# PT. KAKAS NURAIN FALAH

## SPIRAL WOUND GASKETS
## METAL JACKETED GASKET
## SOLID METAL GASKET
## KAMMPROFILE GASKET
## RING JOINT GASKET

Driven by the industry's need for safe, effective sealing solutions, KANUR invented the spiral wound gasket.


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HTTPS://KANUR.ID/

# SPIRAL WOUND GASKETS

3Star Spiral Wound Gasket is a semi-metallic gasket which is commonly used as sealing on pipe joints. The size of the Spiral Wound Gasket was designed to refer to the ASME B16.5, BS1560, ASME Series A (MSS-SP44) Flange design standards, ASME B16.47 Series B (API605), BS EN 1092 (BS (4504), DIN and also JIS Design Pressure Spiral Wound Gasket 125 PSI - 2500 PSI. To meet the aplications needs, 3Star Spiral Wound Gasket can be offered complete assembly Outer Ring (Centering Ring), Inner Ring and Seal Component (Basic) or partially assembly.

In its development, 3Star Spiral Wound Gasket product already meets the criteria for use in critical applications especially in Oil & Gas industry. This Spiral Wound Gasket gasket is excellent in term for use as prevention of leakage at the pipeline connections where there is potentially fire, toxic waste pollution and negative impact to the environment.

Spiral Wound Gasket has been passed through Fire Test Qualification test and is certified by Yarmouth Research and Technology with API Spec 6FB reference standards

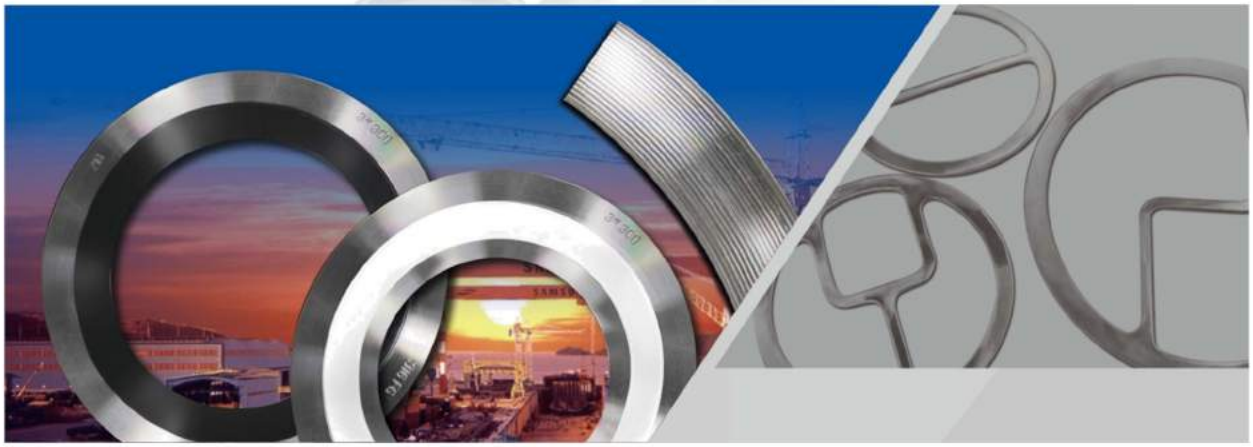
Additional : Another development of 3Star Spiral Wound Gasket. Specially Engineered Spiral Wound Gasket has been tested Fugitive Emissions to meet and achieve the needs in industry especially in Oil & Gas industry. The fugitive emission testing process refers to Chevron Fugitive Test (CFET) testing protocol which complies with the EPA request for Fugitive Emission Levels gaskets comply with the allowable fugitive emission leakage levels

Need to Find Out

Improving services to clients, 3Star Spiral Wound Gasket product, presented printed Barcode on the surface of each products which provide convenience of client and manufacture in:

- Traceability -Instant solution to find the SWG specfications
- Quality Find out more about 3STAR Spiral Wound Gasket
- Installation Guide-Find out the way to proper installation
- Link-Easy way to find & connect with us

# SPIRAL WOUND GASKETS



**Flamable Lock at Connection**

- **Suitable for High Pressure Applications**
- **Certified to API 607 - ISO 10497**
- **Proven High Performance Design**
- **Spiral Wound size variants cover broad range of Applications**

**Spiral Wound Gasket products are manufactured in accordance with all relevant gasket to suit flange designations : ASME B16.5, BS 1560, ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (AP1605), BS EN 1092 (BS4504; plus DIN, JIS and NF**

**fire safe Spiral Wound Gasket are specialy designed for use in area where essentially concern to prevent leakage and flammable, toxic or corrosive products under the emergency fire conditions**

**Used in some hot gas applications, beside as filter for spiral wound gasket mica will act as oxidation barrier in combination with other sealing materials such as using premium oxidation inhibited grade flexible fraphite the Spiral Wound Gasket provides soft conforming material in fire-safe design with excellent chemical resistance**

**Spiral Wound Gasket assemblies has pass through the Fire Test Qualification done & certified by Yarmouth Research and Technology, LLC accordance with the standards of API Spec 6FB**

# SPIRAL WOUND GASKETS

## Spiral Wound Gasket Feature & Construction

**The Spiral wound gasket is the ideal gasket in the semi-metallic category. The effects of pressure and temperature fluctuations, the temperature difference across the flange face, along with flange rotation, bolt stress relaxation and creep, demand a gasket with adequate flexibility and recovery, to maintain a seal under variable working conditions. The spiral wound gasket meets these reqirements.**

**Widely used in the petrochemical, power plant, shipbuilding and oil refining industries where a cryogenic to high temperature and high pressure is required**

- **Resistance to high temperature and high pressure.**
- **Superior resilience with allows the gasket to adjust automatically to change in operating conditions, like pressure and thermal shocks, vibrants, etc**
- **Excellent sealing performance even on irregular flange surface finishes**
- **Designed to dimensions and shapes(round, oval, square, diamond, etc) with economical costs**
- **Various hoop & filler materials available for operating conditions**

**Metal Winding and Fillerher**
**The unique structure of alternate piles of perfomed widing metal strip and a soft non-metallic filler materials with "V" shape allows superior resiliency and self - adjustment**

**The soft non - metallic fillers having good chemical resistance & heat resistance are necessarily with me metal widing on both contac faces of the gasket, thus producing a smooth sealing surfaces.**

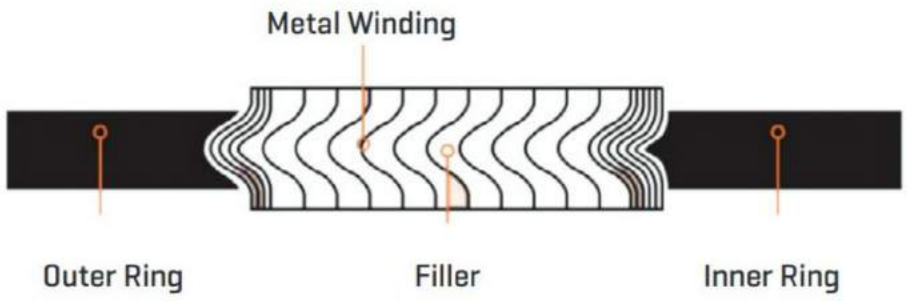
**When recomended the use of Outer Ring**

- **To make Gasket centering with**
- **To protect Gasket Body**
- **To prevent over compression damage which might occur due to the high available bolt loading**

**When recommended the use Inner Ring**

- **Under high pressure & temperature in process**
- **To protect accumulation of solids, reduce turbulents of process and minimize erosion of faces.**
- **When bigger size gasket required**
- **When the use of Expanded Graphite Strip, Expanded PTFE Strip**
- **to prevent over compression damage**

**Structure**
**The Spiral wound gasket**

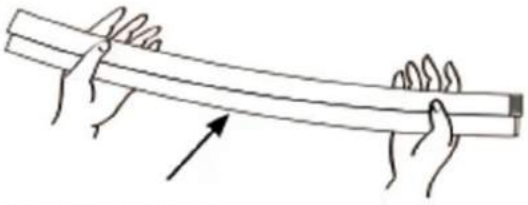


# HOW TO ORDER SPIRAL WOUND GASKET

**How to Handle and use big sized Semi Metallic Gasket**

**Carrying**

**Specified workers required when carrying bis size gasket to prevent deformation and it shall be moved in even interval for safety protection.**



Outer Ring (Center Ring)

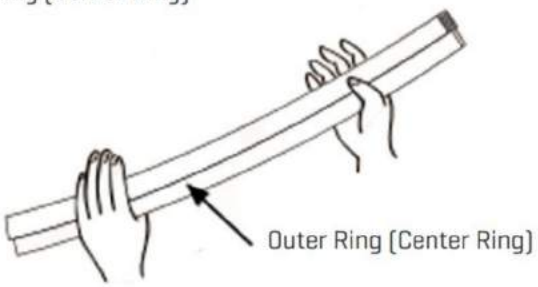
**Grid Method**

**a. Horizontally**

**Keeping your palm horizontal, place the gasket on the palms and then but softly hold it with your thumbs.**

**b. Vertically**

**Keep your palms vertically and hold the gasket with thumbs and remining firmly so as not to drop it.**



Outer Ring (Center Ring)

* Treating : Gasket must not be thrown and fallen

**Storage and Precautions**

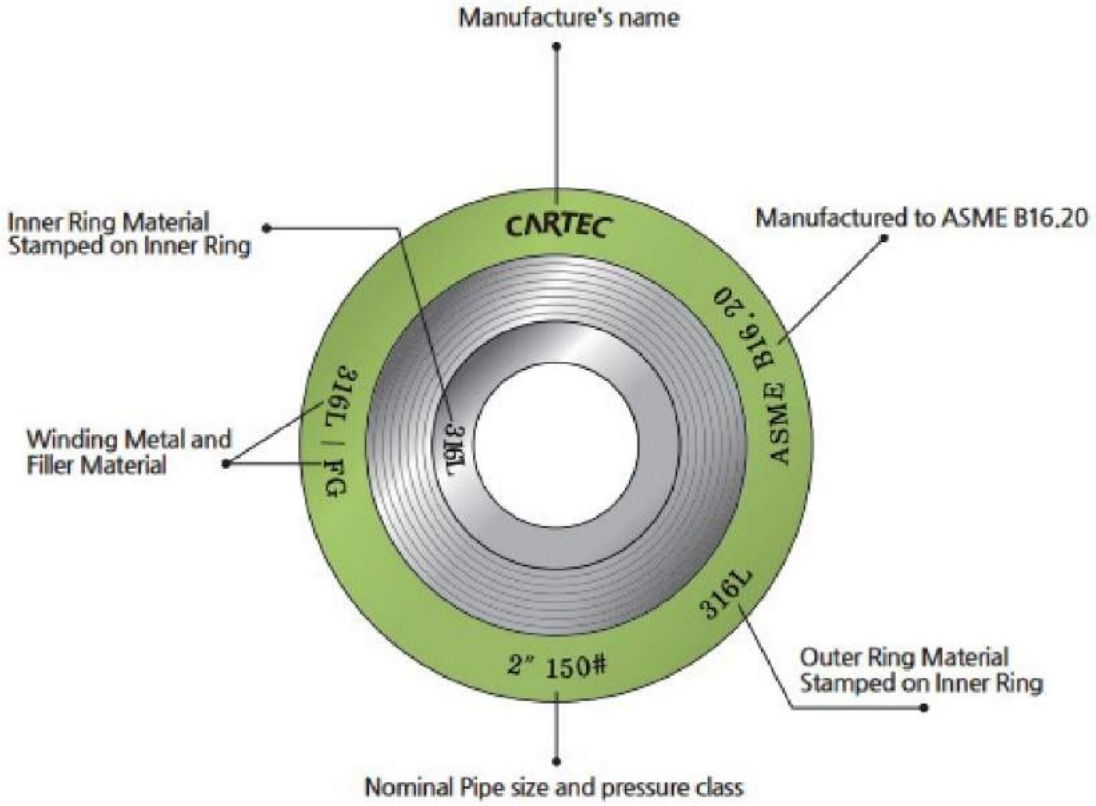
**Please do not put any of heavy things on top of the gasket**

- **Please do not stroage in unstable and vibration conditions.**
- **Please avoid direct sunlight and keep in cool place, caring of humid and dust.**
- **Please observe & out process.**
- **Please pile up old gasket on top and using new one storages in bottom.**

| Diameter | 1500 mm Under | 2000 mm Under | 2500 mm Under | 3000 mm Under | 3500 mm Under | 1500 mm Over |
|---|---|---|---|---|---|---|
| Min. Worker | 2 | 3 | 4 | 6 | 7 | 8 |

# SPIRAL WOUND GASKETS

## Spiral Wound Gasket Marking




### Cross Section as Flanges

| Type | Cross Section | Flanges | Remarks |
|---|---|---|---|
| Basic |  | Tongue & Groove<br>Male & Female | Air Filter , Inner ring type should be recommended |
| With Inner Ring Type |  | Male & Female | |
| With Outer Ring Type |  | Raised Face & Flat Face | |
| With Inner and Outer Type |  | Raised Face & Flat Face | |

### Recommended Compressed Thickness

| Gasket Thickness | RCT |
|---|---|
| 3.2 | 2.4 - 2.6 |
| 4.5 | 3.2 - 3.4 |
| 6.4 | 4.6 – 4.8 |

