## SECTION ONE: NON-METALLIC GASKETS

A "Soft Gasket" material is a term used when referring to a gasket material that is easily compressed under a low bolt load. This term has been used to distinguish the difference from a metallic gasket. A soft gasket material can be selected from a large variety of elastomers, compressed non-asbestos, PTFE, flexible graphite and high temperature sheet products. Soft gaskets are used in a wide range of applications such as for pipe flanges, heat exchangers, compressors and bonnet valves, to name just a few. Soft gasket material can be purchased in a variety of cut shapes or be provided in sheet or rolls.

As part of Lamons strategy to offer customers a wider range of products, we are pleased to supply the following soft gasket materials:



- Elastomeric and Fiber Sheet
- Compressed Non-Asbestos Sheet
- Virgin / Glass-Filled / Reprocessed PTFE Sheet
- Biaxially Orientated (Filled) PTFE Sheet
- Expanded PTFE Sheet
- PTFE Joint Sealant
- PTFE Envelope Gaskets
- Flexible Graphite Sheet
- Mica Sheet
- Ceramic Fiber

## ELASTOMERS

An Elastomer is a polymer with the physical property of elasticity. Elastomer is a term derived from elastic polymer, which is often used interchangeably with the term rubber. Each of the monomers which link to form the polymer is usually made of carbon, hydrogen, oxygen and/or silicon. Elastomers are usually thermosets requiring a curing process involving heat and the addition of sulfur or other equivalent curatives. In addition, elastomers might also be thermoplastic.

### SBR (STYRENE-BUTADIENE)

SBR is a synthetic rubber that has excellent abrasion resistance and has good resistance to weak organic acids, alcohols, moderate chemicals and ketones. It is not good in ozone, strong acids, fats, oils, greases and most hydrocarbons. Its temperature range would be from approximately -65°F to 250°F (-54°C to 121°C).

## CR-Chloroprene (Neoprene)

Chloroprene is a synthetic rubber that is suitable for use against moderate acids, alkalies and salt solutions. It has good resistance to commercial oils and fuels. It is very poor against strong oxidizing acids, aromatic and chlorinated hydrocarbons. Its temperature range would be from approximately -60°F to 250°F (-51°C to 121°C).

## Buna-N/Rubber (Nitrile, NBR)

Buna-N is a synthetic rubber that has good resistance to oils and solvents, aromatic and aliphatic hydrocarbons, petroleum oils and gasoline over a wide range of temperature. It also has good resistance to caustics and salts but only fair acid resistance. It is poor in strong oxidizing agents, chlorinated hydrocarbons, ketones and esters. It is suitable over a temperature range of approximately -60°F to 250°F (-51°C to 121°C).

## EPDM (Ethylene Propylene)

This synthetic material has good resistance to strong acids, alkalies, salts and chlorine solutions. It is not suitable for use in oils, solvents or aromatic hydrocarbons. Its temperature range would be between -70°F to 350°F (-57°C to 177°C).

## Fluorocarbon (Viton®)

Fluorocarbon elastomer has good resistance to oils, fuel, chlorinated solvents, aliphatic and aromatic hydrocarbons and strong acids. It is not suitable for use against amines, esters, ketones or steam. Its normal temperature range would be between -15°F to 450°F (-26°C to 232°C).

## Chlorosulfonated Polyethylene (Hypalon®)

Hypalon® has good acid, alkali and salt resistance. It resists weathering, sunlight, ozone, oils and commercial fuels such as diesel and kerosene. It is not good in aromatics or chlorinated hydrocarbons and has poor resistance against chromic acid and nitric acid. It's normal temperature range would be between -50°F and 275°F (-46°C and 135°C).

## Natural Rubber

Natural rubber has good resistance to mild acids and alkalis, salts and chlorine solutions. It has poor resistance to oils and solvents and is not recommended for use with ozone. Its temperature range is very limited and is suitable only for use from -70°F to 200°F (-57°C to 93°C).

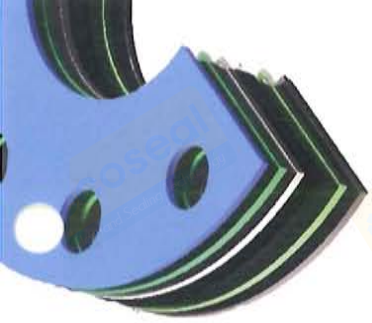
## Silicones

Silicone rubbers have good resistance to hot air. They are unaffected by sunlight and ozone. They are not, however, suitable for use against steam, aliphatic and aromatic hydrocarbons. The temperature range would be between -65°F to 500°F (-54°C to 260°C).

## Vegetable Fiber Sheet

Vegetable fiber sheet is a tough pliable gasket material manufactured by paper making techniques utilizing plant fibers and a glue-glycerine impregnation. It is widely used for sealing petroleum products, gases and a wide variety of solvents. Its maximum temperature limit is 250°F (121°C). If a more compressible material is required, a combination cork-fiber sheet is available. The cork-fiber sheet has the same maximum temperature limitation as the vegetable fiber sheet.

**Note:** Viton® and Hypalon® are registered trademarks of DuPont.



# Compressed Non-Asbestos

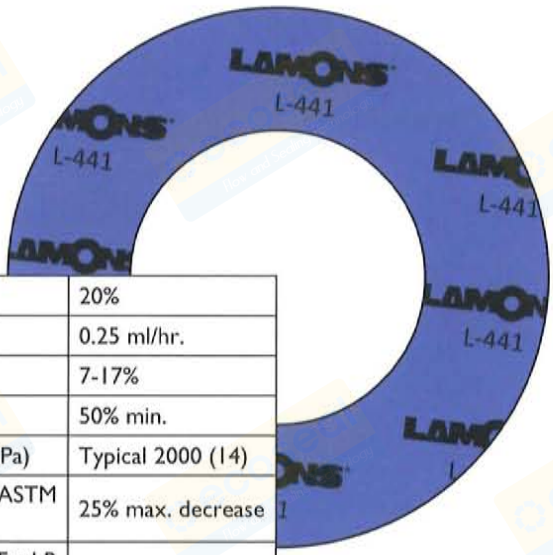
Early efforts to replace asbestos resulted in the introduction and testing of compressed non-asbestos products in the 1970's. Many of these products have seen extensive use since that period, however there have been enough problems to warrant careful consideration in choosing a replacement material for compressed asbestos. Most manufacturers of non-asbestos sheet materials use synthetic fibers, like aramid or Kevlar®, in conjunction with an elastomeric binder. The elastomeric binder makes up a larger percentage of this sheet and thereby becomes a more important consideration when determining applications.

## L-441

A general service sheet gasket material with a wide range of application potential. Manufactured with a formulation of high quality fillers, premium aramid fibers and nitrile binder, L-441 is the workhorse of the Lamons gasket line.

Applications and Characteristics

- Excellent sealing ability
- Excellent chemical resistance
- Good creep relaxation minimization
- Great recovery




| | | |
|---|---|---|
| Creep Relaxation | ASTM F-38B (1/32") | 20% |
| Sealability | ASTM F-37A (1/32") | 0.25 ml/hr. |
| Compressibility | ASTM F-36J | 7-17% |
| Recovery | ASTM F-36J | 50% min. |
| Tensile Strength | ASTM F-152 (cross-grain) psi (MPa) | Typical 2000 (14) |
| Change in Tensile | ASTM F-152 after immersion in ASTM Oil #3 @ 5 hrs./300°F (149°C) | 25% max. decrease |
| Weight Increase | ASTM F-146 after immersion in Fuel B @ 5 hrs./73°F (23°C) | 15% Maximum |
| Thickness Increase | ASTM F-146 after immersion in fluid: | |
| | ASTM Oil 1, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Oil 3, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Fuel A, 5 hrs./73°F (23°C) | 0-5% |
| | ASTM Fuel B, 5 hrs./73°F (23°C) | 0-7% |
| Standard Line Callout | ASTM F-104 | F712121B3E22M5 |
| Leachable Chlorides | FSA Method (Typical) | 100 ppm |
| Density | 112 lbs/ft³ (1.8 g/cc) | |
| Color | Blue | |
| Temperature Range | -40°F to 400°F (-40°C to 204°C) | |

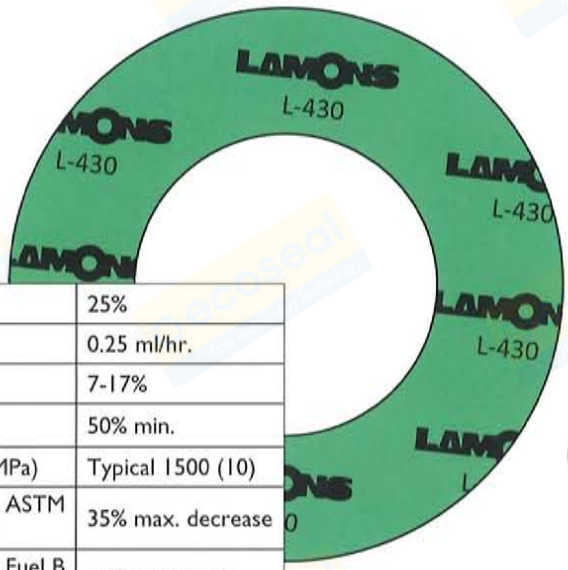
NOTE: Kelvar® is a registered trademark of DuPont.

## L-430

A general purpose sheet gasket material with superior mechanical properties. Constructed with premium aramid fiber and nitrile binder, L-430 is a general service sheet material with compatibility to many services.

Applications and Characteristics:

- Used successfully in mild organic and inorganic acids
- Diluted alkalis
- General chemicals
- Synthetic oils
- Petroleum and petroleum derivatives



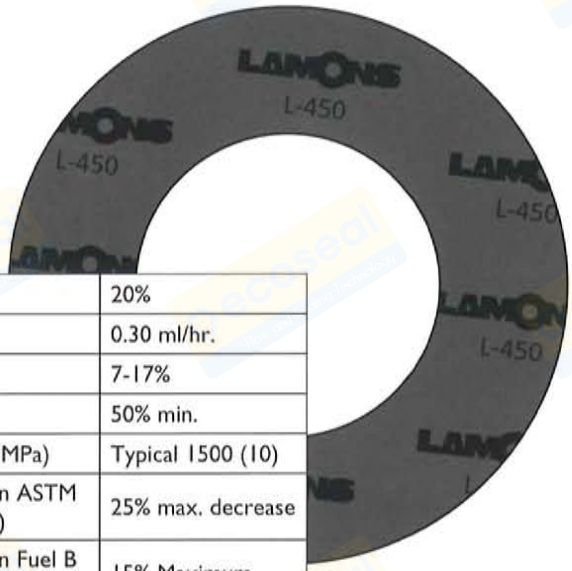

| | | |
|---|---|---|
| Creep Relaxation | ASTM F-38B (1/32") | 25% |
| Sealability | ASTM F-37A (1/32") | 0.25 ml/hr. |
| Compressibility | ASTM F-36J | 7-17% |
| Recovery | ASTM F-36J | 50% min. |
| Tensile Strength | ASTM F-152 (cross-grain) psi (MPa) | Typical 1500 (10) |
| Change in Tensile | ASTM F-152 after immersion in ASTM Oil #3 @ 5 hrs./300°F (149°C) | 35% max. decrease |
| Weight Increase | ASTM F-146 after immersion in Fuel B @ 5 hrs./73°F (23°C) | 15% Maximum |
| Thickness Increase | ASTM F-146 after immersion in fluid: | |
| | ASTM Oil 1, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Oil 3, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Fuel A, 5 hrs./73°F (23°C) | 0-5% |
| | ASTM Fuel B, 5 hrs./73°F (23°C) | 0-7% |
| Standard Line Callout | ASTM F-104 | F712111E12M4 |
| Leachable Chlorides | FSA Method (Typical) | 200 ppm |
| Density | 112 lbs/ft³ (1.8 g/cc) | |
| Color | White/Green | |
| Temperature Range | -40°F to 400°F (-40°C to 204°C) | |

## L-450

A premium sheet material utilizing carbon fiber and graphite as reinforcing agents. L-450 is designed to perform in extreme temperatures and pressures. Standardization and consolidation of many other gasket materials can be achieved by the use of L-450.

Applications and Characteristics:

- Good anti-stick properties
- Good steam resistance, water, stronger acids and alkalis, inert gases, general chemicals, oils and fuels, petroleum and petroleum derivatives.



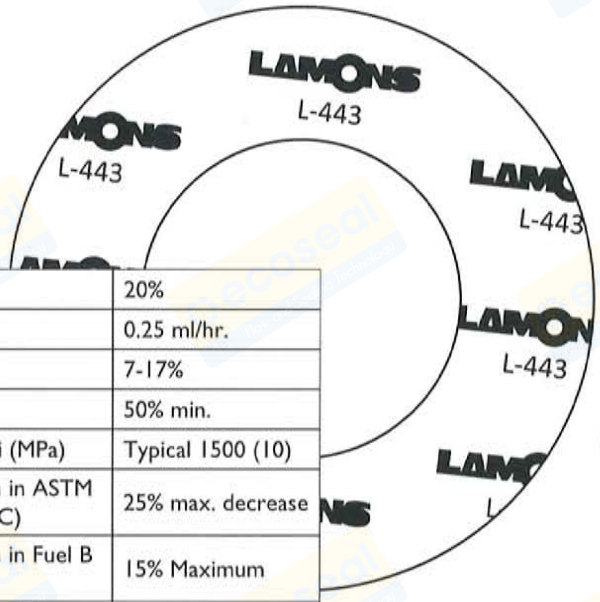

| | | |
|---|---|---|
| Creep Relaxation | ASTM F-38B (1/32") | 20% |
| Sealability | ASTM F-37A (1/32") | 0.30 ml/hr. |
| Compressibility | ASTM F-36J | 7-17% |
| Recovery | ASTM F-36J | 50% min. |
| Tensile Strength | ASTM F-152 (cross-grain) psi (MPa) | Typical 1500 (10) |
| Change in Tensile | ASTM F-152 after immersion in ASTM Oil #3 @ 5 hrs./300°F (149°C) | 25% max. decrease |
| Weight Increase | ASTM F-146 after immersion in Fuel B @ 5 hrs./73°F (23°C) | 15% Maximum |
| Thickness Increase | ASTM F-146 after immersion in fluid: | |
| | ASTM Oil 1, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Oil 3, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Fuel A, 5 hrs./73°F (23°C) | 0-5% |
| | ASTM Fuel B, 5 hrs./73°F (23°C) | 0-7% |
| Standard Line Callout | ASTM F-104 | F712122B3E22M5 |
| Leachable Chlorides | FSA Method (Typical) | 200 ppm |
| Density | 87 lbs/ft³ (1.4 g/cc) | |
| Color | Black | |
| Temperature Range | -40°F to 650°F (-40°C to 343°C) | |

## L-443

A compressed gasket material with a reinforcement structure consisting of glass and aramid fibers. Excellent resistance to steam can be realized due to the addition of glass fiber. A premium nitrile binder is utilized to achieve resilience and additional chemical resistance.

Applications and Characteristics:

- It can be applied to a variety of process media including steam, general chemicals, petroleum and petroleum derivatives.
- It possesses excellent creep relaxation minimization and good mechanical properties.



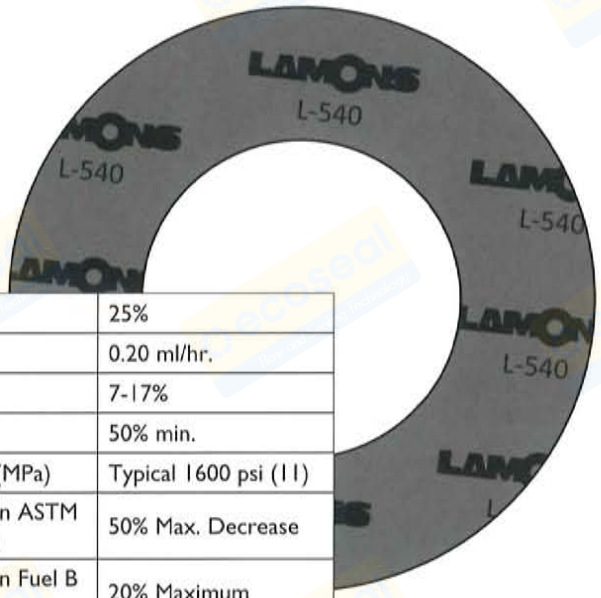

| | | |
|---|---|---|
| Creep Relaxation | ASTM F-38B (1/32") | 20% |
| Sealability | ASTM F-37A (1/32") | 0.25 ml/hr. |
| Compressibility | ASTM F-36J | 7-17% |
| Recovery | ASTM F-36J | 50% min. |
| Tensile Strength | ASTM F-152 (cross-grain) psi (MPa) | Typical 1500 (10) |
| Change in Tensile | ASTM F-152 after immersion in ASTM Oil #3 @ 5 hrs./300°F (149°C) | 25% max. decrease |
| Weight Increase | ASTM F-146 after immersion in Fuel B @ 5 hrs./73°F (23°C) | 15% Maximum |
| Thickness Increase | ASTM F-146 after immersion in fluid: | |
| | ASTM Oil 1, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Oil 3, 5 hrs./300°F (149°C) | 0-5% |
| | ASTM Fuel A, 5 hrs./73°F (23°C) | 0-5% |
| | ASTM Fuel B, 5 hrs./73°F (23°C) | 0-7% |
| Standard Line Callout | ASTM F-104 | F712132B3E21M5 |
| Leachable Chlorides | FSA Method (Typical) | 200 ppm |
| Density | 100 lbs/ft$^3$ (1.6 g/cc) | |
| Color | White/Green | |
| Temperature Range | -40°F to 500°F (-40°C to 260°C) | |

## L-540

A compressed sheet gasket material utilizing a neoprene binder. This material has an inherent resistance to oil and petroleum based solvents.

Applications and Characteristics:

- It is chemically stable and possesses good mechanical properties.
- It is an excellent choice for water, saturated steam refrigerants, oils and fuels.



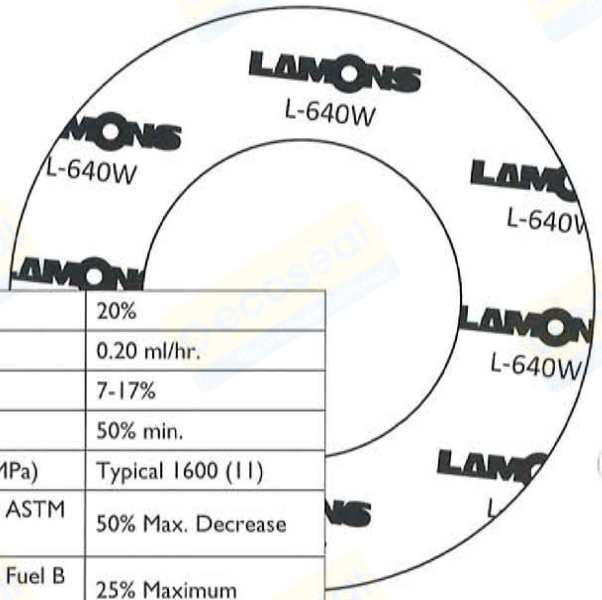

| | | |
|---|---|---|
| Creep Relaxation | ASTM F-38B (1/32") | 25% |
| Sealability | ASTM F-37A (1/32") | 0.20 ml/hr. |
| Compressibility | ASTM F-36J | 7-17% |
| Recovery | ASTM F-36J | 50% min. |
| Tensile Strength | ASTM F-152 (cross-grain) psi (MPa) | Typical 1600 psi (11) |
| Change in Tensile | ASTM F-152 after immersion in ASTM oil #3 @ 5 hrs./300°F (149°C) | 50% Max. Decrease |
| Weight Increase | ASTM F-146 after immersion in Fuel B @ 5 hrs./73°F (23°C) | 20% Maximum |
| Thickness Increase | ASTM F-146 after immersion in fluid: | |
| | ASTM Oil 1, 5 hrs./300°F (149°C) | 0-10% |
| | ASTM Oil 3, 5 hrs./300°F (149°C) | 15-25% |
| | ASTM Fuel A, 5 hrs./73°F (23°C) | 0-10% |
| | ASTM Fuel B, 5 hrs./73°F (23°C) | 10-20% |
| Standard Line Callout | ASTM F-104 | F712332BE4E45M5 |
| Leachable Chlorides | FSA Method (Typical) | 500 ppm |
| Density | 106 lbs/ft³ (1.7 g/cc) | |
| Color | Dark Gray | |
| Temperature Range | -40°F to 400°F (-40°C to 204°C) | |

## L-640W

A premium compressed sheet gasket material comprised of an engineered blend of aramid fiber, high quality fillers and SBR binder.

Applications and Characteristics:

- Good anti-stick properties
- Good steam resistance, water, mild, acids and alkalis, inert gases.




| | | |
|---|---|---|
| Creep Relaxation | ASTM F-38B (1/32") | 20% |
| Sealability | ASTM F-37A (1/32") | 0.20 ml/hr. |
| Compressibility | ASTM F-36J | 7-17% |
| Recovery | ASTM F-36J | 50% min. |
| Tensile Strength | ASTM F-152 (cross-grain) psi (MPa) | Typical 1600 (11) |
| Change in Tensile | ASTM F-152 after immersion in ASTM oil #3 @ 5 hrs./300°F (149°C) | 50% Max. Decrease |
| Weight Increase | ASTM F-146 after immersion in Fuel B @ 5 hrs./73°F (23°C) | 25% Maximum |
| Thickness Increase | ASTM F-146 after immersion in fluid: | |
| | ASTM Oil 1, 5 hrs./300°F (149°C) | 0-15% |
| | ASTM Oil 3, 5 hrs./300°F (149°C) | 20-35% |
| | ASTM Fuel A, 5 hrs./73°F (23°C) | 0-15% |
| | ASTM Fuel B, 5 hrs./73°F (23°C) | 15-25% |
| Standard Line Callout | ASTM F-104 | F712541B3E45M5 |
| Leachable Chlorides | FSA Method (Typical) | 200 ppm |
| Density | 112 lbs/ft³ (1.8g/cc) | |
| Color | White | |
| Temperature Range | -40°F to 400°F (-40°C to 204°C) | |

# Flexible Graphite

This is an all graphite material containing no resins or inorganic fillers. It is available with or without a metal insertion, and in adhesive-back tape form. Flexible Graphite has outstanding resistance to corrosion against a wide variety of acids, alkalies and salt solutions, organic compounds, and heat transfer fluids, even at high temperatures. There are two proven metal reinforced flexible graphite laminate materials ideal for 95% of all sheet gasket applications. Lamons flexible graphite laminates (LG-SS and LG-TC) are surface branded for easy identification. These gasket materials meet refinery, petrochemical and industrial service requirements.

## Lamons LG-SS

LG-SS is a flat metal 316/316L stainless steel reinforced flexible graphite sheet material made with minimum 98% typical carbon content.

| | |
|---|---|
| Nominal Thickness | 0.030"-0.120" (0.8 mm - 3 mm) |
| 316/316L insert thickness | 0.002" (0.05 mm) |
| Density | 70 lb/ft$^3$ (1.12 g/cc) |
| Ash content (Max) | 2.0% |
| Total chlorine (Max) | 50 ppm |
| Number of inserts | One |
| Compressibility | 30%-40% |
| Recovery | 15%-20% |
| Creep relaxation | <4% |
| Stability under stress (DIN 52913) | 48 N/m$^2$ |
| ASME code factor "M value" | 2 |
| ASME code factor "Y value" | 900 psi |
| Gas permeability according DIN 3535 (0.60") | <1.0 ml/min |
| Tp max at 15,000 psi gasket stress | 3227 psi (22 MPa) |
| PVRC design constants*: | $G_b$ = 816 psi<br>a = 0.377 psi<br>$G_s$ = 0.066 psi |
| Typical thicknesses | 1/16" (1.5 mm)<br>1/8" (3 mm) |

*The values are taken from BFG-6.1 and ROTT. Test results are subject to interpretation and can lead to differing design constants.

## LAMONS LG-TC

LG-TC is a reinforced flexible graphite sheet material laminated with tanged 316/316L stainless steel insert and made with minimum 98% typical carbon content.

| | |
|---|---|
| Nominal Thickness | 0.030"- 0.120" (0.8 mm - 3 mm) |
| 316/316L insert thickness | 0.004"/0.005" (0.1/0.127 mm) |
| Density | 70 lb/ft³ (1.12 g/cc) |
| Ash content (Max) | 1.0% |
| Total chlorine (Max) | 50 ppm |
| Number of inserts | One |
| Compressibility | 30%-40% |
| Recovery | 15%-20% |
| Creep relaxation | <4% |
| Stability under stress (DIN 52913) | 48 N/m² |
| ASME code factor "M value" | 2 |
| ASME code factor "Y value" | 2500 psi |
| Gas permeability according DIN 3535 (0.60") | <1.0 ml/min |
| Tp max at 15,000 PSI gasket stress | 2287 psi (16 MPa) |
| PVRC design constants*: | $G_b$ = 1400 psi<br>a = 0.324 psi<br>$G_s$ = 0.010 psi |
| Typical thicknesses | 1/16" (1.5 mm)<br>1/8" (3 mm) |

*The values are taken from BFG-6.1 and ROTT. Test results are subject to interpretation and can lead to differing design constants.

## LAMONS LG-L

LG-L homogeneous graphite sheets are manufactured from high carbon content of minimum 98% natural graphite.


| | |
|---|---|
| Nominal Thickness | 0.030"-0.120" (0.8 mm - 3 mm) |
| Density | 70 lb/ft³ (1.12 g/cc) |
| Ash content (Max) | 1.0% |
| Total chlorine (Max) | 50 ppm |
| Number of inserts | One |
| Compressibility | 30%-40% |
| Recovery | 15%-20% |
| Creep relaxation | <4% |
| Stability under stress (DIN 52913) | 48 N/m² |
| ASME code factor "M value" | 2 |
| ASME code factor "Y value" | 2500 psi |
| Gas permeability according DIN 3535 (0.60") | <1.0 ml/min |
| Tp max at 15,000 PSI gasket stress | 2287 psi (16 MPa) |
| PVRC design constants*: | $G_b$ = 1400 psi<br>a = 0.324 psi<br>$G_s$ = 0.010 psi |
| Typical thicknesses | 1/16" (1.5 mm)<br>1/8" (3 mm) |

*The values are taken from BFG-6.1 and ROTT. Test results are subject to interpretation and can lead to differing design constants.

## GRAPHITE TAPE

Rolls of graphite tape can be furnished with a strong self-adhesive backing strip, to facilitate repair of pre-laminated surfaces, enhancement of existing design or installation as a form-in-place gasket.

# PTFE Products

PTFE (Polytetrafluoroethylene) has emerged as the most common thermoplastic gasket material. PTFE's outstanding properties include resistance to temperature extremes from cryogenic to 450°F (232°C) (for virgin material). PTFE is highly resistant to chemicals, solvents, caustics and acids except free fluorine and alkali metals. It has a very low surface energy and does not adhere to the flanges. PTFE gaskets can be supplied in a variety of forms; either as virgin or reprocessed material, and also with a variety of filler material. The principal advantage in adding fillers to PTFE is to inhibit cold flow or creep relaxation.

## Virgin / Glass-Filled / Reprocessed PTFE Sheet

| Typical Physical Properties | | | | | |
|---|---|---|---|---|---|
| **Property** | **Units** | **ASTM Method** | **Typical Values (Virgin)** | **Typical Values (G-F)** | **Typical Values (Repro)** |
| Specific Gravity | g/cc | D-792 | 2.14 - 2.20 | 2.15 - 2.24 | 2.13 - 2.20 |
| Hardness | Shore D | D-2240 | 52 - 65 | 55 - 58 | 52 - 65 |
| Tensile Strength | psi (MPa) | D-638<br>D-1708 | 2800 min<br>(19.3 MPa) | 1000 - 2000<br>(7-14 MPa) | 1500 - 2400<br>(10 MPa - 17 MPa) |
| Elongation | % | D638<br>D-1708 | 270 min | 50 - 150 | 75 - 200 |
| Deformation Under Load<br>(73°F, 2000 psi, 24 hrs.) | % | D-621 | 15 - 16 | 3 - 9 | N/A |
| Coefficient of Linear Thermal Expansion<br>(78°F - 400°F) | in/in/°F | D-696 | 4 - 9 x $10^{-5}$ | 3 - 8 x $10^{-5}$ | N/A |
| Thermal Conductivity | BTU/hr/ $ft^2$/F-in | C-177 | 1.7 | 2.5 - 3.5 | |
| Dielectric Strength | volts/mil | D-149a | 300 min | N/A | 500 - 1000 |
| Temperature Range | °F (°C) | | Cryogenic to 450°F (232°C) | Cryogenic to 450°F (232°C) | Cryogenic to 450°F (232°C) |

## Biaxially Orientated PTFE Sheet

Lamons offers biaxially orientated PTFE sheet gasket material that is specifically designed for the chemical industry. The sheet size available is normally 60"x 60" (1524 mm x 1524 mm) in 1/32" (0.8 mm), 1/16" (1.5 mm) & 1/8" (3 mm) thickness, but it is also available in 70" x 70" (1778 mm x 1778 mm), plus other variations of thickness. The material is manufactured to ensure the properties are the same in all directions, therefore reducing creep, which is often found in other types of PTFE gasket materials.

This material is available in various grades:



A biaxially orientated silica-filled PTFE sheet for use in sealing most chemicals except molten alkali metals, fluorine gas, and hydrogen fluoride. This material is approved for potable water service, complies with requirements of FDA regulations and can be used at all concentrations of sulfuric acid.



A biaxially orientated sheet material containing PTFE and hollow glass microspheres for use in sealing most chemicals except molten alkali metals, fluorine gas and hydrogen fluoride. This material is approved for potable water service, complies with requirements of FDA regulations and has exceptional compression characteristics making it good for use in glass lined flanges or where loading problems exist.



A pigment-free biaxially orientated, barium sulfate-filled PTFE sheet for use in sealing food, pharmaceuticals, and other general chemical media. This material complies with requirements of FDA regulations and is acceptable for use in aqueous hydrofluoric acid below 49%, but is not suitable for sealing molten alkali metals or fluorine gas.

| Typical Physical Properties | | | | | | | |
|---|---|---|---|---|---|---|---|
| Style | Units | Silica Filler | | Hollow Glass Microspheres | | Barium Sulfate | |
| Color | | Pink | | Blue | | Off White | |
| Thickness | in (mm) | 1/16" (1.6) | 1/8" (3.175) | 1/16" (1.6) | 1/8" (3.175) | 1/16" (1.6) | 1/8" (3.175) |
| Density | lbs/ft³ (g/cc) | 13.7 (2.2) | 13.7 (2.2) | 87 (1.4) | 87 (1.4) | 18 (2.9) | 18 (2.9) |
| ASTM Compressibility | % | 7 | 7 | 35 | 30 | 8 | 7 |
| ASTM Recovery | % | 44 | 45 | 44 | 43 | 43 | 45 |
| ASTM Tensile Strength | psi (MPa) | 2320 (16) | 2175 (15) | 2030 (14) | 1450 (10) | 2175 (15) | 2465 (17) |
| DIN Residual Stress @ 175°C | psi (MPa) | 4351 (30) | 2900 (20) | 4351 (30) | 3770 (26) | 4061 (28) | 2755 (19) |
| DIN Gas Permeability | mL/min | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| ASTM Liquid Leakage; Fuel A 50psi | mL/hr | 4 | 3 | 0.65 | 0.75 | 3 | 3 |
| ASTM Creep Relaxation | % | 35 | 53 | 31 | 47 | 33 | 51 |
| MAX Temp | °F (°C) | 500 (260) | | 500 (260) | | 500 (260) | |
| MAX Pressure | psi/MPa | 1235/ 8.5 | | 1235/ 8.5 | | 1235/ 8.5 | |

## Expanded PTFE Sheet

Expanded PTFE effectively fills flange imperfections for a tight, leak-free seal. It is easily compressed under lower loads, beneficial for applications such as FRP or glass-lined flanges. Unlike conventional PTFE, which is prone to creep and cold flow, expanded PTFE has good creep resistance and bolt torque retention properties even under higher compressive force. With expanded PTFE, it is much more possible to bolt up once and not have to retorque later. Most commonly FDA/USDA suitable.

| Typical Physical Properties | | |
|---|---|---|
| **Property** | **ASTM Method** | **Typical Values** |
| Compressibility | F-36 | 68% |
| Recovery | F-36 | 12% |
| Sealability | F-37-B | 0.00 ml (Fuel A) / 0.02 hr (Nitrogen) |
| Creep Relaxation | F-38 | 32% @ 212°F (100°C)/ 16% @73°F (23°C) |
| Temperature Limit | | Cryogenic to 450°F (232°C) |
| Pressure Limit | | Full vacuum to 3000 psi (20 MPa) |

## PTFE Joint Sealant

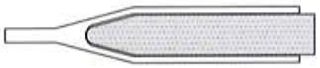
100% pure, specially processed PTFE sealant provides soft, highly compressible gasketing on a roll for long-life, trouble-free sealing that cuts maintenance and storing costs. Under pressure, PTFE sealant provides a very thin and wide ribbon-like joint sealant so that the smallest possible gasket surface area is exposed to the harmful effects of corrosive media.

## PTFE Envelope Gaskets

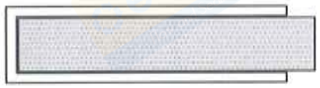
Envelope gaskets utilizing PTFE jackets have become popular for use in severely corrosive services because of their low minimum seating stresses, excellent creep resistance, high deformability and choice of a variety of filler materials to assure optimum performance on any specific application. Fillers such as corrugated metal and rubber sheets are available.

There are three basic designs of envelopes:

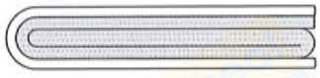
1. **Slit Type / V Type / Style 800:** sliced from cylinders and split from the outside diameter to within approximately 1/16" (1.5 mm) of the inside diameter. The bearing surface is determined by the filler dimensions. Clearance is required between the ID of the filler and the envelope ID. The gasket OD normally rests within the bolt hole circle and the ID is approximately equal to the nominal ID of pipe. Available in sizes to a maximum OD of 24.



2. **Milled Type / Square Cut / Style 820:** machined from cylinder stock. The jacket is machined from the OD to within approximately 1/32" (0.8 mm) it's ID. The jacket's ID fits flush with pipe bore and its OD nests within the bolts. Available in sizes up to a maximum OD of 24" (609 mm). Milled envelopes are more expensive than slit type since considerably more material is lost in machining.



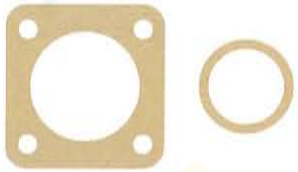
3. **Formed Tape** Type: large diameter (over 12 NPS) and irregularly shaped envelopes are formed from tape and heat sealed to produce a continuous jacket construction.



# High Temperature Sheet Products

## Mica

Mica sheet is a readily-processible form comprised of a high percentage of mineral held together with small amount of silicon binder. Its lamellar and non-fibrous structure, together with the low ratio of binder allows for a significant reduction of weight loss at elevated temperatures, and especially when compared to other high temperature compositions. It resists a wide array of chemicals and is unaffected by water, acids, bases, solvents and mineral oils.



| Typical Physical Properties | | |
|---|---|---|
| Property | Method | Typical Values |
| Density | IEC 371-2 | 118 lbs/ft³ (1.9 g/cc) |
| Tensile Strength | DIN 52910 | 2,900 psi (20 MPa) |
| Compressibility | ASTM F36-J | 25% |
| Recovery | ASTM F36-J | 35% |
| Ignition Loss @ 800°C | DIN 52911 | <5% |
| Dielectric Strength | IEC 243 - 23°C | Approx. 20 kV/mm (508 V/mil) |
| Creep Strength 50MPa, 300°C | DIN 52913 | Approx. 5801 psi (40 MPa) |
| Creep Strength 7252psi, 572°F | DIN 52913 | 5800 (40 MPa) |
| MAX Temperature | N/A | 1832 (1000) |
| MAX Pressure | N/A | 72.5 psi (5 bar) |

Mica sheet is used in automobile exhaust manifolds, gas turbines, gas and oil burners, heat exchangers and other bolted flanged connections.

**Note on High Temperature Gaskets:** Lamons also utilizes mica in conjunction with oxidation resistant grade flexible graphite as a filler material for spiral wound gaskets, and as a facing material for kammprofiled and corrugated gaskets in the semi-metallic section. While the HTG configuration is not quite as high in temperature rating as mica sheet, it offers the sealing ability for pressure rating found in a semi-metallic gasket design

## Ceramic Fiber

Ceramic fiber is available in sheet or blanket form and makes an excellent gasket material for hot air duct work with low pressures and light flanges. It is satisfactory for service up to approximately 2000°F (1093°C). Ceramic material is also used as a filler material in spiral-wound gaskets.

## Non-Metallic Gasket Dimensions for Pipe Flanges

Soft material gaskets are dimensionally sized per ASME B16.21 for use with ASME B16.5 flanges. Non-metallic gaskets are used in Raised Face (RF), Flat Face (FF), Welding Neck (WN), and Slip On (SO) flanges. Typically, the outside diameter dimension is the bolt circle diameter minus one bolt diameter unless a full face gasket is requested.

