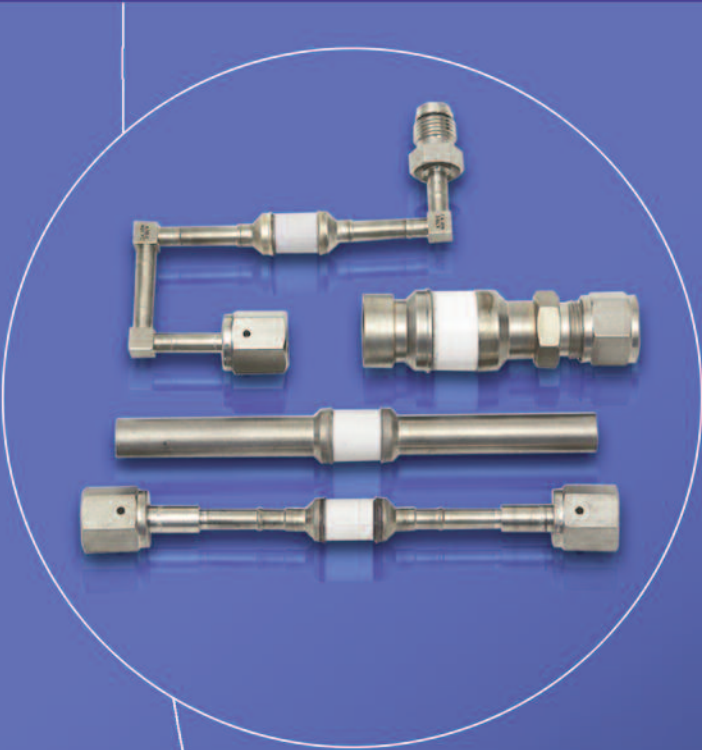




CUSTOM ISOLATOR ASSEMBLIES



Feedthrough

Multipin Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference

Description

Electrical isolators, sometimes referred to as 'breaks' or 'envelopes', consist of metal sleeves brazed to each end of an insulating ceramic tube. These assemblies provide electrical isolation of system components that operate within a common environment. They can also be used to act as a conduit to introduce gases or liquids into hermetic systems.

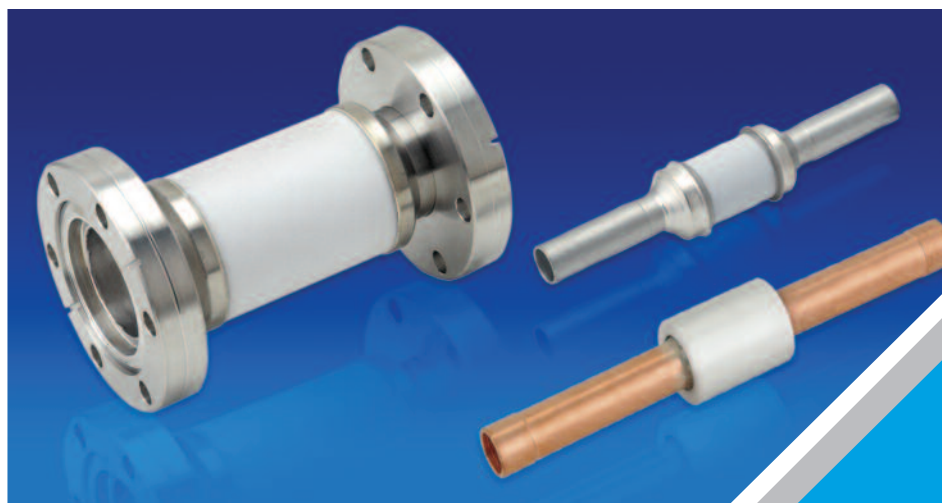
- Cryogenic isolators are used to introduce cryogenic fluids into a system and to provide electrical isolation of line components.
- Water isolators are used to introduce water or other fluids into a system and to provide electrical isolation of line components.
- Vacuum isolators are used to provide an electrical break between the vacuum system and other external components.

Standard Specifications

- Voltages up to 75 kV DC
- Temperature Range: -269°C to 450°C
- Internal IDs to 8 inches
- Internal Pressure 1×10^{-10} torr to 1000 psig

Extreme / Custom Design

- Voltages in excess of 180 kV
- Pressures to 10,000 psig
- Insulator IDs in excess of 15 inches
- Special fittings
- Radiation resistant
- Non-circular geometries
- Fluted configurations



Installation

Standard installation mountings include:

- Weld (Pulse-TIG, TIG, Laser, E-Beam)
- ISO KF flange
- ConFlat flange

Applications

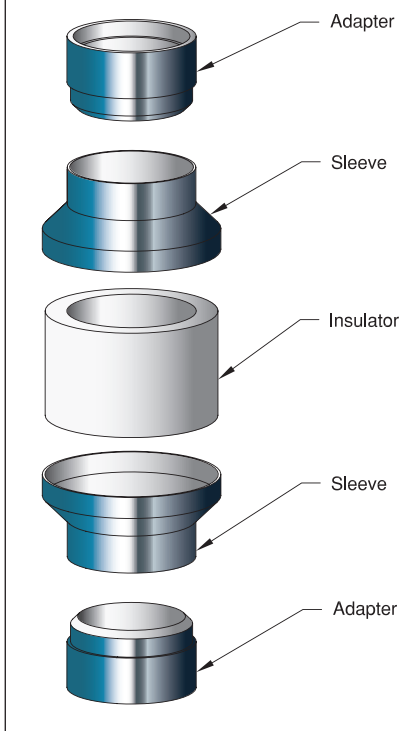
A few of the many applications in which these isolators are commonly used are:




- Semiconductor processing equipment
- Particle accelerators
- Furnaces
- Analytical equipment
- Beam line tubes
- Aerospace
- Telecommunications

New Products

- Newly designed water isolators with higher pressure ratings
- Standard non-magnetic isolators

Typical Isolator Construction



| Type | Voltage DC | Pressure Rating (@ 20° C) | Temperature Range | Isolator ID (inches) | Sub-section | Section Pages |
|---|------------|---------------------------|-------------------|----------------------|-------------|----------------|
|  | to 13 kV | to 1000 psig | -269°C to 450°C | .11 to .41 | Cryogenic | E.1 154-155 |
|  | 5 kV | to 450 psig | 0°C to 100°C | .32 to .57 | Water | E.2 156-157 |
|  | to 75 kV | to 900 psig | -269°C to 450°C | .31 to 8.0 | Vacuum | E.3 158-165 |

