Ring Type Joints

How They Work

Under axial compressive load, ring type joints plastically deform and flow into the irregularities of the flange groove. Since the load bearing area of the ring type joint is relatively small, very high surface stresses result between the sealing faces of the ring type joint and the groove. These stresses are further increased on the Style RX and BX rings which allows for very high internal pressures to be sealed.

Since ring type joints are solid metal, their recovery characteristics are poor. The seal is maintained by the action of axial load upon the gasket.

Surface Finish Requirements

With all metal to metal type seals, it is imperative that the gasket and groove sealing faces are free from indentations, score marks, tool/chatter marks and other imperfections. The surface finish of the gasket and groove sealing faces is also critical and should not exceed the following:

Style R and RX	63 microinches Ra maximum (1.6 micrometer Ra)
Style BX	32 microinches Ra maximum (0.8 micrometer Ra)

Reuse

Ring type joints are designed to have a limited amount of positive interference, which ensures that the ring type joint seats correctly into the groove on compression. Their reuse is not recommended for two reasons:

- The initial seating of the gasket will be impaired.
- When the gasket is plastically deformed, work hardening of the external metal surface occurs. This may result in permanent damage to the groove.

Hardness of Materials

On compression of the flange assembly, it is imperative that the ring type joint be significantly softer than the flange groove so that the gasket plastically deforms and not the groove. The use of harder ring type joints can result in flange groove damage. For this reason, ring type joints are supplied with the following maximum hardness values:

Material	Werkstoff Number	Maximum Hardness		Identification
		Brinell*	Rockwell B†	
Soft Iron		90	56	D
Low Carbon Steel		120	68	S
4 - 6% Chrome 1/2% Moly.		130	72	F5
Type 304 Stainless Steel	1.4301	160	83	S304
Type 316 Stainless Steel	1.4401	160	83	S316
Type 347 Stainless Steel	1.4550	160	83	S347
Type 410 Stainless Steel	1.4006	170	86	S410

** Measured with 3000Kg load except soft iron which is measured with 500Kg load*
† Measured with 100 Kg load and 1/16" diameter ball.

Some materials can be supplied with NACE certification on request.

Protective Coating

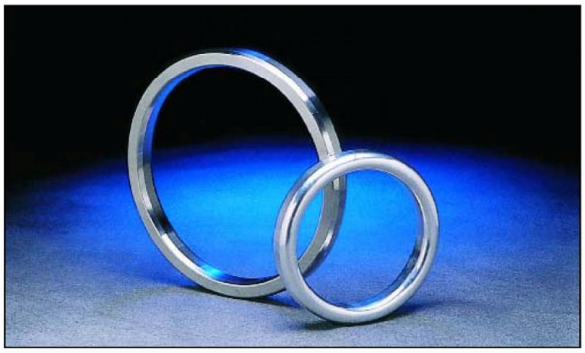
In accordance with API Specifications, soft iron, low carbon steel, and other ferrous materials ring type joints are protected from corrosion with electroplated zinc to a maximum thickness of 0.0003". Alternative material coatings can be supplied on request.

STYLE R

The Ring Type Joint was initially developed for high pressure/temperature applications found in the petroleum industry and is primarily used in the oil field on drilling and completion equipment. However, today this product range can also be found on valves and pipework assemblies, along with some high integrity pressure vessel joints.

Standard Style R Ring Type Joints are manufactured in accordance with both API 6A and ASME B16.20 size/ratings. Available in both oval and octagonal configurations, both types are interchangeable on the modern octagonal type grooved flanges.

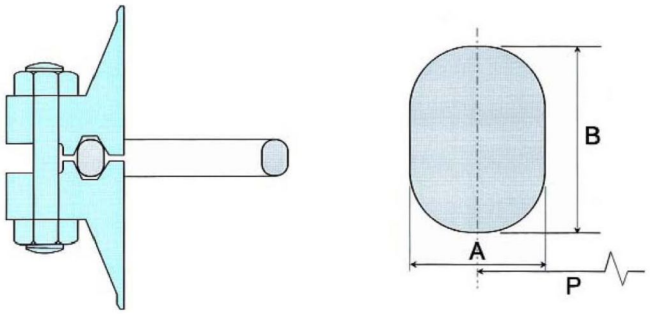
As with all solid metal Ring Type Joints including Style R, it is recommended to replace the ring when flange connection is broken.



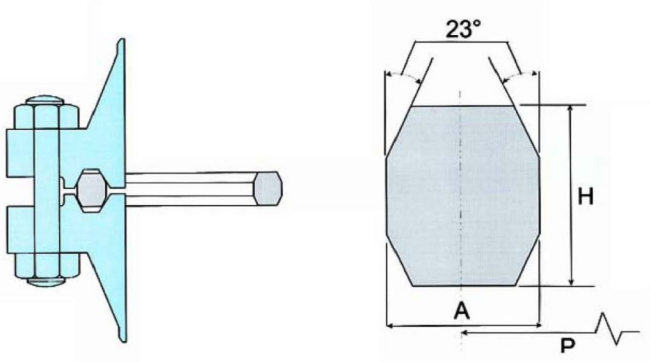
Style R

DIMENSIONAL DATA – STYLE R

OVAL



OCTAGONAL



TOLERANCES: (INCHES)	
A (width of ring)	±0.008
B, H (height of ring)	±0.020
P (average pitch diameter of ring)	±0.007
23° (angle)	±1/2°

Flexitallic Style R Ring Type Joints can be manufactured in accordance with all relevant standards to suit the following flange designations:
API 6A
ASME/ANSI B16.5
MSS SP44 (ASME B16.47 SERIES A)
BS 1560

STYLE RX

The Style RX is an adaptation of the standard Style R which energizes on assembly. The RX is designed to fit the same groove design as a standard Style R, making the joints interchangeable.

