

<b>COMPANY:</b>	<b>PHONE:</b>
<b>CONTACT:</b>	<b>FAX:</b>
<b>ADDRESS:</b>	<b>E-MAIL:</b>
<b>DATE:</b>	<b>QUOTE DUE DATE:</b> (UPDATE:)

**APPLICATION DETAILS:** (Please Attach Customer Drawing / Sketch)

Brief Description:

Annual quantities: RFQ Quantities:

Is This a New Design?  Yes  No Are Modifications Possible?  Yes  No

Drawing or Sketch Attached?  Yes  No What is the Seal Type?  Shaped  Circular

See Presentation Reference Drawing/Spec #:

**SERVICE CONDITIONS:**

Media:	Life Expectancy:
Working Temperature:	Max/Proof Pressure: @ Temp. =
Working Pressure:	Max Temperature: @ Pressure =
Pressure Direction: (Internal/External/Axial)	<b>Target Sealing Level:</b> Helium: Std.cc/sec
Pressure Cycles:	Flow Rate: cc/minute
Temperature Cycles:	Other:

**FLANGE DETAILS:** (Please Provide Drawing)

Amount of Flange Movement in Service (inches) Radial: Axial: #Cycles:

Material: Thickness:

Groove / Counter Bore: Please list dimensions in Groove Details section

ANSI Raised Face: Size: # Rating: Face Surface Finish: (RMS)

Flange(s) with Clamping System: (ISO, KF, etc) Standard: Size:

Other: Description: (Please Provide Drawing)

**GROOVE DETAILS:** (Please Provide Drawing)

Type (Round, Rectangular, Dovetail, etc.):

Outer Diameter:	Tolerance:	Depth:	Tolerance:
Inner Diameter:	Tolerance:	<b>Finish (RMS)</b>	Type:

*Finish Type: lathe (circular), endmill (multi directional), other...*

**BOLTING DETAILS:** (Please Provide Drawing)

Size:	Type / Grade:
Number: Bolt Circle:	Tapped / Through:

**OTHER:**

Special coating / plating specification:

Special quality / inspection specifications:

Other:

## Typical Bolt / Fastener Information

Size / Nominal Diameter	Nominal Diameter inches	Pitch (THD/IN)	Area at Root of Thread sq. in.	30000 PSI Stress		45000 PSI Stress		60000 PSI Stress	
				Fastener Preload lbs	Torque Req'd K= .15 lbs-in	Fastener Preload lbs	Torque Req'd K= .15 lbs-in	Fastener Preload lbs	Torque Req'd K= .15 lbs-in
#6	0.138	32	0.008	225	5	338	7	450	9
#8	0.164	32	0.012	360	9	540	13	720	18
#10	0.190	24	0.015	435	12	653	19	870	25
#12	0.226	24	0.021	618	21	927	31	1236	42
1/4"	0.250	20	0.027	807	30	1211	45	1614	61
5/16"	0.313	18	0.045	1362	64	2043	96	2724	128
3/8"	0.375	16	0.068	2034	114	3051	172	4068	229
7/16"	0.438	14	0.093	2799	184	4199	276	5598	367
1/2"	0.500	13	0.126	3771	283	5657	424	7542	566
9/16"	0.563	12	0.162	4860	410	7290	615	9720	820
5/8"	0.625	11	0.202	6060	568	9090	852	12120	1136
3/4"	0.750	10	0.302	9060	1019	13590	1529	18120	2039
7/8"	0.875	9	0.419	12570	1650	18855	2475	25140	3300
1"	1.000	8	0.551	16530	2480	24795	3719	33060	4959
1-1/8"	1.125	8	0.728	21840	3686	32760	5528	43680	7371
1-1/4"	1.250	8	0.929	27870	5226	41805	7838	55740	10451
1-3/8"	1.375	8	1.155	34650	7147	51975	10720	69300	14293
1-1/2"	1.500	8	1.405	42150	9484	63225	14226	84300	18968
1-3/4"	1.750	8	1.980	59400	15593	89100	23389	118800	31185
2"	2.000	8	2.652	79560	23868	119340	35802	159120	47736

### NOTES:

1. For fasteners larger than one Inch, It is often customary to use a thread pitch of 8 In place of UNC thread pitch.
2. Contact Applications Engineering for other sizes.
3. These values/estimates are offered as guidelines only. There are many other factors that the flange designer must consider such as: thermal cycling, vibration, cyclic fatigue, flange thickness, flange rotation, bolt stress relaxation, additional bolt preload, externally applied loads, etc. The customer is responsible for the flange design and for ensuring that the flanges, bolts and bolt loads are sufficient for the application. Please refer to Section VIII of the ASME Boiler and Pressure Vessel Code for code requirements.

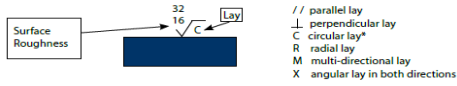
This conversion Chart will help with any conversion about Groove/Flange surface finish

### Surface Finish

The leak rate of any joint is largely influenced by the condition of the surfaces in the joint. Leak paths are inherent in any sealing surface. Both the surface roughness of the seal and the surface roughness of the mating flange surfaces will affect sealing performance.