Feedthrough

Multipin Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference

Specifications

Materials

Tube:

.11 ID: 321 Stainless steel

.25 ID: 304 Stainless steel

.41 ID: 304 Stainless steel

Cap: 42 Nickel iron

Insulation: Alumina ceramic

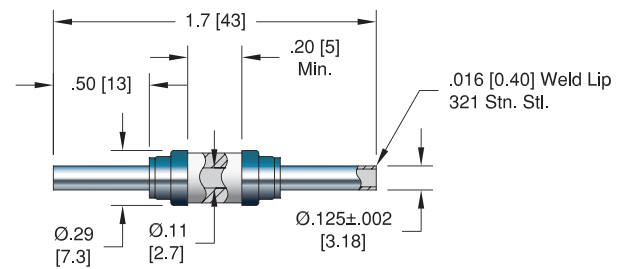
Magnetic Materials: Yes

Voltage Rating See table

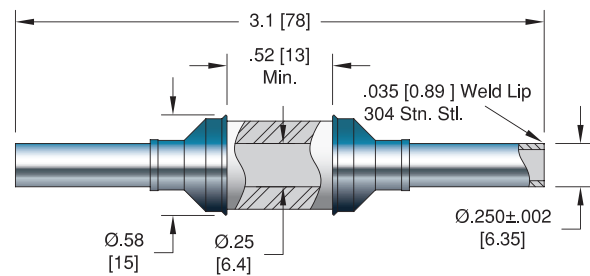
Temperature Range -269°C to 450°C

Pressure @ 20°C See table

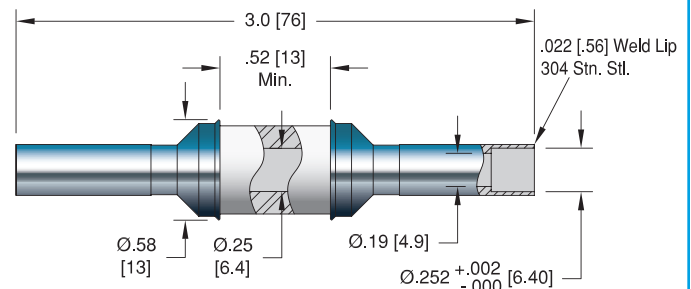
Cryogenic - ID: .11 [2.7]



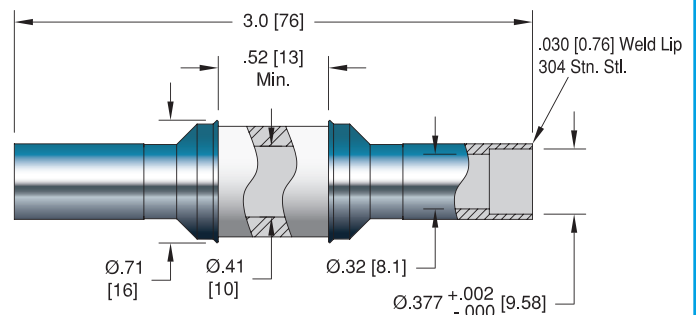
Cryogenic - ID: .25 [6.4]



Cryogenic - ID: .25 [6.4]



Cryogenic - ID: .41 [10]



Feedthrough

Multipin Connector

Coaxial

Thermocouple

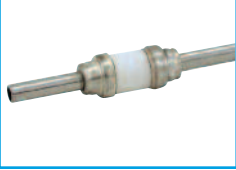
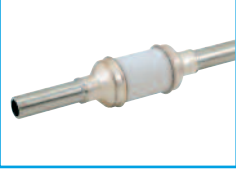
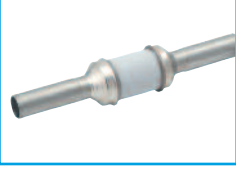
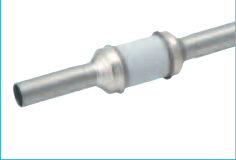
Isolator

Viewport

Pressure

Accessories

Technical Reference

| Cryogenic ID: .11 [2.7] | VOLTAGE | INSTALLATION | PRESSURE | | PART NUMBER |
|--|---------|--------------|----------|-----|-------------|
| | DC | | PSIG | BAR | |
|  | 6 kV | Weld | 1000 | 68 | 0858-01-W |
| Cryogenic ID: .25 [6.4] | 13 kV | Weld | 900 | 61 | 17108-01-W |
|  | | | | | |
| Cryogenic ID: .25 [6.4] | 13 kV | Weld | 900 | 61 | 8002-01-W |
|  | | | | | |
| Cryogenic ID: .41 [10] | 13 kV | Weld | 400 | 27 | 8002-02-W |
|  | | | | | |

Feedthrough

Multiple Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference

Specifications

Materials

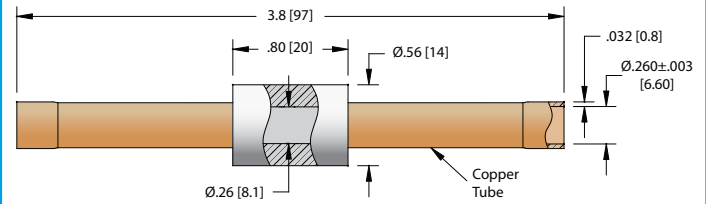
Tube: Copper
 Insulation: Alumina ceramic
 Magnetic Materials: No

Voltage Rating 5 kV DC

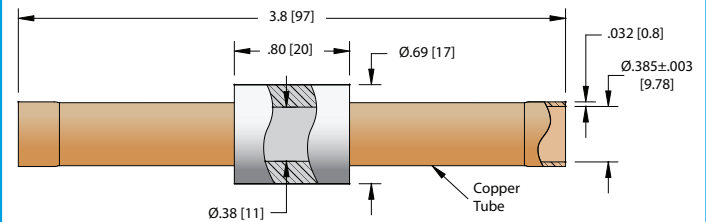
Temperature Range 0°C to 100°C

Pressure @ 20°C See table

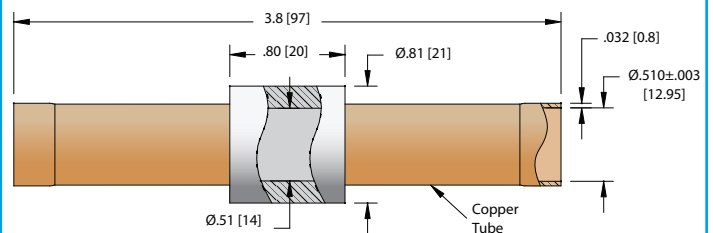
Water - ID: .26 [8.1]