### Recommended Gasket Thickness

| Gasket Thickness | RCT |
|---|---|
| 4.5mm | ~ Ø 1000 |
| 6.4mm | Ø 1000 ~ |

# SPIRAL WOUND GASKETS

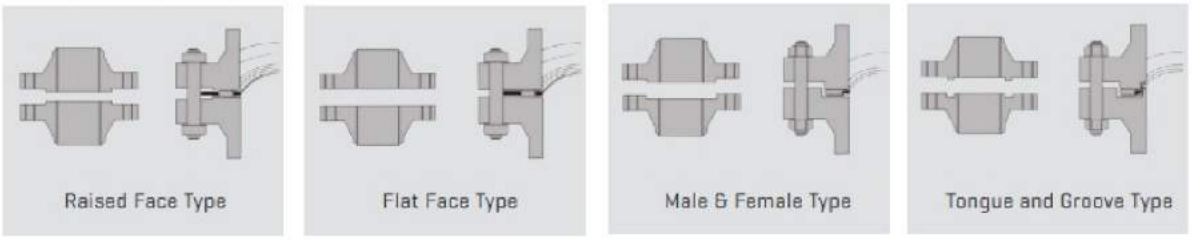
## Tolerance of Dimensions

| Type | Nominal Pipe Size [ NPS ] | Inner Ring I.D (D1 ) | Gasket I.D (D2 ) | Gasket O.D (D3 ) | Gasket O.D (D3 ) | Gasket Thickness T(2 ) |
|---|---|---|---|---|---|---|
| | 1/2"~3" | ±0.8 | ±0.4 | ±0.8 | | |
| | 4"~ 8" | ±1.5 | | | | |
| | 10"~ 24" | | ±0.8 | +1.5, -0.8 | ±0.8 | ±0.13 |
| | 26"~ 34 | ±1.5 | | ±1.5 | | |
| | 36"~ 60" | | ±1.3 | | | |

## Cross Section and ZEL No.

| Cross Section | Metal Winding | Filler Material | | | Application | Standard |
|---|---|---|---|---|---|---|
| | | Non – Asbestos | Expanded graphite | Expanded PTFE | | |
| Gasket Thickness : 4.5 mm Basic Type (Without anything attached) | SS 304<br>SS 316<br>As Specified | 3804<br>3806<br>3808 | 3804-GRP<br>3806-GRP<br>3808-GRP | 3804-PTFE<br>3806-PTFE<br>3808-PTFE | High temperature & Pressure Equipment, Extreme Low Temperature Equipment, Valve, Boiler Manhole, Hand hole, Turbine, Pump, Casting Cover T&G, M&F Flange Special Flange | KS B1518<br>JIS B2404<br>JPI 7S-41 |
| Inner Ring : Low Carbon Steel 3.2 mm Stainless Steel 3.0 mm Gasket Thickness : 4.5 mm With Inner Ring attached | SS 304<br>SS 316<br>As Specified | 3804-R<br>3806-R<br>3808-R | 3804-R-GRP<br>3806-R-GRP<br>3808-R-GRP | 3804-R-PTFE<br>3806-R-PTFE<br>3808-R-PTFE | High temperature & Pressure Equipment, Extreme Low Temperature Equipment T&G. M&F Flange | KS B1518<br>JIS B2404<br>JPI 7S-41 |
| Inner Ring : Low Carbon Steel 3.2 mm Stainless Steel 3.0 mm Gasket Thickness : 4.5 mm With Outer guide Ring attached | SS 304<br>SS 316<br>As Specified | 3834<br>3836<br>3838 | 3834-GRP<br>3836-GRP<br>3838-GRP | 3834-PTFE<br>3836-PTFE<br>3838-PTFE | High temperature & Pressure Equipment, Extreme Low Temperature, Pipe, General Pipe Flange, R.F. Flange, Flat Flange | KS B1518<br>JIS B 2404<br>JPI-7S-41<br>ASME B16.20 |
| Inner Ring : Low Carbon Steel 3.2 mm Stainless Steel 3.0 mm Gasket Thickness : 4.5 mm With Outer guide Ring and Inner attached | SS 304<br>SS 316<br>As Specified | 3834-R<br>3836-R<br>3838-R | 3834-R-GRP<br>3836-R-GRP<br>3838-R-GRP | 3834-R-PTFE<br>3836-R-PTFE<br>3838-R-PTFE | Paces recurring Merits of Outer and inner Rings, RF Flange, Flat Flange | KS B1518<br>JIS B 2404<br>JPI-7S-41<br>ASME B16.20 |

## Recommended Gasket Style



# Maximum Bore of ASME B16.5 Flanges for use with Spiral Wound Gaskets

<table>
<tr><th rowspan="2">Flange Size (NPS)</th><th colspan="8">Pressure Class</th></tr>
<tr><th>75</th><th colspan="2">150</th><th>300</th><th>400</th><th>600</th><th>900(1)</th><th>1500(1)</th><th>2500(1)</th></tr>
<tr><td>1/2</td><td rowspan="16">No flange</td><td colspan="2" rowspan="3">W/N Flange only (2)</td><td rowspan="15">No Flanges Use Class 600</td><td rowspan="3">W/N Flange only (2)</td><td rowspan="15">No Flanges Use Class 1500</td><td colspan="2" rowspan="3">W/N Flange only (2)</td></tr>
<tr><td>3/4</td></tr>
<tr><td>1</td></tr>
<tr><td>1 1/4</td><td colspan="2" rowspan="2">SO Flange (3)<br>W/N Flange (2)</td><td rowspan="2">SO Flange (3)<br>W/N Flange (2)</td></tr>
<tr><td>1 1/2</td></tr>
<tr><td>2</td><td colspan="2" rowspan="2">SO Flange (3)<br>W/N Flange, any bore</td><td rowspan="2">SO Flange (3) W/N Flange, any bore</td><td colspan="2" rowspan="2">W/N Flange with SW bore(Includes nozzle(4) but excludes SO Flange)</td></tr>
<tr><td>2 1/2</td></tr>
<tr><td>3</td><td colspan="2" rowspan="13">SO Flange W/N Flange, any bore</td><td colspan="2" rowspan="6">W/N Flange with Schedule 10S bore described in ASME B36.19M(Includes nozzle(4) but excludes SO Flange)</td><td colspan="2" rowspan="12">W/N Flange with Schedule 80 bore (excludes nozzle (4) and SO Flange)(5)</td><td rowspan="12">No Flanges</td></tr>
<tr><td>4</td></tr>
<tr><td>6</td></tr>
<tr><td>8</td></tr>
<tr><td>10</td></tr>
<tr><td>12</td></tr>
<tr><td>14</td><td colspan="2" rowspan="7">W/N Flange with Schedule 10S bore described in ASME B36.19M(Includes nozzle(4) and excludes SO Flange)(5)</td></tr>
<tr><td>16</td></tr>
<tr><td>18</td></tr>
<tr><td>20</td></tr>
<tr><td>24</td></tr>
</table>

General Note

- This table shows the maximum bore of for which the spiral wound gasket dimensions shown in Table 9(ASMEB16.20:2007) are recommended, considering the tolerances involved, possible eccentric installation, and the pissibility that the gasket may extend into the assembled Flange bore.
- For maximum permissible Flange bores for nonmandatory inner rings.
- Abbreviations: So = slip on and threaded, W/N = welding neck, and SW = standard wall.

Note

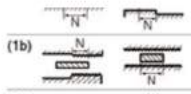
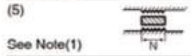
- Referto para. 3.2.5(ASME B16.20) for required use of inner rings. These inner rings may extendinto the pipe bore a maximum of 1.5mm under the worst combination of maximum bore, eccentricinstallation, and additive tolerances.
- In these sizes, the gasket is suitablefor a weldingneck flange with a standardwall bore, if the gasket and the flangesare assembled concentrically. This also applies to a nozzle. It is the user's responsibility to determineif the gasketis satis- factory for a flanges of any larger bore
- Gaskets in these sizes are suitable for slip-on flanges only if the gaskets and are assemblesconcentrically.
- A nozzle is a long weldingneck; the bore equals the flanges NPS.
- An NPS 24 gasket is suitablefor nozzles

# Spiral Wound Gasket Feature & Construction

| Outside Diameter of Gasket [Note (1)] | | | SI Units, mm | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inside Diameter of Gasket by Class [Notes (2), (3)] | | | | | | | Outside Diameter of Centering Ring by Class [Note (4)] | | | | | | | |
| | Classes | Classes | | | | | | | | | | | | | | | |
| Flange Size (NPS) | 150, 300, 400, 600 | 900, 1500, 2500 | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
| 1/2 | 31.8 | 31.8 | 19.1 | 19.1 | [Note (5)] | 19.1 | [Note (5)] | 19.1 | 19.1 | 47.8 | 54.1 | [Note (5)] | 54.1 | [Note (5)] | 63.5 | 69.9 |
| 3/4 | 39.6 | 39.6 | 25.4 | 25.4 | [Note (5)] | 25.4 | [Note (5)] | 25.4 | 25.4 | 57.2 | 66.8 | [Note (5)] | 66.8 | [Note (5)] | 69.9 | 76.2 |
| 1 | 47.8 | 47.8 | 31.8 | 31.8 | [Note (5)] | 31.8 | [Note (5)] | 31.8 | 31.8 | 66.8 | 73.2 | [Note (5)] | 73.2 | [Note (5)] | 79.5 | 85.9 |
| 1 1/4 | 60.5 | 60.5 | 47.8 | 47.8 | [Note (5)] | 47.8 | [Note (5)] | 39.6 | 39.6 | 76.2 | 82.6 | [Note (5)] | 82.6 | [Note (5)] | 88.9 | 104.9 |
| 1 1/2 | 69.9 | 69.9 | 54.1 | 54.1 | [Note (5)] | 54.1 | [Note (5)] | 47.8 | 47.8 | 85.9 | 95.3 | [Note (5)] | 95.3 | [Note (5)] | 98.6 | 117.6 |
| 2 | 85.9 | 85.9 | 69.9 | 69.9 | [Note (5)] | 69.9 | [Note (5)] | 58.7 | 58.7 | 104.9 | 111.3 | [Note (5)] | 111.3 | [Note (5)] | 143.0 | 146.1 |
| 21/2 | 98.6 | 98.6 | 82.6 | 82.6 | [Note (5)] | 82.6 | [Note (5)] | 69.9 | 69.9 | 124.0 | 130.3 | [Note (5)] | 130.3 | [Note (5)] | 165.1 | 168.4 |
| 3 | 120.7 | 120.7 | 101.6 | 101.6 | [Note (5)] | 101.6 | 95.3 | 92.2 | 92.2 | 136.7 | 149.4 | [Note (5)] | 149.4 | 168.4 | 174.8 | 196.9 |
| 3 1/2 | 133.4 | [Note (5)] | 114.3 | 114.3 | [Note (5)] | 104.8 | [Note (5)] | [Note (5)] | [Note (5)] | 161.9 | 165.1 | [Note (5)] | 161.9 | [Note (5)] | [Note (5)] | [Note (5)] |
| 4 | 149.4 | 149.4 | 127.0 | 127.0 | 120.7 | 120.7 | 120.7 | 117.6 | 117.6 | 174.8 | 181.1 | 177.8 | 193.8 | 206.5 | 209.6 | 235.0 |
| 5 | 177.8 | 177.8 | 155.7 | 155.7 | 147.6 | 147.6 | 147.6 | 143.0 | 143.0 | 196.9 | 215.9 | 212.9 | 241.3 | 247.7 | 254.0 | 279.4 |
| 6 | 209.6 | 209.6 | 182.6 | 182.6 | 174.8 | 174.8 | 174.8 | 171.5 | 171.5 | 222.3 | 251.0 | 247.7 | 266.7 | 289.1 | 282.7 | 317.5 |
| 8 | 263.7 | 257.3 | 233.4 | 233.4 | 225.6 | 225.6 | 222.3 | 215.9 | 215.9 | 279.4 | 308.1 | 304.8 | 320.8 | 358.9 | 352.6 | 387.4 |
| 10 | 317.5 | 311.2 | 287.3 | 287.3 | 274.6 | 274.6 | 276.4 | 266.7 | 270.0 | 339.9 | 362.0 | 358.9 | 400.1 | 435.1 | 435.1 | 476.3 |
| 12 | 374.7 | 368.3 | 339.9 | 339.9 | 327.2 | 327.2 | 323.9 | 323.9 | 317.5 | 409.7 | 422.4 | 419.1 | 457.2 | 498.6 | 520.7 | 549.4 |
| 14 | 406.4 | 400.1 | 371.6 | 371.6 | 362.0 | 362.0 | 355.6 | 362.0 | [Note (5)] | 450.9 | 485.9 | 482.6 | 492.3 | 520.7 | 577.9 | [Note (5)] |
| 16 | 463.6 | 457.2 | 422.4 | 422.4 | 412.8 | 412.8 | 412.8 | 406.4 | [Note (5)] | 514.4 | 539.8 | 536.7 | 565.2 | 574.8 | 641.4 | [Note (5)] |
| 18 | 527.1 | 520.7 | 474.7 | 474.7 | 469.9 | 469.9 | 463.6 | 463.6 | [Note (5)] | 549.4 | 596.9 | 593.9 | 612.9 | 638.3 | 704.9 | [Note (5)] |
| 20 | 577.9 | 571.5 | 525.5 | 525.5 | 520.7 | 520.7 | 520.7 | 514.4 | [Note (5)] | 606.6 | 654.1 | 647.7 | 682.8 | 698.5 | 755.7 | [Note (5)] |
| 24 | 685.8 | 679.5 | 628.7 | 628.7 | 628.7 | 628.7 | 628.7 | 616.0 | [Note (5)] | 717.6 | 774.7 | 768.4 | 790.7 | 838.2 | 901.7 | [Note (5)] |

| Outside Diameter of Gasket [Note (1)] | | | U.S. Customary Units, in. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Inside Diameter of Gasket by Class [Notes (2), (3)] | | | | | | | Outside Diameter of Centering Ring by Class [Note (4)] | | | | | | |
| | Classes | Classes | | | | | | | | | | | | | | |
| Flange Size (NPS) | 150, 300, 400, 600 | 900, 1500, 2500 | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
| 1/2 | 1.25 | 1.25 | 0.75 | 0.75 | [Note (5)] | 0.75 | [Note (5)] | 0.75 | 0.75 | 1.88 | 2.13 | [Note (5)] | 2.13 | [Note (5)] | 2.50 | 2.75 |
| 3/4 | 1.56 | 1.56 | 1.00 | 1.00 | [Note (5)] | 1.00 | [Note (5)] | 1.00 | 1.00 | 2.25 | 2.63 | [Note (5)] | 2.63 | [Note (5)] | 2.75 | 3.00 |
| 1 | 1.88 | 1.88 | 1.25 | 1.25 | [Note (5)] | 1.25 | [Note (5)] | 1.25 | 1.25 | 2.63 | 2.88 | [Note (5)] | 2.88 | [Note (5)] | 3.13 | 3.38 |
| 1 1/4 | 2.38 | 2.38 | 1.88 | 1.88 | [Note (5)] | 1.88 | [Note (5)] | 1.56 | 1.56 | 3.00 | 3.25 | [Note (5)] | 3.25 | [Note (5)] | 3.50 | 4.13 |