### ASME B16.21 Gasket Tolerances:

Nominal Pipe Size (NPS) 12 and smaller Outside Diameter (OD): +0.0", -1/16" (+0.0, -1.5 mm)

Nominal Pipe Size (NPS) 14 and Larger Outside Diameter (OD): +0.0", -1/8" (+0.0, -3.0 mm)

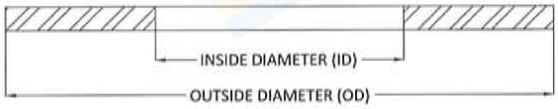
Nominal Pipe Size (NPS) 12 and smaller Inside Diameter (ID): ± 1/16" (±1.5 mm)

Nominal Pipe Size (NPS) 14 and Larger Inside Diameter (ID): ± 1/8" (±3.0 mm)

Bolt Circle Diameter: ± 1/16" (±1.5 mm)

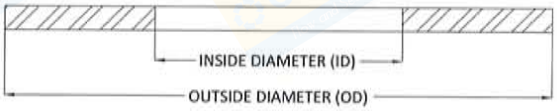
Center to center of adjacent bolt holes: ±1/32" (±1.0 mm)

## Dimensions for Ring Gaskets per ASME B16.21 to Suit ASME B16.5 Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 1.88 | 48 |
| 3/4 | 1.06 | 27 | 2.25 | 57 |
| 1 | 1.31 | 33 | 2.62 | 67 |
| 1 1/4 | 1.66 | 42 | 3.00 | 76 |
| 1 1/2 | 1.91 | 49 | 3.38 | 86 |
| 2 | 2.38 | 60 | 4.12 | 105 |
| 2 1/2 | 2.88 | 73 | 4.88 | 124 |
| 3 | 3.50 | 89 | 5.38 | 137 |
| 3 1/2 | 4.00 | 102 | 6.38 | 162 |
| 4 | 4.50 | 114 | 6.88 | 175 |
| 5 | 5.56 | 141 | 7.75 | 197 |
| 6 | 6.62 | 168 | 8.75 | 222 |
| 8 | 8.62 | 219 | 11.00 | 279 |
| 10 | 10.75 | 273 | 13.38 | 340 |
| 12 | 12.75 | 324 | 16.13 | 410 |
| 14 | 14.00 | 356 | 17.75 | 451 |
| 16 | 16.00 | 406 | 20.25 | 514 |
| 18 | 18.00 | 457 | 21.62 | 549 |
| 20 | 20.00 | 508 | 23.88 | 607 |
| 24 | 24.00 | 610 | 28.25 | 718 |

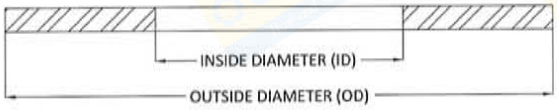
# Dimensions for Ring Gaskets per ASME B16.21 to Suit ASME B16.5 Flanges




| Nominal Pipe Size (NPS) | Class 300 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 2.12 | 54 |
| 3/4 | 1.06 | 27 | 2.62 | 67 |
| 1 | 1.31 | 33 | 2.88 | 73 |
| 1 1/4 | 1.66 | 42 | 3.25 | 83 |
| 1 1/2 | 1.91 | 49 | 3.75 | 95 |
| 2 | 2.38 | 60 | 4.38 | 111 |
| 2 1/2 | 2.88 | 73 | 5.12 | 130 |
| 3 | 3.50 | 89 | 5.88 | 149 |
| 3 1/2 | 4.00 | 102 | 6.50 | 165 |
| 4 | 4.50 | 114 | 7.12 | 181 |
| 5 | 5.56 | 141 | 8.50 | 216 |
| 6 | 6.62 | 168 | 9.88 | 251 |
| 8 | 8.62 | 219 | 12.12 | 308 |
| 10 | 10.75 | 273 | 14.25 | 362 |
| 12 | 12.75 | 324 | 16.62 | 422 |
| 14 | 14.00 | 356 | 19.12 | 486 |
| 16 | 16.00 | 406 | 21.25 | 540 |
| 18 | 18.00 | 457 | 23.50 | 597 |
| 20 | 20.00 | 508 | 25.75 | 654 |
| 24 | 24.00 | 610 | 30.50 | 775 |

| Nominal Pipe Size (NPS) | Class 400 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 2.12 | 54 |
| 3/4 | 1.06 | 27 | 2.62 | 67 |
| 1 | 1.31 | 33 | 2.88 | 73 |
| 1 1/4 | 1.66 | 42 | 3.25 | 83 |
| 1 1/2 | 1.91 | 49 | 3.75 | 95 |
| 2 | 2.38 | 60 | 4.38 | 111 |
| 2 1/2 | 2.88 | 73 | 5.12 | 130 |
| 3 | 3.50 | 89 | 5.88 | 149 |
| 3 1/2 | 4.00 | 102 | 6.38 | 162 |
| 4 | 4.50 | 114 | 7.00 | 178 |
| 5 | 5.56 | 141 | 8.38 | 213 |
| 6 | 6.62 | 168 | 9.75 | 248 |
| 8 | 8.62 | 219 | 12.00 | 305 |
| 10 | 10.75 | 273 | 14.12 | 359 |
| 12 | 12.75 | 324 | 16.50 | 419 |
| 14 | 14.00 | 356 | 19.00 | 483 |
| 16 | 16.00 | 406 | 21.12 | 536 |
| 18 | 18.00 | 457 | 23.38 | 594 |
| 20 | 20.00 | 508 | 25.50 | 648 |
| 24 | 24.00 | 610 | 30.25 | 768 |

# Dimensions for Ring Gaskets per ASME B16.21 to Suit ASME B16.5 Flanges




| Nominal Pipe Size (NPS) | Class 600 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 2.12 | 54 |
| 3/4 | 1.06 | 27 | 2.62 | 67 |
| 1 | 1.31 | 33 | 2.88 | 73 |
| 1 1/4 | 1.66 | 42 | 3.25 | 83 |
| 1 1/2 | 1.91 | 49 | 3.75 | 95 |
| 2 | 2.38 | 60 | 4.38 | 111 |
| 2 1/2 | 2.88 | 73 | 5.12 | 130 |
| 3 | 3.50 | 89 | 5.88 | 149 |
| 3 1/2 | 4.00 | 102 | 6.38 | 162 |
| 4 | 4.50 | 114 | 7.62 | 194 |
| 5 | 5.56 | 141 | 9.50 | 241 |
| 6 | 6.62 | 168 | 10.50 | 267 |
| 8 | 8.62 | 219 | 12.62 | 321 |
| 10 | 10.75 | 273 | 15.75 | 400 |
| 12 | 12.75 | 324 | 18.00 | 457 |
| 14 | 14.00 | 356 | 19.38 | 492 |
| 16 | 16.00 | 406 | 22.25 | 565 |
| 18 | 18.00 | 457 | 24.12 | 613 |
| 20 | 20.00 | 508 | 26.88 | 683 |
| 24 | 24.00 | 610 | 31.12 | 791 |

| Nominal Pipe Size (NPS) | Class 900 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 2.50 | 64 |
| 3/4 | 1.06 | 27 | 2.75 | 70 |
| 1 | 1.31 | 33 | 3.12 | 79 |
| 1 1/4 | 1.66 | 42 | 3.50 | 89 |
| 1 1/2 | 1.91 | 49 | 3.88 | 99 |
| 2 | 2.38 | 60 | 5.62 | 143 |
| 2 1/2 | 2.88 | 73 | 6.50 | 165 |
| 3 | 3.50 | 89 | 6.62 | 168 |
| 3 1/2 | - | - | - | - |
| 4 | 4.50 | 114 | 8.12 | 206 |
| 5 | 5.56 | 141 | 9.75 | 248 |
| 6 | 6.62 | 168 | 11.38 | 289 |
| 8 | 8.62 | 219 | 14.12 | 359 |
| 10 | 10.75 | 273 | 17.12 | 435 |
| 12 | 12.75 | 324 | 19.62 | 498 |
| 14 | 14.00 | 356 | 20.50 | 521 |
| 16 | 16.00 | 406 | 22.62 | 575 |
| 18 | 18.00 | 457 | 25.12 | 638 |
| 20 | 20.00 | 508 | 27.50 | 699 |
| 24 | 24.00 | 610 | 33.00 | 838 |

# Dimensions for Full Face Gaskets to Suit ASME B16.5 Flanges



| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter (Inches) | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 1/2 | 0.84 | 21 | 3.50 | 89 | 4 | 0.62 | 2.38 | 60.3 |
| 3/4 | 1.06 | 27 | 3.88 | 99 | 4 | 0.62 | 2.75 | 69.9 |
| 1 | 1.31 | 33 | 4.25 | 108 | 4 | 0.62 | 3.12 | 79.4 |
| 1 1/4 | 1.66 | 42 | 4.63 | 118 | 4 | 0.62 | 3.50 | 88.9 |
| 1 1/2 | 1.91 | 49 | 5.00 | 127 | 4 | 0.62 | 3.88 | 98.4 |
| 2 | 2.38 | 60 | 6.00 | 152 | 4 | 0.75 | 4.75 | 120.7 |
| 2 1/2 | 2.88 | 73 | 7.00 | 178 | 4 | 0.75 | 5.50 | 139.7 |
| 3 | 3.50 | 89 | 7.50 | 191 | 4 | 0.75 | 6.00 | 152.4 |
| 3 1/2 | 4.00 | 102 | 8.50 | 216 | 8 | 0.75 | 7.00 | 177.8 |
| 4 | 4.50 | 114 | 9.00 | 229 | 8 | 0.75 | 7.50 | 190.5 |
| 5 | 5.56 | 141 | 10.00 | 254 | 8 | 0.88 | 8.50 | 215.9 |
| 6 | 6.62 | 168 | 11.00 | 279 | 8 | 0.88 | 9.50 | 241.3 |
| 8 | 8.62 | 219 | 13.50 | 343 | 8 | 0.88 | 11.75 | 298.5 |
| 10 | 10.75 | 273 | 16.00 | 406 | 12 | 1.00 | 14.25 | 362.0 |
| 12 | 12.75 | 324 | 19.00 | 483 | 12 | 1.00 | 17.00 | 431.8 |
| 14 | 14.00 | 356 | 21.00 | 533 | 12 | 1.12 | 18.75 | 476.3 |
| 16 | 16.00 | 406 | 23.50 | 597 | 16 | 1.12 | 21.25 | 539.8 |
| 18 | 18.00 | 457 | 25.00 | 635 | 16 | 1.25 | 22.75 | 577.9 |
| 20 | 20.00 | 508 | 27.50 | 699 | 20 | 1.25 | 25.00 | 635.0 |
| 24 | 24.00 | 610 | 32.00 | 813 | 20 | 1.38 | 29.50 | 749.3 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter (Inches) | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 1/2 | 0.84 | 21 | 3.75 | 95 | 4 | 0.63 | 2.63 | 66.8 |
| 3/4 | 1.06 | 27 | 4.62 | 117 | 4 | 0.75 | 3.25 | 82.6 |
| 1 | 1.31 | 33 | 4.88 | 124 | 4 | 0.75 | 3.50 | 88.9 |
| 1 1/4 | 1.66 | 42 | 5.25 | 133 | 4 | 0.75 | 3.88 | 98.4 |
| 1 1/2 | 1.91 | 49 | 6.12 | 155 | 4 | 0.88 | 4.50 | 114.3 |
| 2 | 2.38 | 60 | 6.50 | 165 | 8 | 0.75 | 5.00 | 127.0 |
| 2 1/2 | 2.88 | 73 | 7.50 | 191 | 8 | 0.88 | 5.88 | 149.2 |
| 3 | 3.50 | 89 | 8.25 | 210 | 8 | 0.88 | 6.63 | 168.3 |
| 3 1/2 | 4.00 | 102 | 9.00 | 229 | 8 | 0.88 | 7.25 | 184.2 |
| 4 | 4.50 | 114 | 10.00 | 254 | 8 | 0.88 | 7.88 | 200.0 |
| 5 | 5.56 | 141 | 11.00 | 279 | 8 | 0.88 | 9.25 | 235.0 |
| 6 | 6.62 | 168 | 12.50 | 318 | 12 | 0.88 | 10.63 | 269.9 |
| 8 | 8.62 | 219 | 15.00 | 381 | 12 | 1.00 | 13.00 | 330.2 |
| 10 | 10.75 | 273 | 17.50 | 445 | 16 | 1.13 | 15.25 | 387.4 |
| 12 | 12.75 | 324 | 20.50 | 521 | 16 | 1.25 | 17.75 | 450.9 |
| 14 | 14.00 | 356 | 23.00 | 584 | 20 | 1.25 | 20.25 | 514.4 |
| 16 | 16.00 | 406 | 25.50 | 648 | 20 | 1.38 | 22.50 | 571.5 |
| 18 | 18.00 | 457 | 28.00 | 711 | 24 | 1.38 | 24.75 | 628.7 |
| 20 | 20.00 | 508 | 30.50 | 775 | 24 | 1.38 | 27.00 | 685.8 |
| 24 | 24.00 | 610 | 36.00 | 914 | 24 | 1.63 | 32.00 | 812.8 |

# Dimensions for Full Face Gaskets to Suit ASME B16.5 Flanges

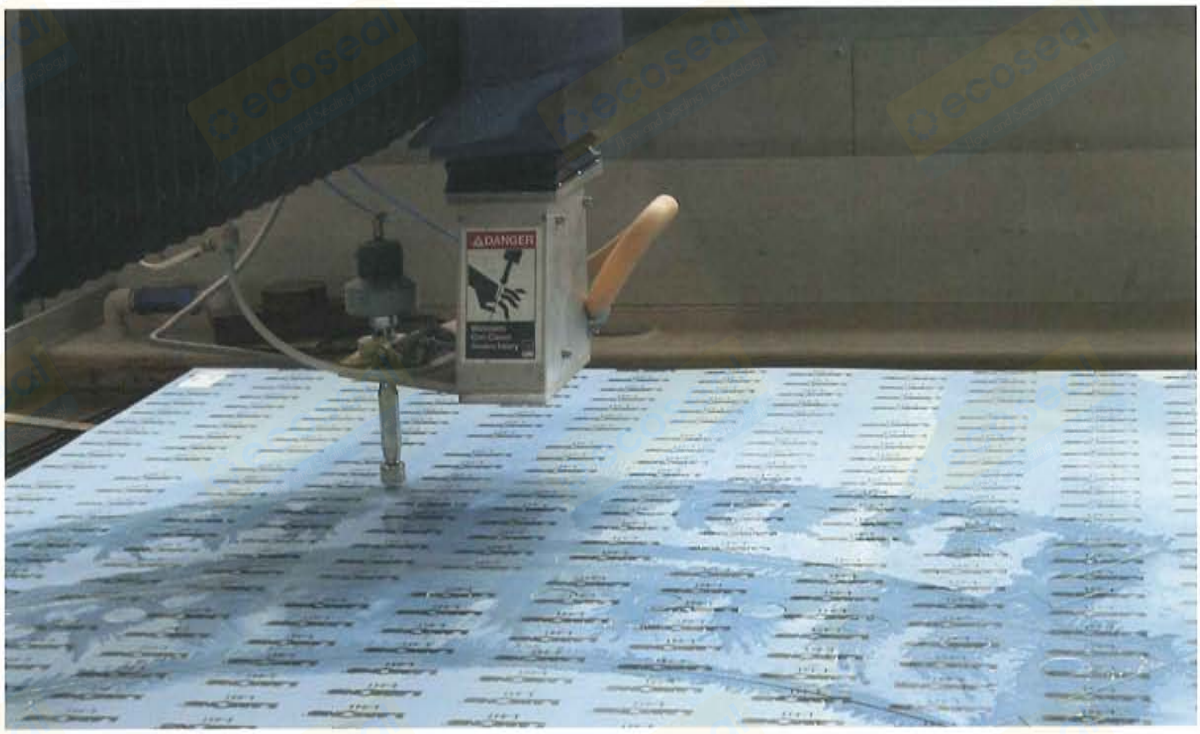
| Nominal Pipe Size (NPS) | Class 400 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter (Inches) | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 1/2 | 0.84 | 21 | 3.75 | 95 | 4 | 0.63 | 2.62 | 66.5 |
| 3/4 | 1.06 | 27 | 4.63 | 117 | 4 | 0.75 | 3.25 | 82.6 |
| 1 | 1.31 | 33 | 4.88 | 124 | 4 | 0.75 | 3.50 | 88.9 |
| 1 1/4 | 1.66 | 42 | 5.25 | 133 | 4 | 0.75 | 3.88 | 98.4 |
| 1 1/2 | 1.91 | 49 | 6.13 | 156 | 4 | 0.88 | 4.50 | 114.3 |
| 2 | 2.38 | 60 | 6.50 | 165 | 8 | 0.75 | 5.00 | 127.0 |
| 2 1/2 | 2.88 | 73 | 7.50 | 191 | 8 | 0.88 | 5.88 | 149.2 |
| 3 | 3.50 | 89 | 8.25 | 210 | 8 | 0.88 | 6.63 | 168.3 |
| 3 1/2 | 4.00 | 102 | 9.00 | 229 | 8 | 1.00 | 7.25 | 184.2 |
| 4 | 4.50 | 114 | 10.00 | 254 | 8 | 1.00 | 7.88 | 200.0 |
| 5 | 5.56 | 141 | 11.00 | 279 | 8 | 1.00 | 9.25 | 235.0 |
| 6 | 6.62 | 168 | 12.50 | 318 | 12 | 1.00 | 10.63 | 269.9 |
| 8 | 8.62 | 219 | 15.00 | 381 | 12 | 1.13 | 13.00 | 330.2 |
| 10 | 10.75 | 273 | 17.50 | 445 | 16 | 1.25 | 15.25 | 387.4 |
| 12 | 12.75 | 324 | 20.50 | 521 | 16 | 1.38 | 17.75 | 450.9 |
| 14 | 14.00 | 356 | 23.00 | 584 | 20 | 1.38 | 20.25 | 514.4 |
| 16 | 16.00 | 406 | 25.50 | 648 | 20 | 1.50 | 22.50 | 571.5 |
| 18 | 18.00 | 457 | 28.00 | 711 | 24 | 1.50 | 24.75 | 628.7 |
| 20 | 20.00 | 508 | 30.50 | 775 | 24 | 1.63 | 27.00 | 685.8 |
| 24 | 24.00 | 610 | 36.00 | 914 | 24 | 1.88 | 32.00 | 812.8 |

| Nominal Pipe Size (NPS) | Class 600 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter (Inches) | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 1/2 | 0.84 | 21 | 3.75 | 95 | 4 | 0.63 | 2.63 | 66.8 |
| 3/4 | 1.06 | 27 | 4.63 | 117 | 4 | 0.75 | 3.25 | 82.6 |
| 1 | 1.31 | 33 | 4.88 | 124 | 4 | 0.75 | 3.50 | 88.9 |
| 1 1/4 | 1.66 | 42 | 5.25 | 133 | 4 | 0.75 | 3.88 | 98.4 |
| 1 1/2 | 1.91 | 49 | 6.13 | 156 | 4 | 0.88 | 4.50 | 114.3 |
| 2 | 2.38 | 60 | 6.50 | 165 | 8 | 0.75 | 5.00 | 127.0 |
| 2 1/2 | 2.88 | 73 | 7.50 | 191 | 8 | 0.88 | 5.88 | 149.2 |
| 3 | 3.50 | 89 | 8.25 | 210 | 8 | 0.88 | 6.63 | 168.3 |
| 3 1/2 | 4.00 | 102 | 9.00 | 229 | 8 | 1.00 | 7.25 | 184.2 |
| 4 | 4.50 | 114 | 10.75 | 273 | 8 | 1.00 | 8.50 | 215.9 |
| 5 | 5.56 | 141 | 13.00 | 330 | 8 | 1.13 | 10.50 | 266.7 |
| 6 | 6.62 | 168 | 14.00 | 356 | 12 | 1.13 | 11.50 | 292.1 |
| 8 | 8.62 | 219 | 16.50 | 419 | 12 | 1.25 | 13.75 | 349.3 |
| 10 | 10.75 | 273 | 20.00 | 508 | 16 | 1.38 | 17.00 | 431.8 |
| 12 | 12.75 | 324 | 22.00 | 559 | 20 | 1.38 | 19.25 | 489.0 |
| 14 | 14.00 | 356 | 23.75 | 603 | 20 | 1.50 | 20.75 | 527.1 |
| 16 | 16.00 | 406 | 27.00 | 686 | 20 | 1.63 | 23.75 | 603.3 |
| 18 | 18.00 | 457 | 29.25 | 743 | 20 | 1.75 | 25.75 | 654.1 |
| 20 | 20.00 | 508 | 32.00 | 813 | 24 | 1.75 | 28.50 | 723.9 |
| 24 | 24.00 | 610 | 37.00 | 940 | 24 | 2.00 | 33.00 | 838.2 |

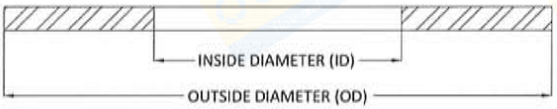
# Dimensions for Full Face Gaskets to Suit ASME B16.5 Flanges

| Nominal Pipe Size (NPS) | Class 900 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter (Inches) | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 1/2 | 0.84 | 21 | 4.75 | 121 | 4 | 0.88 | 3.25 | 82.6 |
| 3/4 | 1.06 | 27 | 5.13 | 130 | 4 | 0.88 | 3.50 | 88.9 |
| 1 | 1.31 | 33 | 5.88 | 149 | 4 | 1.00 | 4.00 | 101.6 |
| 1 1/4 | 1.66 | 42 | 6.25 | 159 | 4 | 1.00 | 4.38 | 111.3 |
| 1 1/2 | 1.91 | 49 | 7.00 | 178 | 4 | 1.13 | 4.88 | 124.0 |
| 2 | 2.38 | 60 | 8.50 | 216 | 8 | 1.00 | 6.50 | 165.1 |
| 2 1/2 | 2.88 | 73 | 9.63 | 245 | 8 | 1.13 | 7.50 | 190.5 |
| 3 | 3.50 | 89 | 9.50 | 241 | 8 | 1.00 | 7.50 | 190.5 |
| 3 1/2 | 4.00 | 102 | 11.50 | 292 | | | | 0.0 |
| 4 | 4.50 | 114 | 11.50 | 292 | 8 | 1.25 | 9.25 | 235.0 |
| 5 | 5.56 | 141 | 13.75 | 349 | 8 | 1.38 | 11.00 | 279.4 |
| 6 | 6.62 | 168 | 15.00 | 381 | 12 | 1.25 | 12.50 | 317.5 |
| 8 | 8.62 | 219 | 18.50 | 470 | 12 | 1.50 | 15.50 | 393.7 |
| 10 | 10.75 | 273 | 21.50 | 546 | 16 | 1.50 | 18.50 | 469.9 |
| 12 | 12.75 | 324 | 24.00 | 610 | 20 | 1.50 | 21.00 | 533.4 |
| 14 | 14.00 | 356 | 25.25 | 641 | 20 | 1.63 | 22.00 | 558.8 |
| 16 | 16.00 | 406 | 27.75 | 705 | 20 | 1.75 | 24.25 | 616.0 |
| 18 | 18.00 | 457 | 31.00 | 787 | 20 | 2.00 | 27.00 | 685.8 |
| 20 | 20.00 | 508 | 33.75 | 857 | 20 | 2.13 | 29.50 | 749.3 |
| 24 | 24.00 | 610 | 41.00 | 1041 | 20 | 2.63 | 35.50 | 901.7 |





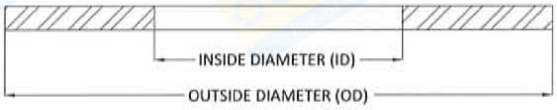
# Dimensions for Ring Gaskets per ASME B16.21 to Suit ASME B16.47 Series A Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 30.50 | 775 |
| 28 | 28.00 | 711 | 32.75 | 832 |
| 30 | 30.00 | 762 | 34.75 | 883 |
| 32 | 32.00 | 813 | 37.00 | 940 |
| 34 | 34.00 | 864 | 39.00 | 991 |
| 36 | 36.00 | 914 | 41.25 | 1048 |
| 38 | 38.00 | 965 | 43.75 | 1111 |
| 40 | 40.00 | 1016 | 45.75 | 1162 |
| 42 | 42.00 | 1067 | 48.00 | 1219 |
| 44 | 44.00 | 1118 | 50.25 | 1276 |
| 46 | 46.00 | 1168 | 52.25 | 1327 |
| 48 | 48.00 | 1219 | 54.50 | 1384 |
| 50 | 50.00 | 1270 | 56.50 | 1435 |
| 52 | 52.00 | 1321 | 58.75 | 1492 |
| 54 | 54.00 | 1372 | 61.00 | 1549 |
| 56 | 56.00 | 1422 | 63.25 | 1607 |
| 58 | 58.00 | 1473 | 65.50 | 1664 |
| 60 | 60.00 | 1524 | 67.50 | 1715 |

| Nominal Pipe Size (NPS) | Class 300 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 32.88 | 835 |
| 28 | 28.00 | 711 | 35.38 | 899 |
| 30 | 30.00 | 762 | 37.50 | 953 |
| 32 | 32.00 | 813 | 39.62 | 1006 |
| 34 | 34.00 | 864 | 41.62 | 1057 |
| 36 | 36.00 | 914 | 44.00 | 1118 |
| 38 | 38.00 | 965 | 41.50 | 1054 |
| 40 | 40.00 | 1016 | 43.88 | 1115 |
| 42 | 42.00 | 1067 | 45.88 | 1165 |
| 44 | 44.00 | 1118 | 48.00 | 1219 |
| 46 | 46.00 | 1168 | 50.12 | 1273 |
| 48 | 48.00 | 1219 | 52.12 | 1324 |
| 50 | 50.00 | 1270 | 54.25 | 1378 |
| 52 | 52.00 | 1321 | 56.25 | 1429 |
| 54 | 54.00 | 1372 | 58.75 | 1492 |
| 56 | 56.00 | 1422 | 60.75 | 1543 |
| 58 | 58.00 | 1473 | 62.75 | 1594 |
| 60 | 60.00 | 1524 | 64.75 | 1645 |

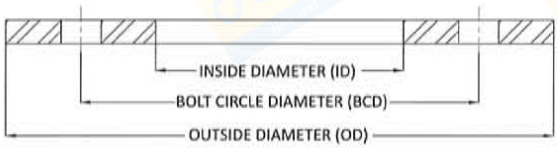
# Dimensions for Ring Gaskets per ASME B16.21 to Suit ASME B16.47 Series A Flanges




| Nominal Pipe Size (NPS) | Class 400 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 32.75 | 832 |
| 28 | 28.00 | 711 | 35.12 | 892 |
| 30 | 30.00 | 762 | 37.25 | 946 |
| 32 | 32.00 | 813 | 39.50 | 1003 |
| 34 | 34.00 | 864 | 41.50 | 1054 |
| 36 | 36.00 | 914 | 44.00 | 1118 |
| 38 | 38.00 | 965 | 42.25 | 1073 |
| 40 | 40.00 | 1016 | 44.38 | 1127 |
| 42 | 42.00 | 1067 | 46.38 | 1178 |
| 44 | 44.00 | 1118 | 48.50 | 1232 |
| 46 | 46.00 | 1168 | 50.75 | 1289 |
| 48 | 48.00 | 1219 | 53.00 | 1346 |
| 50 | 50.00 | 1270 | 55.25 | 1403 |
| 52 | 52.00 | 1321 | 57.26 | 1454 |
| 54 | 54.00 | 1372 | 59.75 | 1518 |
| 56 | 56.00 | 1422 | 61.75 | 1568 |
| 58 | 58.00 | 1473 | 63.75 | 1619 |
| 60 | 60.00 | 1524 | 66.25 | 1683 |

| Nominal Pipe Size (NPS) | Class 600 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 34.12 | 867 |
| 28 | 28.00 | 711 | 36.00 | 914 |
| 30 | 30.00 | 762 | 38.25 | 972 |
| 32 | 32.00 | 813 | 40.25 | 1022 |
| 34 | 34.00 | 864 | 42.25 | 1073 |
| 36 | 36.00 | 914 | 44.50 | 1130 |
| 38 | 38.00 | 965 | 43.50 | 1105 |
| 40 | 40.00 | 1016 | 45.50 | 1156 |
| 42 | 42.00 | 1067 | 48.00 | 1219 |
| 44 | 44.00 | 1118 | 50.00 | 1270 |
| 46 | 46.00 | 1168 | 52.26 | 1327 |
| 48 | 48.00 | 1219 | 54.75 | 1391 |
| 50 | 50.00 | 1270 | 57.00 | 1448 |
| 52 | 52.00 | 1321 | 59.00 | 1499 |
| 54 | 54.00 | 1372 | 61.25 | 1556 |
| 56 | 56.00 | 1422 | 63.50 | 1613 |
| 58 | 58.00 | 1473 | 65.50 | 1664 |
| 60 | 60.00 | 1524 | 67.75 | 1721 |

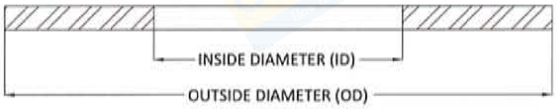
# Dimensions for Full Face Gaskets to Suit ASME B16.47 Series A Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 26 | 26.00 | 660 | 34.25 | 870 | 24 | 1.38 | 31.75 | 806.5 |
| 28 | 28.00 | 711 | 36.50 | 927 | 28 | 1.38 | 34.00 | 863.6 |
| 30 | 30.00 | 762 | 38.75 | 984 | 28 | 1.38 | 36.00 | 914.4 |
| 32 | 32.00 | 813 | 41.75 | 1060 | 28 | 1.63 | 38.50 | 977.9 |
| 34 | 34.00 | 864 | 43.75 | 1111 | 32 | 1.63 | 40.50 | 1028.7 |
| 36 | 36.00 | 914 | 46.00 | 1168 | 32 | 1.63 | 42.75 | 1085.9 |
| 38 | 38.00 | 965 | 48.75 | 1238 | 32 | 1.63 | 45.25 | 1149.4 |
| 40 | 40.00 | 1016 | 50.75 | 1289 | 36 | 1.63 | 47.25 | 1200.2 |
| 42 | 42.00 | 1067 | 53.00 | 1346 | 36 | 1.63 | 49.50 | 1257.3 |
| 44 | 44.00 | 1118 | 55.25 | 1403 | 40 | 1.63 | 51.75 | 1314.5 |
| 46 | 46.00 | 1168 | 57.25 | 1454 | 40 | 1.63 | 53.75 | 1365.3 |
| 48 | 48.00 | 1219 | 59.50 | 1511 | 44 | 1.63 | 56.00 | 1422.4 |
| 50 | 50.00 | 1270 | 61.75 | 1568 | 44 | 1.88 | 58.25 | 1479.6 |
| 52 | 52.00 | 1321 | 64.00 | 1626 | 44 | 1.88 | 60.50 | 1536.7 |
| 54 | 54.00 | 1372 | 66.25 | 1683 | 44 | 1.88 | 62.75 | 1593.9 |
| 56 | 56.00 | 1422 | 68.75 | 1746 | 48 | 1.88 | 65.00 | 1651.0 |
| 58 | 58.00 | 1473 | 71.00 | 1803 | 48 | 1.88 | 67.25 | 1708.2 |
| 60 | 60.00 | 1524 | 73.00 | 1854 | 52 | 1.88 | 69.25 | 1759.0 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 26 | 26.00 | 662 | 38.25 | 972 | 28 | 1.75 | 34.50 | 876.3 |
| 28 | 28.00 | 713 | 40.75 | 1035 | 28 | 1.75 | 37.00 | 939.8 |
| 30 | 30.00 | 764 | 43.00 | 1092 | 28 | 1.88 | 39.25 | 997.0 |
| 32 | 32.00 | 815 | 45.25 | 1149 | 28 | 2.00 | 41.50 | 1054.1 |
| 34 | 34.00 | 866 | 47.50 | 1207 | 28 | 2.00 | 43.50 | 1104.9 |
| 36 | 36.00 | 917 | 50.00 | 1270 | 32 | 2.13 | 46.00 | 1168.4 |
| 38 | 38.00 | 968 | 46.00 | 1168 | 32 | 1.63 | 43.00 | 1092.2 |
| 40 | 40.00 | 1019 | 48.75 | 1238 | 32 | 1.75 | 45.50 | 1155.7 |
| 42 | 42.00 | 1070 | 50.75 | 1289 | 32 | 1.75 | 47.50 | 1206.5 |
| 44 | 44.00 | 1121 | 53.25 | 1353 | 32 | 1.88 | 49.75 | 1263.7 |
| 46 | 46.00 | 1172 | 55.75 | 1416 | 28 | 2.00 | 52.00 | 1320.8 |
| 48 | 48.00 | 1223 | 57.75 | 1467 | 32 | 2.00 | 54.00 | 1371.6 |
| 50 | 50.00 | 1274 | 60.25 | 1530 | 32 | 2.13 | 56.25 | 1428.8 |
| 52 | 52.00 | 1324 | 62.25 | 1581 | 32 | 2.13 | 58.25 | 1479.6 |
| 54 | 54.00 | 1375 | 65.25 | 1657 | 28 | 2.38 | 61.00 | 1549.4 |
| 56 | 56.00 | 1426 | 67.25 | 1708 | 28 | 2.38 | 63.00 | 1600.2 |
| 58 | 58.00 | 1477 | 69.25 | 1759 | 32 | 2.38 | 65.00 | 1651.0 |
| 60 | 60.00 | 1528 | 71.25 | 1810 | 32 | 2.38 | 67.00 | 1701.8 |

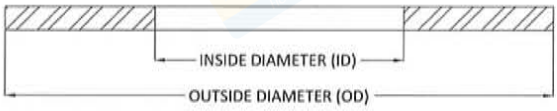
# Dimensions for Ring Gaskets per ASME B16.21 to Suit ASME B16.47 Series B Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 28.56 | 725 |
| 28 | 28.00 | 711 | 30.56 | 776 |
| 30 | 30.00 | 762 | 32.56 | 827 |
| 32 | 32.00 | 813 | 34.69 | 881 |
| 34 | 34.00 | 864 | 36.81 | 935 |
| 36 | 36.00 | 914 | 38.88 | 988 |
| 38 | 38.00 | 965 | 41.12 | 1044 |
| 40 | 40.00 | 1016 | 43.12 | 1095 |
| 42 | 42.00 | 1067 | 45.12 | 1146 |
| 44 | 44.00 | 1118 | 47.12 | 1197 |
| 46 | 46.00 | 1168 | 49.44 | 1256 |
| 48 | 48.00 | 1219 | 51.44 | 1307 |
| 50 | 50.00 | 1270 | 53.44 | 1357 |
| 52 | 52.00 | 1321 | 55.44 | 1408 |
| 54 | 54.00 | 1372 | 57.62 | 1464 |
| 56 | 56.00 | 1422 | 59.62 | 1514 |
| 58 | 58.00 | 1473 | 62.19 | 1580 |
| 60 | 60.00 | 1524 | 64.19 | 1630 |

| Nominal Pipe Size (NPS) | Class 300 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 30.38 | 772 |
| 28 | 28.00 | 711 | 32.50 | 826 |
| 30 | 30.00 | 762 | 34.88 | 886 |
| 32 | 32.00 | 813 | 37.00 | 940 |
| 34 | 34.00 | 864 | 39.12 | 994 |
| 36 | 36.00 | 914 | 41.25 | 1048 |
| 38 | 38.00 | 965 | 43.25 | 1099 |
| 40 | 40.00 | 1016 | 45.25 | 1149 |
| 42 | 42.00 | 1067 | 47.25 | 1200 |
| 44 | 44.00 | 1118 | 49.25 | 1251 |
| 46 | 46.00 | 1168 | 51.88 | 1318 |
| 48 | 48.00 | 1219 | 53.88 | 1369 |
| 50 | 50.00 | 1270 | 55.88 | 1419 |
| 52 | 52.00 | 1321 | 57.88 | 1470 |
| 54 | 54.00 | 1372 | 60.25 | 1530 |
| 56 | 56.00 | 1422 | 62.75 | 1594 |
| 58 | 58.00 | 1473 | 65.19 | 1656 |
| 60 | 60.00 | 1524 | 67.12 | 1705 |

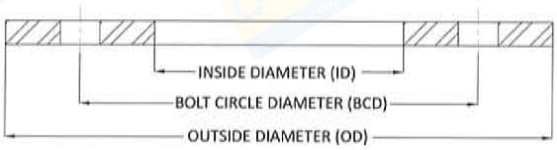
# Dimensions for Flat Ring Gaskets per ASME B16.21 to Suit ASME B16.47 Series B Flanges




| Nominal Pipe Size (NPS) | Class 400 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 29.38 | 746 |
| 28 | 28.00 | 711 | 31.50 | 800 |
| 30 | 30.00 | 762 | 33.75 | 857 |
| 32 | 32.00 | 813 | 35.88 | 911 |
| 34 | 34.00 | 864 | 37.88 | 962 |
| 36 | 36.00 | 914 | 40.25 | 1022 |

| Nominal Pipe Size (NPS) | Class 600 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 26 | 26.00 | 660 | 30.12 | 765 |
| 28 | 28.00 | 711 | 32.25 | 819 |
| 30 | 30.00 | 762 | 34.62 | 879 |
| 32 | 32.00 | 813 | 36.75 | 933 |
| 34 | 34.00 | 864 | 39.25 | 997 |
| 36 | 36.00 | 914 | 41.25 | 1048 |

# Dimensions for Full Face Gaskets to Suit ASME B16.47 Series B Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 26 | 26.00 | 660 | 30.94 | 786 | 36 | 0.88 | 29.31 | 744.5 |
| 28 | 28.00 | 711 | 32.94 | 837 | 40 | 0.88 | 31.31 | 795.3 |
| 30 | 30.00 | 762 | 34.94 | 887 | 44 | 0.88 | 33.31 | 846.1 |
| 32 | 32.00 | 813 | 37.06 | 941 | 48 | 0.88 | 35.44 | 900.2 |
| 34 | 34.00 | 864 | 39.56 | 1005 | 40 | 1.00 | 37.69 | 957.3 |
| 36 | 36.00 | 914 | 41.63 | 1057 | 44 | 1.00 | 39.75 | 1009.7 |
| 38 | 38.00 | 965 | 44.25 | 1124 | 40 | 1.13 | 42.13 | 1070.1 |
| 40 | 40.00 | 1016 | 46.25 | 1175 | 44 | 1.13 | 44.13 | 1120.9 |
| 42 | 42.00 | 1067 | 48.25 | 1226 | 48 | 1.13 | 46.13 | 1171.7 |
| 44 | 44.00 | 1118 | 50.25 | 1276 | 52 | 1.13 | 48.13 | 1222.5 |
| 46 | 46.00 | 1168 | 52.81 | 1341 | 40 | 1.25 | 50.56 | 1284.2 |
| 48 | 48.00 | 1219 | 54.81 | 1392 | 44 | 1.25 | 52.56 | 1335.0 |
| 50 | 50.00 | 1270 | 56.81 | 1443 | 48 | 1.25 | 54.56 | 1385.8 |
| 52 | 52.00 | 1321 | 58.81 | 1494 | 52 | 1.25 | 56.56 | 1436.6 |
| 54 | 54.00 | 1372 | 61.00 | 1549 | 56 | 1.25 | 58.75 | 1492.3 |
| 56 | 56.00 | 1422 | 63.00 | 1600 | 60 | 1.25 | 60.75 | 1543.1 |
| 58 | 58.00 | 1473 | 65.94 | 1675 | 48 | 1.38 | 63.44 | 1611.4 |
| 60 | 60.00 | 1524 | 67.94 | 1726 | 52 | 1.38 | 65.44 | 1662.2 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | | # of Bolt Holes | Bolt Hole Diameter | Bolt Circle Diameter (BCD) | |
| | Inches | mm | Inches | mm | | | Inches | mm |
| 26 | 26.00 | 660 | 34.13 | 867 | 32 | 1.38 | 31.63 | 803.4 |
| 28 | 28.00 | 711 | 36.25 | 921 | 36 | 1.38 | 33.75 | 857.3 |
| 30 | 30.00 | 762 | 39.00 | 991 | 36 | 1.50 | 36.25 | 920.8 |
| 32 | 32.00 | 813 | 41.50 | 1054 | 32 | 1.63 | 38.50 | 977.9 |
| 34 | 34.00 | 864 | 43.63 | 1108 | 36 | 1.63 | 40.63 | 1032.0 |
| 36 | 36.00 | 914 | 46.13 | 1172 | 32 | 1.75 | 42.88 | 1089.2 |
| 38 | 38.00 | 965 | 48.13 | 1223 | 36 | 1.75 | 44.88 | 1140.0 |
| 40 | 40.00 | 1016 | 50.13 | 1273 | 40 | 1.75 | 46.88 | 1190.8 |
| 42 | 42.00 | 1067 | 52.50 | 1334 | 36 | 1.88 | 49.00 | 1244.6 |
| 44 | 44.00 | 1118 | 54.50 | 1384 | 40 | 1.88 | 51.00 | 1295.4 |
| 46 | 46.00 | 1168 | 57.50 | 1461 | 36 | 2.00 | 53.75 | 1365.3 |
| 48 | 48.00 | 1219 | 59.50 | 1511 | 40 | 2.00 | 55.75 | 1416.1 |
| 50 | 50.00 | 1270 | 61.50 | 1562 | 44 | 2.00 | 57.75 | 1466.9 |
| 52 | 52.00 | 1321 | 63.50 | 1613 | 48 | 2.00 | 59.75 | 1517.7 |
| 54 | 54.00 | 1372 | 65.88 | 1673 | 48 | 2.00 | 62.13 | 1578.1 |
| 56 | 56.00 | 1422 | 69.50 | 1765 | 36 | 2.38 | 65.00 | 1651.0 |
| 58 | 58.00 | 1473 | 71.94 | 1827 | 40 | 2.38 | 67.44 | 1713.0 |
| 60 | 60.00 | 1524 | 73.94 | 1878 | 40 | 2.38 | 69.44 | 1763.8 |

# Section Two: Semi-Metallic Gaskets

Semi-Metallic gaskets are designed to feature soft, pliable sealing materials - which enhance the tightness of the assembly with lower overall load requirements when compared to full metallic gaskets. They are most popular due to this configuration, and are available in a wide variety of styles and sizes. They can typically be fabricated of any metal which is available in thin strip or sheet, and which can be welded. Therefore, they can be used against virtually any corrosive medium dependent upon the choice of the metal and filler/facing material. Additionally, they can be used over the complete temperature range from cryogenic to approximately 2000°F (1093°C). Semi-metallic gaskets can generally be used in pressures ranging from vacuum to those seen in ASME B16.5 standard 2500 pressure class flange ratings. They are resilient and, as a consequence, can compensate somewhat for flange movement that may occur due to temperature gradients, variations of pressure and vibration.

Lamons offers the following filler / facing materials for semi-metallic gaskets:

| Temperature Range | |
|---|---|
| PTFE | Cryogenic to 450°F (232°C) |
| Flexible Graphite | Cryogenic to 850°F (454°C) |
| Oxidation Resistant Grade Flexible Graphite | Cryogenic to 975°F (524°C) |
| HTG (High Temperature Gasket) | Cryogenic to 1500°F (816°C) |
| Mica | Cryogenic to 1832°F (1000°C) |
| Ceramic | Cryogenic to 2000°F (1093°C) |

# Lamons SpiraSeal® Product Family

Spiral wound gaskets have become extremely popular due to the wide variety of available styles and sizes. Spiral wound gaskets can be fabricated of any metal which is available in thin strip and which can be welded; therefore, they can be used against virtually any corrosive medium dependent upon the choice of the metal and filler. They can be used over the complete temperature range from cryogenic to approximately 2000°F (1093°C). This type of gasket can be used in all pressures from vacuum to the standard 2500 pressure class flange ratings. Spiral wound gaskets can also be manufactured with variable densities, i.e. relatively low density gaskets for vacuum service up to extremely high density gaskets having a seating stress of approximately 30,000 psi (207 MPa). The softer gaskets would require a seating stress in the range of 5,000 psi (34 MPa).



## Variable Density

Spiral wound gaskets are manufactured by alternately winding strips of metal and soft fillers on the outer edge of winding mandrels that determine the inside dimensions of the wound component. In the winding process, the alternating plies are maintained under pressure. Varying the pressure during the winding operation and/or the thickness of the soft filler, the density of the gasket can be controlled over a wide range. As a general rule, low winding pressure and thick soft fillers are used for low pressure applications. Thin fillers and high pressure loads are used for high pressure applications. This, of course, would account for the higher bolt loads that have to be applied to the gasket in high pressure applications. In addition to all these advantages of the spiral wound gasket, they are relatively low cost.

## Available Sizes and Thicknesses

Lamons spiral wound gaskets are available in thicknesses of 0.0625" (1.5 mm), 0.100" (2.5 mm), 0.125" (3 mm), 0.175" (4 mm), 0.250" (6.4 mm), and 0.285" (7 mm). The chart on page 47 indicates the size range that can normally be fabricated in the various thicknesses along with the recommended compressed thickness of each and the maximum flange width.

## Flange Surface Finish

Use of spiral wound gaskets gives the designer and the user a wider tolerance for flange surface finishes than other metallic gaskets. While they can be used against most commercially available flange surface finishes, experience has indicated that the appropriate flange surface finishes used with spiral wound gaskets are as follows:

- 125 to 250 AARH optimum
- 500 AARH maximum

# Available SpiraSeal® Styles

Lamons spiral wound gaskets are available in a variety of styles to suit the particular flange facing being utilized on the flanges.

## Lamons Style W

Style W gaskets are SpiraSeal® windings only. No inner or outer ring is utilized. Used in a variety of different applications, they may be furnished in many different sizes and thicknesses.

Style W gaskets are made in standard sizes to fit:

A. Large tongue and groove joints, 1/2 to 24 NPS, standard pressures;

B. Small tongue and groove joints, 1/2 to 24 NPS, standard pressures; and,

C. Large male and female joints 1/4 to 24 NPS, standard pressures,

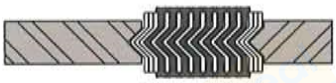
## Lamons Style WR

Style WR gaskets consist of a spiral wound sealing component with a solid metal outer guide ring. The outer guide ring serves to center the gasket properly in the flange joint, acts as an anti-blowout device, provides radial support for the spiral wound component, and acts as a compression gauge to prevent the spiral wound component from being over crushed. Normally the outer guide rings are furnished in mild steel, but can be supplied in other metals when required by operating conditions.

## Lamons Style WRI

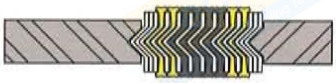
Style WRI is identical to style WR, with the addition of an inner ring. The inner ring also serves several functions. Primarily, it provides radial support for the gasket on the ID to help prevent the occurrences of buckling or imploding. The inner ring also serves as an additional compression limiter. Its ID is normally sized slightly larger than the ID of the flange bore, minimizing turbulence in process flow. The inner rings are normally supplied in the same material as the spiral wound component. Lamons normally manufactures standard Style WR and WRI spiral wound gaskets to ASME B16.20, designed to suit ASME B16.5 and ASME B16.47 flanges.

## Lamons Style WRI-LC



Style WRI-LC gaskets provide a seal at relatively lower seating stress. This means that our design requires less bolt load to seat, yet still has the recovery like a standard spiral wound. The WRI-LC gasket is typical to Class 150 and 300 flanges, where users have a concern with insufficient potential of pre-load. But, the density of the WRI-LC gasket can be varied to meet virtually any requirement. Electronic controls on Lamons' SpiraSeal machines assure high quality precision welding with equal spacing, the correct number of metal plies on the gasket inside periphery, proper ratio of metal to filler, proper number of metal plies on the outside and spot welds on the OD.

## Lamons Style WRI-HTG



Style WRI-HTG gaskets combine the corrosion and oxidation resistance of mica with the "sealability" of flexible graphite. The mica material, in conjunction with the metal spirals serves as a barrier between oxidizing process conditions and/or external air and the graphite. While Inconel® X-750 is commonly selected as the winding metal, any alloy can be selected. The overall effective rating of the HTG configuration can be utilized in temperatures of up to 1500°F (815°C). Higher temperatures can be realized given further consultation with Lamons Engineering Department.

## Lamons Style WRI-LP

Designed for highly corrosive environments, Style WRI-LP is a Spiral wound gasket with a conventional outer guide ring and a "Kammpro" style LPI inner ring. This dual sealing design engages the raised face completely from the OD to the bore. The winding can be constructed with the required metal and soft filler specified by the user. The "Kammpro" inner ring metal can be ordered in any alloy, such as Monel®, or in carbon steel. A carbon steel inner ring can be given a protective PTFE coating for increased chemical resistance. The Kammpro inner ring is faced typically with either 0.020" (0.5 mm) thick EPTFE or graphite. The WRI-LP has seen wide-spread approvals for Hydrofluoric Acid (HF) service, although this design has much further potential. Its main advantages are: no metal contact with the media; chemical resistance; fire safe design; sizing to meet ASME B16.5; available in large diameter and for special flanges.

## Lamons Inhibitor

Lamons Inhibitor gasket provides corrosion resistance in the most extreme conditions. It combines a HTG filler configuration with highest purity graphite, and a Kammpro inner ring laminated with soft PTFE material. The design of the Inhibitor gasket utilizes the Kammpro inner ring to provide the primary sealing interface. The inner ring material and its covering layer are inert in terms of corrosion through contact with dissimilar materials. This fire safe design incorporates the sealing integrity of highest purity graphite in conjunction with mica on the ID and OD, preventing the entrance of further corrosive conditions to the media.

## Lamons Style WR-AB

Inward buckling of spiral wound gaskets is sometimes a concern in industry today. Work is ongoing through various industry committees to improve the standard in this regard. Some end users do not want to use inner rings due to cost or bore intrusion - to address this stance, Lamons offers Style WR-AB. By creating a space for expansion between the OD of the winding and the outer ring, the buckling along the inside could be reduced. This feature, combined with a reinforced inside circumference, help to further reduce the likelihood of inward buckling after installation.