Water - ID: .38 [11]



Water - ID: .51 [14]



Feedthrough

Multipin Connector

Coaxial

Thermocouple

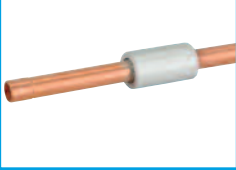
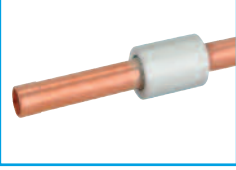
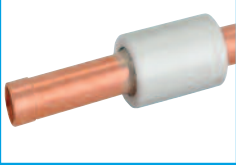
Isolator

Viewport

Pressure

Accessories

Technical Reference

| Water ID: .26 [8.1] | VOLTAGE DC | INSTALLATION | PRESSURE @ 20°C | | PART NUMBER |
|---|------------|-----------------|-----------------|-----|-------------|
| | | | PSIG | BAR | |
|  | 5 kV | Braze or Solder | 450 | 30 | 17228-01-B |
| Water ID: .38 [11] | 5 kV | Braze or Solder | 300 | 20 | 17229-01-B |
|  | | | | | |
| Water ID: .51 [14] | 5 kV | Braze or Solder | 200 | 13 | 17230-01-B |
|  | | | | | |

Feedthrough

Multipin Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference

Feedthrough

Multipin Connector

Coaxial

Thermocouple

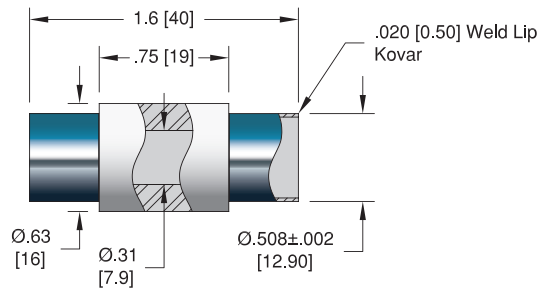
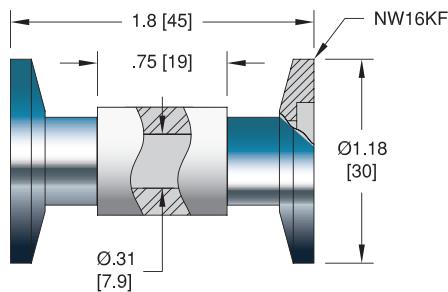
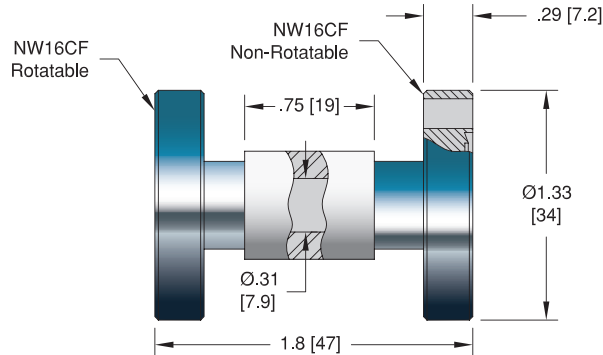
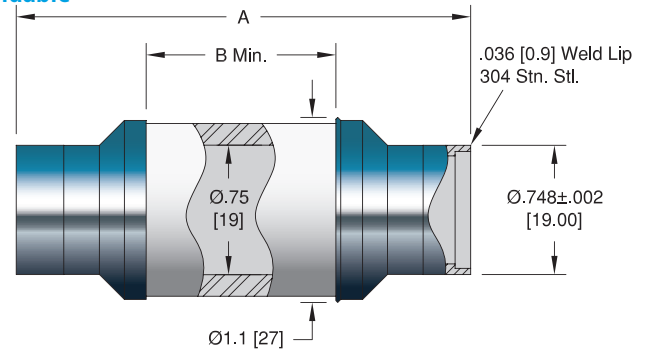
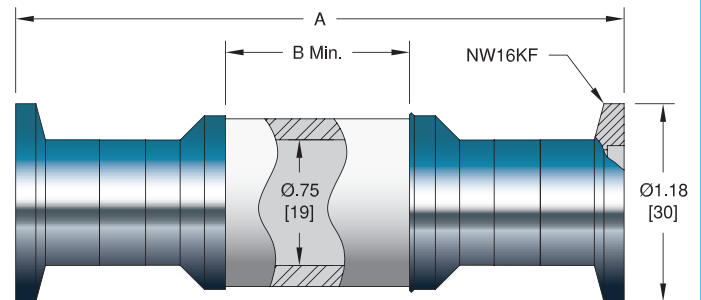
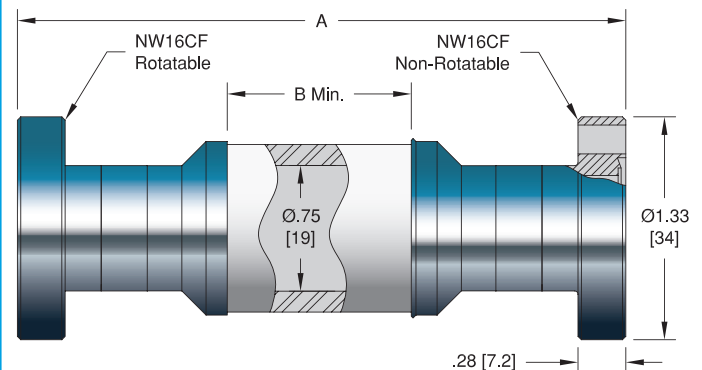
Isolator

Viewport

Pressure

Accessories

Technical Reference

Insulator ID: .31 [7.9]**Weldable****ISO KF****ConFlat****Insulator ID: .75 [19]****Weldable****ISO KF****ConFlat****Specifications - Insulator ID: .31 [7.9]****Materials**

Tube: Kovar
 Insulation: Alumina ceramic
 Magnetic Materials: Yes

Voltage Rating 15 kV DC**Temperature Range** -55°C to 450°C, ISO KF -25°C to 205°C**Pressure @ 20°C** See table**Specifications - Insulator ID: .75 [19]****Materials**

Tube: Stainless steel
 Insulation: Alumina ceramic
 Magnetic Materials: See table