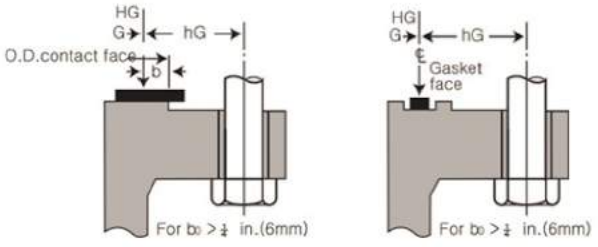
# Effective Gasket Width2 (Cont'd)

| | | | |
|---|---|---|---|
| |  | $\frac{N}{2}$ | $\frac{N}{2}$ |
| (1b) |  | | |
| (1c) |  W≤N | $\frac{W+T}{2}$ : $\left(\frac{W+N}{2}\text{ max}\right)$ | $\frac{W+T}{2}$ : $\left(\frac{W+N}{4}\text{ max}\right)$ |
| (1d) See Note(1) |  W≤N | | |
| (2) 1/64 in.(0.4mm) nubbin |  W≤N/2 | $\frac{W+N}{4}$ | $\frac{W+3N}{8}$ |
| (3) 1/64 in.(0.4mm) nubbin |  W≤N/2 | $\frac{N}{4}$ | $\frac{3N}{8}$ |
| (4) See Note(1) |  | $\frac{3N}{8}$ | $\frac{7N}{16}$ |
| (5) See Note(1) |  | $\frac{N}{4}$ | $\frac{3N}{8}$ |
| (6) |  | $\frac{N}{8}$ | - |

Effective Gasket Seating Width, b

b=b01 When b0 ¼ in.(6mm): b=Cb √ b01 When b0>¼ in.(6mm)

Location of Gasket Load Reaction



## Table SW-2.1-1 Dimensions for Spiral-Wound Gaskets Used With ASME B16.5 Flanges. Cont'd

| Outside Diameter of Gasket [Note (1)] | | | U.S. Customary Units, in. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classes | | Classes | Inside Diameter of Gasket by Class [Notes (2), (3)] | | | | | | | Outside Diameter of Centering Ring by Class [Note (4)] | | | | | | | |
| Flange Size (NPS) | 150, 300, 400, 600 | 900, 1500, 2500 | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
| 1 1/4 | 2.38 | 2.38 | 1.88 | 1.88 | [Note (5)] | 1.88 | [Note (5)] | 1.56 | 1.56 | 3.00 | 3.25 | [Note (5)] | 3.25 | [Note (5)] | 3.50 | 4.13 |
| 11/2 | 2.75 | 2.75 | 2.13 | 2.13 | [Note (5)] | 2.13 | [Note (5)] | 1.88 | 1.88 | 3.38 | 3.75 | [Note (5)] | 3.75 | [Note (5)] | 3.88 | 4.63 |
| 2 | 3.38 | 3.38 | 2.75 | 2.75 | [Note (5)] | 2.75 | [Note (5)] | 2.31 | 2.31 | 4.13 | 4.38 | [Note (5)] | 4.38 | [Note (5)] | 5.63 | 5.75 |
| 21/2 | 3.88 | 3.88 | 3.25 | 3.25 | [Note (5)] | 3.25 | [Note (5)] | 2.75 | 2.75 | 4.88 | 5.13 | [Note (5)] | 5.13 | [Note (5)] | 6.50 | 6.63 |
| 3 | 4.75 | 4.75 | 4.00 | 4.00 | [Note (5)] | 4.00 | 3.75 | 3.63 | 3.63 | 5.38 | 5.88 | [Note (5)] | 5.88 | 6.63 | 6.88 | 7.75 |
| 31/2 | 5.25 | [Note (5)] | 4.50 | 4.50 | [Note (5)] | 4.13 | [Note (5)] | [Note (5)] | [Note (5)] | 6.38 | 6.50 | [Note (5)] | 6.38 | [Note (5)] | [Note (5)] | [Note (5)] |
| 4 | 5.88 | 5.88 | 5.00 | 5.00 | 4.75 | 4.75 | 4.75 | 4.63 | 4.63 | 6.88 | 7.13 | 7.00 | 7.63 | 8.13 | 8.25 | 9.25 |
| 5 | 7.00 | 7.00 | 6.13 | 6.13 | 5.81 | 5.81 | 5.81 | 5.63 | 5.63 | 7.75 | 8.50 | 8.38 | 9.50 | 9.75 | 10.00 | 11.00 |
| 6 | 8.25 | 8.25 | 7.19 | 7.19 | 6.88 | 6.88 | 6.88 | 6.75 | 6.75 | 8.75 | 9.88 | 9.75 | 10.50 | 11.38 | 11.13 | 12.50 |
| 8 | 10.38 | 10.13 | 9.19 | 9.19 | 8.88 | 8.88 | 8.75 | 8.50 | 8.50 | 11.00 | 12.13 | 12.00 | 12.63 | 14.13 | 13.88 | 15.25 |
| 10 | 12.50 | 12.25 | 11.31 | 11.31 | 10.81 | 10.81 | 10.88 | 10.50 | 10.63 | 13.38 | 14.25 | 14.13 | 15.75 | 17.13 | 17.13 | 18.75 |
| 12 | 14.75 | 14.50 | 13.38 | 13.38 | 12.88 | 12.88 | 12.75 | 12.75 | 12.50 | 16.13 | 16.63 | 16.50 | 18.00 | 19.63 | 20.50 | 21.63 |
| 14 | 16.00 | 15.75 | 14.63 | 14.63 | 14.25 | 14.25 | 14.00 | 14.25 | [Note (5)] | 17.75 | 19.13 | 19.00 | 19.38 | 20.50 | 22.75 | [Note (5)] |
| 16 | 18.25 | 18.00 | 16.63 | 16.63 | 16.25 | 16.25 | 16.25 | 16.00 | [Note (5)] | 20.25 | 21.25 | 21.13 | 22.25 | 22.63 | 25.25 | [Note (5)] |
| 18 | 20.75 | 20.50 | 18.69 | 18.69 | 18.50 | 18.50 | 18.25 | 18.25 | [Note (5)] | 21.63 | 23.50 | 23.38 | 24.13 | 25.13 | 27.75 | [Note (5)] |
| 20 | 22.75 | 22.50 | 20.69 | 20.69 | 20.50 | 20.50 | 20.50 | 20.25 | [Note (5)] | 23.88 | 25.75 | 25.50 | 26.88 | 27.50 | 29.75 | [Note (5)] |
| 24 | 27.00 | 26.75 | 24.75 | 24.75 | 24.75 | 24.75 | 24.75 | 24.25 | [Note (5)] | 28.25 | 30.50 | 30.25 | 31.13 | 33.00 | 35.50 | [Note (5)] |

### General Note

- For reference, see figure SW -2.1-1.
- The gasket thickness tolerance is ±0.13 mm (±0.005 in.) measured across the metallic portion of the gasket, not including the filler, which may protrude slightly beyond the metal
- For limitations on the maximum flange bore for use with these spiral-wound gaskets, see Table SW-2.5-2.

### Notes

- (The gasket outside diameter tolerance for NPS 1／2 through NPS 8 is ±0.8 mm (±0.03 in.); for NPS 10 through NPS 24, +1.5 mm,−0.8 mm (+0.06 in., −0.03 in.).
- Refer to para. SW-2.5 for required use of inner rings
- The gasket inside diameter tolerance for NPS 1／2 through NPS 8 is ±0.4 mm (±0.016 in.); for NPS 10 through NPS 24, ±0.8 mm (±0.03 in.)
- The centering-ring outside diameter tolerance is ±0.8 mm (±0.03 in.)
- There areno Class 400 flanges in NPS 1／2 through NPS 31／2 (use Class 600); Class 900 flanges in NPS 1／2 through NPS 2 1／2 or in NPS 31／2 (use Class 1500); Class 1500 flangesin NPS 31／2; or Class 2500 flanges in NPS 3 1／2 or NPS 14 and larger.

## Table SW-2.1-2 Dimensions for Spiral-Wound Gaskets Used With ASME B16.47 Series A Flanges

| SI Units, mm | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class 150 | | | | Class 300 | | | Class 400 | | | Class 600 | | | Class 900 | | |
| | Gasket | | | Gasket | | | Gasket | | | Gasket | | | Gasket | | |
| Flange Size (NPS) | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | Centering-Ring Outside Diameter [Note (4)] | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | Centering-Ring Outside Diameter [Note (4)] | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | Centering-Ring Outside Diameter [Note (4)] | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | Centering-Ring Outside Diameter [Note (4)] | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | Centering-Ring Outside Diameter [Note (4)] |
| 26 | 673.1 | 704.9 | 774.7 | 685.8 | 736.6 | 835.2 | 685.8 | 736.6 | 831.9 | 685.8 | 736.6 | 866.9 | 685.8 | 736.6 | 882.7 |
| 28 | 723.9 | 755.7 | 831.9 | 736.6 | 787.4 | 898.7 | 736.6 | 787.4 | 892.3 | 736.6 | 787.4 | 914.4 | 736.6 | 787.4 | 946.2 |
| 30 | 774.7 | 806.5 | 882.7 | 793.8 | 844.6 | 952.5 | 793.8 | 844.6 | 946.2 | 793.8 | 844.6 | 971.6 | 793.8 | 844.6 | 1 009.7 |
| 32 | 825.5 | 860.6 | 939.8 | 850.9 | 901.7 | 1006.6 | 850.9 | 901.7 | 1 003.3 | 850.9 | 901.7 | 1 022.4 | 850.9 | 901.7 | 1 073.2 |
| 34 | 876.3 | 911.4 | 990.6 | 901.7 | 952.5 | 1 057.4 | 901.7 | 952.5 | 1 054.1 | 901.7 | 952.5 | 1 073.2 | 901.7 | 952.5 | 1 136.7 |
| 36 | 927.1 | 968.5 | 1 047.8 | 955.8 | 1 006.6 | 1 117.6 | 955.8 | 1 006.6 | 1 117.6 | 955.8 | 1 006.6 | 1 130.3 | 958.9 | 1 009.7 | 1 200.2 |
| 38 | 977.9 | 1 019.3 | 1 111.3 | 977.9 | 1 016.0 | 1054.1 | 971.6 | 1 022.4 | 1 073.2 | 990.6 | 1 041.4 | 1 104.9 | 1 035.1 | 1 085.9 | 1 200.2 |
| 40 | 1 028.7 | 1 070.1 | 1 162.1 | 1022.4 | 1 070.1 | 1114.6 | 1 025.7 | 1 076.5 | 1 127.3 | 1 047.8 | 1 098.6 | 1 155.7 | 1 098.6 | 1 149.4 | 1 251.0 |
| 42 | 1 079.5 | 1 124.0 | 1 219.2 | 1073.2 | 1 120.9 | 1165.4 | 1 076.5 | 1 127.3 | 1 178.1 | 1 104.9 | 1 155.7 | 1 219.2 | 1 149.4 | 1 200.2 | 1 301.8 |
| 44 | 1 130.3 | 1 178.1 | 1 276.4 | 1130.3 | 1 181.1 | 1 219.2 | 1 130.3 | 1 181.1 | 1 231.9 | 1 162.1 | 1 212.9 | 1 270.0 | 1 206.5 | 1 257.3 | 1 368.6 |
| 46 | 1 181.1 | 1 228.9 | 1 327.2 | 1178.1 | 1 228.9 | 1 273.3 | 1 193.8 | 1 244.6 | 1 289.1 | 1 212.9 | 1 263.7 | 1 327.2 | 1 270.0 | 1 320.8 | 1 435.1 |
| 48 | 1 231.9 | 1 279.7 | 1 384.3 | 1235.2 | 1 286.0 | 1 324.1 | 1 244.6 | 1 295.4 | 1 346.2 | 1 270.0 | 1 320.8 | 1 390.7 | 1 320.8 | 1 371.6 | 1 485.9 |
| 50 | 1 282.7 | 1 333.5 | 1 435.1 | 1 295.4 | 1 346.2 | 1 378.0 | 1 295.4 | 1 346.2 | 1 403.4 | 1 320.8 | 1 371.6 | 1 447.8 | [Note (5)] | [Note (5)] | [Note (5)] |