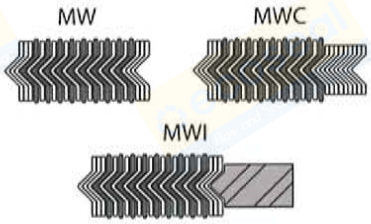
## Lamons Style WRI-HF

This gasket was developed for Hydrofluoric (HF) acid applications. It consists of a Monel® and PTFE winding with a carbon steel centering ring and a PTFE inner ring. The carbon steel outer ring can be coated with special HF acid detecting paint if desired. The PTFE inner ring reduces corrosion to the flanges between the bore of the pipe and the ID of the spiral wound sealing element.

## Lamons Style WRI-RJ

The style WRI-RJ gasket is identical to a Style WRI in construction features but is specially sized to be used as a replacement gasket for flanges machined to accept oval or octagonal ring joint gaskets. The sealing component is located between the ID of the groove machined in the flange and the flange bore. These are intended to be used as replacement parts and are considered a maintenance item. In new construction, where spiral wound gaskets are intended to be used, raised face flanges should be utilized.

## Lamons Style MW, MWC & MWI

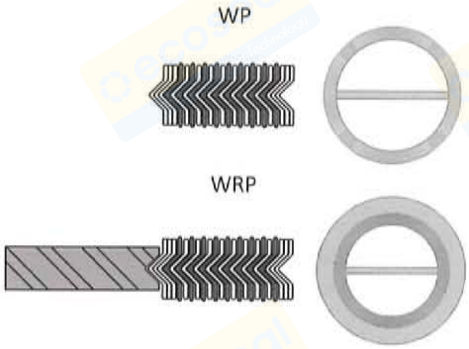



These gaskets are available in round, obround, and oval shapes and are used for standard manhole cover plates. When spiral wound manhole gaskets with a straight side are required, it is necessary that some curvature be allowable, given to the fact that spiral wound gaskets are wrapped under tension and therefore tend to buckle inward when the gaskets are removed from the winding mandrel. As a rule of thumb, the ratio of the long ID to the short ID should not exceed three to one.

## Lamons Style H

Style H gaskets are for use on boiler hand hole and tubecap assemblies. They are available in round, square, rectangular, diamond, obround, oval and pear shapes. Lamons has tooling available for manufacturing most of the standard handhold and tubecap sizes of the various boiler manufacturers. However, these are also available in special sizes and shapes. (To order special gaskets, dimensional drawings or sample cover plates should be provided in order to assure proper fit.)

## Lamons Style WP & WRP




These gaskets are similar to Style W and Style WR, with the addition of pass partitions for use with shell and tube heat exchangers. Partitions are normally supplied as double-jacketed construction, made of the same material as the spiral wound component. The partition strips can be soft soldered, tack welded or silver soldered to the spiral wound component. The double-jacketed partition strips are normally slightly thinner than the spiral wound component in order to minimize the bolt loading required to properly seat the gasket.

## Lamons Style L

The spiral wound components of Style L are identical to those of Style W and in addition have a wire loop welded to the outer periphery of the gasket, sized so as to fit over diametrically opposite bolts, for proper centering of the spiral wound component on the gasket seating surface. Whenever possible, it is recommended that a Style WR gasket be used in lieu of a Style L gasket because of the obvious advantages of the outer solid metal guide ring. The Style L is considerably more difficult to produce than the Style WR and therefore more expensive.

## Spiral Wound Gasket Dimensions for Pipe Flanges

Spiral wound gaskets must be sized to ensure the winding component is seated properly between flat surfaces. If it protrudes beyond a raised face or into a flange bore, mechanical damage and leakage may occur.

Style W typically is applied in confined groove type flanges, and it is sized by the following formulas:

**Gasket is confined on the Inside Diameter (ID) and Outside Diameter (OD):**
Gasket Inside Diameter (ID) = Groove Inside Diameter (ID) + 1/16" (1.5 mm)
Gasket Outside Diameter (OD) = Groove Outside Diameter (OD) – 1/16" (1.5 mm)

**Gasket is confined on the Outside Diameter (OD):**
Gasket Inside Diameter (ID) = Bore + Minimum 1/4" (6.4 mm)
Gasket Outside Diameter (OD) = Recess Outside Diameter (OD) - 1/16" (1.5 mm)

## Limitations of Size & Thickness

| Gasket Thickness | | Maximum Inside Diameter (ID)* | | Maximum Flange Width* | | Recommended Compressed Thickness | |
|---|---|---|---|---|---|---|---|
| Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 0.063 | 1.59 | 9 | 229 | 0.375 | 9.53 | 0.050/0.055 | 1.27/1.39 |
| 0.100 | 2.54 | 12 | 305 | 0.500 | 12.70 | 0.075/0.080 | 1.91/2.03 |
| 0.125 | 3.18 | 40 | 1016 | 0.750 | 19.05 | 0.090/0.100 | 2.29/2.54 |
| 0.175 | 4.45 | 75 | 1905 | 1.000 | 25.40 | 0.125/0.135 | 3.18/3.43 |
| 0.250 | 6.35 | 160 | 4064 | 1.250 | 31.75 | 0.180/0.200 | 4.57/5.08 |
| 0.285 | 7.24 | 160 | 4064 | 1.250 | 31.75 | 0.200/0.220 | 5.08/5.59 |

*These limitations are intended as a general guide only. Materials of construction and flange width of gasket can affect the limitations listed.

# Dimensions for Style W to Suit Large Male and Female Joints


| Nominal Pipe Size (NPS) | Pressure Class | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 150, 300, 400, 600 | | | | 900, 1500 | | | |
| | Inside Diameter (ID) | | Outside Diameter (OD) | | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4 | 0.50 | 12.7 | 1.00 | 25.4 | - | - | - | - |
| 1/2 | 1.00 | 25.4 | 1.38 | 34.9 | 1.00 | 25.4 | 1.38 | 34.9 |
| 3/4 | 1.31 | 33.3 | 1.69 | 42.9 | 1.31 | 33.3 | 1.69 | 42.9 |
| 1 | 1.50 | 38.1 | 2.00 | 50.8 | 1.50 | 38.1 | 2.00 | 50.8 |
| 1 1/4 | 1.88 | 47.6 | 2.50 | 63.5 | 1.88 | 47.6 | 2.50 | 63.5 |
| 1 1/2 | 2.13 | 54.0 | 2.88 | 73.0 | 2.13 | 54.0 | 2.88 | 73.0 |
| 2 | 2.88 | 73.0 | 3.63 | 92.1 | 2.88 | 73.0 | 3.63 | 92.1 |
| 2 1/2 | 3.38 | 85.7 | 4.13 | 104.8 | 3.38 | 85.7 | 4.13 | 104.8 |
| 3 | 4.25 | 108.0 | 5.00 | 127.0 | 4.25 | 108.0 | 5.00 | 127.0 |
| 3 1/2 | 4.75 | 120.7 | 5.50 | 139.7 | 4.75 | 120.7 | 5.50 | 139.7 |
| 4 | 5.19 | 131.8 | 6.19 | 157.2 | 5.19 | 131.8 | 6.19 | 157.2 |
| 4 1/2 | 5.69 | 144.5 | 6.75 | 171.5 | - | - | - | - |
| 5 | 6.31 | 160.3 | 7.31 | 185.7 | 6.31 | 160.3 | 7.31 | 185.7 |
| 6 | 7.50 | 190.5 | 8.50 | 215.9 | 7.50 | 190.5 | 8.50 | 215.9 |
| 8 | 9.38 | 238.1 | 10.63 | 269.9 | 9.38 | 238.1 | 10.63 | 269.9 |
| 10 | 11.25 | 285.8 | 12.75 | 323.9 | 11.25 | 285.8 | 12.75 | 323.9 |
| 12 | 13.50 | 342.9 | 15.00 | 381.0 | 13.50 | 342.9 | 15.00 | 381.0 |
| 14 | 14.75 | 374.7 | 16.25 | 412.8 | 14.75 | 374.7 | 16.25 | 412.8 |
| 16 | 17.00 | 431.8 | 18.50 | 469.9 | 17.00 | 431.8 | 18.50 | 469.9 |
| 18 | 19.25 | 489.0 | 21.00 | 533.4 | 19.25 | 489.0 | 21.00 | 533.4 |
| 20 | 21.00 | 533.4 | 23.00 | 584.2 | 21.00 | 533.4 | 23.00 | 584.2 |
| 24 | 25.25 | 641.4 | 27.25 | 692.2 | 25.25 | 641.4 | 27.25 | 692.2 |

| Nominal Pipe Size (NPS) | Pressure Class | | | |
|---|---|---|---|---|
| | 2500 | | | |
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/4 | - | - | - | - |
| 1/2 | 0.81 | 20.6 | 1.38 | 34.9 |
| 3/4 | 1.06 | 27.0 | 1.69 | 42.9 |
| 1 | 1.25 | 31.8 | 2.00 | 50.8 |
| 1 1/4 | 1.63 | 41.3 | 2.50 | 63.5 |
| 1 1/2 | 1.88 | 47.6 | 2.88 | 73.0 |
| 2 | 2.38 | 60.3 | 3.63 | 92.1 |
| 2 1/2 | 3.00 | 76.2 | 4.13 | 104.8 |
| 3 | 3.75 | 95.3 | 5.00 | 127.0 |
| 3 1/2 | - | - | - | - |
| 4 | 4.75 | 120.7 | 6.19 | 157.2 |
| 4 1/2 | - | - | - | - |
| 5 | 5.75 | 146.1 | 7.31 | 185.7 |
| 6 | 6.75 | 171.5 | 8.50 | 215.9 |
| 8 | 8.75 | 222.3 | 10.63 | 269.9 |
| 10 | 10.75 | 273.1 | 12.75 | 323.9 |
| 12 | 13.00 | 330.2 | 15.00 | 381.0 |

## Dimensions for Style W


### For Large Tounge and Groove Joints

| Nominal Pipe Size (NPS) | Pressure Class 150-2500* | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 1.00 | 25.4 | 1.38 | 34.9 |
| 3/4 | 1.31 | 33.3 | 1.69 | 42.9 |
| 1 | 1.50 | 38.1 | 2.00 | 50.8 |
| 1 1/4 | 1.88 | 47.6 | 2.50 | 63.5 |
| 1 1/2 | 2.13 | 54.0 | 2.88 | 73.0 |
| 2 | 2.88 | 73.0 | 3.63 | 92.1 |
| 2 1/2 | 3.38 | 85.7 | 4.13 | 104.8 |
| 3 | 4.25 | 108.0 | 5.00 | 127.0 |
| 3 1/2 | 4.75 | 120.7 | 5.50 | 139.7 |
| 4 | 5.19 | 131.8 | 6.19 | 157.2 |
| 5 | 6.31 | 160.3 | 7.31 | 185.7 |
| 6 | 7.50 | 190.5 | 8.50 | 215.9 |
| 8 | 9.38 | 238.1 | 10.63 | 269.9 |
| 10 | 11.25 | 285.8 | 12.75 | 323.9 |
| 12 | 13.50 | 342.9 | 15.00 | 381.0 |
| 14 | 14.75 | 374.7 | 16.25 | 412.8 |
| 16 | 16.75 | 425.5 | 18.50 | 469.9 |
| 18 | 19.25 | 489.0 | 21.00 | 533.4 |
| 20 | 21.00 | 533.4 | 23.00 | 584.2 |
| 24 | 25.25 | 641.4 | 27.25 | 692.2 |

* 2500# only thru 12" NPS

### For Small Tounge and Groove Joints

| Nominal Pipe Size (NPS) | Pressure Class 150-2500* | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 1.00 | 25.4 | 1.38 | 34.9 |
| 3/4 | 1.31 | 33.3 | 1.69 | 42.9 |
| 1 | 1.50 | 38.1 | 1.88 | 47.6 |
| 1 1/4 | 1.88 | 47.6 | 2.25 | 57.2 |
| 1 1/2 | 2.13 | 54.0 | 2.50 | 63.5 |
| 2 | 2.88 | 73.0 | 3.25 | 82.6 |
| 2 1/2 | 3.38 | 85.7 | 3.75 | 95.3 |
| 3 | 4.25 | 108.0 | 4.63 | 117.5 |
| 3 1/2 | 4.75 | 120.7 | 5.13 | 130.2 |
| 4 | 5.19 | 131.8 | 5.69 | 144.5 |
| 5 | 6.31 | 160.3 | 6.81 | 173.0 |
| 6 | 7.50 | 190.5 | 8.00 | 203.2 |
| 8 | 9.38 | 238.1 | 10.00 | 254.0 |
| 10 | 11.25 | 285.8 | 12.00 | 304.8 |
| 12 | 13.50 | 342.9 | 14.25 | 362.0 |
| 14 | 14.75 | 374.7 | 15.50 | 393.7 |
| 16 | 16.75 | 425.5 | 17.63 | 447.7 |
| 18 | 19.25 | 489.0 | 20.13 | 511.2 |
| 20 | 21.00 | 533.4 | 22.00 | 558.8 |
| 24 | 25.25 | 641.4 | 26.25 | 666.8 |

* 2500# only thru 12" NPS



### Style W Gasket Tolerances:

| Gasket Diameter (Inches) | Inside Diameter (ID) | Outside Diameter (OD) |
|---|---|---|
| Up to 1" | (+3/64", -0.00") | (+0.00", -1/32") |
| 1" to 24" | (+1/32", -0.00") | (+0.00", -1/32") |
| 24" to 36" | (+3/64", -0.00") | (+0.00", -1/16") |
| 36" to 60" | (+1/16", -0.00") | (+0.00", -1/16") |
| 60" and above | (+3/32", -0.00") | (+0.00", -3/32") |

| Gasket Diameter (mm) | Inside Diameter (ID) | Outside Diameter (OD) |
|---|---|---|
| Up to 25.4 mm | (+1.2 mm, -0.00 mm) | (+0.00 mm, -0.8 mm) |
| 25.4 mm to 610 mm | (+0.8 mm, -0.00 mm) | (+0.00 mm, -0.8 mm) |
| 610 mm to 914 mm | (+1.2 mm, -0.00 mm) | (+0.00 mm, -1.6 mm) |
| 914 mm to 1524 mm | (+1.6 mm, -0.00 mm) | (+0.00 mm, -1.6 mm) |
| 1524 mm and above | (+2.4 mm, -0.00 mm) | (+0.00 mm, -2.4 mm) |

Thickness +0.015" - 0.00" (+0.381 mm, -0.00 mm) on special gaskets with:

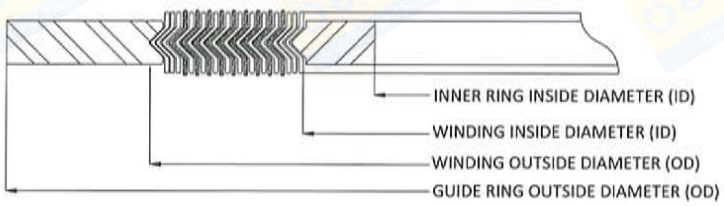
a. Less than 1" (25.4 mm) ID greater that 26" (660.4 mm) ID.

b. PTFE fillers

c. 1" (25.4 mm) or larger flange width.

Thickness + 0.010 -0.000" (+0.254 mm, -0.00 mm) for most other sizes and materials.

## Dimensions for Style WRI per ASME B16.20 to Suit ASME B16.5 Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | 0.50 | 12.7 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 1.88 | 47.6 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 2.25 | 57.2 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 2.63 | 66.7 |
| 1 1/4 | 1.50 | 38.1 | 1.88 | 47.6 | 2.38 | 60.3 | 3.00 | 76.2 |
| 1 1/2 | 1.75 | 44.5 | 2.13 | 54.0 | 2.75 | 69.9 | 3.38 | 85.7 |
| 2 | 2.19 | 55.6 | 2.75 | 69.9 | 3.38 | 85.7 | 4.13 | 104.8 |
| 2 1/2 | 2.62 | 66.5 | 3.25 | 82.6 | 3.88 | 98.4 | 4.88 | 123.8 |
| 3 | 3.19 | 81.0 | 4.00 | 101.6 | 4.75 | 120.7 | 5.38 | 136.5 |
| 3 1/2* | 3.50 | 88.9 | 4.50 | 114.3 | 5.25 | 133.4 | 6.38 | 161.9 |
| 4 | 4.19 | 106.4 | 5.00 | 127.0 | 5.88 | 149.2 | 6.88 | 174.6 |
| 5 | 5.19 | 131.8 | 6.13 | 155.6 | 7.00 | 177.8 | 7.75 | 196.9 |
| 6 | 6.19 | 157.2 | 7.19 | 182.6 | 8.25 | 209.6 | 8.75 | 222.3 |
| 8 | 8.50 | 215.9 | 9.19 | 233.4 | 10.38 | 263.5 | 11.00 | 279.4 |
| 10 | 10.56 | 268.2 | 11.31 | 287.3 | 12.50 | 317.5 | 13.38 | 339.7 |
| 12 | 12.50 | 317.5 | 13.38 | 339.7 | 14.75 | 374.7 | 16.13 | 409.6 |
| 14 | 13.75 | 349.3 | 14.63 | 371.5 | 16.00 | 406.4 | 17.75 | 450.9 |
| 16 | 15.75 | 400.1 | 16.63 | 422.3 | 18.25 | 463.6 | 20.25 | 514.4 |
| 18 | 17.69 | 449.3 | 18.69 | 474.7 | 20.75 | 527.1 | 21.63 | 549.3 |
| 20 | 19.69 | 500.1 | 20.69 | 525.5 | 22.75 | 577.9 | 23.88 | 606.4 |
| 24 | 23.75 | 603.3 | 24.75 | 628.7 | 27.00 | 685.8 | 28.25 | 717.6 |

*Not Listed in ASME B16.20

## Double Color Coding for SpiraSeal® Gaskets per ASME B16.20

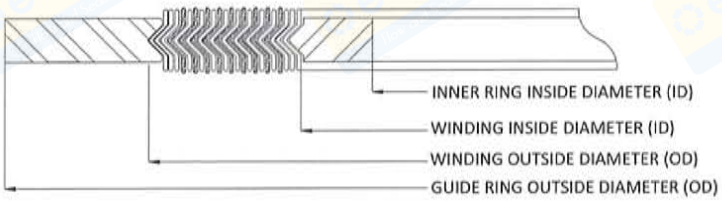
### Metallic Windings

| | | | |
|---|---|---|---|
| 304 SS | Yellow | Incoloy | White |
| 316L SS | Green | Titanium | Purple |
| 317L SS | Maroon | Alloy 20 | Black |
| 347 SS | Blue | Carbon Steel | Silver |
| 321 SS | Turquoise | Hastelloy "B" | Brown |
| Monel | Orange | Hastelloy "C" | Beige |
| Inconel | Gold | Phos. Bronze | Copper |
| Nickel | Red | | |

### Non-Metallic Fillers

| | |
|---|---|
| PTFE | White Stripe |
| Ceramic | Light Green Stripe |
| Flexible Graphite | Gray Stripe |
| Phyllosilicate (HTG) | Light Blue Stripe |

# Dimensions for Style WRI per ASME B16.20 to Suit ASME B16.5 Flanges

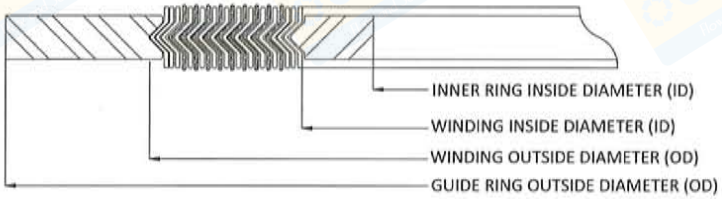



| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | 0.50 | 12.7 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 2.13 | 54.0 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 2.63 | 66.7 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 2.88 | 73.0 |
| 1 1/4 | 1.50 | 38.1 | 1.88 | 47.6 | 2.38 | 60.3 | 3.25 | 82.6 |
| 1 1/2 | 1.75 | 44.5 | 2.13 | 54.0 | 2.75 | 69.9 | 3.75 | 95.3 |
| 2 | 2.19 | 55.6 | 2.75 | 69.9 | 3.38 | 85.7 | 4.38 | 111.1 |
| 2 1/2 | 2.62 | 66.5 | 3.25 | 82.6 | 3.88 | 98.4 | 5.13 | 130.2 |
| 3 | 3.19 | 81.0 | 4.00 | 101.6 | 4.75 | 120.7 | 5.88 | 149.2 |
| 3 1/2* | 3.50 | 88.9 | 4.50 | 114.3 | 5.25 | 133.4 | 6.50 | 165.1 |
| 4 | 4.19 | 106.4 | 5.00 | 127.0 | 5.88 | 149.2 | 7.13 | 181.0 |
| 5 | 5.19 | 131.8 | 6.13 | 155.6 | 7.00 | 177.8 | 8.50 | 215.9 |
| 6 | 6.19 | 157.2 | 7.19 | 182.6 | 8.25 | 209.6 | 9.88 | 250.8 |
| 8 | 8.50 | 215.9 | 9.19 | 233.4 | 10.38 | 263.5 | 12.13 | 308.0 |
| 10 | 10.56 | 268.2 | 11.31 | 287.3 | 12.50 | 317.5 | 14.25 | 362.0 |
| 12 | 12.50 | 317.5 | 13.38 | 339.7 | 14.75 | 374.7 | 16.63 | 422.3 |
| 14 | 13.75 | 349.3 | 14.63 | 371.5 | 16.00 | 406.4 | 19.13 | 485.8 |
| 16 | 15.75 | 400.1 | 16.63 | 422.3 | 18.25 | 463.6 | 21.25 | 539.8 |
| 18 | 17.69 | 449.3 | 18.69 | 474.7 | 20.75 | 527.1 | 23.50 | 596.9 |
| 20 | 19.69 | 500.1 | 20.69 | 525.5 | 22.75 | 577.9 | 25.75 | 654.1 |
| 24 | 23.75 | 603.3 | 24.75 | 628.7 | 27.00 | 685.8 | 30.50 | 774.7 |

| Nominal Pipe Size (NPS) | Class 400 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | 0.50 | 12.7 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 2.13 | 54.0 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 2.63 | 66.7 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 2.88 | 73.0 |
| 1 1/4 | 1.50 | 38.1 | 1.88 | 47.6 | 2.38 | 60.3 | 3.25 | 82.6 |
| 1 1/2 | 1.75 | 44.5 | 2.13 | 54.0 | 2.75 | 69.9 | 3.75 | 95.3 |
| 2 | 2.19 | 55.6 | 2.75 | 69.9 | 3.38 | 85.7 | 4.38 | 111.1 |
| 2 1/2 | 2.62 | 66.5 | 3.25 | 82.6 | 3.88 | 98.4 | 5.13 | 130.2 |
| 3 | 3.19 | 81.0 | 4.00 | 101.6 | 4.75 | 120.7 | 5.88 | 149.2 |
| 3 1/2* | 3.50 | 88.9 | 4.13 | 104.8 | 5.25 | 133.4 | 6.38 | 161.9 |
| 4 | 4.04 | 102.6 | 4.75 | 120.7 | 5.88 | 149.2 | 7.00 | 177.8 |
| 5 | 5.05 | 128.3 | 5.81 | 147.6 | 7.00 | 177.8 | 8.38 | 212.7 |
| 6 | 6.10 | 154.9 | 6.88 | 174.6 | 8.25 | 209.6 | 9.75 | 247.7 |
| 8 | 8.10 | 205.7 | 8.88 | 225.4 | 10.38 | 263.5 | 12.00 | 304.8 |
| 10 | 10.05 | 255.3 | 10.81 | 274.6 | 12.50 | 317.5 | 14.13 | 358.8 |
| 12 | 12.10 | 307.3 | 12.88 | 327.0 | 14.75 | 374.7 | 16.50 | 419.1 |
| 14 | 13.50 | 342.9 | 14.25 | 362.0 | 16.00 | 406.4 | 19.00 | 482.6 |
| 16 | 15.35 | 389.9 | 16.25 | 412.8 | 18.25 | 463.6 | 21.13 | 536.6 |
| 18 | 17.25 | 438.2 | 18.50 | 469.9 | 20.75 | 527.1 | 23.38 | 593.7 |
| 20 | 19.25 | 489.0 | 20.50 | 520.7 | 22.75 | 577.9 | 25.50 | 647.7 |
| 24 | 23.25 | 590.6 | 24.75 | 628.7 | 27.00 | 685.8 | 30.25 | 768.4 |

*Not Listed in ASME B16.20

# Dimensions for Style WRI per ASME B16.20 to Suit ASME B16.5 Flanges

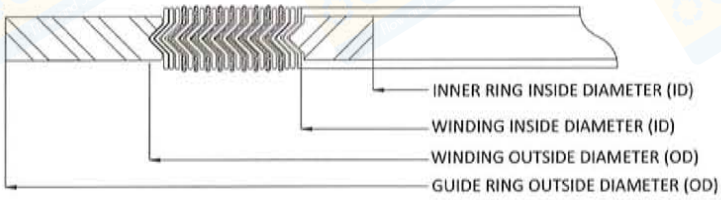



| Nominal Pipe Size (NPS) | Class 600 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | 0.50 | 12.7 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 2.13 | 54.0 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 2.63 | 66.7 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 2.88 | 73.0 |
| 1 1/4 | 1.50 | 38.1 | 1.88 | 47.6 | 2.38 | 60.3 | 3.25 | 82.6 |
| 1 1/2 | 1.75 | 44.5 | 2.13 | 54.0 | 2.75 | 69.9 | 3.75 | 95.3 |
| 2 | 2.19 | 55.6 | 2.75 | 69.9 | 3.38 | 85.7 | 4.38 | 111.1 |
| 2 1/2 | 2.62 | 66.5 | 3.25 | 82.6 | 3.88 | 98.4 | 5.13 | 130.2 |
| 3 | 3.19 | 81.0 | 4.00 | 101.6 | 4.75 | 120.7 | 5.88 | 149.2 |
| 3 1/2 | 3.50 | 88.9 | 4.13 | 104.8 | 5.25 | 133.4 | 6.38 | 161.9 |
| 4 | 4.04 | 102.6 | 4.75 | 120.7 | 5.88 | 149.2 | 7.63 | 193.7 |
| 5 | 5.05 | 128.3 | 5.81 | 147.6 | 7.00 | 177.8 | 9.50 | 241.3 |
| 6 | 6.10 | 154.9 | 6.88 | 174.6 | 8.25 | 209.6 | 10.50 | 266.7 |
| 8 | 8.10 | 205.7 | 8.88 | 225.4 | 10.38 | 263.5 | 12.63 | 320.7 |
| 10 | 10.05 | 255.3 | 10.81 | 274.6 | 12.50 | 317.5 | 15.75 | 400.1 |
| 12 | 12.10 | 307.3 | 12.88 | 327.0 | 14.75 | 374.7 | 18.00 | 457.2 |
| 14 | 13.50 | 342.9 | 14.25 | 362.0 | 16.00 | 406.4 | 19.38 | 492.1 |
| 16 | 15.35 | 389.9 | 16.25 | 412.8 | 18.25 | 463.6 | 22.25 | 565.2 |
| 18 | 17.25 | 438.2 | 18.50 | 469.9 | 20.75 | 527.1 | 24.13 | 612.8 |
| 20 | 19.25 | 489.0 | 20.50 | 520.7 | 22.75 | 577.9 | 26.88 | 682.6 |
| 24 | 23.25 | 590.6 | 24.75 | 628.7 | 27.00 | 685.8 | 31.13 | 790.6 |

| Nominal Pipe Size (NPS) | Class 900 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | - | - | - | - | - | - |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 2.50 | 63.5 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 2.75 | 69.9 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 3.13 | 79.4 |
| 1 1/4 | 1.31 | 33.3 | 1.56 | 39.7 | 2.38 | 60.3 | 3.50 | 88.9 |
| 1 1/2 | 1.63 | 41.4 | 1.88 | 47.6 | 2.75 | 69.9 | 3.88 | 98.4 |
| 2 | 2.06 | 52.3 | 2.31 | 58.7 | 3.38 | 85.7 | 5.63 | 142.9 |
| 2 1/2 | 2.50 | 63.5 | 2.75 | 69.9 | 3.88 | 98.4 | 6.50 | 165.1 |
| 3 | 3.10 | 78.7 | 3.75 | 95.3 | 4.75 | 120.7 | 6.63 | 168.3 |
| 3 1/2* | 3.50 | 88.9 | 4.13 | 104.8 | 5.25 | 133.4 | 7.50 | 190.5 |
| 4 | 4.04 | 102.6 | 4.75 | 120.7 | 5.88 | 149.2 | 8.13 | 206.4 |
| 5 | 5.05 | 128.3 | 5.81 | 147.6 | 7.00 | 177.8 | 9.75 | 247.7 |
| 6 | 6.10 | 154.9 | 6.88 | 174.6 | 8.25 | 209.6 | 11.38 | 288.9 |
| 8 | 7.75 | 196.9 | 8.75 | 222.3 | 10.13 | 257.2 | 14.13 | 358.8 |
| 10 | 9.69 | 246.1 | 10.88 | 276.2 | 12.25 | 311.2 | 17.13 | 435.0 |
| 12 | 11.50 | 292.1 | 12.75 | 323.9 | 14.50 | 368.3 | 19.63 | 498.5 |
| 14 | 12.63 | 320.8 | 14.00 | 355.6 | 15.75 | 400.1 | 20.50 | 520.7 |
| 16 | 14.75 | 374.7 | 16.25 | 412.8 | 18.00 | 457.2 | 22.63 | 574.7 |
| 18 | 16.75 | 425.5 | 18.25 | 463.6 | 20.50 | 520.7 | 25.13 | 638.2 |
| 20 | 19.00 | 482.6 | 20.50 | 520.7 | 22.50 | 571.5 | 27.50 | 698.5 |
| 24 | 23.25** | 590.6 | 24.75 | 628.7 | 26.75 | 679.5 | 33.00 | 838.2 |

*Not Listed in ASME B16.20 ** Inner rings are required

# Dimensions for Style WRI per ASME B16.20 to Suit ASME B16.5 Flanges




| Nominal Pipe Size (NPS) | Class 1500 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | - | - | - | - | - | - |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 2.50 | 63.5 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 2.75 | 69.9 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 3.13 | 79.4 |
| 1 1/4 | 1.31 | 33.3 | 1.56 | 39.7 | 2.38 | 60.3 | 3.50 | 88.9 |
| 1 1/2 | 1.63 | 41.4 | 1.88 | 47.6 | 2.75 | 69.9 | 3.88 | 98.4 |
| 2 | 2.06 | 52.3 | 2.31 | 58.7 | 3.38 | 85.7 | 5.63 | 142.9 |
| 2 1/2 | 2.50 | 63.5 | 2.75 | 69.9 | 3.88 | 98.4 | 6.50 | 165.1 |
| 3 | 3.10 | 78.7 | 3.63 | 92.1 | 4.75 | 120.7 | 6.88 | 174.6 |
| 3 1/2* | 3.50 | 88.9 | 4.13 | 104.8 | 5.25 | 133.4 | 7.38 | 187.3 |
| 4 | 3.85 | 97.8 | 4.63 | 117.5 | 5.88 | 149.2 | 8.25 | 209.6 |
| 5 | 4.90 | 124.5 | 5.63 | 142.9 | 7.00 | 177.8 | 10.00 | 254.0 |
| 6 | 5.80 | 147.3 | 6.75 | 171.5 | 8.25 | 209.6 | 11.13 | 282.6 |
| 8 | 7.75 | 196.9 | 8.50 | 215.9 | 10.13 | 257.2 | 13.88 | 352.4 |
| 10 | 9.69 | 246.1 | 10.50 | 266.7 | 12.25 | 311.2 | 17.13 | 435.0 |
| 12 | 11.50** | 292.1** | 12.75 | 323.9 | 14.50 | 368.3 | 20.50 | 520.7 |
| 14 | 12.63** | 320.8** | 14.25 | 362.0 | 15.75 | 400.1 | 22.75 | 577.9 |
| 16 | 14.50** | 368.3** | 16.00 | 406.4 | 18.00 | 457.2 | 25.25 | 641.4 |
| 18 | 16.75** | 425.5** | 18.25 | 463.6 | 20.50 | 520.7 | 27.75 | 704.9 |
| 20 | 18.75** | 476.3** | 20.25 | 514.4 | 22.50 | 571.5 | 29.75 | 755.7 |
| 24 | 22.75** | 577.9** | 24.25 | 616.0 | 26.75 | 679.5 | 35.50 | 901.7 |

| Nominal Pipe Size (NPS) | Class 2500 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4* | - | - | - | - | - | - | - | - |
| 1/2 | 0.56 | 14.2 | 0.75 | 19.1 | 1.25 | 31.8 | 2.75 | 69.9 |
| 3/4 | 0.81 | 20.6 | 1.00 | 25.4 | 1.56 | 39.7 | 3.00 | 76.2 |
| 1 | 1.06 | 26.9 | 1.25 | 31.8 | 1.88 | 47.6 | 3.38 | 85.7 |
| 1 1/4 | 1.31 | 33.3 | 1.56 | 39.7 | 2.38 | 60.3 | 4.13 | 104.8 |
| 1 1/2 | 1.63 | 41.4 | 1.88 | 47.6 | 2.75 | 69.9 | 4.63 | 117.5 |
| 2 | 2.06 | 52.3 | 2.31 | 58.7 | 3.38 | 85.7 | 5.75 | 146.1 |
| 2 1/2 | 2.50 | 63.5 | 2.75 | 69.9 | 3.88 | 98.4 | 6.63 | 168.3 |
| 3 | 3.10 | 78.7 | 3.63 | 92.1 | 4.75 | 120.7 | 7.75 | 196.9 |
| 3 1/2* | 3.50 | 88.9 | - | - | - | - | - | - |
| 4 | 3.85** | 97.8** | 4.63 | 117.5 | 5.88 | 149.2 | 9.25 | 235.0 |
| 5 | 4.90** | 124.5** | 5.63 | 142.9 | 7.00 | 177.8 | 11.00 | 279.4 |
| 6 | 5.80** | 147.3** | 6.75 | 171.5 | 8.25 | 209.6 | 12.50 | 317.5 |
| 8 | 7.75** | 196.9** | 8.50 | 215.9 | 10.13 | 257.2 | 15.25 | 387.4 |
| 10 | 9.69** | 246.1** | 10.63 | 269.9 | 12.25 | 311.2 | 18.75 | 476.3 |
| 12 | 11.50** | 292.1** | 12.50 | 317.5 | 14.50 | 368.3 | 21.63 | 549.3 |

*Not Listed in ASME B16.20 ** Inner rings are required

## Spiral-Wound WR/WRI Tolerances per ASME B16.20 Specifications

- The winding thickness: ±0.005" (0.13 mm) measured across the metallic portion of the winding not including the filler.
- The winding outside diameter
  - o NPS ½ through NPS 8 is ±1/32" (±0.8 mm)
  - o NPS 10 through NPS 24 is +1/16", - 1/32" (+1.5 mm, -0.8 mm)
- The winding inside diameter
  - o NPS ½ through NPS 8 is ±1/64" (±0.4 mm )
  - o NPS 10 through NPS 24 is ±1/32" (±0.8 mm)
- The guide ring outside diameter: ±1/32" (±0.8 mm)
- The guide ring and inner thickness shall be from 0.117" (2.97 mm) to 0.131" (3.33 mm)
- The inner ring inside diameter:
  - o NPS ½ through 3 is ±1/32" (±0.8 mm)
  - o NPS 4 through 24 is ±1/16" (±1.5 mm)

## Table for Minimum Pipe Wall Thickness that is Suitable for use with Standard Inner Rings per the ASME B16.20

| Nominal Pipe Size (NPS) | Pressure Class | | | | | | |
|---|---|---|---|---|---|---|---|
| | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
| 1/2 | Schedule 80 | | | | | | |
| 3/4 | | | | | | | |
| 1 | | | | | | | |
| 1 1/4 | Schedule 40 | | | | | | |
| 1 1/2 | | | | | | | |
| 2 | | | | | | | |
| 2 1/2 | | | | | | | |
| 3 | | | | | | | |
| 3 1/2* | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 8 | Schedule 10S | | Schedule 30 | | Schedule 80 | | |
| 10 | | | | | | | |
| 12 | | | | | | | |
| 14 | | | | | | | |
| 16 | | | | | | | |
| 18 | | | | | | | |
| 20 | | | | | | | |
| 24 | | | | | | | |

General Notes per ASME B16.20:

- The pipe wall schedules identified represent the minimum pipe wall thickness suitable for use with inner rings for ASME B16.5 flanges (reference ASME B 36.10M and B36.19M).
- Gasket with inner rings should be used only with socket welding, lapped, welding neck, and integral flanges.

* Not Listed in ASME B16.20

# Table for Limitations on the Maximum ASME B16.5 Flange Bore for use with Standard ASME B16.20 Spiral Wound Gaskets

<table>
<tr><th rowspan="2">Nominal Pipe Size (NPS)</th><th colspan="7">Pressure Class</th></tr>
<tr><th>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 colspan="2" rowspan="3">WN Flange only (2)</td><td rowspan="4">No Flanges<br>Use 600</td><td rowspan="2">WN Flange only</td><td rowspan="3">No Flanges<br>Use 1500</td><td colspan="2" rowspan="4">WN 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>WN Flange (2)</td><td rowspan="2">SO Flange (3)<br>WN Flange (2)</td></tr>
<tr><td>1 1/2</td></tr>
<tr><td>2</td><td colspan="2" rowspan="2">SO Flange (3)<br>WN Flange, any bore</td><td rowspan="3">SO and WN<br>Flange<br>any bore</td></tr>
<tr><td>2 1/2</td></tr>
<tr><td>3</td><td colspan="2" rowspan="12">SO and WN Flange any bore</td><td rowspan="6">WN Flange with Schedule 0S bore described in ASME B36.19M (Includes nozzle (4) but excludes SO Flanges)</td><td rowspan="4"></td><td colspan="2" rowspan="3">WN flange with SW bore (include nozzle (4) but excludes SO flange)</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>8</td></tr>
<tr><td>10</td><td colspan="2" rowspan="5">WN flange with schedule 80 bore (excludes nozzle (4) and SO flange) (5)</td></tr>
<tr><td>12</td></tr>
<tr><td>14</td><td rowspan="5">WN Flange with Schedule 10S bore described in ASME B36.19M (Excludes nozzle (4) and SO Flanges) (5)</td><td rowspan="5">No Flanges</td></tr>
<tr><td>16</td></tr>
<tr><td>18</td></tr>
<tr><td>20</td></tr>
<tr><td>24</td></tr>
</table>

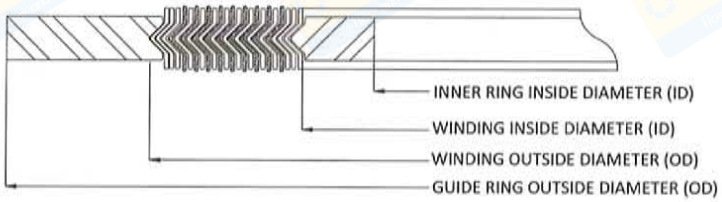
**Abbreviations:**

**SO** = slip on and threaded
**WN** = welding neck
**SW** = standard wall

**Notes per the ASME B16.20 specification:**

1. Inner rings are required for class 900 NPS 24, class 1500 NPS 12 through 24, and class 2500 NPS 4 through NPS 12 per the ASME B16.20. These inner rings may extend into the pipe bore a maximum of 1/16" (1.5 mm) under the worst combination of maximum bore, eccentric installation, and additive tolerances.
2. In these sizes, the gasket is suitable for a welding neck flange with a standard wall bore, if the gasket and the flanges are assembled concentrically. This also applies to a nozzle. It is the user's responsibility to determine if the gasket is satisfactory for a flange or any larger bore.
3. Gaskets in theses sizes are suitable for slip on flanges only if the gaskets and flanges are assembled concentrically
4. A nozzle is a long welding neck; the bore equals the flange NPS
5. A NPS 24 gasket is suitable for nozzles.

