

# ISO-Universal Fittings

Sizes NW 63 to NW 630 (2½" to 25")



Series 76 ISO-Universal components are a vacuum flanging system for 63 mm to 1000 mm fittings. The dimension criteria are based on requirements established by the International Standards Organization (ISO). There are two flange styles in the ISO-Universal system: Multi-Fastener (MF) and Bolted. The flange family is also called: ISO-MF, ISO-PF or ISO-K. Figure 1 illustrates the components of this flange system.

This catalog features a large variety of components such as elbows, tees, crosses, reducers and adapters having ISO-MF flanges. Currently there is no ISO standard for the flange face to centerline distance in this system.

There is however, an industry standard followed by several manufacturers. MKS Instruments follows these standards in designing the Series 76 ISO-Universal components.

There are several advantages in the use of ISO components. One advantage is that the flange is “sexless.” The seal is on a symmetrical centering ring that interfaces with two identical flanges. In addition, ISO Universal flanges are more compact than ASA flanges, which were designed for pressure and are unnecessarily massive for vacuum use. Since these flanges are an ISO standard, they can be used with components from other manufacturers.

## Applications

The Series 76 ISO-Universal component system is used in a variety of industries from process manufacturing to semiconductor fabrication to thin film deposition. Some uses in vacuum systems are:

- Roughing and foreline plumbing for large vacuum systems
- High vacuum, high conductance, interconnections
- Modular systems which will be modified frequently
- Experimental systems in research laboratories

ISO-Universal flange components using elastomer seals are primarily designed for use at subatmospheric pressure. When elastomer seals are used without baking, typical limiting pressures may be around  $10^{-6}$  Torr. Baked systems using Viton® can be used to  $10^{-8}$  Torr. Standard components can be used to a slight over pressure. MF flanges may be used at a maximum pressure of 30 psig if the metal spacer ring is used and the flange clamps are firmly retained.



## Series 76 Components

- Elbows
- Tees
- Crosses
- Reducers
- Adapters

## Description

Series 76 ISO-Universal flanges and components in this catalog are made of type 304 stainless steel. Centering ring and seal assemblies are offered with an aluminum centering ring and spacer ring, or with a stainless centering ring and an aluminum spacer ring. Rotatable bolt rings and clamps are made of aluminum alloy. Retaining rings are made of steel.

Flange seal surfaces are carefully machined and inspected for defects. They are cleaned and packaged to remain clean and protected in shipping. The user should observe precaution as required to prevent seal surface harm. This is especially important for used components returned to storage.

## Installation

The Series 76 ISO-Universal flange components can be connected in various ways. The figures below illustrate some possibilities. Figure 2a shows a pair of MF flanges retained by double claw clamps. This is usually the most economical arrangement. In Figure 2b an MF flange with a rotatable bolt ring is joined to a bolted flange using nuts and bolts. In Figure 2c an MF flange is joined to a tapped bolt flange using single claw clamps. Tapped flanges are found on some valve bodies. Alternatively, a rotatable bolt ring could have been used with an MF flange to obtain the same result shown in Figure 2c. Last, Figure 2d shows a pair of bolted flanges joined in the usual way by nuts and bolts.

In attaching a rotatable bolt ring to an MF flange as in Figure 2b, the ring is first passed over the flange with the larger bore of the ring facing outward from the open port.

The split retaining ring is then snapped into the groove on the periphery of the MF flange. Then the bolt ring is pulled forward into position. Pairs of bolted flanges may also be used.

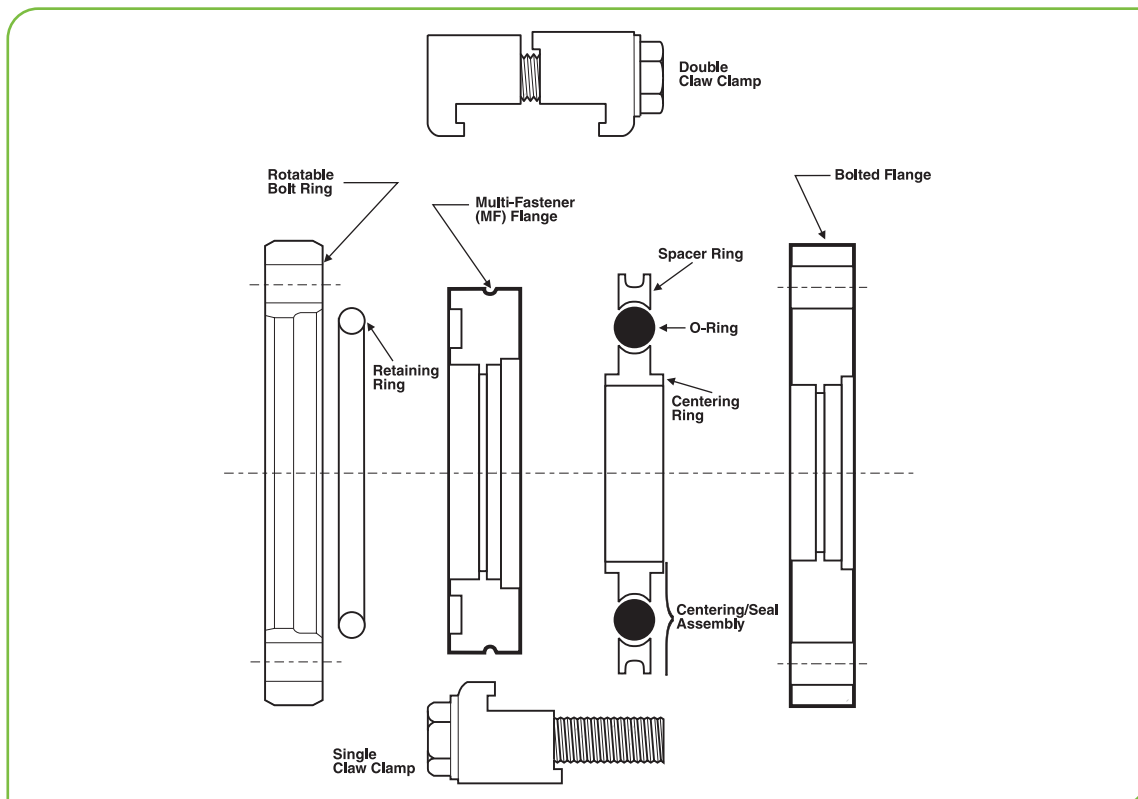


Figure 1 — Component Nomenclature for the ISO Universal Flange System

Figure 3 shows the dimensions of ISO Universal flange components for sizes from 63 to 630 mm, which are standard in this catalog. The maximum size for an MF flange is NW 500, while the bolted flange can run up to NW 1000. The recommended number of clamps to be used with MF flanges are also listed.

Flanges and seals are designed to be tightened to metal to metal contact. It is important that the clamps or bolts not be over tightened or warping of the flanges could result. The torque rating for clamps and bolts is 7 to 10 pounds per foot.

There are a variety of choices available when selecting centering ring assemblies. Two types of elastomers are available, Buna-N and Viton. Use Viton where temperatures, chemical resistance or long installed life make it beneficial. Use Buna-N where temperatures are

moderate, and installed useful life is consistent with this material. The centering ring is available in two types of metal: stainless steel and aluminum. Use stainless steel where chemical resistance is needed.

MKS Instruments presently supplies Series 76 ISO Universal flanges drilled for inch dimension tubing and pipe. Weld assembly should be by an experienced TIG or MIG welder. Bored flanges have been designed for assembly by internal fusion welding without the use of filler metal. Tacking is advisable. A weld rotator aides in making attractive welds with minimum warping. Excessive current or non uniform rotation can cause warping of the flange face. When there is a concern about warping, use a flange with a stub. Butt welding to stubs in sizes up to 10 inch diameter with a wall thickness of 1/8 inch can also be by fusion. Internal purge gas will prevent excessive oxidation.

