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How to Specify a Cylindrical Vacuum Chamber

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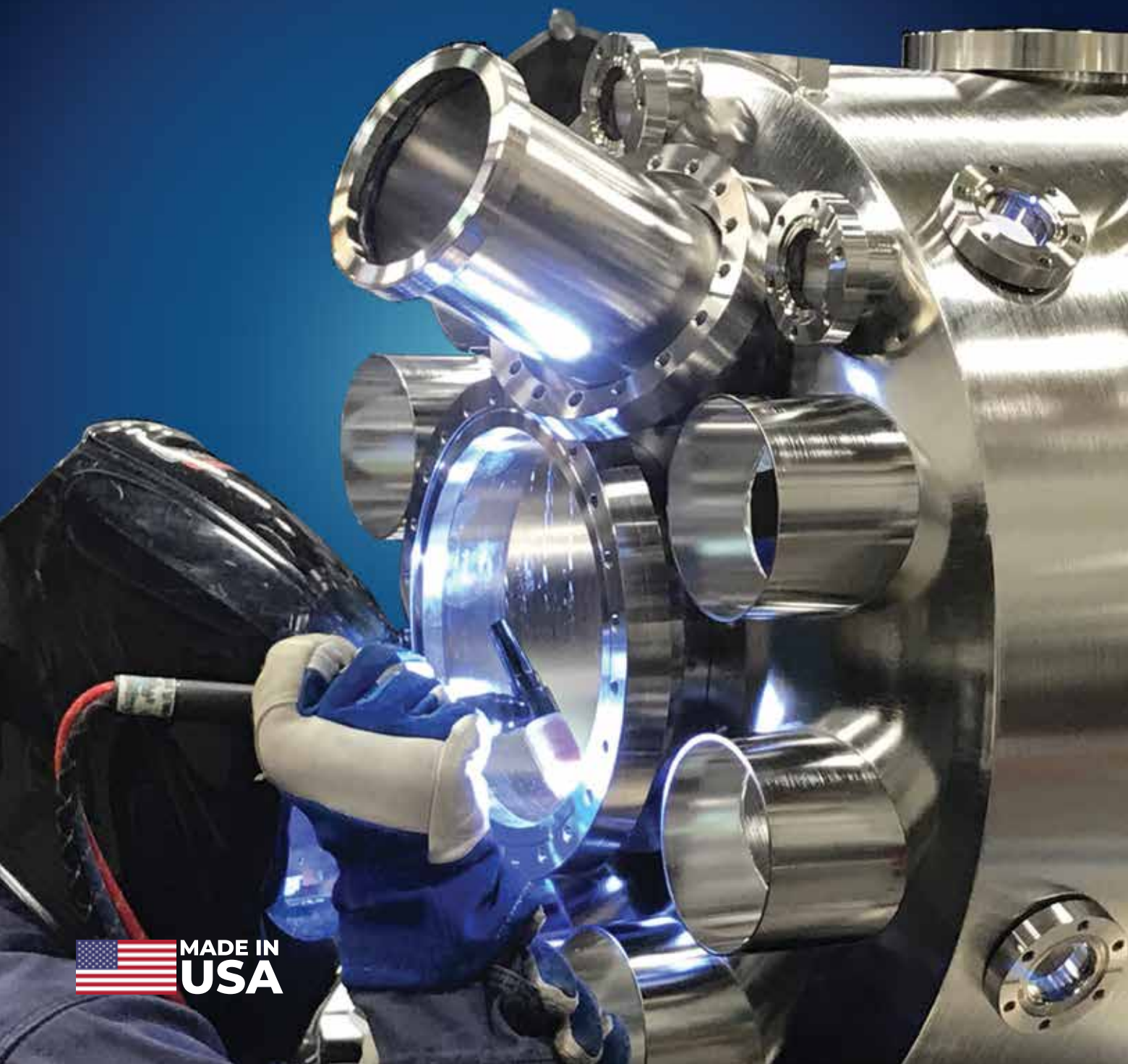

STEP 1: Specify the Material and Finish

MATERIAL OPTIONS:

- 304L Stainless Steel (standard)
- 316L Stainless Steel
- 6061 Aluminum

FINISH OPTIONS:

Tubing Finish Options:

- Glass Bead-Blasted (standard)
- Mechanically Polished (brushed)
- Electropolished

Flange Finish Options*:

