

INSULATION KITS



flange protection





Carrara S.p.a. truly believes in the modern meaning of SUPPLIER, taking active part in the creation of real value, coming from skills and flexibility, innovation and vertical relationships with its Clients.

Carrara's product range now includes GUARDIAN, the new line of Insulation Kits dedicated to the protection of industrial flanges, guaranteeing the same high quality standards as those of its other products.

The product range is made up of:

- Guardian Performer
- Guardian Performer Fire
- Guardian Premium
- Guardian Basic

Table of contents

0.0	Company	Global Sealing Solutions	page 4
1.0	Guardian Performer	Style ICP Fire	page 7
		Style ICA	page 8
		Style ICB	page 9
2.0	Guardian Premium	Style IS	page 11
		Style IPT	page 12
3.0	Guardian Basic	Style ICSF	page 13
		Style IE	page 13
4.0	Technical specifications	Technical references regarding Insulation Kits	page 14
5.0	Tables	Summary tables and other uses	page 18

The data shown in the technical data sheets have been obtained from tests carried out at Carrara S.p.a laboratories, from tests performed at third-party laboratories and from the experience of using the products in industrial applications. Correct product selection and installation are determining factors for product functionality. Carrara S.p.a. assumes no responsibility for damage to property and persons caused by improper use, incorrect use or non-optimal use of its products. Carrara S.p.a. reserves the right to change the technical data shown in this catalogue without having to communicate any changes to third parties.

Carrara

Carrara Global Sealing Solutions, committed to Partnership

4 Operating Divisions

- Sealing systems and valve components
- Industrial Sealing Systems
- Environmental Services
- Technical threads for industry

Carrara is Partner to the main producers of process components for fluid control and is certified by the main International EPCs and main Oil and Gas Players to provide sealing systems and Environmental Services.

- 20.000 m² of covered surface area
- 160 employees
- Patented products
- Frame Agreements with International Customers





Mission

- Satisfying our Customers by producing efficient Sealing Systems.
- Providing our Customers with the best technical, logistic and price solution.
- Committing to establishing long-term business Partnerships with Customers and working with them striving for continuous improvement.

Assets

To achieve its mission, Carrara Global Sealing Solutions has provided itself with space for logistics, equipment, management software and human resources adapted to the needs of an increasingly competitive and demanding market.

- The vast factory surface area ensures an extremely logical flow of raw materials, semi-finished goods and goods, guaranteeing maximum efficiency.
- The equipment for handling, processing, quality control and packaging is all integrated into a process that allows the management of high products volume while maintaining traceability and compliance with quality standards and delivery terms agreed with the Customer.
- The use of SAP and advanced order management software allows to minimise the manual processing of data in order to guarantee integrity at every stage of the process.
- Staff expertise and skill are constantly checked and integrated within a structured plan aimed at producing continuous improvement.

Sealing Solutions

Carrara offers sealing solutions to maximise performance and reduce maintenance requirements. Safety, efficiency and added value are the driving force behind the R&D department, which is responsible for selecting materials and initiating the production of new products and upgrades.

Partnership

Carrara Global Sealing Solutions, a Partner to win together!

Carrara works with Customers in a globalised and competitive market to win with them and alongside them. This is why Carrara offers expertise and reliability in its modern role as Supply Chain Partner.

Guardian Performer

Style ICP - ICA - ICB



■ GUARDIAN PERFORMER FIRE ICP

Guardian Performer FIRE ICP has been designed to provide a solution at the same time suitable for the electrical insulation of flanges and the Fire Safe seals.

Guardian Performer FIRE ICP is, in fact, compliant with the requirements of the Fire Test API 6FB Third Edition.

Thanks to its special composition, the gasket guarantees high sealing standards on the flanges RF, FF and RTJ up to 200°C in ANSI 150 - 2500 # and API 2 - 10K# and PN 420# ratings.



Guardian Performer FIRE ICP

is particularly suitable for use with critical fluids, with high pH or in the presence of H₂S. thanks to its double seal. It is, in fact, able to guarantee extremely low emission levels, compliant to the most stringent limits.



**FIRE TEST
API 6B THIRD EDITION APPROVED**

Standard Design

Thickness (camprofile gasket + sealing layers)	7.90 mm (0.3125")
SS316 Metal Core thickness	2.00 mm (0.080")
GRE Laminate thickness (per side)	1.00 mm (0.040")
GRE Laminate	Option A: G10 (FR4) maximum 150°C Option B: G11 (FR5) maximum 200°C
Sealing Element	Camprofile gasket with PTFE and MICA layers
Sleeves thickness 0.90÷1.10 mm	Option A: GRE G10 (FR4) maximum 150°C Option B: GRE G11 (FR5) maximum 200°C
Washers thickness 3.00 mm	GRE Laminate Option A: GRE G10 (FR4) maximum 150°C Option B: GRE G11 (FR5) maximum 200°C Zinc Plated Carbon Steel

Customized kits as per thickness and materials of the components are also available.

■ GUARDIAN PERFORMER ICA AND ICB

Guardian Performer ICA and ICB have a metal support on which the GRE insulation layer is applied.

Other than creating an excellent insulation barrier in the G10 (FR4) and G11 (FR5) models, the GRE materials also provide significant mechanical and chemical resistance, and can therefore be used in a wide range of applications.

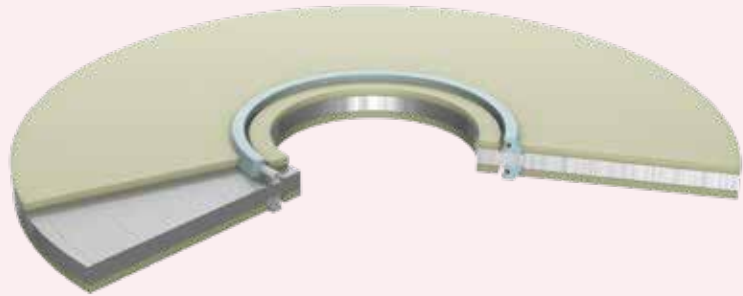


The energized PTFE gaskets equipped with a spring ensure high quality sealing thanks to being fixed to the metal retainer.