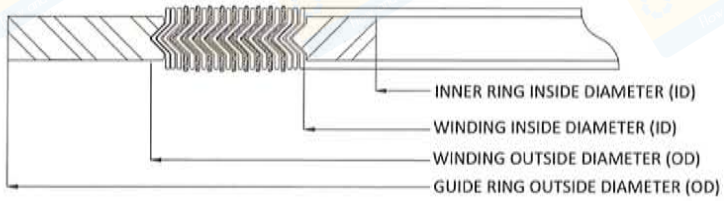
# Dimensions for Style WR/WRI to Suit AWWA C207 Class E Slip-On and Welding Neck Flanges




| Nominal Pipe Size (NPS) | Class 125 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 22 | 22.00 | 558.8 | 22.75 | 577.9 | 24.00 | 609.6 | 26.00 | 660.4 |
| 26 | 26.00 | 660.4 | 26.50 | 673.1 | 27.75 | 704.9 | 30.50 | 774.7 |
| 28 | 28.00 | 711.2 | 28.50 | 723.9 | 27.75 | 704.9 | 32.75 | 831.9 |
| 30 | 30.00 | 762.0 | 30.50 | 774.7 | 31.75 | 806.5 | 34.75 | 882.7 |
| 32 | 32.00 | 812.8 | 32.50 | 825.5 | 33.88 | 860.4 | 37.00 | 939.8 |
| 34 | 34.00 | 863.6 | 34.50 | 876.3 | 35.88 | 911.2 | 39.00 | 990.6 |
| 36 | 36.00 | 914.4 | 36.50 | 927.1 | 38.13 | 968.4 | 41.25 | 1047.8 |
| 38 | 38.00 | 965.2 | 38.50 | 977.9 | 40.13 | 1019.2 | 43.75 | 1111.3 |
| 40 | 40.00 | 1016.0 | 40.50 | 1028.7 | 42.13 | 1070.0 | 45.75 | 1162.1 |
| 42 | 42.00 | 1066.8 | 42.50 | 1079.5 | 44.25 | 1124.0 | 48.00 | 1219.2 |
| 44 | 44.00 | 1117.6 | 44.50 | 1130.3 | 46.38 | 1177.9 | 50.25 | 1276.4 |
| 46 | 46.00 | 1168.4 | 46.50 | 1181.1 | 48.38 | 1228.7 | 52.25 | 1327.2 |
| 48 | 48.00 | 1219.2 | 48.50 | 1231.9 | 50.38 | 1279.5 | 54.50 | 1384.3 |
| 50 | 50.00 | 1270.0 | 50.50 | 1282.7 | 52.50 | 1333.5 | 56.50 | 1435.1 |
| 52 | 52.00 | 1320.8 | 52.50 | 1333.5 | 54.50 | 1384.3 | 58.75 | 1492.3 |
| 54 | 54.00 | 1371.6 | 54.50 | 1384.3 | 56.50 | 1435.1 | 61.00 | 1549.4 |
| 60 | 60.00 | 1524.0 | 60.50 | 1536.7 | 62.50 | 1587.5 | 67.50 | 1714.5 |

| Nominal Pipe Size (NPS) | Class 175 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.00 | 660.4 | 26.50 | 673.1 | 27.75 | 704.9 | 29.13 | 739.8 |
| 28 | 28.00 | 711.2 | 28.50 | 723.9 | 29.75 | 755.7 | 31.13 | 790.6 |
| 30 | 30.00 | 762.0 | 30.50 | 774.7 | 31.75 | 806.5 | 33.38 | 847.7 |
| 32 | 32.00 | 812.8 | 32.50 | 825.5 | 33.75 | 857.3 | 35.38 | 898.5 |
| 34 | 34.00 | 863.6 | 34.50 | 876.3 | 35.88 | 911.2 | 37.50 | 952.5 |
| 36 | 36.00 | 914.4 | 36.50 | 927.1 | 37.88 | 962.0 | 39.50 | 1003.3 |
| 38 | 38.00 | 965.2 | 38.50 | 977.9 | 39.88 | 1012.8 | 41.50 | 1054.1 |
| 40 | 40.00 | 1016.0 | 40.50 | 1028.7 | 42.00 | 1066.8 | 43.50 | 1104.9 |
| 42 | 42.00 | 1066.8 | 42.50 | 1079.5 | 44.00 | 1117.6 | 45.88 | 1165.2 |
| 44 | 44.00 | 1117.6 | 44.50 | 1130.3 | 46.00 | 1168.4 | 47.88 | 1216.0 |
| 46 | 46.00 | 1168.4 | 46.50 | 1181.1 | 48.00 | 1219.2 | 49.88 | 1266.8 |
| 48 | 48.00 | 1219.2 | 48.50 | 1231.9 | 50.13 | 1273.2 | 51.88 | 1317.6 |
| 50 | 50.00 | 1270.0 | 50.50 | 1282.7 | 52.25 | 1327.2 | 53.88 | 1368.4 |
| 52 | 52.00 | 1320.8 | 52.50 | 1333.5 | 54.38 | 1381.1 | 56.13 | 1425.6 |
| 54 | 54.00 | 1371.6 | 54.50 | 1384.3 | 56.38 | 1431.9 | 58.13 | 1476.4 |
| 60 | 60.00 | 1524.0 | 60.50 | 1536.7 | 62.50 | 1587.5 | 61.13 | 1552.6 |

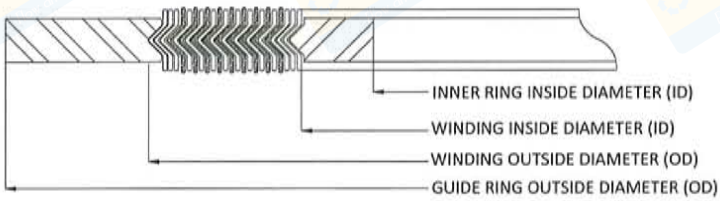
# Dimensions for Style WR/WRI to Suit AWWA C207 Class E Slip-On and Welding Neck Flanges




| Nominal Pipe Size (NPS) | Class 250 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.00 | 660.4 | 26.50 | 673.1 | 27.75 | 704.9 | 32.75 | 831.9 |
| 28 | 28.00 | 711.2 | 28.50 | 723.9 | 29.75 | 755.7 | 35.25 | 895.4 |
| 30 | 30.00 | 762.0 | 30.50 | 774.7 | 31.75 | 806.5 | 37.50 | 952.5 |
| 32 | 32.00 | 812.8 | 32.50 | 825.5 | 33.88 | 860.4 | 39.75 | 1009.7 |
| 34 | 34.00 | 863.6 | 34.50 | 876.3 | 35.88 | 911.2 | 41.75 | 1060.5 |
| 36 | 36.00 | 914.4 | 36.50 | 927.1 | 38.13 | 968.4 | 44.00 | 1117.6 |
| 38 | 38.00 | 965.2 | 38.50 | 977.9 | 40.13 | 1019.2 | 46.00 | 1168.4 |
| 40 | 40.00 | 1016.0 | 40.50 | 1028.7 | 42.13 | 1070.0 | 48.25 | 1225.6 |
| 42 | 42.00 | 1066.8 | 42.50 | 1079.5 | 44.25 | 1124.0 | 50.75 | 1289.1 |
| 44 | 44.00 | 1117.6 | 44.50 | 1130.3 | 46.38 | 1177.9 | 53.00 | 1346.2 |
| 46 | 46.00 | 1168.4 | 46.50 | 1181.1 | 48.38 | 1228.7 | 55.25 | 1403.4 |
| 48 | 48.00 | 1219.2 | 48.50 | 1231.9 | 50.38 | 1279.5 | 58.75 | 1492.3 |

| Nominal Pipe Size (NPS) | Class 350 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.00 | 660.4 | 26.50 | 673.1 | 27.75 | 704.9 | 29.63 | 752.5 |
| 28 | 28.00 | 711.2 | 28.50 | 723.9 | 29.75 | 755.7 | 31.63 | 803.3 |
| 30 | 30.00 | 762.0 | 30.50 | 774.7 | 31.75 | 806.5 | 33.88 | 860.4 |
| 32 | 32.00 | 812.8 | 32.50 | 825.5 | 33.88 | 860.4 | 35.88 | 911.2 |
| 34 | 34.00 | 863.6 | 34.50 | 876.3 | 35.88 | 911.2 | 37.88 | 962.0 |
| 36 | 36.00 | 914.4 | 36.50 | 927.1 | 38.13 | 968.4 | 40.38 | 1025.5 |
| 38 | 38.00 | 965.2 | 38.50 | 977.9 | 40.13 | 1019.2 | 42.38 | 1076.3 |
| 40 | 40.00 | 1016.0 | 40.50 | 1028.7 | 42.13 | 1070.0 | 44.38 | 1127.1 |
| 42 | 42.00 | 1066.8 | 42.50 | 1079.5 | 44.25 | 1124.0 | 46.63 | 1184.3 |
| 44 | 44.00 | 1117.6 | 44.50 | 1130.3 | 46.38 | 1177.9 | 49.00 | 1244.6 |
| 46 | 46.00 | 1168.4 | 46.50 | 1181.1 | 48.38 | 1228.7 | 51.00 | 1295.4 |
| 48 | 48.00 | 1219.2 | 48.50 | 1231.9 | 50.38 | 1279.5 | 53.00 | 1346.2 |
| 52 | 52.00 | 1320.8 | 52.50 | 1333.5 | 54.25 | 1378.0 | 57.38 | 1457.3 |
| 54 | 54.00 | 1371.6 | 54.50 | 1384.3 | 56.50 | 1435.1 | 59.38 | 1508.1 |
| 60 | 60.00 | 1524.0 | 60.50 | 1536.7 | 62.50 | 1587.5 | 65.38 | 1660.5 |
| 66 | 66.00 | 1676.4 | 66.50 | 1689.1 | 68.50 | 1739.9 | 72.50 | 1841.5 |

# Dimensions for Style WR/WRI per ASME B16.20 to Suit ASME B16.47 Series A or MSS-SP-44 Flanges

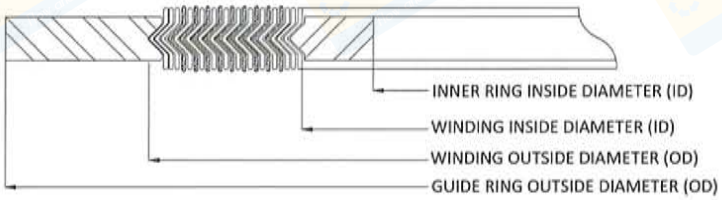



| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 22* | - | - | 22.75 | 577.9 | 24.00 | 609.6 | 26.00 | 660.4 |
| 26 | 25.75 | 654.1 | 26.50 | 673.1 | 27.75 | 704.9 | 30.50 | 774.7 |
| 28 | 27.75 | 704.9 | 28.50 | 723.9 | 29.75 | 755.7 | 32.75 | 831.9 |
| 30 | 29.75 | 755.7 | 30.50 | 774.7 | 31.75 | 806.5 | 34.75 | 882.7 |
| 32 | 31.75 | 806.5 | 32.50 | 825.5 | 33.88 | 860.4 | 37.00 | 939.8 |
| 34 | 33.75 | 857.3 | 34.50 | 876.3 | 35.88 | 911.2 | 39.00 | 990.6 |
| 36 | 35.75 | 908.1 | 36.50 | 927.1 | 38.13 | 968.4 | 41.25 | 1047.8 |
| 38 | 37.75 | 958.9 | 38.50 | 977.9 | 40.13 | 1019.2 | 43.75 | 1111.3 |
| 40 | 39.75 | 1009.7 | 40.50 | 1028.7 | 42.13 | 1070.0 | 45.75 | 1162.1 |
| 42 | 41.75 | 1060.5 | 42.50 | 1079.5 | 44.25 | 1124.0 | 48.00 | 1219.2 |
| 44 | 43.75 | 1111.3 | 44.50 | 1130.3 | 46.38 | 1177.9 | 50.25 | 1276.4 |
| 46 | 45.75 | 1162.1 | 46.50 | 1181.1 | 48.38 | 1228.7 | 52.25 | 1327.2 |
| 48 | 47.75 | 1212.9 | 48.50 | 1231.9 | 50.38 | 1279.5 | 54.50 | 1384.3 |
| 50 | 49.75 | 1263.7 | 50.50 | 1282.7 | 52.50 | 1333.5 | 56.50 | 1435.1 |
| 52 | 51.75 | 1314.5 | 52.50 | 1333.5 | 54.50 | 1384.3 | 58.75 | 1492.3 |
| 54 | 53.50 | 1358.9 | 54.50 | 1384.3 | 56.50 | 1435.1 | 61.00 | 1549.4 |
| 56 | 55.50 | 1409.7 | 56.50 | 1435.1 | 58.50 | 1485.9 | 63.25 | 1606.6 |
| 58 | 57.50 | 1460.5 | 58.50 | 1485.9 | 60.50 | 1536.7 | 65.50 | 1663.7 |
| 60 | 59.50 | 1511.3 | 60.50 | 1536.7 | 62.50 | 1587.5 | 67.50 | 1714.5 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 22* | - | - | 22.75 | 577.9 | 24.75 | 628.7 | 27.75 | 704.9 |
| 26 | 25.75 | 654.1 | 27.00 | 685.8 | 29.00 | 736.6 | 32.88 | 835.0 |
| 28 | 27.75 | 704.9 | 29.00 | 736.6 | 31.00 | 787.4 | 35.38 | 898.5 |
| 30 | 29.75 | 755.7 | 31.25 | 793.8 | 33.25 | 844.6 | 37.50 | 952.5 |
| 32 | 31.75 | 806.5 | 33.50 | 850.9 | 35.50 | 901.7 | 39.63 | 1006.5 |
| 34 | 33.75 | 857.3 | 35.50 | 901.7 | 37.50 | 952.5 | 41.63 | 1057.3 |
| 36 | 35.75 | 908.1 | 37.63 | 955.7 | 39.63 | 1006.5 | 44.00 | 1117.6 |
| 38 | 37.50 | 952.5 | 38.50 | 977.9 | 40.00 | 1016.0 | 41.50 | 1054.1 |
| 40 | 39.50 | 1003.3 | 40.25 | 1022.4 | 42.13 | 1070.0 | 43.88 | 1114.4 |
| 42 | 41.50 | 1054.1 | 42.25 | 1073.2 | 44.13 | 1120.8 | 45.88 | 1165.2 |
| 44 | 43.50 | 1104.9 | 44.50 | 1130.3 | 46.50 | 1181.1 | 48.00 | 1219.2 |
| 46 | 45.38 | 1152.7 | 46.38 | 1177.9 | 48.38 | 1228.7 | 50.13 | 1273.2 |
| 48 | 47.63 | 1209.8 | 48.63 | 1235.1 | 50.63 | 1285.9 | 52.13 | 1324.0 |
| 50 | 49.00 | 1244.6 | 51.00 | 1295.4 | 53.00 | 1346.2 | 54.25 | 1378.0 |
| 52 | 52.00 | 1320.8 | 53.00 | 1346.2 | 55.00 | 1397.0 | 56.25 | 1428.8 |
| 54 | 53.25 | 1352.6 | 55.25 | 1403.4 | 57.25 | 1454.2 | 58.75 | 1492.3 |
| 56 | 55.25 | 1403.4 | 57.25 | 1454.2 | 59.25 | 1505.0 | 60.75 | 1543.1 |
| 58 | 57.00 | 1447.8 | 59.50 | 1511.3 | 61.50 | 1562.1 | 62.75 | 1593.9 |
| 60 | 60.00 | 1524.0 | 61.50 | 1562.1 | 63.50 | 1612.9 | 64.75 | 1644.7 |

*Not listed in ASME B16.20

# Dimensions for Style WR/WRI per ASME B16.20 to Suit ASME B16.47 Series A or MSS-SP-44 Flanges

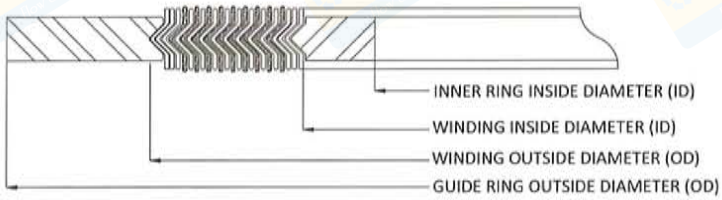



| Nominal Pipe Size (NPS) | Class 400 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| Inches | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 22* | - | - | 22.75 | 577.9 | 24.75 | 628.7 | 27.63 | 701.7 |
| 26 | 26.00 | 660.4 | 27.00 | 685.8 | 29.00 | 736.6 | 32.75 | 831.9 |
| 28 | 28.00 | 711.2 | 29.00 | 736.6 | 31.00 | 787.4 | 35.13 | 892.2 |
| 30 | 29.75 | 755.7 | 31.25 | 793.8 | 33.25 | 844.6 | 37.25 | 946.2 |
| 32 | 32.00 | 812.8 | 33.50 | 850.9 | 35.50 | 901.7 | 39.50 | 1003.3 |
| 34 | 34.00 | 863.6 | 35.50 | 901.7 | 37.50 | 952.5 | 41.50 | 1054.1 |
| 36 | 36.13 | 917.7 | 37.63 | 955.7 | 39.63 | 1006.5 | 44.00 | 1117.6 |
| 38 | 37.50 | 952.5 | 38.25 | 971.6 | 40.25 | 1022.4 | 42.25 | 1073.2 |
| 40 | 39.38 | 1000.3 | 40.38 | 1025.5 | 42.38 | 1076.3 | 44.38 | 1127.1 |
| 42 | 41.38 | 1051.1 | 42.38 | 1076.3 | 44.38 | 1127.1 | 46.38 | 1177.9 |
| 44 | 43.50 | 1104.9 | 44.50 | 1130.3 | 46.50 | 1181.1 | 48.50 | 1231.9 |
| 46 | 46.00 | 1168.4 | 47.00 | 1193.8 | 49.00 | 1244.6 | 50.75 | 1289.1 |
| 48 | 47.50 | 1206.5 | 49.00 | 1244.6 | 52.00 | 1320.8 | 53.00 | 1346.2 |
| 50 | 49.50 | 1257.3 | 51.00 | 1295.4 | 53.00 | 1346.2 | 55.25 | 1403.4 |
| 52 | 51.50 | 1308.1 | 53.00 | 1346.2 | 55.00 | 1397.0 | 57.25 | 1454.2 |
| 54 | 53.25 | 1352.6 | 55.25 | 1403.4 | 57.25 | 1454.2 | 59.75 | 1517.7 |
| 56 | 55.25 | 1403.4 | 57.25 | 1454.2 | 59.25 | 1505.0 | 61.75 | 1568.5 |
| 58 | 57.25 | 1454.2 | 59.25 | 1505.0 | 61.25 | 1555.8 | 63.75 | 1619.3 |
| 60 | 59.75 | 1517.7 | 61.75 | 1568.5 | 63.75 | 1619.3 | 66.25 | 1682.8 |

| Nominal Pipe Size (NPS) | Class 600 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| Inches | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 22* | - | - | 22.75 | 577.9 | 24.75 | 628.7 | 28.88 | 733.4 |
| 26 | 25.50 | 647.7 | 27.00 | 685.8 | 29.00 | 736.6 | 34.13 | 866.8 |
| 28 | 27.50 | 698.5 | 29.00 | 736.6 | 31.00 | 787.4 | 36.00 | 914.4 |
| 30 | 29.75 | 755.7 | 31.25 | 793.8 | 33.25 | 844.6 | 38.25 | 971.6 |
| 32 | 32.00 | 812.8 | 33.50 | 850.9 | 35.50 | 901.7 | 40.25 | 1022.4 |
| 34 | 34.00 | 863.6 | 35.50 | 901.7 | 37.50 | 952.5 | 42.25 | 1073.2 |
| 36 | 36.13 | 917.7 | 37.63 | 955.7 | 39.63 | 1006.5 | 44.50 | 1130.3 |
| 38 | 37.50 | 952.5 | 39.00 | 990.6 | 41.00 | 1041.4 | 43.50 | 1104.9 |
| 40 | 39.75 | 1009.7 | 41.25 | 1047.8 | 43.25 | 1098.6 | 45.50 | 1155.7 |
| 42 | 42.00 | 1066.8 | 43.50 | 1104.9 | 45.50 | 1155.7 | 48.00 | 1219.2 |
| 44 | 43.75 | 1111.3 | 45.75 | 1162.1 | 47.75 | 1212.9 | 50.00 | 1270.0 |
| 46 | 45.75 | 1162.1 | 47.75 | 1212.9 | 49.75 | 1263.7 | 52.25 | 1327.2 |
| 48 | 48.00 | 1219.2 | 50.00 | 1270.0 | 52.00 | 1320.8 | 54.75 | 1390.7 |
| 50 | 50.00 | 1270.0 | 52.00 | 1320.8 | 54.00 | 1371.6 | 57.00 | 1447.8 |
| 52 | 52.00 | 1320.8 | 54.00 | 1371.6 | 56.00 | 1422.4 | 59.00 | 1498.6 |
| 54 | 54.25 | 1378.0 | 56.25 | 1428.8 | 58.25 | 1479.6 | 61.25 | 1555.8 |
| 56 | 56.25 | 1428.8 | 58.25 | 1479.6 | 60.25 | 1530.4 | 63.50 | 1612.9 |
| 58 | 58.00 | 1473.2 | 60.50 | 1536.7 | 62.50 | 1587.5 | 65.50 | 1663.7 |
| 60 | 60.25 | 1530.4 | 62.75 | 1593.9 | 64.75 | 1644.7 | 68.25 | 1733.6 |

*Not listed in ASME B16.20

## Dimensions for Style WR/WRI per ASME B16.20 to Suit ASME B16.47 Series A or MSS-SP-44 Flanges




| Nominal Pipe Size (NPS) | Class 900 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID)** | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 22* | - | - | 24.25 | 616.0 | 27.00 | 685.8 | 33.00 | 838.2 |
| 26 | 26.00 | 660.4 | 27.00 | 685.8 | 29.00 | 736.6 | 34.75 | 882.7 |
| 28 | 28.00 | 711.2 | 29.00 | 736.6 | 31.00 | 787.4 | 37.25 | 946.2 |
| 30 | 30.25 | 768.4 | 31.25 | 793.8 | 33.25 | 844.6 | 39.75 | 1009.7 |
| 32 | 32.00 | 812.8 | 33.50 | 850.9 | 35.50 | 901.7 | 42.25 | 1073.2 |
| 34 | 34.00 | 863.6 | 35.50 | 901.7 | 37.50 | 952.5 | 44.75 | 1136.7 |
| 36 | 36.25 | 920.8 | 37.75 | 958.9 | 39.75 | 1009.7 | 47.25 | 1200.2 |
| 38 | 39.75 | 1009.7 | 40.75 | 1035.1 | 42.75 | 1085.9 | 47.25 | 1200.2 |
| 40 | 41.75 | 1060.5 | 43.25 | 1098.6 | 45.25 | 1149.4 | 49.25 | 1251.0 |
| 42 | 43.75 | 1111.3 | 45.25 | 1149.4 | 47.25 | 1200.2 | 51.25 | 1301.8 |
| 44 | 45.50 | 1155.7 | 47.50 | 1206.5 | 49.50 | 1257.3 | 53.88 | 1368.4 |
| 46 | 48.00 | 1219.2 | 50.00 | 1270.0 | 52.00 | 1320.8 | 56.50 | 1435.1 |
| 48 | 50.00 | 1270.0 | 52.00 | 1320.8 | 54.00 | 1371.6 | 58.50 | 1485.9 |

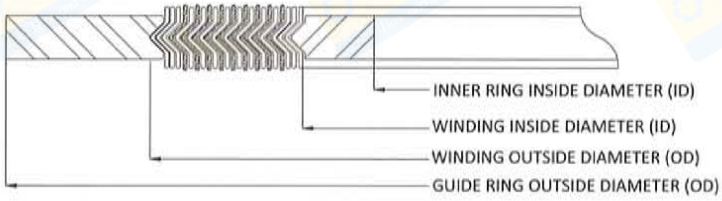
*Not listed in ASME B16.20

**Inner rings are required

### Large Spiral Wound Gasket Tolerances per ASME B16.20 to be used with ASME B16.47 Series A Flanges

- The winding thickness is ±0.005" (±0.13 mm) measured across the metallic portion of the gasket not including the filler
- The winding inside diameter
  - o NPS 26 through NPS 34 is ±1/32" (±0.8 mm)
  - o NPS 36 through NPS 60 is ± 3/64" (±1.3 mm)
- The winding outside diameter
  - o NPS 26 through 60 is ± 1/16" (1.5 mm)
- The guide ring outside diameter tolerance is ±1/32" (±0.8 mm)
- The guide ring and inner thickness shall be from 0.117" (2.97 mm) to 0.131" (3.33 mm)
- The inner ring inside diameter is: ±1/8" (±3.0 mm)
- These inner rings are suitable for use with pipe walls 0.38" (9.53 mm) or thicker

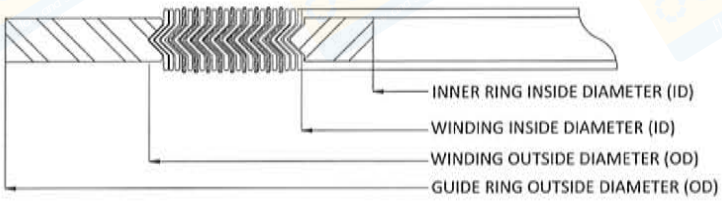
# Dimensions for Style WR/WRI per ASME B16.20 to Suit ASME B16.47 Series B or API-605 Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 25.75 | 654.05 | 26.50 | 673.1 | 27.50 | 698.5 | 28.56 | 725.5 |
| 28 | 27.75 | 704.9 | 28.50 | 723.9 | 29.50 | 749.3 | 30.56 | 776.3 |
| 30 | 29.75 | 755.7 | 30.50 | 774.7 | 31.50 | 800.1 | 32.56 | 827.1 |
| 32 | 31.75 | 806.5 | 32.50 | 825.5 | 33.50 | 850.9 | 34.69 | 881.1 |
| 34 | 33.75 | 857.3 | 34.50 | 876.3 | 35.75 | 908.1 | 36.81 | 935.0 |
| 36 | 35.75 | 908.1 | 36.50 | 927.1 | 37.75 | 958.9 | 38.88 | 987.4 |
| 38 | 37.75 | 958.9 | 38.38 | 974.7 | 39.75 | 1009.7 | 41.13 | 1044.6 |
| 40 | 39.75 | 1009.7 | 40.25 | 1022.4 | 41.88 | 1063.6 | 43.13 | 1095.4 |
| 42 | 41.75 | 1060.5 | 42.50 | 1079.5 | 43.88 | 1114.4 | 45.13 | 1146.2 |
| 44 | 43.75 | 1111.3 | 44.25 | 1124.0 | 45.88 | 1165.2 | 47.13 | 1197.0 |
| 46 | 45.75 | 1162.1 | 46.50 | 1181.1 | 48.19 | 1224.0 | 49.44 | 1255.7 |
| 48 | 47.75 | 1212.9 | 48.50 | 1231.9 | 50.00 | 1270.0 | 51.44 | 1306.5 |
| 50 | 49.75 | 1263.7 | 50.50 | 1282.7 | 52.19 | 1325.6 | 53.44 | 1357.3 |
| 52 | 51.75 | 1314.5 | 52.50 | 1333.5 | 54.19 | 1376.4 | 55.44 | 1408.1 |
| 54 | 53.75 | 1365.3 | 54.50 | 1384.3 | 56.00 | 1422.4 | 57.63 | 1463.7 |
| 56 | 56.00 | 1422.4 | 56.88 | 1444.6 | 58.19 | 1478.0 | 59.63 | 1514.5 |
| 58 | 58.19 | 1478.0 | 59.08 | 1500.6 | 60.19 | 1528.8 | 62.19 | 1579.6 |
| 60 | 60.44 | 1535.2 | 61.31 | 1557.3 | 62.44 | 1585.9 | 64.19 | 1630.4 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 25.75 | 654.05 | 26.50 | 673.1 | 28.00 | 711.2 | 30.38 | 771.5 |
| 28 | 27.75 | 704.9 | 28.50 | 723.9 | 30.00 | 762.0 | 32.50 | 825.5 |
| 30 | 29.75 | 755.7 | 30.50 | 774.7 | 32.00 | 812.8 | 34.88 | 885.8 |
| 32 | 31.75 | 806.5 | 32.50 | 825.5 | 34.00 | 863.6 | 37.00 | 939.8 |
| 34 | 33.75 | 857.3 | 34.50 | 876.3 | 36.00 | 914.4 | 39.13 | 993.8 |
| 36 | 35.75 | 908.1 | 36.50 | 927.1 | 38.00 | 965.2 | 41.25 | 1047.8 |
| 38 | 38.25 | 971.6 | 39.75 | 1009.7 | 41.25 | 1047.8 | 43.25 | 1098.6 |
| 40 | 40.25 | 1022.4 | 41.75 | 1060.5 | 43.25 | 1098.6 | 45.25 | 1149.4 |
| 42 | 42.75 | 1085.9 | 43.75 | 1111.3 | 45.25 | 1149.4 | 47.25 | 1200.2 |
| 44 | 44.25 | 1124.0 | 45.75 | 1162.1 | 47.25 | 1200.2 | 49.25 | 1251.0 |
| 46 | 46.38 | 1178.1 | 47.88 | 1216.0 | 29.38 | 746.1 | 51.88 | 1317.6 |
| 48 | 45.50 | 1155.7 | 49.75 | 1263.7 | 51.63 | 1311.3 | 53.88 | 1368.4 |
| 50 | 49.88 | 1267.0 | 51.88 | 1317.6 | 53.38 | 1355.7 | 55.88 | 1419.2 |
| 52 | 51.88 | 1317.8 | 53.88 | 1368.4 | 55.38 | 1406.5 | 57.88 | 1470.0 |
| 54 | 53.75 | 1365.3 | 55.25 | 1403.4 | 57.25 | 1454.2 | 60.25 | 1530.4 |
| 56 | 56.25 | 1428.8 | 58.25 | 1479.6 | 60.00 | 1524.0 | 62.75 | 1593.9 |
| 58 | 58.44 | 1484.4 | 60.44 | 1535.1 | 61.94 | 1573.2 | 65.19 | 1655.8 |
| 60 | 61.31 | 1557.3 | 62.56 | 1589.1 | 64.19 | 1630.4 | 67.19 | 1706.6 |

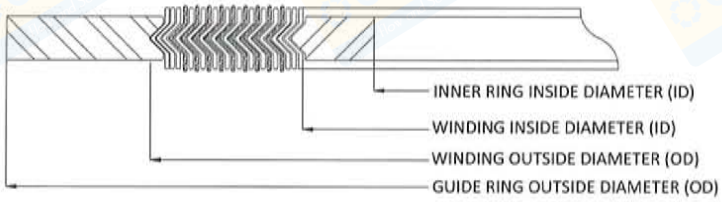
# Dimensions for Style WR/WRI per ASME B16.20 to Suit ASME B16.47 Series B or API-605 Flanges




| Nominal Pipe Size (NPS) | Class 400 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 25.75 | 654.05 | 26.25 | 666.8 | 27.50 | 698.5 | 29.38 | 746.1 |
| 28 | 27.63 | 701.8 | 28.13 | 714.4 | 29.50 | 749.3 | 31.50 | 800.1 |
| 30 | 29.63 | 752.6 | 30.13 | 765.2 | 31.75 | 806.5 | 33.75 | 857.3 |
| 32 | 31.50 | 800.1 | 32.00 | 812.8 | 33.88 | 860.4 | 35.88 | 911.2 |
| 34 | 33.50 | 850.9 | 34.13 | 866.8 | 35.88 | 911.2 | 37.88 | 962.0 |
| 36 | 35.38 | 898.7 | 36.13 | 917.6 | 38.00 | 965.2 | 40.25 | 1022.4 |
| 38 | 37.50 | 952.5 | 38.25 | 971.6 | 40.25 | 1022.4 | 42.25 | 1073.2 |
| 40 | 39.38 | 1000.3 | 40.38 | 1025.5 | 42.38 | 1076.3 | 44.38 | 1127.1 |
| 42 | 41.38 | 1051.1 | 42.38 | 1076.3 | 44.38 | 1127.1 | 46.38 | 1177.9 |
| 44 | 43.50 | 1104.9 | 44.50 | 1130.3 | 46.50 | 1181.1 | 48.50 | 1231.9 |
| 46 | 46.00 | 1168.4 | 47.00 | 1193.8 | 49.00 | 1244.6 | 50.75 | 1289.1 |
| 48 | 47.50 | 1206.5 | 49.00 | 1244.6 | 51.00 | 1295.4 | 53.00 | 1346.2 |
| 50 | 49.50 | 1257.3 | 51.00 | 1295.4 | 53.00 | 1346.2 | 55.25 | 1403.4 |
| 52 | 51.50 | 1308.1 | 53.00 | 1346.2 | 55.00 | 1397.0 | 57.25 | 1454.2 |
| 54 | 53.25 | 1352.6 | 55.25 | 1403.4 | 57.25 | 1454.2 | 59.75 | 1517.7 |
| 56 | 55.25 | 1403.4 | 57.25 | 1454.2 | 59.25 | 1505.0 | 61.75 | 1568.5 |
| 58 | 57.25 | 1454.2 | 59.25 | 1505.0 | 61.25 | 1555.8 | 63.75 | 1619.3 |
| 60 | 59.75 | 1517.7 | 61.75 | 1568.5 | 63.75 | 1619.3 | 66.25 | 1682.8 |

| Nominal Pipe Size (NPS) | Class 600 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 25.38 | 644.652 | 26.13 | 663.6 | 28.13 | 714.4 | 30.13 | 765.2 |
| 28 | 27.00 | 685.8 | 27.75 | 704.9 | 29.75 | 755.7 | 32.25 | 819.2 |
| 30 | 29.63 | 752.6 | 30.63 | 777.9 | 32.63 | 828.7 | 34.63 | 879.5 |
| 32 | 31.25 | 793.8 | 32.75 | 831.9 | 34.75 | 882.7 | 36.75 | 933.5 |
| 34 | 33.50 | 850.9 | 35.00 | 889.0 | 37.00 | 939.8 | 39.25 | 997.0 |
| 36 | 35.50 | 901.7 | 37.00 | 939.8 | 39.00 | 990.6 | 41.25 | 1047.8 |
| 38 | 37.50 | 952.5 | 39.00 | 990.6 | 41.00 | 1041.4 | 43.50 | 1104.9 |
| 40 | 39.75 | 1009.7 | 41.25 | 1047.8 | 43.25 | 1098.6 | 45.50 | 1155.7 |
| 42 | 42.00 | 1066.8 | 43.50 | 1104.9 | 45.50 | 1155.7 | 48.00 | 1219.2 |
| 44 | 43.75 | 1111.3 | 45.75 | 1162.1 | 47.75 | 1212.9 | 50.00 | 1270.0 |
| 46 | 45.75 | 1162.1 | 47.75 | 1212.9 | 49.75 | 1263.7 | 52.25 | 1327.2 |
| 48 | 48.00 | 1219.2 | 50.00 | 1270.0 | 52.00 | 1320.8 | 54.75 | 1390.7 |
| 50 | 50.00 | 1270.0 | 52.00 | 1320.8 | 54.00 | 1371.6 | 57.00 | 1447.8 |
| 52 | 52.00 | 1320.8 | 54.00 | 1371.6 | 56.00 | 1422.4 | 59.00 | 1498.6 |
| 54 | 54.25 | 1378.0 | 56.25 | 1428.8 | 58.25 | 1479.6 | 61.25 | 1555.8 |
| 56 | 56.25 | 1428.8 | 58.25 | 1479.6 | 60.25 | 1530.4 | 63.50 | 1612.9 |
| 58 | 58.00 | 1473.2 | 60.50 | 1536.7 | 62.50 | 1587.5 | 65.50 | 1663.7 |
| 60 | 60.25 | 1530.4 | 62.75 | 1593.9 | 64.75 | 1644.7 | 68.25 | 1733.6 |

# Dimensions for Style WR/WRI per ASME B16.20 to Suit ASME B16.47 Series B or API-605 Flanges



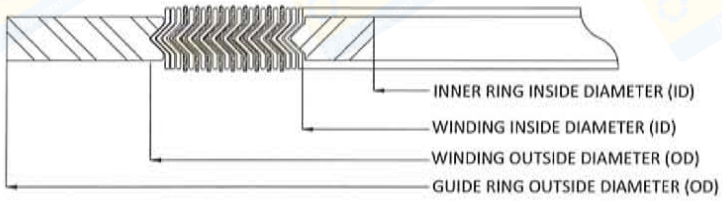

| Nominal Pipe Size (NPS) | Class 900 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.25 | 666.75 | 27.25 | 692.2 | 29.50 | 749.3 | 33.00 | 838.2 |
| 28 | 28.25 | 717.6 | 29.25 | 743.0 | 31.50 | 800.1 | 35.50 | 901.7 |
| 30 | 30.75 | 781.1 | 31.75 | 806.5 | 33.75 | 857.3 | 37.75 | 958.9 |
| 32 | 33.00 | 838.2 | 34.00 | 863.6 | 36.00 | 914.4 | 40.00 | 1016.0 |
| 34 | 35.25 | 895.4 | 36.25 | 920.8 | 38.25 | 971.6 | 42.25 | 1073.2 |
| 36 | 36.25 | 920.8 | 37.25 | 946.2 | 39.25 | 997.0 | 44.25 | 1124.0 |
| 38 | 39.75 | 1009.7 | 40.75 | 1035.1 | 42.75 | 1085.9 | 47.25 | 1200.2 |
| 40 | 41.75 | 1060.5 | 43.25 | 1098.6 | 45.25 | 1149.4 | 49.25 | 1251.0 |
| 42 | 43.75 | 1111.3 | 45.25 | 1149.4 | 47.25 | 1200.2 | 51.25 | 1301.8 |
| 44 | 45.50 | 1155.7 | 47.50 | 1206.5 | 49.50 | 1257.3 | 53.88 | 1368.4 |
| 46 | 48.00 | 1219.2 | 50.00 | 1270.0 | 52.00 | 1320.8 | 56.50 | 1435.1 |
| 48 | 50.00 | 1270.0 | 52.00 | 1320.8 | 54.00 | 1371.6 | 58.50 | 1485.9 |

* Inner rings are required

## Large Spiral Wound Gasket Tolerances Per ASME B16.20 to Be Used With ASME B16.47 Series B Flanges

- The winding thickness is ±0.005" (±0.13 mm) measured across the metallic portion of the gasket, not including the filler
- The winding inside diameter
  - o NPS 26 through NPS 34 NPS is ±1/32" (±0.8 mm)
  - o NPS 36 through NPS 60 NPS is ± 3/64" (±1.3 mm)
- The winding outside diameter
  - o NPS 26 through 60 NPS is ± 1/16" (1.5 mm)
- The guide ring outside diameter tolerance is ±1/32" (±0.8 mm)
- The guide and inner ring thickness shall be from 0.117" (2.97 mm) to 0.131" (3.33 mm)
- The inner ring inside diameter is: ±1/8" (±3.0 mm)
- These inner rings are suitable for use with pipe walls 0.38" (9.53 mm) or thicker

# Dimensions for Style WR/WRI to Suit ASME/ANSI B16.5 and Slip-On Flanges



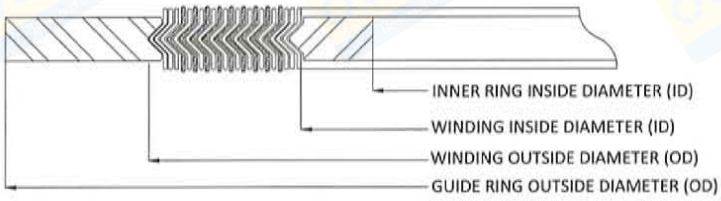

| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4 | - | - | 0.56 | 14.3 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.3 | 0.94 | 23.8 | 1.25 | 31.8 | 1.88 | 47.6 |
| 3/4 | 0.81 | 20.6 | 1.19 | 30.2 | 1.56 | 39.7 | 2.25 | 57.2 |
| 1 | 1.06 | 27.0 | 1.44 | 36.5 | 1.88 | 47.6 | 2.63 | 66.7 |
| 1 1/4 | 1.38 | 34.9 | 1.88 | 47.6 | 2.38 | 60.3 | 3.00 | 76.2 |
| 1 1/2 | 1.63 | 41.3 | 2.13 | 54.0 | 2.75 | 69.9 | 3.38 | 85.7 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4 | - | - | 0.56 | 14.3 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.3 | 0.94 | 23.8 | 1.25 | 31.8 | 2.13 | 54.0 |
| 3/4 | 0.81 | 20.6 | 1.19 | 30.2 | 1.56 | 39.7 | 2.63 | 66.7 |
| 1 | 1.06 | 27.0 | 1.44 | 36.5 | 1.88 | 47.6 | 2.88 | 73.0 |
| 1 1/4 | 1.38 | 34.9 | 1.88 | 47.6 | 2.38 | 60.3 | 3.25 | 82.6 |
| 1 1/2 | 1.63 | 41.3 | 2.13 | 54.0 | 2.75 | 69.9 | 3.75 | 95.3 |

| Nominal Pipe Size (NPS) | Class 400 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4 | - | - | 0.56 | 14.3 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.3 | 0.94 | 23.8 | 1.25 | 31.8 | 2.13 | 54.0 |
| 3/4 | 0.81 | 20.6 | 1.19 | 30.2 | 1.56 | 39.7 | 2.63 | 66.7 |
| 1 | 1.06 | 27.0 | 1.44 | 36.5 | 1.88 | 47.6 | 2.88 | 73.0 |
| 1 1/4 | 1.38 | 34.9 | 1.88 | 47.6 | 2.38 | 60.3 | 3.25 | 82.6 |
| 1 1/2 | 1.63 | 41.3 | 2.13 | 54.0 | 2.75 | 69.9 | 3.75 | 95.3 |

| Nominal Pipe Size (NPS) | Class 600 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/4 | - | - | 0.56 | 14.3 | 0.88 | 22.2 | 1.75 | 44.5 |
| 1/2 | 0.56 | 14.3 | 0.94 | 23.8 | 1.25 | 31.8 | 2.13 | 54.0 |
| 3/4 | 0.81 | 20.6 | 1.19 | 30.2 | 1.56 | 39.7 | 2.63 | 66.7 |
| 1 | 1.06 | 27.0 | 1.44 | 36.5 | 1.88 | 47.6 | 2.88 | 73.0 |
| 1 1/4 | 1.38 | 34.9 | 1.88 | 47.6 | 2.38 | 60.3 | 3.25 | 82.6 |
| 1 1/2 | 1.63 | 41.3 | 2.13 | 54.0 | 2.75 | 69.9 | 3.75 | 95.3 |

# Dimensions for Style WR/WRI to Suit ASME/ANSI B16.5 and Slip-On Flanges

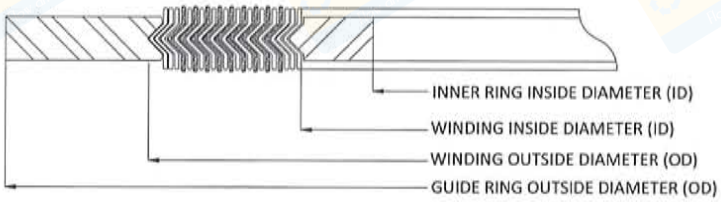



| Nominal Pipe Size (NPS) | Class 900 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | 0.56 | 14.3 | 0.94 | 23.8 | 1.25 | 31.8 | 2.50 | 63.5 |
| 3/4 | 0.81 | 20.6 | 1.19 | 30.2 | 1.56 | 39.7 | 2.75 | 69.9 |
| 1 | 1.06 | 27.0 | 1.44 | 36.5 | 1.88 | 47.6 | 3.13 | 79.4 |
| 1 1/4 | 1.38 | 34.9 | 1.88 | 47.6 | 2.38 | 60.3 | 3.50 | 88.9 |
| 1 1/2 | 1.63 | 41.3 | 2.13 | 54.0 | 2.75 | 69.9 | 3.88 | 98.4 |

| Nominal Pipe Size (NPS) | Class 1500 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | 0.56 | 14.3 | 0.94 | 23.8 | 1.25 | 31.8 | 2.50 | 63.5 |
| 3/4 | 0.81 | 20.6 | 1.19 | 30.2 | 1.56 | 39.7 | 2.75 | 69.9 |
| 1 | 1.06 | 27.0 | 1.44 | 36.5 | 1.88 | 47.6 | 3.13 | 79.4 |
| 1 1/4 | 1.38 | 34.9 | 1.88 | 47.6 | 2.38 | 60.3 | 3.50 | 88.9 |
| 1 1/2 | 1.63 | 41.3 | 2.13 | 54.0 | 2.75 | 69.9 | 3.88 | 98.4 |

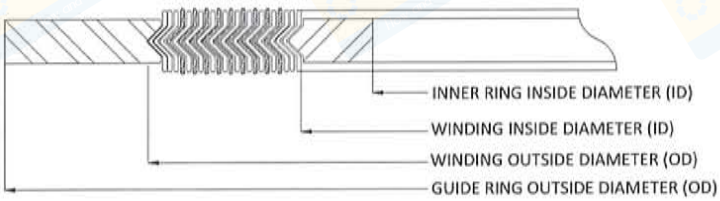
Standard spiral wound gasket dimensions are not compatible with slip-on flanges, threaded flange, or lap joint flanges in certain sizes due to the larger bore on slip-on flanges.

