)

$S_g$  = Maximum gasket stress (psi)

$W_{m1}$  = Minimum required bolt load for the operating conditions (Lb<sub>f</sub>)

$W_{m2}$  = Minimum required bolt load for gasket seating (Lb<sub>f</sub>)

$y$  = Minimum gasket seating stress (psi)



Gasket factors (m) for Operating Conditions and Minimum Design Seating Stress (y), as shown bellow:

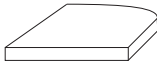





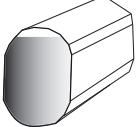
GASKET DESIGN	m	y psi (MPa)	PROFILE	Effective Gasket Seating Width				
				Grupo	Column			
Elastomer < 75 Shore A > 75 Shore A	0.50 1.00	100 (0.69) 200 (1.38)		(1a), (1b), (1c), (1d), (4), (5)				
Compressed Fibre ICP 9400 ICP 9600 ICP 9700	3.4 3.7 4.0	2,900 (20.0) 3,335 (23.0) 3,625 (25.0)						
PTFE (1.5 mm thick) FLON200 FLON300 FLON400	1.6 2.0 3.0	1,650 (11.38) 1,900 (13.1) 2,550 (17.58)						
Expanded Graphite (1.5 mm thick) 9000 9000 R 9000 RR	2 6.5 2.6	2,500 (17.2) 3,300 (22.75) 2,800 (19.3)						
MICA	2.0	2,500 (17.24)						
Spiral Wound Gasket *Stainless Steel, Monel and Nickel Alloys	3.00	5,000 (34.48)					(1a), (1b)	II
Double Corrugated Metal Gasket (with filler material) * Soft aluminum * Soft copper or bronze * Iron or Carbon Steel * Monel * Stainless Steel / Nickel Alloys	2.50 2.75 3.00 3.25 3.50	2,900 (20) 3,700 (25.5) 4,500 (31.03) 5,500 (37.9) 6,500 (44.82)					(1a), (1b)	
Corrugated Metal Gasket * Soft aluminum * Soft copper or bronze * Iron or Carbon Steel * Monel o Chromium 4%-6% * Stainless Steel / Nickel Alloys	2.75 3.00 3.25 3.50 3.75	3,700 (25.5) 4,500 (31.03) 5,500 (37.92) 6,500 (44.82) 7,600 (52.40)					(1a), (1b), (1c), (1d)	
Single Metal Jacketed (with filler material) * Soft aluminum * Soft copper or bronze * Iron or Carbon Steel * Monel * Chromium 4%-6% * Stainless Steel / Nickel Alloys	3.25 3.50 3.75 3.50 3.75 3.75	5,500 (37.92) 6,500 (44.82) 7,600 (52.40) 8,000 (55.16) 9,000 (62.1) 9,000 (62.1)					(1a), (1b), (1c), (1d), (2)	
Grooved Metal * Soft aluminum * Copper or soft bronze * Iron or Carbon Steel * Monel o Chromium 4%-6% * Stainless Steel / Nickel Alloys	3.25 3.50 3.75 3.75 4.25	5,500 (37.92) 6,500 (44.82) 7,600 (52.40) 9,000 (62.1) 10,100 (69.64)					(1a), (1b), (1c), (1d), (2), (3)	
Ring Type Joint * Iron or Carbon Steel * Monel o Chromium 4%-6% * Stainless Steel / Nickel Alloys	5.50 6.00 6.50	18,000 (124) 21,800 (150.3) 26,000 (179.3)		(6)	I			

Table 4.1

“m” gasket factor and minimum gasket seating stress “y”



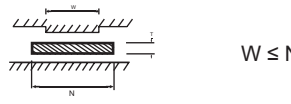
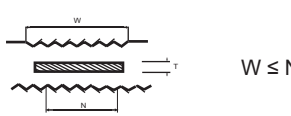
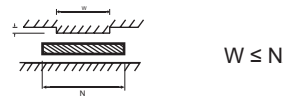
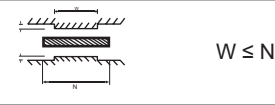

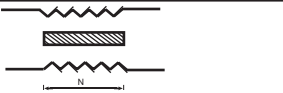
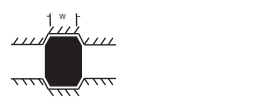
Flange and Gasket Diagram	Basic Gasket Seating Stress $b_0$	
	Column 1 Ring Type Joints	Column 2 (Spiral Wound, Metal jacketed, Camprofile, Corrugated Metal gaskets)
1a 	$\frac{N}{2}$	$\frac{N}{2}$
1b 	$\frac{N}{2}$	$\frac{N}{2}$
1c  $W \leq N$	$\frac{w + T}{2}$	$\frac{w + T}{2}$
1d  $W \leq N$	$\frac{w + N}{4}$ (max.)	$\frac{w + N}{4}$ (max.)
2  $W \leq N/2$	$\frac{W + N}{4}$	$\frac{W + 3N}{8}$
3  $W \leq N/2$	$\frac{N}{4}$	$\frac{3N}{8}$
4 	$\frac{3N}{8}$	$\frac{7N}{16}$
5 	$\frac{N}{4}$	$\frac{3N}{8}$
6 	$W / 8$	-

Table 4.2  
Effective Gasket Seating Stress

$$b = b_0 \quad \text{if} \quad b_0 \leq 6.4 \text{ mm} \left( \frac{1}{4}'' \right)$$

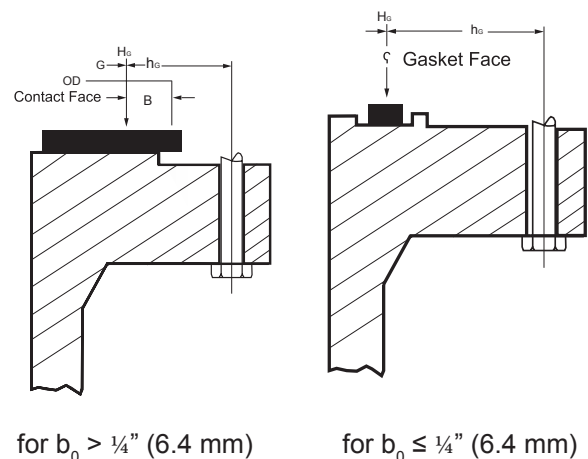
$$b = 0.5 (b_0)^{0.5} \quad \text{if} \quad b_0 > 6.4 \text{ mm} \left( \frac{1}{4}'' \right)$$

$$N = \frac{1}{2} (OD - ID)$$

$$G = OD - 2b$$

**Note:** Where serration do not exceed 0,4 mm (1/64") depth and 0,8 mm (1/32") spacing, choose 1b or 1d.

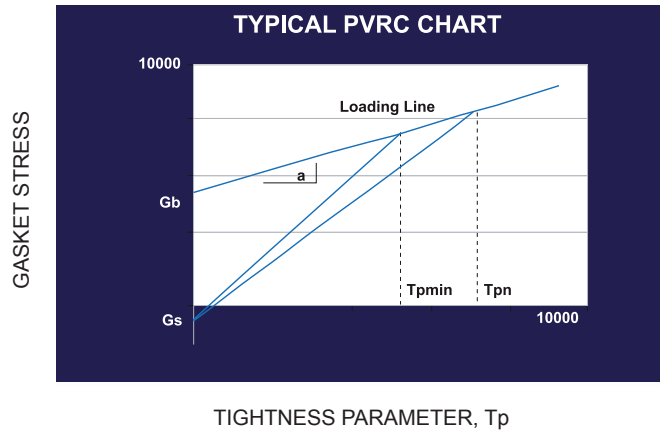
#### Location of Gasket Load Reaction





## 2. PVRC (Pressure Vessel Research Council Method)

PVRC has conceived a new philosophy that addresses the mechanisms of sealing that will benefit gasket manufacturers, vessel designers and the operators of process equipment in general. The result is a package that recommends minimum levels of gasket assembly stress to fulfill the operational requirements of the user. The new procedure is similar to the existing ASME Section VIII calculation, except it incorporates new gasket factors (to replace the traditional “m” and “y” gasket factors) that have been determined through an extensive test program.



Graphic 4.1  
PVRC Typical Graphic

The new gasket factors are  $(G_b)$ ,  $(a)$  y  $(G_s)$ . **(Table 4.3)**

$(G_b)$  and  $(a)$  represent the initial gasket compression characteristics and relate to the initial installation, while  $(G_s)$  represents the unloading characteristics typically associated with the operating behavior.

The PVRC method has been developed over the years using the following parameters for bolted joint designs and determining gasket constants:

1. Determine the tightness class “Tc” that corresponds to the acceptable leak rate for the application:

**T2 Standard:** Represents a leak rate (mass) per unit diameter of 0.002 mg/sec/mm-day.

**T3 Tight:** Represents a leak rate (mass) per unit diameter of 0.002 mg/sec/mm-day.

2. The PVRC has proposed the introduction of the Tightness Class (C) corresponding to three levels of maximum leak rates:

Tightness Class	Tightness Constant C
Air, Water	0.1
Standard	1.0
Tight	10.0

3. Select the appropriate gasket constants  $(G_b)$ ,  $(a)$  y  $(G_s)$  for the gasket style and material **(Table 4.3)**

4. Determine gasket parameters  $(N)$ ,  $(b_o)$ ,  $(b)$ , and  $(G)$  in accordance with **Table 4.2**.

5. Gasket seating area,  $A_g = 0.7854 (OD^2 - ID^2)$

6. Hydraulic area,  $A_i = 0.7854 G^2$

7. Minimum required tightness,  $T_{pmin} = 0.1243 \times C \times P_d$  ( $P_d$  = Design Pressure)

8. Assembly Tightness,  $T_{pa} = 0.1243 \times C \times P_t$  ( $P_t$  = Test pressure)

(Typically  $1.5 \times P_d$ )

9. Tightness Parameter Ratio,  $T_r = \text{Log}(T_{pa}) / \text{Log}(T_{pmin})$

10. Gasket Operating Stress,  $S_{m1} = G_s (G_b/G_s \times T_{pa}^a)^{1/Tr}$
11. Gasket Seating Stress,  $S_{m2} = G_b (T_{pa}^a) / (e \times 1.5) - P_d (A_i/A_g)$
12. Design factor,  $Mo = \text{the greater of } S_{m1}/P_d \text{ or } S_{m2}/P_d$
13. Design Bolt load,  $W_{mo} = A_g \times S_{mo} + A_i \times P_d$  where  $S_{mo}$  is greater than  $S_{m1}, S_{m2}, 2P, S_L$

$S_L$  = A minimum allowed value of operating gasket stress equal to 90% of the minimum gasket stress in the test that determined the gasket constants. It is 6.21 MPa (900 psi) for the standard and soft ROTT test procedures, and 10.3 MPa (1,500 psi) for the hard gasket procedure.

Gasket Material	$G_b$ psi (MPa)	a	$G_s$ psi (MPa)
<b>Compressed Fibre 1.6 mm thick (1/16")</b>			
ICP 9400	680 (4.69)	0.29	2.40 (0.016)
ICP 9600	1,200 (8.27)	0.22	3.4 (0.023)
ICP 9700	1,180 (8.14)	0.204	170 (1.17)
<b>Virgin PTFE 1.6 mm thick (1/16")</b>	700 (4.83)	0.251	2.1 (0.014)
<b>Modified PTFE 1.6 mm thick (1/16")</b>			
FLON 200	183 (1.26)	0.36	0.004 (2.76.10 <sup>-5</sup> )
FLON 300	155 (1.07)	0.36	0.006 (4.14 .10 <sup>-5</sup> )
FLON 400	209 (1.44)	0.356	0.045 (3.10 .10 <sup>-4</sup> )
<b>Expanded Graphite 1.5 mm thick</b>			
9000	970 (6.69)	0.384	0.05 (3.448.10 <sup>-4</sup> )
9000R	816 (5.63)	0.377	0.07 (4.83.10 <sup>-4</sup> )
9000RR	1,400 (9.65)	0.32	0.01 (6.89.10 <sup>-5</sup> )
<b>MICA</b>	1,906 (13.14)	0.2	456 (3.14)
<b>Spiral Wound Gasket</b>			
(Stainless Steel / Flexible Graphite)	2,450 (16.89)	0.237	13.05 (0.09)
(Stainless Steel / PTFE)	2,600 (17.93)	0.23	16.0 (0.11)
(Stainless Steel/ Exfoliated Vermiculite)	480 (3.31)	0.43	9.76 (0.067)
<b>Camprofile Gasket</b>			
(Stainless Steel / Graphite)	410 (2.83)	0.4	27 (0.186)
<b>Metal Jacketed Gasket</b>			
Soft Iron	2,800 (19.31)	0.23	15 (0.10)
Stainless Steel	2,950 (20.34)	0.23	15 (0.10)
Soft Copper	1,800 (12.41)	0.35	15 (0.10)
<b>Corrugated Gasket (MJ114)</b>			
Stainless Steel / Graphite	1,251 (8.63)	0.309	11 (0.08)

Table 4.3  
Gasket Factors

# GASKET INSTALLATION SECTION 5



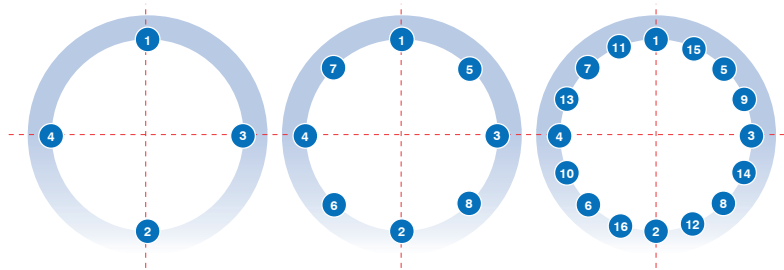
## a. BEST PRACTICE

- ✓ 1 The connecting flanges should be the same type and correctly aligned.
- ✓ 2 Fasteners should be selected to ensure that they do not exceed their elastic limit at the required tension.
- ✗ 3 Do not re-torque the fasteners after the exposure at high temperatures of compressed fibre reinforced with elastomer.
- ✓ 4 Ensure that fasteners show no signs of corrosion, which might affect their load bearing capacity.
- ✓ 5 Should be applied an uniform and thin layer of lubricant. Where stainless steel is used, it should be ensured that the coating is suitable for use.
- ✗ 6 Fasteners and / or gaskets should never be re-used.
- ✓ 7 High quality gaskets should always be procured only from reputable suppliers.
- ✓ 8 Gaskets should be kept as thin as possible.
- ✗ 9 The gaskets never must be beaten against the flange. This will damage both the flange as the gasket, reducing sealing performance.
- ✓ 10 The bolt holes should be cut first, followed by the outer and inner gasket diameters. Note that if the bolt holes are fairly close to the outer diameter of the gasket, can produce a sufficient tension to break the seal at this point.
- ✓ 11 Gaskets should be stored in a cool dry place, away from heat, humidity, direct sunlight, ozone sources, water, oil and chemicals.  
They should also be stored flat (in other words, are not placed into hooks)
- ✗ 12 Avoid the use of Jointing Compounds and Pastes. These can lubricate the flange gasket interface and encourage stress-relaxation effects.

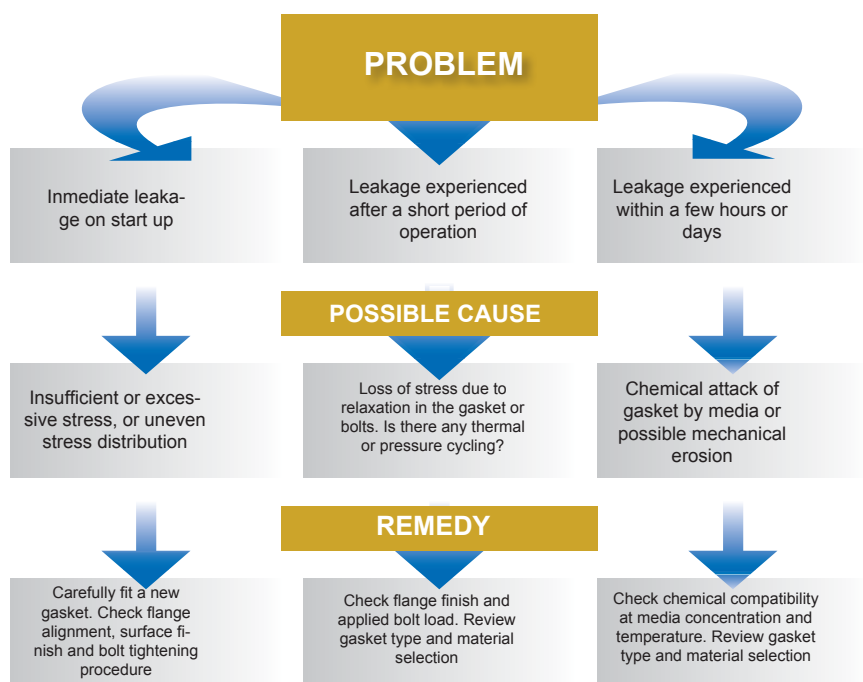
## b. BOLT TORQUE

Gaskets should be tightened evenly in at least three, or even four stages using an opposed-pattern as illustrated here.

Be aware that “cross-talk” exists between bolts during the tightening process so that as one tightens and the gasket compresses, another bolt may loosen. Therefore, a final pass around all of the bolts at the end is suggested to ensure that all remain tight.



## c. TROUBLESHOOTING



#### d. BOLTING UP SEQUENCE









**PHASE I:** Torque bolts up to approximately 30% of the final torque value following the diametrically opposed sequence specified in **Table 6.1 / Table 6.2**.

**PHASE II:** Repeat Phase 1, increasing the torque value to approximately 60% of the final torque value.

**PHASE III:** Repeat Phase 2, increasing the torque value to the final required torque value.

**PHASE IV:** A final tightening should be performed following an adjacent bolt-to-bolt sequence to ensure that all bolts have been evenly stressed.

### Surface Finish Requirements

GASKET DESCRIPTION	GASKET CROSS SECTION	GASKET SURFACE FINISH (Ra)	
		µm	µ inch
Flat Non Metallic		3.2 to 6.3	125 to 250
Spiral Wound Gasket		2.0 to 6.3	80 to 250
Camprofile		3.2 to 6.3	125 to 250
Double Metal Jacketed		1.6 to 2.0	63 to 80
Metal Jacketed Gasket		2.5	100 to 125
Corrugated Metal		1.6	63
Grooved Metal		1.6	63
Ring Type Joint		1.6	63

**Table 5.1**  
**Surface Finish Requirements**

**IMPORTANT:** Under no circumstances the flange sealing surfaces should be machined in a manner that tool marks would extend radially across the sealing surface. Such tool marks are practically impossible to seal regardless of the type of gasket used.



# BOLT TORQUE

## SECTION 6



### BOLT TORQUE CALCULATION

The torque required to produce a certain stress in bolting is dependent upon a number of conditions, some of which are:

1. Diameter of Bolt
2. Type and number of threads on bolt
3. Material of bolt
4. Condition of nut bearing surfaces
5. Lubrication of bolt threads and nut bearing surfaces


The **table 6.1** shows suggested maximum clamp load and maximum bolt torque for use in different types of screw connections with lubricated and non lubricated threads, secured by torque wrench. The estimated bolt torques are calculated at 85 percent of the specified elastic limit in accordance to ISO 898-1.

mm	$\mu_G = 0.10$ (Lubricated Thread)						$\mu_G = 0.20$ (Non Lubricated Thread)					
	$F_{max}$ (N)			$M_M$ (Nm)			$F_{max}$ (N)			$M_M$ (Nm)		
	8.8	10.9	12.9	8.8	10.9	12.9	8.8	10.9	12.9	8.8	10.9	12.9
M4	4,200	5,900	7,100	2.4	3.3	4	3,900	5,450	6,550	2.9	4.1	4.9
M5	6,900	9,700	11,600	4.9	7	8	6,350	8,950	10,700	6	8.5	10
M6	9,750	13,700	16,400	8	12	14	9,000	12,600	15,100	10	14	17
M7	14,400	20,200	24,200	13	19	23	13,200	18,500	22,200	16	23	28
M8	17,900	25,100	30,200	20	28	34	16,500	23,200	27,900	25	35	41
M9	23,800	33,400	40,100	29	41	49	22,000	30,900	37,100	36	51	61
M10	28,400	40,000	48,000	40	56	67	26,200	36,900	44,300	49	69	83
M12	41,500	58,500	70,000	69	98	115	38,300	54,000	64,500	86	120	145
M14	56,500	80,000	96,000	110	155	185	52,500	74,000	88,500	135	190	230
M16	78,500	110,000	132,000	170	240	285	73,000	102,000	123,000	210	295	355
M18	95,000	134,000	160,000	235	330	395	88,000	124,000	148,000	290	405	485
M20	122,000	172,000	206,000	330	465	560	114,000	160,000	192,000	410	580	690
M22	152,000	214,000	257,000	445	620	750	141,000	199,000	239,000	550	780	930
M24	176,000	248,000	298,000	570	800	960	164,000	230,000	276,000	710	1,000	1,200
M27	232,000	326,000	391,000	840	1,200	1,400	215,000	302,000	363,000	1,050	1,500	1,800
M30	282,000	397,000	476,000	1,150	1,600	1,950	262,000	368,000	442,000	1,450	2,000	2,400

**Table 6.1.** Maximum strength and maximum bolt torque for different types of screw connections

The **table 6.2** shows suggested bolt torque for standard ANSI / API6A to use with PTFE covered and non lubricated threads, secured by torque wrench.

The estimated bolt torques are calculated at 72 percent of the specified elastic limit.

 inch	Camp Load  lb <sub>f</sub>	PTFE covered thread		Non lubricated thread	
		Assembly Torque Nm	Assembly Torque lb <sub>f</sub> . ft	Assembly Torque Nm	Assembly Torque lb <sub>f</sub> . ft
		f = 0.07		f = 0.13	
1/2	7,450	48	35	80	59
5/8	11,865	92	68	155	115
3/4	17,559	160	118	270	200
7/8	24,241	253	188	429	319
1	31,802	376	279	639	474
1 1/8	41,499	540	401	925	686
1 1/4	52,484	745	553	1,285	953
1 3/8	64,759	996	739	1,727	1,281
1 1/2	78,322	1,297	962	2,261	1,677
1 5/8	93,173	1,653	1,226	2,894	2,146
1 3/4	109,313	2,069	1,534	3,636	2,696
1 7/8	126,741	2,549	1,890	4,493	3,332
2	145,458	3,097	2,297	5,476	4,061
2 1/4	186,758	4,418	3,276	7,851	5,822
2 1/2	233,212	6,068	4,500	10,828	8,030
2 5/8	233,765	6,394	4,716	11,429	8,430
2 3/4	257,694	7,354	5,424	13,168	9,712
3	309,050	9,555	7,047	17,156	12,654
3 1/4	365,070	12,154	8,965	21,878	16,136
3 3/4	491,099	18,685	13,782	33,766	24,905
3 7/8	525,521	20,620	15,208	37,293	27,506
4	561,108	22,683	16,730	41,057	30,282

**Table 6.2.** Recommended bolt torque for standard ANSI / API6A

# TORQUE VALUES FOR FLANGE INSULATION SETS

CLASS 150				
NPS [inch]	N° Bolts	Bolt Dia. [inch]	Suggested Torque	
			ft.Lb <sub>f</sub>	Kg <sub>r</sub> .cm
1	4	½	40	553
1 ¼	4	½	40	553
1 ½	4	½	40	553
2	4	⅝	80	1,106
2 ½	4	⅝	80	1,106
3	4	⅝	110	1,521
3 ½	8	⅝	80	1,106
4	8	⅝	100	1,383
5	8	¾	120	1,659
6	8	¾	130	1,797
8	8	¾	130	1,797
10	12	⅞	215	2,972
12	12	⅞	220	3,042
14	12	1	320	4,424
16	16	1	320	4,424
18	16	1 ⅛	450	6,221
20	20	1 ⅛	450	6,221
24	20	1 ¼	650	8,987

CLASS 300				
NPS [inch]	N° Bolts	Bolt Dia. [inch]	Suggested Torque	
			ft.Lb <sub>f</sub>	Kg <sub>r</sub> .cm
1	4	⅝	80	1,106
1 ¼	4	⅝	80	1,106
1 ½	4	¾	110	1,521
2	8	⅝	110	1,521
2 ½	8	¾	150	2,074
3	8	¾	150	2,074
3 ½	8	¾	150	2,074
4	8	¾	180	2,489
5	8	¾	180	2,489
6	12	¾	170	2,350
8	12	⅞	265	3,664
10	16	1	320	4,424
12	16	1 ⅛	450	6,221
14	20	1 ⅛	450	6,221
16	20	1 ¼	650	8,987
18	24	1 ¼	650	8,987
20	24	1 ¼	650	8,987
24	24	1 ½	1,200	16,591

CLASS 600				
NPS [inch]	N° Bolts	Bolt Dia. [inch]	Suggested Torque	
			ft.Lb <sub>f</sub>	Kg <sub>r</sub> .cm
1	4	⅝	80	1,106
1 ¼	4	⅝	110	1,521
1 ½	4	¾	110	1,521
2	8	⅝	110	1,521
2 ½	8	¾	150	2,074
3	8	¾	150	2,074
3 ½	8	⅞	200	2,765
4	8	⅞	225	3,111
5	8	1	350	4,839
6	12	1	320	4,424
8	12	1 ⅛	450	6,221
10	16	1 ¼	650	8,987
12	20	1 ¼	675	9,332
14	20	1 ⅝	820	11,337
16	20	1 ½	1,125	15,554
18	20	1 ⅝	1,430	19,771
20	24	1 ⅝	1,400	19,356
24	24	1 ⅞	2,230	30,831

CLASS 900				
NPS [inch]	N° Bolts	Bolt Dia. [inch]	Suggested Torque	
			ft.Lb <sub>f</sub>	Kg <sub>r</sub> .cm
1	4	⅞	110	1,521
1 ¼	4	⅞	170	2,350
1 ½	4	1	240	3,318
2	8	⅞	170	2,350
2 ½	8	1	240	3,318
3	8	⅞	215	2,972
4	8	1 ⅛	450	6,221
5	8	1 ¼	650	8,987
6	12	1 ⅛	455	6,291
8	12	1 ⅝	820	11,337
10	16	1 ⅝	850	11,752
12	20	1 ⅝	870	12,028
14	20	1 ½	1125	15,554
16	20	1 ⅝	1430	19,771
18	20	1 ⅞	2230	30,831
20	20	2	2300	31,799
24	20	2 ½	5500	76,041

**Note:**

1. Recommended torque values are based on using weld-neck (integral flanges).
2. Blind or other flange types may require different sealing loads.
3. Specified Bolt Torque values refers in a lubricated thread with 0.15 friction factor.