Guardian Performer ICB is also equipped with a secondary seal thus increasing sealing performance.

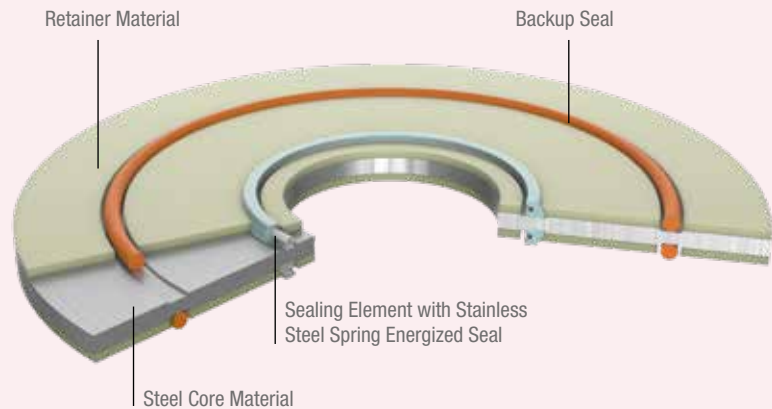
The gasket can be used on RF, FF and RTJ flanges in place of inefficient Phenolic Ring Joints.

Guardian Performer ICA and ICB can be used up to 200°C in ANSI 150 - 2500# and API 2 - 10K# e PN 420# ratings.



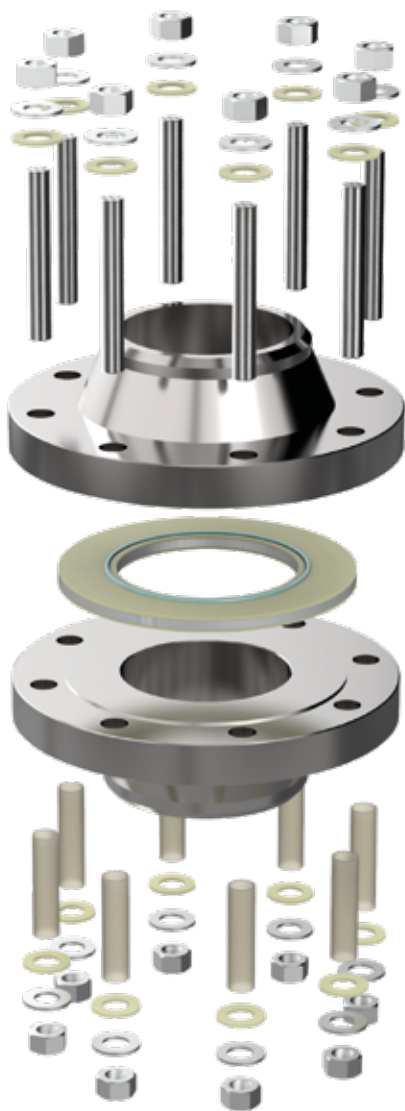
Guardian Performer ICA

The main seal in energized PTFE can also be made of NBR or FKM rubber. It is specific for applications where Low Emission requirements are needed.



Guardian Performer ICB

Guardian Performer ICB is specific for Sub-sea applications. The main seal in energized PTFE also has a secondary seal in NBR or FKM rubber, to ensure maximum system efficiency. Since the secondary gaskets are bidirectional they can they can block external pressure from sea water while the main seal contains the internal thrust.



Standard Design Guardian Performer ICA and ICB

Gasket Thickness	6.35 mm (0.250")
SS316 Metal Core thickness (other available on demand)	3.00 mm (0.120")
GRE Laminate thickness (per side)	1.60 mm (0.065")
GRE Laminate	Option A: G10 (FR4) maximum 150°C Option B: G11 (FR5) maximum 200°C
Primary Sealing Element	PTFE with SS spring
Secondary Sealing Element (only style ICB)	Option A: PTFE with SS spring Option B: NBR Option C: FKM
Sleeves thickness 0.90÷1.10 mm	Option A: GRE G10 (FR4) maximum 150°C Option B: GRE G11 (FR5) maximum 200°C
Washers thickness 3.00 mm	GRE Laminate Option A: GRE G10 (FR4) maximum 150°C Option B: GRE G11 (FR5) maximum 200°C Zinc Plated Carbon Steel

Customized kits as per thickness and materials of the components are also available.

ASTM	TEST METHOD	G10 (FR4)	G11 (FR5)
D149	Dielectric Strength KV/mm Short Time	29.5 ÷ 31.5	19.7
D695	Compressive Strength (Kpsi)	65	50
D790	Flexural Strength (Kpsi)	65	57
D638	Tensile Strength (Kpsi)	50	41
--	Temperature - Operating	-130°C to +150°C	-45°C to +200°C
--	ANSI Gasket Pressure Range	Classes 150 ÷ 2500 psi	
--	API Gasket Pressure Range	API 2000 ÷ 10000 psi	
--	PN Gasket Pressure Range	PN 6 ÷ 420	

Sealing Element	Temperature - Operating
PTFE	Cryogenic to +260°C
NBR	-40°C to +120°C
FKM	-29°C to +200°C

The data in the tables show the expected mean values.