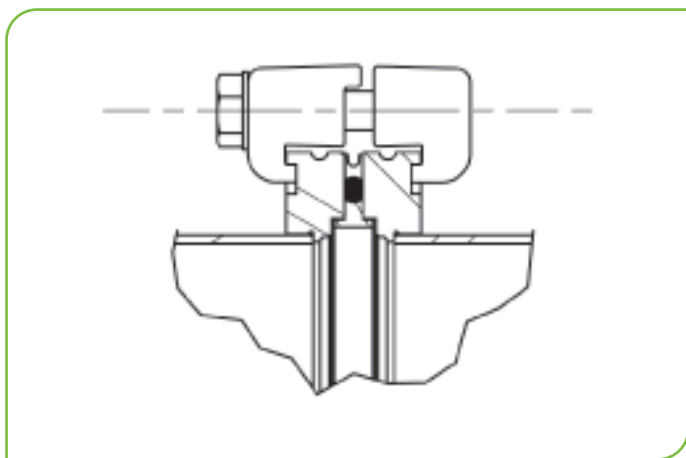


Figure 2a

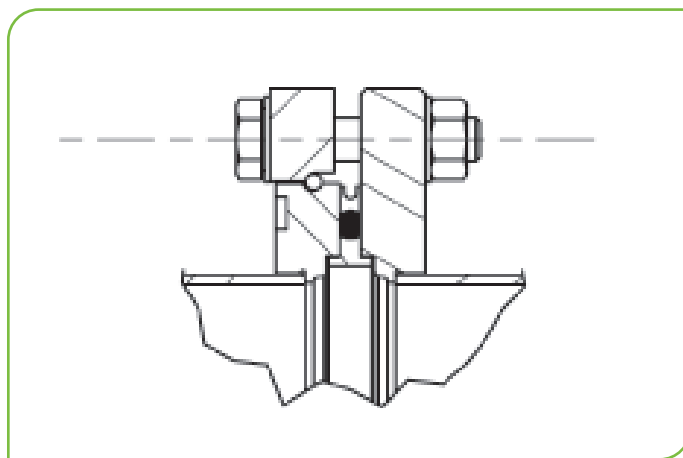


Figure 2b

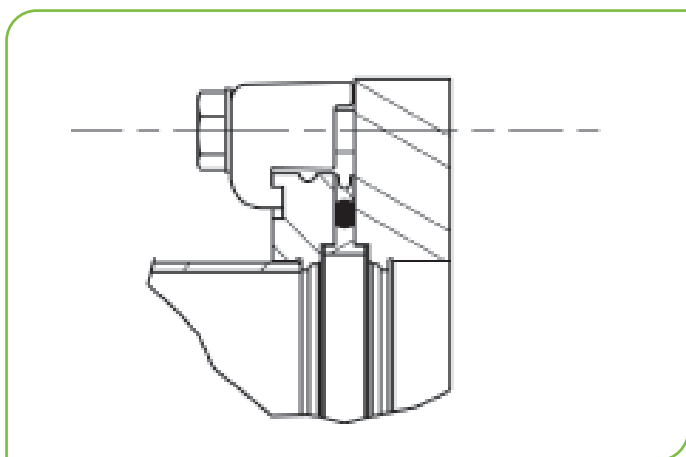


Figure 2c

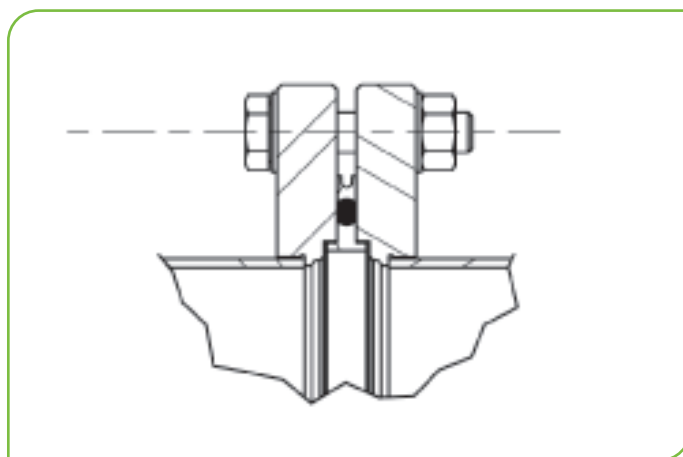


Figure 2d

Remove any oxidation by wire brushing. This should be done while the part is still slightly warm, since the oxides are nearly impossible to remove later. Use only a stainless steel wire brush or wheel, since ordinary steel brushes leave iron residue which will then rust.

Since the centering ring grooves on the NW 100 and NW 160 flange happen to be almost exactly the diameters of the tubing to be used with these sizes, the flange can be inadvertently welded on backwards. When working with

the MF flange, note that the clamp retaining groove goes to the rear (tube) side. Working with the bolted flange requires more care. Close inspection of the weld prep detail will show the recess from the tube side to have a negligible radius, while there is a small radius visible on the seal side.

The technical staff of MKS Instruments is available to help you with system design and any special needs you may encounter. Call 800-345-1967 for a quotation.