## Table SW-2.1-2 Dimensions for Spiral-Wound Gaskets Used With ASME B16.47 Series A Flanges Cont'd

| SI Units, mm | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class 150 | | | Class 300 | | | Class 400 | | | Class 600 | | | Class 900 | | | |
| | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] |
| Flange Size (NPS) | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | |
| 50 | 1 282.7 | 1 333.5 | 1 435.1 | 1 295.4 | 1 346.2 | 1 378.0 | 1 295.4 | 1 346.2 | 1 403.4 | 1 320.8 | 1 371.6 | 1 447.8 | [Note (5)] | [Note (5)] | [Note (5)] |
| 52 | 1 333.5 | 1 384.3 | 1 492.3 | 1 346.2 | 1 397.0 | 1 428.8 | 1 346.2 | 1 397.0 | 1 454.2 | 1 371.6 | 1 422.4 | 1 498.6 | [Note (5)] | [Note (5)] | [Note (5)] |
| 54 | 1 384.3 | 1 435.1 | 1 549.4 | 1 403.4 | 1 454.2 | 1 492.3 | 1 403.4 | 1 454.2 | 1 517.7 | 1 428.8 | 1 479.6 | 1 555.8 | [Note (5)] | [Note (5)] | [Note (5)] |
| 56 | 1 435.1 | 1 485.9 | 1 606.6 | 1 454.2 | 1 505.0 | 1 543.1 | 1 454.2 | 1 505.0 | 1 568.5 | 1 479.6 | 1 530.4 | 1 612.9 | [Note (5)] | [Note (5)] | [Note (5)] |
| 58 | 1 485.9 | 1 536.7 | 1 663.7 | 1 511.3 | 1 562.1 | 1 593.9 | 1 505.0 | 1 555.8 | 1 619.3 | 1 536.7 | 1 587.5 | 1 663.7 | [Note (5)] | [Note (5)] | [Note (5)] |
| 60 | 1 536.7 | 1 587.5 | 1 714.5 | 1 562.1 | 1 612.9 | 1 644.7 | 1 568.5 | 1 619.3 | 1 682.8 | 1 593.9 | 1 644.7 | 1 733.6 | [Note (5)] | [Note (5)] | [Note (5)] |

### General Note

- For reference, see Figure SW-2.1-1.
- The gasket thickness tolerance is ±0.13 mm (±0.005 in.) measured across the metallic portion of the gasket, not including the filler, which may protrude slightly beyond the metal.
- For limitations on the maximum flange bore for use with these spiral-wound gaskets, see Table SW-2.5-2.

### Notes

- The gasket outside diameter tolerance for NPS 1⁄2 through NPS 8 is ±0.8 mm (±0.03 in.); for NPS 10 through NPS 24, +1.5 mm,−0.8 mm (+0.06 in., −0.03 in.).
- Refer to para. SW-2.5 for required use of inner rings.
- The gasket inside diameter tolerance for NPS 1⁄2 through NPS 8 is ±0.4 mm (±0.016 in.); for NPS 10 through NPS 24, ±0.8 mm (±0.03 in.).
- The centering-ring outside diameter tolerance is ±0.8 mm (±0.03 in.).
- There are no Class 400 flanges in NPS 1⁄2 through NPS 31⁄2 (use Class 600); Class 900 flanges in NPS 1⁄2 through NPS 2 1⁄2 or in NPS 31⁄2 (use Class 1500); Class 1500 flanges in NPS 31⁄2; or Class 2500 flanges in NPS 3 1⁄2 or NPS 14 and larger

| U.S. Customary Units, in. | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class 150 | | | Class 300 | | | Class 400 | | | Class 600 | | | Class 900 | | | |
| | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] |
| Flange Size (NPS) | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | |
| 26 | 26.50 | 27.75 | 30.50 | 27.00 | 29.00 | 32.88 | 27.00 | 29.00 | 32.75 | 27.00 | 29.00 | 34.13 | 27.00 | 29.00 | 34.75 |
| 28 | 28.50 | 29.75 | 32.75 | 29.00 | 31.00 | 35.38 | 29.00 | 31.00 | 35.13 | 29.00 | 31.00 | 36.00 | 29.00 | 31.00 | 37.25 |
| 30 | 30.50 | 31.75 | 34.75 | 31.25 | 33.25 | 37.50 | 31.25 | 33.25 | 37.25 | 31.25 | 33.25 | 38.25 | 31.25 | 33.25 | 39.75 |
| 32 | 32.50 | 33.88 | 37.00 | 33.50 | 35.50 | 39.63 | 33.50 | 35.50 | 39.50 | 33.50 | 35.50 | 40.25 | 33.50 | 35.50 | 42.25 |
| 34 | 34.50 | 35.88 | 39.00 | 35.50 | 37.50 | 41.63 | 35.50 | 37.50 | 41.50 | 35.50 | 37.50 | 42.25 | 35.50 | 37.50 | 44.75 |
| 36 | 36.50 | 38.13 | 41.25 | 37.63 | 39.63 | 44.00 | 37.63 | 39.63 | 44.00 | 37.63 | 39.63 | 44.50 | 37.75 | 39.75 | 47.25 |
| 38 | 38.50 | 40.13 | 43.75 | 38.50 | 40.00 | 41.50 | 38.25 | 40.25 | 42.25 | 9.00 | 41.00 | 43.50 | 40.75 | 42.75 | 47.25 |
| 40 | 40.50 | 42.13 | 45.75 | 40.25 | 42.13 | 43.88 | 40.38 | 42.38 | 44.38 | 41.25 | 43.25 | 45.50 | 43.25 | 45.25 | 49.25 |
| 42 | 42.50 | 44.25 | 48.00 | 42.25 | 44.13 | 45.88 | 42.38 | 44.38 | 46.38 | 43.50 | 45.50 | 48.00 | 45.25 | 47.25 | 51.25 |
| 44 | 44.50 | 46.38 | 50.25 | 44.50 | 46.50 | 48.00 | 44.50 | 46.50 | 48.50 | 45.75 | 47.75 | 50.00 | 47.50 | 49.50 | 53.88 |
| 46 | 46.50 | 48.38 | 52.25 | 46.38 | 48.38 | 50.13 | 47.00 | 49.00 | 50.75 | 47.75 | 49.75 | 52.25 | 50.00 | 52.00 | 56.50 |
| 48 | 48.50 | 50.38 | 54.50 | 48.63 | 50.63 | 2.13 | 49.00 | 51.00 | 53.00 | 50.00 | 52.00 | 54.75 | 52.00 | 54.00 | 58.50 |
| 50 | 50.50 | 52.50 | 56.50 | 51.00 | 53.00 | 54.25 | 51.00 | 53.00 | 55.25 | 52.00 | 54.00 | 57.00 | [Note (5)] | [Note (5)] | [Note (5)] |
| 52 | 52.50 | 54.50 | 58.75 | 53.00 | 55.00 | 56.2 | 53.00 | 55.00 | 57.25 | 54.00 | 56.00 | 59.00 | [Note (5)] | [Note (5)] | [Note (5)] |
| 54 | 54.50 | 56.50 | 61.00 | 55.25 | 57.25 | 58.75 | 55.25 | 57.25 | 59.75 | 56.25 | 58.25 | 61.25 | [Note (5)] | [Note (5)] | [Note (5)] |
| 56 | 56.50 | 58.50 | 63.25 | 57.25 | 59.25 | 60.75 | 57.25 | 59.25 | 61.75 | 58.25 | 60.25 | 63.50 | [Note (5)] | [Note (5)] | [Note (5)] |
| 58 | 58.50 | 60.50 | 65.50 | 59.50 | 61.50 | 62.75 | 59.25 | 61.25 | 63.75 | 60.50 | 62.50 | 65.50 | [Note (5)] | [Note (5)] | [Note (5)] |
| 60 | 60.50 | 62.50 | 67.50 | 61.50 | 63.50 | 64.75 | 61.75 | 63.75 | 66.25 | 62.75 | 64.75 | 68.25 | [Note (5)] | [Note (5)] | [Note (5)] |

## Table SW-2.1-3 Dimensions for Spiral-Wound Gaskets Used With ASME B16.47 Series B Flanges

| U.S. Customary Units, in. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class 150 | | | Class 300 | | | Class 400 | | | Class 600 | | | Class 900 | | |
| | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] |
| Flange Size (NPS) | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | |
| 26 | 26.50 | 27.75 | 30.50 | 27.00 | 29.00 | 32.88 | 27.00 | 29.00 | 32.75 | 27.00 | 29.00 | 34.13 | 27.00 | 29.00 | 34.75 |
| 28 | 28.50 | 29.75 | 32.75 | 29.00 | 31.00 | 35.38 | 29.00 | 31.00 | 35.13 | 29.00 | 31.00 | 36.00 | 29.00 | 31.00 | 37.25 |
| 30 | 30.50 | 31.75 | 34.75 | 31.25 | 33.25 | 37.50 | 31.25 | 33.25 | 37.25 | 31.25 | 33.25 | 38.25 | 31.25 | 33.25 | 39.75 |
| 32 | 32.50 | 33.88 | 37.00 | 33.50 | 35.50 | 39.63 | 33.50 | 35.50 | 39.50 | 33.50 | 35.50 | 40.25 | 33.50 | 35.50 | 42.25 |
| 34 | 34.50 | 35.88 | 39.00 | 35.50 | 37.50 | 41.63 | 35.50 | 37.50 | 41.50 | 35.50 | 37.50 | 42.25 | 35.50 | 37.50 | 44.75 |
| 36 | 36.50 | 38.13 | 41.25 | 37.63 | 39.63 | 44.00 | 37.63 | 39.63 | 44.00 | 37.63 | 39.63 | 44.50 | 37.75 | 39.75 | 47.25 |
| 38 | 38.50 | 40.13 | 43.75 | 38.50 | 40.00 | 41.50 | 38.25 | 40.25 | 42.25 | 9.00 | 41.00 | 43.50 | 40.75 | 42.75 | 47.25 |
| 40 | 40.50 | 42.13 | 45.75 | 40.25 | 42.13 | 43.88 | 40.38 | 42.38 | 44.38 | 41.25 | 43.25 | 45.50 | 43.25 | 45.25 | 49.25 |
| 42 | 42.50 | 44.25 | 48.00 | 42.25 | 44.13 | 45.88 | 42.38 | 44.38 | 46.38 | 43.50 | 45.50 | 48.00 | 45.25 | 47.25 | 51.25 |
| 44 | 44.50 | 46.38 | 50.25 | 44.50 | 46.50 | 48.00 | 44.50 | 46.50 | 48.50 | 45.75 | 47.75 | 50.00 | 47.50 | 49.50 | 53.88 |
| 46 | 46.50 | 48.38 | 52.25 | 46.38 | 48.38 | 50.13 | 47.00 | 49.00 | 50.75 | 47.75 | 49.75 | 52.25 | 50.00 | 52.00 | 56.50 |
| 48 | 48.50 | 50.38 | 54.50 | 48.63 | 50.63 | 2.13 | 49.00 | 51.00 | 53.00 | 50.00 | 52.00 | 54.75 | 52.00 | 54.00 | 58.50 |
| 50 | 50.50 | 52.50 | 56.50 | 51.00 | 53.00 | 54.25 | 51.00 | 53.00 | 55.25 | 52.00 | 54.00 | 57.00 | [Note (5)] | [Note (5)] | [Note (5)] |
| 52 | 52.50 | 54.50 | 58.75 | 53.00 | 55.00 | 56.2 | 53.00 | 55.00 | 57.25 | 54.00 | 56.00 | 59.00 | [Note (5)] | [Note (5)] | [Note (5)] |
| 54 | 54.50 | 56.50 | 61.00 | 55.25 | 57.25 | 58.75 | 55.25 | 57.25 | 59.75 | 56.25 | 58.25 | 61.25 | [Note (5)] | [Note (5)] | [Note (5)] |
| 56 | 56.50 | 58.50 | 63.25 | 57.25 | 59.25 | 60.75 | 57.25 | 59.25 | 61.75 | 58.25 | 60.25 | 63.50 | [Note (5)] | [Note (5)] | [Note (5)] |
| 58 | 58.50 | 60.50 | 65.50 | 59.50 | 61.50 | 62.75 | 59.25 | 61.25 | 63.75 | 60.50 | 62.50 | 65.50 | [Note (5)] | [Note (5)] | [Note (5)] |
| 60 | 60.50 | 62.50 | 67.50 | 61.50 | 63.50 | 64.75 | 61.75 | 63.75 | 66.25 | 62.75 | 64.75 | 68.25 | [Note (5)] | [Note (5)] | [Note (5)] |

| SI Units, mm | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class 150 | | | Class 300 | | | Class 400 | | | Class 600 | | | Class 900 | | |
| | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] | Gasket | | Centering-Ring Outside Diameter [Note (4)] |
| Flange Size (NPS) | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | | Inside Diameter [Notes (1), (2)] | Outside Diameter [Note (3)] | |
| 50 | 1 282.7 | 1 333.5 | 1 435.1 | 1 295.4 | 1 346.2 | 1 378.0 | 1 295.4 | 1 346.2 | 1 403.4 | 1 320.8 | 1 371.6 | 1 447.8 | [Note (5)] | [Note (5)] | [Note (5)] |
| 52 | 1 333.5 | 1 384.3 | 1 492.3 | 1 346.2 | 1 397.0 | 1 428.8 | 1 346.2 | 1 397.0 | 1 454.2 | 1 371.6 | 1 422.4 | 1 498.6 | [Note (5)] | [Note (5)] | [Note (5)] |
| 54 | 1 384.3 | 1 435.1 | 1 549.4 | 1 403.4 | 1 454.2 | 1 492.3 | 1 403.4 | 1 454.2 | 1 517.7 | 1 428.8 | 1 479.6 | 1 555.8 | [Note (5)] | [Note (5)] | [Note (5)] |
| 56 | 1 435.1 | 1 485.9 | 1 606.6 | 1 454.2 | 1 505.0 | 1 543.1 | 1 454.2 | 1 505.0 | 1 568.5 | 1 479.6 | 1 530.4 | 1 612.9 | [Note (5)] | [Note (5)] | [Note (5)] |
| 58 | 1 485.9 | 1 536.7 | 1 663.7 | 1 511.3 | 1 562.1 | 1 593.9 | 1 505.0 | 1 555.8 | 1 619.3 | 1 536.7 | 1 587.5 | 1 663.7 | [Note (5)] | [Note (5)] | [Note (5)] |
| 60 | 1 536.7 | 1 587.5 | 1 714.5 | 1 562.1 | 1 612.9 | 1 644.7 | 1 568.5 | 1 619.3 | 1 682.8 | 1 593.9 | 1 644.7 | 1 733.6 | [Note (5)] | [Note (5)] | [Note (5)] |

### General Note

- For reference, see Figure SW-2.1-1
- The gasket thickness tolerance is ±0.13 mm (±0.005 in.) measured across the metallic portion of the gasket ,not including the filler, which may protrude slightly beyond the metal.
- For limitations on the maximum flange bore for use with these spiral-wound gaskets, see Table SW-2.5-3.

