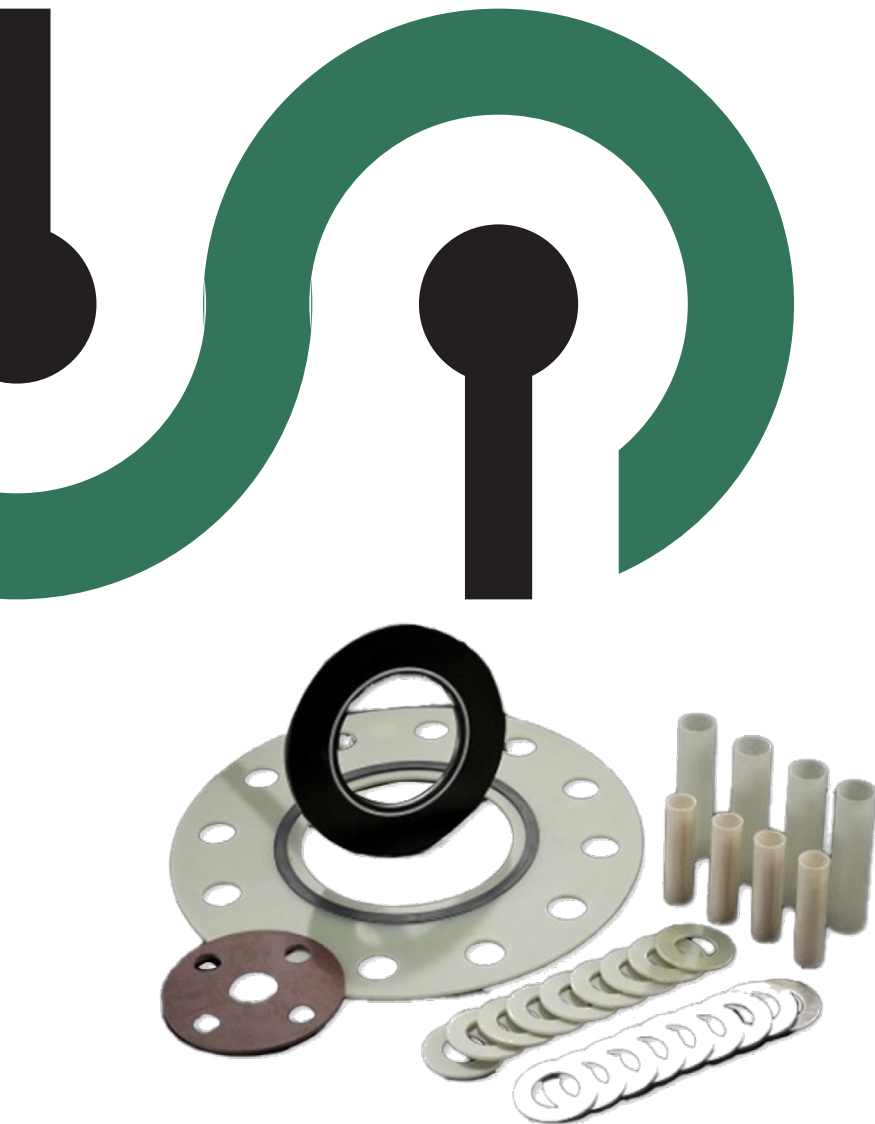


Isolation Kits and Monolithic Catjoint





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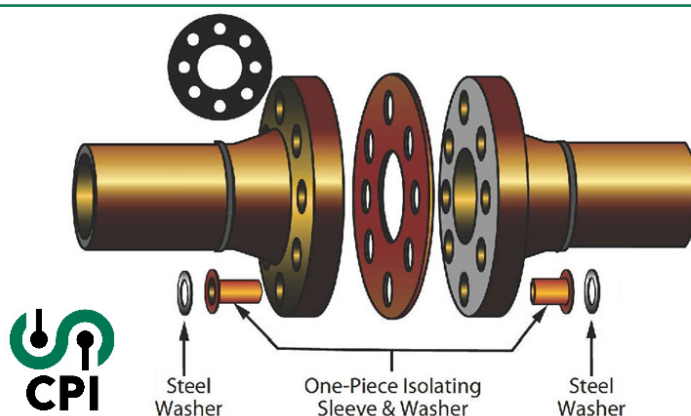
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Isolation Kits

CPI Isolation kits are composed of:

- Insulating sealing gasket
- Sleeves or tubes for bolts
- Metallic insulating washers



Elements designed to isolate electrically the circulation of electrical currents in flanges, and metallic equipment.