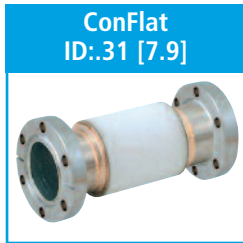
Voltage Rating See table**Temperature Range** See table**Pressure @ 20°C** See table



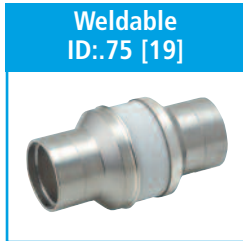
| VOLTAGE DC | INSTALLATION | PRESSURE @ 20 °C PSIG BAR | | PART NUMBER |
|------------|--------------|------------------------------|----|-------------|
| 15 kV | Weld | 900 | 61 | 9997-05-W |



| ISO FLANGE | | | | |
|------------|--------|---|---|-------------|
| 15 kV | NW16KF | - | - | 17235-01-KF |



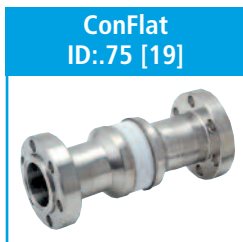
| CONFLAT FLANGE | | | | |
|----------------|-----------------|-----|----|------------|
| 15 kV | 1 1/3" (NW16CF) | 900 | 61 | 4511-01-CF |



| VOLTAGE DC | INSTALLATION | DIMENSIONS A B | | PRESSURE @ 20 °C PSIG BAR | | TEMP °C MIN MAX | | MAGNETIC MATERIALS | PART NUMBER |
|------------|--------------|-------------------|------------|------------------------------|----|--------------------|-----|--------------------|-------------|
| 6 kV | Weld | 1.9 [48] | 0.25 [6.3] | 500 | 34 | -55 | 450 | Yes | 9998-04-W |
| 20 kV | Weld | 2.6 [67] | 1.0 [25] | 500 | 34 | -55 | 450 | Yes | 9998-01-W |
| 35 kV | Weld | 3.6 [92] | 2.0 [51] | 500 | 34 | -55 | 450 | Yes | 9998-03-W |
| 6 kV | Weld | 1.9 [48] | 0.25 [6.3] | 350 | 24 | -269 | 450 | No | 9998-06-W |
| 20 kV | Weld | 2.6 [67] | 1.0 [25] | 350 | 24 | -269 | 450 | No | 9998-07-W |
| 35 kV | Weld | 3.6 [92] | 2.0 [51] | 350 | 24 | -269 | 450 | No | 9998-08-W |



| ISO FLANGE | | | | | | | | | |
|------------|--------|-----------|------------|---|---|-----|-----|-----|-------------|
| 6 kV | NW16KF | 2.9 [73] | 0.25 [6.3] | - | - | -25 | 205 | Yes | 17236-01-KF |
| 20 kV | NW16KF | 3.6 [92] | 1.0 [25] | - | - | -25 | 205 | Yes | 17236-02-KF |
| 35 kV | NW16KF | 4.6 [118] | 2.0 [51] | - | - | -25 | 205 | Yes | 17236-03-KF |
| 6 kV | NW16KF | 2.9 [73] | 0.25 [6.3] | - | - | -25 | 205 | No | 17236-04-KF |
| 20 kV | NW16KF | 3.6 [92] | 1.0 [25] | - | - | -25 | 205 | No | 17236-05-KF |
| 35 kV | NW16KF | 4.6 [118] | 2.0 [51] | - | - | -25 | 205 | No | 17236-06-KF |



| CONFLAT FLANGE | | | | | | | | | |
|----------------|-----------------|-----------|------------|-----|----|------|-----|-----|------------|
| 6 kV | 1 1/3" (NW16CF) | 2.9 [73] | 0.25 [6.3] | 500 | 34 | -55 | 450 | Yes | 8000-04-CF |
| 20 kV | 1 1/3" (NW16CF) | 3.6 [92] | 1.0 [25] | 500 | 34 | -55 | 450 | Yes | 8000-02-CF |
| 35 kV | 1 1/3" (NW16CF) | 4.6 [118] | 2.0 [51] | 500 | 34 | -55 | 450 | Yes | 8000-03-CF |
| 6 kV | 1 1/3" (NW16CF) | 2.9 [73] | 0.25 [6.3] | 350 | 24 | -269 | 450 | No | 8000-06-CF |
| 20 kV | 1 1/3" (NW16CF) | 3.6 [92] | 1.0 [25] | 350 | 24 | -269 | 450 | No | 8000-07-CF |
| 35 kV | 1 1/3" (NW16CF) | 4.6 [118] | 2.0 [51] | 350 | 24 | -269 | 450 | No | 8000-08-CF |

Feedthrough
Multipin Connector
Coaxial
Thermocouple
Isolator
Viewport
Pressure
Accessories
Technical Reference