### Notes

- Refer to para. SW-2.5 for required use of inner rings
- The gasket inside diameter tolerance for NPS 26 through NPS 34 is ±0.8 mm (±0.03 in.), and the tolerancefor NPS 36 through NPS 60 is ±1.5 mm (±0.06 in.).
- The gasket outside diameter tolerance for NPS 26 through NPS 60 is ±1.5 mm (±0.06 in.).
- The centering-ring outside diameter tolerance is±0.8 mm (±0.03 in.).
- There are no Class 900 flanges in NPS 50 and larger

## Table SW-2.1-4 Inside Diameters of Inner Rings for Spiral-Wound Gaskets for Use With ASME B16.5 Flanges

| Flange Size (NPS) | Inside Diameter of Inner Ring by Pressure Class, mm (in.) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
| 1/2 | 14.2 (0.56) | 14.2 (0.56) | [Note (1)] | 14.2 (0.56) | [Note (1)] | 14.2 (0.56) | 14.2 (0.56) |
| 3/4 | 20.6 (0.81) | 20.6 (0.81) | [Note (1)] | 20.6 (0.81) | [Note (1)] | 20.6 (0.81) | 20.6 (0.81) |
| 1 | 26.9 (1.06) | 26.9 (1.06) | [Note (1)] | 26.9 (1.06) | [Note (1)] | 26.9 (1.06) | 26.9 (1.06) |
| 11/4 | 38.1 (1.50) | 38.1 (1.50) | [Note (1)] | 38.1 (1.50) | [Note (1)] | 33.3 (1.31) | 33.3 (1.31) |
| 11/2 | 44.5 (1.75) | 44.5 (1.75) | [Note (1)] | 44.5 (1.75) | [Note (1)] | 41.4 (1.63) | 41.4 (1.63) |
| 2 | 55.6 (2.19) | 55.6 (2.19) | [Note (1)] | 55.6 (2.19) | [Note (1)] | 52.3 (2.06) | 52.3 (2.06) |
| 2 1/2 | 66.5 (2.62) | 66.5 (2.62) | [Note (1)] | 66.5 (2.62) | [Note (1)] | 63.5 (2.50) | 63.5 (2.50) |
| 3 | 81.0 (3.19) | 81.0 (3.19) | [Note (1)] | 81.0 (3.19) | 78.7 (3.10) | 78.7 (3.10) | 78.7 (3.10) |
| 31/2 | 101.1 (3.98) | 101.1 (3.98) | [Note (1)] | 91.4 (3.60) | [Note (1)] | [Note (1)] | [Note (1)] |
| 4 | 106.4 (4.19) | 106.4 (4.19) | 102.6 (4.04) | 102.6 (4.04) | 102.6 (4.04) | 97.8 (3.85) | 97.8 (3.85) |
| 5 | 131.8 (5.19) | 131.8 (5.19) | 128.3 (5.05) | 128.3 (5.05) | 128.3 (5.05) | 124.5 (4.90) | 124.5 (4.90) |
| 6 | 157.2 (6.19) | 157.2 (6.19) | 154.9 (6.10) | 154.9 (6.10) | 154.9 (6.10) | 147.3 (5.80) | 147.3 (5.80) |
| 8 | 215.9 (8.50) | 215.9 (8.50) | 205.7 (8.10) | 205.7 (8.10) | 196.9 (7.75) | 196.9 (7.75) | 196.9 (7.75) |
| 10 | 268.2 (10.56) | 268.2 (10.56) | 255.3 (10.05) | 255.3 (10.05) | 246.1 (9.69) | 246.1 (9.69) | 246.1 (9.69) |
| 12 | 317.5 (12.50) | 317.5 (12.50) | 307.3 (12.10) | 307.3 (12.10) | 292.1 (11.50) | 292.1 (11.50) | 292.1 (11.50) |
| 14 | 349.3 (13.75) | 349.3 (13.75) | 342.9 (13.50) | 342.9 (13.50) | 320.8 (12.63) | 320.8 (12.63) | [Note (1)] |
| 16 | 400.1 (15.75) | 400.1 (15.75) | 389.9 (15.35) | 389.9 (15.35) | 374.7 (14.75) | 368.3 (14.50) | [Note (1)] |
| 18 | 449.3 (17.69) | 449.3 (17.69) | 438.2 (17.25) | 438.2 (17.25) | 425.5 (16.75) | 425.5 (16.75) | [Note (1)] |
| 20 | 500.1 (19.69) | 500.1 (19.69) | 489.0 (19.25) | 489.0 (19.25) | 482.6 (19.00) | 476.3 (18.75) | [Note (1)] |
| 24 | 603.3 (23.75) | 603.3 (23.75) | 590.6 (23.25) | 590.6 (23.25) | 590.6 (23.25) | 577.9 (22.75) | [Note (1)] |

### General Note

- **The inner-ring thickness shall be 2.97 mm to 3.33 mm (0.117 in. to 0.131 in.)**
- **For sizes NPS 1／2 through NPS 3, the inside diameter tolerance is ±0.8 mm (±0.03 in.); for larger sizes, the inside diameter tolerance is ±1.5 mm (±0.06 in.). See TableSW-2.5-1 for minimum pipe wall thicknesses that are suitable for use with standard inner rings.**
- **Refer to para. SW-2.5 for required use of inner rings**

### Notes

- **There are no Class 400 flanges in NPS 1／2 through NPS 31／2 (use Class 600); Class 900 flanges in NPS 1／2 through NPS 21／2 or in NPS 31／2 (use Class 1500); Class 1500 flanges in NPS 31／2; or Class 2500 flanges in NPS 31／2 or NPS 14 and larger.**

## Table SW-2.1-5 Inside Diameters of Inner Rings for Spiral-Wound Gaskets Used Between ASME B16.47 Series A Flange

| Flange Size (NPS) | Inside Diameter of Inner Ring by Pressure Class, mm (in.) | | | | |
|---|---|---|---|---|---|
| | 150 | 300 | 400 | 600 | 900 |
| 26 | 654.1 (25.75) | 654.1 (25.75) | 660.4 (26.00) | 647.7 (25.50) | 660.4 (26.00) |
| 28 | 704.9 (27.75) | 704.9 (27.75) | 711.2 (28.00) | 698.5 (27.50) | 711.2 (28.00) |
| 30 | 755.7 (29.75) | 755.7 (29.75) | 755.7 (29.75) | 755.7 (29.75) | 768.4 (30.25) |
| 32 | 806.5 (31.75) | 806.5 (31.75) | 812.8 (32.00) | 812.8 (32.00) | 812.8 (32.00) |
| 34 | 857.3 (33.75) | 857.3 (33.75) | 863.6 (34.00) | 863.6 (34.00) | 863.6 (34.00) |
| 36 | 908.1 (35.75) | 908.1 (35.75) | 917.7 (36.13) | 917.7 (36.13) | 920.8 (36.25) |
| 38 | 958.9 (37.75) | 952.5 (37.50) | 952.5 (37.50) | 952.5 (37.50) | 1 009.7 (39.75) |
| 40 | 1 009.7 (39.75) | 1 003.3 (39.50) | 1 000.3 (39.38) | 1 009.7 (39.75) | 1 060.5 (41.75) |
| 42 | 1 060.5 (41.75) | 1 054.1 (41.50) | 1 051.1 (41.38) | 1 066.8 (42.00) | 1 111.3 (43.75) |
| 44 | 1 111.3 (43.75) | 1 104.9 (43.50) | 1 104.9 (43.50) | 1 111.3 (43.75) | 1 155.7 (45.50) |
| 46 | 1 162.1 (45.75) | 1 152.7 (45.38) | 1 168.4 (46.00) | 1 162.1 (45.75) | 1 219.2 (48.00) |
| 48 | 1 212.9 (47.75) | 1 209.8 (47.63) | 1 206.5 (47.50) | 1 219.2 (48.00) | 1 270.0 (50.00) |
| 50 | 1 263.7 (49.75) | 1 244.6 (49.00) | 1 257.3 (49.50) | 1 270.0 (50.00) | [Note (1)] |
| 52 | 1 314.5 (51.75) | 1 320.8 (52.00) | 1 308.1 (51.50) | 1 320.8 (52.00) | [Note (1)] |
| 54 | 1 358.9 (53.50) | 1 352.6 (53.25) | 1 352.6 (53.25) | 1 378.0 (54.25) | [Note (1)] |
| 56 | 1 409.7 (55.50) | 1 403.4 (55.25) | 1 403.4 (55.25) | 1 428.8 (56.25) | [Note (1)] |
| 58 | 1 460.5 (57.50) | 1 447.8 (57.00) | 1 454.2 (57.25) | 1 473.2 (58.00) | [Note (1)] |
| 60 | 1 511.3 (59.50) | 1 524.0 (60.00) | 1 517.7 (59.75) | 1 530.4 (60.25) | [Note (1)] |

**General Note**

- **The inner-ring thickness shall be 2.97 mm to 3.33 mm (0.117 in. to 0.131 in.).**
- **The inside diameter tolerance is ±3.0 mm (±0.12 in.)**
- **These inner rings are suitable for use with pipe walls 9.53 mm (0.38 in.) or thicker.**
- **Refer to para. SW-2.5 for required use of inner rings.**

**Notes**

- **There are no Class 900 flanges in NPS 50 and larger**

## Table SW-2.1-6 Inside Diameters of Inner Rings for Spiral-Wound Gaskets Used Between ASMEB16.47 Series B Flanges

| Flange Size (NPS) | Inside Diameter of Inner Ring by Pressure Class, mm (in.) | | | | |
|---|---|---|---|---|---|
| | 150 | 300 | 400 | 600 | 900 |
| 26 | 654.1 (25.75) | 654.1 (25.75) | 654.1 (25.75) | 644.7 (25.38) | 666.8 (26.25) |
| 28 | 704.9 (27.75) | 704.9 (27.75) | 701.8 (27.63) | 685.8 (27.00) | 717.6 (28.25) |
| 30 | 755.7 (29.75) | 755.7 (29.75) | 752.6 (29.63) | 752.6 (29.63) | 781.1 (30.75) |
| 32 | 806.5 (31.75) | 806.5 (31.75) | 800.1 (31.50) | 793.8 (31.25) | 838.2 (33.00) |
| 34 | 857.3 (33.75) | 857.3 (33.75) | 850.9 (33.50) | 850.9 (33.50) | 895.4 (35.25) |
| 36 | 908.1 (35.75) | 908.1 (35.75) | 898.7 (35.38) | 901.7 (35.50) | 920.8 (36.25) |
| 38 | 958.9 (37.75) | 971.6 (38.25) | 952.5 (37.50) | 952.5 (37.50) | 1 009.7 (39.75) |
| 40 | 1 009.7 (39.75) | 1 022.4 (40.25) | 1 000.3 (39.38) | 1 009.7 (39.75) | 1 060.5 (41.75) |
| 42 | 1 060.5 (41.75) | 1 085.9 (42.75) | 1 051.1 (41.38) | 1 066.8 (42.00) | 1 111.3 (43.75) |
| 44 | 1 111.3 (43.75) | 1 124.0 (44.25) | 1 104.9 (43.50) | 1 111.3 (43.75) | 1 155.7 (45.50) |
| 46 | 1 162.1 (45.75) | 1 178.1 (46.38) | 1 168.4 (46.00) | 1 162.1 (45.75) | 1 219.2 (48.00) |
| 48 | 1 212.9 (47.75) | 1 231.9 (48.50) | 1 206.5 (47.50) | 1 219.2 (48.00) | 1 270.0 (50.00) |
| 50 | 1 263.7 (49.75) | 1 267.0 (49.88) | 1 257.3 (49.50) | 1 270.0 (50.00) | [Note (1)] |
| 52 | 1 314.5 (51.75) | 1 317.8 (51.88) | 1 308.1 (51.50) | 1 320.8 (52.00) | [Note (1)] |
| 54 | 1 365.3 (53.75) | 1 365.3 (53.75) | 1 352.6 (53.25) | 1 378.0 (54.25) | [Note (1)] |
| 56 | 1 422.4 (56.00) | 1 428.8 (56.25) | 1 403.4 (55.25) | 1 428.8 (56.25) | [Note (1)] |
| 58 | 1 478.0 (58.19) | 1 484.4 (58.44) | 1 454.2 (57.25) | 1 473.2 (58.00) | [Note (1)] |
| 60 | 1 535.2 (60.44) | 1 557.3 (61.31) | 1 517.7 (59.75) | 1 530.4 (60.25) | [Note (1)] |