Applications



Offshore installations and water environments:



Chemical installations:



Oil Refinery Pipes:

Isolation gaskets have the function of electrically isolating flanges, preventing corrosion and prolonging their useful life.

CPI-TGCD kits according to ANSI 16.5 and API 605. Others standards available upon request.

The CPI-TGCD flange Kits consist of a set with an insulating gasket, insulating sleeves and dimensioned washers properly for the intended application and conveniently packaged to minimize the possibility of loss of component parts during installation.

They prevent contact between metals, stopping static current. Isolation kits provide effective sealing, and they are designed to maintain system integrity and reliability.

Made of high Isolating materials, and low water absorption, are formed by a isolation gasket, sleeves to protect the stud bolts, iron washers and insulating washers manufactured according to the measurements of the flange.

In this way, they avoid corrosion and prolong their useful life for many years.

CPI PRODY SOL manufactures isolation kits according to DIN or ASA standards or under customer specifications.

CPI TGCD Isolation Kits Kits

CPI-TGCD Isolation kits are the most widely used way of controlling losses due to corrosion.

They can be used for:

- Control electrical currents in pipelines of oil, gas, water, refinery and chemical plants.
- Increase the effectiveness of protection systems and limit or eliminate electrical corrosion.



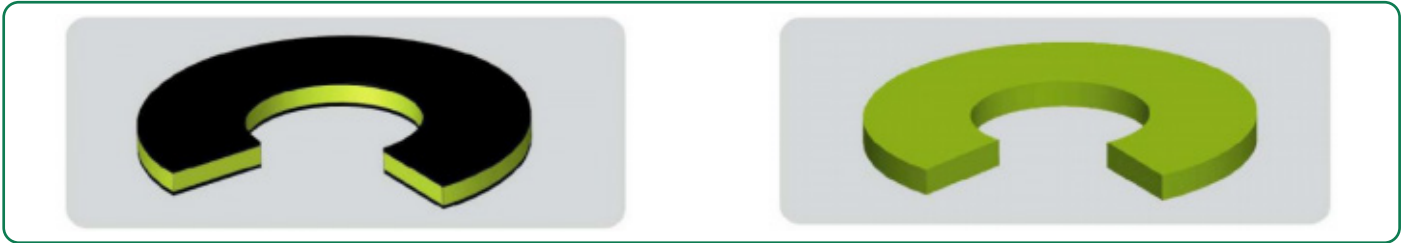
Features

- Can be used with offset flanges.
- Can be used on RTJ or BX flanges.
- Little initial torque is needed.
- No retightening required.
- Usable for high pressures.
- Reusable.
- Limited exposure area (Long life).
- Compensates for pressure variations, compression changes, vibrations, temperature, variations, etc.
- Greatly reduces human error during installation.
- Wide selection of materials available.
- Low installation and maintenance costs.

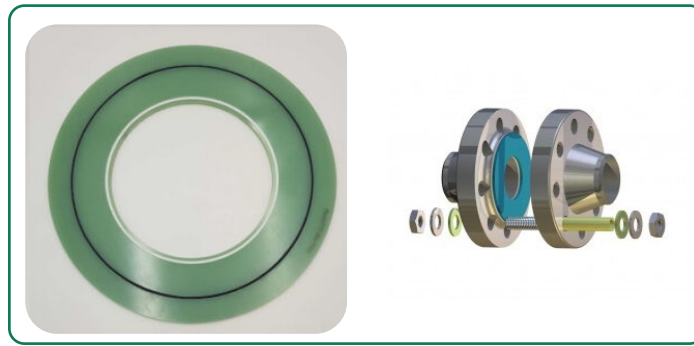
F Type

They are manufactured to fit the raised face portion of the flange. As there are no holes in the gasket for the screws, in type F kits, the outer diameter of the gasket is included in the inner diameter of the circle of holes.

Available in various materials according to the working conditions.



The central gasket can have an elastomer or PTFE ring to facilitate sealing: TYPE FG



E Type

It is an FF gasket with the same outside diameter as the flange bolt holes and precision cut bolt holes.

This design facilitates proper gasket alignment during installation. Type E gaskets are available in a wide variety of high temperature materials. TYPE EG seals incorporate an elastomeric or PTFE ring on both faces of the gasket.

It is also possible to incorporate a SPRING ENERGIZED ring.



D Type

Type D gaskets are specifically designed to fit into the grooves of the flanges. They are made of a fabric-reinforced phenolic material in the middle and are sized to ANSI and API specifications.

Type D Gaskets are available in an oval shape as well as an octagonal shape. BX Gaskets with 15,000 psi are also available.