- Machined (standard)
- Electropolished

**Sealing surfaces and knife edges are protected during any finishing process to ensure functionality.*

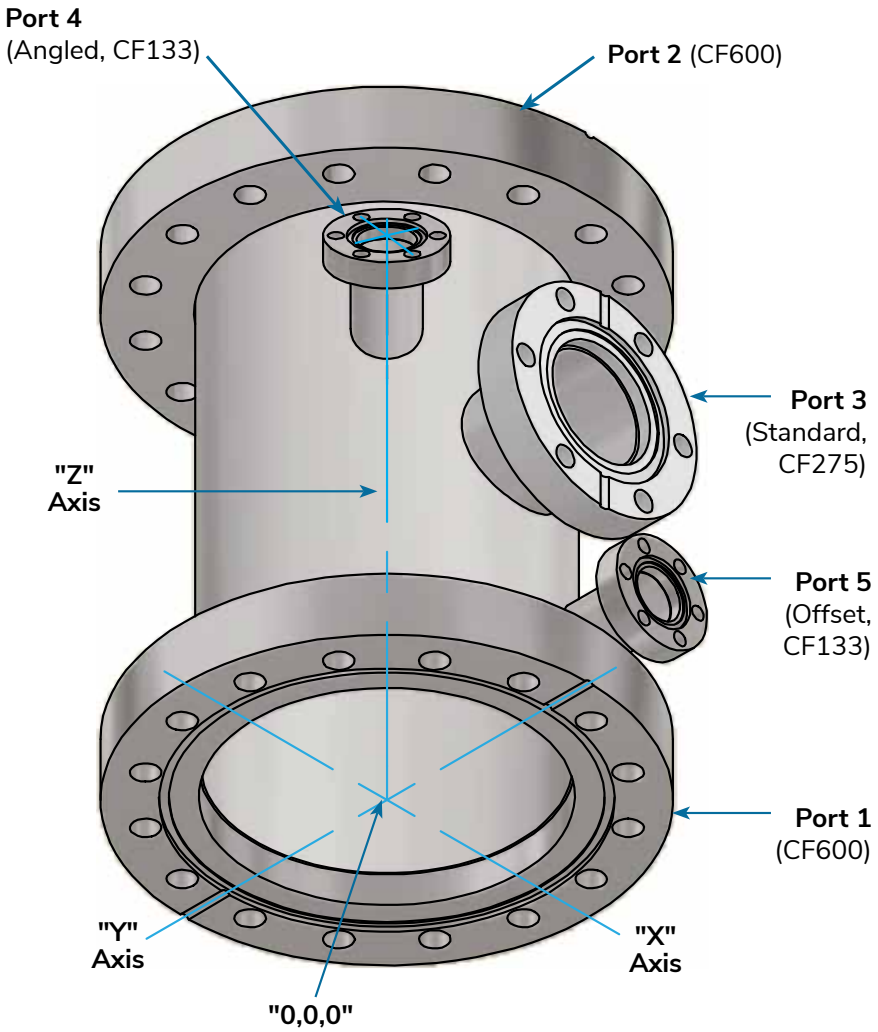

Figure 1:
Cylindrical Example Chamber with Port Numbers, Flange Type & Size, and 3D Cartesian Coordinate System (Isometric)

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Step 2: Specify the Main Body

The **MAIN BODY** of a cylindrical chamber is typically defined as the section comprised of the largest-diameter tubing segment and its associated flange terminations. On our **Cylindrical Example Chamber (Figure 1)**, the Main Body consists of **Port 1, Port 2**, and the section of tubing that connects them **(Figure 2**).

A) SPECIFY THE MAIN BODY OVERALL LENGTH (OAL)

The Main Body OAL is measured from flange face-to-flange face.

B) SPECIFY THE MAIN BODY FLANGES (Type & Size)

Please refer to the catalog for all possible flange sizes. Representative examples are provided in **Table 2** on page 6.