**General Note**

- **The inner-ring thickness shall be 2.97 mm to 3.33 mm (0.117 in. to 0.131 in.).**
- **The inside diameter tolerance is ±3.0 mm (±0.12 in.).**
- **These inner rings are suitable for use with pipe walls 9.53 mm (0.375 in.) or thicker.**
- **Refer to para. SW-2.5 for required use of inner rings.**

**Notes**

- **There are no Class 900 flanges in NPS 50 and larger**

## Table SW-2.1-6 Inside Diameters of Inner Rings for Spiral-Wound Gaskets Used Between ASMEB16.47 Series B Flanges

<table>
<tr><th rowspan="2">Flange Size (NPS)</th><th colspan="7">Minimum Pipe Wall Thickness by Pressure Class</th></tr>
<tr><th>150</th><th>300</th><th>400</th><th>600</th><th>900</th><th>1500</th><th>2500</th></tr>
<tr><td>1/2<br>3/4<br>1</td><td colspan="7">Schedule 80</td></tr>
<tr><td>1 1/4<br>1 1/2<br>2<br>2 1/2<br>3<br>3 1/2<br>4<br>5<br>6</td><td colspan="5">Schedule 40</td><td colspan="2">Schedule 80</td></tr>
<tr><td>8<br>10<br>12<br>14<br>16<br>18<br>20<br>24</td><td colspan="2">Schedule 10S</td><td colspan="2">Schedule 30</td><td colspan="2">Schedule 80</td></tr>
</table>

**General Note**

- **The pipe wall schedules identified represent the minimum recommended pipe wall thickness suitable for use with inner rings for ASME B16.5 flanges. (Reference ASME B36.10M and ASME B36.19M.)**
- **Gaskets with inner rings should be used only with socket welding, lapped, welding neck, and integral flanges.**
- **Refer to para. SW-2.5 for required use of inner rings.**

# Table SW-2.5-3 Maximum Bore of ASME B16.47 Series A Flanges for Use With Spiral-Wound Gaskets

| Flange Size (NPS) | Inside Diameter of Inner Ring by Pressure Class, mm (in.) | | | | |
|---|---|---|---|---|---|
| | 150 | 300 | 400 | 600 | 900 |
| 26 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 28 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 30 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 32 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 34 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 36 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 38 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 40 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 42 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 44 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 46 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 48 | Note (1) | Note (2) | Note (2) | Note (2) | Note (2) |
| 50 | Note (1) | Note (2) | Note (2) | Note (2) | Note (3) |
| 52 | Note (1) | Note (2) | Note (2) | Note (2) | Note (3) |
| 56 | Note (1) | Note (2) | Note (2) | Note (2) | Note (3) |
| 58 | Note (1) | Note (2) | Note (2) | Note (2) | Note (3) |
| 60 | Note (1) | Note (2) | Note (2) | Note (2) | Note (3) |

**General Note**

- This Table shows the maximum bore of flanges for which the spiral-wound gasket dimensions shown in Table SW-2.1-2 are recommended, considering the tolerances involved, the possibility of eccentric installation, and the possibility that the gasket may extend into the assembled flange bore.
- Refer to para. SW-2.5 for required use of inner rings

**Notes**

- Applies only to welding neck flanges with a bore not larger than the inside diameter of a 4.75-mm (0.187-in.) wall pipe. Larger bores must be checked individually.
- Applies only to welding neck flanges with a bore not larger than the inside diameter of a 6.4-mm (0.25-in.) wall pipe, except that NPS 38, Class 300 is not suitable for a bore larger than the inside diameter of a 7.6-mm (0.30-in.) wall pipe. Larger bores must be checked individually.
- There are no Class 900 flanges in NPS 50 and larger.

## Table SW-2.5-4 Maximum Bore of ASME B16.47 Series B Flanges for Use With Spiral-Wound Gasket

| Flange Size (NPS) | Inside Diameter of Inner Ring by Pressure Class, mm (in.) | | | | |
|---|---|---|---|---|---|
| | 150 | 300 | 400 | 600 | 900 |
| 26 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 28 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 30 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 32 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 34 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 36 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 38 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 40 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 44 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 46 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 48 | Note (1) | Note (1) | Note (1) | Note (1) | Note (1) |
| 50 | Note (1) | Note (1) | Note (1) | Note (1) | Note (2) |
| 52 | Note (1) | Note (1) | Note (1) | Note (1) | Note (2) |
| 54 | Note (1) | Note (1) | Note (1) | Note (1) | Note (2) |
| 56 | Note (1) | Note (1) | Note (1) | Note (1) | Note (2) |
| 58 | Note (1) | Note (1) | Note (1) | Note (1) | Note (2) |
| 60 | Note (1) | Note (1) | Note (1) | Note (1) | Note (2) |

**General Note**

- **This Table shows the maximum bore of flanges for which the spiral-wound gasket dimensions shown in Table SW-2.1-3 are recom- mended, considering the tolerances involved, the possibility of eccentric installation, and the possibility that the gasket may extend into the assembled flange bore.**
- **Refer to para. SW-2.5 for required use of inner rings**

**Notes**

- **Welding neck and integral flanges having maximum inside diameters as described in ASME B16.47. (2) There are no Class 900 flanges in NPS 50 and larger.**

## Table SW-3-1 Color Coding and Abbreviations for Spiral-Wound Gasket Materials

| Material | Abbreviation | Color Code |
|---|---|---|
| **Metallic Winding Materials** | | |
| Carbon steel | CS | Silver |
| Type 304 SS | 304 | Yellow |
| Type 304 L SS | 304 L | No Color |
| Type 309 SS | 309 | No Color |
| Type 310 SS | 310 | No Color |
| Type 316 L SS | 316 L | Green |
| Type 317 L SS | 317 L | Maroon |
| Type 321 SS | 321 | Turquoise |
| Type 347 SS | 347 | Blue |
| Type 430 SS | 430 | No Color |
| Monel 400 | MON | Orange |
| Nickel 200 | NI | Red |
| Titanium | TI | Purple |
| 20Cb-3 alloy | A-20 | Black |
| Hastelloy B | HAST B | Brown |
| Ni-Mo-Cr | ... | Beige |
| Hastelloy C | HAST C | ... |
| Inconel 600 | INC 600 | Gold |
| Grade 600 | ... | Ni |
| Cr-Fe-Cb | ... | Inconel |
| 625 | INC 625 | Gold Grade 625 |
| Inconel X-750 | INX | No |
| Incoloy 800 | IN 800 | White |
| Grade 800 | ... | Ni |
| Fe-Cr-Mo-Cu | ... | Incoloy |
| 825 | IN 825 | White Grade 825 |
| No color | Zirconium | ZIRC |
| **All Other Materials** | **Manufacturer's standard** | **No color** |
| **Nonmetallic Filler Materials** | | |
| Polytetrafluoroethylene | PTFE | White stripe |
| Vermiculite | ... | Light blue stripe |
| Phlogopite (magnesium mica) | ... | Light blue stripe |
| Flexible graphite | FG | Gray stripe |
| Ceramic | CER | Light green stripe |

# SPIRAL WOUND GASKETS

## Availability of Hoop Materials and Filler Materials

| Materials | Code | Recommended For | Temp. |
|---|---|---|---|
| SS 304 | 304 | Standard Product | 500℃ |
| SS 304 L | 304L | Fluid where low carbon contained stainless steel is required | 430℃ |
| SS 316 | 316 | Petroleum and Petrochemical industries | 600℃ |
| SS 316L | 316L | Fluid where low carbon contained stainless steel is required | 600℃ |
| SS 310S | 310 | For high temperature | 800℃ |
| SS 321 | 321 | Petroleum and Petrochemical industries | 800℃ |
| SS 347 | 347 | For high temperature | 800℃ |
| Titanium | TI | Anti-corrosion at high temperature | 600℃ |
| Monel | MO | Anti-corrosion at high temperature | 800℃ |
| Nickel | NI | Anti-corrosion at high temperature | 760℃ |
| Alumunium | AL | For Alumunium flange | 200℃ |
| Inconel 600 | IN | Anti-corrosion at high temperature | 800℃ |

## Availability of Filler Materials

| Materials | Applications | Temperature |
|---|---|---|
| Non-Asbestos | To seal in cooling system of BWR type atomic power and advanced type converter and to seal in primary cooling system of BWR type atomic power plant but wehere to avoid the use of asbestos | 300℃ ~ 550℃ |
| Graphite | To seal in high vacuum or high temperature condition where a perfect airtightness is required, or in the place where it is wanted to do without additional bolting even attached by severe heat cycles | 450℃ |
| PTFE | To seal strong acids | 260℃ |

## Service Range and Available Size
## Application Standard

| JIC NO FLUID | 1834-R | | 1836-R | | 3836-R-SF | | 3836-R-TF | |
|---|---|---|---|---|---|---|---|---|
| | Temp (℃) | Pressure (kgf/cm²) | Temp (℃) | Pressure (kgf/cm²) | Temp (℃) | Pressure (kgf/cm²) | Temp (℃) | Pressure (kgf/cm²) |
| Water | 100 | 300 | 100 | 300 | 100 | 350 | 200 | 200 |
| Steam, Hot Water | 500 | 200 | 580 | 250 | 580 | 350 | 300 | 100 |
| Hot Oil | 500 | 100 | 580 | 100 | 580 | 200 | 300 | 100 |
| Organic Solvents | 500 | 100 | 580 | 100 | 580 | 200 | 300 | 100 |
| Heat Transfer Liquids | 500 | 100 | 580 | 100 | 580 | 200 | 300 | 100 |
| Hydrocarbon | 500 | 100 | 580 | 100 | 580 | 200 | 300 | 100 |
| Gases | 400 | 100 | 400 | 100 | 400 | 200 | 300 | 100 |
| Cryogenic Gases | -200 | 50 | 200 | 50 | 240 | 100 | -100 | 100 |
| Acidic Fluid | - | - | - | - | - | - | 300 | 100 |
| Vacuum | 400 | - | 400 | - | 580 | - | 300 | - |

**Note**

- **JIC No. 3836-GRP is recommended for synthetic heat transfer liquids (KSK oil etc) for temperatures over 300oC**
- **Expanded Graphite cannont be for used oxidizing agents**

# SPIRAL WOUND GASKETS

## Application Standard

| Outer ring O.D Inner ring ID. NGasket I.D | Width of gasket | Width of Inner ring | Width of Outer ring | Outer ring O.D Inner ring ID. NGasket I.D | Width of gasket | Width of Inner ring | Width of Outer ring |
|---|---|---|---|---|---|---|---|
| | Dimensions | Min. Width | Min. Width | | Dimensions | Min. Width | Min. Width |
| 15 ~ 30 | 5.0 ~ 10 | 3.0 | - | 301 ~ 400 | 9.0 ~ 40 | 9.0 | 9.0 |
| 31 ~ 46 | 5.0 ~ 15 | 3.0 | 5.5 | 401 ~ 500 | 10.0 ~ 40 | 10.0 | 10.0 |
| 47 ~ 55 | 5.5 ~ 20 | 3.5 | 5.5 | 501 ~ 600 | 11.0 ~ 35 | 11.0 | 11.0 |
| 56 ~ 70 | 5.5 ~ 25 | 4.0 | 5.5 | 601 ~ 800 | 12.0 ~ 35 | 12.0 | 12.0 |
| 71 ~ 90 | 6.0 ~ 30 | 4.5 | 5.5 | 80` ~ 1000 | 13.0 ~ 30 | 13.0 | 13.0 |
| 91 ~ 110 | 6.0 ~ 35 | 5.0 | 5.5 | 1001 ~ 1200 | 14.0 ~ 30 | 14.0 | 14.0 |
| 111 ~ 150 | 6.5 ~ 35 | 5.5 | 5.5 | 1201 ~ 1500 | 15.0 ~ 23 | 15.0 | 15.0 |
| 151 ~ 170 | 7.0 ~ 40 | 6.0 | 6.0 | 1501 ~ 1800 | 15.0 ~ 25 | 20.0 | 20.0 |
| 171 ~ 200 | 7.0 ~ 40 | 7.0 | 7.0 | 1801 ~ 2000 | - | - | 20.0 |
| 201 ~ 300 | 8.0 ~ 40 | 8.0 | 8.0 | | - | - | - |

## Maximum Gasket O.D

| Type Gasket Thickness | Non Asbestos | Graphite | PTFE |
|---|---|---|---|
| 3.2 | 500 | 400 | 400 |
| 4.5 (Standard) | 2000 | 1500 | 1500 |
| 6.4 | - | 2500 | 2500 |

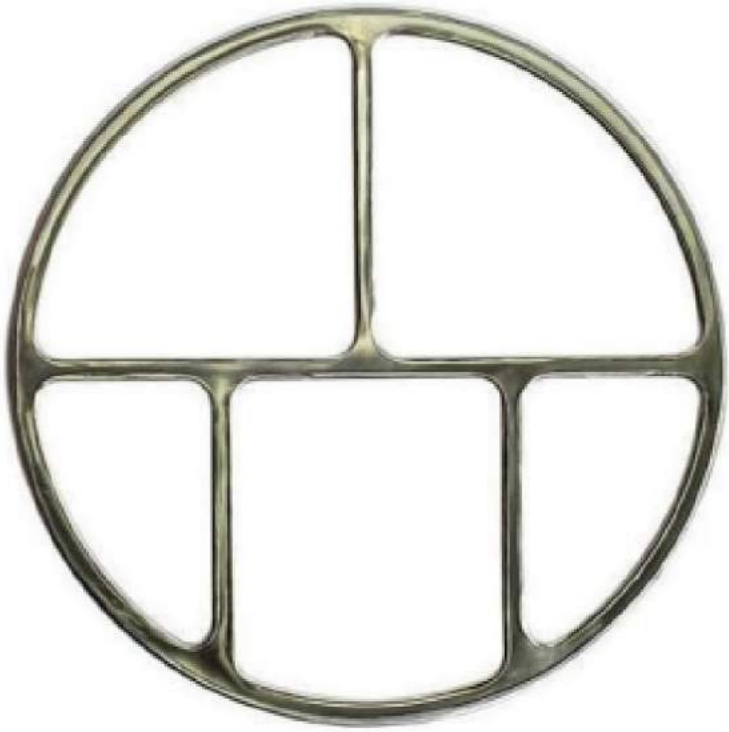
**Note**
**Any other size, please contact us**