# TORQUE VALUES FOR FLANGE INSULATION SETS

CLASS 1500				
NPS [inch]	N° Bolts	Bolt Dia. [inch]	Suggested Torque	
			ft.Lb <sub>r</sub>	Kg <sub>r</sub> .cm
1	4	7/8	110	1,521
1 1/4	4	7/8	170	2,350
1 1/2	4	1	240	3,318
2	8	7/8	170	2,350
2 1/2	8	1	240	3,318
3	8	1 1/8	370	5,115
4	8	1 1/4	650	8,987
5	8	1 3/4	1,000	13,826
6	12	1 3/8	820	11,337
8	12	1 5/8	1,400	19,356
10	12	1 7/8	2,100	29,034
12	16	2	2,300	31,799
14	16	2 1/4	3,400	47,007
16	16	2 1/2	4,300	59,450
18	16	2 3/4	6,200	85,718
20	16	3	7,800	107,839
24	16	3 1/2	13,000	179,732



CLASS 2500				
NPS [inch]	N° Bolts	Bolt Dia. [inch]	Suggested Torque	
			ft.Lb <sub>r</sub>	Kg <sub>r</sub> .cm
1	4	7/8	170	2,350
1 1/4	4	1	300	4,148
1 1/2	4	1 1/8	400	5,530
2	8	1	300	4,148
2 1/2	8	1 1/8	400	5,530
3	8	1 1/4	600	8,295
4	8	1 1/2	650	8,987
5	8	1 3/4	1,500	20,738
6	8	2	2,300	31,799
8	12	2	2,400	33,181
10	12	2 1/2	4,900	67,745
12	12	2 3/4	7,900	109,222

**Note:**

1. Recommended torque values are based on using weld-neck (integral) flanges.
2. Blind or other flange types may require different sealing loads.
3. Specified Bolt Torque values refers in a lubricated thread with 0.15 friction factor.



# CHEMICAL RESISTANCE OF MATERIALS

## SECTION 7

Below we observe the chemical compatibility of non metallic sheets:

MEDIA	Compressed Fibre Sheet							Graphite			PTFE		
	9200	9200 G	9400	9400 M	9600	9700	9700 M	9000	9000R 9000RR	PTFE	FLON 200	FLON 300	FLON 400
Acetaldehyde	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●
Acetamide	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Acetic Acid	▲	▲	●	■	●	●	■	●	■	●	●	●	●
Acetone	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Acetylene	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Ádipic Acid	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Alum	●	●	●	●	●	●	▲	●	●	●	●	●	●
Aluminum Acetate	▲	▲	●	●	●	●	▲	●	■	●	●	●	●
Aluminum Chlorate	▲	▲	●	■	●	●	■	●	●	●	●	●	●
Aluminum Chloride	▲	▲	●	●	●	●	▲	●	●	●	●	●	●
Ammonia	■	■	●	▲	●	●	●	●	●	●	●	●	100 °C
Ammonium Bicarbonate	▲	▲	●	▲	●	●	●	●	●	●	●	●	●
Ammonium Chloride	▲	▲	●	■	●	●	■	●	●	●	●	●	●
Amyl Acetate	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Aniline	■	■	■	■	■	■	■	●	●	●	●	●	●
Asphalt	●	●	●	●	●	●	●	●	●	●	●	●	●
ASTM Oil N°1	■	■	●	●	●	●	●	●	●	●	●	●	●
ASTM Oil N°3	■	■	●	●	●	●	●	●	●	●	●	●	●
Barium Chloride	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Benzene	■	■	●	▲	●	●	▲	●	●	●	●	●	●
Benzoic Acid	■	■	▲	▲	●	●	▲	●	●	●	●	●	●
Bleach Solutions	■	■	●	■	●	●	■	▲	■	●	●	●	●
Borax	■	■	●	●	●	●	●	●	●	●	●	●	●
Butane	■	■	●	●	●	●	●	●	●	●	●	●	●
Butyl Acetate	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Butyl Alcohol (Butanol)	●	●	●	●	●	●	●	●	●	●	●	●	●
Calcium Chloride	▲	▲	●	●	●	●	▲	●	●	●	●	●	●
Calcium Hydroxide	●	●	●	●	●	●	▲	●	●	●	●	●	●
Calcium Sulphate	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Carbon Dioxide	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Carbon Disulphide	■	■	■	■	■	▲	■	●	●	●	●	●	●
Carbon Tetrachloride	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Chlorine (Dry)	■	■	■	■	■	▲	■	20 °C	■	●	●	●	●

● Recommended      ▲ Recommended depends on operating conditions      ■ Not recommended

MEDIA	Compressed Fibre Sheet							Graphite		PTFE			
	9200	9200 G	9400	9400 M	9600	9700	9700 M	9000	9000R 9000 RR	PTFE	FLON 200	FLON 300	FLON 400
Chlorine (Wet)	■	■	■	■	■	■	■	▲	■	●	●	●	●
Chloroform	■	■	▲	■	▲	▲	▲	●	●	●	●	●	●
Chlorometane	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Chromic Acid	■	■	■	■	■	▲	■	< 10%, 25°C	■	●	●	●	●
Citric Acid	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Copper Acetate	■	■	●	●	●	●	●	●	●	●	●	●	●
Copper Chloride	▲	▲	▲	▲	-	-	-	●	●	●	●	●	●
Creosote	■	■	■	■	■	■	■	●	●	●	●	●	●
Cresol	■	■	▲	■	▲	▲	■	●	●	●	●	●	●
Cyclohexanol	■	■	●	●	●	●	●	●	●	●	●	●	●
Cyclohexanone	▲	▲	■	■	■	■	■	●	●	●	●	●	●
Decaline	■	■	●	●	●	●	●	●	●	●	●	●	●
Diesel Oil	■	■	●	●	●	●	●	●	●	●	●	●	●
Dimethylformamide	■	■	■	■	■	■	■	●	●	●	●	●	●
Dowtherm A	■	■	●	●	●	●	●	●	●	●	●	●	●
Ethane	■	■	●	●	●	●	●	●	●	●	●	●	●
Ethanol	●	●	●	●	●	●	●	●	●	●	●	●	●
Ethyl Acetate	■	■	▲	■	▲	▲	▲	●	●	●	●	●	●
Ethyl Chloride	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Ethyl Ether	■	■	●	●	●	●	●	●	●	●	●	●	●
Ethylene	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Ethylene Chloride	■	■	■	■	■	■	■	●	●	●	●	●	●
Ethylene Glycol	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Ferric Chloride	▲	▲	●	●	●	●	●	●	■	●	●	●	●
Formaldehyde	■	■	●	●	●	▲	●	●	●	●	●	●	●
Formic Acid	▲	▲	▲	■	▲	●	▲	●	●	●	●	●	●
Freon 12	■	■	●	●	●	●	●	●	●	●	●	●	●
Freon 22	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●
Fuel Oil	■	■	●	●	●	●	●	●	●	●	●	●	●
Gasoline	■	■	●	●	●	●	●	●	●	●	●	●	●
Glucose	●	●	●	●	●	●	●	●	●	●	●	●	●
Glycerine	●	●	●	●	●	●	●	●	●	●	●	●	●
Heptane	■	■	●	▲	●	●	●	●	●	●	●	●	●
Hydraulic Oil (Glycol)	■	■	●	▲	●	●	▲	●	●	●	●	●	●
Hydraulic Oil (Mineral)	■	■	●	▲	●	●	▲	●	●	●	●	●	●
Hydraulic Oil (Phosphate / Ester)	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Hydrochloric Acid 20%	■	■	▲	■	▲	▲	■	●	■	●	●	●	●
Hydrochloric Acid 36%	■	■	■	■	■	■	■	●	■	●	●	●	●

● Recommended      ▲ Recommended depends on operating conditions      ■ Not recommended

MEDIA	Compressed Fibre Sheet							Graphite			PTFE			
	9200	9200 G	9400	9400 M	9600	9700	9700 M	9000	9000R	9000 RR	PTFE	FLON 200	FLON 300	FLON 400
Hydrofluoric 40%	■	■	■	■	■	■	■	140 °C	■	■	175 °C	■	175 °C	■
Hydrogen	▲	▲	●	■	●	●	▲	●	●	●	●	●	●	●
Isobutane	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Isooctane	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Isopropyl Alcohol	▲	▲	●	●	●	●	●	●	●	●	●	●	●	●
Kerosene	■	■	●	▲	●	●	●	●	●	●	●	●	●	●
Lactic Acid 50%	▲	▲	●	●	●	●	●	●	●	●	●	●	●	●
Lead Acetate	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Lead Arsenate	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Lubricating Oil	■	■	●	●	■	●	●	●	●	●	●	●	●	●
Magnesium Chloride	■	■	●	●	●	●	●	●	■	■	●	●	●	●
Magnesium Sulphate	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Malic Acid	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Methane	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Methanol	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Methyl Chloride	■	■	▲	■	▲	▲	▲	●	●	●	●	●	●	●
Methyl Ethyl Ketone	■	■	▲	■	■	▲	▲	●	●	●	●	●	●	●
Methylene Chloride	■	■	■	■	■	■	■	●	■	■	●	●	●	●
Naphta	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Nitric Acid 20%	■	■	■	■	■	■	■	■	■	■	●	●	●	●
Nitric Acid 40%	■	■	■	■	■	■	■	■	■	■	●	●	●	●
Nitric Acid 90%	■	■	■	■	■	■	■	■	■	■	●	●	●	●
Nitrogen	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Octane	■	■	●	●	●	●	●	●	●	●	●	●	●	●
Oleic Acid	■	■	■	■	●	●	●	●	●	●	●	●	●	●
Oleum	■	■	■	■	■	■	■	■	■	■	●	●	●	●
Oxalic Acid	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●	●
Oxygen	●	●	●	■	●	●	▲	●	●	●	●	●	●	●
Pentane	■	■	●	●	●	●	●	●	▲	▲	●	●	●	●
Perchloroethylene	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●	●
Phenol	■	■	■	■	■	■	■	●	●	●	●	●	●	●
Phosphoric Acid	■	■	■	■	●	●	■	< 50%	< 60%	■	●	●	●	●
Potassium Acetate	▲	▲	●	●	●	●	●	●	●	●	●	●	●	●
Potassium Carbonate	▲	▲	●	▲	●	●	●	●	●	●	●	●	●	▲
Potassium Chlorate	▲	▲	●	■	●	●	■	▲	▲	▲	●	●	●	●
Potassium Chloride	▲	▲	●	●	●	●	●	●	●	●	●	●	●	●
Potassium Dichromate	▲	▲	●	●	●	●	●	▲	▲	▲	●	●	●	●

● Recommended      ▲ Recommended depends on operating conditions      ■ Not recommended

Technical & Design

MEDIA	Compressed Fibre Sheet							Graphite		PTFE			
	9200	9200 G	9400	9400 M	9600	9700	9700 M	9000	9000R 9000 RR	PTFE	FLON 200	FLON 300	FLON 400
Potassium Hydroxide	▲	▲	▲	▲	▲	●	▲	●	●	●	●	●	■
Potassium Nitrate	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Potassium Permanganate	■	■	●	●	●	●	●	▲	▲	●	●	●	●
Propane	■	■	●	●	●	●	●	●	●	●	●	●	●
Pyridine	■	■	■	■	■	■	■	▲	●	●	●	●	●
Salt	●	●	●	●	●	●	●	●	< 20 °C	●	●	●	●
Silicone Oil	●	●	●	▲	●	●	●	●	●	●	●	●	●
Sodium Aluminate	●	●	●	●	●	●	●	●	●	●	●	●	●
Sodium Bisulphite	●	●	●	●	●	●	▲	●	●	●	●	●	●
Sodium Carbonate	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Sodium Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●
Sodium Cyanide	▲	▲	●	●	▲	●	●	●	●	●	●	●	●
Sodium Hydroxide	▲	▲	▲	▲	▲	●	▲	<20%, 30°C	▲	●	●	●	■
Sodium Sulphate	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Sodium Sulphide	▲	▲	●	●	●	●	●	●	●	●	●	●	●
Steam	▲	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●
Stearic Acid	▲	▲	●	▲	●	●	●	●	●	●	●	●	●
Sulphur Dioxide	■	■	■	■	■	▲	■	●	●	●	●	●	●
Sulphuric Acid 20%	■	■	■	■	■	■	■	<70%, 20°C	■	●	●	●	●
Sulphuric Acid 96%	■	■	■	■	■	■	■	■	■	●	●	●	●
Tetrachloroethane	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Tetraline	■	■	●	●	●	●	●	●	●	●	●	●	●
Toluene	■	■	●	●	●	●	●	●	●	●	●	●	●
Transformer Oil	■	■	●	▲	●	●	●	●	●	●	●	●	●
Trichloroethylene	■	■	▲	▲	▲	▲	▲	●	●	●	●	●	●
Trietanolamine	■	■	●	●	●	●	●	●	●	●	●	●	●
Urea	■	■	●	●	●	●	●	●	●	●	●	●	●
Vinyl Acetate	●	●	●	●	●	●	●	●	●	●	●	●	●
Water	●	●	●	●	●	●	●	●	●	●	●	●	●
White Spirit	●	●	●	●	●	●	●	●	●	●	●	●	●
Xylene	■	■	■	■	■	■	■	●	●	●	●	●	●

● Recommended

▲ Recommended depends on operating conditions

■ Not recommended



# Chemical resistance of rubber sheets

	SBR	NR	NEOPRENE	NBR	EPDM	IIR	HYPALON	SILICONE	VITON	KALREZ
Chloroene (wet)	■	■	■	■	■	■	▲	■	▲	▲
Chromic acid (40%)	■	■	■	■	▲	■	▲	■	●	●
Creosote	■	■	■	▲	■	■	■	■	●	●
Diesel oil	■	■	▲	●	■	■	●	■	●	●
Diethyl ether	■	■	■	■	■	■	■	■	■	●
Ethane	■	■	▲	●	■	■	■	■	●	●
Ether	-	■	■	■	■	■	■	■	■	●
Ethanol	●	▲	●	●	●	●	●	●	●	●
Ethylene	▲	-	-	●	▲	-	-	▲	■	●
Ethylene glycol	●	▲	●	●	●	●	●	●	●	●
Ethylene oxide	■	■	■	■	■	■	■	■	■	●
Ferric chloride (wet)	●	●	▲	●	●	●	●	▲	■	●
Formaldehyde (40%)	●	▲	■	■	●	▲	●	▲	■	●
Formic acid	●	▲	▲	■	●	■	●	▲	■	●
Freon 12	●	■	●	●	▲	▲	●	■	▲	●
Freon 22	●	▲	●	●	●	●	●	■	■	●
Glycerine	●	●	●	●	●	●	●	●	●	●
Heavy oils	-	-	-	-	-	-	●	-	●	●
Hydrobromic acid (37%)	■	●	■	■	●	●	●	■	●	●
Hydrochloric acid (37%)	▲	■	■	▲	▲	▲	●	■	●	●
Hydrochloric acid (48%)	■	▲	●	■	▲	▲	●	■	●	●
Hydrogen peroxide (<30%)	■	■	▲	▲	●	■	■	●	●	●
Hydrogen sulphide (dry)	■	●	●	●	▲	●	●	■	■	●
Isobutyl alcohol	●	▲	●	▲	●	●	●	●	●	●
Isopropyl alcohol	●	▲	●	▲	●	●	■	●	●	●

	SBR	NR	NEOPRENE	NBR	EPDM	IIR	HYPALON	SILICONE	VITON	KALREZ
Steam	■	■	■	■	●	▲	■	■	■	●
Water	●	●	-	●	●	●	●	●	●	●
Air	-	●	●	●	●	●	-	●	●	●
Acetic acid (10%)	●	■	▲	■	●	●	▲	●	■	●
Acetone	▲	▲	▲	■	●	●	▲	■	■	●
Acetylene	●	■	▲	●	■	■	●	▲	●	●
Adipic acid	●	●	●	●	●	●	-	-	-	●
Aluminium chloride	●	●	●	●	●	●	●	▲	●	●
Ammonia	■	■	●	▲	●	●	■	▲	■	●
Ammonium chloride	●	●	●	●	●	●	●	▲	●	●
Ammonium hydroxide (10%)	■	▲	▲	▲	●	●	●	▲	▲	●
Aniline	■	■	■	■	▲	▲	■	■	▲	●
Benzene	■	■	■	■	■	■	■	■	▲	●
Bleach solutions	■	■	■	■	●	●	●	▲	●	●
Brine	●	■	■	■	■	■	●	■	●	●
Bromine (anhydrous)	■	-	■	■	■	■	■	■	●	●
Bunker fuel	■	■	■	■	■	■	-	▲	●	●
Butane	■	■	▲	●	■	■	●	■	●	●
Butyl alcohol (50°C)	●	●	●	●	▲	▲	●	▲	●	●
Calcium chloride	●	●	●	●	●	●	●	●	●	●
Calcium hydroxide	●	▲	●	▲	●	●	●	▲	●	●
Calcium hypochlorite (15%)	▲	▲	■	■	●	●	●	▲	●	●
Carbon dioxide	●	▲	▲	●	▲	▲	●	▲	▲	●
Carbon tetrachloride	■	■	■	■	■	■	■	■	●	●
Chloroene (dry)	■	■	■	■	■	■	■	■	▲	●

	SBR	NR	NEOPRENE	NBR	EPDM	IIR	HYPALON	SILICONE	VITON	KALREZ
Sea water	●	●	▲	●	●	●	●	●	●	●
Soap solution	●	▲	▲	●	●	●	●	●	●	●
Sodium carbonate	-	●	●	●	●	●	●	●	●	●
Sodium dichromate (10%)	-	-	-	-	●	-	-	-	-	●
Sodium hydroxide (50%)	●	▲	▲	▲	▲	▲	●	▲	■	●
Sodium hypochlorite (20%)	■	▲	■	▲	▲	▲	●	▲	▲	●
Styrene	■	■	■	■	■	■	■	■	■	●
Sulphur dioxide (dry)	●	▲	■	■	●	▲	▲	▲	●	●
Sulphur dioxide (wet)	■	-	-	■	●	●	▲	▲	●	●
Sulphur trioxide	●	▲	■	■	▲	▲	■	▲	●	●
Sulphuric acid (10%)	▲	▲	▲	▲	●	●	●	■	▲	●
Tannic acid	●	●	▲	●	●	●	●	▲	●	●
Toluene	■	■	■	■	■	■	■	■	●	●
Transformer oil	■	■	▲	●	■	■	▲	▲	●	●
Trichloroethane	■	■	■	■	■	■	■	■	▲	●
Trichloroethylene	■	■	■	■	■	■	■	■	●	●
Turpentine	■	■	■	●	■	■	■	■	●	●
Urea solution (30%)	-	-	●	●	●	●	-	-	●	●
Vinyl chloride	■	■	■	■	▲	■	■	-	●	●
Xylene	■	■	■	■	■	■	■	■	●	●

● Recommended  
 ▲ Recommended depends on operating conditions  
 ■ Not recommended

	SBR	NR	NEOPRENE	NBR	EPDM	IIR	HYPALON	SILICONE	VITON	KALREZ
Kerosene (70°C)	■	■	■	●	■	■	■	■	●	●
Liquid petroleum gas	■	■	▲	●	■	■	■	■	●	●
lye	●	▲	▲	▲	●	●	●	▲	▲	●
Magnesium chloride	●	●	●	●	●	●	●	●	●	●
Methane	■	■	▲	●	■	■	●	■	▲	●
Methanol	-	●	●	●	●	●	●	●	■	●
Methyl chloride	■	■	■	■	■	■	■	■	▲	●
Methyl ethyl ketone	■	■	■	■	●	●	■	■	■	●
Methylene chloride	■	■	■	■	■	■	■	■	▲	●
Mineral oils	■	■	■	●	■	■	▲	▲	●	●
Naphtha	■	■	■	▲	■	■	■	■	●	●
Natural gas	●	■	▲	●	■	■	●	▲	●	●
Nitric acid (10%)	■	▲	▲	■	●	●	●	▲	●	●
Nitrogen	●	●	●	●	●	●	●	●	●	●
Octane	■	■	■	▲	■	■	●	■	●	●
oleum	■	■	■	■	■	■	■	■	▲	●
Oxalic acid	●	▲	▲	▲	●	●	●	▲	●	●
Oxygen	▲	▲	●	▲	●	●	●	●	●	●
Perchloroethylene	■	■	■	■	■	■	■	■	●	●
Phenols	-	●	▲	■	▲	●	■	●	●	●
Phosphoric acid (50%)	▲	▲	▲	■	●	●	●	▲	●	●
Potassium dichromate (10%)	●	▲	●	●	●	●	●	●	●	●
Potassium hydroxide (50%)	●	▲	▲	▲	●	●	●	▲	■	●
Potassium nitrate	●	●	●	●	●	●	●	●	●	●
Propane	■	■	▲	●	▲	■	●	■	●	●
Pyridine	■	■	■	■	■	▲	■	■	■	●

# Corrosion resistance of metals

C: Copper

A: Aluminum

M: Monel

N: Nickel

S: Iron & Carbon Steel

SS4: 304 Stainless Steel

SS6: 316 Stainless Steel

● Satisfactory

▲ Fair

■ Unsatisfactory

SERVICE	C	A	M	N	S	SS4	SS6
Acetic Acid, Pure	▲	●	●	▲	■	▲	▲
Acetic Anhydride	■	●	●	-	-	▲	▲
Acetone	●	●	●	●	●	●	●
Acetylene	-	●	●	-	●	●	●
Air	●	●	●	-	●	●	-
Aluminum Chloride	▲	■	●	-	▲	■	■
Aluminum Sulphate	▲	-	▲	-	■	▲	▲
Alums	▲	-	▲	-	■	▲	▲
Ammonia	-	●	●	-	●	●	●
Ammonium Chloride	■	■	▲	▲	-	▲	▲
Ammonium Hydroxide	■	▲	-	-	●	●	●
Ammonium Nitrate	■	▲	-	-	●	●	●
Ammonium Phosphate	▲	▲	●	●	■	●	●
Amyl Acetate	▲	▲	●	-	-	●	●
Amyl Alcohol	●	-	●	-	-	-	-
Aniline	■	■	●	-	●	●	●
Asphalt	●	-	●	-	●	●	-
Barium Chloride	-	■	-	●	-	▲	●
Barium Hydroxide	■	■	-	●	-	●	-
Barium Sulphide	■	-	●	-	-	●	●
Beer	●	●	●	-	●	●	●
Benzene	●	●	●	-	●	●	●
Benzine	●	●	●	-	●	●	●
Borax	▲	▲	●	●	●	●	●
Boric Acid	▲	●	●	●	■	●	●
Bromine	■	-	-	-	■	■	■
Butane	-	●	●	-	●	-	●
Butanol	●	-	●	-	●	-	-
Butyl Acetate	●	●	-	-	-	●	●
Calcium Bisulphide	■	-	■	-	■	●	●
Calcium Chloride	●	-	▲	-	●	-	-
Calcium Hydroxide	-	-	●	●	●	▲	▲
Carbon dioxide (Dry)	●	●	●	-	●	●	●
Carbon dioxide (Wet)	▲	▲	●	-	▲	●	●
Carbon Bisulphide	■	●	●	-	●	●	●
Carbon Monoxide	■	-	-	-	●	●	●