Guardian Premium

Style IS



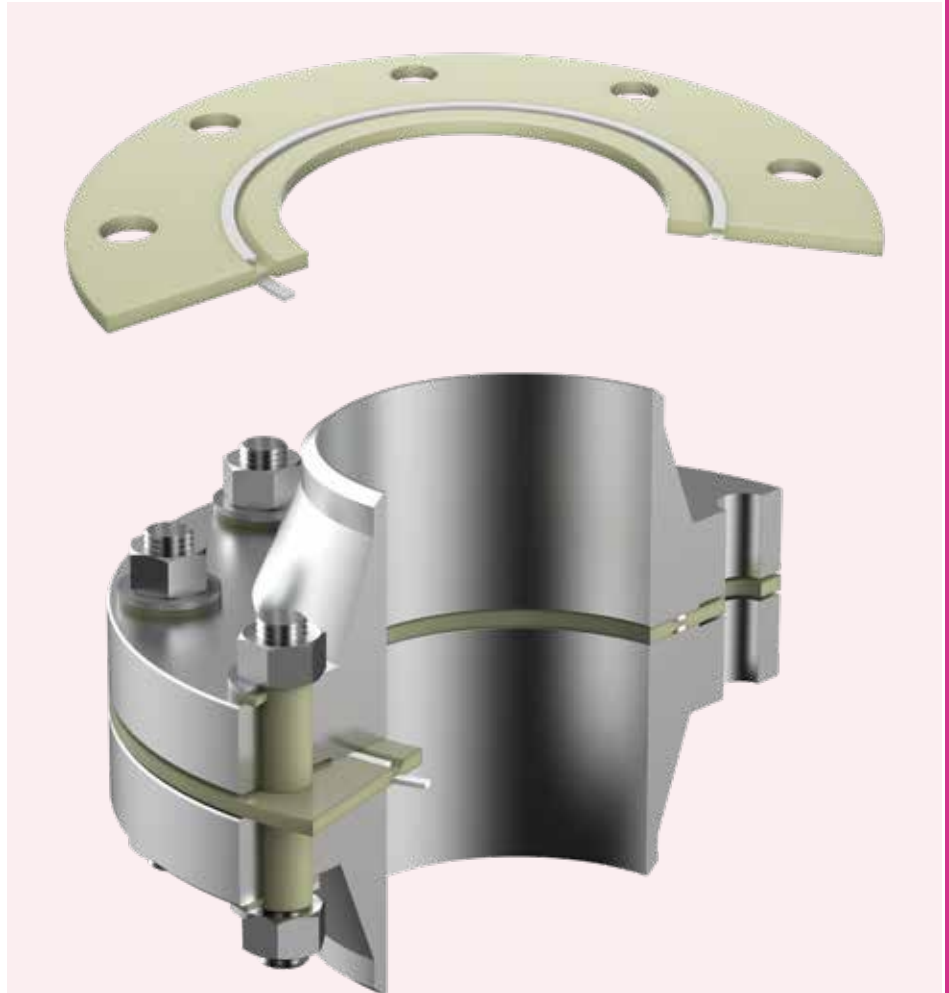
■ GUARDIAN PREMIUM IS

Guardian Premium IS does not have any metal support, while the GRE material functions both as retainer and as insulation.

The gasket can be used on RF, FF and also RTJ flanges, in place of inefficient Phenolic Ring Joints.

Sealing is ensured by PTFE as well as nitrile or fluorinated rubber. The housing groove of the gasket it is shaped to prevent breakage of the retainer in the case of overstress, as well as to give greater elasticity to the sealing element.

Guardian Premium IS can be used up to 200°C depending on the selected GRE in ANSI 150 - 1500#, API 2 - 5K# and PN 250# ratings.



Standard Design Guardian Premium IS

Retainer	Option B: G10 (FR4) maximum 150°C
	Option C: G11 (FR5) maximum 200°C
Sealing Element	Option A: PTFE
	Option B: NBR
	Option C: FKM
Sleeves	Option B: GRE G10 (FR4) maximum 150°C
	Option B: GRE G11 (FR5) maximum 200°C
Washers thickness 3.00 mm	Insulating washers
	Option B: GRE G10 (FR4) maximum 150°C
	Option C: GRE G11 (FR5) maximum 200°C
	Zinc Plated Carbon Steel

Customized thickness gaskets are available in all types of steel and alloy.

■ GUARDIAN PREMIUM IPT

Guardian Premium IPT uses Planiflon® B13, modified and bi-directionally oriented PTFE for sealing and electrical insulation, which minimizes the effects of relaxation and viscous flow typical of these seals, guaranteeing excellent reliability even in the most harsh uses.

Planiflon® B13 is suitable for use on RF and FF flanges guaranteeing extensive chemical compatibility, Covering the entire 0÷14 range, with the exception of the few fluids for which the filler is not compatible.

Guardian Premium IPT can be used up to 200°C in ANSI 150 - 300# and PN 6-40#.

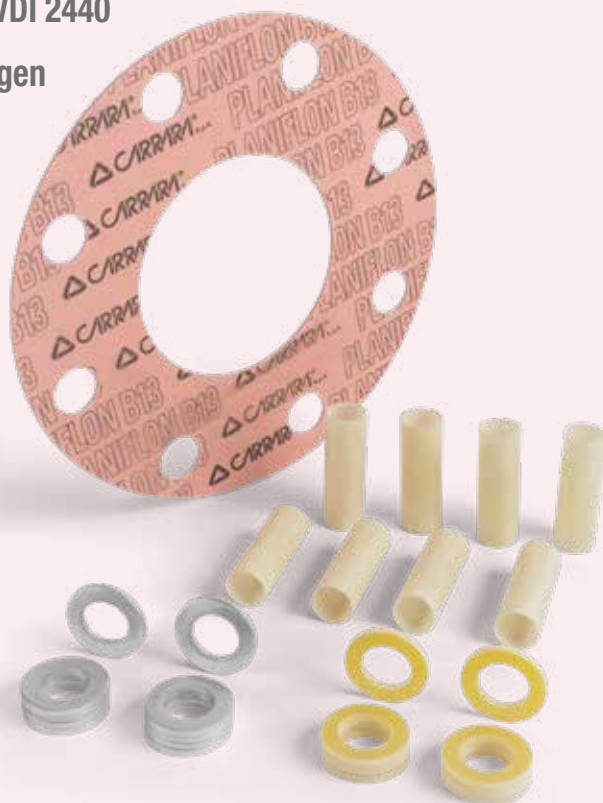
The use of Sleeves and Washers made of GRE – Glass Reinforced Epoxy Resin Composite materials is to be preferred over other materials and, in particular, to phenolic materials, as those in GRE have a significantly lower hygroscopic factor. This allows the seal to function correctly for the scheduled time without malfunctions due to the loss of mechanical load caused by to the collapse of the washers.