Sealing systems for high performance

TGCDLB, TGCDPGE / TGCDPGEA designs include sealing gaskets. The purpose of this design is to break each laminated layer within the gasket itself thus creating a barrier through which fluid and/or gas cannot migrate. The sealing element can be any elastomeric or PTFE material, as well as more sophisticated ones like Spring-Energized Teflon. As a result of this advanced design, no maintenance of the flange is necessary, its insulation and avoid corrosion, is achieved in an economical way. TGCDLB is available in types FF (Type E) and RS (Type F). Depending on the sealing element selected, the TGCDLB is rated for most hydrocarbon and water service applications.

TGCDLB sealing system

The TGCDLB System is a low pressure system designed for electrical flange isolation and general sealing applications.

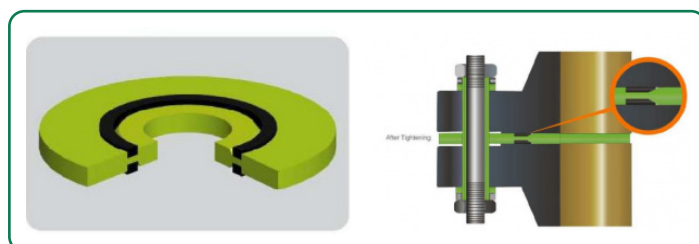
This gasket is suitable for use on flat and non-flat gaskets/flanges in ANSI class 150 and 600. In addition to providing electrical insulation, the gasket is excellent for isolating flanges made of dissimilar metals or where corrosion prevention is desired on the flanges.



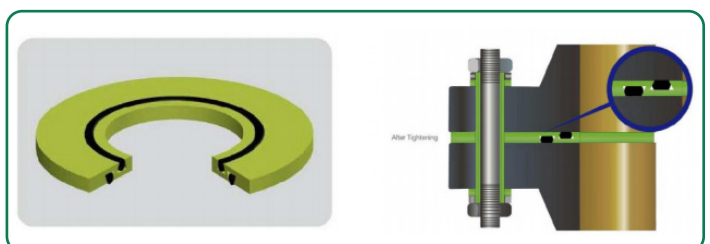
TGCDPGE / TGCDPGEA sealing system

The TGCDPGE and TGCDPGEA systems have an excellent sealing and insulating design for all types of flanges. The sealing elements encapsulated in the special designed groove, prevent the sealing element from breaking when the nut bolts are not the same. Materials like Nitrile, EPDM, Viton and PTFE can be used as sealing element; this increases the options for different working conditions. Consult the tables of the sealing range, temperature and compatibilities of the materials.

TGCDPGE sealing system



TGCDPGEA sealing system



TCDVCS sealing system

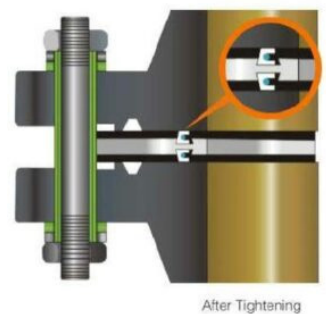
The TCDVCS gasket is a special design for sealing and isolating critical services.

It is suitable for: treated faces, flat faces, and RTJ flanges at any pressure including API 15,000 psi service.

TCDVCS is a highly reliable system used for both general purposes and insulation sealing, especially suitable for High Pressure.

The gasket material incorporates high strength glass reinforced epoxy laminate bonded to a stainless steel core.

Gasket material incorporates high strength glass reinforced epoxy laminate bonded to a stainless steel core. This provides the strength of a traditional metal gasket while maintaining complete electrical isolation between the flange faces. Gasket grooves are machined through the insulating laminate and into the stainless steel core, providing a solid foundation for the gasket to sit on and break the potential leak path inherent in glass laminates. Spring loaded PTFE inner face gaskets are installed in the dovetail sealing grooves to provide a reliable spring energized seal.



The metal core of the gasket is made of stainless steel 316L.

Other metals such as Duplex or Inconel are available under request.

MAIN FEATURES

- Seals and insulates at all rated pressures, including API 15,000 psi service.
- Withstand severe service conditions, including large bending moments, vibration, temperature, and pressure cycling.
- Designed to withstand corrosive environments, including high concentrations of CO₂, H₂S, etc.
- Excellent insulation properties for cathodic protection.
- Pressure activated gaskets provide a high confidence seal and eliminate costly leaks.
- The gasket is matched to the inside diameter to protect the flange faces from media-induced corrosion and flow-induced erosion.
- Prevents turbulent flow in flanged connections.
- Mitigates galvanic corrosion on dissimilar metal flanges.
- Available to fit any flange specification (ANSI, API, MSSP, BS, DIN, AS) and more.
- Can mate mismatched RTJ with RF flanges.