SERVICE	C	A	M	N	S	SS4	SS6
Chlorine	●	●	●	-	●	●	●
Chlorinated Solvents	●	●	●	-	●	●	-
Chromic Acid	■	■	▲	-	-	-	●
Citric Acid	●	●	●	-	■	●	●
Copper Chloride	-	■	▲	-	▲	■	■
Copper Sulphate	-	■	●	-	■	●	●
Corn Oi	-	●	●	-	●	●	●
Creosote	●	●	●	-	●	●	●
Dowtherm	●	■	-	-	●	-	-
Ethers	●	●	●	-	●	-	-
Ethyl Acetate	●	▲	●	-	●	●	●
Ethyl Cellulose	-	-	●	●	-	-	-
Ethyl Chloride	●	-	●	●	●	●	●
Ethylene Glycol	●	●	●	-	●	●	●
Ferric Chloride	■	■	■	■	■	■	■
Ferric Sulphate	■	■	■	■	■	▲	●
Formaldehyde	▲	▲	●	-	▲	●	●
Formic Acid	▲	■	-	-	■	▲	▲
Freon	●	●	●	-	-	-	-
Fuel Oil	●	-	●	-	●	●	-
Gasoline	●	●	●	-	●	●	●
Glucose	●	●	●	-	●	●	●
Glue	-	●	●	-	●	●	●
Glycerol	▲	●	●	-	●	●	●
Green Sulphate Liquor	-	-	●	-	●	-	-
Hydrobromic Acid	-	■	-	-	■	-	-
Hydrochloric Acid	■	■	-	-	■	■	■
Hydrofluoric Acid< 65%	-	■	▲	■	■	■	■
Hydrofluoric Acid> 65%	■	■	-	■	■	■	■
Hydrogen	●	●	●	-	●	●	●
Hydrogen Peroxide	■	●	▲	▲	■	●	●
Kerosene	●	-	●	-	●	●	●
Lactic Acid	-	-	●	●	■	-	▲
Lubricating Oils	●	●	●	-	●	●	-
Magnesium Chloride	▲	■	▲	▲	▲	▲	▲
Magnesium Hydroxide	■	■	●	●	●	●	●

# Corrosion resistance of metals

C: Copper

A: Aluminum

M: Monel

N: Nickel

S: Iron & Carbon Steel

SS4: 304 Stainless Steel

SS6: 316 Stainless Steel

● Satisfactory

▲ Fair

■ Unsatisfactory

SERVICE	C	A	M	N	S	SS4	SS6
Magnesium Sulphate	●	-	●	-	●	●	●
Mercuric Chloride	■	■	■	■	-	■	■
Mercury	■	■	●	-	●	●	●
Methanol	●	●	●	-	●	●	●
Methyl Chloride	●	-	●	-	●	-	-
Milk	-	●	●	●	●	-	●
Mineral Oils	●	●	●	-	●	●	●
Natural Gas	-	●	●	-	●	●	●
Nickel Chloride	■	■	-	-	-	▲	▲
Nickel Sulphate	■	■	-	-	-	●	●
Nitric Acid (Conc.)	■	●	■	■	■	▲	▲
Nitric Acid (dil.)	■	■	■	■	■	●	●
Nitrobenzene	▲	-	-	-	●	-	●
Oleic Acid	■	●	●	●	-	●	●
Oxalic Acid	-	●	●	-	-	-	-
Oxygen	●	●	●	-	●	●	●
Petroleum Oils >500°F	■	●	■	■	●	●	●
Phosphoric Acid	▲	■	▲	-	■	●	●
Potassium Chloride	●	-	●	●	●	●	●
Potassium Cyanide	■	■	●	-	●	●	●
Potassium Hydroxide	■	■	●	●	-	▲	▲
Potassium Sulphate	●	●	●	●	●	▲	▲
Propane	-	-	●	-	●	●	●
Seawater	-	■	●	-	-	▲	▲
Sodium Bicarbonate	-	■	●	●	-	●	●
Sodium Chloride	▲	■	●	●	●	▲	●

SERVICE	C	A	M	N	S	SS4	SS6
Sodium Cyanide	■	■	▲	-	●	-	●
Sodium Hydroxide	■	■	●	●	●	▲	▲
Sodium Nitrate	▲	●	●	●	●	▲	●
Sodium Peroxide	-	●	●	●	-	●	●
Sodium Phosphate	●	●	●	●	-	-	●
Sodium Silicate	-	■	●	●	●	-	●
Sodium Sulphate	●	-	●	●	●	●	●
Steam <200°C	●	●	●	●	●	●	●
Stearic Acid	-	-	●	●	-	●	●
Sulphur	■	●	■	■	●	▲	▲
Sulphur Chloride	■	-	-	-	-	-	-
Sulphuric Acid < 10%	■	-	-	■	■	■	▲
Sulphuric Acid 10-75 %	■	-	-	-	■	■	▲
Sulphuric Acid > 75%	■	■	-	■	▲	■	■
Sulphurous Acid	-	-	■	■	●	■	-
Tannic Acid	●	■	●	●	-	▲	▲
Tar	-	●	-	-	●	●	▲
Tartaric Acid	-	●	-	-	●	●	-
Toluene	-	●	●	-	●	-	-
Trichloroethylene	-	-	●	-	-	-	-
Turpentine	-	●	●	-	-	●	●
Vinegar	-	-	●	-	-	▲	●
Water	●	●	●	●	●	●	●
Whiskey and wines	●	-	●	-	■	▲	●
Zinc Chloride	■	■	●	-	-	■	■
Zinc Chloride	■	-	●	-	-	●	●

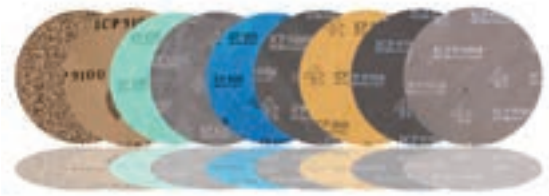
\*\*Properties and application parameters shown in the table are typical. Material's specific applications should not be undertaken without independent study and evaluation for suitability.

Consult the technical department of **CALVO SEALING** for specific recommendations.



# DIMENSIONAL DATA

## SECTION 8



### A. NON METALLIC FLAT GASKETS

<b>Non Metallic Gasket dimension to EN 1514-1 / DIN 2690</b> (used with EN 1092 RF flanges) .....	116
<b>Non Metallic Gasket dimension to EN 1514-1 / DIN 2690</b> (used with EN 1092 FF flanges) .....	117
<b>Non Metallic Gasket dimension to ASME B16.21</b> (used with BS1560 & ASME/ANSI B16.5 RF flanges) .....	118
<b>Non Metallic Gasket dimension to ASME B16.21</b> (used with BS 1560 & ASME/ANSI B16.5 FF flanges).....	119
<b>Non Metallic Gasket dimension to ASME B16.21</b> (used with ASME B16.47 Series A & ASME B16.47 Series B flanges) .....	120
<b>Non Metallic Gasket dimension to ASME B16.21</b> (used with ASME B16.47 Series A FF flanges) .....	121
<b>Non Metallic Gasket dimension to ASME B16.21</b> (used with ASME B16.47 Series B FF flanges).....	122
<b>Non Metallic Gasket dimension to BS 3063</b> (used with BS 10 Tabla D,E,F,H,J,K flanges) .....	123
<b>Non Metallic Gasket dimension to JIS</b> .....	126

### B. FLANGE INSULATION SETS



<b>Flange Insulation Sets ICP KD01 / 04</b> (used with ANSI/ASME B16.5 RF & FF flanges).....	129
<b>Flange Insulation Sets KD02 / 03</b> (used with ANSI/ASME B16.5 RF flanges).....	130

## C. SPIRAL WOUND GASKET



<b>Spiral Wound Gasket dimension to EN 1514-2 / DIN 2690</b> (used with EN 1092 flanges) .....	131
<b>Spiral Wound Gasket dimension to ASME B16.20</b> (used with BS 1560 & ASME/ANSI B16.5 flanges) .....	132
<b>Spiral Wound Gasket dimension to ASME B16.20</b> (used with ASME/ANSI B 16.47 Series A flanges) .....	133
<b>Spiral Wound Gasket dimension to ASME B16.20</b> (used with ASME/ANSI B 16.47 Series B flanges) .....	134
<b>Spiral Wound Gasket dimension to BS 3381</b> (used with BS 1560 / ASME B 16.5 flanges) .....	135
<b>Spiral Wound Gasket dimension to JIS</b> (used with JIS Nominal Pressure 10 Kg <sub>f</sub> /cm <sup>2</sup> - 20 Kg <sub>f</sub> /cm <sup>2</sup> ) .....	136

## D. CAMPROFILE GASKET



<b>Camprofile Gasket dimension to EN 1514-6</b> (used with EN 1092 flanges) .....	138
<b>Camprofile Gasket dimension to ASME B16.20</b> (used with BS 1560 & ASME/ANSI B16.5 RF flanges) .....	139
<b>Camprofile Gasket dimension to ASME B16.20</b> (used with BS 1560 & ASME/ANSI B16.5 Tongue & Groove flanges) .....	140
<b>Camprofile Gasket dimension to ASME B16.20</b> (used with ASME/ANSI B 16.47 Series A flanges) .....	141
<b>Camprofile Gasket dimension to ASME B16.20</b> (used with ASME/ANSI B 16.47 Series B flanges) .....	142

## E. METAL JACKETED GASKET



<b>METAL JACKETED GASKET DIMENSION TO EN 1514-4</b> (used with EN 1092 flanges) .....	143
<b>METAL JACKETED GASKET DIMENSION TO ASME B16.20</b> (used with BS 1560 & ASME/ANSI B 16.5 flanges) .....	144
<b>METAL JACKETED GASKET DIMENSION TO ASME B16.20</b> (used with ASME/ANSI B 16.47 Series A flanges) .....	145

## F. G-ST GASKET



<b>G-ST Flange Gasket special dimension to EN 1514-1</b> (used with EN 1092 flanges) .....	146
<b>G-ST-P/S Flange Gasket special dimension to DIN 2690</b> (used with EN 1092 flanges) .....	147
<b>G-ST-P/S Flange Gasket special dimension to EN 1514-1</b> (used with EN 1092 flanges) .....	148
<b>G-ST-P/K Flange Gasket special dimension to DIN ISO 2501 PN 10</b> .....	149
<b>G-ST-P/KN Flange Gasket special dimension to DIN 2690</b> (used with EN 1092 flanges) .....	150
<b>G-ST-P/HTB Flange Gasket special dimension to DIN EN 682 / VP 401</b> .....	151
<b>G-ST-P/GR Flange Gasket special dimension to FDG-03893</b> .....	153

## G. RING TYPE JOINT

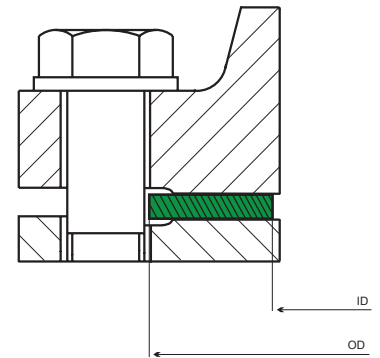


<b>Dimensiones de Juntas RTJ para ASME B16.20 &amp; API Std 6 A</b> (para bridas ASME B16.5 Y ASME B16.47 A) .....	154
---	-----

# Non Metallic Gasket dimension to EN 1514-1 / DIN 2690 (used with EN 1092 RF flanges)



DN (mm)	ID	OD					
		PN 2.5	PN 6	PN 10	PN 16	PN 25	PN 40
10	18	39	39	46	46	46	46
15	22	44	44	51	51	51	51
20	27	54	54	61	61	61	61
25	34	64	64	71	71	71	71
32	43	76	76	82	82	82	82
40	49	86	86	92	92	92	92
50	61	96	96	107	107	107	107
65	77	116	116	127	127	127	127
80	89	132	132	142	142	142	142
100	115	152	152	162	162	168	168
125	141	182	182	192	192	194	194
150	169	207	207	218	218	224	224
200	220	262	262	273	273	284	290
250	273	317	317	328	329	340	352
300	324	373	373	378	384	400	417
350	356	423	423	438	444	457	474
400	407	473	473	489	495	514	546
450	458	528	528	539	555	564	571
500	508	578	578	594	617	624	628
600	610	679	679	695	734	731	747
700	712	784	784	810	804	833	-
800	813	890	890	917	911	942	-
900	915	990	990	1,017	1,011	1,042	-
1,000	1,016	1,090	1,090	1,124	1,128	1,154	-
1,200	1,220	1,290	1,307	1,341	1,342	1,364	-
1,400	1,420	1,490	1,524	1,548	1,542	1,578	-
1,600	1,620	1,700	1,724	1,772	1,764	1,798	-
1,800	1,820	1,900	1,931	1,972	1,964	2,000	-
2,000	2,020	2,100	2,138	2,182	2,168	2,230	-
2,200	2,220	2,307	2,348	2,384	-	-	-
2,400	2,420	2,507	2,558	2,594	-	-	-
2,600	2,620	2,707	2,762	2,794	-	-	-
2,800	2,820	2,924	2,972	3,014	-	-	-
3,000	3,020	3,124	3,172	3,228	-	-	-
3,200	3,220	3,324	3,382	-	-	-	-
3,400	3,420	3,524	3,592	-	-	-	-
3,600	3,620	3,734	3,804	-	-	-	-
3,800	3,820	3,931	-	-	-	-	-
4,000	4,020	4,131	-	-	-	-	-



Dimensions in mm

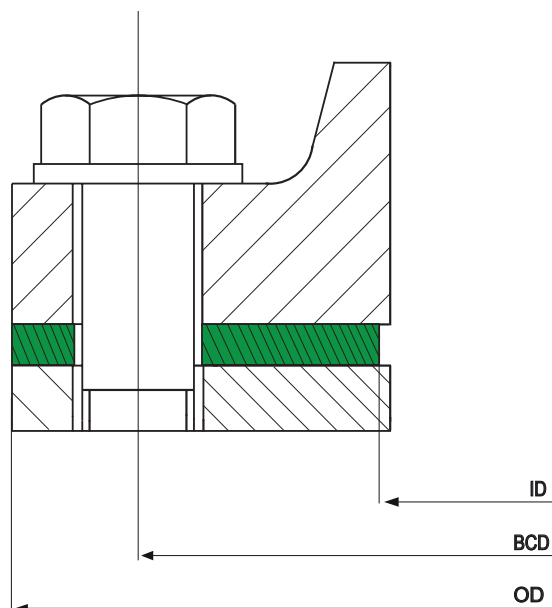




## Non Metallic Gasket dimension to EN 1514-1 / DIN 2690 (used with EN 1092 FF flanges)

DN (mm)	PN 2.5 - PN 6				PN 10 - PN 16 - PN 40			
	OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD
10	75	4	11	50	90	4	14	60
15	80	4	11	55	95	4	14	65
20	90	4	11	65	105	4	14	75
25	100	4	11	75	115	4	14	85
32	120	4	14	90	140	4	18	100
40	130	4	14	100	150	4	18	110
50	140	4	14	110	165	4	18	125
65	160	4	14	130	185	8	18	145
80	190	4	18	150	200	8	18	160
100	210	4	18	170	235	8	22	190
125	240	8	18	200	270	8	26	220
150	265	8	18	225	300	8	26	250
200	320	8	18	280	375	12	26	320
250	375	12	18	335	450	12	30	385
300	440	12	22	395	515	16	30	450
350	490	12	22	445	580	16	33	510
400	540	16	22	495	660	16	36	585
450	595	16	22	550	685	20	36	610
500	645	20	22	600	755	20	36	670
600	755	20	26	705	890	20	39	795

Dimensions in mm



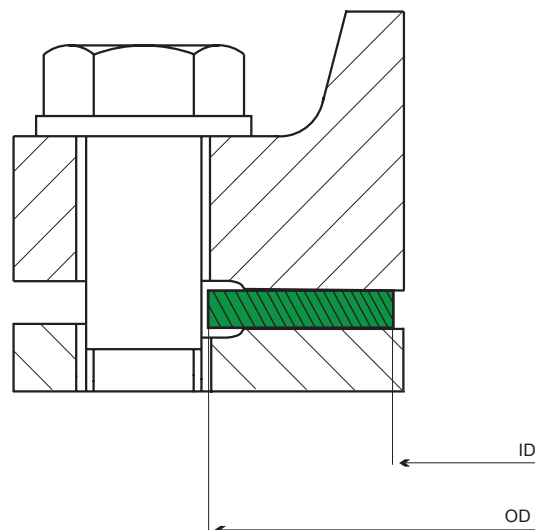
# Non Metallic Gasket dimension to ASME B16.21

(used with BS1560 & ASME/ANSI B16.5 RF flanges)



DN (inch)	DN (mm)	ID	OD				
			Class 150	Class 300	Class 400	Class 600	Class 900
1/2	15	21	48	54	54	54	64
3/4	20	27	57	67	67	67	70
1	25	33	67	73	73	73	79
1 1/4	32	42	76	83	83	83	89
1 1/2	40	48	86	95	95	95	98
2	50	60	105	111	111	111	143
2 1/2	65	73	124	130	130	130	165
3	80	89	137	149	149	149	168
3 1/2	90	102	162	165	162	162	-
4	100	114	175	181	178	194	206
5	125	141	197	216	213	241	248
6	150	168	222	251	248	267	289
8	200	219	279	308	305	321	359
10	250	273	340	362	359	400	435
12	300	324	410	422	419	457	498
14	350	356	451	486	483	492	521
16	400	406	514	540	537	565	575
18	450	457	549	597	594	613	638
20	500	508	606	654	648	683	699
24	600	610	718	775	768	791	838

Dimensions in mm



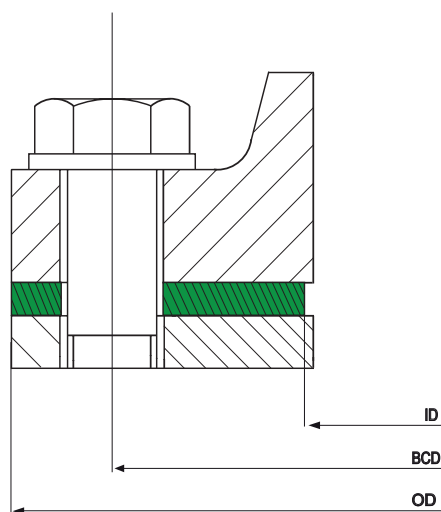


# Non Metallic Gasket dimension to ASME B16.21

(used with BS 1560 & ASME/ANSI B16.5 FF flanges)

DN (inch)	ID	Class 150				Class 300				Class 600 / Class 900			
		OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD
½	21	89	4	16	60	95	4	16	67	95	4	16	67
¾	27	98	4	16	69.9	117	4	19	82.6	117	4	19	83
1	33	108	4	16	79.4	122	4	19	88.9	124	4	19	89
1 ¼	42	117	4	16	88.9	133	4	19	98.4	133	4	19	98
1 ½	48	127	4	16	98.4	155	4	22	114.3	156	4	22	114
2	60	152	4	19	120.7	165	8	19	127	165	8	19	127
2 ½	73	178	4	19	139.7	191	8	22	149.2	191	8	22	149
3	89	191	4	19	152.4	210	8	22	168.3	210	8	22	168
3 ½	102	216	8	19	177.8	229	8	22	184.2	229	8	25	184
4	114	229	8	19	190.5	254	8	22	200	273	8	25	216
5	141	254	8	22	215.9	279	8	22	235	330	8	29	267
6	168	279	8	22	241.3	318	12	22	269.9	356	12	29	292
8	219	343	8	22	298.5	381	12	25	330.2	419	12	31	349
10	273	406	12	25	362	445	16	29	641.4	508	16	35	432
12	324	483	12	25	431.8	521	16	32	450.9	559	20	35	489
14	356	533	12	29	476.3	584	20	32	514.4	603	20	38	527
16	406	597	16	29	539.8	648	20	35	571.5	686	20	41	603
18	457	635	16	32	577.9	711	24	35	628.7	743	20	44	654
20	508	699	20	32	635	775	24	35	685.8	813	24	44	724
24	610	813	20	29	749.3	914	24	41	812.8	910	24	51	838

Dimensions in mm



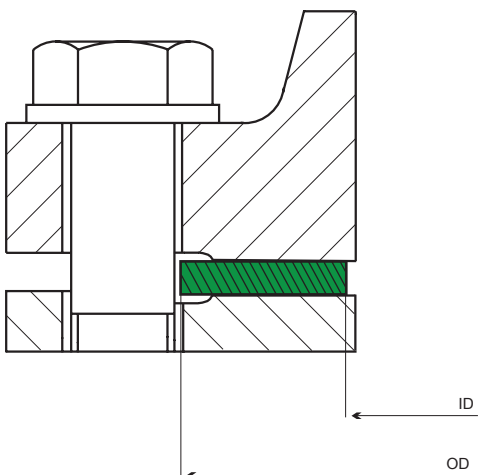
# Non Metallic Gasket dimension to ASME B16.21

(used with ASME B16.47 Series A & ASME B16.47 Series B RF flanges)



DN (inch)	ASME B16.47 SERIE A					ASME B16.47 SERIE B			
	ID	OD				OD			
		Class 150	Class 300	Class 400	Class 600	Class 150	Class 300	Class 400	Class 600
22	559	660	705	702	733	-	-	-	-
26	660	775	835	832	867	725	772	746	765
28	711	832	899	892	914	776	826	800	819
30	762	883	953	946	972	827	886	857	879
32	813	940	1,006	1,003	1,022	881	940	911	933
34	864	991	1,057	1,054	1,073	935	994	962	997
36	914	1,048	1,118	1,118	1,130	987	1,048	1,022	1,048
38	965	1,111	1,054	1,073	1,105	1,045	1,099	-	-
40	1,016	1,162	1,115	1,132	1,156	1,099	1,149	-	-
42	1,067	1,219	1,165	1,178	1,219	1,146	1,200	-	-
44	1,118	1,276	1,219	1,232	1,270	1,197	1,251	-	-
46	1,168	1,327	1,273	1,289	1,327	1,256	1,318	-	-
48	1,219	1,384	1,324	1,346	1,391	1,307	1,368	-	-
50	1,270	1,435	1,378	1,403	1,448	1,357	1,419	-	-
52	1,321	1,492	1,429	1,454	1,499	1,408	1,470	-	-
54	1,372	1,549	1,492	1,518	1,556	1,464	1,556	-	-
56	1,422	1,607	1,543	1,569	1,613	1,514	1,594	-	-
58	1,473	1,664	1,594	1,619	1,664	1,580	1,673	-	-
60	1,524	1,715	1,645	1,683	1,721	1,630	1,705	-	-

Dimensions in mm



DESCRIPTIONS	TOLERANCE (mm)
Gasket Outer Diameter	+ 0 / -3.0
Gasket Inner Diameter	± 3.0



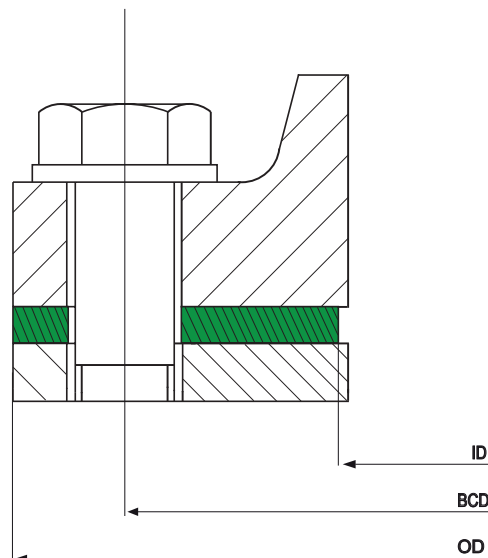


# Non Metallic Gasket dimension to ASME B16.21

(used with ASME B16.47 Series A FF flanges)

DN (inch)	ID	Class 150				Class 300				Class 600			
		OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD
22	559	749	20	35	695	838	24	41	743	870	24	48	778
26	660	870	24	35	806	972	28	44	876	1,016	28	51	914
28	711	927	28	35	864	1,035	28	44	940	1,073	28	54	965
30	762	984	28	35	914	1,092	28	48	997	1,130	28	54	1,022
32	813	1,060	28	41	978	1,149	28	51	1,054	1,194	28	60	1,080
34	864	1,111	32	41	1,029	1,207	28	51	1,105	1,245	28	60	1,130
36	914	1,168	32	41	1,086	1,270	32	54	1,168	1,314	32	67	1,194
38	965	1,238	32	41	1,149	1,168	32	41	1,092	1,270	32	60	1,162
40	1,016	1,289	36	41	1,200	1,207	32	44	1,156	1,321	32	60	1,213
42	1,067	1,346	36	41	1,257	1,289	32	44	1,207	1,403	32	67	1,283
44	1,118	1,403	40	41	1,314	1,365	32	48	1,264	1,454	32	67	1,334
46	1,168	1,454	40	41	1,365	1,416	28	51	1,321	1,511	28	67	1,391
48	1,219	1,511	44	41	1,422	1,467	32	51	1,372	1,594	32	73	1,461
50	1,270	1,568	44	48	1,480	1,530	32	54	1,429	1,670	32	79	1,524
52	1,321	1,626	44	48	1,537	1,581	32	54	1,480	1,721	32	79	1,575
54	1,372	1,683	44	48	1,594	1,657	28	60	1,549	1,778	28	79	1,632
56	1,422	1,746	48	48	1,651	1,708	28	60	1,600	1,854	28	86	1,695
58	1,473	1,803	48	48	1,708	1,759	32	60	1,651	1,905	32	86	1,746
60	1,524	1,854	52	48	1,759	1,810	32	60	1,702	1,994	32	92	1,810