C) SPECIFY MAIN BODY TUBING*

- Nominal Diameter
- Wall Thickness

**Pipe can be used in place of tubing upon request.*

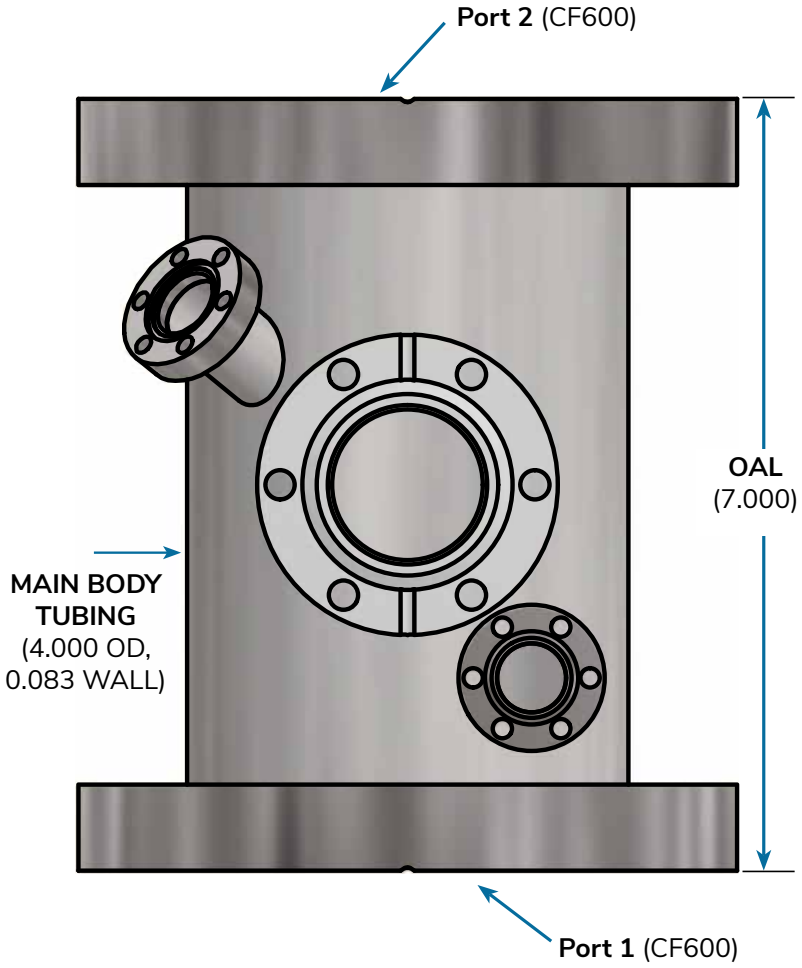

Figure 2:
Cylindrical Example Chamber with Main Body Items & Dimensions Labeled (Front)

STEP 3: Specify the Side Ports

The **SIDE PORTS** of a cylindrical chamber are those ports that branch off from the Main Body. On our **Cylindrical Example Chamber (Figure 1)**, the Side Ports are **Port 3**, **Port 4**, and **Port 5**.

A) SPECIFY PORT FLANGES* (Type & Size)

Please refer to the catalog for all possible flange sizes. Representative examples are provided in **Table 2** on page 6.

**Each flange size has an associated standard tube size. Unless otherwise requested, this standard tube size will be used.*

B) SPECIFY PORT LOCATION AND ORIENTATION

The following features and dimensions define a port's location and orientation on the cylindrical chamber **(Figures 3, 4, & 5)**:

FOCAL POINT: A port's **Focal Point** is a feature that helps define the port's orientation and focal length.

- Locate each Focal Point in space using a 3-dimensional Cartesian coordinate system.

AZIMUTHAL ANGLE: A port's **Azimuthal Angle** defines its angular position along the circumference of the cylindrical chamber.

- Specify each port's **Azimuthal Angle** relative to a common azimuthal origin.

POLAR ANGLE: A port's **Polar Angle** defines its angular orientation relative to the Z-Axis of the Main Body.

- Specify each port's Polar Angle relative to a common polar origin.

OFFSET DISTANCE: A port's **Offset Distance** defines how far its Focal Point is from the Z-Axis of the Main Body. This distance can be defined along the X-Axis or the Y-Axis of the Main Body.

- Specify each port's Offset Distance.

FOCAL LENGTH: A port's **Focal Length** defines the linear distance between the port's flange face and Focal Point.

- Specify each port's Focal Length relative to its flange face and its established Focal Point.

ORIENTATION: A port's **Orientation** is a term that quickly describes key qualities of the port. There are four different Orientations that can describe a port:

- **Standard:** (e.g., Port 3)
  -Polar Angle equals 90-degrees
  -Focal Point lies on the Z-Axis of the Main Body
- **Angled:** (e.g., Port 4)
  -Polar Angle does not equal 90-degrees
  -Focal Point lies on the Z-Axis of the Main Body
- **Offset:** (e.g., Port 5)
  -Polar Angle equals 90-degrees
  -Focal Point does not lie on the Z-Axis of the Main Body
- **Angled-Offset:** (no example shown)
  -Polar Angle does not equal 90-degrees
  -Focal Point does not lie on the Z-Axis of the Main Body

Table 1 on page 5 summarizes all the information needed to specify the Side Ports on our **Cylindrical Example Chamber**.