Feedthrough

Multipin Connector

Coaxial

Thermocouple

Isolator

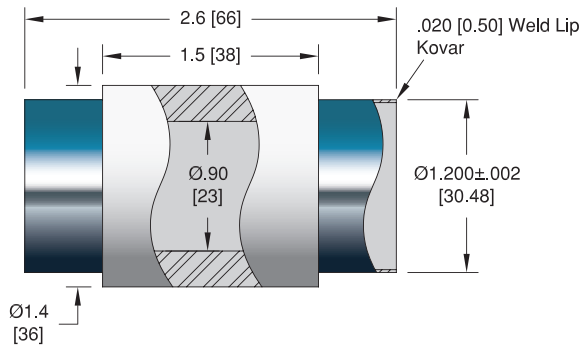
Viewport

Pressure

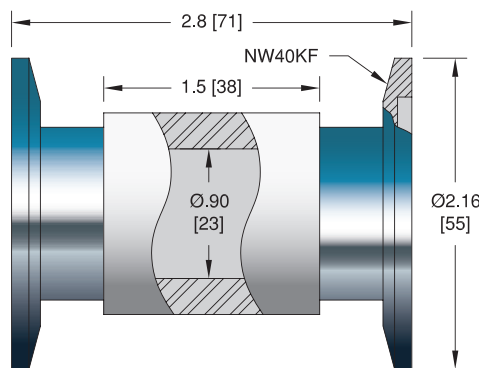
Accessories

Technical Reference

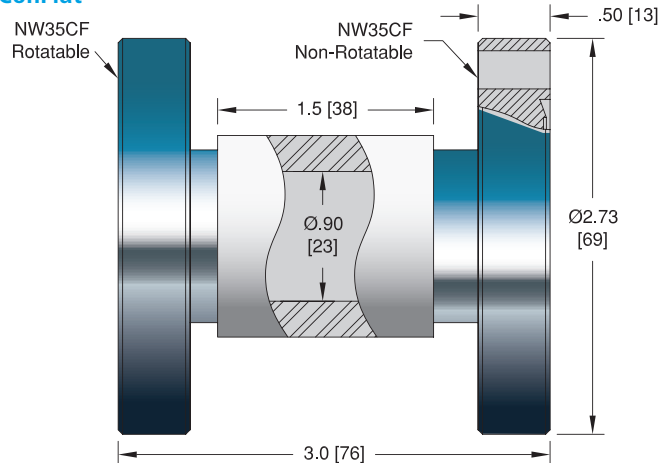
Insulator ID: .90 [23] Weldable



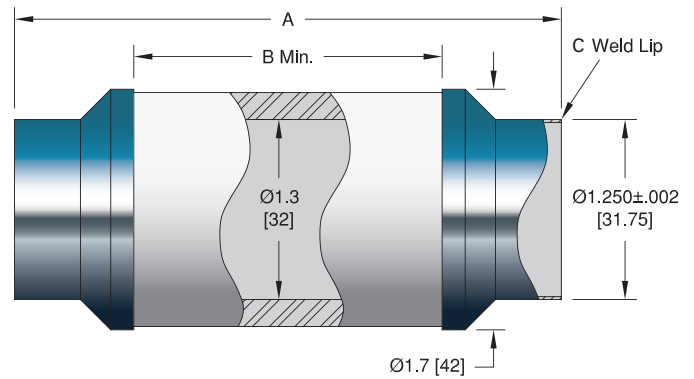
ISO KF



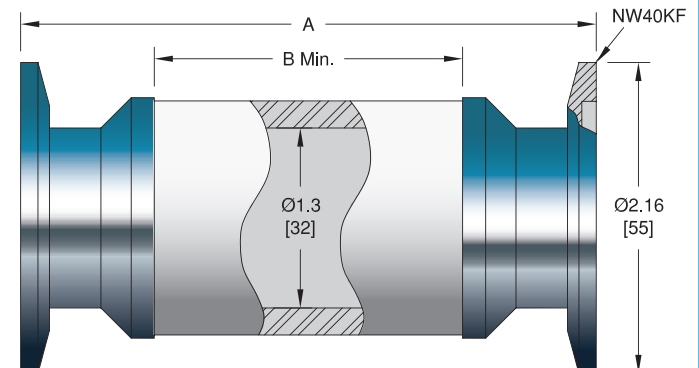
ConFlat



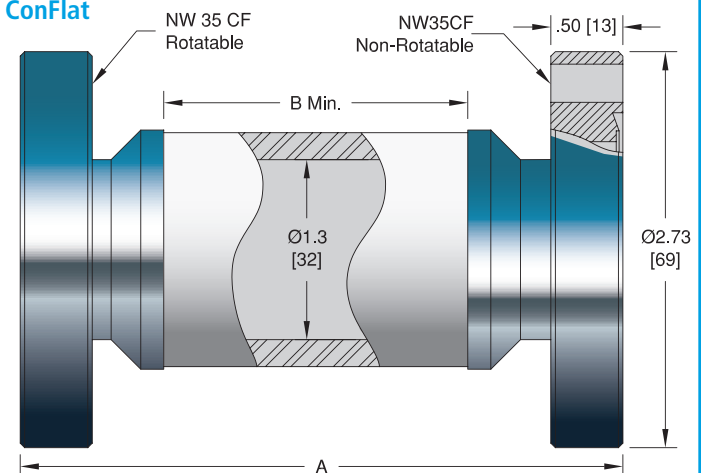
Insulator ID: 1.3 [32] Weldable



ISO KF



ConFlat



Specifications - Insulator ID: .90 [23]

Materials

Tube: Kovar
Insulation: Alumina ceramic
Magnetic Materials: Yes

Voltage Rating 30 kV DC

Temperature Range -55°C to 450°C, ISO KF -25°C to 205°C

Pressure @ 20°C See table

Specifications - Insulator ID: 1.3 [32]

Materials

Tube: Kovar or 304 stainless steel
Insulation: Alumina ceramic
Magnetic Materials: See table

Voltage Rating See table

Temperature Range See table

Pressure @ 20°C See table

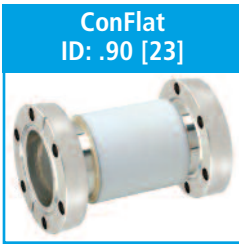


| VOLTAGE DC | INSTALLATION | PRESSURE @ 20 °C PSIG BAR | | PART NUMBER |
|------------|--------------|------------------------------|----|-------------|
| 30 kV | Weld | 360 | 24 | 9997-09-W |



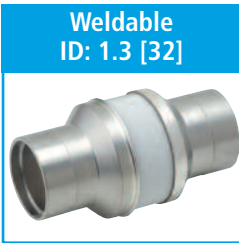
ISO FLANGE

| | | | | |
|-------|--------|---|---|-------------|
| 30 kV | NW40KF | - | - | 17237-01-KF |
|-------|--------|---|---|-------------|



CONFLAT FLANGE

| | | | | |
|-------|-----------------|-----|----|------------|
| 30 kV | 2 3/4" (NW35CF) | 360 | 24 | 4511-02-CF |
|-------|-----------------|-----|----|------------|

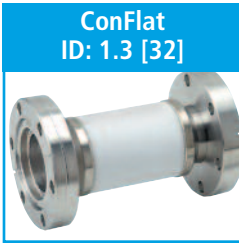


| VOLTAGE DC | INSTALLATION | A | DIMENSIONS B C | | | PRESSURE @ 20 °C PSIG BAR | | TEMP °C MIN MAX | MAGNETIC MATERIALS | PART NUMBER |
|------------|--------------|-----------|-------------------|-------------|----------|------------------------------|----|--------------------|--------------------|-------------|
| 5 kV | Weld | 1.9 [49] | 0.6 [4.0] | .020 [0.50] | Kovar | 350 | 24 | -55 450 | Yes | 9999-03-W |
| 35 kV | Weld | 3.8 [96] | 2.0 [50] | .020 [0.50] | Kovar | 350 | 24 | -55 450 | Yes | 9999-01-W |
| 65 kV | Weld | 5.7 [144] | 3.9 [99] | .020 [0.50] | Kovar | 350 | 24 | -55 450 | Yes | 9999-04-W |
| 5 kV | Weld | 1.9 [49] | 0.6 [4.0] | .035 [0.90] | Stn.Stl. | 250 | 17 | -269 450 | No | 17199-01-W |
| 35 kV | Weld | 3.8 [96] | 2.0 [50] | .035 [0.90] | Stn.Stl. | 250 | 17 | -269 450 | No | 17199-02-W |
| 65 kV | Weld | 5.7 [144] | 3.9 [99] | .035 [0.90] | Stn.Stl. | 250 | 17 | -269 450 | No | 17199-03-W |