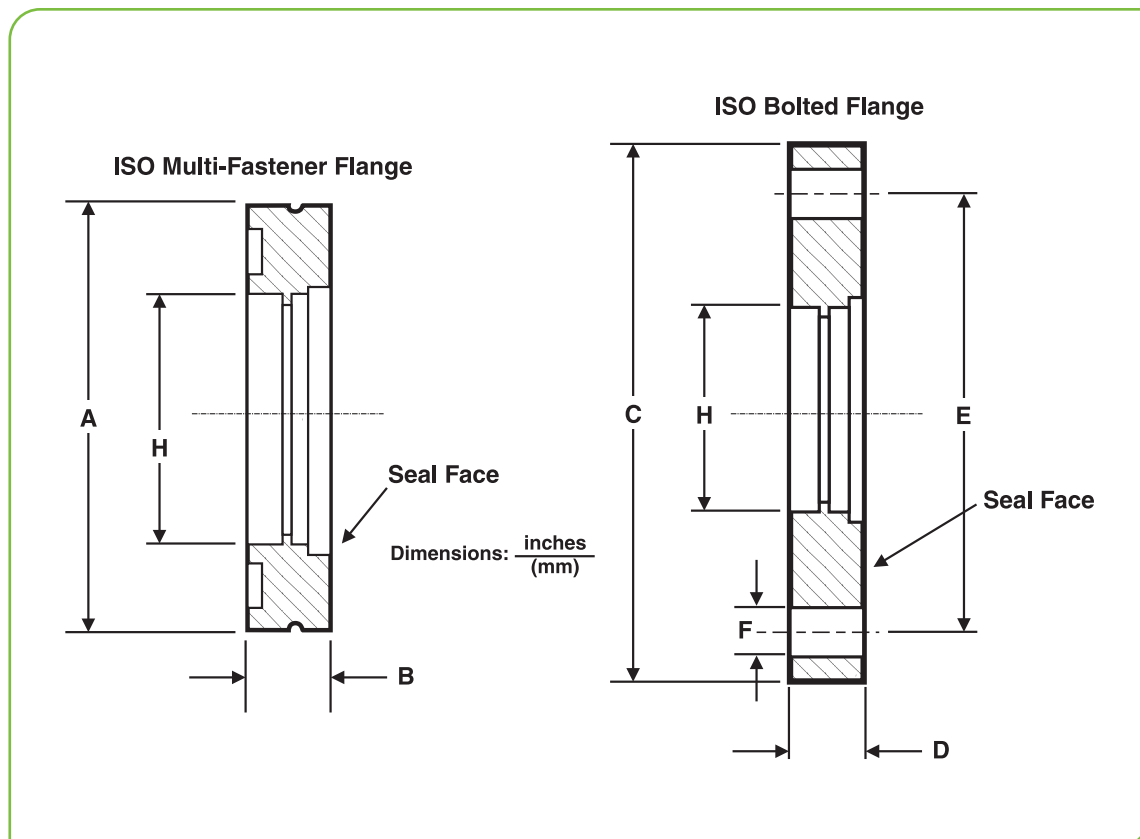


Figure 3

Specifications													
Maximum Pressure (with spacer ring)	30 psig												
Minimum Pressure	10 <sup>-8</sup> Torr												
Leak Check	>10 <sup>-9</sup> std-cc/s												
Torque Rating (clamps and bolts)	7-10 lbs/foot												
Materials	<ul style="list-style-type: none"> <li>• 304 stainless steel</li> <li>• Steel</li> <li>• Aluminum alloy</li> <li>• Aluminum alloy</li> <li>• Aluminum spacer ring, choice of aluminum or stainless steel centering ring, choice of Viton or Buna-N elastomer seal</li> </ul>												
Elastomer Comparison	<table border="1"> <thead> <tr> <th>Compound</th> <th>Color</th> <th>Bakeout</th> <th>Benefits</th> </tr> </thead> <tbody> <tr> <td><b>Buna-N</b> N674-70 Black 80°C Seals easier, lower cost</td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Viton®</b> V747-75 Black 150°C High temperature, lasts longer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Compound	Color	Bakeout	Benefits	<b>Buna-N</b> N674-70 Black 80°C Seals easier, lower cost				<b>Viton®</b> V747-75 Black 150°C High temperature, lasts longer			
Compound	Color	Bakeout	Benefits										
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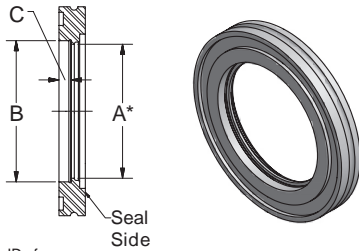
Nominal* Flange Size (mm)	H Suggested Table/Pipe Dims: ** O.D. x Wall (inches)	ISO Multi-Fastener Flange (ISO-MF)			ISO Bolted Flange (ISO-BF)					
		A (O.D.)	B (Thickness)	# Clamps Required	C (O.D.)	D (Thickness)	E (Bolt Circle)	F (Bolt Holes)	N (# Holes)	Wrench (mm)
NW 63	2.5 x .065	3.74 (95)	.47 (12)	3-4	5.12 (130)	.47 (12)	4.33 (110)	.35 (9)	4	13
NW 80	3.0 x .065	4.33 (110)	.47 (12)	4-8	5.71 (145)	.47 (12)	4.92 (125)	.35 (9)	8	13
NW 100	4.0 x .065	5.12 (130)	.47 (12)	4-8	6.50 (165)	.47 (12)	5.71 (145)	.35 (9)	8	13
NW 160	6.0 x .083	7.09 (180)	.47 (12)	4-8	8.86 (225)	.63 (16)	7.87 (200)	.43 (11)	8	17
NW 200	8.0 x .120	9.45 (240)	.47 (12)	6-12	11.22 (285)	.63 (16)	10.24 (260)	.43 (11)	12	17
NW 250	10.0 x .125	11.42 (290)	.47 (12)	6-12	13.19 (335)	.63 (16)	12.20 (310)	.43 (11)	12	17
NW 320	12.75 x .165	14.57 (370)	.67 (17)	8-12	16.73 (425)	.79 (20)	15.55 (395)	.55 (14)	12	19
NW 400	16.0 x .188	17.72 (450)	.67 (17)	8-16	20.08 (510)	.79 (20)	18.90 (480)	.55 (14)	16	19
NW 500	20.0 x .188	21.65 (550)	.67 (17)	12-16	24.02 (610)	.79 (20)	22.83 (580)	.55 (14)	16	19
NW 630	25.0 x .250	---	---	---	29.53 (750)	.94 (24)	28.35 (720)	.55 (14)	20	19

\* NW is retained here by convention. It does not specify the flange type but is from the German "Nennweite," meaning nominal diameter.

\*\* Schedule 5 pipe is for sizes 320 and above.

### Flange, Bored

in/mm



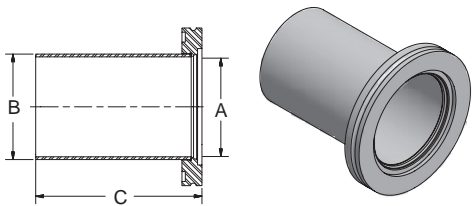
\* Given as ID of suggested tubing

- Stainless steel type 304
- For internal weld
- Infinitely rotatable
- Made for inch tube and pipe diameters
- Use with clamps or rotatable bolt ring

Flange Size (ISO)	Nominal Bore	A	B	C	Part Number
NW 63	2½"	2.37 (60)	2.50 (64)	0.22 (6)	100760206
NW 80	3"	2.87 (73)	3.00 (76)	0.22 (6)	100760208
NW 100	4"	3.87 (98)	4.00 (102)	0.22 (6)	100760210
NW 160	6"	5.83 (148)	6.00 (152)	0.22 (6)	100760216
NW 200	8"	7.76 (197)	8.00 (203)	0.22 (6)	100760220
NW 250	10"	9.75 (248)	10.00 (254)	0.22 (6)	100760225
NW 320	12 ¾"	12.42 (315)	12.75 (324)	0.30 (8)	100760232
NW 400	16"	15.62 (397)	16.00 (406)	0.30 (8)	100760240
NW 500	20"	19.62 (498)	20.00 (508)	0.30 (8)	100760250

### Flange, Long Weld Stub

in/mm

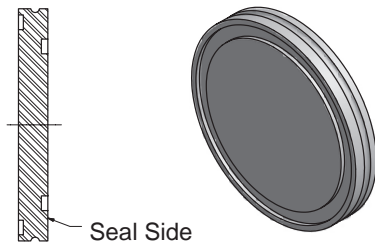


- Stainless steel type 304
- For butt weld
- Standard inch diameters
- Use with clamps or rotatable bolt ring

Flange Size (ISO)	Nominal Bore	A	B	C	Part Number
NW 63	2½"	2.37 (60)	2.50 (64)	3.94 (100)	100760406
NW 80	3"	2.87 (73)	3.00 (76)	3.94 (100)	100760408
NW 100	4" (.065" wall)	3.87 (98)	4.00 (102)	3.94 (100)	100760410
NW 160	4" (.083" wall)	3.87 (98)	4.00 (102)	3.94 (100)	100760411
NW 200	6"	5.83 (148)	6.00 (152)	3.94 (100)	100760416
NW 250	8"	7.76 (197)	8.00 (203)	3.94 (100)	100760420
NW 320	10"	9.75 (248)	10.00 (254)	3.94 (100)	100760425
NW 400	12 ¾"	12.42 (315)	12.75 (324)	3.94 (100)	100760432
NW 500	16"	15.62 (397)	16.00 (406)	3.94 (100)	100760440
NW 500	20"	19.62 (498)	20.00 (508)	3.94 (100)	100760450

### Flange, Blank-Off

in/mm

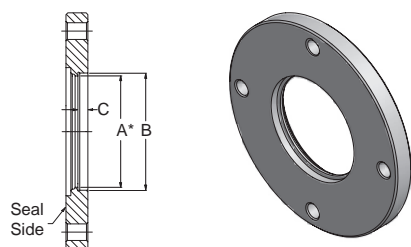


- Stainless steel type 304
- Infinitely rotatable
- To close off unused ports
- Use with clamps or rotatable bolt ring

Flange Size (ISO)	Part Number
NW 63	100760106
NW 80	100760108
NW 100	100760110
NW 160	100760116
NW 200	100760120
NW 250	100760125
NW 320	100760132
NW 400	100760140
NW 500	100760150

### Flange, Bolted, Bored

in/mm



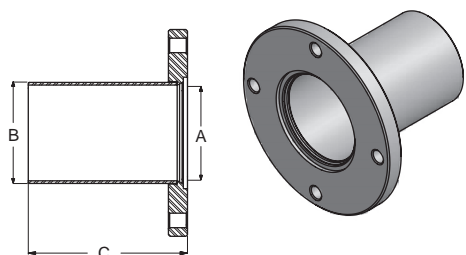
\* Given as ID of suggested tubing

- Stainless steel type 304
- For use with bolts only
- For internal weld
- Made for inch tube and pipe diameters
- Tapped bolt holes on special order

Flange Size (ISO)	Nominal Bore	A	B	C	Part Number
NW 63	2½"	2.37 (60)	2.50 (64)	0.22 (6)	100762406
NW 80	3"	2.87 (73)	3.00 (76)	0.22 (6)	100762408
NW 100	4"	3.87 (98)	4.00 (102)	0.22 (6)	100762410
NW 160	6"	5.83 (148)	6.00 (152)	0.37 (10)	100762416
NW 200	8"	7.76 (197)	8.00 (203)	0.37 (10)	100762420
NW 250	10"	9.75 (248)	10.00 (254)	0.41 (11)	100762425
NW 320	12 ¾"	12.42 (315)	12.75 (324)	0.41 (11)	100762432
NW 400	16"	15.62 (397)	16.00 (406)	0.41 (11)	100762440
NW 500	20"	19.62 (498)	20.00 (508)	0.41 (11)	100762450
NW 630	24"	23.50 (597)	24.00 (610)	0.57 (15)	100762463

### Flange, Bolted, Weld Stub

in/mm

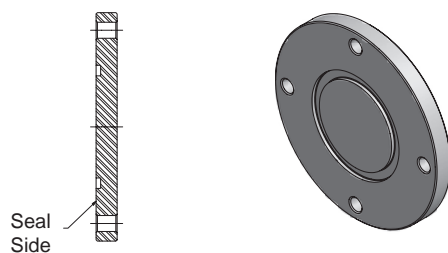


- Stainless steel type 304
- For butt weld
- For use with bolts only
- Made for inch tube and pipe diameters