Guardian Premium IPT

The main seal is made with a bi-axially oriented modified PTFE gasket to minimize the relaxation effects of the material.

Approvals

- TA LUFT VDI 2440
- BAM Oxygen Service



Standard Design Guardian Premium IPT, Basic ICSF and IE

Gasket Thickness	3.00 mm (0.125")
Sleeves thickness 0.90÷1.10 mm	Option A: GRE G10 (FR4) maximum 150°C
	Option B: GRE G11 (FR5) maximum 200°C
Washers thickness 3.00 mm	GRE Laminate
	Option A: GRE G10 (FR4) maximum 150°C
	Option B: GRE G11 (FR5) maximum 200°C
	Zinc Plated Carbon Steel

Gaskets with customized thickness and made of other materials are also available.

Guardian Basic

■ GUARDIAN BASIC ICSF

Guardian Basic ICSF uses Planiflex® PF64 for sealing and electrical insulation, which is made of aramid fibers and NBR rubber-based materials, selected especially to guarantee the highest levels of performance in a wide range of industrial applications.

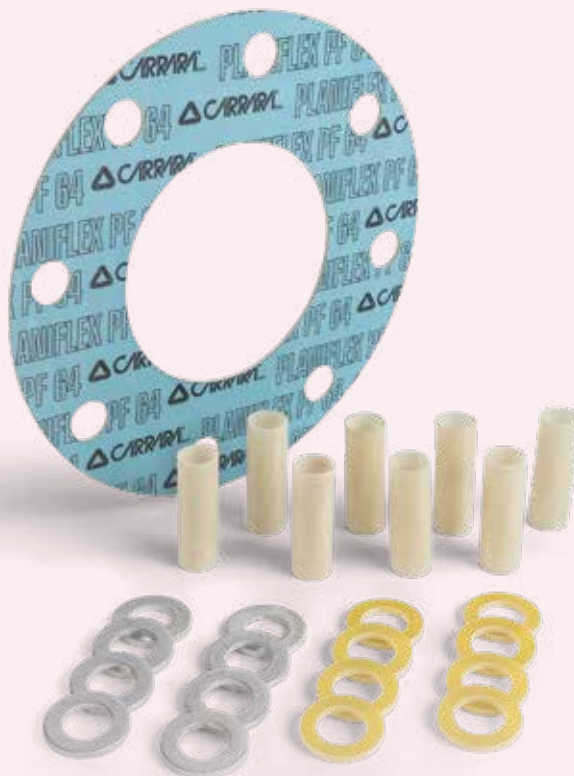
Planiflex® PF64 can be used continuously in temperatures ranging from -40°C ÷ 250°C and in pressure ratings of up to 600 lbs and PN40. These gaskets have chemical compatibility in the pH range typical of that of nitrile rubbers.

Planiflex® PF64 can be used for sealing vapors, lubricants, solvents, gases, steam, and many acids and diluted alkali.

Its dielectric strength of about 20 KV/mm is suitable for many corrosion protection applications. The use of Sleeves and Washers in GRE ensures the highest effectiveness of Guardian Basic ICSF.

Guardian Basic ICSF

The main seal is made with CSF Planiflex PF64, it is a durable and reliable gasket.



Guardian Basic IE

Guardian Basic IE is the insulation Kit that uses a phenolic material for the realization of the seal as well as for the production of washers and sleeves.

It is also available in the IER rubberized version, in order to reduce permeability and improve the endurance.



Specifications

■ Electrical insulation of piping

The Insulation Kits are used both to insulate the piping from the flow of electrostatic charges, as well as to reduce the risks of galvanic corrosion as different types of metal used together without protection can lead to electro erosion.

The flange Kit includes a gasket, and, for each bolt, a sleeve, two insulating washers and two plated steel washers. The sets are packed individually, with labels indicating the size, type and combination of the materials.

■ Insulating materials

A good insulation kit must be made of materials with particular electrical, mechanical and age resistance requirements. The materials with greater added value in the creation of the insulation kits are GRE - Glass Reinforced Epoxy Resin Composite Materials, while those using Phenolic Resin have

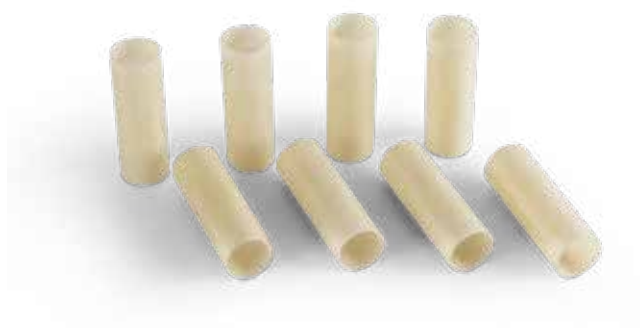
less technological characteristics due to their high water absorption factor and low mechanical strength. The gaskets in the kit can also be made of PTFE or compressed fibre (CSF), while the sleeves can also be made of Mylar, Nomex or Polyethylene.

Retainer features	Phenolic	Rubber Faced Phenolic	G10 (FR4)	G11 (FR5)
Dielectric Strength KV/mm Short Time	20,0	20,0	29,0 ÷ 31,5	21,5
Compressive Strength (MPa)	172,0	172,0	450,0	430,0
Water Absorption (%)	1,6	1,6	0,1	0,1
Flexural Strength (MPa)	155,0	1.500,0	450,0	410,0
IZOD Impact Strength (Ft-Lbs/Inch)	1,2	1,2	14,0	12,0
Tensile Strength (MPa)	138,0	138,0	344,0	290,0
Shear Strength (MPa)	68,0	68,0	144,0	144,0
Bond Strength (Kg)	680,0	680,0	1.180,0	1.000,0
Temperature - Operating	-50°C ÷ 100°C	-50°C ÷ 75°C	-150°C ÷ 150°C	-75°C ÷ 200°C

- **Dielectric Strength:** measurement of the dielectric strength of the material related to its thickness; it is calculated in **Volts/Mil** (Volts per one thousandth of an inch) or in **KV/mm** (Kilo Volts per millimetre).
- **Tensile Strength:** is the material's ability to withstand tensile loads; it is calculated in **psi** or **MPa**.
- **Compressive Strength:** is the material's ability to withstand loads tending to reduce size; it is calculated in **psi** or **MPa**.
- **Flexural Strength:** in bending tests is the load value just before failure of the material; it is calculated in **psi** or **MPa**.
- **Shear Strength:** is the shear stress which tends to create a fracture on the plane parallel to the direction of the force; it is calculated in **psi** or **MPa**.
- **Bond Strength:** It is the bonding strength of the insulating material to the metal retainer; it is calculated in **lb** or **Kg**.
- **Water Absorption (%):** It is the calculation of the absorption of water by the material; it is calculated in weight percentage.
- **Izod impact strength:** it is the impact test to determine resistance to notching; it is calculated in **Ft-Lbs/Inch**.