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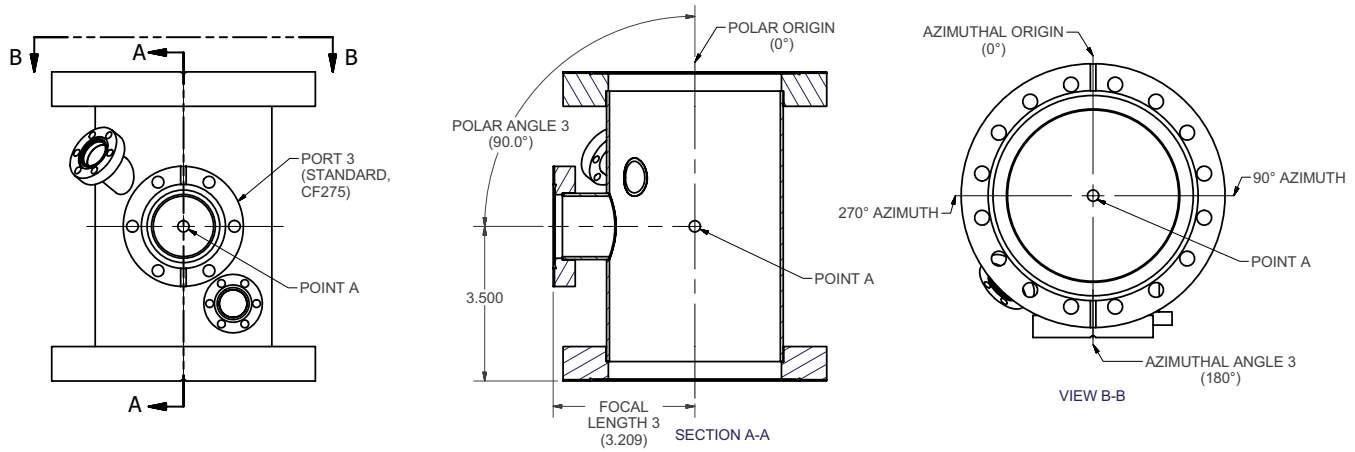

Figure 3: *Cylindrical Example Chamber - Features and Dimensions of a Standard Port (e.g., Port 3)*

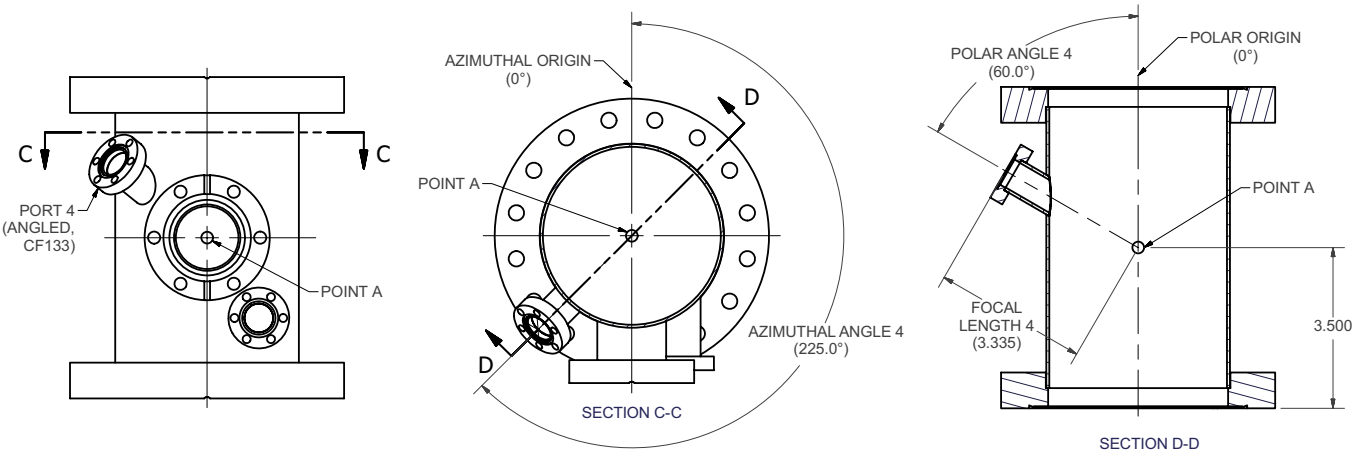

Figure 4: *Cylindrical Example Chamber - Features and Dimensions of an Angled Port (e.g., Port 4)*