Surface roughness, also called surface texture or finish, is a trait of any surface. The design engineer usually specifies the required surface roughness of a flange sealing surface to ensure proper function of the flange in the joint.

Surface roughness is usually specified with a "check mark" symbol on a drawing as shown in the figure below. Surface roughness is typically indicated in RMS or microinches ( $\mu\text{in}$ ) and is located on the left side of the symbol above the check mark. In the example below the roughness value is 32 RMS maximum and 16 RMS minimum. If a single value is specified, this value is interpreted as a maximum value.

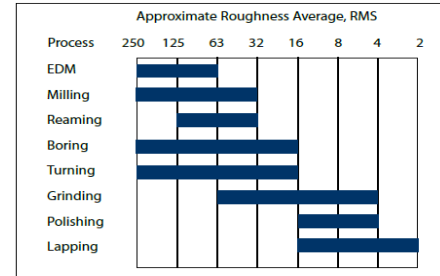


\* Most metal seal applications require a circular or circumferential lay

The directional lay of a finished surface refers to the direction of the machining or polishing marks. The lay of a sealing surface is specified under the surface roughness symbol as shown in the figure above.

Surface Finish Conversion Chart						
N	Rt	Ra	CLA	RMS	Cut-off length	
					Inches	mm
1.	0.3	0.025	1	1.1	0.003	0.08
2.	0.5	0.05	2	2.2	0.01	0.25
3.	0.8	0.1	4	4.4	0.01	0.25
4.	1.2	0.2	8	8.8	0.01	0.25
5.	2.0	0.4	16	17.6	0.01	0.25
6.	4.0	0.8	32	35.2	0.03	0.8
7.	8.0	1.6	63	64.3	0.03	0.8
8.	13	3.2	125	137.5	0.1	2.5
9.	25	6.3	250	275	0.1	2.5
10.	50	12.5	500	550	0.1	2.5
11.	100	25.0	1,000	1,100	0.3	8.0
12.	200	50.0	2,000	2,200	0.3	8.0

N = New ISO scale numbers  
Rt = Roughness, total in microns  
Ra = Roughness, average in microns  
CLA = Center line average in microinches  
RMS = Root mean square in microinches



## Equivalent Leakage Rates

Std cc/sec*	mbar-l/sec	Torr Liters/sec	Time for one cc to Leak	Time for one bubble** to leak
10 <sup>-1</sup>	1.01 x 10 <sup>-1</sup>	7.6 x 10 <sup>-2</sup>	10 seconds	0.25 seconds
10 <sup>-2</sup>	1.01 x 10 <sup>-2</sup>	7.6 x 10 <sup>-3</sup>	100 seconds	2.5 seconds
10 <sup>-3</sup>	1.01 x 10 <sup>-3</sup>	7.6 x 10 <sup>-4</sup>	16.7 minutes	25 seconds
10 <sup>-4</sup>	1.01 x 10 <sup>-4</sup>	7.6 x 10 <sup>-5</sup>	2.8 hours	4 minutes
10 <sup>-5</sup>	1.01 x 10 <sup>-5</sup>	7.6 x 10 <sup>-6</sup>	28 hours	40 minutes
10 <sup>-6</sup>	1.01 x 10 <sup>-6</sup>	7.6 x 10 <sup>-7</sup>	11.5 days	7 hours
10 <sup>-7</sup>	1.01 x 10 <sup>-7</sup>	7.6 x 10 <sup>-8</sup>	3.8 months	3 days
10 <sup>-8</sup>	1.01 x 10 <sup>-8</sup>	7.6 x 10 <sup>-9</sup>	3.2 years	1 month
10 <sup>-9</sup>	1.01 x 10 <sup>-9</sup>	7.6 x 10 <sup>-10</sup>	32 years	9 months
10 <sup>-10</sup>	1.01 x 10 <sup>-10</sup>	7.6 x 10 <sup>-11</sup>	320 years	8 years
10 <sup>-11</sup>	1.01 x 10 <sup>-11</sup>	7.6 x 10 <sup>-12</sup>	3200 years	80 years

\* Std cc/sec = One cubic centimeter of gas flow per second at 14.7 psi of pressure and a temperature of 77°F

\*\* Bubble diameter is 3mm

Leak Legend	Approximate Leak Rates per meter of circumference	Actual leak rate in service will depend on the following:
Ultra-Helium	≤ 1 x 10 <sup>-11</sup> std.cc/sec He	<b>Seal Load:</b> Wall Thickness or Spring Load <b>Surface Finish:</b> Seal and Cavity <b>Surface Treatment:</b> Coating/Plating/Jacket Material
Helium	≤ 1 x 10 <sup>-9</sup> std.cc/sec He	
Bubble	≤ 1 x 10 <sup>-4</sup> std.cc/sec He	
Low Bubble	≤ 25 cc/sec @ 50 psig Nitrogen per inch of diameter	