Flange Size (ISO)	Nominal Bore	A	B	C	Part Number
NW 63	2½"	2.37 (60)	2.50 (64)	3.94 (100)	100762706
NW 80	3"	2.87 (73)	3.00 (76)	3.94 (100)	100762708
NW 100	4" (.065" wall)	3.87 (98)	4.00 (102)	3.94 (100)	100762710
NW 160	6"	5.83 (148)	6.00 (152)	3.94 (100)	100762716
NW 200	8"	7.76 (197)	8.00 (203)	3.94 (100)	100762720
NW 250	10"	9.75 (248)	10.00 (254)	3.94 (100)	100762725
NW 320	12 ¾"	12.42 (315)	12.75 (324)	3.94 (100)	100762732
NW 400	16"	15.62 (397)	16.00 (406)	3.94 (100)	100762740
NW 500	20"	19.62 (498)	20.00 (508)	3.94 (100)	100762750
NW 630	24"	23.50 (597)	24.00 (610)	3.94 (100)	100762763

### Flange, Bolted, Blank

in/mm



- Stainless steel type 304
- To close off unused ports or for special boring
- For use with bolts only
- Tapped bolt holes on special order

Flange Size (ISO)	Part Number
NW 63	100760306
NW 80	100760308
NW 100	100760310
NW 160	100760316
NW 200	100760320
NW 250	100760325
NW 320	100760332
NW 400	100760340
NW 500	100760350
NW 630	100760363

**Seal, Centering Ring Assembly, Stainless Steel/Viton®**

in/mm



- Stainless steel centering ring
- Replaceable Viton O-Ring
- Aluminum spacer ring
- Rated to 150°C max

Flange Size (ISO)	A	B	Part Number
NW 63	2.63 (67)	0.15 (4)	100760506
NW 80	3.14 (80)	0.15 (4)	100760508
NW 100	3.89 (99)	0.15 (4)	100760510
NW 160	5.90 (150)	0.15 (4)	100760516
NW 200	8.26 (210)	0.15 (4)	100760520
NW 250	10.14 (258)	0.15 (4)	100760525
NW 320	12.30 (312)	0.22 (6)	100760532
NW 400	15.53 (395)	0.22 (6)	100760540
NW 500	19.51 (496)	0.22 (6)	100760550
NW 630	25.41 (645)	0.22 (6)	100760563

**Seal, Centering Ring Assembly, Aluminum/Buna-N**

in/mm



- Aluminum centering ring
- Replaceable Buna-N O-Ring
- Aluminum spacer ring
- Rated to 80°C max.

Flange Size (ISO)	A	B	Part Number
NW 63	2.63 (67)	0.15 (4)	100760706
NW 80	3.14 (80)	0.15 (4)	100760708
NW 100	3.89 (99)	0.15 (4)	100760710
NW 160	5.90 (150)	0.15 (4)	100760716
NW 200	8.26 (210)	0.15 (4)	100760720
NW 250	10.14 (258)	0.15 (4)	100760725
NW 320	12.30 (312)	0.22 (6)	100760732
NW 400	15.53 (395)	0.22 (6)	100760740
NW 500	19.51 (496)	0.22 (6)	100760750
NW 630	25.41 (645)	0.22 (6)	100760763

**Seal, Centering Ring Assembly, Aluminum/Viton®**

in/mm



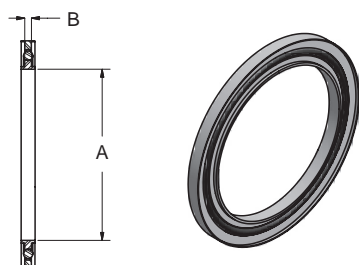
- Aluminum centering ring
- Replaceable Viton O-Ring
- Aluminum spacer ring
- Rated to 150°C max

Flange Size (ISO)	A	B	Part Number
NW 63	2.63 (67)	0.15 (4)	100760606
NW 80	3.14 (80)	0.15 (4)	100760608
NW 100	3.89 (99)	0.15 (4)	100760610
NW 160	5.90 (150)	0.15 (4)	100760616
NW 200	8.26 (210)	0.15 (4)	100760620
NW 250	10.14 (258)	0.15 (4)	100760625
NW 320	12.30 (312)	0.22 (6)	100760632
NW 400	15.53 (395)	0.22 (6)	100760640
NW 500	19.51 (496)	0.22 (6)	100760650
NW 630	25.41 (645)	0.22 (6)	100760663



### Seal, Overpressure Assembly

in/mm

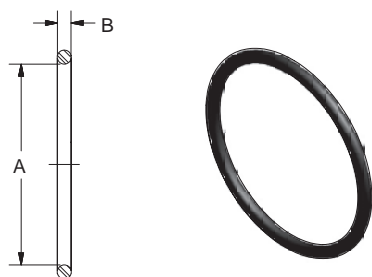


- Stainless steel centering ring
- Replaceable Viton O-Ring
- Includes aluminum overpressure ring

Flange Size (ISO)	A	B	Part Number
NW 80	3.14 (80)	0.15 (4)	100938657
NW 100	3.89 (99)	0.15 (4)	100938658
NW 160	5.90 (150)	0.15 (4)	100937685

### Seal, Replacement O-Ring, Viton®

in/mm

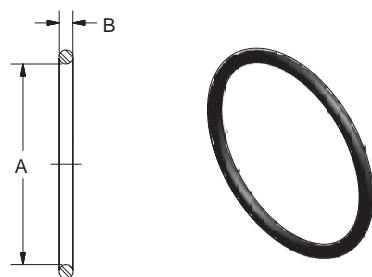


- Viton
- Standard US O-Ring sizes
- Bakeable to 150°C
- Replaceable seal for centering ring assembly

Flange Size (ISO)	Standard Number	A	B	Part Number
NW 63	2-336	2.85 (72)	0.21 (5)	100762006
NW 80	2-340	3.35 (85)	0.21 (5)	100762008
NW 100	2-346	4.10 (104)	0.21 (5)	100762010
NW 160	2-361	5.98 (152)	0.21 (5)	100762016
NW 200	2-371	8.48 (215)	0.21 (5)	100762020
NW 250	2-378	10.48 (266)	0.21 (5)	100762025
NW 320	2-454	12.48 (317)	0.28 (7)	100762032
NW 400	2-460	15.48 (393)	0.28 (7)	100762040
NW 500	2-468	19.46 (494)	0.28 (7)	100762050
NW 630	2-474	24.94 (634)	0.28 (7)	100762063

### Seal, Replacement O-Ring, Buna-N

in/mm

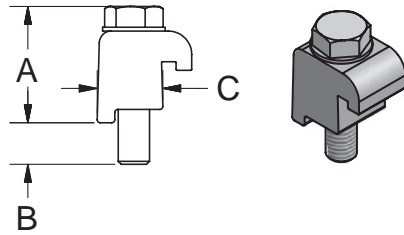


- Buna-N
- Standard US O-Ring sizes
- Bakeable to 80°C
- Replaceable seal for centering ring assembly

Flange Size (ISO)	Standard Number	A	B	Part Number
NW 63	2-336	2.85 (72)	0.21 (5)	100761906
NW 80	2-340	3.35 (85)	0.21 (5)	100761908
NW 100	2-346	4.10 (104)	0.21 (5)	100761910
NW 160	2-361	5.98 (152)	0.21 (5)	100761916
NW 200	2-371	8.48 (215)	0.21 (5)	100761920
NW 250	2-378	10.48 (266)	0.21 (5)	100761925
NW 320	2-454	12.48 (317)	0.28 (7)	100761932
NW 400	2-460	15.48 (393)	0.28 (7)	100761940
NW 500	2-468	19.46 (494)	0.28 (7)	100761950
NW 630	2-474	24.94 (634)	0.28 (7)	100761963

### Clamp, Single Claw

in/mm

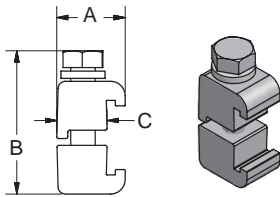


- Aluminum clamp
- Stainless steel bolt
- Stainless steel washer
- To join an MF flange to a tapped bolted flange

Flange Size (ISO)	Bolt Size	A	B	C	Part Number
NW 63	M 8	1.20 (30)	0.39 (10)	0.62 (16)	100761006
NW 80	M 8	1.20 (30)	0.39 (10)	0.62 (16)	100761006
NW 100	M 8	1.20 (30)	0.39 (10)	0.62 (16)	100761006
NW 160	M 10	1.25 (32)	0.39 (10)	0.80 (20)	100761016
NW 200	M 10	1.25 (32)	0.39 (10)	0.80 (20)	100761016
NW 250	M 10	1.25 (32)	0.39 (10)	0.80 (20)	100761016
NW 320	M 12	1.57 (40)	0.72 (18)	1.04 (26)	100761032
NW 400	M 12	1.57 (40)	0.72 (18)	1.04 (26)	100761040
NW 500	M 12	1.57 (40)	0.72 (18)	1.04 (26)	100761040