# Dimensions for Style WR/WRI to Suit Type A and B Flange Facings per EN 1514-2 (Inches)



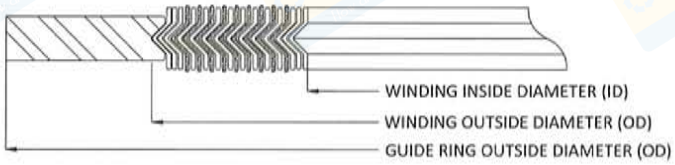

| DN | Inner ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | PN10, PN25, PN40 | PN63, PN100, PN160 | PN10 | PN25 | PN40 | PN63 | PN100 | PN160 |
| mm | Inches | Inches | Inches | Inches | Inches | | | | | |
| 10 | 0.709 | 0.945 | 1.339 | 1.339 | 1.811 | | | 2.205 | | |
| 15 | 0.906 | 1.142 | 1.535 | 1.535 | 2.008 | | | 2.402 | | |
| 20 | 1.102 | 1.339 | 1.811 | - | 2.402 | | | - | | |
| 25 | 1.378 | 1.614 | 2.087 | 2.087 | 2.795 | | | 3.228 | | |
| 32 | 1.693 | 1.929 | 2.402 | - | 3.228 | | | - | | |
| 40 | 1.969 | 2.205 | 2.677 | 2.677 | 3.622 | | | 4.055 | | |
| 50 | 2.402 | 2.756 | 3.386 | 3.386 | 4.213 | | | 4.449 | 4.685 | |
| 65 | 3.031 | 3.386 | 4.016 | 4.173 | 5.000 | | | 5.394 | 5.630 | |
| 80 | 3.543 | 3.898 | 4.528 | 4.685 | 5.591 | | | 5.827 | 6.063 | |
| 100 | 4.528 | 5.000 | 5.630 | 5.787 | 6.378 | 6.614 | | 6.850 | 7.087 | |
| 125 | 5.512 | 5.984 | 6.772 | 6.929 | 7.559 | 7.638 | | 8.268 | 8.543 | |
| 150 | 6.575 | 7.047 | 7.835 | 7.992 | 8.543 | 8.819 | | 9.724 | 10.118 | |
| 200 | 8.504 | 8.976 | 9.764 | 9.921 | 10.709 | 11.181 | 11.417 | 12.165 | 12.756 | |
| 250 | 10.512 | 10.984 | 11.929 | 12.087 | 12.874 | 13.386 | 13.858 | 14.331 | 15.394 | 15.276 |
| 300 | 12.520 | 12.992 | 13.937 | 14.094 | 14.842 | 15.748 | 16.417 | 16.693 | 18.031 | 18.031 |
| 350 | 14.173 | 14.803 | 15.748 | 15.905 | 17.205 | 17.992 | 18.661 | 19.134 | 20.157 | - |
| 400 | 16.142 | 16.614 | 17.717 | 17.953 | 19.213 | 20.236 | 21.496 | 21.378 | 22.520 | - |
| 500 | 20.079 | 20.551 | 21.654 | 21.890 | 23.346 | 24.567 | 24.724 | 25.866 | 27.716 | - |
| 600 | 24.016 | 24.488 | 25.591 | 25.827 | 27.362 | 28.779 | 29.409 | 30.079 | 32.008 | - |
| 700 | 27.953 | 28.425 | 29.764 | 30.000 | 31.890 | 32.795 | 33.543 | 34.606 | 37.402 | - |
| 800 | 31.890 | 32.677 | 34.016 | 34.252 | 36.102 | 37.087 | 38.346 | 38.898 | - | - |
| 900 | 35.827 | 36.614 | 37.953 | 38.189 | 40.039 | 41.024 | 42.677 | 43.622 | - | - |
| 1000 | 39.764 | 40.551 | 42.283 | 42.520 | 44.252 | 45.433 | 47.008 | - | - | - |

# Dimensions for Style WR/WRI to Suit Type A and B Flange Facings per EN 1514-2 (Millimeters)



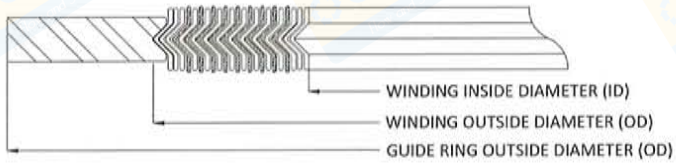

| DN | Inner ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | PN10, PN25, PN40 | PN63, PN100, PN160 | PN10 | PN25 | PN40 | PN63 | PN100 | PN160 |
| mm | mm | mm | mm | mm | mm | | | | | |
| 10 | 18 | 24 | 34 | 34 | 46 | | | 56 | | |
| 15 | 23 | 29 | 39 | 39 | 51 | | | 61 | | |
| 20 | 28 | 34 | 46 | - | 61 | | | - | | |
| 25 | 35 | 41 | 53 | 53 | 71 | | | 82 | | |
| 32 | 43 | 49 | 61 | - | 82 | | | - | | |
| 40 | 50 | 56 | 68 | 68 | 92 | | | 103 | | |
| 50 | 61 | 70 | 86 | 86 | 107 | | | 113 | 119 | |
| 65 | 77 | 86 | 102 | 106 | 127 | | | 137 | 143 | |
| 80 | 90 | 99 | 115 | 119 | 142 | | | 148 | 154 | |
| 100 | 115 | 127 | 143 | 147 | 162 | 168 | | 174 | 180 | |
| 125 | 140 | 152 | 172 | 176 | 192 | 194 | | 210 | 217 | |
| 150 | 167 | 179 | 199 | 203 | 217 | 224 | | 247 | 257 | |
| 200 | 216 | 228 | 248 | 252 | 272 | 284 | 290 | 309 | 324 | |
| 250 | 267 | 279 | 303 | 307 | 327 | 340 | 352 | 364 | 391 | 388 |
| 300 | 318 | 330 | 354 | 358 | 377 | 400 | 417 | 424 | 458 | 458 |
| 350 | 360 | 376 | 400 | 404 | 437 | 457 | 474 | 486 | 512 | - |
| 400 | 410 | 422 | 450 | 456 | 488 | 514 | 546 | 543 | 572 | - |
| 500 | 510 | 522 | 550 | 556 | 593 | 624 | 628 | 657 | 704 | - |
| 600 | 610 | 622 | 650 | 656 | 695 | 731 | 747 | 764 | 813 | - |
| 700 | 710 | 722 | 756 | 762 | 810 | 833 | 852 | 879 | 950 | - |
| 800 | 810 | 830 | 864 | 870 | 917 | 942 | 974 | 988 | - | - |
| 900 | 910 | 930 | 964 | 970 | 1017 | 1042 | 1084 | 1108 | - | - |
| 1000 | 1010 | 1030 | 1074 | 1080 | 1124 | 1154 | 1194 | - | - | - |

# Dimensions for Style WR to Suit British Standard BS 10 Welded Neck & Slip-On Flanges Table D and E (Millimeters)



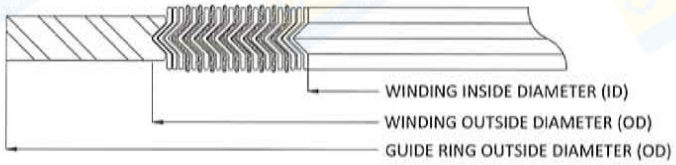

| Nominal Pipe Size (NPS) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | |
|---|---|---|---|---|
| | | | TABLE D | TABLE E |
| 1/2 | 26.2 | 37.3 | 54.0 | 54.0 |
| 3/4 | 31.8 | 42.9 | 60.3 | 60.3 |
| 1 | 39.7 | 52.4 | 69.9 | 69.9 |
| 1 1/4 | 47.6 | 60.3 | 74.6 | 74.6 |
| 1 1/2 | 54.0 | 66.7 | 85.8 | 85.8 |
| 2 | 66.7 | 79.4 | 98.5 | 98.5 |
| 2 1/2 | 82.6 | 98.5 | 111.2 | 111.2 |
| 3 | 96.9 | 112.8 | 130.2 | 130.2 |
| 3 1/2 | 109.6 | 125.5 | 149.3 | 149.3 |
| 4 | 123.9 | 139.7 | 161.9 | 161.9 |
| 4 1/2 | 136.6 | 152.4 | 174.6 | 174.6 |
| 5 | 149.2 | 165.1 | 193.6 | 193.6 |
| 6 | 174.6 | 190.5 | 219.0 | 215.9 |
| 7 | 200.0 | 219.0 | 244.5 | 241.3 |
| 8 | 225.4 | 244.5 | 276.2 | 273.0 |
| 9 | 250.8 | 269.9 | 308.0 | 304.8 |
| 10 | 276.3 | 295.3 | 336.6 | 336.6 |
| 11 | 301.6 | 320.7 | 362.0 | 362.0 |
| 12 | 327.0 | 349.3 | 387.4 | 384.2 |
| 13 | 368.3 | 390.6 | 419.1 | 415.9 |
| 14 | 393.7 | 416.0 | 447.7 | 447.7 |
| 15 | 419.1 | 441.3 | 473.0 | 473.0 |
| 16 | 444.5 | 466.7 | 498.5 | 498.5 |
| 17 | 473.0 | 498.5 | 530.3 | 527.0 |
| 18 | 498.5 | 523.9 | 562.0 | 562.0 |
| 19 | 523.9 | 549.3 | 587.4 | 587.4 |
| 20 | 549.3 | 574.7 | 619.2 | 619.2 |
| 21 | 574.7 | 603.3 | 651.0 | 647.7 |
| 22 | 600.0 | 628.7 | 673.1 | 673.1 |
| 23 | 625.5 | 654.0 | 698.5 | 698.5 |
| 24 | 650.9 | 679.5 | 730.3 | 728.7 |

# Dimensions for Style WR to Suit British Standard BS 10 Welded Neck & Slip-On Flanges Table F, H, J, K, & R (Millimeters)



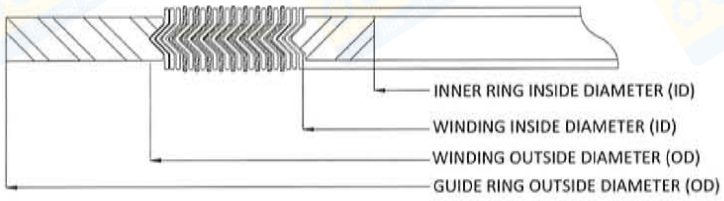

| Nominal Pipe Size (NPS) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | | | | |
|---|---|---|---|---|---|---|---|
| | | | TABLE F | TABLE H | TABLE J | TABLE K | TABLE R |
| 1/2 | 26.2 | 38.9 | 54.0 | 66.7 | 66.7 | 66.7 | 66.7 |
| 3/4 | 31.8 | 44.5 | 60.3 | 66.7 | 66.7 | 66.7 | 66.7 |
| 1 | 39.7 | 55.6 | 71.5 | 71.5 | 71.5 | 79.4 | 79.4 |
| 1 1/4 | 47.6 | 63.5 | 82.6 | 82.6 | 82.6 | 82.6 | 82.6 |
| 1 1/2 | 54.0 | 69.9 | 88.9 | 88.9 | 88.9 | 95.3 | 95.3 |
| 2 | 66.7 | 82.6 | 111.2 | 111.2 | 108.0 | 111.2 | 111.2 |
| 2 1/2 | 82.6 | 101.6 | 130.2 | 130.2 | 127.0 | 127.0 | 127.0 |
| 3 | 96.9 | 115.9 | 149.3 | 149.3 | 146.0 | 146.0 | 146.0 |
| 3 1/2 | 109.6 | 128.6 | 162.0 | 162.0 | 158.9 | 162.0 | 162.0 |
| 4 | 123.9 | 142.9 | 174.7 | 174.7 | 171.5 | 174.7 | 174.7 |
| 4 1/2 | 136.6 | 158.9 | 190.5 | 190.5 | 187.4 | 187.4 | 187.4 |
| 5 | 149.2 | 171.5 | 215.9 | 215.9 | 212.8 | 212.8 | 212.8 |
| 6 | 174.6 | 196.9 | 241.3 | 241.3 | 238.2 | 238.2 | 238.2 |
| 7 | 200.0 | 225.4 | 273.0 | 273.0 | 269.9 | 266.7 | 266.7 |
| 8 | 225.4 | 250.9 | 304.8 | 304.8 | 301.7 | 292.1 | 298.5 |
| 9 | 250.8 | 276.3 | 333.4 | 333.4 | 330.2 | 330.2 | 330.2 |
| 10 | 279.4 | 304.8 | 358.8 | 358.8 | 355.6 | 355.6 | 362.0 |
| 11 | 304.8 | 330.2 | 384.2 | 384.2 | 381.0 | 384.2 | 403.3 |
| 12 | 330.2 | 358.7 | 416.0 | 416.0 | 412.8 | 403.3 | 428.7 |
| 13 | 362.0 | 390.6 | 444.5 | 444.5 | 441.4 | 451.0 | 463.6 |
| 14 | 387.4 | 415.9 | 470.0 | 470.0 | 466.8 | 476.3 | 495.3 |
| 15 | 412.8 | 441.4 | 495.3 | 495.3 | 492.2 | 508.0 | 520.7 |
| 16 | 444.5 | 476.3 | 527.0 | 527.0 | 523.9 | 533.4 | 552.5 |
| 17 | 469.9 | 504.9 | 558.8 | 558.8 | 555.7 | 565.2 | 577.9 |
| 18 | 495.3 | 530.3 | 581.0 | 581.0 | 577.9 | 619.2 | 638.2 |
| 19 | 523.9 | 562.0 | 612.3 | 612.3 | 609.6 | - | - |
| 20 | 549.3 | 587.4 | 644.6 | 644.6 | 641.4 | 673.1 | 692.2 |
| 21 | 574.7 | 619.2 | 670.0 | 670.0 | 666.8 | - | - |
| 22 | 600.0 | 644.5 | 695.4 | 695.4 | 692.2 | 730.3 | 755.7 |
| 23 | 625.5 | 670.0 | 723.9 | 723.9 | 720.8 | - | - |
| 24 | 651.0 | 695.4 | 749.3 | 749.3 | 746.1 | - | - |

# Dimensions for Style WR to Suit British Standard BS 10 Welded Neck & Slip-On Flanges Table S (Millimeters)




| Nominal Pipe Size (NPS) | BS 10: 1931 | | BS 10: 1962 | | Guide Ring Outside Diameter (OD) |
|---|---|---|---|---|---|
| | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | |
| 1/2 | 19.1 | 31.8 | 19.1 | 31.8 | 69.9 |
| 3/4 | 25.4 | 39.7 | 25.4 | 39.7 | 69.9 |
| 1 | 31.8 | 47.6 | 31.8 | 47.6 | 82.6 |
| 1 1/4 | 38.1 | 55.6 | 38.1 | 55.6 | 88.9 |
| 1 1/2 | 44.5 | 63.5 | 44.5 | 63.5 | 101.6 |
| 2 | 57.2 | 76.2 | 57.2 | 79.4 | 114.3 |
| 2 1/2 | 69.9 | 88.9 | 73.0 | 95.3 | 127.0 |
| 3 | 82.6 | 101.6 | 85.7 | 108.0 | 142.9 |
| 3 1/2 | 95.3 | 114.3 | 98.4 | 120.7 | 168.3 |
| 4 | 108.0 | 127.0 | 111.1 | 136.5 | 177.8 |
| 4 1/2 | 120.7 | 139.7 | 123.8 | 149.2 | 190.5 |
| 5 | 133.4 | 152.4 | 136.5 | 161.9 | 212.7 |
| 6 | 158.8 | 177.8 | 161.9 | 187.3 | 247.7 |
| 7 | 187.3 | 209.6 | 187.3 | 219.1 | 288.9 |
| 8 | 212.7 | 235.0 | 212.7 | 244.5 | 323.9 |
| 9 | 238.1 | 260.4 | 241.3 | 273.1 | 358.8 |
| 10 | 263.5 | 285.8 | 266.7 | 301.6 | 393.7 |
| 11 (12) 3/4 O/D Pipe) | 288.9 | 317.5 | 292.1 | 327.0 | 435.0 |
| 12 (14) 3/4 O/D Pipe) | 314.3 | 346.1 | 320.7 | 355.6 | 469.9 |
| 13 (15) 3/4 O/D Pipe) | 339.7 | 371.5 | 346.1 | 384.2 | 501.7 |
| 14 (16) 3/4 O/D Pipe) | 365.1 | 400.1 | 371.5 | 409.6 | 539.8 |
| 15 (17) 3/4 O/D Pipe) | 390.5 | 428.6 | 400.1 | 438.2 | 581.0 |
| 16 (18) 3/4 O/D Pipe) | 415.9 | 454.0 | 425.5 | 466.7 | 616.0 |

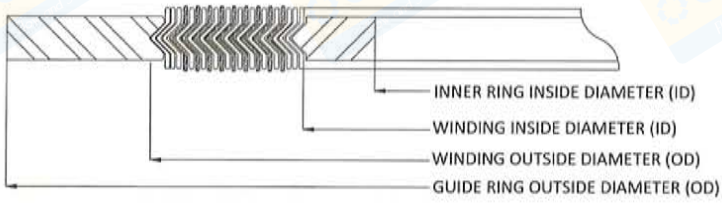
# Dimensions for Style WR/WRI per British BS 3381 to Suit BS 1560 and ASME/ANSI B16.5 Flanges (Millimeters)




| Nominal Pipe Size (NPS) | Class 150 | | | |
|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 14.3 | 18.7 | 32.2 | 47.6 |
| 3/4 | 20.6 | 26.6 | 40.1 | 57.2 |
| 1 | 27.0 | 32.9 | 48.0 | 66.7 |
| 1 1/4 | 34.9 | 45.6 | 60.7 | 76.2 |
| 1 1/2 | 41.3 | 53.6 | 70.3 | 85.7 |
| 2 | 52.4 | 69.5 | 86.1 | 104.8 |
| 2 1/2 | 63.5 | 82.2 | 98.8 | 123.8 |
| 3 | 77.8 | 101.2 | 121.1 | 136.5 |
| 4 | 103.2 | 126.6 | 149.6 | 174.6 |
| 5 | 128.5 | 153.6 | 178.2 | 196.9 |
| 6 | 154.0 | 180.6 | 210.0 | 222.3 |
| 8 | 203.2 | 231.4 | 263.9 | 279.4 |
| 10 | 254.0 | 286.9 | 317.9 | 339.7 |
| 12 | 303.2 | 339.3 | 375.1 | 409.6 |
| 14 | 342.9 | 371.1 | 406.8 | 450.9 |
| 16 | 393.7 | 421.9 | 464.0 | 514.4 |
| 18 | 444.5 | 475.9 | 527.5 | 549.3 |
| 20 | 495.3 | 526.7 | 578.3 | 606.4 |
| 24 | 596.9 | 631.4 | 686.2 | 717.6 |

| Nominal Pipe Size (NPS) | Class 300 | | | |
|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 14.3 | 32.2 | 18.7 | 54.0 |
| 3/4 | 20.6 | 40.1 | 25.0 | 66.7 |
| 1 | 27.0 | 48.0 | 31.4 | 73.0 |
| 1 1/4 | 34.9 | 60.7 | 44.1 | 82.6 |
| 1 1/2 | 41.3 | 70.3 | 50.4 | 95.3 |
| 2 | 52.4 | 86.1 | 66.3 | 111.1 |
| 2 1/2 | 63.5 | 98.8 | 79.0 | 130.2 |
| 3 | 77.8 | 121.1 | 94.9 | 149.2 |
| 4 | 103.2 | 149.6 | 120.3 | 181.0 |
| 5 | 128.5 | 178.2 | 147.2 | 215.9 |
| 6 | 154.0 | 210.0 | 174.2 | 250.8 |
| 8 | 203.2 | 263.9 | 225.0 | 308.0 |
| 10 | 254.0 | 317.9 | 280.6 | 362.0 |
| 12 | 303.2 | 375.1 | 333.0 | 422.3 |
| 14 | 342.9 | 406.8 | 364.7 | 485.8 |
| 16 | 393.7 | 464.0 | 415.5 | 539.8 |
| 18 | 444.5 | 527.5 | 469.5 | 596.9 |
| 20 | 495.3 | 578.3 | 520.3 | 654.1 |
| 24 | 596.9 | 686.2 | 625.1 | 774.7 |

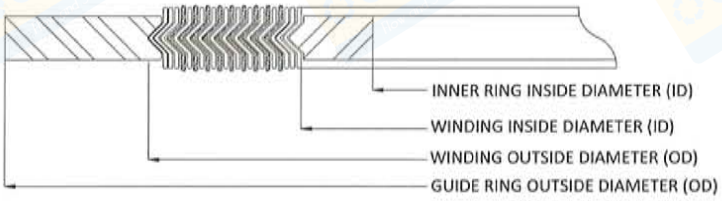
# Dimensions for Style WR/WRI per British BS 3381 to Suit BS 1560 and ASME/ANSI B16.5 Flanges (Millimeters)




| Nominal Pipe Size (NPS) | Class 600 | | | |
|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 14.3 | 18.7 | 32.2 | 54.0 |
| 3/4 | 20.6 | 25.0 | 40.1 | 66.7 |
| 1 | 27.0 | 31.4 | 48.0 | 73.0 |
| 1 1/4 | 34.9 | 44.1 | 60.7 | 82.6 |
| 1 1/2 | 41.3 | 50.4 | 70.3 | 95.3 |
| 2 | 52.4 | 66.3 | 86.1 | 111.1 |
| 2 1/2 | 63.5 | 79.0 | 98.8 | 130.2 |
| 3 | 77.8 | 94.9 | 121.1 | 149.2 |
| 4 | 103.2 | 120.3 | 149.6 | 193.7 |
| 5 | 128.5 | 147.2 | 178.2 | 241.3 |
| 6 | 154.0 | 174.2 | 210.0 | 266.7 |
| 8 | 203.2 | 225.0 | 263.9 | 320.7 |
| 10 | 254.0 | 280.6 | 317.9 | 400.1 |
| 12 | 303.2 | 333.0 | 375.1 | 457.2 |
| 14 | 342.9 | 364.7 | 406.8 | 492.1 |
| 16 | 393.7 | 415.5 | 464.0 | 565.2 |
| 18 | 444.5 | 469.5 | 527.5 | 612.8 |
| 20 | 495.3 | 520.3 | 578.3 | 682.6 |
| 24 | 596.9 | 625.1 | 686.2 | 790.6 |

| Nominal Pipe Size (NPS) | Class 900 | | | |
|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 14.3 | 18.7 | 32.2 | 63.5 |
| 3/4 | 20.6 | 25.0 | 40.1 | 69.9 |
| 1 | 27.0 | 31.4 | 48.0 | 79.4 |
| 1 1/4 | 34.9 | 44.1 | 60.7 | 88.9 |
| 1 1/2 | 41.3 | 50.4 | 70.3 | 98.4 |
| 2 | 52.4 | 66.3 | 86.1 | 142.9 |
| 2 1/2 | 63.5 | 79.0 | 98.8 | 165.1 |
| 3 | 77.8 | 94.9 | 121.1 | 168.3 |
| 4 | 103.2 | 120.3 | 149.6 | 206.4 |
| 5 | 128.5 | 147.2 | 178.2 | 247.7 |
| 6 | 154.0 | 174.2 | 210.0 | 288.9 |
| 8 | 203.2 | 225.0 | 263.9 | 358.8 |
| 10 | 254.0 | 280.6 | 317.9 | 435.0 |
| 12 | 303.2 | 333.0 | 375.1 | 498.5 |
| 14 | 342.9 | 364.7 | 406.8 | 520.7 |
| 16 | 393.7 | 415.5 | 464.0 | 574.7 |
| 18 | 444.5 | 469.5 | 527.5 | 638.2 |
| 20 | 495.3 | 520.3 | 578.3 | 698.5 |
| 24 | 596.9 | 625.1 | 686.2 | 838.2 |

# Dimensions for Style WR/WRI per British BS 3381 to Suit BS 1560 and ASME/ANSI B16.5 Flanges (Millimeters)

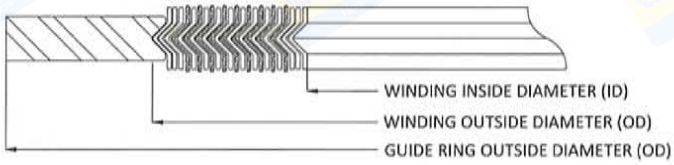



| Nominal Pipe Size (NPS) | Class 1500 | | | |
|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 14.3 | 18.7 | 32.2 | 63.5 |
| 3/4 | 20.6 | 25.0 | 40.1 | 69.9 |
| 1 | 27.0 | 31.4 | 48.0 | 79.4 |
| 1 1/4 | 34.9 | 44.1 | 60.7 | 88.9 |
| 1 1/2 | 41.3 | 50.4 | 70.3 | 98.4 |
| 2 | 52.4 | 66.3 | 86.1 | 142.9 |
| 2 1/2 | 63.5 | 79.0 | 98.8 | 165.1 |
| 3 | 77.8 | 94.9 | 121.1 | 174.6 |
| 4 | 103.2 | 120.3 | 149.6 | 209.6 |
| 5 | 128.5 | 147.2 | 178.2 | 254.0 |
| 6 | 154.0 | 174.2 | 210.0 | 282.6 |
| 8 | 203.2 | 225.0 | 263.9 | 352.4 |
| 10 | 254.0 | 280.6 | 317.9 | 435.0 |
| 12 | 303.2 | 333.0 | 375.1 | 520.7 |
| 14 | 342.9 | 364.7 | 406.8 | 577.9 |
| 16 | 393.7 | 415.5 | 464.0 | 641.4 |
| 18 | 444.5 | 469.5 | 527.5 | 704.9 |
| 20 | 495.3 | 520.3 | 578.3 | 755.7 |
| 24 | 596.9 | 625.1 | 686.2 | 901.7 |

| Nominal Pipe Size (NPS) | Class 2500 | | | |
|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 14.3 | 18.7 | 32.2 | 69.9 |
| 3/4 | 20.6 | 25.0 | 40.1 | 76.2 |
| 1 | 27.0 | 31.4 | 48.0 | 85.7 |
| 1 1/4 | 34.9 | 39.3 | 60.7 | 104.8 |
| 1 1/2 | 41.3 | 47.2 | 70.3 | 117.5 |
| 2 | 52.4 | 58.3 | 86.1 | 146.1 |
| 2 1/2 | 63.5 | 69.5 | 98.8 | 168.3 |
| 3 | 77.8 | 91.7 | 121.1 | 196.9 |
| 4 | 103.2 | 117.1 | 149.6 | 235.0 |
| 5 | 128.5 | 142.5 | 178.2 | 279.4 |
| 6 | 154.0 | 171.1 | 210.0 | 317.5 |
| 8 | 203.2 | 215.5 | 263.9 | 387.4 |
| 10 | 254.0 | 269.5 | 317.9 | 476.3 |
| 12 | 303.2 | 323.5 | 375.1 | 549.6 |

# Dimensions for Style WR to Suit French Standard NF-M-87621

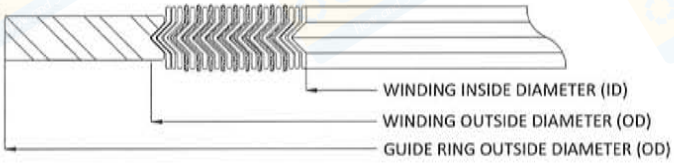
## (Millimeters)




| Nominal Pipe Size (NPS) | Class 150 | | | Class 300 | | | Class 600 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 19 | 29 | 47 | 19 | 29 | 54 | 19 | 29 | 54 |
| 3/4 | 25 | 37 | 57 | 25 | 37 | 66 | 25 | 37 | 66 |
| 1 | 32 | 44 | 66 | 32 | 44 | 73 | 32 | 44 | 73 |
| 1 1/4 | 48 | 57 | 76 | 48 | 57 | 82 | 48 | 57 | 82 |
| 1 1/2 | 54 | 67 | 85 | 54 | 67 | 95 | 54 | 67 | 95 |
| 2 | 70 | 82 | 104 | 70 | 82 | 111 | 70 | 82 | 111 |
| 2 1/2 | 83 | 95 | 124 | | 95 | 130 | 83 | 95 | 130 |
| 3 | 102 | 117 | 136 | 102 | 117 | 149 | 102 | 117 | 149 |
| 4 | 127 | 146 | 174 | 127 | 146 | 181 | 120 | 146 | 193 |
| 5 | 156 | 176 | 197 | 156 | 176 | 216 | 148 | 176 | 241 |
| 6 | 183 | 206 | 222 | 183 | 206 | 251 | 175 | 206 | 266 |
| 8 | 233 | 260 | 279 | 233 | 260 | 308 | 225 | 260 | 320 |
| 10 | 287 | 314 | 339 | 287 | 314 | 362 | 275 | 314 | 400 |
| 12 | 340 | 371 | 409 | 340 | 371 | 422 | 327 | 371 | 457 |
| 14 | 372 | 403 | 451 | 372 | 403 | 485 | 362 | 403 | 492 |
| 16 | 422 | 460 | 514 | 422 | 460 | 539 | 413 | 460 | 565 |
| 18 | 475 | 524 | 549 | 475 | 524 | 597 | 470 | 524 | 612 |
| 20 | 525 | 575 | 606 | 525 | 575 | 654 | 521 | 575 | 682 |
| 24 | 629 | 682 | 717 | 629 | 682 | 774 | 629 | 682 | 790 |

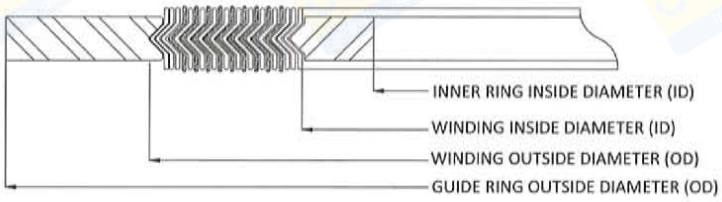
| Nominal Pipe Size (NPS) | Class 900 | | | Class 1500 | | | Class 2500 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | Winding Inside Diameter (ID) | Winding Outside Diameter (OD) | Guide Ring Outside Diameter (OD) |
| 1/2 | 19 | 29 | 63 | 19 | 29 | 63 | 19 | 29 | 70 |
| 3/4 | 25 | 37 | 70 | 25 | 37 | 70 | 25 | 37 | 76 |
| 1 | 32 | 44 | 79 | 32 | 44 | 79 | 32 | 44 | 86 |
| 1 1/4 | 40 | 57 | 89 | 40 | 57 | 89 | 40 | 57 | 105 |
| 1 1/2 | 48 | 67 | 98 | 48 | 67 | 98 | 48 | 67 | 117 |
| 2 | 59 | 82 | 143 | 59 | 82 | 143 | 59 | 82 | 146 |
| 2 1/2 | 70 | 95 | 165 | 70 | 95 | 165 | 70 | 95 | 168 |
| 3 | 95 | 117 | 168 | 92 | 117 | 174 | 92 | 117 | 197 |
| 4 | 120 | 146 | 206 | 118 | 146 | 209 | 118 | 146 | 235 |
| 5 | 148 | 176 | 247 | 143 | 176 | 254 | 143 | 176 | 279 |
| 6 | 175 | 206 | 289 | 171 | 206 | 282 | 171 | 206 | 317 |
| 8 | 225 | 260 | 359 | 216 | 260 | 352 | 216 | 260 | 387 |
| 10 | 275 | 314 | 435 | 270 | 314 | 435 | 270 | 314 | 476 |
| 12 | 327 | 371 | 498 | 324 | 371 | 520 | 324 | 371 | 549 |
| 14 | 362 | 403 | 520 | 362 | 403 | 578 | - | - | - |
| 16 | 413 | 460 | 574 | 413 | 460 | 641 | - | - | - |
| 18 | 464 | 524 | 638 | 454 | 524 | 705 | - | - | - |
| 20 | 514 | 575 | 698 | 514 | 575 | 756 | - | - | - |
| 24 | 616 | 682 | 838 | 516 | 682 | 901 | - | - | - |

# Dimensions for Style WR to Suit Japanese (JIS) Flanges
## Pressure Rating 10 kgf/cm²



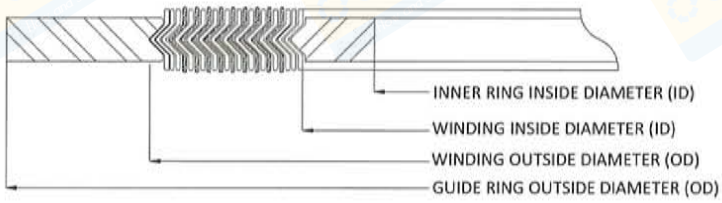

| DN | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm |
| 10 | 0.945 | 24 | 1.457 | 37 | 2.047 | 52 |
| 15 | 1.102 | 28 | 1.614 | 41 | 2.244 | 57 |
| 20 | 1.339 | 34 | 1.850 | 47 | 2.441 | 62 |
| 25 | 1.575 | 40 | 2.087 | 53 | 2.913 | 74 |
| 32 | 2.008 | 51 | 2.638 | 67 | 3.307 | 84 |
| 40 | 2.244 | 57 | 2.874 | 73 | 3.504 | 89 |
| 50 | 2.717 | 69 | 3.504 | 89 | 4.094 | 104 |
| 65 | 3.425 | 87 | 4.213 | 107 | 4.882 | 124 |
| 80 | 3.858 | 98 | 4.646 | 118 | 5.276 | 134 |
| 90 | 4.331 | 110 | 5.118 | 130 | 5.669 | 144 |
| 100 | 4.843 | 123 | 5.630 | 143 | 6.260 | 159 |
| 125 | 5.827 | 148 | 6.811 | 173 | 7.480 | 190 |
| 150 | 6.850 | 174 | 7.835 | 199 | 8.661 | 220 |
| 175 | 7.913 | 201 | 8.898 | 226 | 9.646 | 245 |
| 200 | 8.937 | 227 | 9.921 | 252 | 6.693 | 170 |
| 225 | 9.921 | 252 | 10.906 | 277 | 11.417 | 290 |
| 250 | 10.945 | 278 | 12.205 | 310 | 13.071 | 332 |
| 300 | 12.953 | 329 | 14.213 | 361 | 14.843 | 377 |
| 350 | 14.409 | 366 | 15.984 | 406 | 16.614 | 422 |
| 400 | 16.417 | 417 | 17.992 | 457 | 19.055 | 484 |
| 450 | 18.425 | 468 | 20.394 | 518 | 21.220 | 539 |
| 500 | 20.394 | 518 | 22.362 | 568 | 23.386 | 594 |
| 550 | 22.402 | 569 | 24.370 | 619 | 25.591 | 650 |
| 600 | 24.409 | 620 | 26.378 | 670 | 27.559 | 700 |

# Dimensions for Style WR to Suit Japanese (JIS) Flanges
## Pressure Rating 16-20 kgf/cm²




| DN | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
|---|---|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 10 | 0.709 | 18 | 0.945 | 24 | 1.457 | 37 | 2.047 | 52 |
| 15 | 0.866 | 22 | 1.102 | 28 | 1.614 | 41 | 2.244 | 57 |
| 20 | 1.102 | 28 | 1.339 | 34 | 1.850 | 47 | 2.441 | 62 |
| 25 | 1.339 | 34 | 1.575 | 40 | 2.087 | 53 | 2.913 | 74 |
| 32 | 1.693 | 43 | 2.008 | 51 | 2.638 | 67 | 3.307 | 84 |
| 40 | 1.929 | 49 | 2.244 | 57 | 2.874 | 73 | 3.504 | 89 |
| 50 | 2.402 | 61 | 2.717 | 69 | 3.504 | 89 | 4.094 | 104 |
| 65 | 3.031 | 77 | 3.425 | 87 | 4.213 | 107 | 4.882 | 124 |
| 80 | 3.504 | 89 | 3.898 | 99 | 4.685 | 119 | 5.512 | 140 |
| 90 | 4.016 | 102 | 4.488 | 114 | 5.472 | 139 | 5.906 | 150 |
| 100 | 4.528 | 115 | 5.000 | 127 | 5.984 | 152 | 6.496 | 165 |
| 125 | 5.512 | 140 | 5.984 | 152 | 6.969 | 177 | 7.953 | 202 |
| 150 | 6.535 | 166 | 7.165 | 182 | 8.425 | 214 | 9.331 | 237 |
| 175 | - | - | - | - | - | - | - | - |
| 200 | 8.543 | 217 | 9.173 | 233 | 10.433 | 265 | 11.102 | 282 |
| 225 | - | - | - | - | - | - | - | - |
| 250 | 10.551 | 268 | 11.339 | 288 | 12.913 | 328 | 13.937 | 354 |
| 300 | 12.559 | 319 | 13.346 | 339 | 14.921 | 379 | 15.906 | 404 |
| 350 | 14.016 | 356 | 14.803 | 376 | 16.378 | 416 | 17.717 | 450 |
| 400 | 16.024 | 407 | 17.008 | 432 | 18.976 | 482 | 20.000 | 508 |
| 450 | 18.031 | 458 | 19.016 | 483 | 20.984 | 533 | 22.559 | 573 |
| 500 | 20.000 | 508 | 20.984 | 533 | 22.953 | 583 | 24.724 | 628 |
| 550 | 22.008 | 559 | 22.992 | 584 | 24.961 | 634 | 26.929 | 684 |
| 600 | 24.016 | 610 | 25.000 | 635 | 26.969 | 685 | 28.898 | 734 |

## Dimensions for Style WR to Suit Japanese (JIS) Flanges
## Pressure Rating 30 kgf/cm²

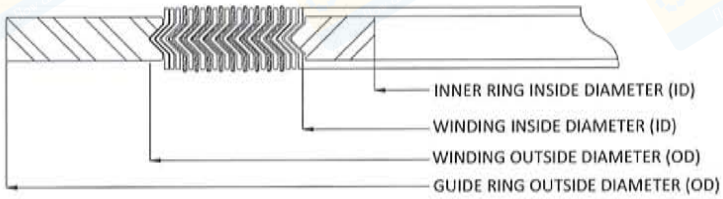



| DN | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
|---|---|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 10 | 0.709 | 18 | 0.945 | 24 | 1.457 | 37 | 2.323 | 59 |
| 15 | 0.866 | 22 | 1.102 | 28 | 1.614 | 41 | 2.520 | 64 |
| 20 | 1.102 | 28 | 1.339 | 34 | 1.850 | 47 | 2.717 | 69 |
| 25 | 1.339 | 34 | 1.575 | 40 | 2.087 | 53 | 3.110 | 79 |
| 32 | 1.693 | 43 | 2.008 | 51 | 2.638 | 67 | 3.504 | 89 |
| 40 | 1.929 | 49 | 2.244 | 57 | 2.874 | 73 | 3.937 | 100 |
| 50 | 2.402 | 61 | 2.717 | 69 | 3.504 | 89 | 4.488 | 114 |
| 65 | 2.677 | 68 | 3.071 | 78 | 3.858 | 98 | 5.512 | 140 |
| 80 | 3.150 | 80 | 3.543 | 90 | 4.331 | 110 | 5.906 | 150 |
| 90 | 3.622 | 92 | 4.016 | 102 | 5.000 | 127 | 6.378 | 162 |
| 100 | 4.094 | 104 | 4.567 | 116 | 5.551 | 141 | 6.772 | 172 |
| 125 | 5.039 | 128 | 5.512 | 140 | 6.496 | 165 | 8.150 | 207 |
| 150 | 6.024 | 153 | 6.496 | 165 | 7.756 | 197 | 9.803 | 249 |
| 200 | 7.953 | 202 | 8.583 | 218 | 9.843 | 250 | 11.575 | 294 |
| 250 | 9.882 | 251 | 10.669 | 271 | 12.244 | 311 | 14.173 | 360 |
| 300 | 11.811 | 300 | 12.598 | 320 | 14.173 | 360 | 16.457 | 418 |
| 350 | 13.228 | 336 | 14.016 | 356 | 15.591 | 396 | 18.228 | 463 |
| 400 | 15.079 | 383 | 15.866 | 403 | 17.835 | 453 | 20.630 | 524 |

## Dimensions for Style WR to Suit Japanese (JIS) Flanges
## Pressure Rating 40 kgf/cm²

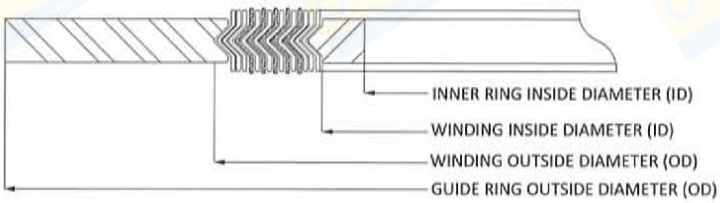
| DN | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
|---|---|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 10 | 0.591 | 15 | 0.827 | 21 | 1.339 | 34 | 2.323 | 59 |
| 15 | 0.709 | 18 | 0.945 | 24 | 1.457 | 37 | 2.520 | 64 |
| 20 | 0.906 | 23 | 1.142 | 29 | 1.654 | 42 | 2.717 | 69 |
| 25 | 1.142 | 29 | 1.378 | 35 | 1.890 | 48 | 3.110 | 79 |
| 32 | 1.496 | 38 | 1.732 | 44 | 2.362 | 60 | 3.504 | 89 |
| 40 | 1.693 | 43 | 2.008 | 51 | 2.638 | 67 | 3.937 | 100 |
| 50 | 2.165 | 55 | 2.480 | 63 | 3.110 | 79 | 4.488 | 114 |
| 65 | 2.677 | 68 | 3.071 | 78 | 3.858 | 98 | 5.512 | 140 |
| 80 | 3.150 | 80 | 3.543 | 90 | 4.331 | 110 | 5.906 | 150 |
| 90 | 3.622 | 92 | 4.016 | 102 | 5.000 | 127 | 6.378 | 162 |
| 100 | 4.094 | 104 | 4.567 | 116 | 5.551 | 141 | 7.165 | 182 |
| 125 | 5.039 | 128 | 5.512 | 140 | 6.496 | 165 | 8.819 | 224 |
| 150 | 6.024 | 153 | 6.496 | 165 | 7.756 | 197 | 10.433 | 265 |
| 200 | 7.953 | 202 | 8.583 | 218 | 9.843 | 250 | 12.402 | 315 |
| 250 | 9.882 | 251 | 10.669 | 271 | 12.244 | 311 | 14.882 | 378 |
| 300 | 11.811 | 300 | 12.598 | 320 | 14.173 | 360 | 17.087 | 434 |
| 350 | 13.228 | 336 | 14.016 | 356 | 15.591 | 396 | 18.858 | 479 |
| 400 | 15.079 | 383 | 15.866 | 403 | 17.835 | 453 | 20.906 | 531 |

# Dimensions for Style WR to Suit Japanese (JIS) Flanges
## Pressure Rating 63 kgf/cm²




| DN | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
|---|---|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 10 | 0.591 | 15 | 0.827 | 21 | 1.339 | 34 | 2.520 | 64 |
| 15 | 0.709 | 18 | 0.945 | 24 | 1.457 | 37 | 2.717 | 69 |
| 20 | 0.906 | 23 | 1.142 | 29 | 1.654 | 42 | 2.953 | 75 |
| 25 | 1.142 | 29 | 1.378 | 35 | 1.890 | 48 | 3.150 | 80 |
| 32 | 1.496 | 38 | 1.732 | 44 | 2.362 | 60 | 3.543 | 90 |
| 40 | 1.693 | 43 | 2.008 | 51 | 2.638 | 67 | 4.213 | 107 |
| 50 | 2.165 | 55 | 2.480 | 63 | 3.110 | 79 | 4.921 | 125 |
| 65 | 2.677 | 68 | 3.071 | 78 | 3.858 | 98 | 5.984 | 152 |
| 80 | 3.150 | 80 | 3.543 | 90 | 4.331 | 110 | 6.378 | 162 |
| 90 | 3.622 | 92 | 4.016 | 102 | 5.000 | 127 | 7.047 | 179 |
| 100 | 4.094 | 104 | 4.567 | 116 | 5.551 | 141 | 7.638 | 194 |
| 125 | 5.039 | 128 | 5.512 | 140 | 6.496 | 165 | 9.252 | 235 |
| 150 | 6.024 | 153 | 6.496 | 165 | 7.756 | 197 | 10.827 | 275 |
| 200 | 7.953 | 202 | 8.583 | 218 | 9.843 | 250 | 12.913 | 328 |
| 250 | 9.882 | 251 | 10.669 | 271 | 12.244 | 311 | 15.512 | 394 |
| 300 | 11.811 | 300 | 12.598 | 320 | 14.173 | 360 | 17.559 | 446 |
| 350 | 13.228 | 336 | 14.016 | 356 | 15.591 | 396 | 19.213 | 488 |
| 400 | 15.079 | 383 | 15.866 | 403 | 17.835 | 453 | 21.457 | 545 |