ISO FLANGE

| | | | | | | | | | | |
|-------|--------|-----------|------------|---|---|---|---|---------|-----|-------------|
| 5 kV | NW40KF | 2.1 [54] | 0.16 [4.0] | - | - | - | - | -25 205 | Yes | 17238-01-KF |
| 35 kV | NW40KF | 4.0 [101] | 2.0 [50] | - | - | - | - | -25 205 | Yes | 17238-02-KF |
| 65 kV | NW40KF | 5.9 [149] | 3.9 [99] | - | - | - | - | -25 205 | Yes | 17238-03-KF |
| 5 kV | NW40KF | 2.1 [54] | 0.16 [4.0] | - | - | - | - | -25 205 | No | 17238-04-KF |
| 35 kV | NW40KF | 4.0 [101] | 2.0 [50] | - | - | - | - | -25 205 | No | 17238-05-KF |
| 65 kV | NW40KF | 5.9 [149] | 3.9 [99] | - | - | - | - | -25 205 | No | 17238-06-KF |



CONFLAT FLANGE

| | | | | | | | | | |
|-------|-----------------|-----------|------------|---|-----|----|----------|-----|------------|
| 5 kV | 2 3/4" (NW35CF) | 2.3 [59] | 0.16 [4.0] | - | 350 | 24 | -55 450 | Yes | 8001-03-CF |
| 35 kV | 2 3/4" (NW35CF) | 4.2 [107] | 2.0 [50] | - | 350 | 24 | -55 450 | Yes | 8001-02-CF |
| 65 kV | 2 3/4" (NW35CF) | 6.1 [155] | 3.9 [99] | - | 350 | 24 | -55 450 | Yes | 8001-04-CF |
| 5 kV | 2 3/4" (NW35CF) | 2.3 [59] | 0.16 [4.0] | - | 250 | 17 | -269 450 | No | 8001-06-CF |
| 35 kV | 2 3/4" (NW35CF) | 4.2 [107] | 2.0 [50] | - | 250 | 17 | -269 450 | No | 8001-07-CF |
| 65 kV | 2 3/4" (NW35CF) | 6.1 [155] | 3.9 [99] | - | 250 | 17 | -269 450 | No | 8001-08-CF |