### Clamp, Double Claw

in/mm

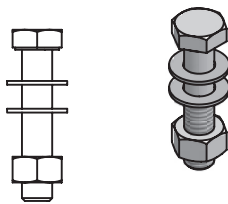


- Aluminum clamp
- Stainless steel bolt
- Stainless steel washer
- To join a pair of MF flanges

Flange Size (ISO)	A	B	C	Part Number
NW 63	0.95 (24)	1.98 (50)	0.63 (16)	100761106
NW 80	0.95 (24)	1.98 (50)	0.63 (16)	100761106
NW 100	0.95 (24)	1.98 (50)	0.63 (16)	100761106
NW 160	1.10 (28)	2.05 (52)	0.80 (20)	100761116
NW 200	1.10 (28)	2.05 (52)	0.80 (20)	100761116
NW 250	1.10 (28)	2.05 (52)	0.80 (20)	100761116
NW 320	1.34 (34)	2.56 (65)	1.04 (26)	100761132
NW 400	1.34 (34)	2.56 (65)	1.04 (26)	100761140
NW 500	1.34 (34)	2.56 (65)	1.04 (26)	100761140

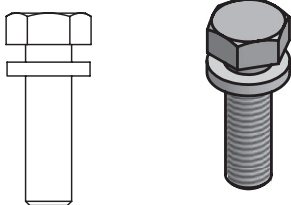
### Bolt and Nut Set

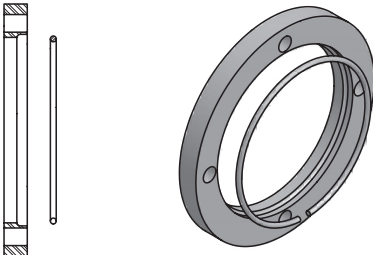
in/mm

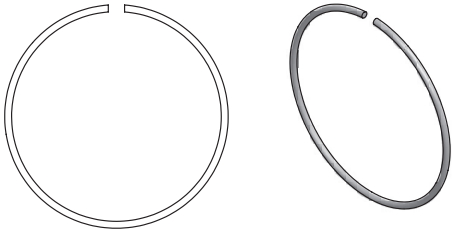


- Stainless steel
- To join two bolted flanges
- Nuts and washers included

Flange Size (ISO)	Bolt Size	No. in Set	Pitch (mm)	Part Number
NW 63	M 8 x 40	4	1.25	100761206
NW 80	M 8 x 40	8	1.25	100761208
NW 100	M 8 x 40	8	1.25	100761208
NW 160	M 10 x 50	8	1.50	100761216
NW 200	M 10 x 50	12	1.50	100761220
NW 250	M 10 x 50	12	1.50	100761220
NW 320	M 12 x 60	12	1.75	100761232
NW 400	M 12 x 60	16	1.75	100761240
NW 500	M 12 x 60	16	1.75	100761240
NW 630	M 12 x 65	20	1.75	100761263

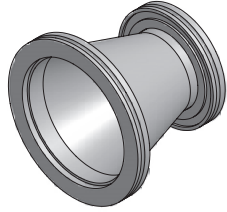
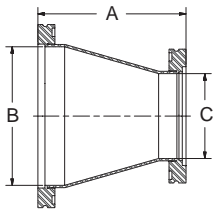
Bolt Set		in/mm				
		Flange Size (ISO)	Bolt Size	No. in Set	Pitch (mm)	Part Number
 <ul style="list-style-type: none"> <li>Stainless steel</li> <li>Bolted flange to tapped flange</li> <li>Includes washer</li> </ul>	NW 63	M 8 x 30	4	1.25	100761306	
	NW 80	M 8 x 30	8	1.25	100761308	
	NW 100	M 8 x 30	8	1.25	100761308	
	NW 160	M 10 x 35	8	1.50	100761316	
	NW 200	M 10 x 35	12	1.50	100761320	
	NW 250	M 10 x 35	12	1.50	100761320	
	NW 320	M 12 x 45	12	1.75	100761332	
	NW 400	M 12 x 45	16	1.75	100761340	
	NW 500	M 12 x 45	16	1.75	100761340	
	NW 630	M 12 x 55	20	1.75	100761363	

Ring, Rotatable Bolt		in/mm	
		Flange Size (ISO)	Part Number
 <ul style="list-style-type: none"> <li>Aluminum</li> <li>Use with MF flange</li> <li>Steel retaining ring included</li> <li>O.D. and bolt pattern same as bolted flange</li> </ul>	NW 63	100762806	
	NW 80	100762808	
	NW 100	100762810	
	NW 160	100762816	
	NW 200	100762820	
	NW 250	100762825	
	NW 320	100762832	
	NW 400	100762840	
	NW 500	100762850	

Ring, Retaining		in/mm	
		Flange Size (ISO)	Part Number
 <ul style="list-style-type: none"> <li>Stainless steel</li> <li>Retains bolt ring</li> </ul>	NW 63	100762906	
	NW 80	100762908	
	NW 100	100762910	
	NW 160	100762916	
	NW 200	100762920	
	NW 250	100762925	
	NW 320	100762932	
	NW 400	100762940	
	NW 500	100762950	

## Conic Reducer

in/mm

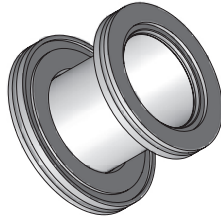
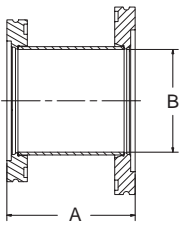


- Stainless steel type 304
- Other combinations available on request
- High conductance adapter

Flange Size (ISO)	A	B	C	Part Number
NW 63 to NW 80	4.14 (105)	2.87 (73)	2.37 (60)	100764906
NW 63 to NW 100	4.14 (105)	3.83 (97)	2.37 (60)	100764917
NW 80 to NW 100	4.14 (105)	3.83 (97)	2.87 (73)	100764908
NW 80 to NW 160	9.52 (242)	5.78 (147)	2.87 (73)	100764927
NW 100 to NW 160	9.52 (242)	5.78 (147)	3.83 (97)	100764910

## Step Reducer

in/mm

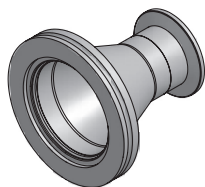
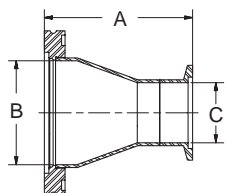


- Stainless steel type 304
- Short overall length

Flange Size (ISO)	A	B	Part Number
NW 63 to NW 80	2.95 (75)	2.31 (59)	100762506
NW 63 to NW 100	2.95 (75)	2.31 (59)	100762517
NW 63 to NW 160	2.95 (75)	2.31 (59)	100762527
NW 80 to NW 100	2.95 (75)	2.87 (73)	100762508
NW 100 to NW 160	2.95 (75)	3.87 (98)	100762510

### Conic Adapter, ISO-MF Flange to ISO-KF Flange

in/mm

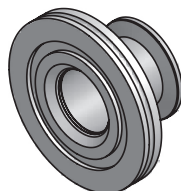
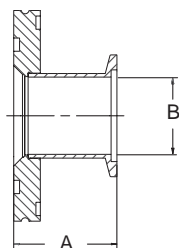


- Stainless steel type 304
- Special adapters available upon request
- High conductance adapter

Flange Size (ISO)	A	B	C	Part Number
NW 63 to NW 40	3.39 (86)	2.37 (60)	1.37 (35)	100765006
NW 63 to NW 50	3.39 (86)	2.37 (60)	1.87 (47)	100765017
NW 80 to NW 40	4.64 (118)	2.87 (73)	1.37 (35)	100765016
NW 80 to NW 50	4.64 (118)	2.87 (73)	1.87 (47)	100765008
NW 100 to NW 50	4.64 (118)	3.83 (97)	1.87 (47)	100765018

### Step Adapter, ISO-MF Flange to ISO-KF Flange

in/mm

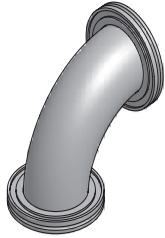
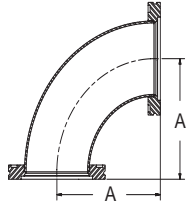


- Stainless steel type 304
- With O-ring groove
- Special adapters available upon request
- Short overall length