Dimensions in mm



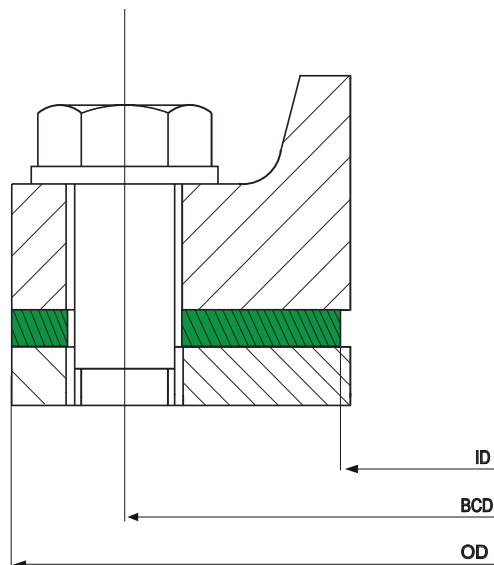
# Non Metallic Gasket dimension to ASME B16.21

(used with ASME B16.47 Series B FF flanges)



DN (inch)	ID	Class 150				Class 300				Class 600			
		OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD
26	660	786	36	22	745	867	32	35	803	889	28	44	806
28	711	837	40	22	795	921	36	35	857	953	28	48	864
30	762	887	44	22	846	991	36	38	921	1,022	28	51	927
32	813	941	48	22	900	1,054	32	41	978	1,086	28	54	984
34	864	1,005	40	25	957	1,108	36	41	1,032	1,162	24	60	1,054
36	914	1,057	44	25	1,010	1,172	32	44	1,089	1,213	28	60	1,105
38	965	1,124	40	29	1,070	1,222	36	44	1,140	-	-	-	-
40	1,016	1,175	44	29	1,121	1,273	40	44	1,191	-	-	-	-
42	1,067	1,226	48	29	1,172	1,334	36	48	1,245	-	-	-	-
44	1,118	1,276	52	29	1,222	1,384	40	48	1,295	-	-	-	-
46	1,168	1,341	40	32	1,284	1,461	36	51	1,365	-	-	-	-
48	1,219	1,392	44	32	1,335	1,511	40	51	1,416	-	-	-	-
50	1,270	1,443	48	32	1,386	1,562	44	51	1,467	-	-	-	-
52	1,321	1,494	52	32	1,437	1,613	48	51	1,518	-	-	-	-
54	1,372	1,549	56	32	1,492	1,673	48	51	1,578	-	-	-	-
56	1,422	1,600	60	32	1,543	1,765	36	60	1,651	-	-	-	-
58	1,473	1,675	48	35	1,611	1,827	40	60	1,713	-	-	-	-
60	1,524	1,726	52	35	1,662	1,878	40	60	1,764	-	-	-	-

Dimensions in mm



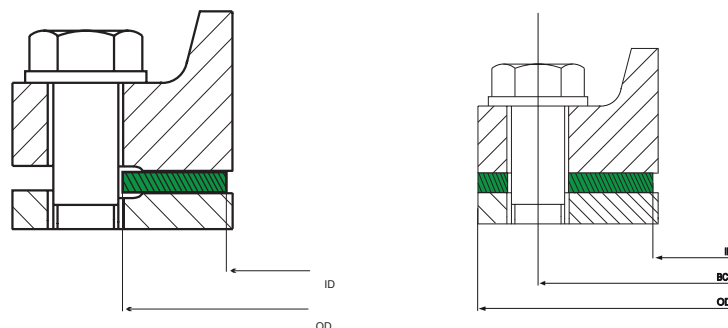


# Non Metallic Gasket dimension to BS 3063

(used with BS 10 RF & FF flanges)

DN (inch)	RF		FF							
	ID	OD	TABLE D				TABLE E			
			OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD
½	21	52	95	4	14	67	95	4	14	67
¾	27	59	102	4	14	73	102	4	14	73
1	34	68	114	4	14	83	114	4	14	83
1 ¼	43	73	121	4	14	87	121	4	14	87
1 ½	48	84	133	4	14	98	133	4	14	98
2	60	97	152	4	18	114	152	4	18	114
2 ½	76	110	165	4	18	127	165	4	18	127
3	89	129	184	4	18	146	184	4	18	146
3 ½	102	148	203	4	18	165	203	8	18	165
4	114	160	216	4	18	178	216	8	18	178
5	140	192	254	8	18	210	254	8	18	210
6	168	217	279	8	18	235	279	8	22	235
7	194	243	305	8	18	260	305	8	22	260
8	219	275	337	8	18	292	337	8	22	292
9	244	306	368	8	18	324	368	12	22	324
10	273	333	406	8	22	356	406	12	22	356
12	324	384	457	12	22	406	457	12	25	406
13	356	416	489	12	22	438	489	12	25	438
14	381	445	527	12	25	470	527	12	25	470
15	406	470	552	12	25	495	552	12	25	495
16	432	495	578	12	25	521	578	12	25	521
17	457	527	610	12	25	552	610	12	25	552
18	483	559	641	12	25	584	641	16	25	584
19	508	584	673	12	25	610	673	16	25	610
20	533	616	705	16	25	641	705	16	25	641
21	559	648	737	16	25	673	737	16	29	673
22	584	670	762	16	29	699	762	16	29	699
23	610	695	787	16	29	724	787	16	29	724
24	635	727	826	16	29	756	826	16	32	756

Dimensions in mm



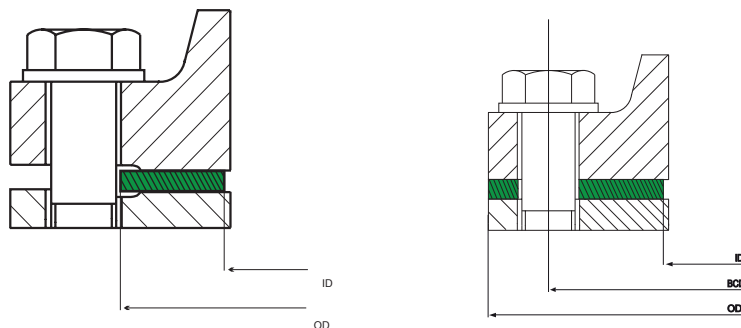
# Non Metallic Gasket dimension to BS 3063

(used with BS 10 RF & FF flanges)



DN (inch)	RF		FF							
	ID	OD	TABLE F / TABLE H				TABLE J			
			OD	n° holes	Ø	BCD	OD	n° holes	Ø	BCD
½	21	52	95	4	14	67	95	4	18	67
¾	27	59	102	4	14	73	102	4	18	73
1	34	70	121	4	18	87	121	4	18	87
1 ¼	43	81	133	4	18	98	133	4	18	98
1 ½	48	86	140	4	19	105	140	4	18	105
2	60	110	165	4	18	127	165	4	22	127
2 ½	76	129	184	8	18	146	184	8	22	146
3	89	148	203	8	18	165	203	8	22	165
3 ½	102	160	216	8	18	178	216	8	22	178
4	114	173	229	8	18	191	229	8	22	191
5	140	213	279	8	22	235	279	8	25	235
6	168	238	305	12	22	260	305	12	25	260
7	194	270	337	12	22	292	337	12	25	292
8	219	302	368	12	22	324	368	12	25	324
9	244	330	406	12	25	356	406	12	29	356
10	273	356	432	12	25	381	432	12	29	381
12	324	413	489	16	25	438	489	16	29	438
13	356	441	527	16	29	470	527	16	32	470
14	381	467	552	16	29	495	552	16	32	495
15	406	492	578	16	29	521	578	16	32	521
16	432	524	610	20	29	552	610	20	32	552
17	457	556	641	20	29	584	641	20	32	584
18	483	578	673	20	32	610	673	20	35	610
19	508	610	705	20	32	641	705	20	35	641
20	533	641	737	24	32	673	737	24	35	673
21	559	667	762	24	32	699	762	24	35	699
22	584	692	787	24	32	724	787	24	35	724
23	610	721	826	24	35	756	826	24	38	756
24	635	746	851	24	35	781	851	24	38	781

Dimensions in mm



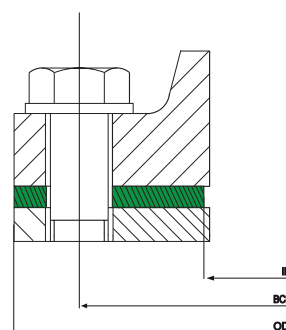
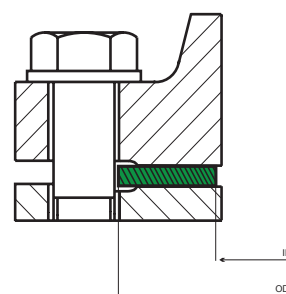




# Non Metallic Gasket dimension to BS 3063

(used with BS 10 RF & FF flanges)

DN (inch)	RF		FF			
	ID	OD	TABLE K			
			OD	n° holes	Ø	BCD
½	21	65	114	4	18	83
¾	27	65	114	4	18	83
1	34	78	127	4	18	95
1 ¼	43	81	133	4	18	98
1 ½	48	92	152	4	22	114
2	60	110	165	8	18	127
2 ½	76	124	184	8	22	146
3	89	143	203	8	22	165
3 ½	102	159	229	8	25	184
4	114	171	241	8	25	197
5	140	210	279	12	25	235
6	168	235	305	12	25	260
7	191	264	343	12	29	292
8	216	289	368	12	29	318
9	241	327	406	16	29	356
10	270	352	432	16	29	381
12	321	400	489	16	29	432
13	346	448	546	16	35	483
14	371	473	572	16	35	508
15	397	505	603	20	35	540

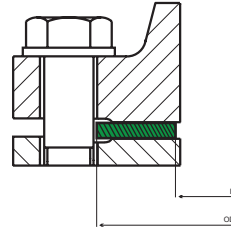


Dimensions in mm

TOLERANCES	
<b>Outer Diameter (OD)</b>	< DN 12 - + 0 / - 1.50 mm > DN 14 - + 0 / - 3.00 mm
<b>Inner Diameter (ID)</b>	< DN 12 - 0 + / - 1.50 mm > DN 14 - 0 + / - 1.50 mm
<b>Ø</b>	+ / - 1.50 mm
<b>BCD</b>	+ / - 0.76 mm

# Non Metallic Gasket dimension to BMS 21

(used with JIS - RF flanges)



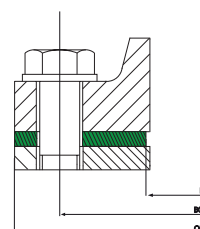
DN (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)								
		PN 2K	PN 5K	Nominal Pressure		PN 16K	PN 20K	PN 30K	PN 40K	PN 63K
				Standard	Thick					
				10K	10K					
10A	18	-	45	53	55	53	53	59	59	64
15	22	-	50	58	60	58	58	64	64	69
20	28	-	55	63	65	63	63	69	69	75
25	35	-	65	74	78	74	74	79	79	80
32	43	-	78	84	88	84	84	89	89	90
40	49	-	83	89	93	89	89	100	100	108
50	61	-	93	104	108	104	104	114	114	125
65	84 (77)	-	118	124	128	124	124	140	140	153
80	90	-	129	134	138	140	140	150	150	163
90	102	-	139	144	148	150	150	163	163	181
100	115	-	149	159	163	165	165	173	183	196
125	141	-	184	190	194	203	203	208	226	235
150	167	-	214	220	224	238	238	251	265	275
175	192	-	240	245	249	-	-	-	-	-
200	218	-	260	270	274	283	283	296	315	330
225	244	-	285	290	294	-	-	-	-	-
250	270	-	325	333	335	356	356	360	380	394
300	321	-	370	378	380	406	406	420	434	449
350	359	-	413	423	425	450	450	465	479	488
400	410	-	473	486	488	510	510	524	534	548
450	460	535	533	541	-	575	575	-	-	-
500	513	585	583	596	-	630	630	-	-	-
550	564	643	641	650	-	684	684	-	-	-
600	615	693	691	700	-	734	734	-	-	-
650	667	748	746	750	-	784	805	-	-	-
700	718	798	796	810	-	836	855	-	-	-
750	770	856	850	870	-	896	918	-	-	-
800	820	906	900	920	-	945	978	-	-	-
850	872	956	950	970	-	995	1,038	-	-	-
900	923	1,006	1,000	1,020	-	1,045	1,088	-	-	-
1,000	1,025	1,106	1,100	1,124	-	1,158	-	-	-	-
1,100	1,130	1,216	1,210	1,234	-	1,258	-	-	-	-
1,200	1,230	1,326	1,320	1,344	-	1,368	-	-	-	-
1,300	1,335	-	-	-	-	1,474	-	-	-	-
1,350	1,385	1,481	1,475	1,498	-	1,534	-	-	-	-
1,400	1,435	-	-	-	-	1,584	-	-	-	-
1,500	1,540	1,636	1,630	1,658	-	1,694	-	-	-	-



# Non Metallic Gasket dimension to BMS 21 (used with JIS - RF flanges)

DN (mm)	Flat Ring, Male & Female, Tongue & Groove Type Flanges												
	d <sub>1</sub> (mm)	PN 2K			PN 5K			PN 10K			PN 16K		
		d <sub>2</sub> (mm)	BCP	n° holes & Ø	d <sub>2</sub> (mm)	BCP	n° holes & Ø	d <sub>2</sub> (mm)	BCP	n° holes & Ø	d <sub>2</sub> (mm)	BCP	n° holes & Ø
10A	18	-	-	-	75	55	4 x 12	90	65	4 x 15	90	65	4 x 15
15	22	-	-	-	80	60	4 x 12	95	70	4 x 15	95	70	4 x 15
20	28	-	-	-	85	65	4 x 12	100	75	4 x 15	100	75	4 x 15
25	35	-	-	-	95	75	4 x 12	125	90	4 x 19	125	90	4 x 19
32	43	-	-	-	115	90	4 x 15	135	100	4 x 19	135	100	4 x 19
40	49	-	-	-	120	95	4 x 15	140	105	4 x 19	140	105	4 x 19
50	61	-	-	-	130	105	4 x 15	155	120	4 x 19	155	120	8 x 19
65	84 (77)	-	-	-	155	130	4 x 15	175	140	4 x 19	175	140	8 x 19
80	90	-	-	-	180	145	4 x 19	185	150	8 x 19	200	160	8 x 23
90	102	-	-	-	190	155	4 x 19	195	160	8 x 19	210	170	8 x 23
100	115	-	-	-	200	165	8 x 19	210	175	8 x 19	225	185	8 x 23
125	141	-	-	-	235	200	8 x 19	250	210	8 x 23	270	225	8 x 25
150	167	-	-	-	265	230	8 x 19	280	240	8 x 23	305	260	12 x 25
175	192	-	-	-	300	260	8 x 23	305	265	12 x 23	-	-	-
200	218	-	-	-	320	280	8 x 23	330	290	12 x 23	350	305	12 x 25
225	244	-	-	-	345	305	12 x 23	350	310	12 x 23	-	-	-
250	270	-	-	-	385	345	12 x 23	400	355	12 x 25	430	380	12 x 27
300	321	-	-	-	430	390	12 x 23	445	400	16 x 25	480	430	16 x 27
350	359	-	-	-	480	435	12 x 25	490	445	16 x 25	540	480	16 x 33
400	410	-	-	-	540	495	16 x 25	560	510	16 x 27	605	540	16 x 33
450	460	605	55	16 x 23	605	555	16 x 25	620	565	20 x 27	675	605	20 x 33
500	513	655	605	20 x 23	655	605	20 x 25	675	620	20 x 27	730	660	20 x 33
550	564	720	655	20 x 25	720	665	20 x 27	745	680	20 x 33	795	720	20 x 39
600	615	770	715	20 x 25	770	715	20 x 27	795	730	24 x 33	845	770	24 x 39
650	667	825	770	24 x 25	825	770	24 x 27	845	780	24 x 33	-	-	-
700	718	875	820	24 x 25	875	820	24 x 27	905	840	24 x 33	-	-	-
750	770	945	880	24 x 27	945	880	24 x 33	970	900	24 x 33	-	-	-
800	820	995	930	24 x 27	995	930	24 x 33	1,020	950	28 x 33	-	-	-
850	872	1,045	980	24 x 27	1,045	980	24 x 33	1,070	1,000	28 x 33	-	-	-
900	923	1,095	1,030	24 x 27	1,095	1,030	24 x 33	1,120	1,050	28 x 33	-	-	-
1,000	1,025	1,195	1,130	28 x 27	1,195	1,130	28 x 33	1,235	1,160	28 x 39	-	-	-
1,100	1,130	1,305	1,240	28 x 27	1,305	1,240	28 x 33	1,345	1,270	28 x 39	-	-	-
1,200	1,230	1,420	1,350	32 x 27	1,420	1,350	32 x 33	1,465	1,380	32 x 39	-	-	-
1,350	1,385	1,575	1,505	32 x 27	1,575	1,505	32 x 33	1,630	1,540	36 x 45	-	-	-
1,500	1,540	1,730	1,660	36 x 27	1,730	1,660	36 x 33	1,795	1,700	40 x 45	-	-	-

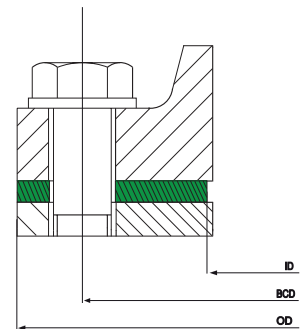
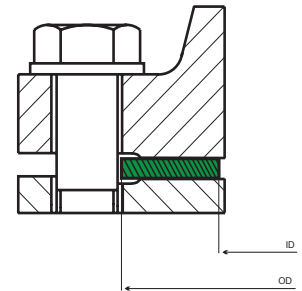
TOLERANCES (mm)	d <sub>1</sub>	d <sub>2</sub>	BCP	Ø
DN < 300	+ / - 1.50	+ / - 1.50	+ / - 1.50	+ / - 0.76
DN > 350	+ / - 1.50	+ / - 3.00		



# Non Metallic Gasket dimension to BMS 21 ( used with JIS - Male & Female, Tongue & Groove flanges )



DN (mm)	Male & Female		Tongue & Groove	
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)
10A	18	38	28	38
15	22	42	32	42
20	28	50	38	50
25	35	60	45	60
32	43	70	55	70
40	49	75	60	75
50	61	90	70	90
65	77	110	90	110
80	90	120	100	120
90	102	130	110	130
100	115	145	125	145
125	141	175	150	175
150	167	215	190	215
200	218	260	230	260
250	270	325	295	325
300	321	375	340	375
350	359	415	380	415
400	410	475	440	475
450	460	523	483	523
500	513	575	535	575
550	564	625	585	625
600	615	675	635	675
650	667	727	682	727
700	718	777	732	777
750	770	832	787	832
800	820	882	837	882
850	872	934	889	934
900	923	987	937	987
1,000	1,025	1,092	1,042	1,092
1,100	1,130	1,192	1,142	1,192
1,200	1,230	1,292	1,237	1,292
1,300	1,335	1,392	1,337	1,392
1,350	1,385	1,442	1,387	1,442
1,400	1,435	1,492	1,437	1,492
1,500	1,540	1,592	1,537	1,592



# Flange Insulation Sets ICP KD01 / KD04

(use with ANSI/ASME B16.5 RF & FF flanges)



DN (inch)	ID	Class 150					Class 300				
		RF	FF				RF	FF			
		OD	OD	BCD	Ø	n° holes	OD	OD	BCD	Ø	n° holes
½	13	44	92	60.5	17	4	50	98	66.5	17	4
¾	19	54	102	69.9	17	4	63	120	82.6	21	4
1	25	63	111	79.2	17	4	69	127	88.9	21	4
1 ¼	32	73	121	88.9	17	4	79	136	98.6	21	4
1 ½	38	82	130	98.6	17	4	91	158	114.3	24	4
2	51	101	155	120.7	20	4	107	168	127	21	8
2 ½	64	120	181	139.7	20	4	127	194	149.4	24	8
3	76	133	194	152.4	20	4	145	213	168.1	24	8
3 ½	89	158	219	177.8	20	8	161	232	184.2	24	8
4	102	171	232	190.5	20	8	177	257	200.2	24	8
5	127	193	257	215.9	23	8	212	282	235	24	8
6	152	218	282	241.3	23	8	247	321	269.7	24	12
8	203	276	346	298.5	23	8	304	384	330.2	27	12
10	254	336	409	362	26	12	358	448	387.4	30	16
12	305	406	486	431.8	26	12	419	524	450.9	33	16
14	337	447	536	476.3	29	12	482	587	514.4	33	20
16	387	511	600	539.8	29	16	536	651	571.5	37	20
18	438	546	638	577.9	33	16	593	714	628.7	37	24
20	489	603	702	635	33	20	650	778	686.8	37	24
24	591	714	816	749.3	36	20	771	917	812.8	43	24

Dimensions in mm

DN (inch)	ID	Class 600					Class 900				
		RF	FF				RF	FF			
		OD	OD	BCD	Ø	n° holes	OD	OD	BCD	Ø	n° holes
½	13	50	98	66.5	17	4	60	124	82.6	24	4
¾	19	63	120	82.6	21	4	66	133	88.9	24	4
1	25	69	127	88.9	21	4	76	152	101.6	27	4
1 ¼	32	79	136	98.6	21	4	85	162	111.3	27	4
1 ½	38	91	158	114.3	24	4	95	181	124	30	4
2	51	107	168	127	21	8	139	219	165.1	27	8
2 ½	64	127	194	149.4	24	8	162	247	190.5	30	8
3	76	145	213	168.1	24	8	165	244	190.5	27	8
3 ½	89	158	232	184.2	27	8	-	-	-	-	-
4	102	190	276	215.9	27	8	203	295	235	33	8
5	127	238	333	266.7	30	8	244	352	279.4	37	8
6	152	263	359	292.1	30	12	285	384	317.5	33	12
8	203	317	422	349.3	33	12	355	473	393.7	40	12
10	254	396	511	431.8	37	16	431	549	469.9	40	16
12	305	453	562	489	37	20	495	613	533.4	40	20
14	337	488	606	527.1	40	20	517	644	558.8	43	20
16	387	562	689	603.3	43	20	571	708	616	46	20
18	438	609	746	654.1	46	20	635	790	685.8	52	20
20	489	679	816	723.9	46	24	695	860	749.3	55	20
24	591	787	943	838.2	52	24	835	1044	901.7	68	20

Dimensions



# Flange Insulation Sets ICP KD02 / KD03

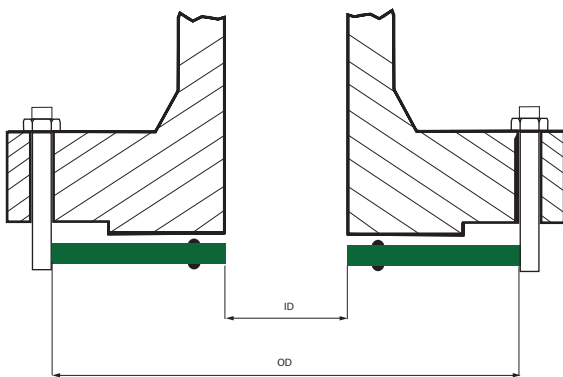
(use with ANSI/ASME B16.5 RF flanges)



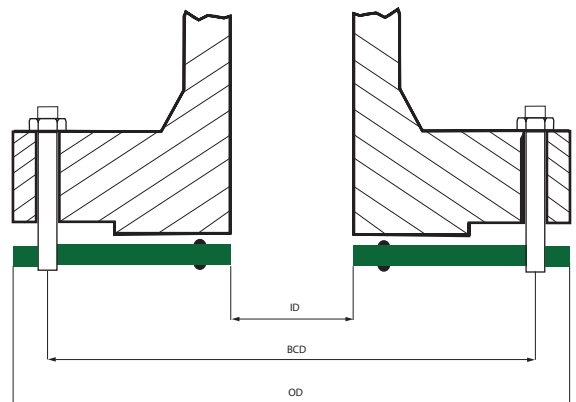
DN (inch)	Class 150		Class 300		Class 600		Class 900		Class 1500		Class 2500	
	RF		RF		RF		RF		RF		RF	
	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD
½	13	44	13	50	13	50	13	60	13	60	13	66
¾	19	54	19	63	19	63	19	66	19	66	19	72
1	25	63	25	69	25	69	25	76	25	76	25	82
1 ¼	32	73	32	79	32	79	32	85	32	85	32	101
1 ½	38	82	38	91	38	91	38	95	38	95	38	114
2	51	101	51	107	51	107	51	139	51	139	51	143
2 ½	64	120	64	127	64	127	64	162	64	162	64	165
3	76	133	76	145	76	145	76	165	76	171	76	193
3 ½	89	158	89	161	89	158	-	-	-	-	-	-
4	102	171	102	177	102	190	102	203	102	206	102	231
5	127	193	127	212	127	238	127	244	127	250	127	276
6	152	218	152	247	152	263	152	285	152	279	152	314
8	203	276	203	304	203	317	203	355	203	349	203	384
10	254	336	254	358	254	396	254	431	254	431	254	473
12	305	406	305	419	305	453	305	495	305	517	305	546
14	337	447	337	482	337	488	337	517	337	574	-	-
16	387	511	387	536	387	562	387	571	387	638	-	-
18	438	546	438	593	438	609	438	635	438	701	-	-
20	489	603	489	650	489	679	489	695	489	752	-	-
24	591	714	591	771	591	787	591	835	591	898	-	-