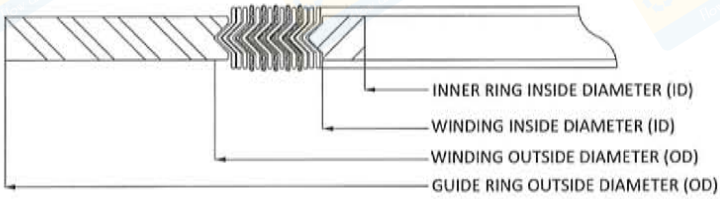
# Dimensions for Style WR-RJ/WRI-RJ to Suit Raised Face to RTJ Flanges




| Nominal Pipe Size (NPS) | Class 150 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1 | Contact Lamons Engineering for Sizes | | | | | | | |
| 1 1/4 | Inside Diameter of inner ring will depend on bore schedule. Please consult with Lamons Engineering for proper sizing | | 1.38 | 34.9 | 1.81 | 46.0 | 3.00 | 76.2 |
| 1 1/2 | | | 1.63 | 41.3 | 2.13 | 54.0 | 3.38 | 85.7 |
| 2 | | | 2.13 | 54.0 | 2.75 | 69.9 | 4.13 | 104.8 |
| 2 1/2 | | | 2.75 | 69.9 | 3.31 | 84.1 | 4.88 | 123.8 |
| 3 | | | 3.31 | 84.1 | 3.94 | 100.0 | 5.38 | 136.5 |
| 4 | | | 4.31 | 109.5 | 5.19 | 131.8 | 6.88 | 174.6 |
| 5 | | | 5.31 | 134.9 | 6.19 | 157.2 | 7.75 | 196.9 |
| 6 | | | 6.31 | 160.3 | 7.19 | 182.6 | 8.75 | 222.3 |
| 8 | | | 8.25 | 209.6 | 9.19 | 233.4 | 11.00 | 279.4 |
| 10 | | | 10.31 | 261.9 | 11.44 | 290.5 | 13.38 | 339.7 |
| 12 | | | 12.19 | 309.6 | 13.56 | 344.5 | 16.13 | 409.6 |
| 14 | | | 13.44 | 341.3 | 14.94 | 379.4 | 17.75 | 450.9 |
| 16 | | | 15.31 | 388.9 | 16.94 | 430.2 | 20.25 | 514.4 |
| 18 | | | 17.25 | 438.2 | 19.00 | 482.6 | 21.63 | 549.3 |
| 20 | | | 19.13 | 485.8 | 21.13 | 536.6 | 23.88 | 606.4 |
| 24 | | | 23.00 | 584.2 | 25.25 | 641.4 | 28.25 | 717.6 |

| Nominal Pipe Size (NPS) | Class 300 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | Inside Diameter of inner ring will depend on bore schedule. Please consult with Lamons Engineering for proper sizing | | 0.56 | 14.3 | 0.94 | 23.8 | 2.13 | 54.0 |
| 3/4 | | | 0.81 | 20.6 | 1.25 | 31.8 | 2.63 | 66.7 |
| 1 | | | 1.06 | 27.0 | 1.56 | 39.7 | 2.88 | 73.0 |
| 1 1/4 | | | 1.31 | 33.3 | 1.88 | 47.6 | 3.25 | 82.6 |
| 1 1/2 | | | 1.56 | 39.7 | 2.19 | 55.6 | 3.75 | 95.3 |
| 2 | | | 2.13 | 54.0 | 2.69 | 68.3 | 4.38 | 111.1 |
| 2 1/2 | | | 2.75 | 69.9 | 3.31 | 84.1 | 5.13 | 130.2 |
| 3 | | | 3.31 | 84.1 | 3.94 | 100.0 | 5.88 | 149.2 |
| 4 | | | 4.31 | 109.5 | 5.19 | 131.8 | 7.13 | 181.0 |
| 5 | | | 5.31 | 134.9 | 6.44 | 163.5 | 8.50 | 215.9 |
| 6 | | | 6.44 | 163.5 | 7.63 | 193.7 | 9.88 | 250.8 |
| 8 | | | 8.25 | 209.6 | 9.94 | 252.4 | 12.13 | 308.0 |
| 10 | | | 10.31 | 261.9 | 12.00 | 304.8 | 14.25 | 362.0 |
| 12 | | | 12.88 | 327.0 | 14.25 | 362.0 | 16.63 | 422.3 |
| 14 | | | 14.25 | 362.0 | 15.75 | 400.1 | 19.13 | 485.8 |
| 16 | | | 16.25 | 412.8 | 17.75 | 450.9 | 21.25 | 539.8 |
| 18 | | | 18.25 | 463.6 | 20.25 | 514.4 | 23.50 | 596.9 |
| 20 | | | 20.25 | 514.4 | 22.19 | 563.6 | 25.75 | 654.1 |
| 24 | | | 24.25 | 616.0 | 26.31 | 668.3 | 30.50 | 774.7 |

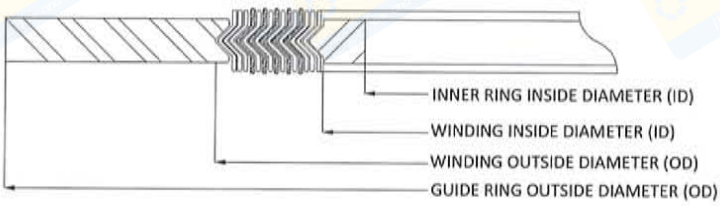
# Dimensions for Style WR-RJ/WRI-RJ to Suit Raised Face to RTJ Flanges




| Nominal Pipe Size (NPS) | Class 400 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | Inside Diameter of inner ring will depend on bore schedule. Please consult with Lamons Engineering for proper sizing | | 0.56 | 14.3 | 0.94 | 23.8 | 2.13 | 54.0 |
| 3/4 | | | 0.81 | 20.6 | 1.25 | 31.8 | 2.63 | 66.7 |
| 1 | | | 1.06 | 27.0 | 1.56 | 39.7 | 2.88 | 73.0 |
| 1 1/4 | | | 1.31 | 33.3 | 1.88 | 47.6 | 3.25 | 82.6 |
| 1 1/2 | | | 1.56 | 39.7 | 2.19 | 55.6 | 3.75 | 95.3 |
| 2 | | | 2.13 | 54.0 | 2.69 | 68.3 | 4.38 | 111.1 |
| 2 1/2 | | | 2.75 | 69.9 | 3.31 | 84.1 | 5.13 | 130.2 |
| 3 | | | 3.31 | 84.1 | 3.94 | 100.0 | 5.88 | 149.2 |
| 4 | | | 4.31 | 109.5 | 5.19 | 131.8 | 7.00 | 177.8 |
| 5 | | | 5.31 | 134.9 | 6.44 | 163.5 | 8.38 | 212.7 |
| 6 | | | 6.44 | 163.5 | 7.63 | 193.7 | 9.75 | 247.7 |
| 8 | | | 8.25 | 209.6 | 9.94 | 252.4 | 12.00 | 304.8 |
| 10 | | | 10.31 | 261.9 | 12.00 | 304.8 | 14.13 | 358.8 |
| 12 | | | 12.88 | 327.0 | 14.25 | 362.0 | 16.50 | 419.1 |
| 14 | | | 14.25 | 362.0 | 15.75 | 400.1 | 19.00 | 482.6 |
| 16 | | | 16.25 | 412.8 | 17.75 | 450.9 | 21.13 | 536.6 |
| 18 | | | 18.25 | 463.6 | 20.25 | 514.4 | 23.38 | 593.7 |
| 20 | | | 20.25 | 514.4 | 22.19 | 563.6 | 25.50 | 647.7 |
| 24 | | | 24.25 | 616.0 | 26.31 | 668.3 | 30.25 | 768.4 |

| Nominal Pipe Size (NPS) | Class 600 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | Inside Diameter of inner ring will depend on bore schedule. Please consult with Lamons Engineering for proper sizing | | 0.56 | 14.3 | 0.94 | 23.8 | 2.13 | 54.0 |
| 3/4 | | | 0.81 | 20.6 | 1.25 | 31.8 | 2.63 | 66.7 |
| 1 | | | 1.06 | 27.0 | 1.56 | 39.7 | 2.88 | 73.0 |
| 1 1/4 | | | 1.31 | 33.3 | 1.88 | 47.6 | 3.25 | 82.6 |
| 1 1/2 | | | 1.56 | 39.7 | 2.19 | 55.6 | 3.75 | 95.3 |
| 2 | | | 2.13 | 54.0 | 2.69 | 68.3 | 4.38 | 111.1 |
| 2 1/2 | | | 2.75 | 69.9 | 3.31 | 84.1 | 5.13 | 130.2 |
| 3 | | | 3.31 | 84.1 | 3.94 | 100.0 | 5.88 | 149.2 |
| 4 | | | 4.31 | 109.5 | 5.19 | 131.8 | 7.63 | 193.7 |
| 5 | | | 5.31 | 134.9 | 6.44 | 163.5 | 9.50 | 241.3 |
| 6 | | | 6.44 | 163.5 | 7.63 | 193.7 | 10.50 | 266.7 |
| 8 | | | 8.25 | 209.6 | 9.94 | 252.4 | 12.63 | 320.7 |
| 10 | | | 10.31 | 261.9 | 12.00 | 304.8 | 15.75 | 400.1 |
| 12 | | | 12.88 | 327.0 | 14.25 | 362.0 | 18.00 | 457.2 |
| 14 | | | 14.25 | 362.0 | 15.75 | 400.1 | 19.38 | 492.1 |
| 16 | | | 16.25 | 412.8 | 17.75 | 450.9 | 22.25 | 565.2 |
| 18 | | | 18.25 | 463.6 | 20.25 | 514.4 | 24.13 | 612.8 |
| 20 | | | 20.25 | 514.4 | 22.19 | 563.6 | 26.88 | 682.6 |
| 24 | | | 24.25 | 616.0 | 26.31 | 668.3 | 31.13 | 790.6 |

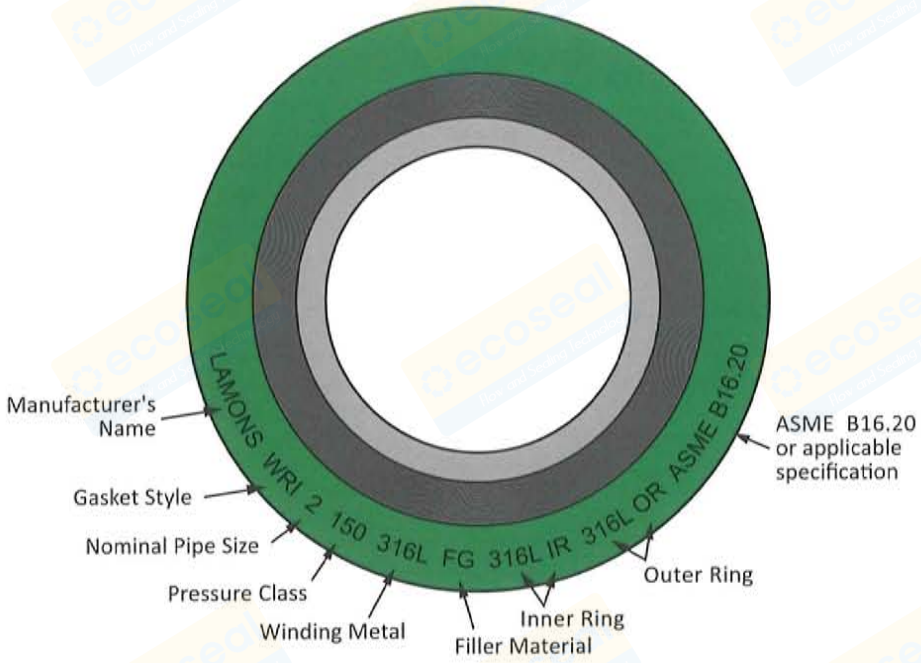
# Dimensions for Style WR-RJ/WRI-RJ to Suit Raised Face to RTJ Flanges



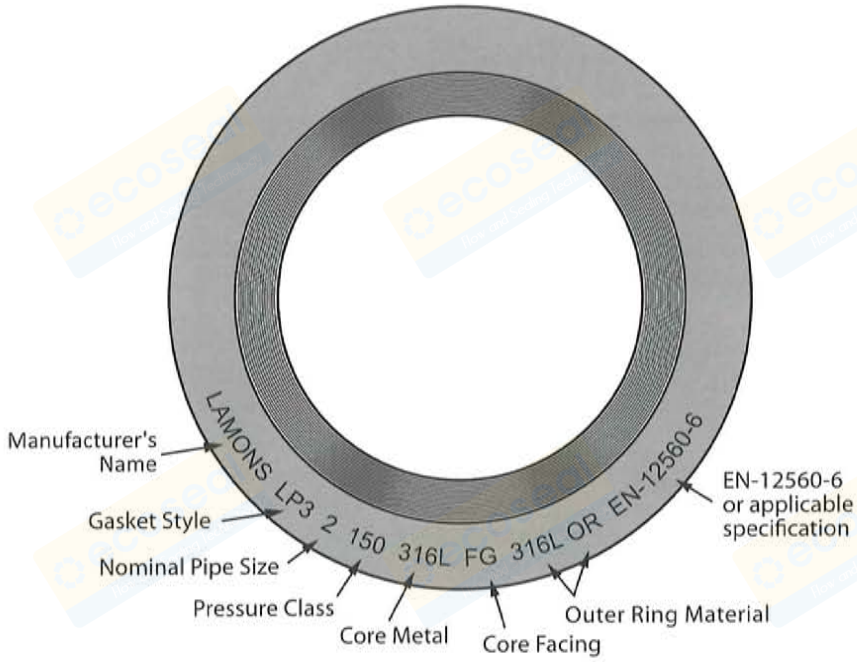

| Nominal Pipe Size (NPS) | Class 900 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | Inside Diameter of inner ring will depend on bore schedule. Please consult with Lamons Engineering for proper sizing | | 0.56 | 14.3 | 1.06 | 27.0 | 2.50 | 63.5 |
| 3/4 | | | 0.81 | 20.6 | 1.31 | 33.3 | 2.75 | 69.9 |
| 1 | | | 1.06 | 27.0 | 1.56 | 39.7 | 3.13 | 79.4 |
| 1 1/4 | | | 1.31 | 33.3 | 1.94 | 49.2 | 3.50 | 88.9 |
| 1 1/2 | | | 1.56 | 39.7 | 2.25 | 57.2 | 3.88 | 98.4 |
| 2 | | | 2.25 | 57.2 | 3.19 | 81.0 | 5.63 | 142.9 |
| 2 1/2 | | | 2.56 | 65.1 | 3.63 | 92.1 | 6.50 | 165.1 |
| 3 | | | 3.19 | 81.0 | 4.19 | 106.4 | 6.63 | 168.3 |
| 4 | | | 4.06 | 103.2 | 5.19 | 131.8 | 8.13 | 206.4 |
| 5 | | | 5.31 | 134.9 | 6.44 | 163.5 | 9.75 | 247.7 |
| 6 | | | 6.31 | 160.3 | 7.63 | 193.7 | 11.38 | 288.9 |
| 8 | | | 8.25 | 209.6 | 9.94 | 252.4 | 14.13 | 358.8 |
| 10 | | | 10.31 | 261.9 | 12.00 | 304.8 | 17.13 | 435.0 |
| 12 | | | 12.88 | 327.0 | 14.25 | 362.0 | 19.63 | 498.5 |
| 14 | | | 13.81 | 350.8 | 15.56 | 395.3 | 20.50 | 520.7 |
| 16 | | | 15.56 | 395.3 | 17.56 | 446.1 | 22.63 | 574.7 |
| 18 | | | 17.69 | 449.3 | 19.94 | 506.4 | 25.13 | 638.2 |
| 20 | | | 19.69 | 500.1 | 21.94 | 557.2 | 27.50 | 698.5 |
| 24 | | | 23.19 | 589.0 | 25.94 | 658.8 | 33.00 | 838.2 |

| Nominal Pipe Size (NPS) | Class 1500 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Inner Ring Inside Diameter (ID) | | Winding Inside Diameter (ID) | | Winding Outside Diameter (OD) | | Guide Ring Outside Diameter (OD) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | Inside Diameter of inner ring will depend on bore schedule. Please consult with Lamons Engineering for proper sizing | | 0.56 | 14.3 | 1.06 | 27.0 | 2.50 | 63.5 |
| 3/4 | | | 0.81 | 20.6 | 1.31 | 33.3 | 2.75 | 69.9 |
| 1 | | | 1.06 | 27.0 | 1.56 | 39.7 | 3.13 | 79.4 |
| 1 1/4 | | | 1.31 | 33.3 | 1.94 | 49.2 | 3.50 | 88.9 |
| 1 1/2 | | | 1.56 | 39.7 | 2.25 | 57.2 | 3.88 | 98.4 |
| 2 | | | 2.25 | 57.2 | 3.19 | 81.0 | 5.63 | 142.9 |
| 2 1/2 | | | 2.56 | 65.1 | 3.63 | 92.1 | 6.50 | 165.1 |
| 3 | | | 3.19 | 81.0 | 4.69 | 119.1 | 6.88 | 174.6 |
| 4 | | | 4.06 | 103.2 | 5.69 | 144.5 | 8.25 | 209.6 |
| 5 | | | 5.06 | 128.6 | 6.94 | 176.2 | 10.00 | 254.0 |
| 6 | | | 6.00 | 152.4 | 7.56 | 192.1 | 11.13 | 282.6 |
| 8 | | | 7.88 | 200.0 | 9.75 | 247.7 | 13.88 | 352.4 |
| 10 | | | 9.81 | 249.2 | 11.88 | 301.6 | 17.13 | 435.0 |
| 12 | | | 11.94 | 303.2 | 13.94 | 354.0 | 20.50 | 520.7 |
| 14 | | | 13.44 | 341.3 | 15.19 | 385.8 | 22.75 | 577.9 |
| 16 | | | 15.00 | 381.0 | 17.00 | 431.8 | 25.25 | 641.4 |
| 18 | | | 17.25 | 438.2 | 19.50 | 495.3 | 27.75 | 704.9 |
| 20 | | | 19.19 | 487.4 | 21.44 | 544.5 | 29.75 | 755.7 |
| 24 | | | 23.00 | 584.2 | 25.50 | 647.7 | 35.50 | 901.7 |

## Markings for Standard Spiral Wound Gaskets




## Markings for Standard Kammpro® Gaskets



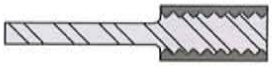
# Lamons Kammpro® Gasket Product Family

Lamons Kammpro gaskets are recognized as a problem solver for heat exchangers, large vessels, and equipment that experience excessive movement due to thermal expansion. The Kammpro provides one of the tightest seals combined with superior load bearing characteristics. Kammpro gaskets consist of a metal sealing core with or without a guide ring. The sealing core is a solid metal gasket with concentric serrations on both sealing surfaces and faced with a soft material such as flexible graphite, EPTFE, or a Lamons HTG configuration depending on operating conditions. It is the preferred design when needing improved performance at low seating stresses. The simultaneous actions of a high compressibility facing material on the outside of the grooved metal in combination with limited penetration of the tips of the solid metal core enhance the interaction of the two materials. This allows the components to perform individually to their optimum capabilities. Kammpro gaskets are manufactured in different materials and non-circular shapes with extreme accuracy. They can also be custom engineered to fit various applications. The suggested flange surface finish for Kammpro gaskets is 125-250 AARH.



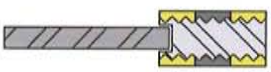
**Kammpro LP1** is manufactured without a guide ring for tongue and groove, or recessed flange applications such as male and female. It is typically used in heat exchanger applications and applied as an upgrade to double jacketed gaskets. It is highly suggested to have the nubbin (if present) machined out as a best practice. Where pass partitions are required, they are also kamm profiled and laminated. They are the same thickness as the ring, and securely held in place with welds.

**Kammpro LP2** is constructed with an integral guide ring for aligning purposes. It is suggested to be used in raised face flanges. The gasket is typically designed and sized per EN12560-6 spec for ASME B16.5 flanges, but can be manufactured to fit other standards.



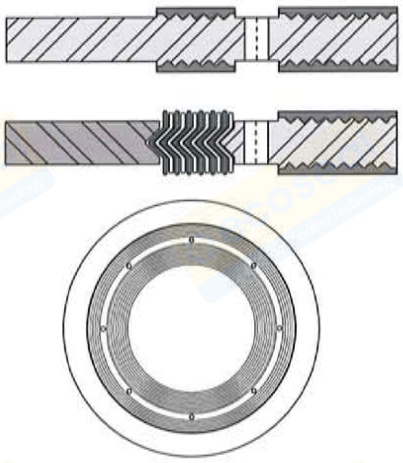
**Kammpro LP3** utilizes a loose fit guide ring. This popular design is preferred for nominal pipe size and pressure class raised face flanges and is used in equipment with excessive radial shear characteristics, thermal cycling, and expansions. The gasket is typically designed and sized per EN12560-6 spec for ASME B16.5 flanges, but can be manufactured to fit other standards.

**Kammpro-HTG** is a problem solver for higher operating temperature scenarios. It utilizes sections of high performance mica/phyllosilicate that protect oxidation resistant grade graphite and shields it from contact with oxidizers. Lamons Kammpro-HTG represents the best technology available in regards to torque retention and sealing ability at elevated temperatures. Lamons Kammpro HTG gaskets can be applied to high temperature applications to 1500°F (850°C) or higher, depending on operating conditions.

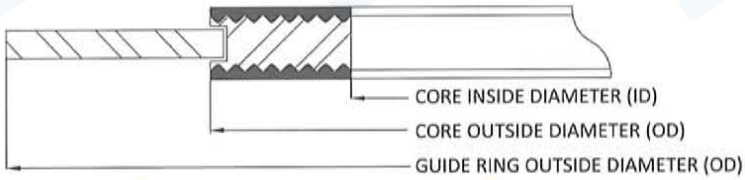


**KAMMPRO ACHE** is specifically designed to replace traditional solid metal "washer" type gaskets typically used in air cooled heat exchangers. The design takes advantage of the serrated profile with graphite facing to bite against the finish of the header plate.

**KAMMPRO DUAL SEAL** gaskets are designed to mate with leak detection devices incorporated into flanged assemblies used in critical applications, such as lethal service. This highly effective gasket has a primary seal followed towards the outer portion of the sealing area by a relief section with through holes, where the leak detection equipment is mounted. Past this relief section is a secondary sealing area that will maintain the integrity of the bolted joint should the primary seal be compromised and pressure differential is identified.

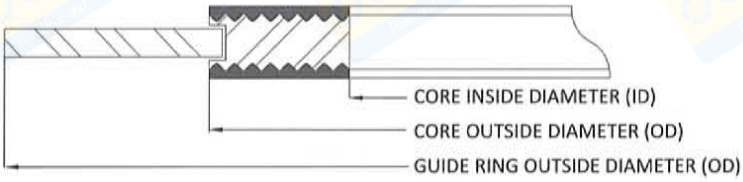


## DIMENSIONS FOR KAMMPRO LP3/LP2 PER EN 12560-6 TO SUIT ASME B16.5 FLANGES (INCHES)



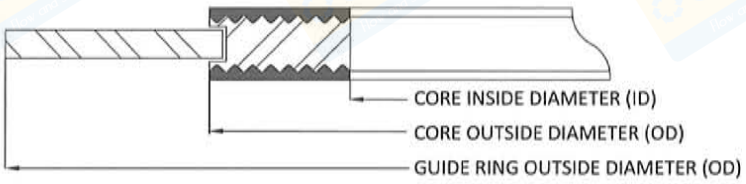

| Nominal Pipe Size (NPS) | Core Inside Diameter (ID) | Core Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Class 150 | Class 300 | Class 400 | Class 600 | Class 900 | Class 1500 | Class 2500 |
| | Inches | Inches | Inches | Inches | Inches | Inches | Inches | Inches | Inches |
| 1/2 | 0.91 | 1.31 | 1.75 | 2.00 | 2.00 | 2.00 | 2.37 | 2.37 | 2.63 |
| 3/4 | 1.13 | 1.56 | 2.12 | 2.50 | 2.50 | 2.50 | 2.63 | 2.63 | 2.87 |
| 1 | 1.44 | 1.87 | 2.50 | 2.75 | 2.75 | 2.75 | 3.00 | 3.00 | 3.25 |
| 1 1/4 | 1.75 | 2.37 | 2.87 | 3.13 | 3.13 | 3.13 | 3.37 | 3.37 | 4.00 |
| 1 1/2 | 2.06 | 2.75 | 3.25 | 3.63 | 3.63 | 3.63 | 3.75 | 3.75 | 4.50 |
| 2 | 2.75 | 3.50 | 4.00 | 4.25 | 4.25 | 4.25 | 5.50 | 5.50 | 5.62 |
| 2 1/2 | 3.25 | 4.00 | 4.75 | 5.00 | 5.00 | 5.00 | 6.37 | 6.37 | 6.50 |
| 3 | 3.87 | 4.87 | 5.25 | 5.75 | 5.75 | 5.75 | 6.50 | 6.75 | 7.63 |
| 3 1/2 | 4.37 | 5.37 | 6.25 | 6.37 | 6.25 | 6.25 | - | - | - |
| 4 | 4.87 | 6.06 | 6.75 | 7.00 | 6.87 | 7.50 | 8.00 | 8.13 | 9.12 |
| 5 | 5.94 | 7.19 | 7.63 | 8.37 | 8.25 | 9.37 | 9.63 | 9.87 | 10.87 |
| 6 | 7.00 | 8.37 | 8.63 | 9.75 | 9.63 | 10.37 | 11.25 | 11.00 | 12.37 |
| 8 | 9.00 | 10.50 | 10.87 | 12.00 | 11.87 | 12.50 | 14.00 | 9.81 | 15.12 |
| 10 | 11.13 | 12.63 | 13.25 | 14.13 | 14.00 | 15.63 | 17.00 | 17.00 | 18.62 |
| 12 | 13.37 | 14.87 | 16.00 | 16.50 | 16.37 | 17.87 | 19.50 | 20.37 | 21.50 |
| 14 | 14.63 | 16.13 | 17.63 | 19.00 | 18.87 | 19.25 | 20.37 | 22.63 | - |
| 16 | 16.63 | 18.37 | 20.13 | 21.13 | 21.00 | 22.12 | 22.50 | 25.12 | - |
| 18 | 18.87 | 20.87 | 21.50 | 23.37 | 23.25 | 24.00 | 25.00 | 27.63 | - |
| 20 | 20.87 | 22.87 | 23.75 | 25.63 | 25.37 | 26.75 | 27.37 | 29.62 | - |
| 22 | 22.87 | 24.87 | 25.87 | 27.63 | 27.50 | 28.75 | - | | - |
| 24 | 24.87 | 26.87 | 28.13 | 30.37 | 30.13 | 31.00 | 32.87 | 35.37 | - |

# Dimensions for Kammpro LP3/LP2 per EN 12560-6 to Suit ASME B16.5 Flanges (Millimeters)



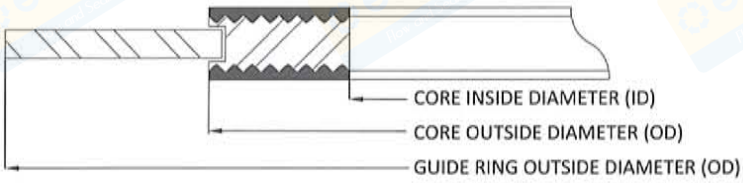

| Nominal Pipe Size (NPS) | Core Inside Diameter (ID) | Core Outside Diameter (OD) | Guide Ring Outside Diameter (OD) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Class 150 | Class 300 | Class 400 | Class 600 | Class 900 | Class 1500 | Class 2500 |
| | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| 1/2 | 23.0 | 33.3 | 44.4 | 50.8 | 50.8 | 50.8 | 60.3 | 60.3 | 66.7 |
| 3/4 | 28.6 | 39.7 | 53.9 | 63.5 | 63.5 | 63.5 | 66.7 | 66.7 | 73.0 |
| 1 | 36.5 | 47.6 | 63.5 | 69.8 | 69.8 | 69.8 | 76.2 | 76.2 | 82.5 |
| 1 1/4 | 44.4 | 60.3 | 73.0 | 79.4 | 79.4 | 79.4 | 85.7 | 85.7 | 101.6 |
| 1 1/2 | 52.4 | 69.8 | 82.5 | 92.1 | 92.1 | 92.1 | 95.2 | 95.2 | 114.3 |
| 2 | 69.8 | 88.9 | 101.6 | 108.0 | 108.0 | 108.0 | 139.7 | 139.7 | 142.8 |
| 2 1/2 | 82.5 | 101.6 | 120.6 | 127.0 | 127.0 | 127.0 | 161.9 | 161.9 | 165.1 |
| 3 | 98.4 | 123.8 | 133.4 | 146.1 | 146.1 | 146.1 | 165.1 | 171.5 | 193.7 |
| 3 1/2 | 111.1 | 136.5 | 158.8 | 161.9 | 158.7 | 158.7 | - | - | - |
| 4 | 123.8 | 154.0 | 171.5 | 177.8 | 174.6 | 190.5 | 203.2 | 206.4 | 231.7 |
| 5 | 150.8 | 182.6 | 193.7 | 212.7 | 209.5 | 238.1 | 244.5 | 250.8 | 276.2 |
| 6 | 177.8 | 212.7 | 219.1 | 247.7 | 244.5 | 263.5 | 285.8 | 279.4 | 314.3 |
| 8 | 228.6 | 266.7 | 276.2 | 304.8 | 301.6 | 317.5 | 355.6 | 249.3 | 384.1 |
| 10 | 282.6 | 320.7 | 336.5 | 358.8 | 355.6 | 396.9 | 431.8 | 431.8 | 473.0 |
| 12 | 339.7 | 377.8 | 406.4 | 419.1 | 415.9 | 454.0 | 495.3 | 517.5 | 546.1 |
| 14 | 371.5 | 409.6 | 447.7 | 482.6 | 479.4 | 488.9 | 517.5 | 574.7 | - |
| 16 | 422.3 | 466.7 | 511.2 | 536.6 | 533.4 | 561.9 | 571.5 | 638.1 | - |
| 18 | 479.4 | 530.2 | 546.1 | 593.7 | 590.5 | 609.6 | 635.0 | 701.7 | - |
| 20 | 530.2 | 581.0 | 603.2 | 650.9 | 644.5 | 679.5 | 695.3 | 752.4 | - |
| 22 | 581.0 | 631.8 | 657.2 | 701.7 | 698.5 | 730.3 | - | - | - |
| 24 | 631.8 | 682.6 | 714.4 | 771.5 | 765.2 | 787.4 | 835.0 | 898.5 | - |

# Dimensions for Kammpro LP3/LP2 per EN 1514-6 to Suit Type A and B Flanges Facings (Inches)




| DN | Core Inside Diameter | Core Outside Diameter (OD) | | | Guide Ring Outside Diameter (OD) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PN10/40 | PN 64/160 | PN 250/400 | PN 10 | PN 16 | PN 25 | PN 40 | PN 64 | PN 100 | PN 160 | PN 250 | PN 320 | PN 400 |
| mm | Inches | Inches | | | Inches | | | | | | | | | |
| 10 | 0.87 | See PN 64 to | See PN 250 | 1.42 | 1.81 | 1.81 | 1.81 | 1.81 | 2.20 | 2.20 | 2.20 | 2.64 | 2.64 | 2.64 |
| 15 | 1.02 | PN 160 | to PN 400 | 1.65 | 2.01 | 2.01 | 2.01 | 2.01 | 2.40 | 2.40 | 2.40 | 2.83 | 2.83 | -- |
| 20 | 1.22 | | | 1.85 | 2.40 | 2.40 | 2.40 | 2.40 | -- | -- | -- | -- | -- | -- |
| 25 | 1.42 | | | 2.05 | 2.80 | 2.80 | 2.80 | 2.80 | 3.23 | 3.23 | 3.23 | 3.27 | 3.62 | 4.09 |
| 32 | 1.81 | | 2.44 | 2.60 | 3.23 | 3.23 | 3.23 | 3.23 | -- | -- | -- | -- | -- | -- |
| 40 | 2.09 | | 2.72 | 2.87 | 3.62 | 3.62 | 3.62 | 3.62 | 4.06 | 4.06 | 4.06 | 4.29 | 4.69 | 5.31 |
| 50 | 2.56 | | 3.19 | 3.43 | 4.21 | 4.21 | 4.21 | 4.21 | 4.45 | 4.69 | 4.69 | 4.88 | 5.28 | 5.91 |
| 65 | 3.19 | | 3.94 | 4.06 | 5.00 | 5.00 | 5.00 | 5.00 | 5.39 | 5.63 | 5.63 | 6.02 | 6.69 | 7.56 |
| 80 | 3.74 | | 4.53 | 4.76 | 5.59 | 5.59 | 5.59 | 5.59 | 5.83 | 6.06 | 6.06 | 6.69 | 7.48 | 8.15 |
| 100 | 4.65 | | 5.43 | 5.75 | 6.38 | 6.38 | 6.61 | 6.61 | 6.85 | 7.09 | 7.09 | 7.95 | 9.02 | 10.08 |
| 125 | 5.59 | | 6.38 | 7.01 | 7.56 | 7.56 | 7.64 | 7.64 | 8.27 | 8.54 | 8.54 | 9.53 | 10.79 | 11.85 |
| 150 | 6.69 | | 7.48 | 8.35 | 8.54 | 8.54 | 8.82 | 8.82 | 9.72 | 10.12 | 10.12 | 11.18 | 12.24 | 13.70 |
| 175 | 7.68 | | 8.46 | 9.65 | 9.72 | 9.72 | 10.00 | 10.43 | 10.91 | 11.30 | 11.18 | 12.44 | 14.09 | 15.83 |
| 200 | 8.66 | 9.45 | 9.76 | 11.02 | 10.71 | 10.71 | 11.18 | 11.42 | 12.17 | 12.76 | 12.76 | 14.09 | 15.67 | 17.40 |
| 250 | 10.63 | 11.42 | 11.81 | 13.39 | 12.87 | 12.91 | 13.39 | 13.86 | 14.33 | 15.39 | 15.28 | 17.40 | 19.21 | -- |
| 300 | 12.60 | 13.39 | 14.02 | 15.75 | 14.84 | 15.08 | 15.75 | 16.42 | 16.69 | 18.03 | 18.03 | 21.10 | -- | -- |
| 350 | 14.76 | 15.55 | 16.34 | -- | 17.20 | 17.44 | 17.99 | 18.66 | 19.13 | 20.16 | -- | -- | -- | -- |
| 400 | 16.77 | 17.72 | 18.66 | -- | 19.25 | 19.49 | 20.24 | 21.50 | 21.38 | 22.52 | -- | -- | -- | -- |
| 450 | 18.90 | 19.92 | -- | -- | 21.22 | 21.85 | -- | 22.48 | -- | -- | -- | -- | -- | -- |
| 500 | 20.87 | 22.05 | 23.15 | -- | 23.39 | 24.29 | 24.57 | 24.72 | 25.87 | 27.72 | -- | -- | -- | -- |
| 600 | 24.80 | 26.14 | 27.56 | -- | 27.36 | 28.90 | 28.78 | 29.41 | 30.08 | 32.01 | -- | -- | -- | -- |
| 700 | 28.74 | 30.31 | 31.97 | -- | 31.89 | 31.65 | 32.80 | 33.54 | 34.61 | 37.40 | -- | -- | -- | -- |
| 800 | 32.68 | 34.49 | 34.88 | -- | 36.10 | 35.87 | 37.09 | 38.35 | 38.90 | -- | -- | -- | -- | -- |
| 900 | 36.61 | 38.66 | 39.13 | -- | 40.04 | 39.80 | 41.02 | 42.68 | 43.62 | -- | -- | -- | -- | -- |
| 1000 | 40.94 | 43.23 | 43.70 | -- | 44.25 | 44.41 | 45.43 | 47.01 | 48.03 | -- | -- | -- | -- | -- |
| 1200 | 49.21 | 51.97 | 52.52 | -- | 52.80 | 52.83 | 53.70 | 55.04 | 57.17 | -- | -- | -- | -- | -- |
| 1400 | 56.69 | 59.92 | -- | -- | 60.94 | 60.71 | 62.13 | 63.70 | -- | -- | -- | -- | -- | -- |
| 1600 | 64.96 | 6.77 | -- | -- | 69.76 | 69.45 | 70.79 | 72.05 | -- | -- | -- | -- | -- | -- |
| 1800 | 72.83 | 75.35 | -- | -- | 77.64 | 77.32 | 78.74 | -- | -- | -- | -- | -- | -- | -- |
| 2000 | 80.71 | 83.46 | -- | -- | 85.91 | 85.35 | 87.80 | -- | -- | -- | -- | -- | -- | -- |
| 2200 | 88.58 | 91.65 | -- | -- | 93.86 | 93.62 | -- | -- | -- | -- | -- | -- | -- | -- |
| 2400 | 96.85 | 98.90 | -- | -- | 102.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2600 | 105.12 | 107.40 | -- | -- | 110.00 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2800 | 113.78 | 116.22 | -- | -- | 118.66 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3000 | 122.05 | 124.65 | -- | -- | 127.09 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# Dimensions for Kammpro LP3/LP2 per EN 1514-6 to Suit Type A and B Flanges Facings (Millimeters)




| DN | Core Inside Diameter (ID) | Core Outside Diameter (OD) | | | Guide Ring Outside Diameter (OD) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PN 10/40 | PN 64/160 | PN 250/400 | PN 10 | PN 16 | PN 25 | PN 40 | PN 64 | PN 100 | PN 160 | PN 250 | PN 320 | PN 400 |
| mm | mm | mm | | | mm | | | | | | | | | |
| 10 | 22 | See PN 64 to | See PN 250 | 36 | 46 | 46 | 46 | 46 | 56 | 56 | 56 | 67 | 67 | 67 |
| 15 | 26 | PN 160 | to PN 400 | 42 | 51 | 51 | 51 | 51 | 61 | 61 | 61 | 72 | 72 | -- |
| 20 | 31 | | | 47 | 61 | 61 | 61 | 61 | -- | -- | -- | -- | -- | -- |
| 25 | 36 | | | 52 | 71 | 71 | 71 | 71 | 82 | 82 | 82 | 83 | 92 | 104 |
| 32 | 46 | | 62 | 66 | 82 | 82 | 82 | 82 | -- | -- | -- | -- | -- | -- |
| 40 | 53 | | 69 | 73 | 92 | 92 | 92 | 92 | 103 | 103 | 103 | 109 | 119 | 135 |
| 50 | 65 | | 81 | 87 | 107 | 107 | 107 | 107 | 113 | 119 | 119 | 124 | 134 | 150 |
| 65 | 81 | | 100 | 103 | 127 | 127 | 127 | 127 | 137 | 143 | 143 | 153 | 170 | 192 |
| 80 | 95 | | 115 | 121 | 142 | 142 | 142 | 142 | 148 | 154 | 154 | 170 | 190 | 207 |
| 100 | 118 | | 138 | 146 | 162 | 162 | 168 | 168 | 174 | 180 | 180 | 202 | 229 | 256 |
| 125 | 142 | | 162 | 178 | 192 | 192 | 194 | 194 | 210 | 217 | 217 | 242 | 274 | 301 |
| 150 | 170 | | 190 | 212 | 217 | 217 | 224 | 224 | 247 | 257 | 257 | 284 | 311 | 348 |
| 175 | 195 | | 215 | 245 | 247 | 247 | 254 | 265 | 277 | 287 | 284 | 316 | 358 | 402 |
| 200 | 220 | 240 | 248 | 280 | 272 | 272 | 284 | 290 | 309 | 324 | 324 | 358 | 398 | 442 |
| 250 | 270 | 290 | 300 | 340 | 327 | 328 | 340 | 352 | 364 | 391 | 388 | 442 | 488 | -- |
| 300 | 320 | 340 | 356 | 400 | 377 | 383 | 400 | 417 | 424 | 458 | 458 | 536 | -- | -- |
| 350 | 375 | 395 | 415 | -- | 437 | 443 | 457 | 474 | 486 | 512 | -- | -- | -- | -- |
| 400 | 426 | 450 | 474 | -- | 489 | 495 | 514 | 546 | 543 | 572 | -- | -- | -- | -- |
| 450 | 480 | 506 | -- | -- | 539 | 555 | -- | 571 | -- | -- | -- | -- | -- | -- |
| 500 | 530 | 560 | 588 | -- | 594 | 617 | 624 | 628 | 657 | 704 | -- | -- | -- | -- |
| 600 | 630 | 664 | 700 | -- | 695 | 734 | 731 | 747 | 764 | 813 | -- | -- | -- | -- |
| 700 | 730 | 770 | 812 | -- | 810 | 804 | 833 | 852 | 879 | 950 | -- | -- | -- | -- |
| 800 | 830 | 876 | 886 | -- | 917 | 911 | 942 | 974 | 988 | -- | -- | -- | -- | -- |
| 900 | 930 | 982 | 994 | -- | 1017 | 1011 | 1042 | 1084 | 1108 | -- | -- | -- | -- | -- |
| 1000 | 1040 | 1098 | 1110 | -- | 1124 | 1128 | 1154 | 1194 | 1220 | -- | -- | -- | -- | -- |
| 1200 | 1250 | 1320 | 1334 | -- | 1341 | 1342 | 1364 | 1398 | 1452 | -- | -- | -- | -- | -- |
| 1400 | 1440 | 1522 | -- | -- | 1548 | 1542 | 1578 | 1618 | -- | -- | -- | -- | -- | -- |
| 1600 | 1650 | 172 | -- | -- | 1772 | 1764 | 1798 | 1830 | -- | -- | -- | -- | -- | -- |
| 1800 | 1850 | 1914 | -- | -- | 1972 | 1964 | 2000 | -- | -- | -- | -- | -- | -- | -- |
| 2000 | 2050 | 2120 | -- | -- | 2182 | 2168 | 2230 | -- | -- | -- | -- | -- | -- | -- |
| 2200 | 2250 | 2328 | -- | -- | 2384 | 2378 | -- | -- | -- | -- | -- | -- | -- | -- |
| 2400 | 2460 | 2512 | -- | -- | 2594 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2600 | 2670 | 2728 | -- | -- | 2794 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2800 | 2890 | 2952 | -- | -- | 3014 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3000 | 3100 | 3166 | -- | -- | 3228 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## A note on Kammpro gasket dimensions

Kammpro gaskets are an ideal upgrade for equipment applications where standard spiral wound gaskets, double jacketed designs, and corrugated metallic gaskets are commonly used.

Kammpro LP1 dimensions can be the same as Style W or Style 300/310 gaskets that are seated in large male/female, large tongue/groove, and small tongue/groove joints. Technically, the dimensions that are specified for large spiral wound ASME B16.20 for ASME B16.47 Series A and B flanges can still apply for the Kammpro Gaskets per LP3/LP2 design.

### Kammpro LP3/LP2 Tolerances per EN 12560-6 Specification:

- Core inside diameter for NPS ½ to 24 is +1/64", - 0" (+0.4 mm, - 0 mm)
- Core outside diameter for NPS ½ to 24 is +0", -1/64" (+0 mm, - 0.4 mm)
- Guide ring outside diameter for NPS ½ to 24 is ±1/32" (±0.8 mm)

### Kammpro LP3/LP2 Tolerances per EN 1514-6 Specification:

- Core inside diameter for DN 10 through DN 1000 is +1/64", - 0" (+0.4 mm, - 0 mm)
- Core outside diameter for DN 10 through DN 1000 is +0", -1/64" (+0 mm, - 0.4 mm)
- Core inside diameter for DN 1000 and larger is +3/64", -0" (+1.0 mm, - 0 mm)
- Core outside diameter for DN 1000 and larger is +0", -3/64" (+0 mm, - 1.0mm)
- Guide ring outside diameter is ±1/32" (±0.8 mm)

# Lamons Corrugated Metal Gaskets (CMG®) Product Family

Lamons CMG gaskets are considered the standard in respect to corrugated metal gasket technology. They are an excellent choice for 150 and 300 class ASME flanges where available bolt loading is minimal. The substrate geometry promotes recovery and resilience through thermal cycles and extended service life. CMG's can be direct replacements for spiral wound gaskets and can eliminate inward buckling issues while creating a seal at moderate flange stresses. Available in a wide range of substrate alloys and covering layer options, CMG gaskets can be utilized to solve many common flange problems. CMG substrate geometries are designed to achieve maximum recovery characteristics. A specific pitch, core thickness and wall angle are engineered to maximize the seal's ability to overcome problems associated with joint relaxation, pressure and thermal cycles. CMG is an excellent choice for pressure classes 150 and 300 ASME B16.5 flanges where available load is minimal.