Flange Size (ISO)	A	B	Part Number
NW 63 to NW 40	1.77 (45)	1.37 (35)	100762606
NW 63 to NW 50	1.77 (45)	1.87 (47)	100762617
NW 80 to NW 40	1.77 (45)	1.37 (35)	100762616
NW 80 to NW 50	1.77 (45)	1.87 (47)	100762608
NW 100 to NW 40	1.77 (45)	1.37 (35)	100762620
NW 100 to NW 50	1.77 (45)	1.87 (47)	100762618

### 90° Elbow, Smooth Radius

in/mm

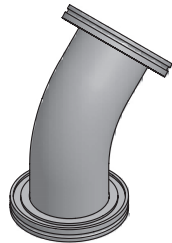
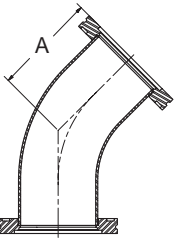


- Stainless steel type 304
- ISO-MF flanges, same size both ports

Flange Size (ISO)	A	Part Number
NW 63	4.00 (102)	100764606
NW 80	4.74 (120)	100764608
NW 100	6.24 (158)	100764610
NW 160	9.24 (235)	100764616

### 45° Elbow, Smooth Radius

in/mm

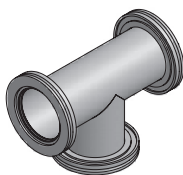
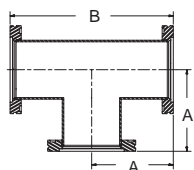


- Stainless steel type 304
- ISO-MF flanges, same size both ports

Flange Size (ISO)	A	Part Number
NW 63	3.25 (83)	100764406
NW 80	3.93 (100)	100764408
NW 100	5.03 (128)	100764410
NW 160	5.49 (139)	100764416

**Tee**

in/mm

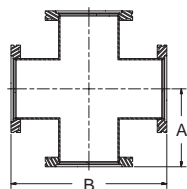


- Stainless steel type 304
- ISO-MF flanges, same size all ports
- Standard flange face to centerline dimensions
- Larger sizes available on request

Flange Size (ISO)	A	B	Part Number
NW 63	3.46 (88)	6.92 (176)	100761406
NW 80	3.86 (98)	7.72 (196)	100761408
NW 100	4.25 (108)	8.50 (216)	100761410
NW 160	5.43 (138)	10.86 (276)	100761416
NW 200	6.61 (168)	13.22 (336)	100761420
NW 250	8.19 (208)	16.38 (416)	100761425
NW 320	12.60 (320)	25.20 (640)	100761432

**Cross**

in/mm

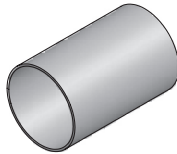


- Stainless steel type 304
- ISO-MF flanges, same size all ports
- Standard flange face to centerline dimensions
- Larger sizes available on request

Flange Size (ISO)	A	B	Part Number
NW 63	3.46 (88)	6.92 (176)	100761506
NW 80	3.86 (98)	7.72 (196)	100761508
NW 100	4.25 (108)	8.50 (216)	100761510
NW 160	5.43 (138)	10.86 (276)	100761516
NW 200	6.61 (168)	13.22 (336)	100761520
NW 250	8.19 (208)	16.38 (416)	100761525
NW 320	12.60 (320)	25.20 (640)	100761532

## Tubing

in/mm

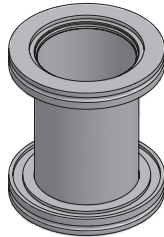
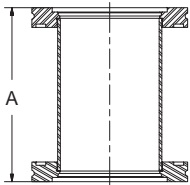


- Stainless steel type 304
- Tube ends deburred, cleaned and capped
- Price per 10 foot length of tube

Flange Size (ISO)	A	B	Part Number
NW 63	2½"	.065"	100764506
NW 80	3"	.065"	100764508
NW 100	4"	.065"	100764510
NW 100	4"	.083"	100764511
NW 160	6"	.083"	100764516
NW 200	8"	.120"	100764520
NW 250	10"	.125"	100764525

## Straight Section

in/mm



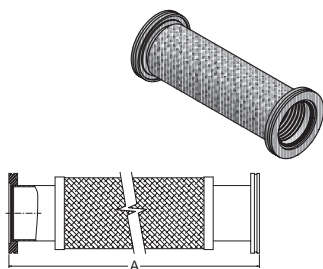
- Stainless steel type 304
- Special lengths to order
- MF type flanges

Flange Size (ISO)	A	Part Number
NW 63	6.92 (176)	100761706
NW 63	4.18 (106)	100761707
NW 80	7.72 (196)	100761708
NW 80	4.18 (106)	100761709
NW 100	8.50 (216)	100761710
NW 100	4.18 (106)	100761711
NW 160	10.86 (276)	100761716
NW 160	4.18 (106)	100761717
NW 200	13.22 (336)	100761720
NW 200	4.18 (106)	100761721
NW 250	16.38 (416)	100761725
NW 250	4.18 (106)	100761726



## Braided Metal Hose

in/mm

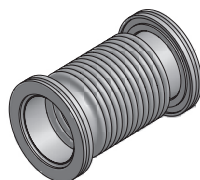
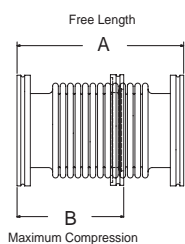


- Ideal for rough pumping line
- Stainless steel
- Flexible, yet resistant to contraction

Flange Size (ISO)	A	Static Bend Radius	Part Number
NW 63	10.74 (273)	7.50 (191)	100766006
NW 63	20.74 (527)	7.50 (191)	100766106
NW 63	40.74 (1035)	7.50 (191)	100766206
NW 80	10.74 (273)	8.75 (222)	100766008
NW 80	20.74 (527)	8.75 (222)	100766108
NW 80	40.74 (1035)	8.75 (222)	100766208
NW 100	10.74 (273)	10.00 (254)	100766010
NW 100	20.74 (527)	10.00 (254)	100766110
NW 100	40.74 (1035)	10.00 (254)	100766210

## Bellows, Section

in/mm



### CAUTION:

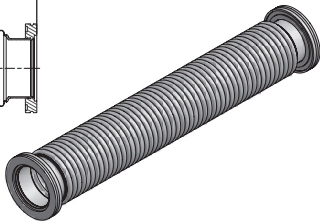
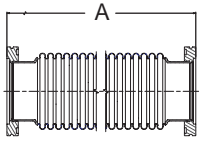
Flanges must be supported to prevent collapsing when subjected to vacuum.

- Stainless Steel
- Formed bellows
- Bellows buttwelded
- Thin wall
- Flexible

Flange Size (ISO)	A	B	Part Number
NW 63	5.90 (150)	4.50 (115)	100763506G
NW 80	5.90 (150)	4.50 (115)	100763508G
NW 100	5.90 (150)	4.50 (115)	100763510G
NW 160	7.90 (200)	5.70 (145)	100763516G
NW 200	9.80 (250)	6.90 (175)	100763520G
NW 250	11.80 (300)	8.10 (205)	100763525G

### Metal Hose, Thick Wall

in/mm



**CAUTION:**

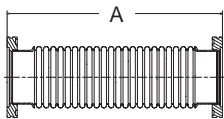
Flanges must be supported to prevent collapsing when subjected to vacuum.

- Unsheathed
- Stainless steel
- Formed metal
- Special lengths on request
- Hose butt welded

Flange Size (ISO)	Status Bend Radius	A	Part Number
NW 63	6½"	19.69 (500)	100763606
NW 63	6½"	39.40 (1000)	100763706
NW 80	7"	19.69 (500)	100763608
NW 80	7"	39.40 (1000)	100763708
NW 100	11"	19.69 (500)	100763610
NW 100	11"	39.40 (1000)	100763710
NW 160	17"	19.69 (500)	100763616
NW 160	17"	39.40 (1000)	100763716
NW 200	18"	19.69 (500)	100763620
NW 200	18"	39.40 (1000)	100763720
NW 250	24"	19.69 (500)	100763625
NW 250	24"	39.40 (1000)	100763725

### Metal Hose, Thin Wall

in/mm



**CAUTION:**

Flanges must be supported to prevent collapsing when subjected to vacuum.