TCDVCS Sealing System – OP

The TGCDVC – OP system is a design of an insulating piece, with a sealing surface designed for pipe flow restriction. TGCDVS-OP incorporates spring energized PTFE or elastomeric seals that are fully encapsulated in the composite gasket making the plate orifice one piece and easy to install. This eliminates the need for conventional hole plates, plate holders and separate gaskets. This orifice plate design substantially reduces residual stress and improves overall sealing performance, even under the most extreme conditions in all hydrocarbon production and injection applications.



The metal core of the gasket is made of stainless steel 316L.

Other metals such as Duplex or Inconel are available on request.

Advantages

- Self-contained, one-piece plate and gasket design (replaces and retrofits conventional plate and annular gasket designs).
- Available for orifice fitting and orifice flanges.
- Flow restriction orifice plates available in any size.
- Integrated, spring energized radial face seals ensure high integrity, with no maintenance required.
- Integrated composite gasket retainer mitigates galvanic corrosion on many metals.
- Protects flanges from media induced corrosion and flow induced erosion on flanges.
- Reduces flange and bolt stress on flanges.
- Increases the pressure sealing capacity of the flange.
- Increases the external loading capacity (bending and tension) of the flange and the bolt on the flanges.
- Easy installation and removal.

Available materials gasket-washer-sleeve-element sealed

Gasket

	Phenolic	Coated Phenolic Neoprene	PTFE	G7	G10	G11/G11 with steel core
Isolation strength Volts/Mil	500	500	350	350	550	550
Resistance to psi compression	25000	25000	2300	40000	50000	50000
Water absorption %	1.6	1.6	0.01	0.07	0.1	0.1
Tensile strength psi	20000	20000	1450	25000	45000	43000
Operating temperature °C	-54 to+104	-54 to +79	-196 to+260	-196 to+232	-196 to+138	-196 to+176

Sleeves

	Mylar	Nomex	G7	G10	G11
Isolation strength Volts/Mil	4000	400	350	400	400
Water absorption %	0.8	N/A	0.1	0.1	0.1
Operating temperature °C	-59 to+149	-54 to +232	-196 to +232	-196 to +138	-196 to +176

Insulating washers

	Phenolic	G7	G10	G11
Isolation strength Volts/Mil	500	350	550	550
Resistance to psi compression	25000	40000	50000	50000
Water absorption %	1.6	0.07	0.1	0.1
Operating temperature °C	-54 to +104	-196 to +232	-196 to +138	-196 to +176

Sealing elements

* These materials are used for types FG and EG

	VITON	NBR	EPDM	PTFE/PTFE with SPRING ENERGIZED	MICA
Operating temperature °C	-29 to +177	-54 to +121	-54 to +149	-196 to 260	-200 to +700

Special materials for high temperatures on request.

METALLIC WASHERS:

- Zinc plated steel (ZPS).
- Stainless steel (SS) washers.
- Hardened steel (HCS) insulating washers.
- Xylan Coated Carbon Steel (XPS).

Features standard materials

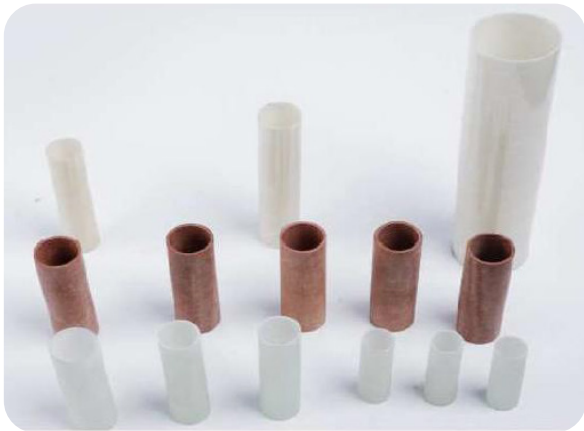
Retention material

G- 10 Glass Reinforced Epoxy Laminate (GRE):

- Compression resistance: 65,000 PSI.
- Isolation strength: 750-800 VPM.
- Maximum temperature in continuous operation: 180°C (356 °F).
- Water absorption: 0.05%.
- Resistance to bending: 65,000 PSI.
- Tensile strength: 50,000 PSI.

H- 11 High Temperature Glass Reinforced Epoxy Laminate (GRE):

- Compression resistance: 50,000 PSI.
- Isolation resistance: 500 VPM.
- Maximum temperature in continuous operation: 200°C (392 °F).
- Water absorption: 0.085%.
- Resistance to bending: 57,700 PSI.
- Tensile strength: 41,000 PSI.