Feedthrough

Multi-pin Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference

Feedthrough

Multipin Connector

Coaxial

Thermocouple

Isolator

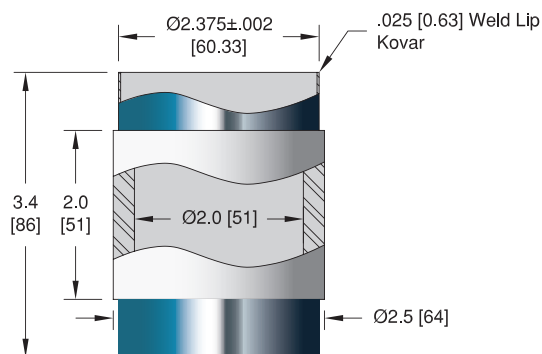
Viewport

Pressure

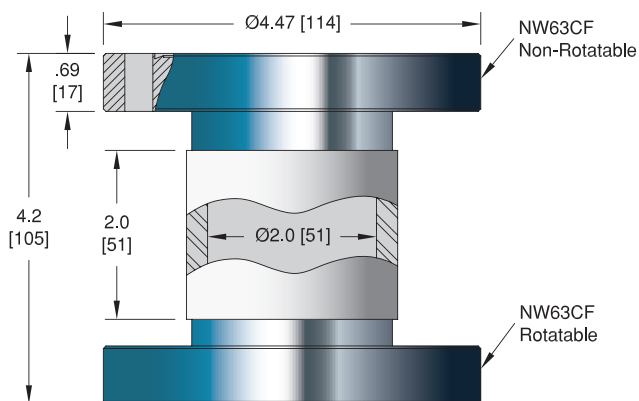
Accessories

Technical Reference

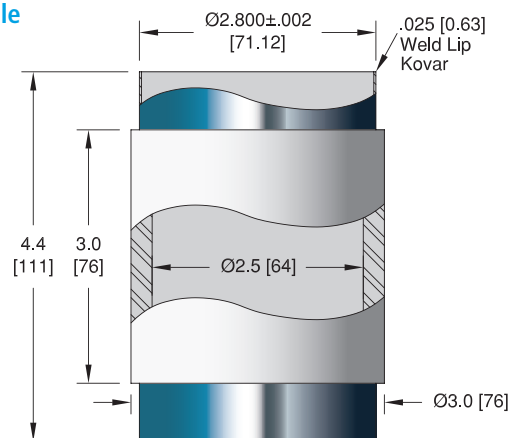
Insulator ID: 2.0 [51] Weldable



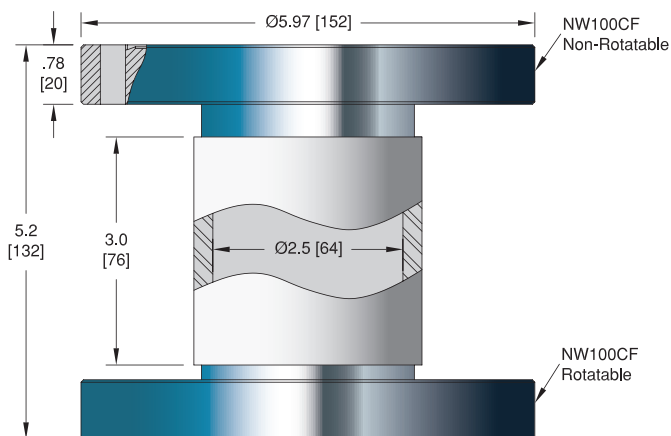
ConFlat



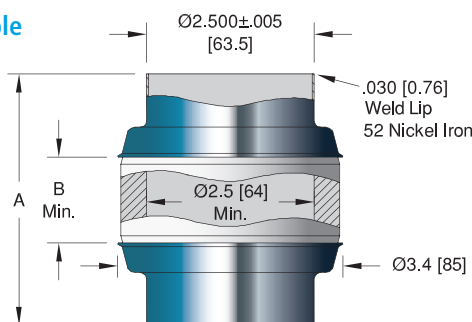
Insulator ID: 2.5 [64] Weldable



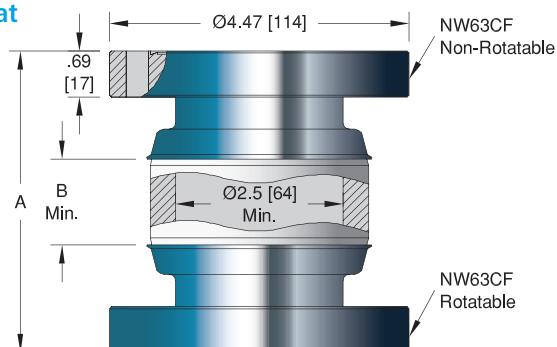
ConFlat



Weldable



ConFlat



Specifications - Insulator ID: 2.0 [51]

Materials

Tube: Kovar
Insulation: Alumina ceramic
Magnetic Materials: Yes

Voltage Rating 40 kV DC

Temperature Range -55°C to 450°C

Pressure @ 20°C 180 PSIG (12 Bar)

Specifications - Insulator ID: 2.5 [64]

Materials

Tube: Kovar or 52 Nickel iron
Insulation: Alumina ceramic
Magnetic Materials: Yes

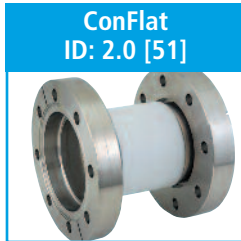
Voltage Rating See table

Temperature Range See table

Pressure @ 20°C See table



| VOLTAGE DC | INSTALLATION | PART NUMBER |
|------------|--------------|-------------|
| 40 kV | Weld | 9997-21-W |

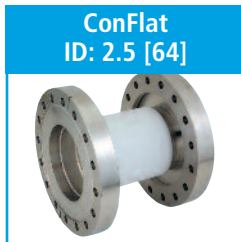


CONFLAT FLANGE

| | | |
|-------|-----------------|------------|
| 40 kV | 4 1/2" (NW63CF) | 4511-03-CF |
|-------|-----------------|------------|



| VOLTAGE DC | INSTALLATION | PRESSURE @ 20 °C | | TEMP °C | | PART NUMBER |
|------------|--------------|------------------|-----|---------|-----|-------------|
| | | PSIG | BAR | MIN | MAX | |
| 60 kV | Weld | 150 | 10 | -55 | 450 | 9997-25-W |

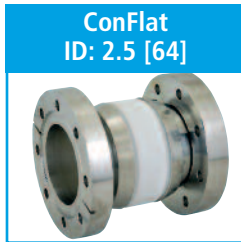


CONFLAT FLANGE

| | | | | | | |
|-------|--------------|-----|----|-----|-----|------------|
| 60 kV | 6" (NW100CF) | 150 | 10 | -55 | 450 | 4511-05-CF |
|-------|--------------|-----|----|-----|-----|------------|



| VOLTAGE DC | INSTALLATION | DIMENSIONS | | PRESSURE @ 20 °C | | TEMP °C | | PART NUMBER |
|------------|--------------|------------|-------------|------------------|-----|---------|-----|-------------|
| | | A | B | PSIG | BAR | MIN | MAX | |
| 20 kV | Weld | 3.7 [95] | 0.90 [22.8] | 80 | 5 | -269 | 450 | 17140-01-W |
| 60 kV | Weld | 6.5 [165] | 3.65 [92.7] | 80 | 5 | -269 | 450 | 17140-02-W |



CONFLAT FLANGE

| | | | | | | | | |
|-------|-----------------|-----------|-------------|----|---|------|-----|-------------|
| 20 kV | 4 1/2" (NW63CF) | 4.5 [114] | 0.90 [22.8] | 80 | 5 | -269 | 450 | 17144-01-CF |
| 60 kV | 4 1/2" (NW63CF) | 7.3 [184] | 3.65 [92.7] | 80 | 5 | -269 | 450 | 17144-02-CF |