## Standard Thickness of Inner and Outer Rings

| Material Gasket Thickness | Standard Thickness | |
|---|---|---|
| | Low Carbon Steel | SS 304 |
| 3.2 | 2.0 | 2.0 |
| 4.5 (Standard) | 3.2 | 3.0 |
| 6.4 | 4.5 | 4.5 |

**Note**
**Please consult us if ring material is other than low carbon steel or SS 304**

# METAL JACKETED GASKET



**Driven by the industry's need for safe, effective sealing solutions for increasingly demanding applications, PT. Kakas Nurain Falah also provide various of type Metal Jacketed Gasket**

**These gaskets are composed of carefully selected cushion materials such as Non Asbestos Millboard, Graphite Sheet and PTFE with external metal jacket of carbon steel, stainless steel,**
**copper, 5Cr-0.5Mo alloy steel, etc. They are widely used on piping flanges, joints of machinery and heat exchangers because they can be fabricated not only to a regular round shape but also to other irregular shapes such as oval, rectangular, etc.**

**With additional rib or rib to seal multi-pass heat exchangers. An increased demand has recently been seem for a special type having attached expanded graphite tapes on both sealing faces to increase seal ability**

# SPIRAL WOUND GASKETS

## Standard Type of Metal Jacketed Gaskets

### Availability of Jacket Materials

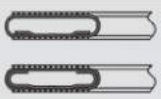
**A Wide range of gasket material is available to company with operating conditions.**
**Jeil's extensive material inventories are as introduced below**

| Metal of Jacket (Vickers, Max) | Low Carbon Steel | Copper | SS 304 | SS 304L | SS 316 | SS 316L | SS 317L | SS 321 | SS 347 | SS 310S | SS 410 | Bronze | Al Bronze | Monel | Titanium | Nickel | Alumunium | Leed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max Hardness Vickers (HV) | 140 | 80 | 180 | 170 | 180 | 170 | 180 | 180 | 180 | 180 | 190 | 130 | 150 | 150 | 180 | 150 | 40 | 10 |
| Max OD (Outer Diameter,mm) | 1200 | 980 | 1200 | 1200 | 1200 | 1200 | 980 | 1200 | 1200 | 1080 | 980 | 980 | 980 | 880 | 980 | 880 | 980 | 1500 |
| **Filler** : NA Millboard / Sheet (Graphite) / Sheet(PTFE) / Ceramic Board | | | | | | | | | | | | | | | | | | |
| **Additional Attachment** : Expended Graphite Tape | | | | | | | | | | | | | | | | | | |

## Design data for Metal Jacketed Gasket

| Jacket Material | Soft Aluminum | Soft Copper or Brass | Iron or Soft Steel | Monel | 4%~6% Chrome | Stainless and Nickel - Base Alloys |
|---|---|---|---|---|---|---|
| Gasket Factor M | 3.25 | 3.50 | 3.75 | 3.50 | 3.75 | 3.75 |
| Min. Design Seating Stress Y (MPa/psi) | 38 / 5,500 | 45 / 6,500 | 52 / 7,600 | 55 / 8,000 | 62 / 9,000 | 62 / 9,000 |
| Sketches |  | | | | | |

## Coss Section and ZELL

| Type | Cross Section | Filler Material | | | |
|---|---|---|---|---|---|
| | | Non-asbestos | GRAPHITE | PTFE | Ceramic |
| Double Jacketed Gasket |  | 3840-NA | 3840-GRP | - | 3840-CE |
| Double Jacketed & Double Shell Gasket |  | 3841-NA | 3841-GRP | 3841-PTFE | 3841-CE |
| Double Jacketed Corrugated Gasket |  | 3860-NA | 3860-GRP | - | 3860-CE |
| Double Jacketed Gasket with GRAPHITE tape |  | 3840-NA (GRP)<br>3841-NA (GRP) | -<br>3841- (GRP) | -<br>3841- PTFE (GRP) | 3840-CE (GRP)<br>3841-CE (GRP) |

# METAL JACKETED GASKET

## ZELL No 3840-CE/3860-CE (With NA Ceramic Filler)

### Service Range

| | |
|---|---|
| Application | Goose neck of blast furnace, Heat exchanger, Naptha cracking furnace, Valve bonnet etc |
| Max Service Temperature | Up to 1300°C |
| Max Service Pressure | Up to 60 kgf/cm² |

## ZEL No. 3840(GRP)/1841(GRP)/3840(GRP)/3841(GRP)

### Service Range

| | |
|---|---|
| Application | Heat Exchanger, Pressure Vessel, Valve Bonnet, Pipe Flange etc |
| Max Service Temperature | Up to 530°C (Neutral or reducing atmosphere)<br>Up to 400°C (Oxidizing atmosphere) |
| Max Service Pressure | Up to 60 kgf/cm² |

### Tolerance

| Dimension | Tolerance |
|---|---|
| Up to 250 mm ID, OD | ±0.5 |
| 251 ~ 500mm ID, OD | ±1.0 |
| 501 ~ 1000mm ID, OD | ±1.5 |
| 1001mm ~ ID, OD | ±2.0 |
| Thickness | ±0.2 |

### Dimension Data

### Double JacketedGasket

| Standard Thickness | 3.0 or 1/8" |
|---|---|
| R | 8 min |
| W | 7 min |
| T | 2.0 ~ 3.0 |
| L | 2.5 min |
| a | 2.5 min |
| Metal Thickness | 0.3 ~ 0.5 |

### Double Jacketed Corrugated Gasket

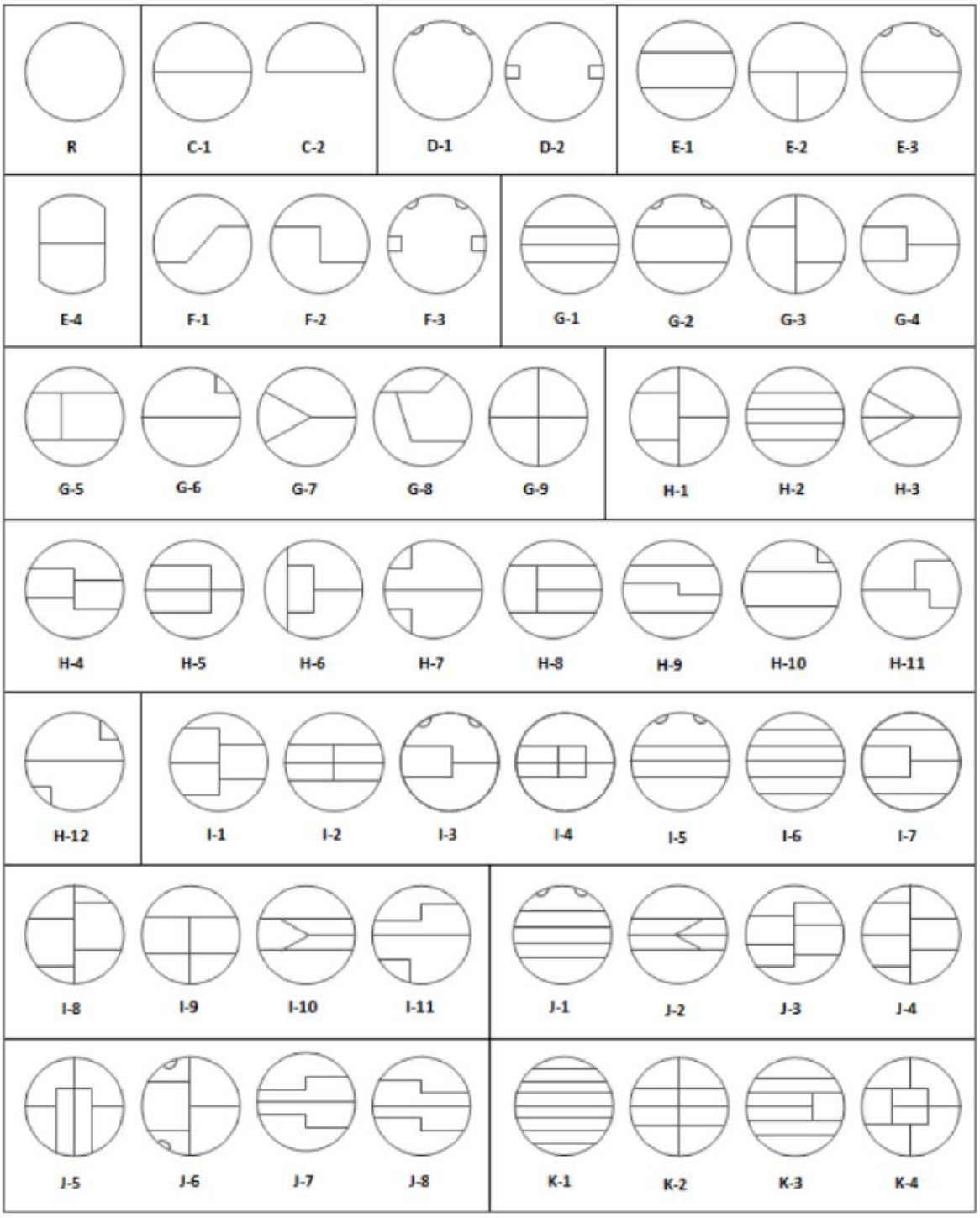
| T (Gasket) Thickness | 3.0 min |
|---|---|
| W (Gasket Width) | 15.0 min |
| t (Corrugation Height) | 1.0±0.3 |
| P(Corrugation Pitch) | 6.4 |
| Metal Thickness | 0.3 ~ 0.5 |

### Tolerance

| Dimensions | Tolerance |
|---|---|
| Up to 250mm ID, OD | ± 0.5 |
| 251~500mm ID, OD | ± 1.0 |
| 501~1000mm ID, OD | ± 1.5 |
| 1001mm ~ ID, OD | ± 2.0 |
| Metal Thickness | ± 0.2 |

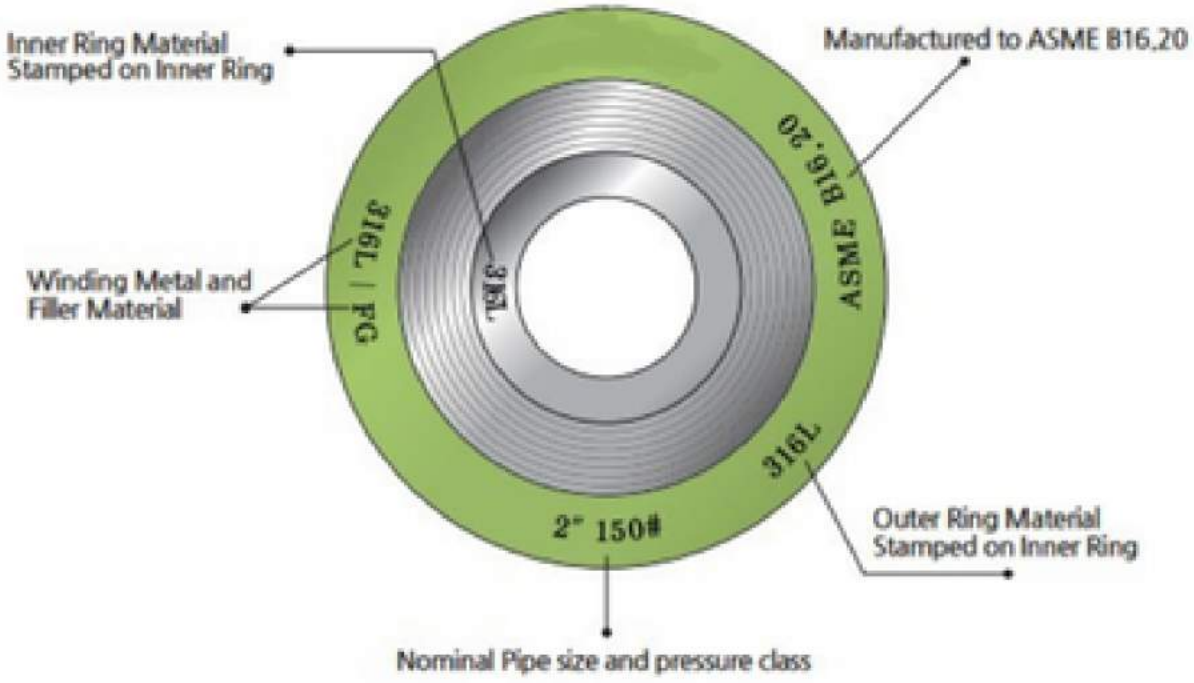
# SPIRAL WOUND GASKETS

**Codes of ribs for Metal Jacketed Gasket**



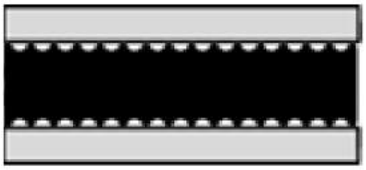
# SPIRAL WOUND GASKETS

## GARLOCK KAMMPROFILE GASKETS

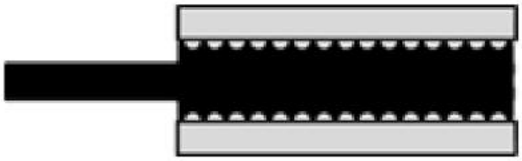



**Garlock Kammprofile gaskets are high performance gaskets constructed of a machined metal core with a soft non-metallic facing material, and an optional outer ring (integral or floating). Garlock Kammprofiles are available in standard flange sizes/classes (per ASME B16.20) as well as custom dimensions for critical equipment such as heat exchangers and reactors. Kammprofiles are designed to handle pressure from full vacuum to class 2500#. The gaskets also provide improved conformability over double jacketed (DJ) and Ring Type Joint (RTJ) gaskets.**

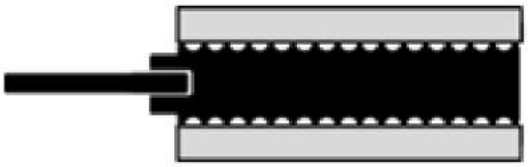
# CONFIGURATIONS



642 A – Kammprofile core completely machined and serrated and then faced with a soft deformable sealing material



642 AR – Kammprofile core machined and serrated with an integral outer ring for alignment. The serrated portion of the core is faced with a soft deformable sealing material



642 AR2 – Kammprofile core machined and serrated with a floating outer ring for alignment (outer ring typically constructed of carbon steel or other suitable metal). The serrated portion of the core is faced with a soft deformable sealing material

## Available Facing Materials

| Material | Minimum Temperature* | Maximum Temperature* |
|---|---|---|
| PTFE | -400°F (-240°C)* | 500°F (260°C) |
| GYLON® | -450°F (-268°C)* | 500°F (260°C) |
| Flexible Graphite (APX-2)† | -350°F (-212°C)* | 850°F (454°C) |
| THERMa-PUR™ | N/A | 1832°F (1000°C)* |

NOTE: Minimum and maximum temperature rating of the finished gasket may be limited by the metal(s) used in the gasket construction.