- Unsheathed
- Stainless steel
- Formed metal
- Flexible
- Hose butt welded

Flange Size (ISO)	A	Part Number
NW 63	9.84 (250)	100763806
NW 63	19.69 (500)	100763906
NW 63	39.40 (1000)	100764006
NW 80	9.84 (250)	100763808
NW 80	19.69 (500)	100763908
NW 80	39.40 (1000)	100764008
NW 100	9.84 (250)	100763810
NW 100	19.69 (500)	100763910

### Flange Protector Cap

in/mm

- Protects flange faces
- Plastic

Flange Size (ISO)	Part Number
NW 63	100760006
NW 80	100760008
NW 100	100760010
NW 160	100005788

Type	Part Number
45° Elbow, Smooth Radius, NW 63	100764406
45° Elbow, Smooth Radius, NW 80	100764408
45° Elbow, Smooth Radius, NW 100	100764410
45° Elbow, Smooth Radius, NW 160	100764416
90° Elbow, Smooth Radius, NW 63	100764606
90° Elbow, Smooth Radius, NW 80	100764608
90° Elbow, Smooth Radius, NW 100	100764610
90° Elbow, Smooth Radius, NW 160	100764616
Bellows, NW 63, 5.9" length	100763506G
Bellows, NW 80, 5.9" length	100763508G
Bellows, NW 100, 5.9" length	100763510G
Bellows, NW 160, 7.9" length	100763516G
Bellows, NW 200, 9.8" length	100763520G
Bellows, NW 250, 11.8" length	100763525G
Bolt and Nut Set, NW 63, Stainless Steel	100761206
Bolt and Nut Set, NW 80, Stainless Steel	100761208
Bolt and Nut Set, NW 100, Stainless Steel	100761208
Bolt and Nut Set, NW 160, Stainless Steel	100761216
Bolt and Nut Set, NW 200, Stainless Steel	100761220
Bolt and Nut Set, NW 250, Stainless Steel	100761220
Bolt and Nut Set, NW 320, Stainless Steel	100761232
Bolt and Nut Set, NW 400, Stainless Steel	100761240
Bolt and Nut Set, NW 500, Stainless Steel	100761240
Bolt and Nut Set, NW 630, Stainless Steel	100761263
Bolt Set, for tapped bolted flanges, NW 63	100761306
Bolt Set, for tapped bolted flanges, NW 80	100761308
Bolt Set, for tapped bolted flanges, NW 100	100761308
Bolt Set, for tapped bolted flanges, NW 160	100761316
Bolt Set, for tapped bolted flanges, NW 200	100761320
Bolt Set, for tapped bolted flanges, NW 250	100761320
Bolt Set, for tapped bolted flanges, NW 320	100761332
Bolt Set, for tapped bolted flanges, NW 400	100761340
Bolt Set, for tapped bolted flanges, NW 500	100761340
Bolt Set, for tapped bolted flanges, NW 630	100761363
Braided Metal Hose, NW 63, 10.74" length	100766006
Braided Metal Hose, NW 80, 10.74" length	100766008
Braided Metal Hose, NW 100, 10.74" length	100766010
Braided Metal Hose, NW 63, 20.74" length	100766106
Braided Metal Hose, NW 80, 20.74" length	100766108
Braided Metal Hose, NW 100, 20.74" length	100766110
Braided Metal Hose, NW 63, 40.74" length	100766206
Braided Metal Hose, NW 80, 40.74" length	100766208
Braided Metal Hose, NW 100, 40.74" length	100766210
Conic Adapter, NW 63 to NW 40	100765006
Conic Adapter, NW 80 to NW 50	100765008
Conic Adapter, NW 80 to NW 40	100765016
Conic Adapter, NW 63 to NW 50	100765017
Conic Adapter, NW 100 to NW 50	100765018
Conic Reducer, NW 63 to NW 80	100764906
Conic Reducer, NW 80 to NW 100	100764908
Conic Reducer, NW 100 to NW 160	100764910
Conic Reducer, NW 63 to NW 100	100764917
Conic Reducer, NW 80 to NW 160	100764927
Cross, NW 63, Stainless Steel	100761506
Cross, NW 80, Stainless Steel	100761508
Cross, NW 100, Stainless Steel	100761510
Cross, NW 160, Stainless Steel	100761516
Cross, NW 200, Stainless Steel	100761520
Cross, NW 250, Stainless Steel	100761525
Cross, NW 320, Stainless Steel	100761532
Double Claw Clamp, NW 63, Aluminum	100761106
Double Claw Clamp, NW 80, Aluminum	100761106
Double Claw Clamp, NW 100, Aluminum	100761106
Double Claw Clamp, NW 160, Aluminum	100761116
Double Claw Clamp, NW 200, Aluminum	100761116
Double Claw Clamp, NW 250, Aluminum	100761116
Double Claw Clamp, NW 320, Aluminum	100761132
Double Claw Clamp, NW 400, Aluminum	100761140
Double Claw Clamp, NW 500, Aluminum	100761140

Type	Part Number
Flange, Blank-Off, NW 63	100760106
Flange, Blank-Off, NW 80	100760108
Flange, Blank-Off, NW 100	100760110
Flange, Blank-Off, NW 160	100760116
Flange, Blank-Off, NW 200	100760120
Flange, Blank-Off, NW 250	100760125
Flange, Blank-Off, NW 320	100760132
Flange, Blank-Off, NW 400	100760140
Flange, Blank-Off, NW 500	100760150
Flange, Bolted, Blank, NW 63	100760306
Flange, Bolted, Blank, NW 80	100760308
Flange, Bolted, Blank, NW 100	100760310
Flange, Bolted, Blank, NW 160	100760316
Flange, Bolted, Blank, NW 200	100760320
Flange, Bolted, Blank, NW 250	100760325
Flange, Bolted, Blank, NW 320	100760332
Flange, Bolted, Blank, NW 400	100760340
Flange, Bolted, Blank, NW 500	100760350
Flange, Bolted, Blank, NW 630	100760363
Flange, Bolted, Bored, NW 63	100762406
Flange, Bolted, Bored, NW 80	100762408
Flange, Bolted, Bored, NW 100	100762410
Flange, Bolted, Bored, NW 160	100762416
Flange, Bolted, Bored, NW 200	100762420
Flange, Bolted, Bored, NW 250	100762425
Flange, Bolted, Bored, NW 320	100762432
Flange, Bolted, Bored, NW 400	100762440
Flange, Bolted, Bored, NW 500	100762450
Flange, Bolted, Bored, NW 630	100762463
Flange, Bolted, Weld Stub, NW 63	100762706
Flange, Bolted, Weld Stub, NW 80	100762708
Flange, Bolted, Weld Stub, NW 100	100762710
Flange, Bolted, Weld Stub, NW 160	100762716
Flange, Bolted, Weld Stub, NW 200	100762720
Flange, Bolted, Weld Stub, NW 250	100762725
Flange, Bolted, Weld Stub, NW 320	100762732
Flange, Bolted, Weld Stub, NW 400	100762740
Flange, Bolted, Weld Stub, NW 500	100762750
Flange, Bolted, Weld Stub, NW 630	100762763
Flange, Bored, NW 63	100760206
Flange, Bored, NW 80	100760208
Flange, Bored, NW 100	100760210
Flange, Bored, NW 160	100760216
Flange, Bored, NW 200	100760220
Flange, Bored, NW 250	100760225
Flange, Bored, NW 320	100760232
Flange, Bored, NW 400	100760240
Flange, Bored, NW 500	100760250
Flange, Long Weld Stub, NW 63	100760406
Flange, Long Weld Stub, NW 80	100760408
Flange, Long Weld Stub, NW 100, .063" wall	100760410
Flange, Long Weld Stub, NW 100, .083" wall	100760411
Flange, Long Weld Stub, NW 160	100760416
Flange, Long Weld Stub, NW 200	100760420
Flange, Long Weld Stub, NW 250	100760425
Flange, Long Weld Stub, NW 320	100760432
Flange, Long Weld Stub, NW 400	100760440
Flange, Long Weld Stub, NW 500	100760450
Flange Protector Cap, NW 160	100005788
Flange Protector Cap, NW 63	100760006
Flange Protector Cap, NW 80	100760008
Flange Protector Cap, NW 100	100760010
Retaining Ring, NW 63	100762906
Retaining Ring, NW 80	100762908
Retaining Ring, NW 100	100762910
Retaining Ring, NW 160	100762916
Retaining Ring, NW 200	100762920
Retaining Ring, NW 250	100762925
Retaining Ring, NW 320	100762932
Retaining Ring, NW 400	100762940
Retaining Ring, NW 500	100762950