## CMG

Lamons Corrugated Metal Gasket (CMG) is a high performance gasket for standard flange or heat exchanger applications. The CMG molds in place by filling in irregularities of the spaces, creating a superior seal. It maintains the seal even in harsh environments, including hydrocarbons and steam applications. The gasket is ideal where low bolt load is present or where high gasket stresses are available. The thin profile is beneficial in areas where flange separation is limited. The heavy 22 gauge core and 1/8" (3.175 mm) pitch frequency results in superior recovery and crush resistance in the most demanding applications.

## CMG-EX

Lamons CMG-EX gasket is a premium variation of Lamons original CMG gasket. The CMG-EX was designed specifically for heat exchanger applications and provides superior performance in cyclic applications and where a high level of radial shear is present. Differential movement between flanges can cause tremendous relaxation issues on traditional heat exchanger gaskets. This problem is addressed in the design of the CMG-EX gasket, as it maintains a highest degree of tightness through operation and the full cycle event.

## CMGT

Lamons CMGT style gasket maintains the same distinctive performance of the CMG, but provides an additional level of chemical resistance by utilizing a PTFE inner ring. Premium flexible graphite covering layers are used over a corrugated substrate with a PTFE facing covering the inner perimeter of the gasket. This configuration allows the user to maintain a "fire safe" design but have the benefits of additional chemical resistance with less potential of graphite contamination in their process.

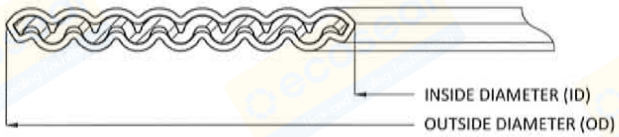
## CMG-PTFE

Lamons CMG-PTFE gasket is also based upon the same design as the CMG, but utilizes full expanded PTFE covering layers. This design is commonly used in FRP or plastic piping where low available load is critical. Premium chemical resistance is realized by the pure PTFE facings, and a variety of metallurgical substrates can be used to match the piping system. The same proprietary substrate geometry is utilized to optimize recovery and resilience.

## CMG-HTG

Lamons CMG-HTG offers rebound and a recovery characteristics where movement between the flanges is a concern, and oxidation of the graphite facing is a potential at elevated temperatures. Lamons CMG-HTG (high temperature gasket) is configured such that the sealing benefit of graphite is included, and is protected with oxidation-resistant barriers of mica material.

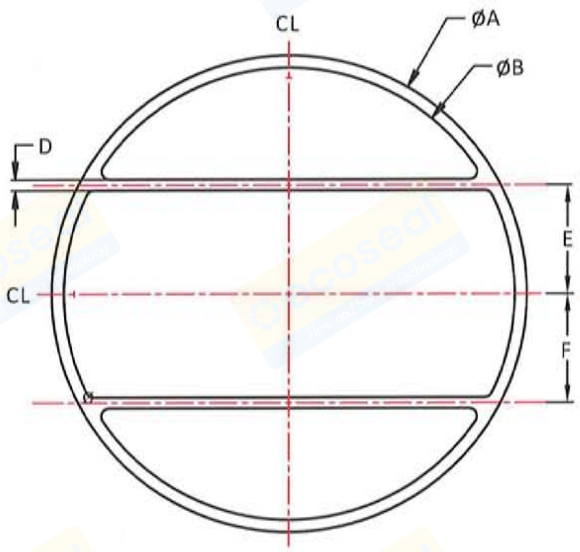
## Dimensions for Corrugated Metal Gasket (CMG) to Suit ASME B16.5 Flanges

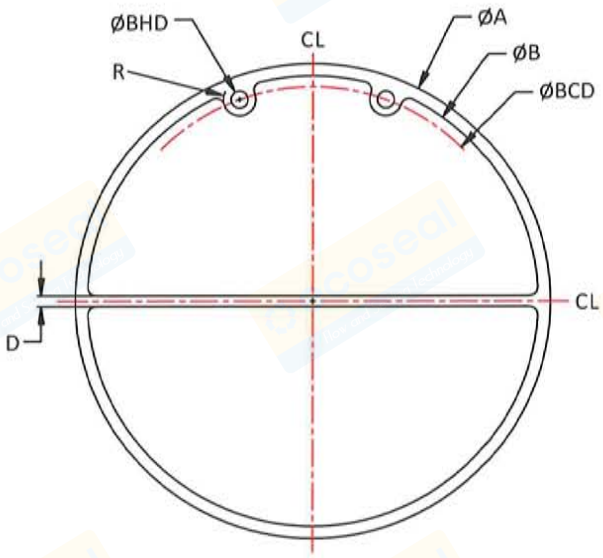


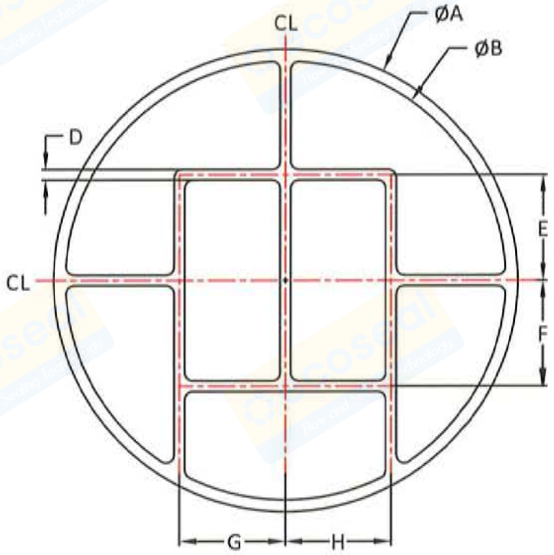

| Nominal Pipe Size (NPS) | Class 150 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 1.88 | 48 |
| 3/4 | 1.06 | 27 | 2.25 | 57 |
| 1 | 1.31 | 33 | 2.62 | 67 |
| 1 1/4 | 1.66 | 42 | 3.00 | 76 |
| 1 1/2 | 1.91 | 49 | 3.38 | 86 |
| 2 | 2.38 | 60 | 4.12 | 105 |
| 2 1/2 | 2.88 | 73 | 4.88 | 124 |
| 3 | 3.50 | 89 | 5.38 | 137 |
| 3 1/2 | 4.00 | 102 | 6.38 | 162 |
| 4 | 4.50 | 114 | 6.88 | 175 |
| 5 | 5.56 | 141 | 7.75 | 197 |
| 6 | 6.62 | 168 | 8.75 | 222 |
| 8 | 8.62 | 219 | 11.00 | 279 |
| 10 | 10.75 | 273 | 13.38 | 340 |
| 12 | 12.75 | 324 | 16.13 | 410 |
| 14 | 14.00 | 356 | 17.75 | 451 |
| 16 | 16.00 | 406 | 20.25 | 514 |
| 18 | 18.00 | 457 | 21.62 | 549 |
| 20 | 20.00 | 508 | 23.88 | 607 |
| 24 | 24.00 | 610 | 28.25 | 718 |

| Nominal Pipe Size (NPS) | Class 300 | | | |
|---|---|---|---|---|
| | Inside Diameter (ID) | | Outside Diameter (OD) | |
| | Inches | mm | Inches | mm |
| 1/2 | 0.84 | 21 | 2.12 | 54 |
| 3/4 | 1.06 | 27 | 2.62 | 67 |
| 1 | 1.31 | 33 | 2.88 | 73 |
| 1 1/4 | 1.66 | 42 | 3.25 | 83 |
| 1 1/2 | 1.91 | 49 | 3.75 | 95 |
| 2 | 2.38 | 60 | 4.38 | 111 |
| 2 1/2 | 2.88 | 73 | 5.12 | 130 |
| 3 | 3.50 | 89 | 5.88 | 149 |
| 3 1/2 | 4.00 | 102 | 6.50 | 165 |
| 4 | 4.50 | 114 | 7.12 | 181 |
| 5 | 5.56 | 141 | 8.50 | 216 |
| 6 | 6.62 | 168 | 9.88 | 251 |
| 8 | 8.62 | 219 | 12.12 | 308 |
| 10 | 10.75 | 273 | 14.25 | 362 |
| 12 | 12.75 | 324 | 16.62 | 422 |
| 14 | 14.00 | 356 | 19.12 | 486 |
| 16 | 16.00 | 406 | 21.25 | 540 |
| 18 | 18.00 | 457 | 23.50 | 597 |
| 20 | 20.00 | 508 | 25.75 | 654 |
| 24 | 24.00 | 610 | 30.50 | 775 |

# Lamons Heat Exchanger Specifications




Information required to fill an order:

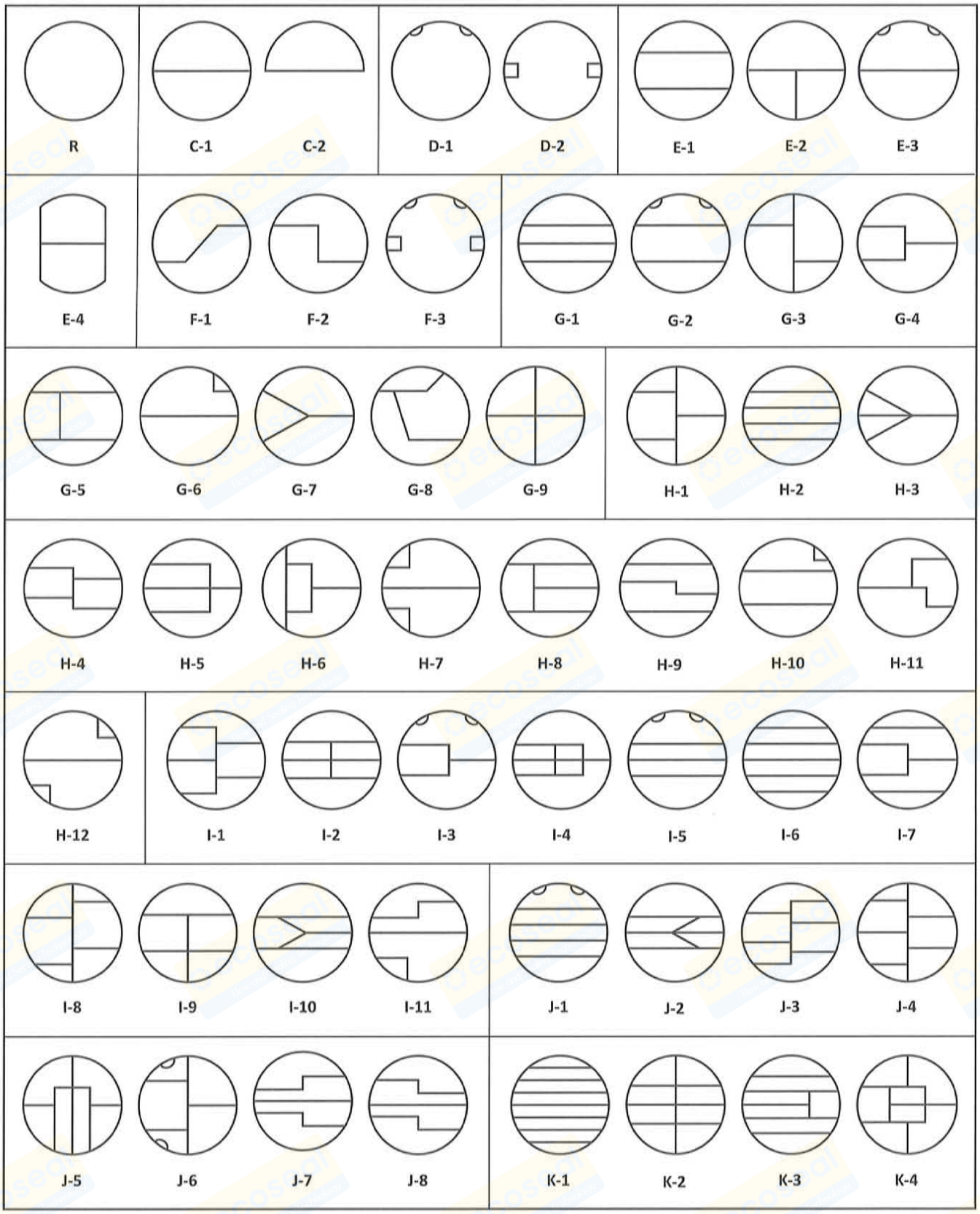
- Gasket shape per the standard shape index
- Metal material
- Filler/facing material
- Thickness

Dimensions required to fill an order:

A: Outside Diameter (OD)
B: Inside Diameter (ID)
D: Pass partition width
E: Distance from centerline of gasket to centerline of first pass partition
F: Distance from centerline of gasket to centerline of second pass partition
G: Distance from centerline of gasket to centerline of third pass partition
H: Distance from centerline of gasket to centerline of fourth pass partition
BCD: Bolt Circle Diameter
BHD: Bolt Hole Diameter
R: Radius
Number of bolt holes
(for full face gasket shape)

# Lamons Heat Exchanger Gaskets

## Standard shape index






LAMONS®
Sealing Global - Servicing Local

# Lamons Metal & Jacketed Gasket Product Family

Lamons jacketed gaskets are normally supplied with a non-asbestos, high temperature filler. The standard filler is normally sufficient for applications up to 900°F (482°C). Other soft fillers are available for higher temperatures or special applications. Standard metals used to make jacketed gaskets, regardless of the type, are aluminum, copper, the various brasses, soft steel, nickel, Monel®, Inconel®, and stainless steel types 304, 316, 321, 347, 410. The choice of metal used for the jacketed part of gasket would depend upon the service conditions being encountered.

## Style 300 Double Jacketed Gasket

Double jacketed gaskets are most commonly used in heat exchanger applications. They are available in virtually any material that is commercially found in 26 gauge sheet. They are also used in standard flanges where the service is not critical and at temperatures beyond which a soft gasket can be used. Since most double jacketed gaskets are custom made, there is virtually no limit to the size, shape or configuration in which these gaskets can be made. This particular type of gasket can be used in a myriad of applications. Since the size and shape are not a problem and since most materials can be obtained commercially, this particular gasket style is popular. It must be remembered that the primary seal against leakage, using a double jacketed gasket, is the metal inner lap where the gasket is thickest before being compressed and densest when compressed. This particular section flows, affecting the seal. As a consequence, the entire inner lap must be under compression. Frequently, the outer lap is not under compression and does not aid in the sealing of the gasket. On most heat exchanger applications the outer lap is also under compression, providing a secondary seal. The intermediate part of a double-jacketed gasket does very little to effect the sealing capability of the gasket. In some cases, nubbins are provided on heat exchanger designs to provide an intermediate seal. This nubbin is normally 1/64" (0.4 mm) high by 1/8" (3 mm) wide. Experience has indicated, however, that there is little advantage to this particular design. The primary seal is still dependent on the inner lap of the gasket doing the brute work and the secondary seal, when applicable, would be provided by the outer lap.

## Style 310 Plain Flat Metal Gaskets

Flat metal gaskets are best suited for applications such as valve bonnets, ammonia fittings, heat exchangers, hydraulic presses, tongue-and-groove joints. They can be used when compressibility is not required to compensate for flange surface finish, warpage or misalignment, and where sufficient clamping force is available to seat the particular metal selected. They must be sealed by the flow of the gasket metal into the imperfections on the gasket seating surfaces of the flange. This typically requires heavy compressive forces. The hardness of gasket metal must be less than the hardness of the flanges to prevent damage to the gasket seating surface of the flange. Flat metal gaskets are relatively inexpensive to produce and can be made of virtually any material that is available in sheet form. Size limitation is normally restricted to the sheet size. Larger gaskets can be fabricated by welding.

**Note:** Monel® and Inconel® are registered trademarks of Special Metals Corporation.

## Style 320 Round Cross Section, Solid Metal Gaskets

Round cross section solid metal gaskets are used on specifically designed flanges grooved or otherwise faced to accurately locate the gasket during assembly. These gaskets seal by a line contact which provides an initial high seating stress at low bolt loads. This makes an ideal gasket for low pressures. The more common materials used for this type of gasket would be aluminum, copper, soft iron or steel, Monel, nickel, and 300 series stainless steels. They are fabricated from wire, formed to size and welded. The weld is then polished to the exact wire diameter.

## Style 333 Double Jacketed Corrugated Gasket

The double jacketed corrugated gasket is an improvement on a plain jacketed gasket in that the corrugations on the gasket will provide an additional labyrinth seal. It also provides the advantage of reducing the contact area of the gasket, enhancing its compressive characteristics. A double jacketed corrugated gasket still relies on the primary seal on the inner lap.

## Style 340 Double Jacketed Corrugated Gasket with a Corrugated Metal Filler

At temperatures in excess of the range of 900°F (483°C) to 1000°F (538°C) where the standard soft filler is normally not recommended, a double jacketed corrugated metal gasket with a corrugated metal filler can be beneficial. This construction has the advantages of the double jacketed corrugated metal gasket and, in addition, since the filler is normally the same material as the gasket itself, the upper temperature limit would be determined by the metal being used. This type of gasket, depending upon metal selected, is designed to be a heat exchanger gasket for high pressure, high temperature applications.

## Style 341 Double Jacketed Corrugated Gasket with Corrugated Metal Filler

Style 341 is the same general configuration as the Style 340, specifically using a 1/32" (0.8 mm) thick corrugated metal filler. In addition, 0.015" (0.4 mm) thick flexible graphite will be applied to both top/bottom

## Style 344 Profile Gaskets

Profile type gaskets offer the desirable qualities of plain washer types and the added advantage of a reduced contact area provided by the V-shaped surface. It is used when a solid metal gasket is required because of pressure or temperature or because of the highly corrosive effect of the fluid to be contained and also when bolting is not sufficient to seat a flat washer.

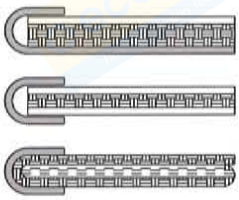
## Style 345/346 A Profile Gasket with a Metal Jacket

345

346

If flange conditions require a profile type gasket, but flange protection is required as well, the profile gasket may be supplied with either a single jacketed or a double jacketed shield. This will provide protection for the flanges and will minimize damage to the flange faces due to the profile surface.

## French Type Gaskets



French type gaskets are available in a one-piece jacketed construction for narrow radial widths not exceeding 1/4" (6.35 mm) and in two and three-piece constructions. This type of gasket can also be used with the jacket on the external edge of the gasket when the application requires the outer edge of the gasket to be exposed to fluid pressure. The most widely used French type gaskets are fabricated using a copper sheath. The double jacketed construction is preferred over the French or single jacketed construction, where practical, since it provides a totally sheathed gasket with none of the soft filler exposed.

## Style 350 Single Jacketed Gasket

The majority of applications for single jacketed gaskets are normally 1/4" (6.35 mm) or less in radial width. This type of gasket is used in air tool applications and engine applications where space is limited, gasket seating surfaces are narrow and relatively low compressive forces are available for seating the gasket.

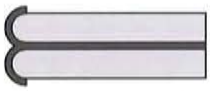
## Style 382 Single Jacketed Overlap

In the single-jacketed overlap construction the maximum flange width is approximately 1/4" (6.4 mm). This type of gasket is used when total enclosure of the soft filler material is required and when the flange width makes it impractical to use a double jacketed gasket

## Style 375 Double Jacketed Double Shell Gasket

The double-jacketed, double-shelled gasket is similar to the double jacketed gasket except that instead of using a shell and a liner, two shells are used in the fabrication of the gasket. It has the advantage of a double lap at both the ID and the OD of the gasket, adding greater stability to the gasket. The construction will withstand higher compressive loads. Double-shell gaskets are normally restricted to use in high pressure applications.

## Style 395 Modified French Type



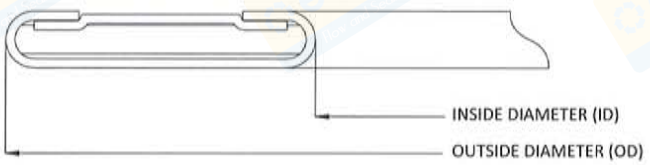
This particular type of gasket is normally used with very light flanges on duct work handling hot gases. Its construction consists of two French type shields welded together with a Cerafelt filler material on either side of the metal. Metal thickness is normally 26 gauge, rolled on the ID to act as a shield.

## Style 370 Corrugated Gasket

The Style 370 includes adhering non-asbestos material strips or fiberglass cord to the corrugated faces – typically in the "valleys".

**Note:** Without exception all of the solid metal gaskets require a very fine surface finish on the flanges. A flange with a flange surface roughness of 63 AARH or smoother is desired. Under no circumstances should the surface finish exceed 125 AARH. In addition, radial gouges or scores would be almost impossible to seal using solid metal gaskets.

# Dimensions for Double Jacketed (DJ) Gaskets per ASME B16.20 to Suit ASME B16.5 Flanges




| Nominal Pipe Size (NPS) | Gasket Inside Diameter (ID) (1) | | Gasket Outside Diameter (OD) by Class (1) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 150 | | 300 | | 400 (2) | | 600 | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | 0.880 | 22.4 | 1.750 | 44.5 | 2.000 | 50.8 | -- | -- | 2.000 | 50.8 |
| 3/4 | 1.130 | 28.7 | 2.130 | 54.1 | 2.500 | 63.5 | -- | -- | 2.500 | 63.5 |
| 1 | 1.500 | 38.1 | 2.500 | 63.5 | 2.750 | 69.9 | -- | -- | 2.750 | 69.9 |
| 1 1/4 | 1.880 | 47.8 | 2.880 | 73.2 | 3.130 | 79.5 | -- | -- | 3.130 | 79.5 |
| 1 1/2 | 2.130 | 54.1 | 3.250 | 82.6 | 3.630 | 92.2 | -- | -- | 3.630 | 92.2 |
| 2 | 2.880 | 73.2 | 4.000 | 101.6 | 4.250 | 108.0 | -- | -- | 4.250 | 108.0 |
| 2 1/2 | 3.380 | 85.9 | 4.750 | 120.7 | 5.000 | 127.0 | -- | -- | 5.000 | 127.0 |
| 3 | 4.250 | 108.0 | 5.250 | 133.4 | 5.750 | 146.1 | -- | -- | 5.750 | 146.1 |
| 4 | 5.190 | 131.8 | 6.750 | 171.5 | 7.000 | 177.8 | 6.880 | 174.8 | 7.500 | 190.5 |
| 5 | 6.000 | 152.4 | 7.630 | 193.8 | 8.380 | 212.9 | 8.250 | 209.6 | 9.380 | 238.3 |
| 6 | 7.500 | 190.5 | 8.630 | 219.2 | 9.750 | 247.7 | 9.630 | 244.6 | 10.380 | 263.7 |
| 8 | 9.380 | 238.3 | 10.880 | 276.4 | 12.000 | 304.8 | 11.880 | 301.8 | 12.500 | 317.5 |
| 10 | 11.250 | 285.8 | 13.250 | 336.6 | 14.130 | 358.9 | 14.000 | 355.6 | 15.630 | 397.0 |
| 12 | 13.500 | 342.9 | 16.000 | 406.4 | 16.500 | 419.1 | 16.380 | 416.1 | 17.880 | 454.2 |
| 14 | 14.750 | 374.7 | 17.630 | 447.8 | 19.000 | 482.6 | 18.880 | 479.6 | 19.250 | 489.0 |
| 16 | 16.750 | 425.5 | 20.130 | 511.3 | 21.130 | 536.7 | 21.000 | 533.4 | 22.130 | 562.1 |
| 18 | 19.250 | 489.0 | 21.500 | 546.1 | 23.380 | 593.9 | 23.250 | 590.6 | 24.000 | 609.6 |
| 20 | 21.000 | 533.4 | 23.750 | 603.3 | 25.630 | 651.0 | 25.380 | 644.7 | 26.750 | 679.5 |
| 24 | 25.250 | 641.4 | 28.130 | 714.5 | 30.380 | 771.7 | 30.130 | 765.3 | 31.000 | 787.4 |

| Nominal Pipe Size (NPS) | Gasket Inside Diameter (ID) (1) | | Gasket Outside Diameter (OD) by Class (1) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 900 (3) | | 1500 | | 2500 (4) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 1/2 | 0.880 | 22.4 | -- | -- | 2.380 | 60.5 | 2.630 | 66.8 |
| 3/4 | 1.130 | 28.7 | -- | -- | 2.630 | 66.8 | 2.880 | 73.2 |
| 1 | 1.500 | 38.1 | -- | -- | 3.000 | 76.2 | 3.250 | 82.6 |
| 1 1/4 | 1.880 | 47.8 | -- | -- | 3.380 | 85.9 | 4.000 | 101.6 |
| 1 1/2 | 2.130 | 54.1 | -- | -- | 3.750 | 95.3 | 4.500 | 114.3 |
| 2 | 2.880 | 73.2 | -- | -- | 5.500 | 139.7 | 5.630 | 143.0 |
| 2 1/2 | 3.380 | 85.9 | -- | -- | 6.380 | 162.1 | 6.500 | 165.1 |
| 3 | 4.250 | 108.0 | 6.500 | 165.1 | 6.750 | 171.5 | 7.630 | 193.8 |
| 4 | 5.190 | 131.8 | 8.000 | 203.2 | 8.130 | 206.5 | 9.130 | 231.9 |
| 5 | 6.000 | 152.4 | 9.630 | 244.6 | 9.880 | 251.0 | 10.880 | 276.4 |
| 6 | 7.500 | 190.5 | 11.250 | 285.8 | 11.000 | 279.4 | 12.380 | 314.5 |
| 8 | 9.380 | 238.3 | 14.000 | 355.6 | 13.750 | 349.3 | 15.130 | 384.3 |
| 10 | 11.250 | 285.8 | 17.000 | 431.8 | 17.000 | 431.8 | 18.630 | 473.2 |
| 12 | 13.500 | 342.9 | 19.500 | 495.3 | 20.380 | 517.7 | 21.500 | 546.1 |
| 14 | 14.750 | 374.7 | 20.380 | 517.7 | 22.630 | 574.8 | -- | -- |
| 16 | 16.750 | 425.5 | 22.500 | 571.5 | 25.130 | 638.3 | -- | -- |
| 18 | 19.250 | 489.0 | 25.000 | 635.0 | 27.630 | 701.8 | -- | -- |
| 20 | 21.000 | 533.4 | 27.380 | 695.5 | 29.630 | 752.6 | -- | -- |
| 24 | 25.250 | 641.4 | 32.880 | 835.2 | 35.380 | 898.7 | -- | -- |

General Note:
The gasket thickness tolerance is (+0.03 in., - 0.000 in.) (+0.8 mm, - 0.0 mm)

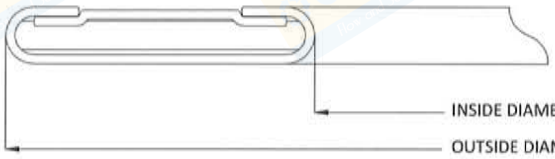
Note:
(1) For gaskets NPS 1/2 through NPS 24, the outside and inside diameter tolerances are +0.06 in, - 0.0 in. (+1.5 mm, - 0.0 mm)

(2) There are no Class 400 flanges for NPS 1/2 through NPS 3 (use Class 600)

(3) There are no Class 900 flanges for NPS 1/2 through NPS 2 1/2 (use Class 1500)

(4) There are no Class 2500 flanges NPS 14 and larger

# Dimensions for Double Jacketed (DJ) Gaskets per ASME B16.20 to Suit ASME B16.47 Series A Flanges




| Nominal Pipe Size (NPS) | Inside Diameter (ID) (1) | | Outside Diameter (OD) by Class (1) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Class 150 | | Class 300 | | Class 400 (2) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.50 | 673.1 | 30.38 | 771.7 | 32.75 | 831.9 | 32.63 | 828.8 |
| 28 | 28.50 | 723.9 | 32.63 | 828.8 | 35.25 | 895.4 | 35.00 | 889.0 |
| 30 | 30.50 | 774.7 | 34.63 | 879.6 | 37.38 | 949.5 | 37.13 | 943.1 |
| 32 | 32.50 | 825.5 | 36.88 | 936.8 | 39.50 | 1003.3 | 39.38 | 1000.3 |
| 34 | 34.50 | 876.3 | 38.88 | 987.6 | 41.50 | 1054.1 | 41.38 | 1051.1 |
| 36 | 36.50 | 927.1 | 41.13 | 1044.7 | 43.88 | 1114.6 | 43.88 | 1114.6 |
| 38 | 38.50 | 977.9 | 43.63 | 1108.2 | 41.38 | 1051.1 | 42.13 | 1070.1 |
| 40 | 40.50 | 1028.7 | 45.63 | 1159.0 | 43.75 | 1111.3 | 44.25 | 1124.0 |
| 42 | 42.50 | 1079.5 | 47.88 | 1216.2 | 45.75 | 1162.1 | 46.25 | 1174.8 |
| 44 | 44.50 | 1130.3 | 50.13 | 1273.3 | 47.88 | 1216.2 | 48.38 | 1228.9 |
| 46 | 46.50 | 1181.1 | 52.13 | 1324.1 | 50.00 | 1270.0 | 50.63 | 1286.0 |
| 48 | 48.50 | 1231.9 | 54.38 | 1381.3 | 52.00 | 1320.8 | 52.88 | 1343.2 |
| 50 | 50.50 | 1282.7 | 56.38 | 1432.1 | 54.13 | 1374.9 | 55.13 | 1400.3 |
| 52 | 52.50 | 1333.5 | 58.63 | 1489.2 | 56.13 | 1425.7 | 57.13 | 1451.1 |
| 54 | 54.50 | 1384.3 | 60.88 | 1546.4 | 58.63 | 1489.2 | 59.63 | 1514.6 |
| 56 | 56.50 | 1435.1 | 63.13 | 1603.5 | 60.63 | 1540.0 | 61.63 | 1565.4 |
| 58 | 58.50 | 1485.9 | 65.38 | 1660.7 | 62.63 | 1590.8 | 63.63 | 1616.2 |
| 60 | 60.50 | 1536.7 | 67.38 | 1711.5 | 64.63 | 1641.6 | 66.13 | 1679.7 |

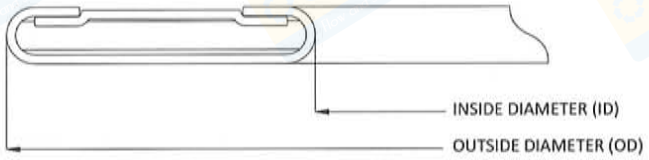
| Nominal Pipe Size (NPS) | Inside Diameter (ID) (1) | | Outside Diameter (OD) by Class (1) | | | |
|---|---|---|---|---|---|---|
| | | | Class 600 | | Class 900 (2) | |
| | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.50 | 673.1 | 34.00 | 863.6 | 34.63 | 879.6 |
| 28 | 28.50 | 723.9 | 35.88 | 911.4 | 37.13 | 943.1 |
| 30 | 30.50 | 774.7 | 38.13 | 968.5 | 39.63 | 1006.6 |
| 32 | 32.50 | 825.5 | 40.13 | 1019.3 | 42.13 | 1070.1 |
| 34 | 34.50 | 876.3 | 42.13 | 1070.1 | 44.63 | 1133.6 |
| 36 | 36.50 | 927.1 | 44.38 | 1127.3 | 47.13 | 1197.1 |
| 38 | 38.50 | 977.9 | 43.38 | 1101.9 | 47.13 | 1197.1 |
| 40 | 40.50 | 1028.7 | 45.38 | 1152.7 | 49.13 | 1247.9 |
| 42 | 42.50 | 1079.5 | 47.88 | 1216.2 | 51.13 | 1298.7 |
| 44 | 44.50 | 1130.3 | 49.88 | 1267.0 | 53.75 | 1365.3 |
| 46 | 46.50 | 1181.1 | 52.13 | 1324.1 | 56.38 | 1432.1 |
| 48 | 48.50 | 1231.9 | 54.63 | 1387.6 | 58.38 | 1482.9 |
| 50 | 50.50 | 1282.7 | 56.88 | 1444.8 | -- | -- |
| 52 | 52.50 | 1333.5 | 58.88 | 1495.6 | -- | -- |
| 54 | 54.50 | 1384.3 | 61.13 | 1552.7 | -- | -- |
| 56 | 56.50 | 1435.1 | 63.13 | 1603.5 | -- | -- |
| 58 | 58.50 | 1485.9 | 65.38 | 1660.7 | -- | -- |
| 60 | 60.50 | 1536.7 | 68.13 | 1730.5 | -- | -- |

General Note:
The gasket thickness tolerance is +0.03 in, -0.000 in (+0.8 mm, -0.0 mm)

Notes:
(1) For gaskets NPS 26 through NPS 60, the outside diameter and inside diameter tolerances are +0.13 in, -0.000 in (+3.3 mm, -0.0 mm).

(2) There are no Class 900 flanges for NPS 50 and larger.

# Dimensions for Double Jacketed (DJ) Gaskets per ASME B16.20 to Suit ASME B16.47 Series B Flanges




| Nominal Pipe Size (NPS) | Inside Diameter (ID) (1) | | Outside Diameter (OD) by Class (1) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Class 150 | | Class 300 | | Class 400 (2) | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.50 | 673.1 | 28.44 | 722.4 | 30.25 | 768.4 | 29.25 | 743.0 |
| 28 | 28.50 | 723.9 | 30.44 | 773.2 | 32.38 | 822.5 | 31.38 | 797.1 |
| 30 | 30.50 | 774.7 | 32.44 | 824.0 | 34.75 | 882.7 | 33.63 | 854.2 |
| 32 | 32.50 | 825.5 | 34.56 | 877.8 | 36.88 | 936.8 | 35.75 | 908.1 |
| 34 | 34.50 | 876.3 | 36.69 | 931.9 | 39.00 | 990.6 | 37.75 | 958.9 |
| 36 | 36.50 | 927.1 | 38.75 | 984.3 | 41.13 | 1044.7 | 40.13 | 1019.3 |
| 38 | 38.50 | 977.9 | 41.00 | 1041.4 | 43.13 | 1095.5 | 42.13 | 1070.1 |
| 40 | 40.50 | 1028.7 | 43.00 | 1092.2 | 45.13 | 1146.3 | 44.25 | 1124.0 |
| 42 | 42.50 | 1079.5 | 45.00 | 1143.0 | 47.13 | 1197.1 | 46.25 | 1174.8 |
| 44 | 44.50 | 1130.3 | 47.00 | 1193.8 | 49.13 | 1247.9 | 48.38 | 1228.9 |
| 46 | 46.50 | 1181.1 | 49.31 | 1252.5 | 51.75 | 1314.5 | 50.63 | 1286.0 |
| 48 | 48.50 | 1231.9 | 51.31 | 1303.3 | 53.75 | 1365.3 | 52.88 | 1343.2 |
| 50 | 50.50 | 1282.7 | 53.31 | 1354.1 | 55.75 | 1416.1 | 55.13 | 1400.3 |
| 52 | 52.50 | 1333.5 | 55.31 | 1404.9 | 57.75 | 1466.9 | 57.13 | 1451.1 |
| 54 | 54.50 | 1384.3 | 57.50 | 1460.5 | 60.13 | 1527.3 | 59.63 | 1514.6 |
| 56 | 56.50 | 1435.1 | 59.50 | 1511.3 | 62.63 | 1590.8 | 61.63 | 1565.4 |
| 58 | 58.50 | 1485.9 | 62.06 | 1576.3 | 65.06 | 1652.5 | 63.63 | 1616.2 |
| 60 | 60.50 | 1536.7 | 64.06 | 1627.1 | 67.06 | 1703.3 | 66.13 | 1679.7 |

| Nominal Pipe Size (NPS) | Inside Diameter (ID) (1) | | Outside Diameter (OD) by Class (1) | | | |
|---|---|---|---|---|---|---|
| | | | Class 600 | | Class 900 (2) | |
| | Inches | mm | Inches | mm | Inches | mm |
| 26 | 26.50 | 673.1 | 30.00 | 762.0 | 32.88 | 835.2 |
| 28 | 28.50 | 723.9 | 32.13 | 816.1 | 35.38 | 898.7 |
| 30 | 30.50 | 774.7 | 34.50 | 876.3 | 37.63 | 955.8 |
| 32 | 32.50 | 825.5 | 36.63 | 930.4 | 39.88 | 1013.0 |
| 34 | 34.50 | 876.3 | 39.13 | 993.9 | 42.13 | 1070.1 |
| 36 | 36.50 | 927.1 | 41.13 | 1044.7 | 44.13 | 1120.9 |
| 38 | 38.50 | 977.9 | 43.38 | 1101.9 | 47.13 | 1197.1 |
| 40 | 40.50 | 1028.7 | 45.38 | 1152.7 | 49.13 | 1247.9 |
| 42 | 42.50 | 1079.5 | 47.88 | 1216.2 | 51.13 | 1298.7 |
| 44 | 44.50 | 1130.3 | 49.88 | 1267.0 | 53.75 | 1365.3 |
| 46 | 46.50 | 1181.1 | 52.13 | 1324.1 | 56.38 | 1432.1 |
| 48 | 48.50 | 1231.9 | 54.63 | 1387.6 | 58.38 | 1482.9 |
| 50 | 50.50 | 1282.7 | 56.88 | 1444.8 | -- | -- |
| 52 | 52.50 | 1333.5 | 58.88 | 1495.6 | -- | -- |
| 54 | 54.50 | 1384.3 | 61.13 | 1552.7 | -- | -- |
| 56 | 56.50 | 1435.1 | 63.13 | 1603.5 | -- | -- |
| 58 | 58.50 | 1485.9 | 65.38 | 1660.7 | -- | -- |
| 60 | 60.50 | 1536.7 | 68.13 | 1730.5 | -- | -- |

General Note:
The gasket thickness tolerance is +0.03 in, -0.000 in (+0.8 mm, -0.0 mm)

Notes:
(1) For gaskets NPS 26 through NPS 60, the outside diameter and inside diameter tolerances are +0.13 in, -0.000 in (+3.3 mm, -0.0 mm)

(2) There are no Class 900 flanges for NPS 50 and larger.

# Lamons Ring Type Joint (RTJ) Gasket Product Family



Lamons manufactures and supplies a large variety of ring type joint gaskets. Lamons Ring Type Joint (RTJ) standard size gaskets are manufactured in accordance to API 6A, API 17D and ASME B16.20 specifications.

### Oval (style 377)

### Octagonal (style 388)

Ring joint gaskets come in two basic types, an oval cross section (Style 377) and an octagonal cross section (Style 388). These basic shapes are used in pressures up to 10,000 psi (64 MPa). The dimensions are standardized and require specially grooved flanges. The octagonal cross section has a higher sealing efficiency than the oval and would be the preferred gasket. However, only the oval cross section can be used in the old type round bottom groove. The newer flat bottom groove design will accept either the oval or the octagonal cross section. The sealing surfaces on the ring joint grooves must be smoothly finished to 63 micro inches and be free of objectionable ridges, tool or chatter marks. RTJ assemblies seal by an initial line contact or an edging action as the compressive forces are applied.

The hardness of the ring should always be less than the hardness of the flanges to prevent flange deformation. Dimensions for standard ring joint gaskets and grooves are covered in ASME B16.20 and API 6A, API 17D and ASME B16.5/B16.20.

Lamons stocks a wide range of sizes and materials ready for immediate shipment, from R11 to R105. Our extensive inventory of raw materials allows for best in class delivery of special sizes and shapes. Please consult with Lamons Engineering for design of non-standard items.