Sleeves

The length of the sleeves must take into account the thickness of the gasket and must not be too short or too long: if it is too short, it fails to protect the bolts, and if too long it could cause problems or break during tension. In relation to the materials, sleeves made of GRE are the best solution for reliability, resistance to aging and insulating capacity.



Sleeve features	Mylar	Nomex	G10 (FR4)
Dielectric Strength KV/mm Short Time	158,0	15,8	29,0 ÷ 31,5
Water Absorption (%)	0,8	7,0	0,1
Flexural Strength (MPa)	90,0	124,0	450,0
Cut Through Resistance	low	high	low
Temperature - Operating	-50°C ÷ 150°C	-50°C ÷ 230°C	-150°C ÷ 150°C

Washers

The insulating washers are used to electrically isolate the bolts from the other metal parts of the system. Carrara suggests to always use insulating washers made of **GRE** because unlike phenolic washers they have higher resistance to compression (60,000 vs 12,000 psi) and are slightly hygroscopic. These differences have an important impact on the performance of the Insulating Kit over time because phenolic material quickly manifests its fragility jeopardizing electrical insulation and also the seal.



Washer features	Phenolic	Rubber Faced Phenolic	G10 (FR4)	G11 (FR5)
Dielectric Strength KV/mm Short Time	20	20	29,0 ÷ 31,5	21,5
Compressive Strength (MPa)	172	172	448	434
Water Absorption (%)	1,60	1,60	0,05	0,10
Temperature - Operating	-50°C ÷ 100°C	-50°C ÷ 75°C	-150°C ÷ 150°C	-75°C ÷ 200°C

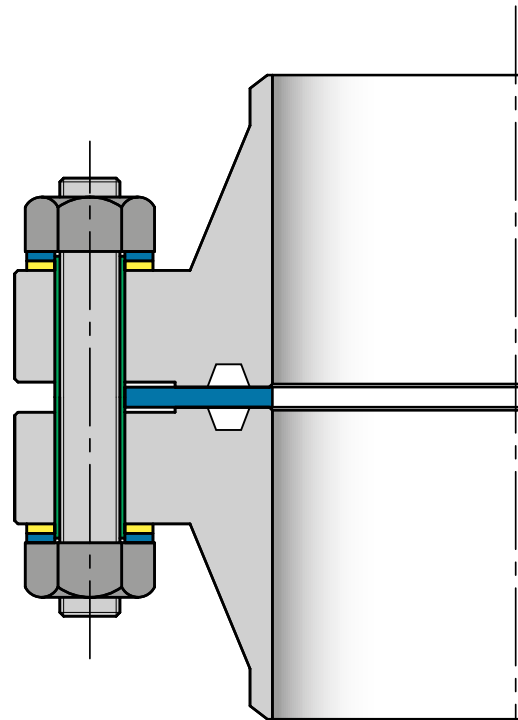
■ RF, FF and RTJ Flanges

Guardian Insulation Kits are suitable for RF, FF and RTJ flanges. In fact, all Performer and Premium models can also be used on RTJ flanges in the place of phenolic ring joint, which are not very effective in sealing.

The internal diameter of the gasket coincides with that of the flange. It is therefore important to always identify its schedule number before choosing.

Recommended installation procedures

- Check that the kit contains all the specified materials and that they are intact.
- Flange surfaces should be cleaned and inspected.
- Install the gasket checking the correct alignment of the flanges.
- Insert the sleeves into the bolt holes.
- Insert each bolt together with the insulation and metal washers, screwing the bolts in place last.
- Tighten the nuts with a star sequence, first assigning 30% of the expected load, then 60% and then 100%.
- Check the tension of the tie rods exposed to aggressive thermal cycles.