Type	Part Number	Type	Part Number
Rotatable, Bolted Ring Assy, NW 63	100762806	Single Claw Clamp, NW 63, Aluminum	100761006
Rotatable, Bolted Ring Assy, NW 80	100762808	Single Claw Clamp, NW 80, Aluminum	100761006
Rotatable, Bolted Ring Assy, NW 100	100762810	Single Claw Clamp, NW 100, Aluminum	100761006
Rotatable, Bolted Ring Assy, NW 160	100762816	Single Claw Clamp, NW 160, Aluminum	100761016
Rotatable, Bolted Ring Assy, NW 200	100762820	Single Claw Clamp, NW 200, Aluminum	100761016
Rotatable, Bolted Ring Assy, NW 250	100762825	Single Claw Clamp, NW 250, Aluminum	100761016
Rotatable, Bolted Ring Assy, NW 320	100762832	Single Claw Clamp, NW 320, Aluminum	100761032
Rotatable, Bolted Ring Assy, NW 400	100762840	Single Claw Clamp, NW 400, Aluminum	100761040
Rotatable, Bolted Ring Assy, NW 500	100762850	Single Claw Clamp, NW 500, Aluminum	100761040
Seal, Centering Ring Assy, NW 63, Aluminum/Buna-N	100760706	Step Adapter, NW 63 to NW 40, w/Groove	100762606
Seal, Centering Ring Assy, NW 80, Aluminum/Buna-N	100760708	Step Adapter, NW 80 to NW 50, w/Groove	100762608
Seal, Centering Ring Assy, NW 100, Aluminum/Buna-N	100760710	Step Adapter, NW 80 to NW 40, w/Groove	100762616
Seal, Centering Ring Assy, NW 160, Aluminum/Buna-N	100760716	Step Adapter, NW 63 to NW 50, w/Groove	100762617
Seal, Centering Ring Assy, NW 200, Aluminum/Buna-N	100760720	Step Adapter, NW 100 to NW 50, w/Groove	100762618
Seal, Centering Ring Assy, NW 250, Aluminum/Buna-N	100760725	Step Adapter, NW 100 to NW 40, w/Groove	100762620
Seal, Centering Ring Assy, NW 320, Aluminum/Buna-N	100760732		
Seal, Centering Ring Assy, NW 400, Aluminum/Buna-N	100760740	Step Reducer, NW 63 to NW 80	100762506
Seal, Centering Ring Assy, NW 500, Aluminum/Buna-N	100760750	Step Reducer, NW 80 to NW 100	100762508
Seal, Centering Ring Assy, NW 630, Aluminum/Buna-N	100760763	Step Reducer, NW 100 to NW 160	100762510
		Step Reducer, NW 63 to NW 100	100762517
		Step Reducer, NW 63 to NW 160	100762527
Seal, Centering Ring Assy, NW 63, Aluminum/Viton	100760606		
Seal, Centering Ring Assy, NW 80, Aluminum/Viton	100760608	Straight Section, NW 63, 6.92" length	100761706
Seal, Centering Ring Assy, NW 100, Aluminum/Viton	100760610	Straight Section, NW 63, 4.18" length	100761707
Seal, Centering Ring Assy, NW 160, Aluminum/Viton	100760616	Straight Section, NW 80, 7.72" length	100761708
Seal, Centering Ring Assy, NW 200, Aluminum/Viton	100760620	Straight Section, NW 80, 4.18" length	100761709
Seal, Centering Ring Assy, NW 250, Aluminum/Viton	100760625	Straight Section, NW 100, 8.5" length	100761710
Seal, Centering Ring Assy, NW 320, Aluminum/Viton	100760632	Straight Section, NW 100, 4.18" length	100761711
Seal, Centering Ring Assy, NW 400, Aluminum/Viton	100760640	Straight Section, NW 160, 10.86" length	100761716
Seal, Centering Ring Assy, NW 500, Aluminum/Viton	100760650	Straight Section, NW 160, 4.18" length	100761717
Seal, Centering Ring Assy, NW 630, Aluminum/Viton	100760663	Straight Section, NW 200, 13.22" length	100761720
		Straight Section, NW 200, 4.18" length	100761721
Seal, Centering Ring Assy, NW 63, SS/Viton	100760506	Straight Section, NW 250, 16.38" length	100761725
Seal, Centering Ring Assy, NW 80, SS/Viton	100760508	Straight Section, NW 250, 4.18" length	100761726
Seal, Centering Ring Assy, NW 100, SS/Viton	100760510		
Seal, Centering Ring Assy, NW 160, SS/Viton	100760516	Tee, NW 63, Stainless Steel	100761406
Seal, Centering Ring Assy, NW 200, SS/Viton	100760520	Tee, NW 80, Stainless Steel	100761408
Seal, Centering Ring Assy, NW 250, SS/Viton	100760525	Tee, NW 100, Stainless Steel	100761410
Seal, Centering Ring Assy, NW 320, SS/Viton	100760532	Tee, NW 160, Stainless Steel	100761416
Seal, Centering Ring Assy, NW 400, SS/Viton	100760540	Tee, NW 200, Stainless Steel	100761420
Seal, Centering Ring Assy, NW 500, SS/Viton	100760550	Tee, NW 250, Stainless Steel	100761425
Seal, Centering Ring Assy, NW 630, SS/Viton	100760563	Tee, NW 320, Stainless Steel	100761432
Seal, Overpressure Assembly, NW 160	100937685		
Seal, Overpressure Assembly, NW 80	100938657	Thick Wall Metal Hose, NW 63, 19.69" length	100763606
Seal, Overpressure Assembly, NW 100	100938658	Thick Wall Metal Hose, NW 80, 19.69" length	100763608
		Thick Wall Metal Hose, NW 100, 19.69" length	100763610
Seal, Replacement O-Ring, NW 63, Buna-N	100761906	Thick Wall Metal Hose, NW 160, 19.69" length	100763616
Seal, Replacement O-Ring, NW 80, Buna-N	100761908	Thick Wall Metal Hose, NW 200, 19.69" length	100763620
Seal, Replacement O-Ring, NW 100, Buna-N	100761910	Thick Wall Metal Hose, NW 250, 19.69" length	100763625
Seal, Replacement O-Ring, NW 160, Buna-N	100761916	Thick Wall Metal Hose, NW 63, 39.40" length	100763706
Seal, Replacement O-Ring, NW 200, Buna-N	100761920	Thick Wall Metal Hose, NW 80, 39.40" length	100763708
Seal, Replacement O-Ring, NW 250, Buna-N	100761925	Thick Wall Metal Hose, NW 100, 39.40" length	100763710
Seal, Replacement O-Ring, NW 320, Buna-N	100761932	Thick Wall Metal Hose, NW 160, 39.40" length	100763716
Seal, Replacement O-Ring, NW 400, Buna-N	100761940	Thick Wall Metal Hose, NW 200, 39.40" length	100763720
Seal, Replacement O-Ring, NW 500, Buna-N	100761950	Thick Wall Metal Hose, NW 250, 39.40" length	100763725
Seal, Replacement O-Ring, NW 630, Buna-N	100761963		
Seal, Replacement O-Ring, NW 63, Viton	100762006	Thin Wall Metal Hose, NW 63, 9.84" length	100763806
Seal, Replacement O-Ring, NW 80, Viton	100762008	Thin Wall Metal Hose, NW 80, 9.84" length	100763808
Seal, Replacement O-Ring, NW 100, Viton	100762010	Thin Wall Metal Hose, NW 100, 9.84" length	100763810
Seal, Replacement O-Ring, NW 160, Viton	100762016	Thin Wall Metal Hose, NW 63, 19.69" length	100763906
Seal, Replacement O-Ring, NW 200, Viton	100762020	Thin Wall Metal Hose, NW 80, 19.69" length	100763908
Seal, Replacement O-Ring, NW 250, Viton	100762025	Thin Wall Metal Hose, NW 100, 19.69" length	100763910
Seal, Replacement O-Ring, NW 320, Viton	100762032	Thin Wall Metal Hose, NW 63, 39.40" length	100764006
Seal, Replacement O-Ring, NW 400, Viton	100762040	Thin Wall Metal Hose, NW 80, 39.40" length	100764008
Seal, Replacement O-Ring, NW 500, Viton	100762050		
Seal, Replacement O-Ring, NW 630, Viton	100762063	Tubing (price per 10 foot), NW 63, 0.065 wall, SS	100764506
		Tubing (price per 10 foot) NW 80, 0.065 wall, SS	100764508
		Tubing (price per 10 foot) NW 100, 0.065 wall, SS	100764510
		Tubing (price per 10 foot) NW 100, 0.083 wall, SS	100764511
		Tubing (price per 10 foot) NW 160, 0.083 wall, SS	100764516
		Tubing (price per 10 foot) NW 200, 0.120 wall, SS	100764520
		Tubing (price per 10 foot) NW 250, 0.125 wall, SS	100764525