Dimensions in mm

## RF TYPE

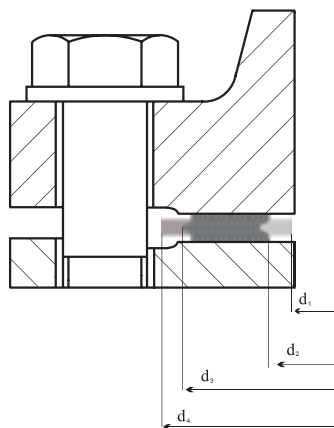


## FF TYPE



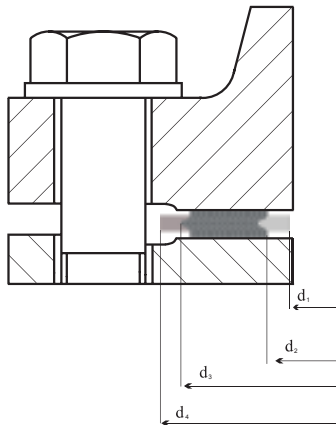
# Spiral Wound Gasket dimension to EN 1514-2 / DIN 2690 (used with EN 1092-1 gasket)

DN (mm)	INNER RING	SEALING ELEMENT			OUTER RING					
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)		d <sub>4</sub> (mm)					
PN	PN 10-160	PN 10-160	PN 10-40	PN 63-160	PN 10	PN 25	PN 40	PN 63	PN 100	PN 160
10	18	24	34	34	46	46	46	56	56	56
15	23	29	39	39	51	51	51	61	61	61
20	28	34	46	-	61	61	61	-	-	-
25	35	41	53	53	71	71	71	82	82	82
32	43	49	61	-	82	82	82	-	-	-
40	50	56	68	68	92	92	92	103	103	103
50	61	70	86	86	107	107	107	113	119	119
65	77	86	102	106	127	127	127	137	143	143
80	90	99	115	119	142	142	142	148	154	154
100	115	127	143	147	162	168	168	174	180	180
125	140	152	172	176	192	194	194	210	217	217
150	167	179	199	203	217	224	224	247	257	257
200	216	228	248	252	272	284	290	309	324	324
250	267	279	303	307	327	340	352	364	391	388
300	318	330	354	358	377	400	417	424	458	458
350	360	376	400	404	437	457	474	486	512	-
400	410	422	450	456	488	514	546	543	572	-
500	510	522	550	556	593	624	628	657	704	-
600	610	622	650	656	695	731	747	764	813	-
700	710	722	756	762	810	833	852	879	950	-
800	810	830	864	870	917	942	974	988	-	-
900	910	930	964	970	1,017	1,042	1,084	1,108	-	-
1,000	1,010	1,030	1,074	1,080	1,124	1,154	1,194	-	-	-



# Spiral Wound Gasket dimension to ASME B16.20

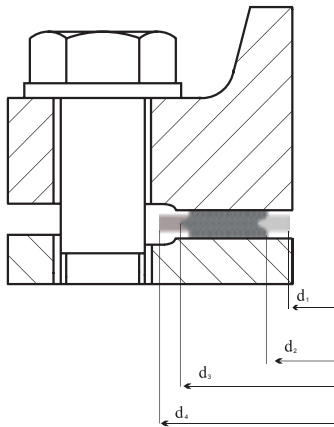
(used with BS 1560 & ASME/ANSI B16.5 flanges)



DN (inch)	INNER RING				
	Inner Diameter - $d_1$ (mm)				
	Class 150-300	Class 400-600	Class 900	Class 1500	Class 2500
½	14.2	14.2	14.2	14.2	14.2
¾	20.6	20.6	20.6	20.6	20.6
1	26.9	26.9	26.9	26.9	26.9
1 ¼	38.1	38.1	38.1	33.3	33.3
1 ½	44.5	44.5	44.5	41.4	41.4
2	55.6	55.6	55.6	52.3	52.3
2 ½	66.5	66.5	66.5	63.5	63.5
3	81.0	78.7	78.7	78.7	78.7
4	106.4	106.4	106.4	106.4	106.4
5	131.8	131.8	131.8	131.8	131.8
6	157.2	157.2	157.2	157.2	157.2
8	215.9	209.6	196.9	196.9	196.9
10	268.2	260.4	246.1	246.1	246.1
12	317.5	317.5	292.1	292.1	292.1
14	349.3	349.3	320.8	320.8	-
16	400.1	400.1	374.7	368.3	-
18	449.3	449.3	425.5	425.5	-
20	500.1	500.1	482.6	476.3	-
24	603.3	603.3	590.6	577.9	-

DN (inch)	SEALING ELEMENT							OUTER RING						
	Inner Diameter - $d_2$ (mm)					$d_3$ (mm)		Outer Diameter - $d_4$ (mm)						
	Class 150-300	Class 400-600	Class 900	Class 1500	Class 2500	Class 150-600	Class 900-2500	Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
½	19.1	19.1	19.1	19.1	19.1	31.8	31.8	47.8	54.1	54.1	54.1	63.5	63.5	63.5
¾	25.4	25.4	25.4	25.4	25.4	39.6	39.6	57.2	66.8	66.8	66.8	69.9	69.9	76.2
1	31.8	31.8	31.8	31.8	31.8	47.8	47.8	66.8	73.2	73.2	73.2	79.5	79.5	85.9
1 ¼	47.8	47.8	39.6	39.6	39.6	60.5	60.5	76.2	82.6	82.6	82.6	88.9	88.9	104.9
1 ½	54.1	54.1	47.8	47.8	47.8	69.9	69.9	85.9	95.3	95.3	95.3	98.6	98.6	114.6
2	69.6	69.6	58.7	58.7	58.7	85.9	85.9	104.9	111.3	111.3	111.3	143	143	146.1
2 ½	82.6	82.6	69.9	69.9	69.9	98.6	98.6	124	130.3	130.3	130.3	165.1	165.1	168.4
3	101.6	101.6	95.36	92.2	92.2	120.7	120.7	136.7	149.4	149.4	149.4	168.4	174.8	196.9
4	127	120.7	120.7	117.6	117.6	149.4	149.4	174.8	181.1	177.8	193.8	206.5	209.6	235
5	155.7	147.6	147.6	143	143	177.8	177.8	196.9	215.9	212.9	241.3	247.7	254	279.4
6	182.6	174.8	174.8	171.5	171.5	209.6	209.6	222.3	251	247.7	266.7	289.1	282.7	317.5
8	233.4	225.6	222.3	215.9	215.9	263.7	263.7	279.4	308	304.8	320.8	359.9	352.6	387.4
10	287.3	274.6	276.4	266.7	270	317.5	317.5	339.9	362	358.9	400.1	435.1	435.1	476.3
12	339.9	327.2	323.9	323.9	317.5	374.7	374.7	409.7	422.4	419.1	457.2	498.6	520.7	549.4
14	371.6	362	356.6	362	-	406.4	406.4	450.9	485.9	482.6	492.3	520.7	577.9	-
16	422.4	412.8	412.8	406.7	-	463.6	463.6	514.4	539.8	536.7	565.2	574.8	641.4	-
18	474.7	469.9	463.6	463.6	-	527.1	527.1	549.4	596.9	593.9	612.9	638.3	704.9	-
20	525.5	520.7	520.7	514.4	-	577.9	577.9	606.6	654.1	647.7	682.8	698.5	755.7	-
24	628.7	628.7	628.7	616	-	685.8	685.9	717.6	774.7	768.4	790.7	838.2	901.7	-

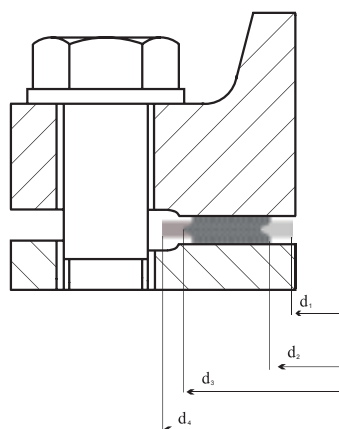
# Spiral Wound Gasket dimension to ASME B16.20 (used with ASME/ANSI B 16.47 Series A flanges)



DN (inch)	INNER RING				
	Inner Diameter - $d_1$ (mm)				
	Class 150	Class 300	Class 400	Class 600	Class 900
26	654.1	654.1	660.4	647.7	660.4
28	704.9	704.9	711.2	698.5	711.2
30	755.7	755.7	755.7	755.7	762.0
32	806.5	806.5	812.8	812.8	812.8
34	857.3	857.3	863.6	863.6	863.6
36	908.1	908.1	917.7	917.7	920.8
38	958.9	952.5	952.5	952.5	1009.7
40	1009.7	1003.3	1000.3	1009.7	1060.5
42	1060.5	1054.1	1051.1	1066.8	1111.3
44	1111.3	1104.9	1104.9	1111.3	1155.7
46	1162.1	1152.7	1168.4	1162.1	1219.2
48	1212.9	1209.8	1206.5	1219.2	1270.0
50	1263.7	1244.6	1257.3	1270.0	-
52	1314.5	1320.8	1308.1	1320.8	-
54	1358.9	1352.6	1352.6	1378.0	-
56	1409.7	1403.4	1403.4	1428.8	-
58	1460.5	1447.8	1454.2	1473.2	-
60	1511.3	1524.0	1517.7	1530.4	-

DN (inch)	SEALING ELEMENT										OUTER RING				
	Inner Diameter - $d_2$ (mm) / Outer Diameter - $d_3$ (mm)										Outer Diameter - $d_4$ (mm)				
	Class 150		Class 300		Class 400		Class 600		Class 900		Class 150	Class 300	Class 400	Class 600	Class 900
	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD					
26	673.1	704.9	685.8	736.6	685.8	736.6	685.8	736.6	685.8	736.6	774.7	835.0	831.9	866.8	882.7
28	723.9	755.7	736.6	787.4	736.6	787.4	736.6	787.4	736.6	787.4	831.9	898.5	892.2	914.4	946.2
30	774.7	806.5	793.8	844.6	793.8	844.6	793.8	844.6	793.8	844.6	882.7	952.5	946.2	971.6	1009.7
32	825.5	860.4	850.9	901.7	850.9	901.7	850.9	901.7	850.9	901.7	939.8	1006.5	1003.3	1022.4	1073.2
34	876.3	911.2	901.7	952.5	901.7	952.5	901.7	952.5	901.7	952.5	990.6	1057.3	1054.1	1073.2	1136.7
36	927.1	968.4	955.7	1006.5	955.7	1006.5	955.7	1006.5	958.9	1009.7	1047.8	1117.6	1117.6	1130.3	1200.2
38	977.9	1019.2	977.9	1016.0	971.6	1022.4	990.6	1041.4	1035.1	1085.9	1111.3	1054.1	1073.2	1104.9	1200.2
40	1028.7	1070.0	1022.4	1070.0	1025.5	1076.3	1047.8	1098.6	1098.6	1149.4	1162.1	1114.4	1127.1	1155.7	1251.0
42	1079.5	1124.0	1073.2	1120.8	1076.3	1127.1	1104.9	1155.7	1149.4	1200.2	1219.2	1165.2	1177.9	1219.2	1301.8
44	1130.3	1177.9	1130.3	1181.1	1130.3	1181.1	1162.1	1212.9	1206.5	1257.3	1276.4	1219.2	1231.9	1270.0	1368.4
46	1181.1	1228.7	1177.9	1228.7	1193.8	1244.6	1212.9	1263.7	1270.0	1320.8	1327.2	1273.2	1289.1	1327.2	1435.1
48	1231.9	1279.5	1235.1	1285.9	1244.6	1295.4	1270.0	1320.8	1320.8	1371.6	1384.3	1324.0	1346.2	1390.7	1485.9
50	1282.7	1333.5	1295.4	1346.2	1295.4	1346.2	1320.8	1371.6	-	-	1435.1	1378.0	1403.4	1447.8	-
52	1333.5	1384.3	1346.2	1397.0	1346.2	1397.0	1371.6	1422.4	-	-	1492.3	1428.8	1454.2	1498.6	-
54	1384.3	1435.1	1403.4	1454.2	1403.4	1454.2	1428.8	1479.6	-	-	1549.4	1492.3	1517.7	1555.8	-
56	1435.1	1485.9	1454.2	1505.0	1454.2	1505.0	1479.6	1555.8	-	-	1606.6	1543.1	1568.5	1612.9	-
58	1485.9	1536.7	1511.1	1562.1	1505.0	1555.8	1536.7	1587.5	-	-	1663.7	1593.9	1619.3	1663.7	-
60	1536.7	1587.5	1562.1	1612.9	1568.5	1619.3	1593.9	1644.7	--	--	1714.5	1644.7	1682.8	1733.6	--

# Spiral Wound Gasket dimension to ASME B16.20 (used with ASME/ANSI B 16.47 Series B flanges)



DN (inch)	INNER RING				
	Inner Diameter - $d_1$ (mm)				
	Class 150	Class 300	Class 400	Class 600	Class 900
26	654.1	654.1	654.1	644.7	666.8
28	704.9	704.9	701.8	685.8	717.6
30	755.7	755.7	752.6	752.6	781.1
32	806.5	806.5	800.1	793.8	838.2
34	857.3	857.3	850.9	850.9	895.4
36	908.1	908.1	898.7	901.7	920.8
38	958.9	971.6	952.5	952.5	1009.7
40	1009.7	1022.4	1000.3	1009.7	1060.5
42	1060.5	1085.9	1051.1	1066.8	1111.3
44	1111.3	1124.0	1104.9	1111.3	1155.7
46	1162.1	1178.1	1168.4	1162.1	1219.2
48	1212.9	1231.9	1206.5	1219.2	1270.0
50	1263.7	1267.0	1257.3	1270.0	-
52	1314.5	1317.8	1308.1	1320.8	-
54	1365.3	1365.3	1352.6	1378.0	-
56	1422.4	1428.8	1403.4	1428.8	-
58	1478.0	1484.4	1454.2	1473.2	-
60	1535.2	1557.3	1517.7	1530.4	-

DN (inch)	SEALING ELEMENT										OUTER RING					
	Inner Diameter - $d_2$ (mm) / Outer Diameter - $d_3$ (mm)										Outer Diameter - $d_4$ (mm)					
	Class 150		Class 300		Class 400		Class 600		Class 900							
	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	Class 150	Class 300	Class 400	Class 600
26	673.1	698.5	673.1	711.2	666.8	698.5	663.7	714.5	692.2	749.3	725.4	771.7	746.3	765.3	838.2	
28	723.9	749.3	723.9	762.0	714.5	749.3	704.9	755.7	743.0	800.1	776.2	825.5	800.1	819.2	901.7	
30	774.7	800.1	774.7	812.8	765.3	806.5	778.0	828.8	806.5	857.3	827.0	886.0	857.3	879.6	958.9	
32	825.5	850.9	825.5	863.6	812.8	860.6	831.9	882.7	863.6	914.4	881.1	939.8	911.4	933.5	1016.0	
34	876.3	908.1	876.3	914.4	866.9	911.4	889.0	939.8	920.8	971.6	935.0	993.9	962.2	997.0	1073.2	
36	927.1	958.9	927.1	965.2	917.7	965.2	939.8	990.6	946.2	997.0	987.6	1047.8	1022.4	1047.8	1124.0	
38	974.6	1009.7	1009.7	1047.8	971.6	1022.4	990.6	1041.4	1035.1	1085.9	1044.7	1098.6	1073.2	1104.9	1200.2	
40	1022.4	1063.8	1060.5	1098.6	1025.7	1076.5	1047.8	1098.6	1098.6	1149.4	1095.5	1149.4	1127.3	1155.7	1251.0	
42	1079.5	1114.6	1111.3	1149.4	1076.5	1127.3	1104.9	1155.7	1149.4	1200.2	1146.3	1200.2	1178.1	1219.2	1301.8	
44	1124.0	1165.4	1162.1	1200.2	1130.3	1181.1	1162.1	1212.9	1206.5	1257.3	1197.1	1251.0	1231.9	1270.0	1368.6	
46	1181.1	1224.0	1216.2	1254.3	1193.8	1244.6	1212.9	1263.7	1270.0	1320.8	1255.8	1317.8	1289.1	1327.2	1435.1	
48	1231.9	1270.0	1263.7	1311.4	1244.6	1295.4	1270.0	1320.8	1320.8	1371.6	1306.6	1368.6	1346.2	1390.7	1485.9	
50	1282.7	1325.6	1317.8	1355.9	1295.4	1346.2	1320.8	1371.6	-	-	1357.4	1419.4	1403.4	1447.8	-	
52	1333.5	1376.4	1368.6	1406.7	1346.2	1397.0	1371.6	1422.4	-	-	1408.2	1470.2	1454.2	1498.6	-	
54	1384.3	1422.4	1403.4	1454.2	1403.4	1454.2	1428.8	1479.6	-	-	1463.8	1530.4	1517.7	1555.8	-	
56	1444.8	1477.8	1479.6	1524.0	1454.2	1505.0	1479.6	1530.4	-	-	1514.6	1593.9	1568.5	1612.9	-	
58	1500.4	1528.8	1535.2	1573.3	1505.0	1555.8	1536.7	1587.5	-	-	1579.6	1655.8	1619.3	1663.7	-	
60	1557.3	1586.0	1589.0	1630.4	1568.5	1619.3	1593.9	1644.7	-	-	1630.4	1706.6	1682.8	1733.6	-	

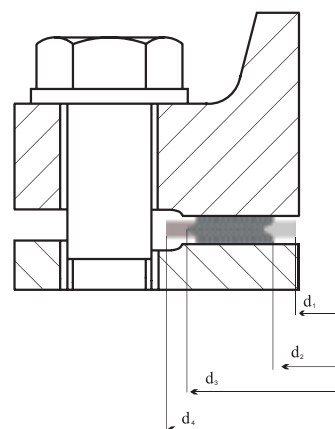


# Spiral Wound Gasket dimension to BS 3381

(used with BS 1560 / ASME B 16.5 flanges)

DN (inch)	INNER RING		SEALING ELEMENT				OUTER RING					
	d <sub>1</sub> (mm)		d <sub>2</sub> (mm)			d <sub>3</sub> (mm)	d <sub>4</sub> (mm)					
	Class 150 - 1500	Class 2500	Class 150	Class 300-1500	Class 2500	Class 150-600	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
½	14.3	14.3	18.7	18.7	18.7	32.2	47.6	54.0	54.0	63.5	63.5	69.9
¾	20.6	20.6	26.6	25.0	25.0	40.1	57.2	66.7	66.7	69.9	69.9	76.2
1	27.0	27.0	32.9	31.4	31.4	48.0	66.7	73.0	73.0	79.4	79.4	85.9
1 ¼	34.9	34.9	45.6	44.1	39.3	60.7	76.2	82.6	82.6	88.9	88.9	104.8
1 ½	41.3	41.3	53.6	50.4	47.2	70.3	85.7	95.3	95.3	98.4	98.4	117.5
2	52.4	52.4	69.5	66.3	58.3	86.1	104.8	111.1	111.1	142.9	142.9	146.1
2 ½	63.5	63.5	82.2	79.0	69.5	98.8	123.8	130.2	130.2	165.1	165.1	168.3
3	77.8	77.8	101.2	94.9	91.7	121.1	136.5	149.2	149.2	168.3	174.6	196.9
4	103.2	103.2	126.6	120.3	117.1	149.6	174.6	181.0	193.7	206.4	209.6	235.0
5	128.5	128.5	153.6	147.2	142.5	178.2	196.9	215.9	241.3	247.7	254.0	279.4
6	154.0	154.0	180.6	174.2	171.1	210.0	222.3	250.8	266.7	288.9	282.6	317.5
8	203.2	203.2	231.4	225.0	215.5	263.9	279.4	308.0	320.7	358.8	352.4	387.4
10	254.0	254.0	286.9	280.6	269.5	317.9	339.7	362.0	400.1	435.0	435.0	476.3
12	303.2	303.2	339.3	333.0	323.5	375.1	409.6	422.3	457.2	498.5	520.7	549.6
14	342.9	-	371.1	364.7	-	406.8	450.9	485.8	492.1	520.7	577.9	-
16	393.7	-	421.9	415.6	-	464.0	514.4	539.8	565.2	574.7	641.4	-
18	444.5	-	475.9	469.5	-	527.5	549.3	596.9	612.8	638.2	704.9	-
20	495.3	-	526.7	520.3	-	578.3	606.4	654.1	682.6	698.5	755.7	-
24	596.9	-	631.4	625.1	-	686.2	717.6	774.7	790.6	838.2	901.7	-

TOLERANCES (mm)			
Inner Ring	Sealing Element		Outer Ring
+ 0	+ 0.4	+ 0	+ 0.4
- 0.8	- 0	- 0.8	- 0

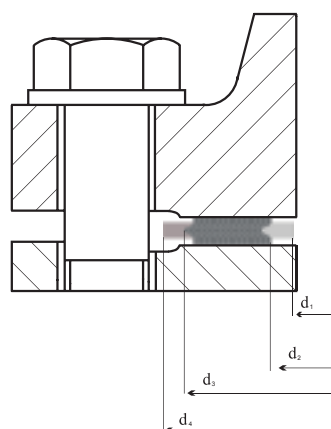
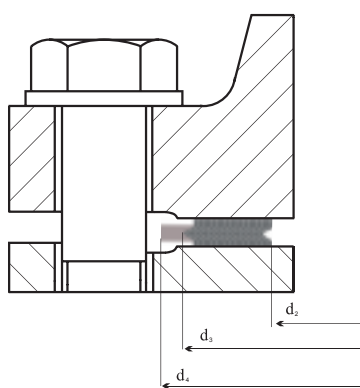


# Spiral Wound Gasket dimension to JIS

(used with JIS - Presión Nominal 10 Kg<sub>f</sub>/cm<sup>2</sup> - 20 Kg<sub>f</sub>/cm<sup>2</sup> flanges)

NOMINAL PRESSURE 10 Kg <sub>f</sub> /cm <sup>2</sup>				
DN (inch)	INNER RING	SEALING ELEMENT		OUTER RING
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	d <sub>4</sub> (mm)
10	-	24	37	52
15	-	28	41	57
20	-	34	47	62
25	-	40	53	74
32	-	51	67	84
40	-	57	73	89
50	-	69	89	104
65	-	87	107	124
80	-	98	118	134
90	-	110	130	144
100	-	123	143	159
125	-	148	173	190
150	-	174	199	220
175	-	201	226	245
200	-	227	252	270
225	-	252	277	290
250	-	278	310	332
300	-	329	361	377
350	-	366	406	422
400	-	417	457	484
450	-	468	518	539
500	-	518	568	594
550	-	569	619	650
600	-	620	670	700

NOMINAL PRESSURE 20 Kg <sub>f</sub> /cm <sup>2</sup>				
DN (inch)	INNER RING	SEALING ELEMENT		OUTER RING
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	d <sub>4</sub> (mm)
10	18	24	37	52
15	22	28	41	57
20	28	34	47	62
25	34	40	53	74
32	43	51	67	84
40	49	57	73	89
50	61	69	89	104
65	77	87	107	124
80	89	99	119	140
90	102	114	139	150
100	115	127	152	165
125	140	152	177	202
150	166	182	214	237
175	-	-	-	-
200	217	233	265	282
225	-	-	-	-
250	268	288	328	354
300	319	339	379	404
350	356	376	416	450
400	407	432	482	508
450	458	483	533	573
500	508	533	583	628
550	559	584	634	684
600	610	635	685	734



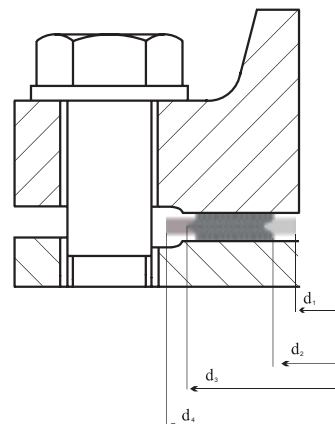
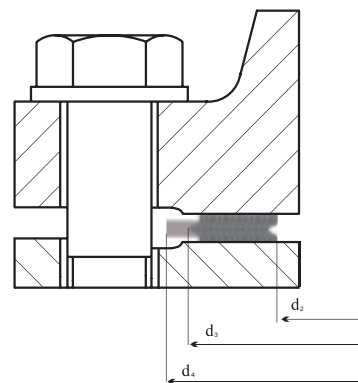
# Spiral Wound Gasket dimension to JIS

(used with JIS - Presión Nominal 30 Kg<sub>f</sub>/cm<sup>2</sup> - 63 Kg<sub>f</sub>/cm<sup>2</sup> flanges)