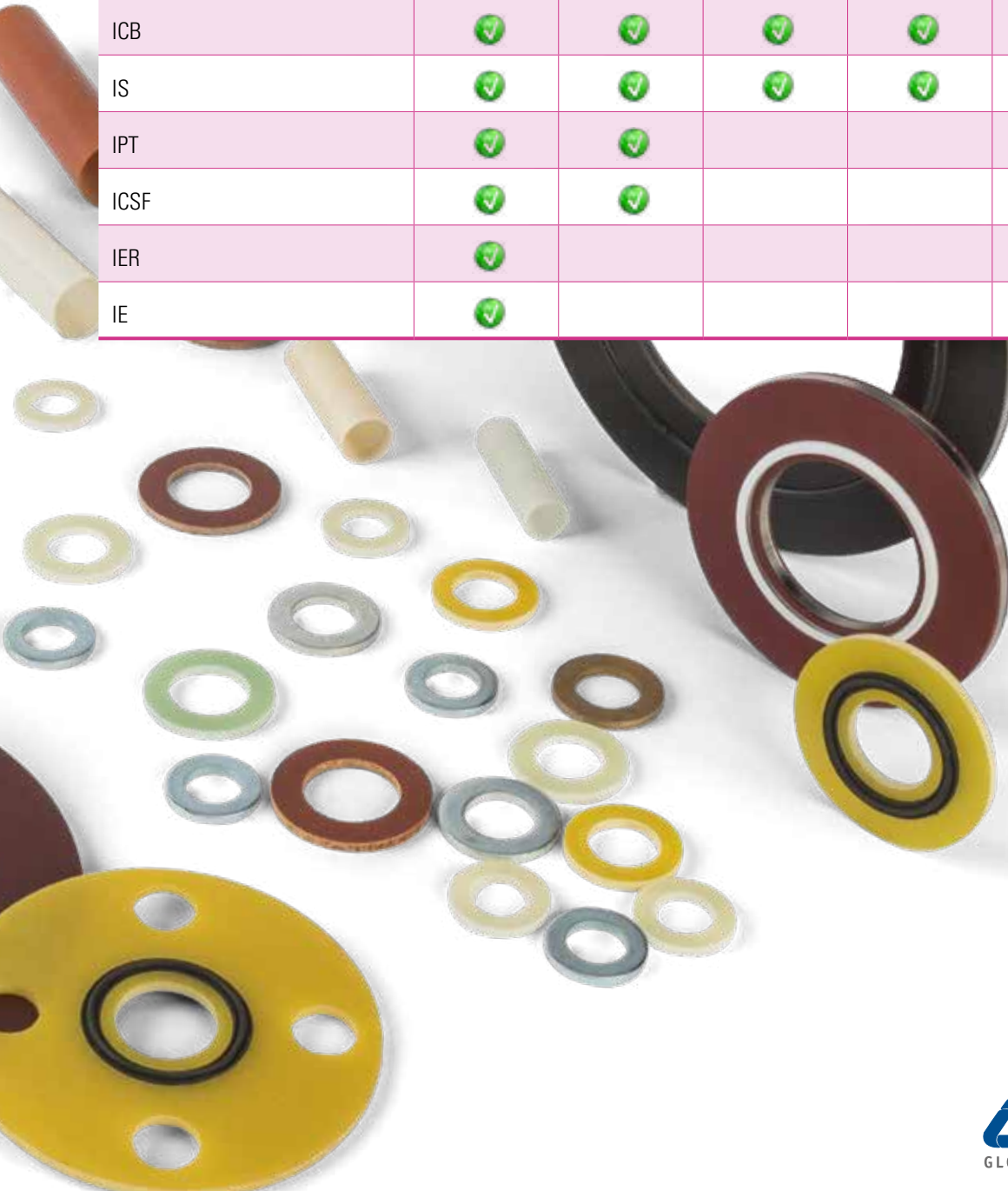


■ Selecting Insulation Kit

The choice of the Insulation Kit depends on the operating conditions of the specific application. Temperature, pressure level and flange facing must always be taken into consideration before making a choice. The temperature can be 200°C max., with GRE G11(FR) materials, while with regards to pressure, all ratings up to API 10000 psi can be covered if the correct product is used. Guardian Performer

models, with energized seal (PTFE spring and envelope) as well as the camprofile version, are suitable for use in high ratings. Guardian Premium IS is to be used only for the 1500 lbs category, while the other gaskets can be used in 150-300 categories as indicated in the table below. For categories of 600 and higher GRE G10(FR4) and G11(FR5) washers must be used.

Guardian	150	300	600	900	1500	2500
ICP	✓	✓	✓	✓	✓	✓
ICA	✓	✓	✓	✓	✓	✓
ICB	✓	✓	✓	✓	✓	✓
IS	✓	✓	✓	✓	✓	
IPT	✓	✓				
ICSF	✓	✓				
IER	✓					
IE	✓					



Dimension Tables

The below dimension tables refer to ANSI B16.5 flanges. The gaskets are classified according to F standards for RF flange design and E standards for FF flange design. The kit includes steel washers and insulating washers, as well as sleeves and gaskets. Height H of the sleeves indicated in the table below, considers a thickness of 3mm for both types of washer. The internal diameter of the gasket refers to the STD Schedule of the flanges.



RATING	DN	GASKET			BOLTS		WASHERS		SLEEVES		
		ext Type "F"	ext Type "E"	Int	Q.tà	Size	Dext	Dint	Dext	Dint	H
#150	1/2	43,8	89	15,8	4	1/2	28,5	16	15	13,4	38,4
	3/4	53,3	98	21,0	4	1/2	28,5	16	15	13,4	41,4
	1	62,9	108	26,7	4	1/2	28,5	16	15	13,4	44,6
	1.1/4	72,4	118	35,1	4	1/2	28,5	16	15	13,4	47,8
	1.1/2	81,9	127	40,9	4	1/2	28,5	16	15	13,4	51,0
	2	101,1	152	52,5	4	5/8	33,5	19	18	16,4	54,2
	2.1/2	120,2	178	62,7	4	5/8	33,5	19	18	16,4	60,6
	3	132,9	191	77,9	4	5/8	33,5	19	18	16,4	63,8
	3.1/2	158,3	216	90,1	8	5/8	33,5	19	18	16,4	63,8
	4	171,0	229	102,3	8	5/8	33,5	19	18	16,4	63,8
	5	193,4	254	128,2	8	3/4	40,0	22	21	19,4	63,8
	6	218,8	279	154,1	8	3/4	40,0	22	21	19,4	66,8
	8	275,9	343	202,7	8	3/4	40,0	22	21	19,4	73,2
	10	336,4	406	254,5	12	7/8	44,5	25	24	22,4	76,4
	12	406,3	483	304,8	12	7/8	44,5	25	24	22,4	79,6
	14	447,7	533	336,6	12	1	51,0	28	27	25,4	86,0
	16	511,2	597	387,4	16	1	51,0	28	27	25,4	89,2
	18	545,3	635	438,2	16	1.1/8	55,5	32	31	29,4	95,4
20	602,5	699	489,0	20	1.1/8	55,5	32	31	29,4	101,8	
24	713,8	813	590,6	20	1.1/4	62,0	35	34	32,4	111,4	
#300	1/2	50,5	95	15,8	4	1/2	28,5	16	15	13,4	44,6
	3/4	63,5	118	21,0	4	5/8	33,5	19	18	16,4	47,8
	1	69,5	124	26,7	4	5/8	33,5	19	18	16,4	51,0
	1.1/4	78,5	133	35,1	4	5/8	33,5	19	18	16,4	54,2
	1.1/2	91,5	156	40,9	4	3/4	40,0	22	21	19,4	57,4
	2	107,5	165	52,5	8	5/8	33,5	19	18	16,4	60,6
	2.1/2	126,5	191	62,7	8	3/4	40,0	22	21	19,4	66,8
	3	145,5	210	77,9	8	3/4	40,0	22	21	19,4	73,2
	3.1/2	161,5	229	90,1	8	3/4	40,0	22	21	19,4	76,4
	4	177,5	254	102,3	8	3/4	40,0	22	21	19,4	79,6
	5	212,5	279	128,2	8	3/4	40,0	22	21	19,4	86,0
	6	247,5	318	154,1	12	3/4	40,0	22	21	19,4	89,2
	8	304,5	381	202,7	12	7/8	44,5	25	24	22,4	98,6
	10	358,5	445	254,5	16	1	51,0	28	27	25,4	111,4
	12	418,5	521	304,8	16	1.1/8	55,5	32	31	29,4	117,6
	14	481,5	584	336,6	20	1.1/8	55,5	32	31	29,4	124,0
	16	536,5	648	387,4	20	1.1/4	62,0	35	34	32,4	130,4
	18	593,5	711	438,2	24	1.1/4	62,0	35	34	32,4	136,8
20	650,5	775	489,0	24	1.1/4	62,0	35	34	32,4	143,0	
24	771,5	914	590,6	24	1.1/2	73,0	41	40	38,4	155,8	