Feedthrough

Multi-pin Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference

Feedthrough

Multipin Connector

Coaxial

Thermocouple

Isolator

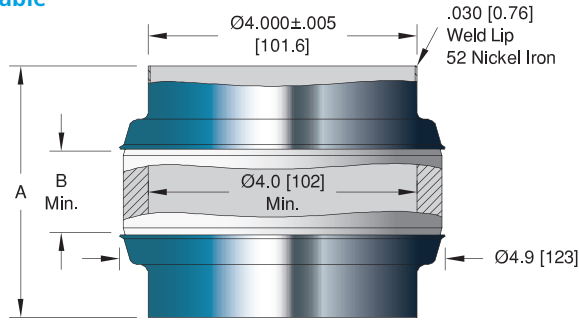
Viewport

Pressure

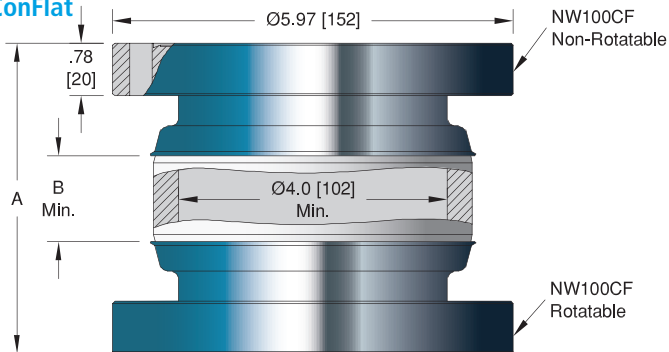
Accessories

Technical Reference

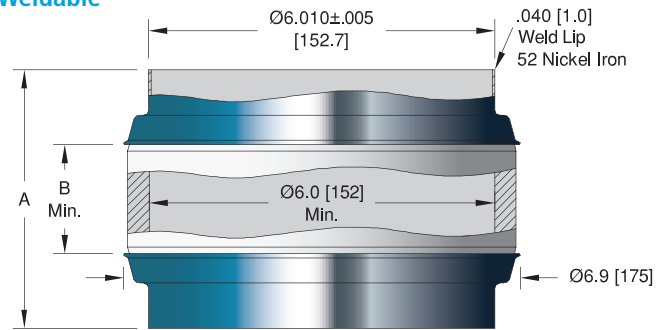
Insulator ID: 4.0 [102] Weldable



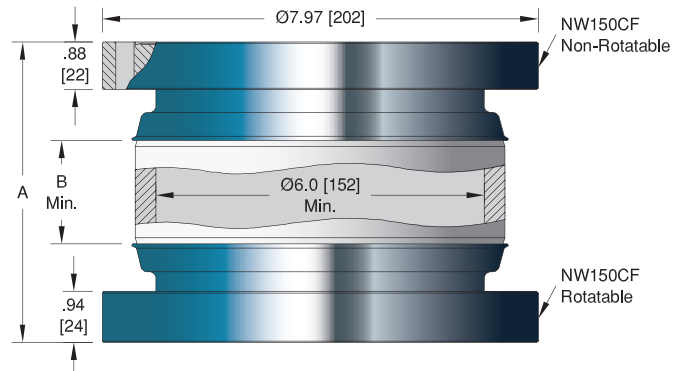
ConFlat



Insulator ID: 6.0 [152] Weldable



ConFlat



Specifications

Materials

Tube: 52 Nickel iron
Insulation: Alumina ceramic
Magnetic Materials: Yes

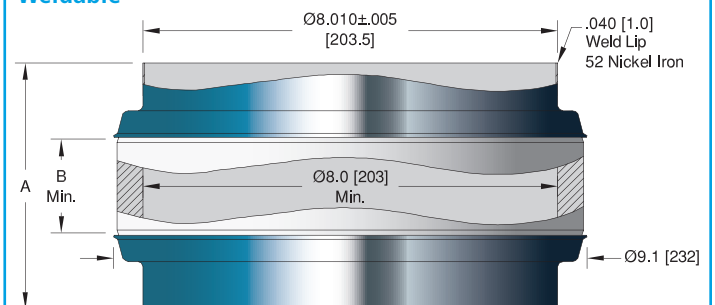
Voltage Rating See table

Temperature Range -269°C to 450°C

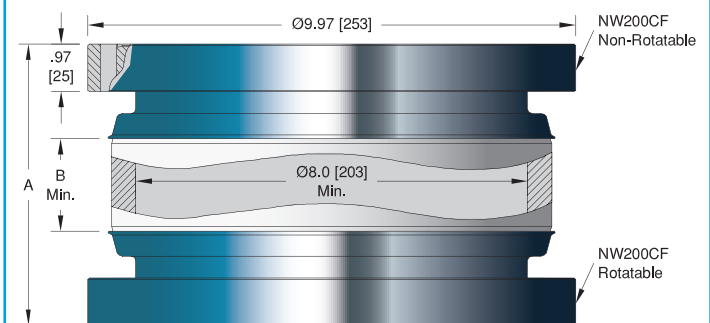
Pressure @ 20°C

Insulator ID: 4.0 [102] – 60 PSIG (4 Bar)
Insulator ID: 6.0 [152] – 40 PSIG (2.7 Bar)
Insulator ID: 8.0 [203] – 30 PSIG (2 Bar)

Insulator ID: 8.0 [203] Weldable

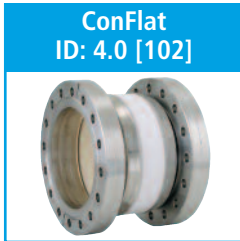


ConFlat





| VOLTAGE DC | INSTALLATION | DIMENSIONS A B | | PART NUMBER |
|------------|--------------|-------------------|-------------|-------------|
| 20 kV | Weld | 3.7 [95] | 0.90 [22.8] | 17141-01-W |
| 60 kV | Weld | 6.5 [165] | 3.65 [92.7] | 17141-02-W |

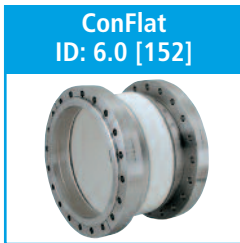


CONFLAT FLANGE

| | | | | |
|-------|--------------|-----------|-------------|-------------|
| 20 kV | 6" (NW100CF) | 4.6 [117] | 0.90 [22.8] | 17145-01-CF |
| 60 kV | 6" (NW100CF) | 7.4 [187] | 3.65 [92.7] | 17145-02-CF |



| VOLTAGE DC | INSTALLATION | DIMENSIONS A B | | PART NUMBER |
|------------|--------------|-------------------|-----------|-------------|
| 30 kV | Weld | 4.5 [114] | 1.5 [38] | 17142-01-W |
| 55 kV | Weld | 6.0 [152] | 3.0 [76] | 17142-02-W |
| 75 kV | Weld | 7.5 [191] | 4.5 [114] | 17142-03-W |



CONFLAT FLANGE

| | | | | |
|-------|--------------|-----------|-----------|-------------|
| 30 kV | 8" (NW150CF) | 5.5 [140] | 1.5 [38] | 17146-01-CF |
| 55 kV | 8" (NW150CF) | 7.0 [178] | 3.0 [76] | 17146-02-CF |
| 75 kV | 8" (NW150CF) | 8.5 [216] | 4.5 [114] | 17146-03-CF |



| VOLTAGE DC | INSTALLATION | DIMENSIONS A B | | PART NUMBER |
|------------|--------------|-------------------|-----------|-------------|
| 30 kV | Weld | 4.75 [121] | 1.5 [38] | 17143-01-W |
| 55 kV | Weld | 6.25 [159] | 3.0 [76] | 17143-02-W |
| 75 kV | Weld | 7.75 [197] | 4.5 [114] | 17143-03-W |



CONFLAT FLANGE

| | | | | |
|-------|---------------|-----------|-----------|-------------|
| 30 kV | 10" (NW200CF) | 5.8 [146] | 1.5 [38] | 17147-01-CF |
| 55 kV | 10" (NW200CF) | 7.3 [184] | 3.0 [76] | 17147-02-CF |
| 75 kV | 10" (NW200CF) | 8.8 [222] | 4.5 [114] | 17147-03-CF |

Feedthrough

Multiple Connector

Coaxial

Thermocouple

Isolator

Viewport

Pressure

Accessories

Technical Reference