NOMINAL PRESSURE 30 Kg <sub>f</sub> /cm <sup>2</sup>				
DN (inch)	INNER RING	SEALING ELEMENT		OUTER RING
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	d <sub>4</sub> (mm)
10	18	24	37	52
15	22	28	41	57
20	28	34	47	62
25	34	40	53	74
32	43	51	67	84
40	49	57	73	89
50	61	69	89	104
65	68	87	107	124
80	80	98	118	134
90	92	110	130	144
100	104	123	143	159
125	128	148	173	190
150	153	174	199	220
200	202	227	252	270
250	251	278	310	332
300	300	329	361	377
350	336	366	406	422
400	383	417	457	484

NOMINAL PRESSURE 40 Kg <sub>f</sub> /cm <sup>2</sup>				
DN (inch)	INNER RING	SEALING ELEMENT		OUTER RING
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	d <sub>4</sub> (mm)
10	15	21	34	59
15	18	24	37	64
20	23	29	42	69
25	29	35	48	79
32	38	44	60	89
40	43	51	67	100
50	55	63	79	114
65	68	78	98	140
80	80	90	110	150
90	92	102	127	162
100	104	116	141	182
125	128	140	165	224
150	153	165	197	265
200	202	218	250	315
250	251	271	311	378
300	300	320	360	434
350	336	356	396	479
400	383	403	453	531

NOMINAL PRESSURE 63 Kg <sub>f</sub> /cm <sup>2</sup>				
DN (inch)	INNER RING	SEALING ELEMENT		OUTER RING
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	d <sub>4</sub> (mm)
10	15	21	34	64
15	18	24	37	69
20	23	29	42	75
25	29	35	48	80
32	38	44	60	90
40	43	51	67	107
50	55	63	79	125
65	68	78	98	152
80	80	90	110	162
90	92	102	127	179
100	104	116	141	194
125	128	140	165	235
150	153	165	197	275
200	202	218	250	328
250	251	271	311	394
300	300	320	360	446
350	336	356	396	488
400	383	403	453	545

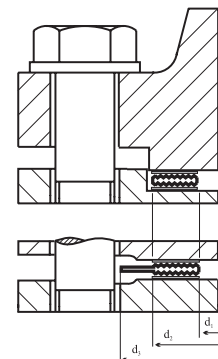




# Camprofile Gasket dimension to EN 1514-6 (used with EN 1092 flanges)

DN (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)			CENTERING RING - d <sub>3</sub> (mm)									
		PN 10-40	PN 64/160	PN 250/400	PN 10	PN 16	PN 25	PN 40	PN 64	PN 100	PN 160	PN 250	PN 300	PN 400
10	22	36	36	36	46	46	46	46	56	56	56	67	67	67
15	26	42	42	42	51	51	51	51	61	61	61	72	72	-
20	31	47	47	47	61	61	61	61	-	-	-	-	-	-
25	36	52	52	52	71	71	71	71	82	82	82	83	92	104
32	46	62	62	66	82	82	82	82	-	-	-	-	-	-
40	53	69	69	73	92	92	92	92	103	103	103	109	119	135
50	65	81	81	87	107	107	107	107	113	119	119	124	134	150
65	81	100	100	103	127	127	127	127	137	143	143	153	170	192
80	95	115	115	121	142	142	142	142	148	154	154	170	190	207
100	118	138	138	146	162	162	168	168	174	180	180	202	229	256
125	142	162	162	178	192	192	194	194	210	217	217	242	274	301
150	170	190	190	212	217	217	224	224	247	257	257	284	311	348
175	195	215	215	245	247	247	254	265	277	287	284	316	358	402
200	220	240	248	280	272	272	284	290	309	324	324	358	398	442
250	270	290	300	348	327	328	340	352	364	391	388	442	488	-
300	320	340	356	400	377	383	400	417	424	458	458	536	-	-
350	375	395	415	-	437	443	457	474	486	512	-	-	-	-
400	426	450	474	-	489	495	514	546	543	572	-	-	-	-
450	480	506	-	-	539	555	-	-	-	-	-	-	-	-
500	530	560	588	-	594	617	624	628	657	704	-	-	-	-
600	630	664	700	-	695	734	731	747	764	813	-	-	-	-
700	730	770	812	-	810	804	833	852	879	950	-	-	-	-
800	830	876	886	-	917	911	942	974	988	-	-	-	-	-
900	930	982	994	-	1,017	1,011	1,042	1,084	1,108	-	-	-	-	-
1,000	1,040	1,098	1,110	-	1,124	1,128	1,154	1,194	1,220	-	-	-	-	-
1,200	1,250	1,320	1,334	-	1,341	1,342	1,364	1,398	1,452	-	-	-	-	-
1,400	1,440	1,522	-	-	1,548	1,542	1,578	1,618	-	-	-	-	-	-
1,600	1,650	1,742	-	-	1,772	1,764	1,798	1,830	-	-	-	-	-	-
1,800	1,850	1,914	-	-	1,972	1,964	2,000	-	-	-	-	-	-	-
2,000	2,050	2,120	-	-	2,182	2,168	2,230	-	-	-	-	-	-	-
2,200	2,250	2,328	-	-	2,384	2,378	-	-	-	-	-	-	-	-
2,400	2,460	2,512	-	-	2,594	-	-	-	-	-	-	-	-	-
2,600	2,670	2,728	-	-	2,794	-	-	-	-	-	-	-	-	-
2,800	2,890	2,952	-	-	3,014	-	-	-	-	-	-	-	-	-
3,000	3,100	3,166	-	-	3,228	-	-	-	-	-	-	-	-	-

TOLERANCES (mm)		
DN (mm)	d <sub>2</sub>	d <sub>3</sub>
< 1000	+ / - 0.4	+ 0 / - 1.0
250 - 600	+ 0.4 / - 0	+ 1.0 - 0

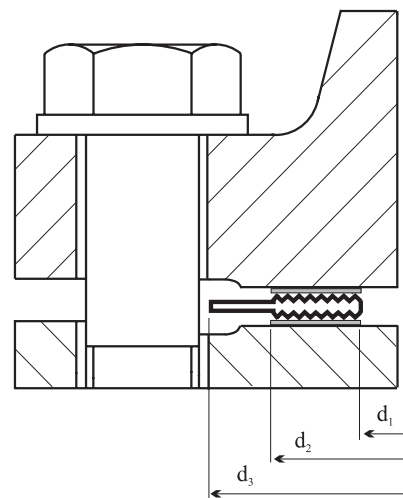


# Camprofile Gasket dimension to ASME B16.20 (used with BS 1560 & ASME/ANSI B16.5 RF flanges)



DN (inch)	Sealing Element (mm)		CENTERING RING - $d_3$ (mm)					
	$d_1$	$d_2$	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
1/2	23	33	48	54	54	64	64	70
3/4	29	40	57	67	67	70	70	76
1	37	48	67	73	73	79	79	86
1 1/4	44	60	76	83	83	89	89	105
1 1/2	52	70	86	95	95	98	98	118
2	70	89	105	111	111	143	143	146
2 1/2	83	102	124	130	130	165	165	168
3	98	124	137	149	149	168	175	197
4	124	154	175	181	194	206	210	235
5	151	183	197	216	241	248	254	279
6	178	213	222	250	267	289	283	318
8	229	267	279	308	321	359	352	387
10	283	321	340	362	400	435	435	476
12	340	378	410	422	457	499	521	550
14	372	410	451	486	492	521	578	581
16	422	467	514	540	565	575	641	644
18	479	530	549	597	613	638	705	-
20	530	581	606	654	683	699	756	-
24	632	683	718	755	791	838	902	-

TOLERANCES (mm)				
DN (mm)	DN (inch)	$d_1$	$d_2$	$d_3$
15 - 200	1/2 - 8	+ / - 0.4	+ / - 0.8	+ / - 0.8
250 - 600	10 - 24	+ / - 0.8	+ 1.5 - 0.8	+ / - 0.8





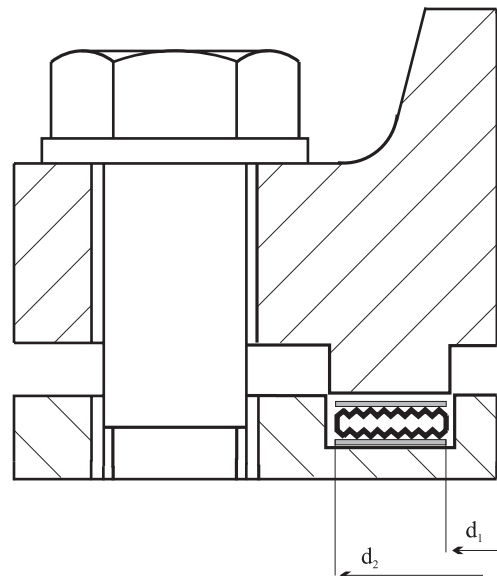


## Camprofile Gasket dimension to ASME B16.20

(used with BS 1560 & ASME/ANSI B16.5

Tongue & Groove flanges)

DN (inch)	d <sub>1</sub> (mm)	d <sub>2</sub> "narrow" (mm)	d <sub>2</sub> "width" (mm)
½	25	35	35
¾	33	43	43
1	38	48	51
1 ¼	48	57	64
1 ½	54	64	73
2	73	83	92
2 ½	86	95	105
3	108	118	127
3 ½	121	130	140
4	132	145	157
5	160	173	186
6	190	203	216
8	238	254	270
10	286	305	324
12	343	362	381
14	375	394	413
16	425	448	470
18	489	511	535
20	535	559	585
22	591	616	641
24	640	667	690



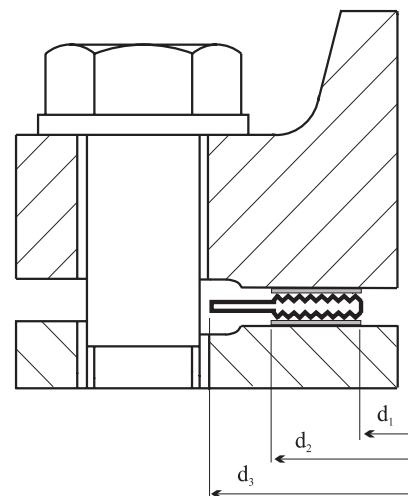
TOLERANCES (mm)			
DN (mm)	DN (inch)	d <sub>1</sub>	d <sub>2</sub>
15 - 200	½ - 8	+ / - 0.4	+ / - 0.8
250 - 600	10 - 24	+ / - 0.8	+ 1.5 - 0.8

# Camprofile Gasket dimension to ASME B16.20 (used with ASME/ANSI B 16.47 Series A RF flanges)



DN (inch)	SEALING ELEMENT				CENTERING RING				
	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)			d <sub>3</sub> (mm)				
		Class 150 - 300	Class 400 - 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
26	650	685	705	725	774.7	835.2	831.9	866.9	882.7
28	705	745	765	785	831.9	898.7	892.3	914.4	946.2
30	755	795	820	840	882.7	952.5	946.2	971.6	1009.7
32	805	850	875	895	939.8	1006.6	1003.3	1022.4	1073.2
34	855	900	930	950	990.6	1057.4	1054.1	1073.2	1136.7
36	905	955	985	1005	1047.8	1117.6	1117.6	1130.3	1200.2
38	960	1015	1030	1065	1111.3	1054.1	1073.2	1104.9	1200.2
40	1010	1065	1085	1120	1162.1	1114.6	1127.3	1155.7	1251.0
42	1060	1120	1135	1175	1219.2	1165.4	1178.1	1219.2	1301.8
44	1110	1170	1190	1230	1276.4	1219.2	1231.9	1270.0	1368.6
46	1160	1225	1250	1285	1327.2	1273.3	1289.1	1327.2	1435.1
48	1210	1275	1300	1340	1384.3	1324.1	1346.2	1390.7	1485.9
50	1260	1330	1355	-	1435.1	1378.0	1403.4	1447.8	-
52	1310	1385	1405	-	1492.3	1428.8	1454.2	1498.6	-
54	1360	1435	1460	-	1549.4	1492.3	1517.7	1555.8	-
56	1410	1490	1515	-	1606.6	1543.1	1568.5	1612.9	-
58	1460	1540	1565	-	1663.7	1593.9	1619.3	1663.7	-
60	1510	1595	1625	-	1714.5	1644.7	1682.8	1733.6	-

TOLERANCES (mm)				
DN (mm)	NPS (inch)	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>
15 - 200	½ - 8	+ / - 0.4	+ / - 0.8	+ / - 0.8
250 - 600	10 - 24	+ / - 0.8	+ 1.5 - 0.8	+ / - 0.8

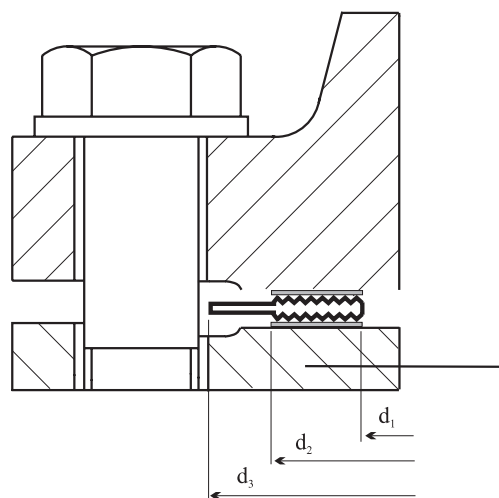




## Camprofile Gasket dimension to ASME B16.20 (used with ASME/ANSI B 16.47 Series B RF flanges)

DN (inch)	SEALING ELEMENT		CENTERING RING
	$d_1$ (mm)	$d_2$ (mm)	$d_3$ (mm)
26	673.1	698.5	725.4
28	723.9	749.3	776.2
30	774.7	800.1	827.0
32	825.5	850.9	881.1
34	876.3	908.1	935.0
36	927.1	958.9	987.6
38	974.9	1009.7	1044.7
40	1022.4	1063.8	1095.5
42	1079.5	1114.6	1146.3
44	1124.0	1165.4	1197.1
46	1181.1	1224.0	1255.8
48	1231.9	1270.0	1306.6
50	1282.7	1325.6	1357.4
52	1333.5	1376.4	1408.2
54	1384.3	1422.4	1463.8
56	1444.8	1478.0	1514.6
58	1500.1	1528.8	1579.6
60	1557.3	1586.0	1630.4

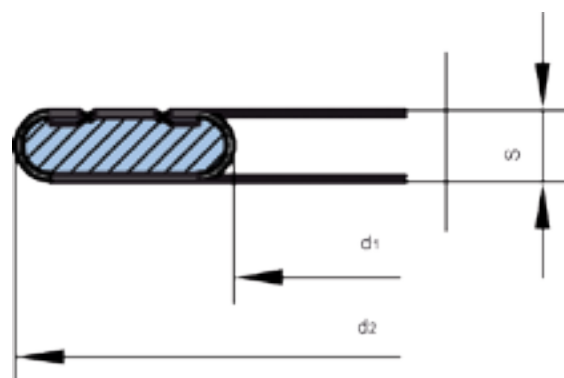
TOLERANCES (mm)				
DN (mm)	DN (inch)	$d_1$	$d_2$	$d_3$
15 - 200	½ - 8	+ / - 0.4	+ / - 0.8	+ / - 0.8
250 - 600	10 - 24	+ / - 0.8	+ 1.5 - 0.8	+ / - 0.8



# Metal Jacketed Gasket dimension to EN 1514-4 (used with EN 1092 flanges)



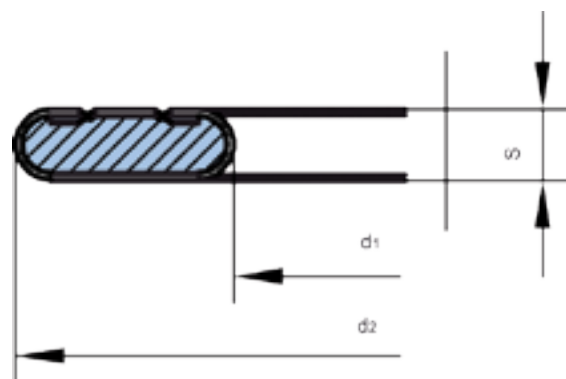
DN (mm)	$d_1$ (mm)	Outer Diameter - $d_2$ (mm)					
		PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
10	18	48	48	48	48	58	58
15	22	53	53	53	53	63	63
20	27	63	63	63	63	74	74
25	34	73	73	73	73	84	84
32	43	84	84	84	84	90	90
40	49	94	94	94	94	105	105
50	61	109	109	109	109	115	121
65	77	129	129	129	129	140	146
80	89	144	144	144	144	150	156
100	115	164	164	170	170	176	183
125	141	194	194	196	196	213	220
150	169	220	220	226	226	250	260
200	220	275	275	286	293	312	327
250	273	330	331	343	355	367	394
300	324	380	386	403	420	427	461
350	356	440	446	460	477	489	515
400	407	491	498	517	549	546	575
450	458	541	558	567	574	-	-
500	508	596	620	627	631	660	708
600	610	698	737	734	750	768	819
700	712	813	807	836	-	883	956
800	813	920	914	945	-	994	-
900	915	1,020	1,014	1,045	-	1,114	-



# Metal Jacketed Gasket dimension to ASME B16.20

(used with BS 1560 & ASME/ANSI B16.5 flanges)

DN (inch)	$d_1$ (mm)	Outer Diameter - $d_2$ (mm)						
		Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
½	23.8	44.5	50.8	50.8	50.8	60.4	60.4	66.8
¾	31.8	54.0	63.5	63.5	63.5	66.7	66.7	73.1
1	36.5	63.5	69.9	69.9	69.9	76.2	76.2	82.5
1 ¼	46.0	73.0	79.4	79.4	79.4	85.8	85.8	101.6
1 ½	52.4	82.6	92.1	92.1	92.1	95.3	95.3	114.3
2	73.2	101.6	108.0	108.0	108.0	139.7	139.7	143.0
2 ½	85.9	120.6	127.0	127.0	127.0	161.9	161.9	165.1
3	107.8	133.4	146.1	146.1	146.1	165.1	171.5	193.8
4	131.8	171.5	177.8	174.7	190.5	203.2	206.5	231.9
5	152.4	193.8	212.8	209.5	238.2	244.6	250.9	276.3
6	190.5	219.1	247.7	244.5	263.6	285.8	279.4	314.5
8	238.3	276.3	304.8	301.7	317.5	355.6	349.3	384.3
10	285.8	336.6	358.8	355.6	396.9	431.8	431.8	473.2
12	342.9	406.4	419.1	415.9	454.1	495.3	517.6	546.1
14	374.7	447.7	482.6	479.5	489.0	517.6	574.7	-
16	425.5	511.2	536.6	533.4	562.0	571.5	638.2	-
18	489.0	546.1	593.7	590.6	609.6	635.0	701.8	-
20	533.4	603.3	650.9	644.5	679.5	695.5	752.5	-
24	641.4	714.4	771.6	765.3	787.4	835.1	898.6	-



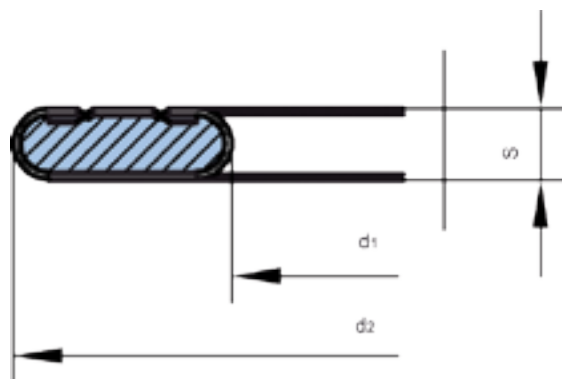


# Metal Jacketed Gasket dimension to ASME B16.20

(used with ASME/ANSI B 16.47 Series A flanges)



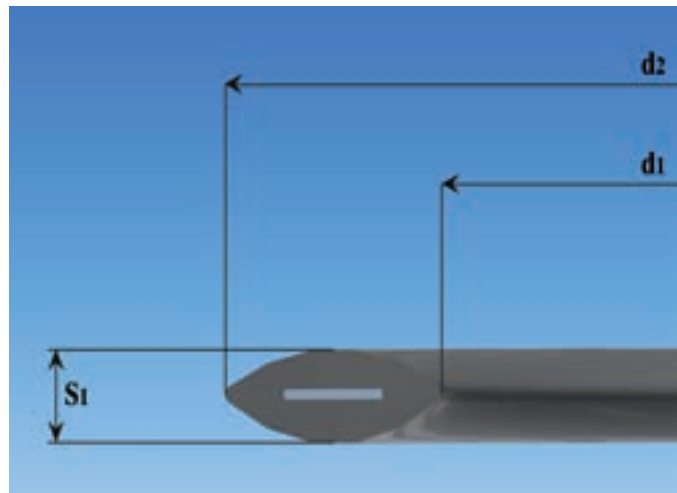
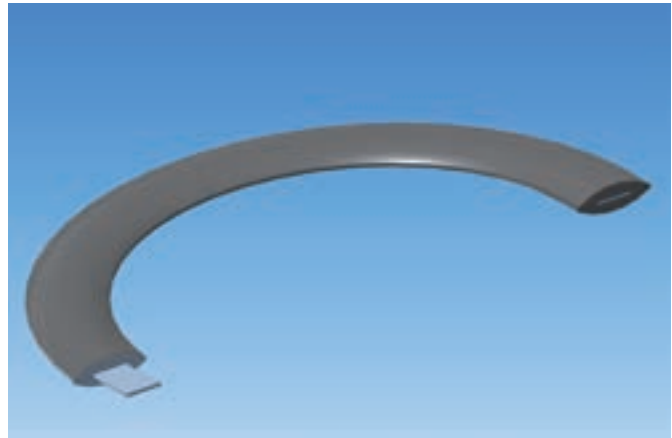
DN (inch)	d <sub>1</sub> (mm)	Outer Diameter - d <sub>2</sub> (mm)				
		Class 150	Class 300	Class 400	Class 600	Class 900
26	673.1	771.6	831.8	828.8	863.6	879.6
28	723.9	828.8	895.3	889.0	911.3	943.1
30	774.7	879.6	949.4	943.1	968.5	1006.6
32	825.5	836.7	1003.3	1000.2	1019.3	1070.1
34	876.3	987.5	1054.1	1051.0	1070.1	1133.6
36	927.1	1044.7	1114.5	1114.5	1127.2	1197.1
38	977.9	1108.2	1051.0	1070.1	1101.8	1197.1
40	1028.7	1159.0	1111.2	1124.0	1152.6	124.0
42	1079.5	1286.1	1162.0	1174.7	1216.1	1298.7
44	1130.3	1273.3	1216.1	1228.8	1267.0	1365.2
46	1181.1	1324.1	1270.0	1286.0	1324.1	1432.0
48	1231.9	1381.2	1320.8	1343.1	1387.6	1482.8
50	1282.7	1432.0	1374.9	1400.3	1444.7	-
52	1333.5	1489.2	1425.7	1451.1	1495.5	-
54	1384.3	1546.3	1489.2	1514.6	1552.7	-
56	1435.1	1603.5	1540.0	1565.4	1603.5	-
58	1485.9	1660.6	1590.8	1616.2	1660.6	-
60	1535.7	1711.4	1641.6	1679.7	1730.5	-



# G-ST Gasket special dimension to EN 1514-1

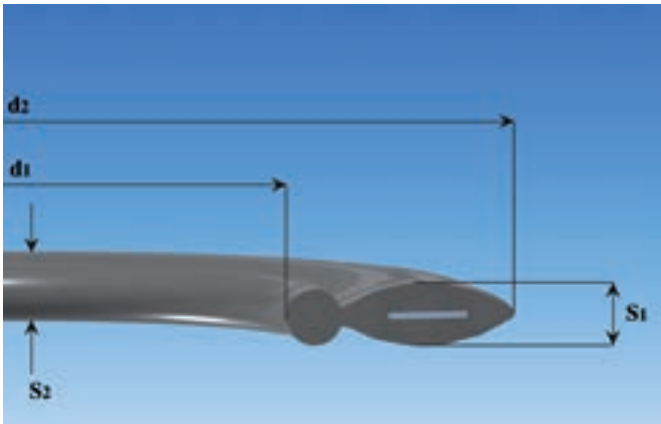
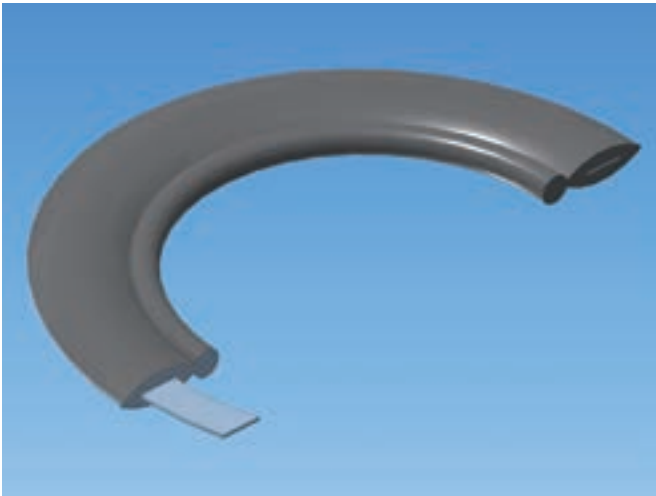
(used with ASME/ANSI B 16.47 Series A flanges)