RATING	DN	GASKET			BOLTS		WASHERS		SLEEVES		
		ext Type "F"	ext Type "E"	Int	Q.tà	Size	Dext	Dint	Dext	Dint	H
#600	1/2	50,5	95,0	15,8	4	1/2	28,5	16,0	15,0	13,4	54,6
	3/4	63,5	117,0	21,0	4	5/8	33,5	19,0	18,0	16,4	57,8
	1	69,5	124,0	26,7	4	5/8	33,5	19,0	18,0	16,4	61,0
	1.1/4	78,5	133,0	35,1	4	5/8	33,5	19,0	18,0	16,4	67,4
	1.1/2	91,5	156,0	40,9	4	3/4	40,0	22,0	21,0	19,4	70,6
	2	107,5	165,0	52,5	8	5/8	33,5	19,0	18,0	16,4	76,8
	2.1/2	126,5	191,0	62,7	8	3/4	40,0	22,0	21,0	19,4	83,2
	3	145,5	210,0	77,9	8	3/4	40,0	22,0	21,0	19,4	89,6
	3.1/2	158,5	229,0	90,1	8	7/8	44,5	25,0	24,0	22,4	96,0
	4	190,5	273,0	102,3	8	7/8	44,5	25,0	24,0	22,4	102,2
	5	238,5	330,0	128,2	8	1	51,0	28,0	27,0	25,4	115,0
	6	263,5	356,0	154,1	12	1	51,0	28,0	27,0	25,4	121,4
	8	316,5	419,0	202,7	12	1.1/8	55,5	32,0	31,0	29,4	137,2
	10	396,5	508,0	254,5	16	1.1/4	62,0	35,0	34,0	32,4	153,0
	12	453,5	559,0	304,8	20	1.1/4	62,0	35,0	34,0	32,4	159,4
	14	488,5	603,0	336,6	20	1.3/8	67,0	38,0	37,0	35,4	165,8
	16	561,5	686,0	387,4	20	1.1/2	73,0	41,0	40,0	38,4	178,4
18	609,5	743,0	438,2	20	1.5/8	78,0	44,0	43,0	41,4	191,2	
20	679,5	813,0	489,0	24	1.5/8	78,0	44,0	43,0	41,4	203,8	
24	786,5	940,0	590,6	24	1.7/8	89,0	51,0	50,0	48,4	229,2	
#900	1/2	60,1	120,7	15,8	4	3/4	40,0	22,0	21,0	19,4	70,6
	3/4	66,4	130,2	21,0	4	3/4	40,0	22,0	21,0	19,4	76,8
	1	76,1	149,2	26,7	4	7/8	44,5	25,0	24,0	22,4	83,2
	1.1/4	85,6	158,7	35,1	4	7/8	44,5	25,0	24,0	22,4	83,2
	1.1/2	95,3	177,8	40,9	4	1	51,0	28,0	27,0	25,4	89,6
	2	139,6	215,9	52,5	8	7/8	44,5	25,0	24,0	22,4	102,2
	2.1/2	162,0	244,5	62,7	8	1	51,0	28,0	27,0	25,4	108,6
	3	165,0	241,3	77,9	8	7/8	44,5	25,0	24,0	22,4	102,2
	4	202,5	292,1	102,3	8	1.1/8	55,5	32,0	31,0	29,4	115,0
	5	243,9	349,3	128,2	8	1.1/4	62,0	35,0	34,0	32,4	127,6
	6	285,0	381,0	154,1	12	1.1/2	55,5	32,0	31,0	29,4	137,2
	8	355,2	469,9	202,7	12	1.3/8	67,0	38,0	37,0	35,4	153,0
	10	431,4	546,1	254,5	16	1.3/8	67,0	38,0	37,0	35,4	165,8
	12	494,9	609,6	304,8	20	1.3/8	67,0	38,0	37,0	35,4	184,8
	14	517,3	641,2	336,6	20	1.1/2	73,0	41,0	40,0	38,4	197,4
	16	571,5	704,8	387,4	20	1.5/8	78,0	44,0	43,0	41,4	203,8
	18	634,3	787,4	438,2	20	1.7/8	89,0	51,0	50,0	48,4	229,2
20	694,8	857,2	489,0	20	2	95,0	54,0	53,0	51,4	242,0	
24	834,2	1041,4	590,6	20	2.1/2	117,5	67,0	66,0	64,4	305,4	
#1500	1/2	60,1	120,7	15,8	4	3/4	40,0	22,0	21,0	19,4	70,6
	3/4	66,4	130,2	21,0	4	3/4	40,0	22,0	21,0	19,4	76,8
	1	76,1	149,2	26,7	4	7/8	44,5	25,0	24,0	22,4	83,2
	1.1/4	85,6	158,7	35,1	4	7/8	44,5	25,0	24,0	22,4	83,2
	1.1/2	95,3	177,8	40,9	4	1	51,0	28,0	27,0	25,4	89,6
	2	139,6	215,9	52,5	8	7/8	44,5	25,0	24,0	22,4	102,2
	2.1/2	162,0	244,5	62,7	8	1	51,0	28,0	27,0	25,4	108,6
	3	170,7	266,7	77,9	8	1.1/8	55,5	32,0	31,0	29,4	121,4
	4	205,8	311,2	102,3	8	1.1/4	62,0	35,0	34,0	32,4	134,0
	5	250,6	374,6	128,2	8	1.1/2	73,0	41,0	40,0	38,4	172,2
	6	279,0	393,7	154,1	12	1.3/8	67,0	38,0	37,0	35,4	191,2
	8	349,2	482,6	202,7	12	1.5/8	78,0	44,0	43,0	41,4	210,2
	10	431,1	584,2	254,5	12	1.7/8	89,0	51,0	50,0	48,4	242,0
	12	517,0	673,1	304,8	16	2	95,0	54,0	53,0	51,4	273,8
	14	574,5	750,0	336,6	16	2.1/4	106,5	60,0	59,0	57,4	292,8
	16	638,3	825,0	387,4	16	2.1/2	117,5	66,0	65,0	63,4	318,2
	18	701,2	915,0	438,2	16	2.3/4	128,5	73,0	72,0	70,4	350,0
20	752,3	985,0	489,0	16	3	140,0	79,0	78,0	76,4	381,6	
24	898,1	1170,0	590,6	16	3.1/2	162,0	92,0	91,0	89,4	432,4	
#2500	1/2	66,4	133,4	15,8	4	3/4	40,0	22,0	21,0	19,4	86,4
	3/4	72,8	139,7	21,0	4	3/4	40,0	22,0	21,0	19,4	89,6
	1	82,5	158,8	26,7	4	7/8	44,5	25,0	24,0	22,4	96,0
	1.1/4	101,7	184,2	35,1	4	1	51,0	28,0	27,0	25,4	102,2
	1.1/2	113,6	203,2	40,9	4	1.1/8	55,5	32,0	31,0	29,4	115,0
	2	143,0	235,0	52,5	8	1	51,0	28,0	27,0	25,4	127,8
	2.1/2	164,4	266,7	62,7	8	1.1/8	55,5	32,0	31,0	29,4	140,4
	3	193,1	304,8	77,9	8	1.1/4	62,0	35,0	34,0	32,4	159,4
	4	231,5	355,6	102,3	8	1.1/2	73,0	41,0	40,0	38,4	178,4
	5	275,4	419,1	128,2	8	1.3/4	84,0	48,0	47,0	45,4	210,2
	6	313,8	482,6	154,1	8	2	95,0	54,0	53,0	51,4	242,0
	8	383,7	552,5	202,7	12	2	95,0	54,0	53,0	51,4	280,0
	10	472,3	673,1	254,5	12	2.1/2	117,5	67,0	66,0	64,4	356,2
12	545,6	762,0	304,8	12	2.3/4	140,0	73,0	72,0	70,4	394,4	