INSTALLATION GUIDE

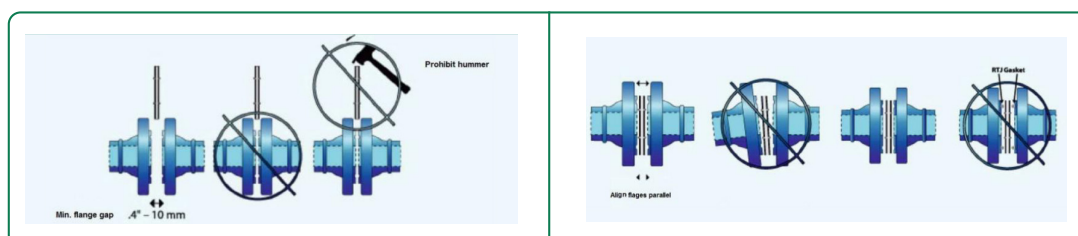
CHECK AND CLEAN

- 1.1 Remove all impurities and residues from the gasket, fixing elements (bolts, studs, nuts) and washers.
- 1.2 Check all fasteners (bolts, studs, nuts) and washers, and make sure they are free from defects such as burrs or cracks.
- 1.3 Check the flange surfaces, make sure they are free of defects that may affect the sealing function of the gasket, such as warping, radial scratches and bump marks.
- 1.4 Any defective component must be replaced.



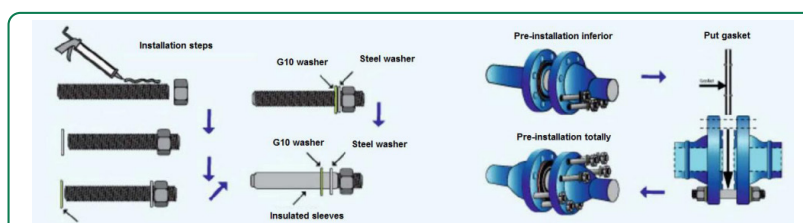
ALIGN DE FLANGES

- 2.1 Make sure the flanges and bolt holes are coaxially matched.
- 2.2 The minimum distance between flanges is 10 mm.
- 2.3 Insert the joint parallel and carefully.
- 2.4 Do not use gasket compounds, grease or lubricants with the gasket surface and flange. These compounds can affect the friction between the gasket and the flange and can cause premature threading of the gasket.



INSTALLATION OF FLANGE KITS

- 3.1 Apply bolt lubricant to the threads of bolts and nuts and to the face of the nut to be tightened, install the steel washer, insulating washer and insulating sleeve to the bolts by turns (make sure the washer is steel is always near of the nut).
- 3.2 Insert the bolt holes. Do not use forces (such as a hammer) as it will damage the sleeves. Please check the alignment, if the installation is difficult; please check the alignment of the flange surface and the size of the sleeve.
- 3.3 Put the insulating washer.



INSTALLATION GUIDE

INSTALLATION OF ISOLATION KITS

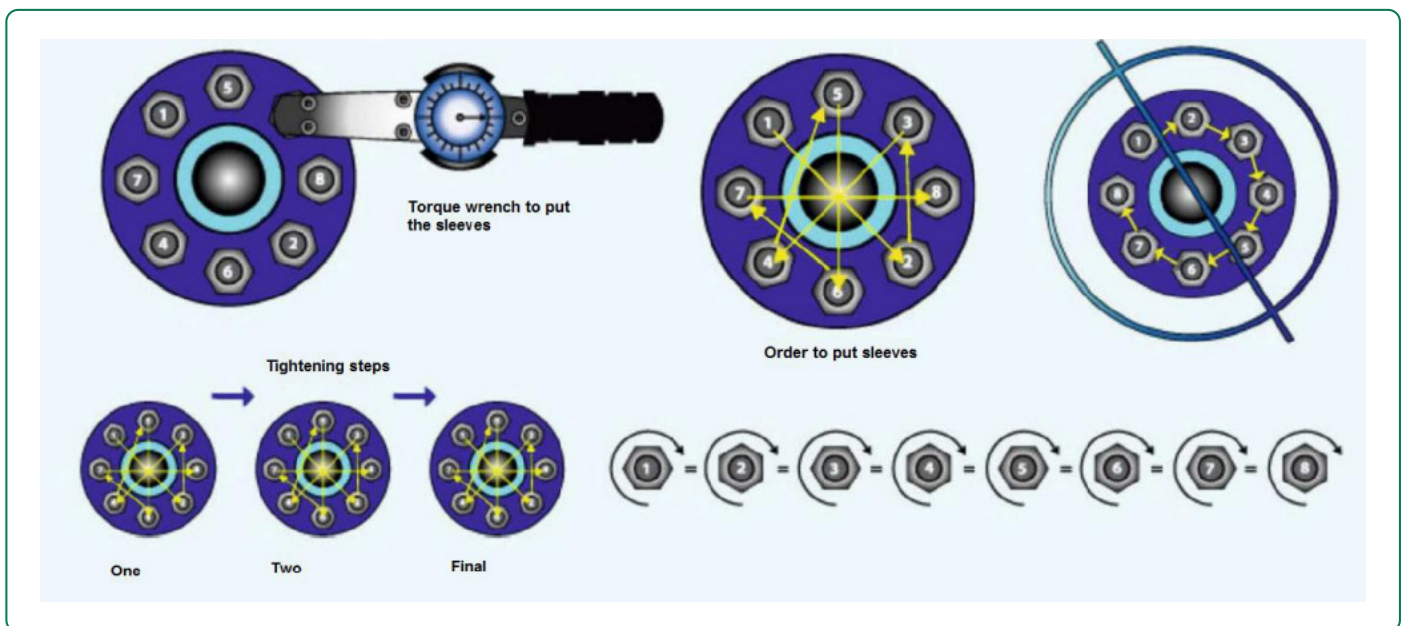
4.1 Use a calibrated torque wrench or other tool that has control functions.