DN (mm)	PN (bar)	Dimensions [mm] $d_1 \times d_2 \times s_1$
15	10 - 40	22 x 51 x 4
20	10 - 40	27 x 61 x 4
25	10 - 40	34 x 71 x 4
32	10 - 40	43 x 82 x 4
40	10 - 40	49 x 92 x 4
50	10 - 40	61 x 107 x 4
65	10 - 40	77 x 127 x 4
80	10 - 40	89 x 142 x 4
100	6	115 x 152 x 5
100	10 - 16	115 x 162 x 5
100	25 - 40	115 x 168 x 5
125	10 - 16	141 x 192 x 5
125	25 - 40	141 x 194 x 5
150	10 - 16	169 x 218 x 5
150	25 - 40	169 x 224 x 5
200	10 - 16	220 x 273 x 6
200	25	220 x 284 x 6
200	40	220 x 290 x 6
250	10	273 x 328 x 6
250	16	273 x 329 x 6
250	25	273 x 340 x 6
250	40	273 x 352 x 6
300	6	324 x 373 x 6
300	10	324 x 378 x 6
300	16	324 x 384 x 6
300	25	324 x 400 x 6
300	40	324 x 417 x 6
350	10	356 x 438 x 7
400	10	407 x 489 x 7
400	16	407 x 495 x 7
400	25	407 x 514 x 7
400	40	407 x 546 x 7
500	10	508 x 594 x 7
500	40	508 x 628 x 7
600	10	610 x 695 x 7
700	10	712 x 810 x 8
800	10	813 x 917 x 8
1000	10	1016 x 1124 x 8
1200	1 - 2.5	1220 x 1290 x 8
1200	6	1220 x 1307 x 8
1200	10	1220 x 1341 x 8
1200	16	1220 x 1342 x 8
1600	2.5	16320 x 1700 x 8
1600	10	1620 x 1772 x 8
1800	10	1820 x 1972 x 8
2000	10	2020 x 2182 x 8



# G-ST-P/S Gasket special dimension to DIN 2690

(used with EN 1092 flanges)



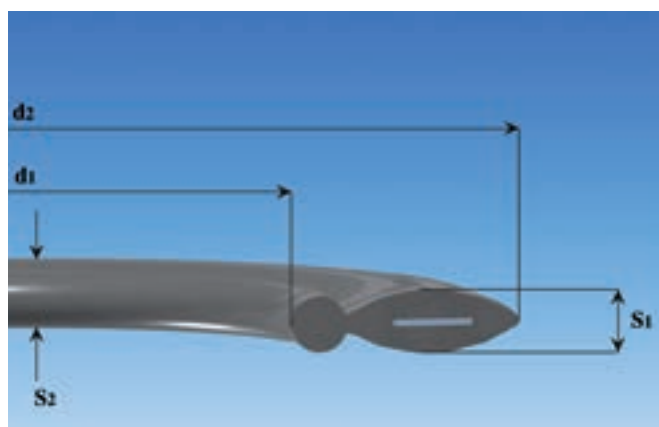
DN (mm)	PN (bar)	Dimensions [mm] $d_1 \times d_2 \times s_1/s_2$
350	6	368 x 423 x 7/10
350	10	368 x 438 x 7/10
350	16	368 x 445 x 7/10
350	25	368 x 458 x 7/10
350	40	368 x 475 x 7/10
400	6	420 x 473 x 7/10
400	10	420 x 490 x 7/10
400	16	420 x 497 x 7/10
400	25	420 x 515 x 7/10
400	40	420 x 547 x 7/10
450	6	470 x 528 x 7/10
450	10	470 x 540 x 7/10
450	16	470 x 557 x 7/10
450	25	470 x 565 x 7/10
450	40	470 x 572 x 7/10
500	6	520 x 578 x 7/10
500	10	520 x 595 x 7/10
500	16	520 x 618 x 7/10
500	25	250 x 625 x 7/10
500	40	520 x 628 x 7/10
600	6	620 x 680 x 7/10
600	10	620 x 695 x 7/10
600	16	620 x 735 x 7/10
600	25	620 x 730 x 7/10
600	40	620 x 745 x 7/10
700	6	720 x 785 x 8/11
700	10	720 x 810 x 8/11
700	16	720 x 805 x 8/11
700	25	720 x 830 x 8/11
700	40	720 x 850 x 8/11
800	6	820 x 890 x 8/11
800	10	820 x 915 x 8/11
800	16	820 x 910 x 8/11
800	25	820 x 940 x 8/11
800	40	820 x 970 x 8/11
900	6	920 x 990 x 8/11
900	10	920 x 1015 x 8/11
900	16	920 x 1010 x 8/11
900	25	920 x 1040 x 8/11
900	40	920 x 1080 x 8/11
1000	6	1020 x 1090 x 8/11
1000	10	1020 x 1120 x 8/11
1000	16	1020 x 1125 x 8/11
1000	40	1020 x 1190 x 8/11
1100		1120 x 1215 x 8/11
1200		1215 x 1285 x 5.5/7
1200	40	1220 x 1395 x 8/11
1200		1280 x 1380 x 8/11
1400		1454 x 1540 x 8/11

# G-ST-P/S Gasket special dimension to EN 1514-1

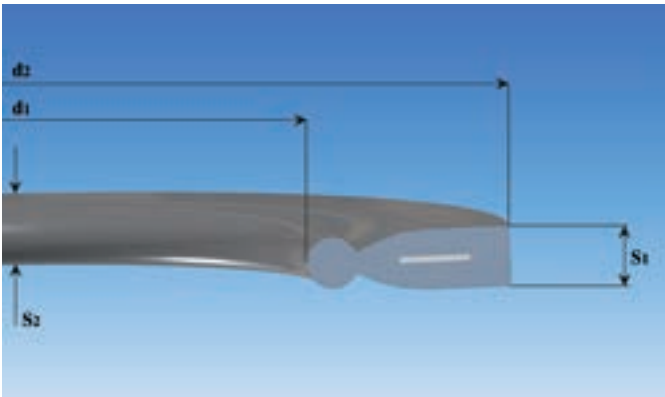
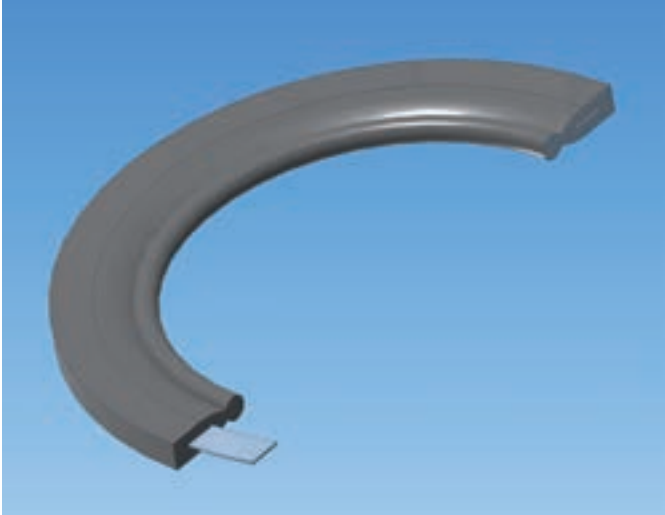
(used with EN 1092 flanges)

DN (mm)	PN (bar)	Dimensions [mm] $d_1 \times d_2 \times s_1/s_2$
15	10 - 40	22 x 51 x 3/4
20	6	27 x 54 x 3/4
20	10 - 40	27 x 61 x 3/4
25	10 - 40	34 x 71 x 3/4
32	6	43 x 76 x 3/4
32	10 - 40	43 x 82 x 3/4
40	10 - 40	49 x 92 x 3/4
50	6	61 x 95 x 4/5
50	10 - 40	61 x 107 x 4/5
65	6	77 x 116 x 4/5
65	10 - 40	77 x 127 x 4/5
80	10 - 40	89 x 142 x 4/5
100	6	115 x 152 x 5/6
100	10 - 16	115 x 162 x 5/6
100	25 - 40	115 x 168 x 5/6
125	6	141 x 182 x 5/6
125	10 - 16	141 x 192 x 5/6
125	25 - 40	141 x 194 x 5/6
150	6	169 x 207 x 6/8
150	10 - 16	169 x 218 x 6/8
150	25 - 40	169 x 224 x 6/8
200	6	220 x 262 x 6/8
200	10 - 16	220 x 273 x 6/8
200	25	220 x 284 x 6/8
200	40	220 x 290 x 6/8
250	6	273 x 317 x 6/8
250	10	273 x 328 x 6/8
250	16	273 x 329 x 6/8
250	25	273 x 340 x 6/8
250	40	273 x 352 x 6/8
300	6	324 x 373 x 6/8
300	10	324 x 378 x 6/8
300	16	324 x 384 x 6/8
300	25	324 x 400 x 6/8
300	40	324 x 417 x 6/8
350	10	356 x 438 x 7/10
350	16	356 x 444 x 7/10
400	10	407 x 489 x 7/10
400	16	407 x 495 x 7/10
450	10	458 x 539 x 7/10
450	16	458 x 555 x 7/10
500	10	508 x 594 x 7/10
500	16	508 x 617 x 7/10
600	10	610 x 695 x 7/10
600	16	610 x 734 x 7/10
700	10	712 x 810 x 8/11
700	16	712 x 804 x 8/11
800	10	813 x 917 x 8/11

DN (mm)	PN (bar)	Dimensions [mm] $d_1 \times d_2 \times s_1/s_2$
800	16	813 x 911 x 8/11
900	10	915 x 1017 x 8/11
900	16	915 x 1011 x 8/11
1000	10	1016 x 1124 x 8/11
1000	16	1016 x 1128 x 8/11
1200	2.5	1220 x 1290 x 8/11
1200	6	1220 x 1307 x 8/11
1200	10	1220 x 1341 x 8/11
1200	16	1220 x 1342 x 8/11
1400	2.5	1420 x 1490 x 8/11



# G-ST-P/K Gasket special dimension to DIN ISO 2501 PN 10



DN (mm)	Outer Ø of pipe (mm)	Dimensions [mm] $d_1 \times d_2 \times s_1/s_2$
10	16	16 x 46 x 3/4
15	20	20 x 51 x 3/4
20	25	25 x 61 x 3/4
25	32	32 x 71 x 3/4
32	40	40 x 82 x 3/4
40	50	50 x 92 x 3/4
50	63	63 x 107 x 4/5
65	75	75 x 127 x 4/5
80	90	90 x 142 x 4/5
100	110	110 x 162 x 5/6
125	125	125 x 192 x 5/6
125	140	140 x 192 x 5/6
150	160	160 x 218 x 6/8
200	200	200 x 273 x 6/8
200	225	225 x 273 x 6/8
250	250	250 x 303 x 6/8
250	250	250 x 328 x 6/8
250	280	280 x 328 x 6/8
300	315	315 x 378 x 6/8
350	355	355 x 438 x 7/10
400	400	400 x 489 x 7/10

Are feasible for suit thermoplastics flanges (PVC, PP, PE, PVDF).

For pressure pipelines made of PVC with solvent cemented flange adaptors and backing flanges, manufactured in accordance with DIN 8063 part 4, and also for pressure pipelines made of PE, PP and PVDF with electrofused flange adaptors and backing flanges manufactured in accordance with DIN 16962 part 2(OO) and DIN 16963 part 11 (PE), also usable for fixed flanges made of PVC, PP and PVDF. Can also be used for intermediate flange - valves.

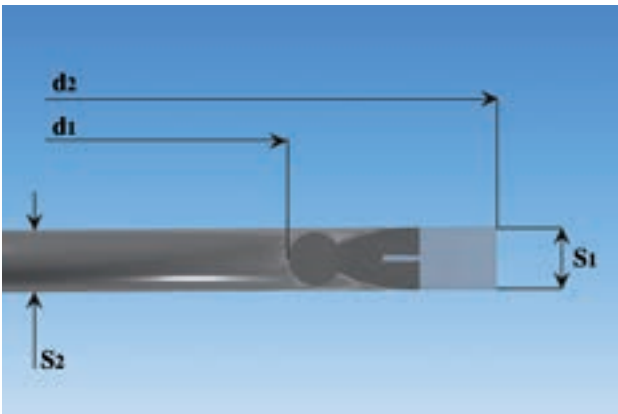
There are also models available for:

- Pipelines made of PVDF with butt-fused adaptors and backing flanges.
- For pressure pipelines made of PE and PP with butt-fused flange adaptors and backing flanges to suit DIN 16962 part 4 (PP) and DIN 16963 part 4 (PE).



# G-ST-P/KN Gasket special dimension to DIN 2690

(used with EN 1092 flanges)



DN (mm)	PN	10	16	25	40	64	100	s <sub>1</sub> /s <sub>2</sub>
	d <sub>1</sub>	d <sub>2</sub>						
10	18	45	45	45	45	56	56	5/3
15	22	50	50	50	50	61	61	5/3
20	28	60	60	60	60			5/3
25	35	70	70	70	70	82	82	5.5 / 3.5
32	43	82	82	82	82			5.5 / 3.5
40	49	92	92	92	92	103	103	5.5 / 3.5
50	61	107	107	107	107	113	119	5.5 / 3.5
65	77	127	127	127	127	137	143	5.5 / 3.5
80	90	142	142	142	142	148	154	5.5 / 3.5
100	115	162	162	168	168	174	180	8/5
125	141	192	192	195	195	210	217	8/5
150	169	218	218	225	225	247	257	8/5
175	195	248	248	225	267	277	287	8/5
200	220	273	273	285	292	309	323	8/5
250	274	328	330	342	353	364	391	8/5
300	325	378	385	402	418	424	458	8/5
350	368	438	445	458	475	486	512	8/5
400	420	490	497	515	547	543	572	8/5
450	470	540	557	565	572			10 / 6.5
500	520	595	618	625	628	657	704	10 / 6.5
600	620	695	735	730	745	764	813	10 / 6.5
700	720	810	805	830	850	879	950	10 / 6.5
800	820	915	910	940	970	988	-	10 / 6.5
900	920	1015	1010	1040	1080	1108	-	10 / 6.5
1000	1020	1120	1125	1150	1190	1220	-	10 / 6.5
1200	1220	1340	1340	1360	1395	1452	-	10 / 6.5
1400	1420	1545	1540	1575	1615	-	-	12/8
1600	1620	1770	1760	1795	1830	-	-	12/8
1800	1820	1970	1960	2000	-	-	-	12/8
2000	2020	2180	2165	2230	-	-	-	12/8
2200	2220	2380	2375	-	-	-	-	12/8
2400	2420	2590	2585	-	-	-	-	12/8
2600	2620	2790	2785	-	-	-	-	12/8
2800	2820	3010	-	-	-	-	-	12/8
3000	3020	3225	-	-	-	-	-	12/8

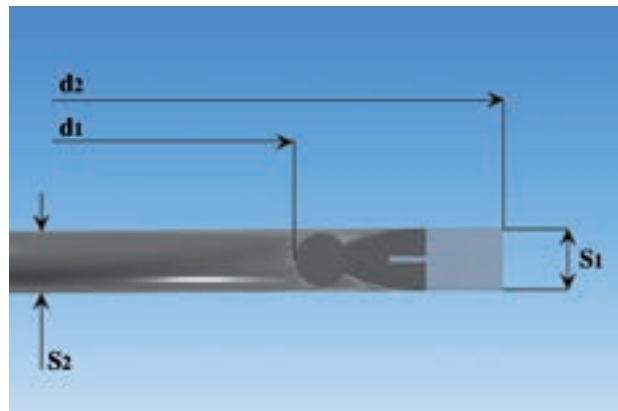
Dimensions in mm

The G-ST profile gasket exhibits deforming and molding characteristics with minimum surface pressure. When extreme stresses occur during installation, the G-ST-P/KN offers the best solution. The outer steel ring on the outside boxes in the surface lip and protects it fully. High surface pressures on the rubber lip or blow-outs under high operating pressure are not possible. In the case of partcoated flanges the sensitive faces are protected.

## APPLICATIONS

Systems operating at high pressure or rubber-coated sub-assemblies in chemical works and power stations.

# G-ST-P/HTB GASKET SPECIAL DIMENSION TO DIN EN 682 / VP 401



Diseñado para juntas de bridas de acero para sistemas contra incendios.

DN (mm)	PN (bar)	Dimensions (mm) $d_1 \times d_2 \times s_1/s_2$
25	10 - 40	34 x 71 x 5.5/4.5
32	10 - 40	43 x 82 x 5.5/4.5
40	10 - 40	49 x 92 x 5.5/4.5
50	10 - 40	61 x 107 x 5.5/4.5
65	10 - 40	77 x 127 x 5.5/4.5
80	10 - 40	89 x 142 x 5.5/4.5
100	10 - 16	115 x 162 x 8/6
125	10 - 16	141 x 192 x 8/6
150	10 - 16	169 x 218 x 8/6
200	10 - 16	220 x 273 x 8/6
200	25	220 x 284 x 8/6
200	16	273 x 329 x 8/6

## \* G-ST-P/OE Flange Gasket

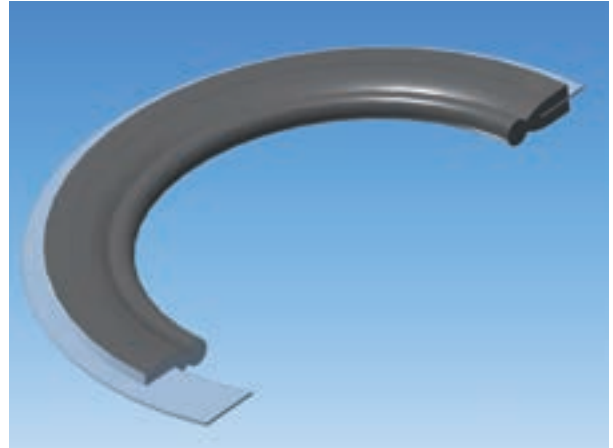
Due to their innovative design, profile gaskets are the first choice to provide reliable sealing for flange joints with low static capacity.

### AVAILABLE MATERIALS

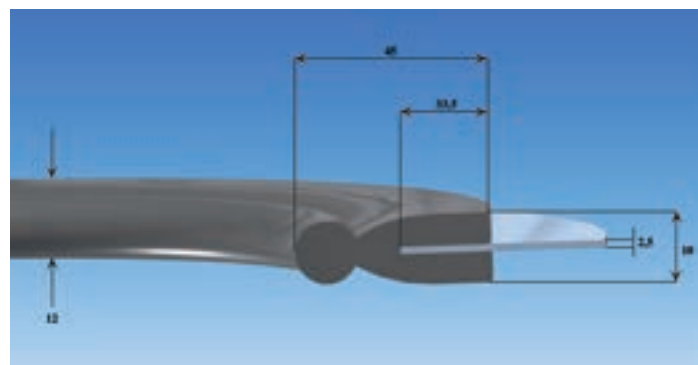
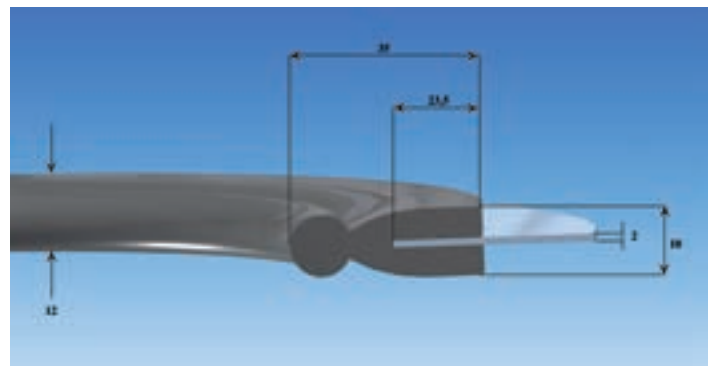
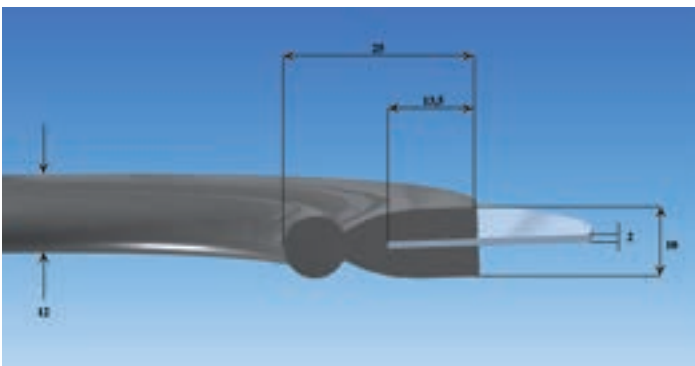
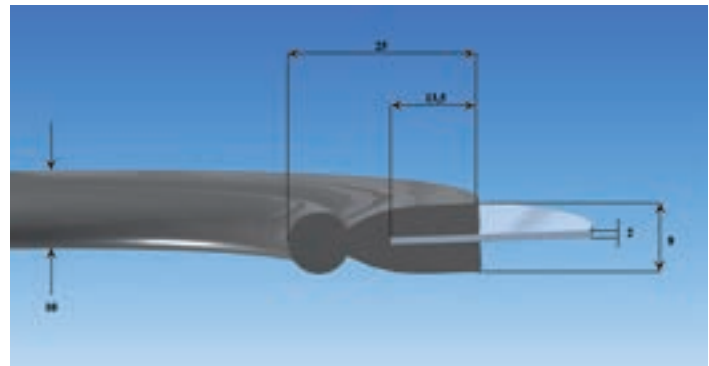
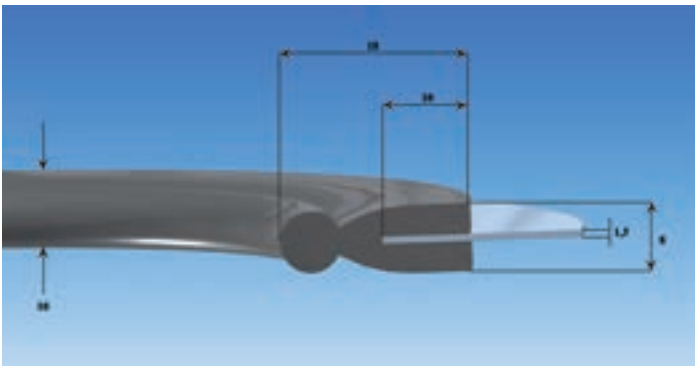
EPDM  
NBR-DUO  
FPM-S

METALLIC INSERTION: 1.4301/AISI 304

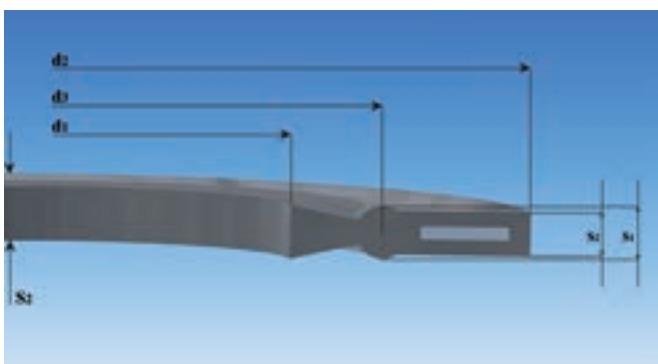
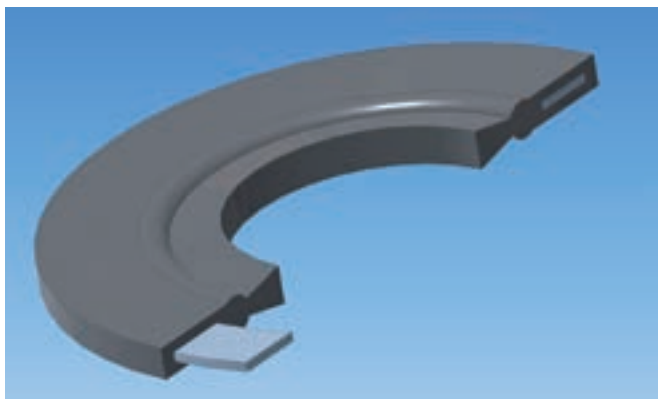
*Other materials under request*



### PROFILES

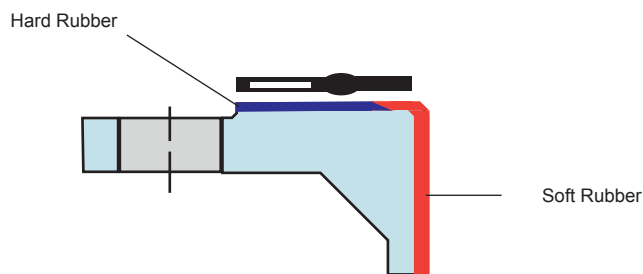


# Dimensiones especiales de Juntas G-ST-P/GR para FDG-0389



DN (mm)	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	s <sub>1</sub> / s <sub>2</sub>
25	28	74	54	3.5 / 3
32	37	85	64	3.5 / 3
40	43	95	70	3.5 / 3
50	54	110	82	4.5 / 4
65	70	130	102	4.5 / 4
80	82	145	114	4.5/4
100	107	165	140	4.5 / 4
125	132	195	163	5.5 / 5
150	159	221	192	5.5 / 5
200	207	276	240	5.5 / 5
250	260	330	293	5.5 / 5
300	310	380	342	5.5 / 5
350	341	440	373	8/7
400	392	491	430	8/7
500	494	596	532	8/7
600	595	698	635	8/7
700	695	813	735	9/8
800	800	920	840	9/8
900	895	1020	940	9/8
1000	1000	1127	1040	9/8
1200	1200	1344	1245	9/8