- Contact Garlock Applications Engineering at 800-448-6688 for values on facing materials not shown. Other grades of graphite available upon request.

## Design Factors

| | Gasket Factors | | Gasket Constants | | | Stress required for tightness | | |
|---|---|---|---|---|---|---|---|---|
| Facing | M | Y (psi) | Gb (psi) | a | Gs (psi) | S 100 (psi) | S 1,000 (psi) | S 10,000 (psi) |
| Graphite (APX-2) | 4.00 | 4,000* | 368 | 0.4 | 0.28 | 2,324 | 5,838 | 14,664 |
| THERMa-PUR™ | 10.00 | 5,000 | 1,737 | 0.264 | 52 | 5,861 | 10,766 | 19,778 |

NOTE: Actual test results indicated y = 1,000 psi, which is consider too low for flange design purposes.

- Contact Garlock Applications Engineering at 800-448-6688 for values on facing materials not shown.

# SPIRAL WOUND GASKETS

## ZEL 3850-SE - Parallel Root
## ZEL 3850-SEB - Floating Centering Ring
## ZEL 3850-SEC - Convex Root

### Characteristic

**This Kammprofile gaskets provide a safe, effective seal with excellent flexibility and recovery, allowing seal integrity under the most severe operating conditions. Two part assembly, consisting of a precision serrated metallic core with the addition of flexible Expanded Graphite Tapes bonded to each face of a solid metal core. While the solid metal core prevents gasket blowout, the facing Expanded Graphite flows easily into the faces allowing a high integrity seal out of Expanded Graphite characteristics, even under low applied seating stresses.**

**Suitable for the application required a small bolt load since the contact area is very small and gasket seating pressures and temperature are very high. A full range of metallic core materials are available. JIC 3850-SE(SF) series. The soft facing material is STARPITE® tape which is preferred where extremely high temperature (max.1000°C) is required. 4 types of cross section as basic, with inner, with outer ring and with inner & outer ring are available in accordance with applied flanges.**

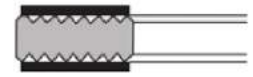
### Standard Facing Materials

| Facing Material | Temp. Max. | Range Stress at Room Temp. Min. | Maximum Service Pressure | Applied |
|---|---|---|---|---|
| **GRAPHITE** Tape<br>JIC 3850-SE (GRP) | 450°C (840°F) | 17 MPa (2500 psi) | Class 150 to 2500 | • Valve Bonnet and non-circular Flange, Heat Exchanger, Pressure Container<br>• Depend on Temperature and Liquid, Ring Material should be changeable. |
| **PTFE** Tape<br>JIC 3850-SE (PTFE) | 260°C (500°F) | 23 MPa (3300 psi) | | |

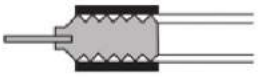
### Standard Core Materials

| Core Material | Temp. Max. |
|---|---|
| Stainless Steel | 535-870°C (1000-1600°F) |
| Carbon Steel | 425°C (800°F) |
| Brass | 260°C (500°F) |
| Copper | 315°C (600°F) |
| Aluminum | 425°C (800°F) |
| Monel | 815°C (1500°F) |
| Nickel | 760°C (1400°F) |
| Inconel | 1100°C (2000°F) |

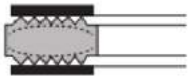
### Structure



Parallel Root
(SE)

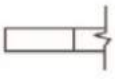


Floating Centering Ring
(SEB)



Convex Root
(SEC)

### Metallic Codesfor Metal Gasket

| Cross Section | JIC NO. | Description |
|---|---|---|
|  | **3850-P**<br>*Plain* | Flat ring punched or lathed from comparatively soft metal such as aluminum, copper etc. Relatively inexpensive to make. |
|  | **3850-SE**<br>*(Serrated)* | Flat ring with concentric serrations made of various types of metal, Used when bolting force is not sufficient to seal a fiat gasket because it contacts flange face only at ser-ration peaks, commonly used on valve bonnets and flanges atlached to equipment. 3 types of cross section-Basic, with outer ring and with inner & outer ring-are available. |

# PT. KAKAS NURAIN FALAH
# Ring Joint Gasket

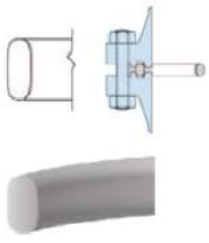
Ring Joint Gasket is a type of pressure energized gasket used on pipe flanges, pressure vessels, valve bonners handling high pressure steam, gas, hot oil. Oil gas, solvent vapor at high temperature

Our experienced technology offers many different types so that customers may select the most suitable one in accordance with operating conditions

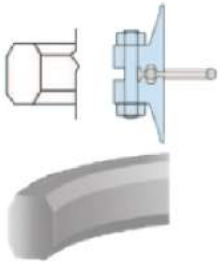
## ZEL 3850

Characteristic
This ring joint gasket designed for use in high
Pressure, temperature applications necessitated the need for a high integrity seal. They are mainly used in the high pressure vessel, pipe flanges valve bonnets handling high pressure steam, gas, hot oil, oil gas, Solvent vapor industries, etc.

A wide range of sizes and materialsare available on request. The hardness of the ring should always be less than the hardnessof the flanges



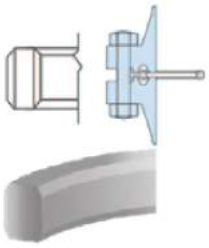
3850-V - Ring Joint Oval Type
This type is the original Joint design.
Contacts flanges face at the curved
Surface and provides a high reliability seal. But due to its shape, it is harder to achieve accuracy of dimensions
And surface finish in oval type than in octagonal one and also more expensive to make. Reduce is not possible.
Complies with ASME B16, 20, API 6A, JIS F 7102 510SR, JPI-7S-23



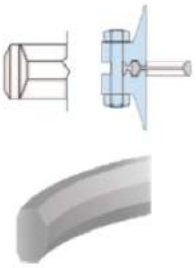
3850-C - Ring joint Octagonal Type
More economicalto make and more accurate in dimensionsand surface finish than oval type because it
Consists of straight surfaces only.But more torque load is required to flow
The gasket material into
Imperfections on the flange facings. Reuse is possible. Complies with the same standards as above.

# SPIRAL WOUND GASKETS

## ZEL 3850



**3850-BX - Ring Joint BX Type**
**Designed to API 6A for use with Grooved flanges on special applications involving high pressures from 5,000 to 15,000 psi**



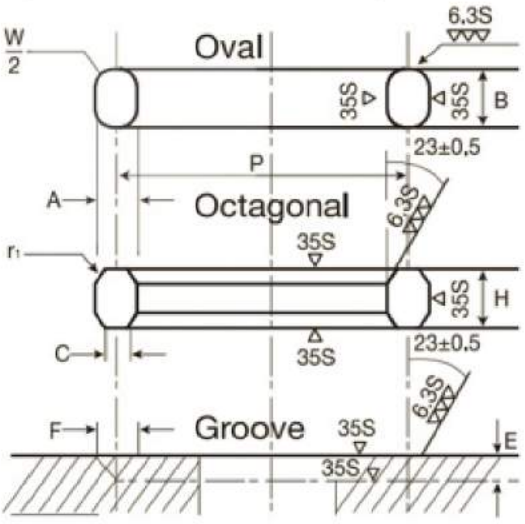
**3850-BX - Ring Joint BX Type**
**Designed to API 6A for use with Grooved flanges on special applications involving high pressures from 5,000 to 15,000 psi**

## Metallice Codesfor Metal Gasket

| Material | Ident. Code | Hardness | | UNS Code |
|---|---|---|---|---|
| | | Brinell | Rockwell Scale "B" | |
| Soft Iron | D | 90 | 56 | - |
| Low Carbon Steel | S | 120 | 68 | - |
| Copper | CU | 60 | - | - |
| SS 304 | 304 | 160 | 83 | S30400 |
| SS 304L | 304L | 150 | 81 | S30403 |
| SS 316 | 316 | 160 | 83 | S31600 |
| SS 316L | 316L | 150 | 81 | S31603 |
| SS 321 | 321 | 160 | 83 | S32100 |
| SS 347 | 347 | 160 | 83 | S34700 |
| SS 410 | 410 | 170 | 87 | S41000 |
| SS 430 | 430 | 170 | 87 | S43000 |
| 5cr-0.5Mo | F5 | 130 | 72 | K42544 |
| Monel400 | M | 140 | 77 | N04400 |
| Titanium | TI | 160 | 83 | - |
| Aluminium | AL | 40 | - | - |
| Nickel200 | NI | 120 | 67 | N02200 |

**Note**
**1. Not applied for JIC3850-P press cut from sheet**

## Standard Sizes (ASME B16.20-2007)




**r1 : 1.59mm when W is 22.225mm and smaller**
**2.38mm when W is 25.400mm and larger**

# Gasket Materials and Contact Facings

| Gasket Material | | Gasket Factor m | Min Design seatingstressy (kgf/mm²) (N/mm²) | Sketches | Use facing sketch | |
|---|---|---|---|---|---|---|
| Self-Energizing types O Rings, Metallic, Elastomer other gasket types considered as self-sealing | | 0 | 0 | - | - | - |
| Elastomer without fabric | Below 75A Shore Durometer<br>75 or higher Shore Durometer | 0.50<br>1.00 | 0<br>0.14 (1.37) | | 1a, 1b, 1c 1d 4,5 | |
| Elastomer without fabric insertion | | 1.25 | 0.28 (2.75) | | | |
| Vegetable Fiber | | 1.75 | 0.77 (7.55) | | | |
| Corrugated Metal | Soft alumunium<br>Soft copper or brass<br>Iron or soft steel<br>Monel or 4 ~ 6% chrome<br>Stainless Steels | 2.75<br>3.00<br>3.25<br>3.50<br>3.75 | 2.60 (25.50)<br>3.16 (30.99)<br>3.87 (37.95)<br>4.57 (44.82)<br>5.34 (52.37) | | 1a, 1b, 1c 1d | B |
| Groove Metal | Soft alumunium<br>Soft copper or brass<br>Iron or soft steel<br>Monel or 4 ~ 6% chrome<br>Stainless Steels | 3.25<br>3.50<br>3.75<br>3.75<br>3.75 | 3.87 (37.95)<br>4.57 (44.82)<br>5.34 (52.37)<br>6.33 (62.08)<br>7.10 (69.63) | | 1a, 1b, 1c 1d 2,3 | |
| Solid Flat Metal | Soft alumunium<br>Soft copper or brass<br>Iron or soft steel<br>Monel or 4 ~ 6% chrome<br>Stainless Steels | 4.00<br>4.75<br>5.50<br>6.00<br>6.50 | 6.19 (60.70)<br>9.14 (89.63)<br>12.66 (124.16)<br>15.33 (150.34)<br>18.28 (179.27) | | 1a, 1b, 1c 1d 2,3,4,5 | |
| Ring Joint | Iron or soft steel<br>Monel or 4 ~ 6% chrome<br>Stainless Steels | 5.50<br>6.00<br>6.50 | 12.66 (124.16)<br>15.33 (150.34)<br>18.28 (179.27) | | 6 | |

**Note**

1. **Gasket factor (m) is applicable only in case that gasket is wholly placed inside the In-dia of bolt holes**
2. **This table gives a list of many commonly used gasket materials and contact facings with suggested design values of m and y that have generally proved satisfactory in actual service when using effective gasket seating width b.**
3. **In market gaskets the surface of a gasket having a lap should be againts the snooth surface of the facing and not againts the nubbin of 1c, 1d & 2**

## How to order Metal Gasket

ZEL NO. 3850 ☐-☐ — Material Code : such as "S", "304", etc

— Cross Sectional Shape : such as "C", "V", "P", etc.