4.2 Install in accordance with the recommended tightening torque.

4.3 Tighten the nut always according to the symmetrical cross drawing.

There are 5 steps they must follow:

- a) To initially tighten all nuts by hand, the large nut can use a small wrench.
- b) Tighten each nut 30% of the recommended tightening torque.
- c) Tighten each nut to 60% of the recommended tightening torque.
- d) Tighten each nut to 100% of the recommended torque.
- e) Tighten all nuts in a clockwise direction to ensure that all nuts reach the required torque.



NOTES:

Recommended torque is based on a minimum gasket seating stress of 7,500 psi.

The stated screw torque values are based on the use of lubricated screws with a friction factor of 0.16. Recommended torque values are based on the use of weld neck (integral) flanges. Different sealing loads. Bolt stress of 30 psi may exceed allowable design stress levels for certain bolt materials.

RECOMMENDED BOLT TORQUE VALUES

NOTES:

1. All values are calculated assuming a 0.11 coefficient of friction and new nuts and studs using non-metallic lubrication.
2. "M" maintenance factor = 0 "Y" minimum design seating stress = 7500 [psi]. For EVOLUTION™ isolating gasket "Y" = 0.
3. Recommended values are based on 30,000 psi bolt stress.
4. If using both lubricated and coated studs or uncoated bolts with no lubricant, contact **CPI** for recommended torque values.

NOTE: On isolating testing - any isolation testing should be completed prior to hydro testing in order to prevent media in line from causing false readings. It is suggested that isolation be checked with the use of an RF meter as per NACE SP0288-2007 standard practice.

It should be noted that humidity and other environmental effects can cause false isolation readings.

FOR METRIC TORQUE VALUES -

$$\text{Nm} = \frac{\text{ft-lb}}{0.73756}$$

divide ft-lb value by 0.73756

* For fire risk service please consider using max values

Please note that Max torque values are based on 50ksi bolt stress and using a B7, or equivalent studs, Grade 2H hex nuts, and A105 or equivalent flange material. For lower strength flanges or bolts contact CPI for torque recommendations.