Dimensions in mm



# Ring Type Joint dimension to ASME B16.20 & API Std 6 A (ICP SM71/SM72)

(used with ASME B16.5 Y ASME B16.47 A flanges)



NOMINAL DIAMETER (inch) / NOMINAL PRESSURE (Lb)										TOLERANCES	± 0.38	± 0.38	± 0.17	± 0.39	± 0.39	± 0.20	± 0.20	WEIGHT (Kg)	
Class 150	Class 300 600	Class 900	Class 1500	Class 2500	Class 300-600	Class 900	Class 2000	Class 3000	Class 5000	ICP SM71 SM72	OD (mm)	ID (mm)	P (mm)	B (mm)	H (mm)	A (mm)	C (mm)	OVAL	OCTOGONAL
	½									R11	40.49	27.79	34.14	11.18	9.65	6.35	4.32	0.05	0.05
		½	½							R12	47.65	31.75	39.70	14.22	12.70	7.95	5.23	0.10	0.10
	¾			½						R13	50.83	34.93	42.88	14.22	12.70	7.95	5.23	0.10	0.10
		¾	¾							R14	52.40	36.50	44.45	14.22	12.70	7.95	5.23	0.11	0.11
1									1	R15	55.58	39.68	47.63	14.22	12.70	7.95	5.23	0.12	0.11
	1	1	1	¾			1	1		R16	58.75	42.85	50.80	14.22	12.70	7.95	5.23	0.12	0.11
1 ¼									1 ¼	R17	65.10	49.20	57.15	14.22	12.70	7.95	5.23	0.14	0.13
	1 ¼	1 ¼	1 ¼	1			1 ¼	1 ¼		R18	62.28	52.38	60.33	14.82	12.70	7.95	5.23	0.15	0.14
1 ½									1 ½	R19	73.05	57.15	65.10	14.82	12.70	7.95	5.23	0.16	0.15
	1 ½	1 ½	1 ½				1 ½	1 ½		R20	76.23	60.33	68.28	14.82	12.70	7.95	5.23	0.17	0.15
				1 ¼						R21	83.37	61.11	72.24	17.53	16.00	11.13	7.75	0.30	0.29
2										R22	90.50	74.60	82.55	14.82	12.70	7.95	5.23	0.20	0.19
	2			1 ½			2		2	R23	93.68	71.42	82.55	17.53	16.00	11.13	7.75	0.34	0.33
		2	2					2		R24	106.38	84.12	95.25	17.53	16.00	11.13	7.75	0.39	0.38
2 ½										R25	109.55	93.65	101.60	14.22	12.70	7.95	5.23	0.25	0.23
	2 ½			2			2 ½		2 ½	R26	112.73	90.47	101.60	17.53	16.00	11.13	7.75	0.42	0.41
		2 ½	2 ½					2 ½		R27	119.08	96.82	107.95	19.05	16.00	11.13	7.75	0.45	0.43
				2 ½						R28	123.87	98.43	111.13	14.22	17.53	12.70	8.66	0.57	0.55
3										R29	122.25	107.95	114.30	17.53	12.70	7.95	5.23	0.28	0.26
	3									R30	128.61	106.35	117.48	17.53	16.00	11.13	7.75	0.48	0.47
	3	3					3	3		R31	134.96	112.70	123.85	17.53	16.00	11.13	7.75	0.51	0.50
				3						R32	139.70	114.30	127.00	19.05	17.53	12.70	8.66	0.65	0.63
3 ½										R33	139.73	123.83	131.78	14.22	12.70	7.95	5.23	0.32	0.30
	3 ½								3	R34	142.91	120.65	131.78	17.53	16.00	11.13	7.75	0.54	0.52
										R35	147.66	125.40	136.53	17.53	16.00	11.13	7.75	0.56	0.55
4									3 ½	R36	157.18	141.28	149.23	14.22	12.70	7.95	5.23	0.37	0.34
	4	4					4	4		R37	160.36	138.10	149.23	17.53	16.00	11.13	7.75	0.62	0.60
				4					4	R38	173.06	141.30	157.18	22.35	20.57	15.88	10.49	1.16	1.14
				4						R39	173.06	150.80	161.93	17.53	16.00	11.13	7.75	0.67	0.65
5										R40	179.40	163.50	171.45	14.22	12.70	7.95	5.23	0.42	0.39
	5	5					5	5		R41	192.11	169.85	180.98	17.53	16.00	11.13	7.75	0.75	0.73
				5						R42	209.55	171.45	190.50	24.40	23.88	19.05	12.32	1.91	1.88
6									5	R43	201.63	185.73	193.68	14.22	12.70	7.95	5.23	0.48	0.44
				5						R44	204.81	182.55	193.68	17.53	16.00	11.13	7.75	0.80	0.78
	6	6					6	6	6	R45	222.28	200.02	211.15	17.53	16.00	11.13	7.75	0.87	0.85
				6						R46	223.85	198.45	211.15	19.05	17.53	12.70	8.66	1.08	1.05
				6						R47	247.65	209.55	228.60	25.40	23.88	19.05	12.32	2.29	2.26
8										R48	255.60	239.70	247.65	14.22	12.70	7.95	5.23	0.61	0.56
	8	8					8	8	8	R49	281.01	258.75	269.88	17.53	16.00	11.13	7.75	1.11	1.09
				8						R50	285.76	254.00	269.88	22.35	20.57	15.88	10.49	1.99	1.95
				8						R51	301.63	257.17	279.40	28.70	26.92	22.23	14.81	3.65	3.69
10										R52	312.75	296.85	304.80	14.22	12.70	7.95	5.23	0.75	0.69
	10	10					10	10	10	R53	334.98	312.72	323.85	17.53	16.00	11.13	7.75	1.34	1.30
				10						R54	339.73	307.97	323.85	22.35	20.57	15.88	10.49	2.39	2.35
				10						R55	371.48	314.32	342.90	36.58	35.05	28.58	19.81	7.35	7.68
12										R56	388.95	373.05	381.00	14.22	12.70	7.95	5.23	0.93	0.87
	12	12			12	12	12	12		R57	392.13	369.87	381.00	17.53	16.00	11.13	7.75	1.57	1.53
				12						R58	403.23	358.77	381.00	28.70	26.92	22.23	14.81	4.98	5.03
14										R59	404.83	388.93	396.88	14.22	12.70	7.95	5.23	0.98	0.90
				12						R60	438.15	374.65	406.40	39.62	38.10	31.75	22.33	10.47	11.09
	14				14		14	14		R61	430.23	407.97	419.10	17.53	16.00	11.13	7.75	1.73	1.69
		14				14				R62	434.98	403.22	419.10	22.35	20.57	15.88	10.49	3.09	3.04



NOMINAL DIAMETER (inch) / NOMINAL PRESSURE (Lb)										TOLERANCES		± 0.38	± 0.38	± 0.17	± 0.39	± 0.39	± 0.20	± 0.20	WEIGHT (Kg)	
Class 150	Class 300-600	Class 900	Class 1500	Class 2500	Class 300-600	Class 900	Class 2000	Class 3000	Class 5000	ICP SM71 ICP SM72	OD (mm)	ID (mm)	P (mm)	B (mm)	H (mm)	A (mm)	C (mm)	OVAL	OCTOGONAL	
			14							R63	444.50	393.70	419.10	33.27	31.75	25.40	17.30	7.33	7.54	
16										R64	461.98	446.08	454.03	14.22	12.70	7.95	5.21	1.12	1.03	
	16				16		16			R65	481.03	458.77	469.90	17.53	16.00	11.13	7.75	1.94	1.89	
		16				16		16		R66	485.78	454.02	469.90	22.35	20.57	15.88	10.49	3.47	3.40	
			16							R67	498.46	441.32	469.90	36.58	35.05	28.58	19.81	10.07	10.53	
18										R68	525.48	509.58	517.53	14.22	12.70	7.95	5.23	1.28	1.18	
	18					18				R69	544.53	522.27	533.40	17.53	16.00	11.13	7.75	2.20	2.15	
		18					18			R70	552.45	514.35	533.40	25.40	23.88	19.05	12.32	5.35	5.27	
			18							R71	561.98	504.82	533.40	36.58	35.05	28.58	19.81	11.43	11.95	
20										R72	566.75	550.85	558.80	14.22	12.70	7.95	5.23	1.38	1.27	
	20					20				R73	596.90	571.50	584.20	19.05	17.53	12.70	8.66	2.99	2.92	
		20					20			R74	603.25	565.15	584.20	25.40	23.88	19.05	12.32	5.85	5.77	
			20							R75	615.95	552.45	584.20	39.62	38.10	31.75	22.33	15.05	15.94	
24										R76	681.05	665.15	673.10	14.22	12.70	7.95	5.23	1.66	1.53	
	24					24				R77	708.03	676.27	692.15	22.35	20.57	15.88	10.49	5.11	5.01	
		24					24			R78	717.55	666.75	692.15	33.37	31.75	25.40	17.30	12.10	12.46	
			24							R79	727.08	657.22	692.15	44.45	41.40	34.93	24.82	22.58	22.06	
				22						R80	623.90	608.00	615.95	-	12.70	7.95	5.23	-	1.40	
					22					R81	649.30	620.70	635.00	-	19.05	14.30	9.58	-	3.86	
								1		R82	68.28	46.02	57.15	-	16.00	11.13	7.75	-	0.23	
								1 1/2		R84	74.63	52.37	63.50	-	16.00	11.13	7.75	-	0.25	
								2		R85	92.08	66.68	79.38	-	17.53	12.70	8.66	-	0.40	
								2 1/2		R86	106.38	74.62	90.50	-	20.57	15.88	10.49	-	0.65	
								3		R87	115.91	84.15	100.03	-	20.57	15.88	10.49	-	0.72	
								4		R88	142.88	104.78	123.83	-	23.88	19.05	12.32	-	1.22	
								3 1/2		R89	133.35	95.25	114.30	-	23.88	19.05	12.32	-	1.13	
								5		R90	177.81	133.35	155.58	-	26.92	22.23	14.81	-	2.05	
								10		R91	292.10	228.60	260.35	-	38.10	31.75	22.33	-	7.10	
										R92	239.73	217.47	228.60	17.53	16.00	11.13	7.75	0.94	0.92	
						26				R93	768.35	730.25	749.30	-	23.88	19.05	12.32	-	7.40	
						28				R94	819.15	781.05	800.10	-	23.88	19.05	12.32	-	7.90	
						30				R95	876.30	838.20	857.25	-	23.88	19.05	12.32	-	8.47	
						32				R96	936.63	892.17	914.40	-	26.92	22.23	14.81	-	12.08	
						34				R97	987.43	942.97	965.20	-	26.92	22.23	14.81	-	12.75	
						36				R98	1044.58	1000.12	1022.35	-	26.92	22.23	14.81	-	13.51	
							8	8		R99	246.08	223.82	234.95	-	16.00	11.13	7.75	-	0.95	
						26				R100	777.88	720.72	749.30	-	35.05	28.58	19.81	-	16.79	
						28				R101	831.85	768.35	800.10	-	38.10	31.75	22.33	-	21.83	
						30				R102	889.00	825.50	857.25	-	38.10	31.75	22.33	-	23.39	
						32				R103	946.15	882.65	914.40	-	38.10	31.75	22.33	-	24.95	
						34				R104	1000.13	930.27	966.20	-	41.40	36.93	24.82	-	31.49	

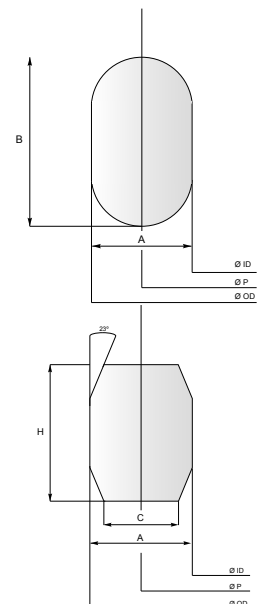
**NOTES**

- Class 10,000 flanges to API 6B are obsolete.
- R30 is suitable for lapped flanges only.
- The 23° surface on both grooves and octagonal ring shall have a surface finish not rougher than 63 RMS.

**MATERIALS**

- Gasket material should be selected to suit the service conditions, it is recommended that the gasket is softer than the flanges.
- RTJ are made in soft iron and low carbon steel and can be zinc plated 0.005 to 0.0127 mm thickness.

TOLERANCES	
A (Width)	± 0.20
B, H (Height)	± 0.51
P (Average pitch diameter)	± 0.18
23° (Angle)	± 1/2°



# Ring Type Joint dimension to ASME B16.20 & API Std 6 A (ICP SM73)

(used with ASME B16.5 Y ASME B16.47 A flanges)

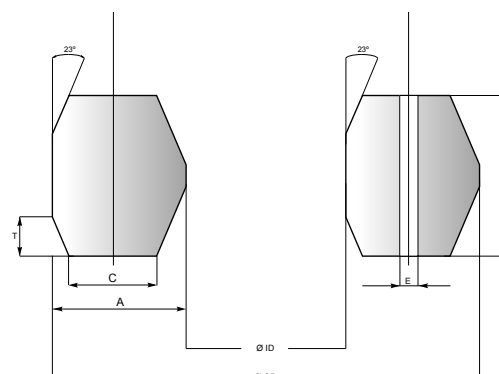


NOMINAL DIAMETER (inch) / NOMINAL PRESSURE (Lb)					TOLERANCES	± 0.50	± 0.50	± 0.20	± 0.20	± 0.15	± 0.79	± 0.39	WEIGHT (Kg)
Class 2000	Class 3000	Class 5000	Class (°)2900	Class 5000	ICP SM73	OD (mm)	ID (mm)	H (mm)	A (mm)	C (mm)	D (mm)	R1 (mm)	
1 1/2	1 1/2	1 1/2		2 2/4	Rx20	76.20	58.72	19.05	8.74	4.62	3.17	1.52	0.24
2					Rx23	93.27	69.45	25.40	11.91	6.45	4.24	1.59	0.52
	2	2			Rx24	105.97	82.15	25.40	11.91	6.45	4.24	1.59	0.60
		3 1/2		3 1/2	Rx25	109.55	92.07	19.05	8.74	4.62	3.17	1.59	0.50
2 1/2	2 1/2	2 1/2			Rx26	111.91	88.09	25.40	11.91	6.45	4.24	1.59	0.64
3	3				Rx27	118.28	94.44	25.40	11.91	6.45	4.24	1.59	0.68
		3			Rx31	134.54	110.72	25.40	11.91	6.45	4.24	1.59	0.78
4	4				Rx35	147.24	123.42	25.40	11.91	6.45	4.24	1.59	0.86
		4			Rx37	159.94	136.12	25.40	11.91	6.45	4.24	1.59	0.95
5	5				Rx39	172.64	148.82	25.40	11.91	6.45	4.24	1.59	1.03
		5			Rx41	191.69	167.87	25.40	11.91	6.45	4.24	1.59	1.15
6	6				Rx44	204.39	180.57	25.40	11.91	6.45	4.24	1.59	1.23
		6			Rx45	221.84	198.02	25.40	11.91	6.45	4.24	1.59	1.34
		8*			Rx46	222.25	195.27	28.58	13.49	6.68	4.77	1.59	1.66
8	8				Rx47	245.26	205.58	41.28	19.84	10.34	6.88	2.29	3.88
		8			Rx49	280.59	256.77	25.40	11.91	6.45	4.24	1.52	1.72
10	10				Rx50	283.36	250.04	31.75	16.66	8.51	5.28	1.59	2.43
		10			Rx53	334.57	310.75	25.40	11.91	6.45	4.24	1.59	2.06
12	12				Rx54	337.34	304.02	31.75	16.66	8.51	5.28	1.59	2.92
		14			Rx57	391.72	367.90	25.40	11.91	6.45	4.24	1.59	2.42
					Rx63	441.73	387.73	50.80	27.00	14.78	8.45	2.29	11.96
16	16				Rx65	480.62	456.80	25.40	11.91	6.45	4.24	1.52	3.00
					Rx66	457.99	424.67	31.75	16.66	8.51	5.28	1.59	4.25
18	18				Rx69	544.12	520.30	25.40	11.91	6.45	4.24	1.59	3.41
					Rx70	550.06	510.38	41.28	19.84	10.34	6.88	2.29	9.12
20	20				Rx73	596.11	569.13	31.75	13.49	6.68	5.28	1.52	5.27
					Rx74	600.86	561.18	41.28	19.84	10.34	6.88	2.29	10.01
			1		Rx82	67.87	44.05	25.40	11.91	6.45	4.24	1.52	0.36
			1 1/2		Rx84	74.22	50.40	25.40	11.91	6.45	4.24	1.59	0.40
			2		Rx85	90.09	63.11	25.40	13.49	6.68	4.24	1.59	0.40
			2 1/2		Rx86	103.58	73.40	28.58	15.09	8.51	4.77	1.59	0.81
			3		Rx87	113.11	82.93	28.58	15.09	8.51	4.77	1.59	0.90
			4		Rx88	139.29	104.33	31.75	17.48	10.34	5.28	1.59	1.46
			3 1/2		Rx89	129.77	93.25	31.75	18.26	10.34	5.28	1.59	3.09
			5		Rx90	174.63	134.95	44.45	19.84	12.17	7.41	2.29	7.75
			10		Rx91	286.94	226.58	45.24	30.18	19.81	7.54	2.29	1.50
8*	8*				Rx99	245.67	221.85	25.40	11.91	6.45	4.24	1.52	2.20
		1 1/4		1 1/4A	Rx201	51.46	39.98	11.30	5.74	3.20	1.44	0.51	0.10
		1 11/16		1 9/16A	Rx205	62.31	51.19	11.10	5.56	3.05	1.82	0.51	0.13
		2 9/16		2 9/16A	Rx210	97.64	78.58	19.05	9.53	5.41	3.17	0.76	0.35
		4 1/16		4 1/16A	Rx215	140.89	117.07	25.40	11.91	5.33	4.24	1.52	0.80

## NOTES

- All 23° surfaces shall have a surface finish not rougher than 32 RMS.
- (\*) Available for cross flanges connection.
- (°) Class 2,900 flanges to API 6B are obsolete.

TOLERANCES	
A (Width)	± 0.20
H (Height)	± 0.20
OD (Outer Diameter)	± 0.5
23° (Angle)	±1/2°



# Ring Type Joint dimension to ASME B16.20 & API Std 6 A (ICP SM74)

(used with ASME B16.5 Y ASME B16.47 A flanges)

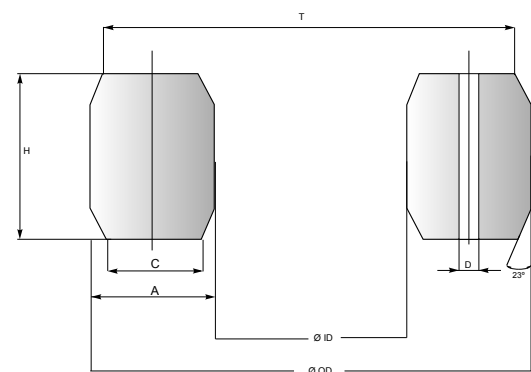


NOMINAL DIAMETER (inch) / NOMINAL PRESSURE (Lb)						TOLERANCES	± 0.50	± 0.50	± 0.20	± 0.20	± 0.15	± 0.79	± 0.39	WEIGHT (Kg)
Class 2000	Class 3000	Class 5000	Class 10000	Class 15000	Class 20000	ICP SM74	OD (mm)	ID (mm)	H (mm)	A (mm)	C (mm)	T (mm)	D (mm)	
			1 11/16	1 11/16		150	72.19	53.59	9.30	9.30	7.98	70.87	1.52	0.13
			1 13/16	1 13/16	1 13/16	151	76.40	57.14	9.63	9.63	8.26	75.03	1.52	0.15
			2 1/16	2 1/16	2 1/16	152	84.68	64.20	10.24	10.24	8.79	83.24	1.52	0.19
			2 9/16	2 9/16	2 9/16	153	100.94	78.18	11.38	11.38	9.78	99.31	1.52	0.29
			3 1/16	3 1/16	3 1/16	154	116.84	92.04	12.40	12.40	10.64	115.09	1.52	0.40
			4 1/16	4 1/16	4 1/16	155	147.96	119.52	14.22	14.22	12.22	145.95	1.52	0.55
			7 1/16	7 1/16	7 1/16	156	237.92	200.68	18.62	18.62	15.98	235.28	1.52	1.87
			9	9	9	157	294.46	252.50	20.98	20.98	18.01	291.49	3.05	2.97
			11	11	11	158	352.04	305.76	23.14	23.14	19.86	348.77	3.05	4.35
			13 5/8	13 5/8	13 5/8	159	426.72	375.32	25.70	25.70	22.07	423.09	3.05	6.53
		13 5/8				160	402.59	375.11	23.83	13.74	10.36	399.21	3.05	3.06
		16 3/4				161	491.41	458.99	28.07	16.21	12.24	487.45	3.05	5.35
		16 3/4	16 3/4	16 3/4		162	475.49	447.05	14.22	14.22	12.22	473.48	1.52	1.94
		18 3/4				163	556.16	521.42	30.10	17.37	13.11	551.89	3.05	6.90
			18 3/4	18 3/4		164	570.56	521.38	30.10	24.59	20.32	566.29	3.05	5.86
		21 1/4				165	624.71	587.73	32.03	18.49	13.97	620.19	3.05	8.76
			21 1/4			166	640.03	587.75	32.03	26.14	21.62	635.51	3.05	12.82
26 3/4						167	759.36	733.14	35.86	13.11	8.03	754.28	1.52	8.53
	26 3/4					168	765.25	733.15	35.86	16.05	10.97	760.17	1.52	10.54
			5 1/8			169	173.51	147.65	15.85	12.93	10.69	171.27	1.52	0.73
			6 5/8	6 5/8		170	218.03	189.59	14.22	14.22	12.22	216.03	1.52	1.03
			8 9/16	8 9/16		171	267.44	239.00	14.22	14.22	12.22	265.43	1.52	1.24
			11 5/32	11 5/32		172	333.07	304.63	14.22	14.22	12.22	331.06	1.52	1.56
						303	852.75	818.80	37.94	-	-	-	-	13.18

## NOTES

- All 23° surfaces shall have a surfaces not rougher than 32 RMS max.
- El radio "R" shall be 8 to 12 % of the gaskets height "H".
- "R" hole shall be in the middle of dimension "C".

TOLERANCES	
A (Width)	+ 0.2
H (Height)	± 0.51
OD (Outer Diameter)	± 0.2
23° (Angle)	±1/4°



# CONVERSION FACTOR

	A	B	To convert A for B, multiply A for	To convert B for A, multiply B for
<b>LENGTH</b>				
	mm	inch	0.0394	25.40
	m	inch	39.37	0.0254
	m	ft	3.28	0.3048
	inch	mile	1000	0.001
<b>FORCE</b>				
	N	lb <sub>f</sub>	0.2248	4.448
	N	Kg <sub>f</sub>	0.102	9.807
<b>WEIGHT</b>				
	Kg	lb	2.2046	0.4536
	g	oz	0.0352	28.349
<b>PRESSURE or STRESS</b>				
	MPa	psi (lb <sub>f</sub> in <sup>-2</sup> )	145.034	0.006895
	MPa	kPa	1000	0.001
	N/mm <sup>2</sup>	MPa	1	1
	bar	psi	14.504	0.06895
	bar	MPa	0.1	10
	inch mercurio	psi	0.4912	2.035
<b>BOLT TORQUE</b>				
	g.cm	lb <sub>f</sub> .in	1,150	0.00069
	N.m	Kg <sub>f</sub> .m	0.102	9.81
	N.m	lb <sub>f</sub> . ft	0.738	1.36
	N.m	lb <sub>f</sub> . in	8.85	0.113
	Kg <sub>f</sub> .m	lb <sub>f</sub> . ft	0.138	7.23
	Kg <sub>f</sub> .m	lb <sub>f</sub> . in	0.0115	86.8
<b>DENSITY</b>				
	g/cm <sup>3</sup>	lb/ft <sup>3</sup>	62.4278	0.016
<b>VOLUME / FLOW</b>				
	l	cm <sup>3</sup>	1,000	0.001
	ml	cm <sup>3</sup>	1	1
	ppm	mg/Kg	1	1
<b>TEMPERATURE</b>				
	°C	°F	(1.8 x °C) + 32	(°F - 32) / 1.8



## CalvoSealing and the differential factor.

For CalvoSealing is not enough to manufacture quality products, also these should respond to the demands and needs of the moment.

We place high priority to research in manufacturing procedures, the materials used and the functionality of each product that we manufactured. Only in this way can be at the level of the most demanding challenges of our clients.







**CALVOSEALING**

✦ Global Business Group

The fluid sealing **specialist**

**Main office:**

C/ Galileo 8 - P.I. Can Estella

08635 St. Esteve Sesrovires

Barcelona, Spain

Tel. +34 937 715 910 - Fax +34 937 715 319

info@calvosealing.com

www.calvosealing.com