## Typical Ring Joint Gasket Materials

| Material | Designation | Maximum Hardness Rockwell B | Maximum Hardness Brinell |
|---|---|---|---|
| Soft Iron | D | 56 | 90 |
| Low Carbon Steel | S | 68 | 120 |
| 4-6 Chrome | F-5* | 72 | 130 |
| 304 Stainless Steel | S304 | 83 | 160 |
| 316 Stainless Steel | S316 | 83 | 160 |
| 321 Stainless Steel | S321 | 83 | 160 |
| 347 Stainless Steel | S347 | 83 | 160 |
| 410 Stainless Steel | S410 | 86 | 170 |
| Alloy 625 | INC 625 | 89 | 180 |
| Alloy 825 | INC 825 | 92 | 195 |
| Other CRAs | Hardness shall meet Lamons material specifications | | |

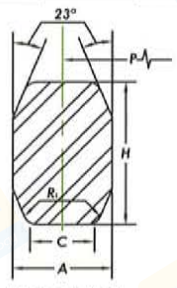
*F-5 identification designates ASTM Specification
A 182 chemical composition requirements only

# Size Designations for Oval or Octagonal Rings

| Nominal Pipe Size (NPS) | Flange Pressure Class | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 150 | 300-600 | 900 | 1500 | 2500 | API 6A (psi) | | |
| | | | | | | 2000 | 3000 | 5000 |
| 1/2 | -- | R-11 | R-12 | R-12 | R-13 | -- | -- | -- |
| 3/4 | -- | R-13 | R-14 | R-14 | R-16 | -- | -- | -- |
| 1 | R-15 | R-16 | R-16 | R-16 | R-18 | -- | -- | -- |
| 1 1/4 | R-17 | R-18 | R-18 | R-18 | R-21 | -- | -- | -- |
| 1 1/2 | R-19 | R-20 | R-20 | R-20 | R-23 | -- | -- | -- |
| 2 | R-22 | R-23 | R-24 | R-24 | R-26 | -- | -- | -- |
| 2 1/16 | -- | -- | -- | -- | -- | R-23 | R-24 | |
| 2 1/2 | R-25 | R-26 | R-27 | R-27 | R-28 | -- | -- | -- |
| 2 9/16 | -- | -- | -- | -- | -- | R-26 | R-27 | |
| 3 | R-29 | R-31 | R-31 | R-35 | R-32 | -- | -- | -- |
| 3 1/8 | -- | -- | -- | -- | -- | R-31 | | R-35 |
| 3 1/2 | R-33 | R-34 | R-34 | -- | -- | -- | -- | -- |
| 4 | R-36 | R-37 | R-37 | R-39 | R-38 | -- | -- | -- |
| 4 1/16 | -- | -- | -- | -- | -- | R-37 | | R-39 |
| 5 | R-40 | R-41 | R-41 | R-44 | R-42 | -- | -- | -- |
| 5 1/8 | -- | -- | -- | -- | -- | R-41 | | R-44 |
| 6 | R-43 | R-45 | R-45 | R-46 | R-47 | -- | -- | -- |
| 7 1/16 | -- | -- | -- | -- | -- | R-45 | | R-46 |
| 8 | R-48 | R-49 | R-49 | R-50 | R-51 | -- | -- | -- |
| 9 | -- | -- | -- | -- | -- | R-49 | | R-50 |
| 10 | R-52 | R-53 | R-53 | R-54 | R-55 | -- | -- | -- |
| 11 | -- | -- | -- | -- | -- | R-53 | | R-54 |
| 12 | R-56 | R-57 | R-57 | R-58 | R-60 | -- | -- | -- |
| 13 5/8 | -- | -- | -- | -- | -- | R-57 | | |
| 14 | R-59 | R-61 | R-62 | R-63 | -- | -- | -- | -- |
| 16 | R-64 | R-65 | R-66 | R-67 | -- | -- | -- | -- |
| 16 3/4 | -- | -- | -- | -- | -- | R-65 | | |
| 18 | R-68 | R-69 | R-70 | R-71 | -- | -- | -- | -- |
| 20 | R-72 | R-73 | R-74 | R-75 | -- | -- | -- | -- |
| 20 3/4 | -- | -- | -- | -- | -- | | R74 | |
| 21 1/4 | -- | -- | -- | -- | -- | R-73 | -- | -- |
| 22 | R-80 | R-81 | -- | -- | -- | -- | -- | -- |
| 24 | R-76 | R-77 | R-78 | R-79 | -- | -- | -- | -- |
| 26 | -- | R-93 | R-100 | -- | -- | -- | -- | -- |
| 28 | -- | R-94 | R-101 | -- | -- | -- | -- | -- |
| 30 | -- | R-95 | R-102 | -- | -- | -- | -- | -- |
| 32 | -- | R-96 | R-103 | -- | -- | -- | -- | -- |
| 34 | -- | R-97 | R-104 | -- | -- | -- | -- | -- |
| 36 | -- | R-98 | R-105 | -- | -- | -- | -- | -- |

# Dimensions for Type R Octagonal and Oval Ring Gaskets to Suit ASME B16.20 and API 6A

| Ring Number | Pitch Diameter of Ring (P) | | Width of Ring (A) | | Height of Ring | | | | Width of Flat on Octagonal Ring (C) | | Radius in Octagonal Ring (R1) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Oval (B) | | Octagonal (H) | | | | | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| R-11 | 1.344 | 34.14 | 0.250 | 6.35 | 0.440 | 11.2 | 0.380 | 9.7 | 0.170 | 4.32 | 0.060 | 1.5 |
| R-12 | 1.563 | 39.70 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-13 | 1.688 | 42.88 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-14 | 1.750 | 44.45 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-15 | 1.875 | 47.63 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-16 | 2.000 | 50.80 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-17 | 2.250 | 57.15 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-18 | 2.375 | 60.33 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-19 | 2.563 | 65.10 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-20 | 2.688 | 68.28 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-21 | 2.844 | 72.24 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-22 | 3.250 | 82.55 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-23 | 3.250 | 82.55 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-24 | 3.750 | 95.25 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-25 | 4.000 | 101.60 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-26 | 4.000 | 101.60 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-27 | 4.250 | 107.95 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-28 | 4.375 | 111.13 | 0.500 | 12.70 | 0.750 | 19.1 | 0.690 | 17.5 | 0.341 | 8.66 | 0.060 | 1.5 |
| R-29 | 4.500 | 114.30 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-30 | 4.625 | 117.48 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-31 | 4.875 | 123.83 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-32 | 5.000 | 127.00 | 0.500 | 12.70 | 0.750 | 19.1 | 0.690 | 17.5 | 0.341 | 8.66 | 0.060 | 1.5 |
| R-33 | 5.188 | 131.78 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-34 | 5.188 | 131.78 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-35 | 5.375 | 136.53 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-36 | 5.875 | 149.23 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-37 | 5.875 | 149.23 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-38 | 6.188 | 157.18 | 0.625 | 15.88 | 0.880 | 22.4 | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-39 | 6.375 | 161.93 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-40 | 6.750 | 171.45 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-41 | 7.125 | 180.98 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-42 | 7.500 | 190.50 | 0.750 | 19.05 | 1.000 | 25.4 | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-43 | 7.625 | 193.68 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-44 | 7.625 | 193.68 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-45 | 8.313 | 211.15 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-46 | 8.313 | 211.15 | 0.500 | 12.70 | 0.750 | 19.1 | 0.690 | 17.5 | 0.341 | 8.66 | 0.060 | 1.5 |
| R-47 | 9.000 | 228.60 | 0.750 | 19.05 | 1.000 | 25.4 | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-48 | 9.750 | 247.65 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-49 | 10.625 | 269.88 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-50 | 10.625 | 269.88 | 0.625 | 15.88 | 0.880 | 22.4 | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-51 | 11.000 | 279.40 | 0.875 | 22.23 | 1.130 | 28.7 | 1.060 | 26.9 | 0.583 | 14.81 | 0.060 | 1.5 |
| R-52 | 12.000 | 304.80 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-53 | 12.750 | 323.85 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-54 | 12.750 | 323.85 | 0.625 | 15.88 | 0.880 | 22.4 | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-55 | 13.500 | 342.90 | 1.125 | 28.58 | 1.440 | 36.6 | 1.380 | 35.1 | 0.750 | 19.05 | 0.090 | 2.3 |
| R-56 | 15.000 | 381.00 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-57 | 15.000 | 381.00 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |



Octagonal

Tolerances:

**P** = average pitch diameter of ring, ± 0.007" (±0.18 mm)

**A** = width of ring, ± 0.008" (± 0.20 mm)

**B, H** = height of ring, (+ 0.05", -0.02") (+1.3 mm, -0.5 mm) Variation in height throughout the entire circumference of any given ring shall not exceed 0.02" within these tolerances

**C** = width of flat on octagonal ring ± 0.008" (±0.20 mm)

**B1** = radius in ring, ± 0.02" (± 0.5 mm)

23 deg = angle, ± 1/2 deg (± 0 deg 30min)



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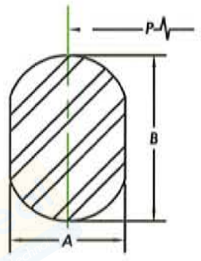
# Dimensions for Type R Octagonal and Oval Ring Gaskets per ASME B16.20 and API 6A

| Ring Number | Pitch Diameter of Ring (P) | | Width of Ring (A) | | Height of Ring | | | | Width of Flat on Octagonal Ring (C) | | Radius in Octagonal Ring (R1) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Oval (B) | | Octagonal (H) | | | | | |
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| R-58 | 15.000 | 381.00 | 0.875 | 22.23 | 1.130 | 28.7 | 1.060 | 26.9 | 0.583 | 14.81 | 0.060 | 1.5 |
| R-59 | 15.625 | 396.88 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-60 | 16.000 | 406.40 | 1.250 | 31.75 | 1.560 | 39.6 | 1.500 | 38.1 | 0.879 | 22.33 | 0.090 | 2.3 |
| R-61 | 16.500 | 419.10 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-62 | 16.500 | 419.10 | 0.625 | 15.88 | 0.880 | 22.4 | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-63 | 16.500 | 419.10 | 1.000 | 25.40 | 1.310 | 33.3 | 1.250 | 31.8 | 0.681 | 17.30 | 0.090 | 2.3 |
| R-64 | 17.875 | 454.03 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-65 | 18.500 | 469.90 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-66 | 18.500 | 469.90 | 0.625 | 15.88 | 0.880 | 22.4 | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-67 | 18.500 | 469.90 | 1.125 | 28.58 | 1.440 | 36.6 | 1.380 | 35.1 | 0.780 | 19.81 | 0.090 | 2.3 |
| R-68 | 20.375 | 517.53 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-69 | 21.000 | 533.40 | 0.438 | 11.13 | 0.690 | 17.5 | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-70 | 21.000 | 533.40 | 0.750 | 19.05 | 1.000 | 25.4 | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-71 | 21.000 | 533.40 | 1.125 | 28.58 | 1.440 | 36.6 | 1.380 | 35.1 | 0.780 | 19.81 | 0.090 | 2.3 |
| R-72 | 22.000 | 558.80 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-73 | 23.000 | 584.20 | 0.500 | 12.70 | 0.750 | 19.1 | 0.690 | 17.5 | 0.341 | 8.66 | 0.060 | 1.5 |
| R-74 | 23.000 | 584.20 | 0.750 | 19.05 | 1.000 | 25.4 | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-75 | 23.000 | 584.20 | 1.250 | 31.75 | 1.560 | 39.6 | 1.500 | 38.1 | 0.879 | 22.33 | 0.090 | 2.3 |
| R-76 | 26.500 | 673.10 | 0.313 | 7.95 | 0.560 | 14.2 | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-77 | 27.250 | 692.15 | 0.625 | 15.88 | 0.880 | 22.4 | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-78 | 27.250 | 692.15 | 1.000 | 25.40 | 1.310 | 33.3 | 1.250 | 31.8 | 0.681 | 17.30 | 0.090 | 2.3 |
| R-79 | 27.250 | 692.15 | 1.375 | 34.93 | 1.750 | 44.5 | 1.630 | 41.4 | 0.977 | 24.82 | 0.090 | 2.3 |
| R-80 | 24.250 | 615.95 | 0.313 | 7.95 | -- | -- | 0.500 | 12.7 | 0.206 | 5.23 | 0.060 | 1.5 |
| R-81 | 25.000 | 635.00 | 0.563 | 14.30 | -- | -- | 0.750 | 19.1 | 0.377 | 9.58 | 0.060 | 1.5 |
| R-82 | 2.250 | 57.15 | 0.438 | 11.13 | -- | -- | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-84 | 2.500 | 63.50 | 0.438 | 11.13 | -- | -- | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-85 | 3.125 | 79.38 | 0.500 | 12.70 | -- | -- | 0.690 | 17.5 | 0.341 | 8.66 | 0.060 | 1.5 |
| R-86 | 3.563 | 90.50 | 0.625 | 15.88 | -- | -- | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-87 | 3.938 | 100.03 | 0.625 | 15.88 | -- | -- | 0.810 | 20.6 | 0.413 | 10.49 | 0.060 | 1.5 |
| R-88 | 4.875 | 123.83 | 0.750 | 19.05 | -- | -- | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-89 | 4.500 | 114.30 | 0.750 | 19.05 | -- | -- | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-90 | 6.125 | 155.58 | 0.875 | 22.23 | -- | -- | 1.060 | 26.9 | 0.583 | 14.81 | 0.060 | 1.5 |
| R-91 | 10.250 | 260.35 | 1.250 | 31.75 | -- | -- | 1.500 | 38.1 | 0.879 | 22.33 | 0.090 | 2.3 |
| R-92 | 9.000 | 228.60 | 0.438 | 11.13 | 0.690 | -- | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-93 | 29.500 | 749.30 | 0.750 | 19.05 | -- | -- | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-94 | 31.500 | 800.10 | 0.750 | 19.05 | -- | -- | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-95 | 33.750 | 857.25 | 0.750 | 19.05 | -- | -- | 0.940 | 23.9 | 0.485 | 12.32 | 0.060 | 1.5 |
| R-96 | 36.000 | 914.40 | 0.875 | 22.23 | -- | -- | 1.060 | 26.9 | 0.583 | 14.81 | 0.060 | 1.5 |
| R-97 | 38.000 | 965.20 | 0.875 | 22.23 | -- | -- | 1.060 | 26.9 | 0.583 | 14.81 | 0.060 | 1.5 |
| R-98 | 40.250 | 1022.35 | 0.875 | 22.23 | -- | -- | 1.060 | 26.9 | 0.583 | 14.81 | 0.060 | 1.5 |
| R-99 | 9.250 | 234.95 | 0.438 | 11.13 | -- | -- | 0.630 | 16.0 | 0.305 | 7.75 | 0.060 | 1.5 |
| R-100 | 29.500 | 749.30 | 1.125 | 28.58 | -- | -- | 1.380 | 35.1 | 0.780 | 19.81 | 0.090 | 2.3 |
| R-101 | 31.500 | 800.10 | 1.250 | 31.75 | -- | -- | 1.500 | 38.1 | 0.879 | 22.33 | 0.090 | 2.3 |
| R-102 | 33.750 | 857.25 | 1.250 | 31.75 | -- | -- | 1.500 | 38.1 | 0.879 | 22.33 | 0.090 | 2.3 |
| R-103 | 36.000 | 914.40 | 1.250 | 31.75 | -- | -- | 1.500 | 38.1 | 0.879 | 22.33 | 0.090 | 2.3 |
| R-104 | 38.000 | 965.20 | 1.375 | 34.93 | -- | -- | 1.630 | 41.4 | 0.977 | 24.82 | 0.090 | 2.3 |
| R-105 | 40.250 | 1022.35 | 1.375 | 34.93 | -- | -- | 1.630 | 41.4 | 0.977 | 24.82 | 0.090 | 2.3 |




Oval

Tolerances:
**P** = average pitch diameter of ring, ±0.007" (±0.18 mm)
**A** = width of ring, ±0.008" (±0.20 mm)
**B, H** = height of ring, (+0.05", -0.02") (+1.3 mm, -0.5 mm) Variation in height throughout the entire circumference of any given ring shall not exceed 0.02" within these tolerances
**C** = width of flat on octagonal ring ±0.008" (±0.20 mm)
**B1** = radius in ring, ±0.02" (±0.5 mm)
23 deg= angle, ±1/2 deg (±0 deg 30min)

## RX Ring Designations for API 6B Flanges

RX ring gaskets are similar in shape to the standard octagonal ring joint gasket but their cross section is designed to take advantage of the contained fluid pressure in effecting a seal. They are made to API 6A and interchangeable with standard octagonal rings for oil field drilling and production applications in API 6B flanges. RX is used at pressures up to 15,000 psi (103 MPa). Standard sizes are stocked in low carbon steel, 304 and 316.

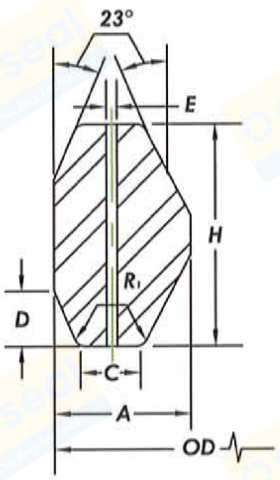
## RX Ring Designations for API 6B Flanges

| API Ring Number | Sizes of Flange (Inches) | | | | Weight | |
|---|---|---|---|---|---|---|
| | 2000 psi | 2900 psi | 3000 psi | 5000 psi | lbs | Kg |
| RX 20 | 1 1/2 | -- | 1 1/2 | 1 1/2 | 0.527 | 0.240 |
| RX 23 | 2 1/16 | -- | -- | -- | 1.150 | 0.523 |
| RX 24 | -- | -- | 2 1/16 | 2 1/16 | 1.330 | 0.605 |
| RX 26 | 2 9/16 | -- | -- | -- | 1.420 | 0.645 |
| RX 27 | -- | -- | 2 9/16 | 2 9/16 | 1.500 | 0.682 |
| RX 31 | 3 1/8 | -- | 3 1/8 | -- | 1.730 | 0.786 |
| RX 35 | -- | -- | -- | 3 1/8 | 1.910 | 0.868 |
| RX 37 | 4 1/16 | -- | 4 1/16 | -- | 2.090 | 0.950 |
| RX 39 | -- | -- | -- | 4 1/16 | 2.270 | 1.032 |
| RX 41 | 5 1/8 | -- | 5 1/8 | -- | 2.540 | 1.155 |
| RX 44 | -- | -- | -- | 5 1/8 | 2.720 | 1.236 |
| RX 45 | 7 1/16 | -- | 7 1/16 | -- | 2.960 | 1.345 |
| RX 46 | -- | -- | -- | 7 1/16 | 3.660 | 1.664 |
| RX 47 | -- | -- | -- | 8* | 8.560 | 3.891 |
| RX 49 | 9 | -- | 9 | -- | 3.790 | 1.723 |
| RX 50 | -- | -- | -- | 9 | 5.360 | 2.436 |
| RX 53 | 11 | -- | 11 | -- | 4.560 | 2.073 |
| RX 54 | -- | -- | -- | 11 | 6.450 | 2.932 |
| RX 57 | 13 5/8 | -- | 13 5/8 | -- | 5.360 | 2.436 |
| RX 63 | -- | -- | -- | 14 | 26.400 | 12.000 |
| RX 65 | 16 3/4 | -- | -- | -- | 6.630 | 3.014 |
| RX 66 | -- | -- | 16 3/4 | -- | 9.390 | 4.268 |
| RX 69 | 18 | -- | -- | -- | 7.520 | 3.418 |
| RX 70 | -- | -- | 18 | -- | 20.140 | 9.155 |
| RX 73 | 21 1/4 | -- | -- | -- | 11.630 | 5.286 |
| RX 74 | -- | -- | 20 3/4 | -- | 22.100 | 10.045 |
| RX 82 | -- | 1 | -- | -- | 0.790 | 0.359 |
| RX 84 | -- | 1 1/2 | -- | -- | 0.880 | 0.400 |
| RX 85 | -- | 2 | -- | -- | 0.880 | 0.400 |
| RX 86 | -- | 2 1/2 | -- | -- | 1.790 | 0.814 |
| RX 87 | -- | 3 | -- | -- | 1.980 | 0.900 |
| RX 88 | -- | 4 | -- | -- | 3.220 | 1.464 |
| RX 89 | -- | 3 1/2 | -- | -- | 2.980 | 1.355 |
| RX 90 | -- | 5 | -- | -- | 6.820 | 3.100 |
| RX 91 | -- | 10 | -- | -- | 17.100 | 7.773 |
| RX 99 | 8* | -- | 8* | -- | 3.310 | 1.505 |
| RX 201 | -- | -- | -- | -- | 0.250 | 0.114 |
| RX 205 | -- | -- | -- | -- | 0.300 | 0.136 |
| RX 210 | -- | -- | -- | -- | 0.750 | 0.341 |
| RX 215 | -- | -- | -- | -- | 1.500 | 0.682 |

*Crossover Flange Connections

# Dimensions for Type RX Ring Gaskets per ASME B16.20 and API 6A

| Ring Number | Pitch Diameter of Ring (P) | | Width of Ring (A) | | Width of Flat (C) | | Height of Outside Bevel (D) | | Height of Ring (H) | | Radius of Ring (R1) | | Hole Size (E)(1) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| RX-20 | 3.000 | 76.20 | 0.344 | 8.74 | 0.182 | 4.62 | 0.125 | 3.18 | 0.750 | 19.05 | 0.060 | 1.5 | -- | -- |
| RX-23 | 3.672 | 93.27 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-24 | 4.172 | 105.97 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-25 | 4.313 | 109.55 | 0.344 | 8.74 | 0.182 | 4.62 | 0.125 | 3.18 | 0.750 | 19.05 | 0.060 | 1.5 | -- | -- |
| RX-26 | 4.406 | 111.91 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-27 | 4.656 | 118.26 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-31 | 5.297 | 134.54 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-35 | 5.797 | 147.24 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-37 | 6.297 | 159.94 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-39 | 6.797 | 172.64 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-41 | 7.547 | 191.69 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-44 | 8.047 | 204.39 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-45 | 8.734 | 221.84 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-46 | 8.750 | 222.25 | 0.531 | 13.49 | 0.263 | 6.68 | 0.188 | 4.78 | 1.125 | 28.58 | 0.060 | 1.5 | -- | -- |
| RX-47 | 9.656 | 245.26 | 0.781 | 19.84 | 0.407 | 10.34 | 0.271 | 6.88 | 1.625 | 41.28 | 0.090 | 2.3 | -- | -- |
| RX-49 | 11.047 | 280.59 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-50 | 11.156 | 283.36 | 0.656 | 16.66 | 0.335 | 8.51 | 0.208 | 5.28 | 1.250 | 31.75 | 0.060 | 1.5 | -- | -- |
| RX-53 | 13.172 | 334.57 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-54 | 13.281 | 337.34 | 0.656 | 16.66 | 0.335 | 8.51 | 0.208 | 5.28 | 1.250 | 31.75 | 0.060 | 1.5 | -- | -- |
| RX-57 | 15.422 | 391.72 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-63 | 17.391 | 441.73 | 1.063 | 27.00 | 0.582 | 14.78 | 0.333 | 8.46 | 2.000 | 50.80 | 0.090 | 2.3 | -- | -- |
| RX-65 | 18.922 | 480.62 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-66 | 18.031 | 457.99 | 0.656 | 16.66 | 0.335 | 8.51 | 0.208 | 5.28 | 1.250 | 31.75 | 0.060 | 1.5 | -- | -- |
| RX-69 | 21.422 | 544.12 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-70 | 21.656 | 550.06 | 0.781 | 19.84 | 0.407 | 10.34 | 0.271 | 6.88 | 1.625 | 41.28 | 0.090 | 2.3 | -- | -- |
| RX-73 | 23.469 | 596.11 | 0.531 | 13.49 | 0.263 | 6.68 | 0.208 | 5.28 | 1.250 | 31.75 | 0.060 | 1.5 | -- | -- |
| RX-74 | 23.656 | 600.86 | 0.781 | 19.84 | 0.407 | 10.34 | 0.271 | 6.88 | 1.625 | 41.28 | 0.090 | 2.3 | -- | -- |
| RX-82 | 2.672 | 67.87 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | 0.060 | 1.5 |
| RX-84 | 2.922 | 74.22 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | 0.060 | 1.5 |
| RX-85 | 3.547 | 90.09 | 0.531 | 13.49 | 0.263 | 6.68 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | 0.060 | 1.5 |
| RX-86 | 4.078 | 103.58 | 0.594 | 15.09 | 0.335 | 8.51 | 0.188 | 4.78 | 1.125 | 28.58 | 0.060 | 1.5 | 0.090 | 2.3 |
| RX-87 | 4.453 | 113.11 | 0.594 | 15.09 | 0.335 | 8.51 | 0.188 | 4.78 | 1.125 | 28.58 | 0.060 | 1.5 | 0.090 | 2.3 |
| RX-88 | 5.484 | 139.29 | 0.688 | 17.48 | 0.407 | 10.34 | 0.208 | 5.28 | 1.250 | 31.75 | 0.060 | 1.5 | 0.120 | 3.0 |
| RX-89 | 5.109 | 129.77 | 0.719 | 18.26 | 0.407 | 10.34 | 0.208 | 5.28 | 1.250 | 31.75 | 0.060 | 1.5 | 0.120 | 3.0 |
| RX-90 | 6.875 | 174.63 | 0.781 | 19.84 | 0.479 | 12.17 | 0.292 | 7.42 | 1.750 | 44.45 | 0.090 | 2.3 | 0.120 | 3.0 |
| RX-91 | 11.297 | 286.94 | 1.188 | 30.18 | 0.780 | 19.81 | 0.297 | 7.54 | 1.781 | 45.24 | 0.090 | 2.3 | 0.120 | 3.0 |
| RX-99 | 9.672 | 245.67 | 0.469 | 11.91 | 0.254 | 6.45 | 0.167 | 4.24 | 1.000 | 25.40 | 0.060 | 1.5 | -- | -- |
| RX-201 | 2.026 | 51.46 | 0.226 | 5.74 | 0.126 | 3.20 | 0.057 | 1.45 | 0.445 | 11.30 | 0.02 (3) | 0.5 (3) | -- | -- |
| RX-205 | 2.453 | 62.31 | 0.219 | 5.56 | 0.12 | 3.05 | 0.072 (2) | 1.83 (2) | 0.437 | 11.10 | 0.02 (3) | 0.5 (3) | -- | -- |
| RX-210 | 3.844 | 97.64 | 0.375 | 9.53 | 0.231 | 5.87 | 0.125 (2) | 3.18 (2) | 0.750 | 19.05 | 0.03 (3) | 0.8 (3) | -- | -- |
| RX-215 | 5.547 | 140.89 | 0.469 | 11.91 | 0.21 | 5.33 | 0.167 (2) | 4.24 (2) | 1.000 | 25.40 | 0.06 (3) | 1.5 (3) | -- | -- |




**Note:**
(1) Rings RX-82 through RX-91 only require one pressure passage hole as illustrated. The Center line of the hole shall be located at the midpoint of dimension C.
(2) Tolerance on these dimensions is (+0, -0.015") (+0 mm,-0.38 mm).
(3) Tolerance on these dimensions is (+0.02", -0) (+0.5 mm, -0 mm)

**Tolerances:**
**OD** = outside diameter of ring, +0.020", -0 (+0.51 mm, -0 mm)
**A** = width of ring, +0.008", -0 (+0.20 mm, -0 mm) variation in width throughout the entire circumference of any ring shall not exceed 0.004" (0.10 mm) within these tolerances.
**C** = width of flat, +0.006", -0 (+0.15 mm, -0 mm)
**D** = height of outside bevel, +0, -0.03" (+0 mm, -0.76 mm)
**H** = height of ring, +0.008", -0 (+0.20 mm, -0 mm) variation in height througout the entire circumference of any ring shall not exceed 0.004" (0.10 mm) within these tolerances.
**R1** = radius of ring, ±0.02" (±0.5 mm)
**E** = hole size, ±0.02" (±0.5 mm)
23 deg = angle, ±1/2 deg (±0 deg 30 min)

## BX Ring Designations for API 6BX Flanges

The BX ring gasket differs from the standard oval or octagonal shape since it is square in cross section and tapers in each corner. They can only be used in API 6BX flanges. BX is used at pressures up to 15,000 psi. Standard sizes are stocked in low carbon steel, 304 and 316.

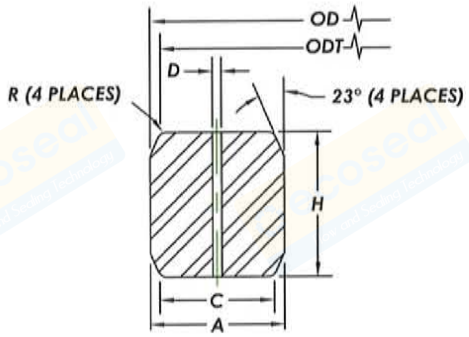
## BX Ring Designations for API 6BX Flanges

| API Ring Number | Nominal Flange Bore (Inches) | | | | | | Weight | |
|---|---|---|---|---|---|---|---|---|
| | 2000 psi | 3000 psi | 5000 psi | 10000 psi | 15000 psi | 20000 psi | lbs | Kg |
| BX 150 | -- | -- | -- | 1 11/16 | 1 11/16 | | 0.295 | 0.134 |
| BX 151 | -- | -- | -- | 1 13/16 | 1 13/16 | 1 13/16 | 0.337 | 0.153 |
| BX 152 | -- | -- | -- | 2 1/16 | 2 1/16 | 2 1/16 | 0.425 | 0.193 |
| BX 153 | -- | -- | -- | 2 9/16 | 2 9/16 | 2 9/16 | 0.632 | 0.287 |
| BX 154 | -- | -- | -- | 3 1/16 | 3 1/16 | 3 1/16 | 0.875 | 0.398 |
| BX 155 | -- | -- | -- | 4 1/16 | 4 1/16 | 4 1/16 | 1.220 | 0.555 |
| BX 156 | -- | -- | -- | 7 1/16 | 7 1/16 | 7 1/16 | 4.140 | 1.882 |
| BX 157 | -- | -- | -- | 9 | 9 | 9 | 6.550 | 2.977 |
| BX 158 | -- | -- | -- | 11 | 11 | 11 | 9.600 | 4.364 |
| BX 159 | -- | -- | -- | 13 5/8 | 13 5/8 | 13 5/8 | 14.410 | 6.550 |
| BX 160 | -- | -- | 13 5/8 | -- | -- | -- | 6.750 | 3.068 |
| BX 161 | -- | -- | -- | -- | -- | -- | 10.437 | 4.744 |
| BX 162 | -- | -- | 16 3/4 | 16 3/4 | -- | -- | 4.375 | 1.989 |
| BX 163 | -- | -- | 18 3/4 | -- | -- | -- | 14.375 | 6.534 |
| BX 164 | -- | -- | -- | 18 3/4 | 18 3/4 | -- | 21.000 | 9.545 |
| BX 165 | -- | -- | 21 1/4 | -- | -- | -- | 18.375 | 8.352 |
| BX 166 | -- | -- | -- | 21 1/4 | -- | -- | 27.500 | 12.500 |
| BX 167 | 26 3/4 | -- | -- | -- | -- | -- | 18.000 | 8.182 |
| BX 168 | -- | 26 3/4 | -- | -- | -- | -- | 24.500 | 11.136 |
| BX 169 | -- | -- | -- | 5 1/8 | 5 1/8 | -- | -- | -- |
| BX 303 | 30 | 30 | -- | -- | -- | -- | -- | -- |

| Additional Sizes | |
|---|---|
| Ring Number | Nominal Size |
| BX 170 | 6 5/8 |
| BX 171 | 8 9/16 |
| BX 172 | 11 5/32 |

# Dimensions for Type BX Ring Gaskets to Suit ASME B16.20 and API 6A

| Ring Number | Nominal Size | | Outerside Diameter of Ring (OD) | | Height of Ring, H | | Width of Ring, A | | Outside Diameter of Flat ODT | | Width of Flat, C | | Hole Size, D (1) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm |
| BX-150 | 1 11/16 | 43 | 2.842 | 72.19 | 0.366 | 9.30 | 0.366 | 9.30 | 2.790 | 70.87 | 0.314 | 7.98 | 0.060 | 1.5 |
| BX-151 | 1 13/16 | 46 | 3.008 | 76.40 | 0.379 | 9.63 | 0.379 | 9.63 | 2.954 | 75.03 | 0.325 | 8.26 | 0.060 | 1.5 |
| BX-152 | 2 1/16 | 52 | 3.334 | 84.68 | 0.403 | 10.24 | 0.403 | 10.24 | 3.277 | 83.24 | 0.346 | 8.79 | 0.060 | 1.5 |
| BX-153 | 2 9/16 | 65 | 3.974 | 100.94 | 0.448 | 11.38 | 0.448 | 11.38 | 3.910 | 99.31 | 0.385 | 9.78 | 0.060 | 1.5 |
| BX-154 | 3 1/16 | 78 | 4.600 | 116.84 | 0.488 | 12.40 | 0.488 | 12.40 | 4.531 | 115.09 | 0.419 | 10.64 | 0.060 | 1.5 |
| BX-155 | 4 1/16 | 103 | 5.825 | 147.96 | 0.560 | 14.22 | 0.560 | 14.22 | 5.746 | 145.95 | 0.481 | 12.22 | 0.060 | 1.5 |
| BX-156 | 7 1/16 | 179 | 9.367 | 237.92 | 0.733 | 18.62 | 0.733 | 18.62 | 9.263 | 235.28 | 0.629 | 15.98 | 0.120 | 3.0 |
| BX-157 | 9 | 229 | 11.593 | 294.46 | 0.826 | 20.98 | 0.826 | 20.98 | 11.476 | 291.49 | 0.709 | 18.01 | 0.120 | 3.0 |
| BX-158 | 11 | 279 | 13.860 | 352.04 | 0.911 | 23.14 | 0.911 | 23.14 | 13.731 | 348.77 | 0.782 | 19.86 | 0.120 | 3.0 |
| BX-159 | 13 5/8 | 346 | 16.800 | 426.72 | 1.012 | 25.70 | 1.012 | 25.70 | 16.657 | 423.09 | 0.869 | 22.07 | 0.120 | 3.0 |
| BX-160 | 13 5/8 | 346 | 15.850 | 402.59 | 0.938 | 23.83 | 0.541 | 13.74 | 15.717 | 399.21 | 0.408 | 10.36 | 0.120 | 3.0 |
| BX-161 | 16 5/8 | 422 | 19.347 | 491.41 | 1.105 | 28.07 | 0.638 | 16.21 | 19.191 | 487.45 | 0.482 | 12.24 | 0.120 | 3.0 |
| BX-162 | 16 5/8 | 422 | 18.720 | 475.49 | 0.560 | 14.22 | 0.560 | 14.22 | 18.641 | 473.48 | 0.481 | 12.22 | 0.060 | 1.5 |
| BX-163 | 18 3/4 | 476 | 21.896 | 556.16 | 1.185 | 30.10 | 0.684 | 17.37 | 21.728 | 551.89 | 0.516 | 13.11 | 0.120 | 3.0 |
| BX-164 | 18 3/4 | 476 | 22.463 | 570.56 | 1.185 | 30.10 | 0.968 | 24.59 | 22.295 | 566.29 | 0.800 | 20.32 | 0.120 | 3.0 |
| BX-165 | 21 1/4 | 540 | 24.595 | 624.71 | 1.261 | 32.03 | 0.728 | 18.49 | 24.417 | 620.19 | 0.550 | 13.97 | 0.120 | 3.0 |
| BX-166 | 21 1/4 | 540 | 25.198 | 640.03 | 1.261 | 32.03 | 1.029 | 26.14 | 25.020 | 635.51 | 0.851 | 21.62 | 0.120 | 3.0 |
| BX-167 | 26 3/4 | 679 | 29.896 | 759.36 | 1.412 | 35.86 | 0.516 | 13.11 | 29.696 | 754.28 | 0.316 | 8.03 | 0.060 | 1.5 |
| BX-168 | 26 3/4 | 679 | 30.128 | 765.25 | 1.412 | 35.86 | 0.632 | 16.05 | 29.928 | 760.17 | 0.432 | 10.97 | 0.060 | 1.5 |
| BX-169 | 5 1/8 | 130 | 6.831 | 173.51 | 0.624 | 15.85 | 0.509 | 12.93 | 6.743 | 171.27 | 0.421 | 10.69 | 0.060 | 1.5 |
| BX-170 | 6 5/8 | 168 | 8.584 | 218.03 | 0.560 | 14.22 | 0.560 | 14.22 | 8.505 | 216.03 | 0.481 | 12.22 | 0.060 | 1.5 |
| BX-171 | 8 9/16 | 217 | 10.529 | 267.44 | 0.560 | 14.22 | 0.560 | 14.22 | 10.450 | 265.43 | 0.481 | 12.22 | 0.060 | 1.5 |
| BX-172 | 11 5/32 | 283 | 13.113 | 333.07 | 0.560 | 14.22 | 0.560 | 14.22 | 13.034 | 331.06 | 0.481 | 12.22 | 0.060 | 1.5 |
| BX-303 | 30 | 762 | 33.573 | 852.75 | 1.494 | 37.95 | 0.668 | 16.97 | 33.361 | 847.37 | 0.457 | 11.61 | 0.060 | 1.5 |




**Note:**

(1) Rings RX-82 through RX-91 only require one pressure passage hole as illustrated. The Center line of the hole shall be located at the midpoint of dimension C.

(2) Tolerance on these dimensions is (+0, -0.015") (+0 mm,-0.38 mm)

(3) Tolerance on these dimensions is (+0.02", -0) (+0.5 mm, -0 mm)

**Tolerances:**

**OD** = outside diameter of ring, (+0.020", -0) (+0.51 mm, -0 mm)

**A** = width of ring, (+0.008", -0) (+0.20 mm, -0 mm) variation in width throughout the entire circumference of any ring shall not exceed 0.004" (0.10 mm) within these tolerances.

**C** = width of flat, (+0.006", -0) (+0.15 mm, -0 mm)

**D** = height of outside bevel, (+0, -0.03") (+0 mm, -0.76 mm)

**H** = height of ring, (+0.008", -0) (+0.20 mm, -0 mm) variation in height throughout the entire circumference of any ring shall not exceed 0.004" (0.10 mm) within these tolerances.

**R1** = radius of ring, ±0.02" (±0.5 mm)

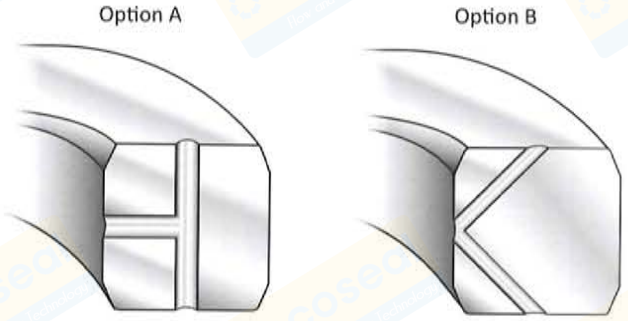
**E** = hole size, ±0.02" (±0.5 mm)

23 deg = angle, ±1/2 deg (±0 deg 30 min)

## SRX and SBX Ring Gaskets

Type SRX and SBX gaskets per API 17D for Subsea Wellhead and Tree Equipment are vented to prevent pressure lock when connections are made up underwater. They have identical measurements to RX and BX ring gaskets with the same number designation, and they will fit the same corresponding connectors. The "S" indicates these gaskets have cross-drilled holes, as fluid entrapment in the ring groove can interfere with proper make up underwater (subsea). With the vent hole, any water trapped between a ring groove bottom and the sealing area of the gasket can escape to the equipment I.D. bore. Material per spec is defined as a corrosion resistant alloy.

SBX ring gaskets can be manufactured in two options for drilling the pressure passage holes as shown below.




The purpose of these two pressure passage holes is to prevent pressure lock when connections are made up underwater.

## Markings for Standard Ring Type Joint Gaskets

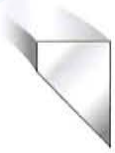
### Style 377R (Rubber Coated Rings)

Style 377R is a rubber coated oval ring gasket (usually steel) used in pressure testing to minimize damage to flanges. The rubber contact points provide additional seals while protecting the flange surfaces.

### Style 377T (Transition Rings)

Style 377T, combination rings combine two different sizes having the same pitch diameter permitting bolt up of differing size flanges.

### Bridgeman (Style 393)



The Bridgeman gasket is a pressure activated gasket for use on pressure vessel heads and valve bonnets for pressures of 1500 psi (10 MPa) and above. The cross section of the gasket is such that internal pressure acting against the ring forces it against the containing surface making a self-energized seal. Bridgeman gaskets are frequently silver plated or lead plated to provide a softer surface and minimize the force required to flow the gasket metal into the flange surface.

### Delta (Style 392)

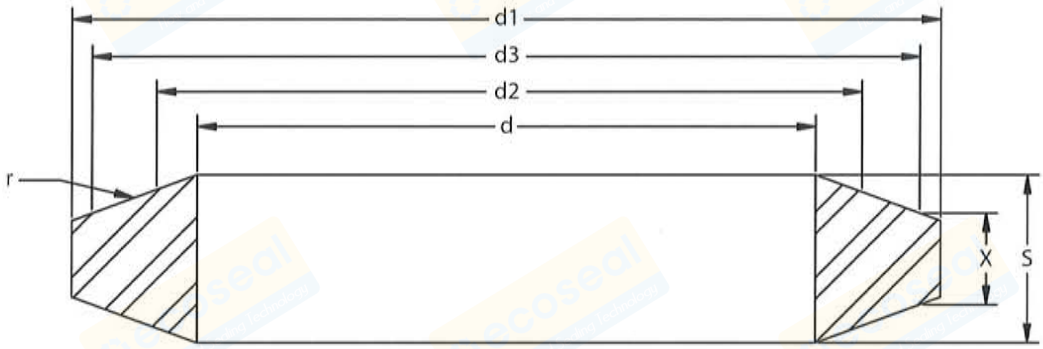
A delta gasket is a pressure actuated gasket used primarily on pressure vessels and valve bonnets at very high pressures in excess of 5000 psi (34 MPa). As with the lens gasket, complete drawings and material specifications must be supplied. Internal pressure forces the gasket material to expand when the pressure forces tend to separate the flanges. Extremely smooth surface finishes of 63 micro inches or smoother are required when using this type of gasket.

### Lens (Style 394)

A lens type gasket is a line contact seal for use in high pressure piping systems and in pressure vessel heads. The lens cross section is a spherical gasket surface and requires special machining on the flanges. These gaskets will seat with a small bolt load since the contact area is very small and gasket seating pressures are very high. Normally the gasket materials should be softer than the flange. In ordering lens gaskets, complete drawings and material specifications must be supplied.

# Dimensions for Lens Rings per DIN 2696

## (Millimeters)




| Nominal Pipe Size (DN) | d | | d1 | S for d Max | d2 Middle Contact Diameter | r | d3 | X |
|---|---|---|---|---|---|---|---|---|
| | min. | max. | | | | | | |
| **Nominal Pressure PN64-400** | | | | | | | | |
| 10 | 10 | 14 | 21 | 7 | 17.1 | 25 | 18 | 5.7 |
| 15 | 14 | 18 | 28 | 805 | 22 | 32 | 27 | 6 |
| 25 | 20 | 29 | 43 | 11 | 34 | 50 | 39 | 6 |
| 40 | 34 | 43 | 62 | 14 | 48 | 70 | 55 | 8 |
| 50 | 46 | 55 | 78 | 16 | 60 | 88 | 68 | 9 |
| 65 | 62 | 70 | 102 | 20 | 76.6 | 112 | 85 | 13 |
| 80 | 72 | 82 | 116 | 22 | 88.2 | 129 | 97 | 13 |
| 100 | 94 | 108 | 143 | 26 | 116 | 170 | 127 | 15 |
| 125 | 116 | 135 | 180 | 29 | 149 | 218 | 157 | 22 |
| 150 | 139 | 158 | 210 | 33 | 171 | 250 | 183 | 26 |
| **Nominal Pressure PN64-100** | | | | | | | | |
| *175 | 176 | 183 | 243 | 31 | 202.5 | 296 | 218 | 28 |
| 200 | 198 | 206 | 276 | 35 | 225 | 329 | 243 | 27 |
| 250 | 246 | 257 | 332 | 37 | 277.7 | 406 | 298 | 25 |
| 300 | 295 | 305 | 385 | 40 | 323.5 | 473 | 345 | 26 |
| 350 | 330 | 348 | 425 | 41 | 368 | 538 | 394 | 23 |
| 400 | 385 | 395 | 475 | 42 | 417.2 | 610 | 445 | 24 |
| **Nominal Pressure PN160-400** | | | | | | | | |
| *175 | 162 | 177 | 243 | 37 | 202.5 | 296 | 218 | 21 |
| 200 | 183 | 200 | 276 | 40 | 225 | 329 | 243 | 25 |
| 250 | 230 | 246 | 332 | 46 | 277.7 | 406 | 298 | 25 |
| 300 | 278 | 285 | 385 | 50 | 323.5 | 473 | 345 | 30 |

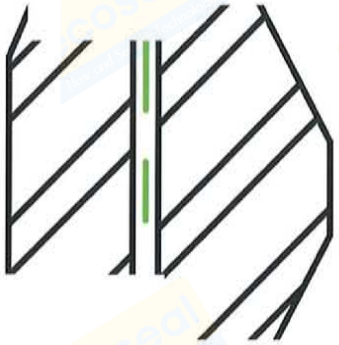
*Avoid using these Nominal Pipe Sizes

# Kammpro® Ring Type Joint (RTJ) Gaskets

## Kammpro-ORJ

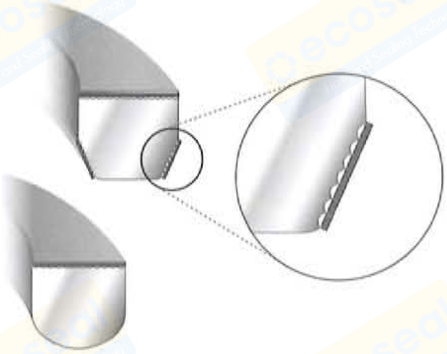
The Kammpro-ORJ is constructed to the standard octagonal API 6A or ASME B16.20 dimensions with the addition of the Kammpro design applied to the sealing areas and faced with oxidation resistant flexible graphite. This design is ideal for applications where cracking or embrittlement has been experienced in the ring joint groove. It is available in a large variety of metal material and can be fabricated as custom engineered designs. Special or custom sizing options are also available.

## Kamm-PEG



Kamm-PEG represents a Pressure Energized Gasket with Kammprofiled sealing surfaces, where a RX type ring is typically used for high pressure reactors. Frequently, custom ring are used in the top and bottom of hydro processing reactors. To greatly enhance sealing ability, top and bottom OD angled sealing gasket surfaces are serrated per Kammprofiled specifications and faced with oxidation inhibited flexible graphite. It has the benefits of under compression graphite flows into minor imperfections creating higher seal tightness.

## Kammpro Adapter (RTJ to RF)



Kammpro-Adapter gaskets allow for ring type joint flanges to be mated up to raised face flanges, utilizing the strengths of the full metallic with the added benefit of kamm profiled sealing surfaces laminated with flexible graphite. Provided the pitch of the groove is sufficiently located under the raised face, this design is among the most robust of adapter styles.

# Specialty Machined Products

Lamons maintains a high capacity of programable mill and lathe capability for custom machine work on most any specialty component. As a leading manufacturer of custom machined products for the refining, petrochemical and industrial markets, Lamons recognizes the quality and service levels these industries require. We have over 30 state of the art CNC machines operated by programmers and machinists to deliver high quality machined components with the quickest response time in the industry.

From a sample, drawing or CAD file, Lamons can program and manufacture/machine custom parts with the highest precision and repeatability within 0.0005" (0.013 mm).

Specialty rings and industrial machined components can be rapidly produced to exact dimensions and to customer specification. Lamons stocks the most extensive inventory of centrifugal castings, forgings and plate in the industry allowing us to respond quickly to most any customer need. From small machined components to rings over 6 feet (1800 mm), Lamons has the capacity and turning capability to deliver most any configuration of heavy cross sectioned components.