Torque table for TGCDLB, TGCDPGE/TGCDPGEA, TGCDVCS, TGDVCS-OP, TGCDMAX															
NPS	150#	MAX* [ft-lb]	300#	MAX* [ft-lb]	400#	MAX* [ft-lb]	600#	MAX* [ft-lb]	900#	MAX* [ft-lb]	1500#	MAX* [ft-lb]	2500#	MAX* [ft-lb]	NPS
ASME B16.5 Recommended Values in [ft-lb]															
1/2	30	45	30	45	30	45	30	45	95	120	95	120	95	120	
3/4	30	45	55	90	55	90	55	90	95	140	95	140	95	140	3/4
1	30	45	55	90	55	90	55	90	155	220	155	220	155	220	1
1 1/4	30	45	55	90	55	90	55	90	155	255	155	255	230	350	1 1/4
1 1/2	30	45	05	160	95	160	95	160	230	380	230	380	335	530	1 1/2
2	55	90	55	90	55	90	55	90	155	255	150	245	230	380	2
2 1/2	55	90	95	160	95	160	95	160	230	380	230	380	335	530	2 1/2
3	55	90	95	160	95	160	95	160	155	255	335	560	470	785	3
3 1/2	55	90	95	160	155	255	155	255	N/A	N/A	N/A	N/A	N/A	N/A	3 1/2
4	55	90	95	160	155	255	155	255	335	560	470	785	840	1400	4
5	95	160	95	160	155	255	230	380	470	785	840	1400	1370	2170	5
6	95	160	95	160	155	255	230	380	335	560	640	1065	2080	2995	6
8	95	160	155	255	230	380	335	560	640	1065	1085	1805	2080	3155	8
10	155	255	230	380	335	560	470	785	640	1065	1700	2830	4165	6005	10
12	155	255	335	560	470	785	470	785	640	1065	2080	3465	5595	8090	12
14	230	380	335	560	470	785	640	1065	840	1400	3005	4390	N/A	N/A	14
16	230	380	470	785	640	1065	840	1400	1085	1805	4165	6105	N/A	N/A	16
18	335	560	470	785	640	1065	1085	1805	1700	2830	5595	8900	N/A	N/A	18
20	335	560	470	785	840	1400	1085	1805	2080	3465	7320	10730	N/A	N/A	20
22	470	785	840	1400	1085	1805	1370	2280	N/A	N/A	N/A	N/A	N/A	N/A	22
24	470	785	840	1400	1370	2280	1700	2830	4165	6945	11765	18060	N/A	N/A	24
ASME B16.47 Series A															
26	470	785	1085	1805	1370	2280	1700	2830	5595	9325	N/A	N/A	N/A	N/A	26
28	470	785	1085	1805	1700	2830	2080	3465	7320	12200	N/A	N/A	N/A	N/A	28
30	470	785	1370	2280	2080	3465	2080	3465	7320	12200	N/A	N/A	N/A	N/A	30
32	840	1400	1700	2830	2080	3465	3005	5005	9370	15615	N/A	N/A	N/A	N/A	32
34	840	1400	1700	2830	2080	3465	3005	5055	11765	19610	N/A	N/A	N/A	N/A	34
36	840	1400	2080	3465	2080	3465	4165	6945	11765	19610	N/A	N/A	N/A	N/A	36
38	840	1400	840	1400	1370	2280	3005	5005	11765	19610	N/A	N/A	N/A	N/A	38
40	840	1400	1085	1805	1700	2830	3005	5005	11765	19610	N/A	N/A	N/A	N/A	40
42	840	1400	1085	1805	1700	2830	4165	6945	11765	19610	N/A	N/A	N/A	N/A	42
44	840	1400	1370	2280	2080	3465	4165	6945	14540	24235	N/A	N/A	N/A	N/A	44
46	840	1400	1700	2830	2080	3465	4165	6945	17720	29535	N/A	N/A	N/A	N/A	46
48	840	1400	1700	2830	3005	5005	5595	9325	17720	29535	N/A	N/A	N/A	N/A	48
50	1370	2280	2080	3465	3005	5005	7320	12200	N/A	N/A	N/A	N/A	N/A	N/A	50
52	1370	2280	2080	3465	3005	5005	7320	12200	N/A	N/A	N/A	N/A	N/A	N/A	52
54	1370	2280	3005	5005	4165	6945	7320	12200	N/A	N/A	N/A	N/A	N/A	N/A	54
56	1370	2280	3005	5005	4165	6945	9370	15615	N/A	N/A	N/A	N/A	N/A	N/A	56
58	1370	2280	3005	5005	4165	6945	9370	15615	N/A	N/A	N/A	N/A	N/A	N/A	58
60	1370	2280	3005	5005	5595	9325	11765	19610	N/A	N/A	N/A	N/A	N/A	N/A	60

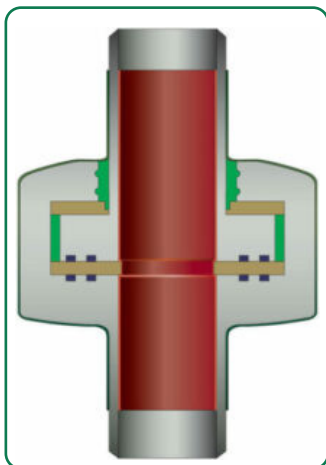
Monolithic Catjoint

The CPI-CATJOINT monolithic cathodic protection insulating joints for higher protection is a monolithic insulating joint whose function is to provide cathodic protection in the lines transporting highly corrosive product.

Monobloc-type insulating joints or insulation joints are necessary for:

- Electrically isolate a buried or submerged pipe that is to be cathodically protected from another pipe or metal structure that is not to be protected.
- When between two pipes (for example a pipe and a copper grounding system or in contact with reinforced concrete, which are cathodic with respect to steel), they serve to avoid these galvanic couples.