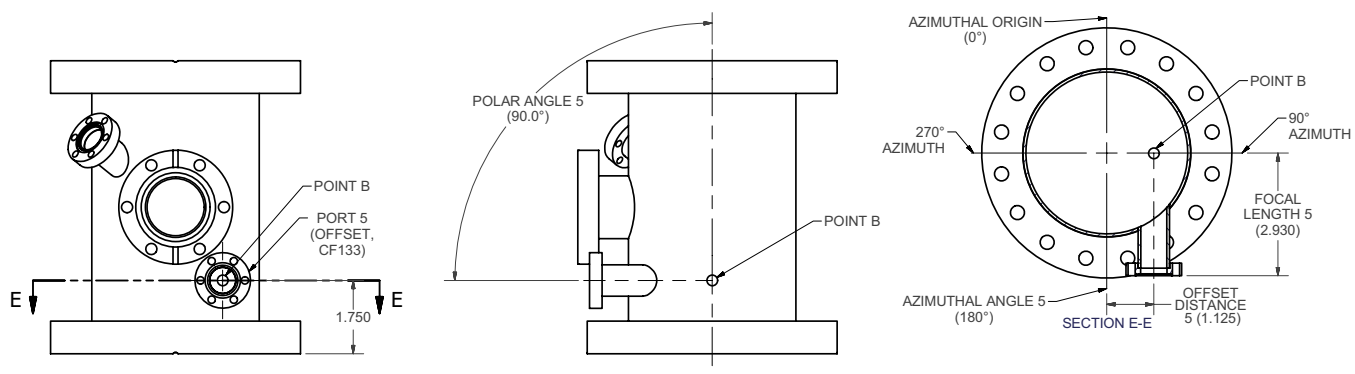

Figure 5: *Cylindrical Example Chamber - Features and Dimensions of an Offset Port (e.g., Port 5)*

Table 1: *Side Port Specifications for Cylindrical Example Chamber*

Port	Orientation	Flange	Focal Point	Focal Point Coordinates (X, Y, Z)	Azimuthal Angle	Polar Angle	Offset Distance	Focal Length
Port 3	Standard	CF275	Point A	(0.000, 0.000, 3.500) in.	180.0°	90.0°	0.000 in.	3.209 in.
Port 4	Angled	CF133	Point A	(0.000, 0.000, 3.500) in.	225.0°	60.0°	0.000 in.	3.335 in.
Port 5	Offset	CF133	Point B	(1.125, 0.000, 1.750) in.	180.0°	90.0°	1.125 in.	2.930 in.

Table 2: *Flange Types, Sizes, Vacuum Ratings, and Temperature Ratings*

FLANGE TYPE	FLANGE SIZES	VACUUM RATING	TEMPERATURE RANGE
CF - Conflat	**133, 212, 275, 338, 450, 462, 600, 675, 800, 1000, 1200, 1325, 1400, 1450, 1650**	$1X10^{-13}$ Torr	-200°C to 450°C
WF - Wire-Sealed	**1200, 1400, 1700, 1900, 2200, 2700**	$1X10^{-13}$ Torr	-200°C to 450°C
QF - Quick Flange	**10 ,16, 25, 40, 50, 63, 80, 100, 160, 200**	$1X10^{-8}$ Torr	-50°C to 200°C
LF - Large Flange (Clamp)	**63, 80, 100, 160, 200, 250, 320, 400, 500**	$1X10^{-8}$ Torr	-50°C to 200°C
LFB - Large Flange (Bolt)	**63, 80, 100, 150, 200, 250, 320, 400, 500**	$1X10^{-8}$ Torr	-50°C to 200°C
ASA	**100, 150, 200, 300, 400, 600, 800, 1000**	$1X10^{-8}$ Torr	-20°C to 200°C

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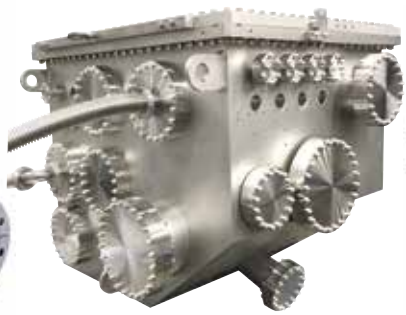

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