CARRARA, Global Sealing Solutions!

In addition to packing, Carrara offers a vast product range of high-quality gaskets for valves and flanges, together with all sealing accessories. The quality of the products, the professional technical and commercial assistance of the Team, the wide availability of stock and other tailor-made services reserved for Customer are the business guidelines to increase the value offered to Customers.



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Carrara is among the leading manufacturers of packing and sealing systems for pumps and valves for all industrial applications. Thanks to the use of high quality yarns and special techniques developed by its R&D division, Carrara packings can offer high performance with an excellent quality-price ratio. Carrara sealing systems guarantee excellent sealing and emission control and can work at high pressures and speeds with any chemicals, reducing wear on shafts and bushings, and minimising maintenance.



Valve Sealants & Components Valve Sealing Systems

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Setting Flange Planisteel® Metal Gaskets for Flange

Spirometallic, Camprofile, Ring Joint and Metal-Plastic for equipment and boilers are part of the Carrara Planisteel® range.

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Carrara product range offers flat gasket sheets and gaskets of the following product families:

- PLANIFLEX® in CSF
- PLANIFLON® in virgin, filled, modified and expanded PTFE
- PLANIGRAPH® in graphite
- PLANIX® in rubber and Mica for high temperatures



Setting Mechanical Seals Mechanical Seals for Pumps

Carrara product range offers a complete range of single cartridge mechanical seals with metal bellows, single cartridge with multiple stationary and rotary springs and split seals. Carrara Mechanical Seals are easy to install and guarantee low component management costs.



FERP Environmental Division

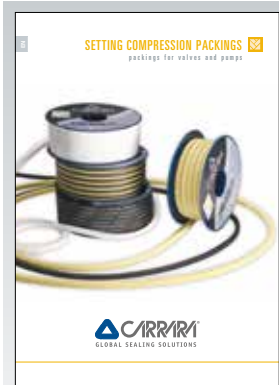
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A wide and certified product range of API 622, ISO 15848, BAM and FDA certified packing for all industrial applications.



Valve Components

Seats for soft or metallic sealing for ball and gate valves, seat/ball kit equipped with all gaskets.



Metallic Flange Gaskets

Planisteel is the range of Spirometallic, Kamprofile and Ring Joints gaskets in compliance with international standards or customised on demand.



Flat Gaskets for Flange

Planigraph, Planiflon and Planiflex gasket sheets and sealing gaskets for all applications.



Mechanical seals

The Single Stationary Multiples Springs Cartridge and Metal Bellows Single Cartridge mechanical seals are the main products in our range.



Insulation Kits

Flange insulation kits for cathodic protection are one of our specialities.



FERP Envir. Division

LDAR and SMART LDAR, monitoring of Tanks and steam systems, 3D environmental consulting.