Its use is indicated especially when it comes to achieving maximum safety in terms of leaks and Isolation strength, having the quality that they can be buried with greater safety than insulating gaskets for flanges.



CPI-CATJOINT monolithic cathodic protection insulating joints do not depend on install a gasket, sleeves and washers on a flange at their installation site.

For the design of these Monobloc or Insulation Joints, the following must be taken into account:

- The fluid that will circulate through the pipe.
- Gas.
- Liquid fuels.
- Drinking water.
- The pressure.
- The diameter of the conduit.
- The temperature (if it is not normal room temperature).
- Pipe thickness.

Being totally hermetic, they are especially indicated, due to their greater safety, in explosive areas.

Monolithic Catjoints can be used in:

- Industrial pipeline networks and gas, hydrocarbon and water distribution stations.
- Before or after gas reduction stations.
- Warehouse facilities in oil and gas mines.
- Hydrocarbon and gas deposits and transportation networks.
- Underground installations and/or near the water and/or on the surface.

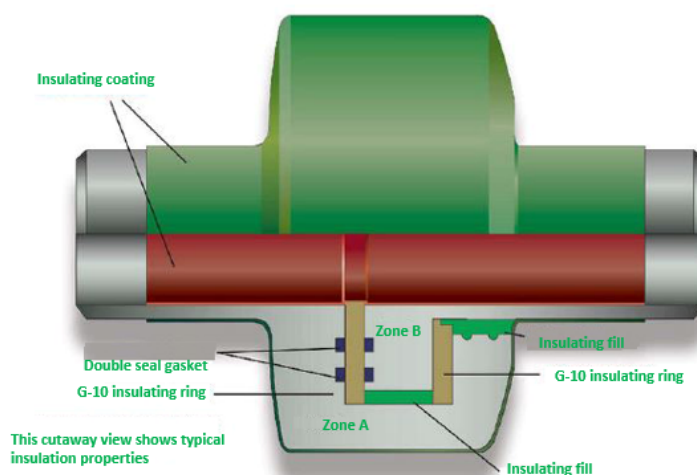
Features

- It does not require a lot of work; the installation is simpler than in the Isolation Kits.
- Requires no manholes, valves, or maintenance – welded in place and buried.
- Reliable and worry-free cathodic isolation.
- Non-conductive epoxy coatings help prevent short circuits, both externally and internally.
- Insulated from parasitic currents impressed on the tube from external forces such as electrical transmission systems, ground currents, and currents flowing from one point to another.
- Excellent bending and resistance to torsion.

Electrical properties

- The use of high quality insulating materials guarantees an excellent quality of our monolithic Isolation joints.
- Replaceable plugs can be used.
- During the electrical tests with voltage of 5 Kv (50Hz), no sparks (discharges) are noticed. This test is performed before and after the hydrostatic test, for 1 minute.
- Electrical resistance of the monoblock is greater than 5 Mohms, under the voltage of 1kV.DC (dry).
- During the tightness test of the outer coating, under voltage of 15–25 kV there are no electric discharges.

Insulating coating – Double seal gasket – G-10 insulating ring - This cutaway view shows typical insulation properties – Zone A – Zone B – Insulating fill – G-10 insulating ring – Insulating fill



Mechanical properties

- The framework of the monolithic Isolation joints is made up of a welded structure of thick sheet metal rings.
- These rings are generally made of construction steels or low alloy steels.

Basic parameters

ANSI 150 (PN 25)

- Maximum working pressure, bar – 25.0 (363 psi)
- Force Pressure Test, PT, bar – 37.5 (544 psi)
- Working temperature range TS, ° F – -4 °
- AC electrical voltage 5kV (50Hz) in 1 min. time (dry)
- Withstand DC voltage 1kV (dry) R, MΩ – 5.0

ANSI 300 (PN 65)

- Maximum working pressure, bar – 63.0 (914 psi)
- Pressure Test Force, PT, bar – 94.5 (1370 psi)
- Working temperature range TS, ° F – -4 °
- AC electrical voltage 5kV (50Hz) in 1 min. time (dry)
- Resistance at voltage DC 1kV (in dry condition) R, MΩ – 5.0

ANSI600 (PN100)

- Maximum operating pressure, bar – 100.0 (1450 psi)
- Pressure Test Force, PT, bar – 150.5 (2183 psi)
- Working temperature range TS, ° F – -4 °
- AC electrical voltage 5kV (50Hz) in 1 min. time (dry)
- Withstand DC voltage 1kV (dry) R, MΩ – 5.0