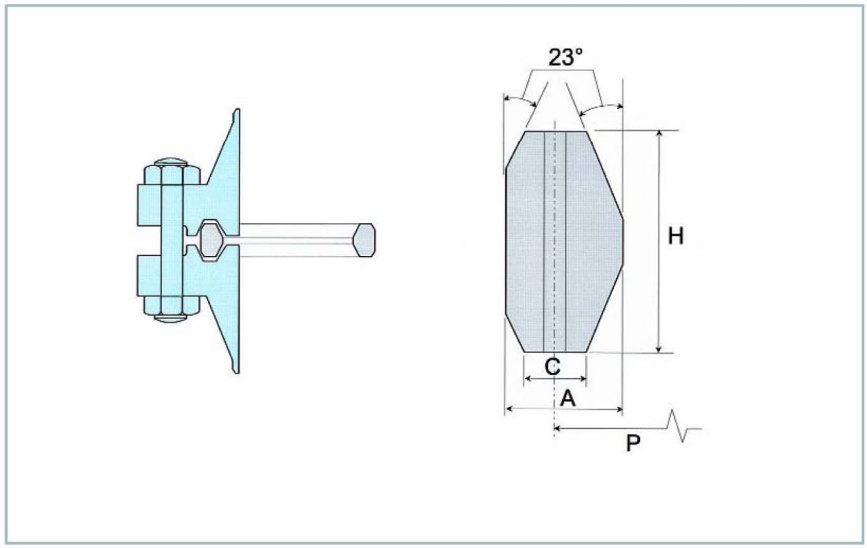
Consideration should be given to the difference in finished make-up distance.

The modified design uses an energizing on assembly effect which improves the efficiency of the seal.

Designs are also available for Subsea applications.

Style RX

DIMENSIONAL DATA – STYLE RX



TOLERANCES: (INCHES)

A* (width of ring)	+0.008,-0.000
H* (height of ring)	+0.008,-0.000
OD (od of ring)	+0.020,-0.000
23° (angle)	± 1/2°

*A plus tolerance of 0.008 inches for width 'A' and height 'H' is permitted, provided the variation in width or height does not exceed 0.004 inches throughout its entire circumference.

NOTE 1:
The pressure passage hole illustrated in the Ring Type Joint cross section ensures equalization of pressure which may be trapped in the grooves, it is in rings RX82 through RX91 only. Center line of hole shall be located at mid point of dimension "c" (width of flat). Hole diameter shall be as follows:

0.06 inches for rings RX82 through RX85;
0.09 inches for rings RX86 and RX87;
0.12 inches for rings RX88 through RX91.

STYLE BX

The Style BX energized Ring Type Joints, manufactured in accordance with API 6A, are designed for use on pressurized systems up to 20,000 psi.

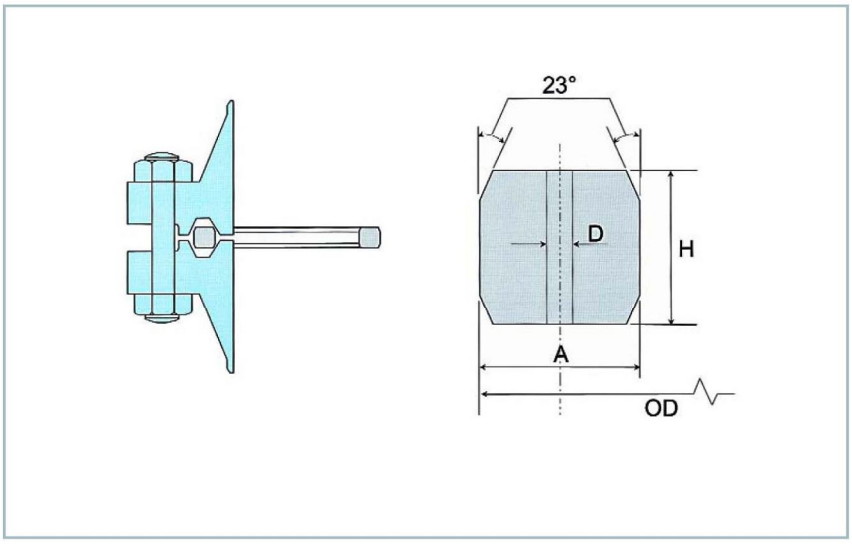
When correctly fitted, the style BX gasket allows virtual face to face contact of the flange faces which means that the gasket is fully trapped on both the inner and outer diameters.

All BX gaskets incorporate a pressure balance hole to ensure equalization of pressure which may be trapped in the grooves.

Designs are also available for Subsea applications.

Style BX

DIMENSIONAL DATA – STYLE BX



TOLERANCES: (INCHES)

A* (width of ring)	+0.008,-0.000
D (hole size)	± 0.02
H* (height of ring)	+0.008,-0.000
OD (od of ring)	+0.000,-0.005
23° (angle)	± 1/4°

One pressure passage hole required per ring on center line *A plus tolerance of 0.008 inches for width ‘A’ and height ‘H’ is permitted, provided the variation in width or height does not exceed 0.004 inches throughout its entire circumference.

NOTE 1:
Radius of the ring shall be 8% to 12% of the ring height ‘H’.