



Typical Caburn Custom Chamber

Features

- Chamber geometry
- Focal point
- Focal plane
- Focal length
- Polar angle



Design Office

Chamber Wall Thickness

Chamber Diameter	Wall Thickness
≤ 254mm	3mm
> 254 but < 610mm	4.8mm
≥ 610mm	6.4mm

Please note that these wall thicknesses are given as reference only. Actual thicknesses may vary according to a chamber's overall design including the size and quantity of ports being fitted. Contact Caburn's technical sales for more details.

Chamber Ports

Preferred Port Tube diameters are as Caburn default tube sizes

Caburn is equipped to build custom vacuum chambers of virtually any complexity. Vacuum vessels can be built to your exact specifications from a rough hand-sketch, detailed engineering drawings or anything in-between. Caburn's engineering department uses the latest AutoCAD® software and can accept drawings as electronic files in either DWG or DXF file formats. Caburn can supply a complete engineering documentation package on those projects for which drawings were not provided by the customer.

Unless specified otherwise the main body of custom chambers less than or equal to 254mm in diameter will be fabricated from tubing. Nonstandard sizes under 254mm and all sizes over 254mm in diameter shall be fabricated from rolled stainless steel sheet metal. The chart below provides nominal wall thicknesses for most Caburn chambers.

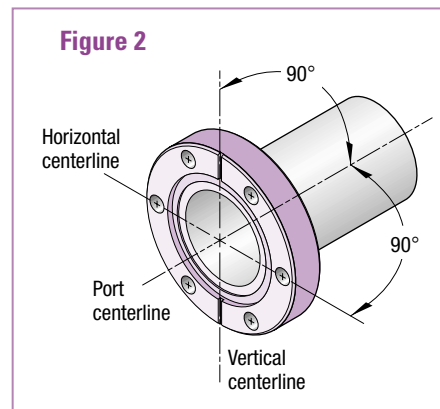
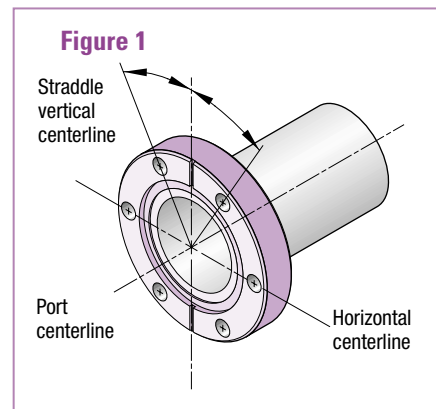
The accurate positioning of ports on Caburn vacuum chamber is made possible with the use of sophisticated aligned fixtures. Five basic geometric parameters are required to define a chamber's port positions. These spherical coordinate system parameters include a port's focal point, focal plane, focal length, polar angle and azimuthal angle, figures 3 through 6 on facing page.

For the purpose of this discussion all vacuum chambers shall have a base port located on a horizontal XY base plane which is perpendicular to the chamber's vertical Z axis, figure 3 on facing page. Whenever bolt style flanges are used, hole patterns shall straddle the vertical

and horizontal centrelines. In the case of CF metal seal flanges fitted with leak test grooves, the grooves shall be oriented vertically, figure 1 below. Furthermore, all port flange seal faces shall be considered perpendicular with their mating tube axes, figure 2 below.

The focal point of a port, also referred to as a port's target point, is usually a position anywhere inside a vacuum chamber where an application task is to be performed. Its location is typically defined by the vertex or convergence point of one or more ports and other chamber features. Focal points can be thought of as sphere centres from which radial ports project. Even though focal points are inside a vacuum chamber they are not necessarily at the chamber's centre. Chambers can contain multiple focal points as required by an application. All focal points are located on focal planes which are parallel to the chamber's main base plane. A port's focal length is defined as an axial and perpendicular distance measured from a port's focal point to the centre of its mounting flange seal face. Minimum focal lengths require the use of tapped flanges. Clearance hole flanges require a minimum 40mm tube extension in order to fit fastening hardware.

Polar angle is a port's angular displacement about a horizontal axis. This horizontal axis of rotation intersects the port's focal point and lays on the focal plane which is in turn perpendicular to the chamber's main Z axis. Polar angles are measured in a north to south direction on a 180° scale between the focal point's vertical axis and the port's



Note: European bolt hole orientation, bolt holes will straddle the horizontal and vertical lines if the number of holes dictates straddling only one line, then the vertical will prevail and be straddled

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Contact your sales office for more details...

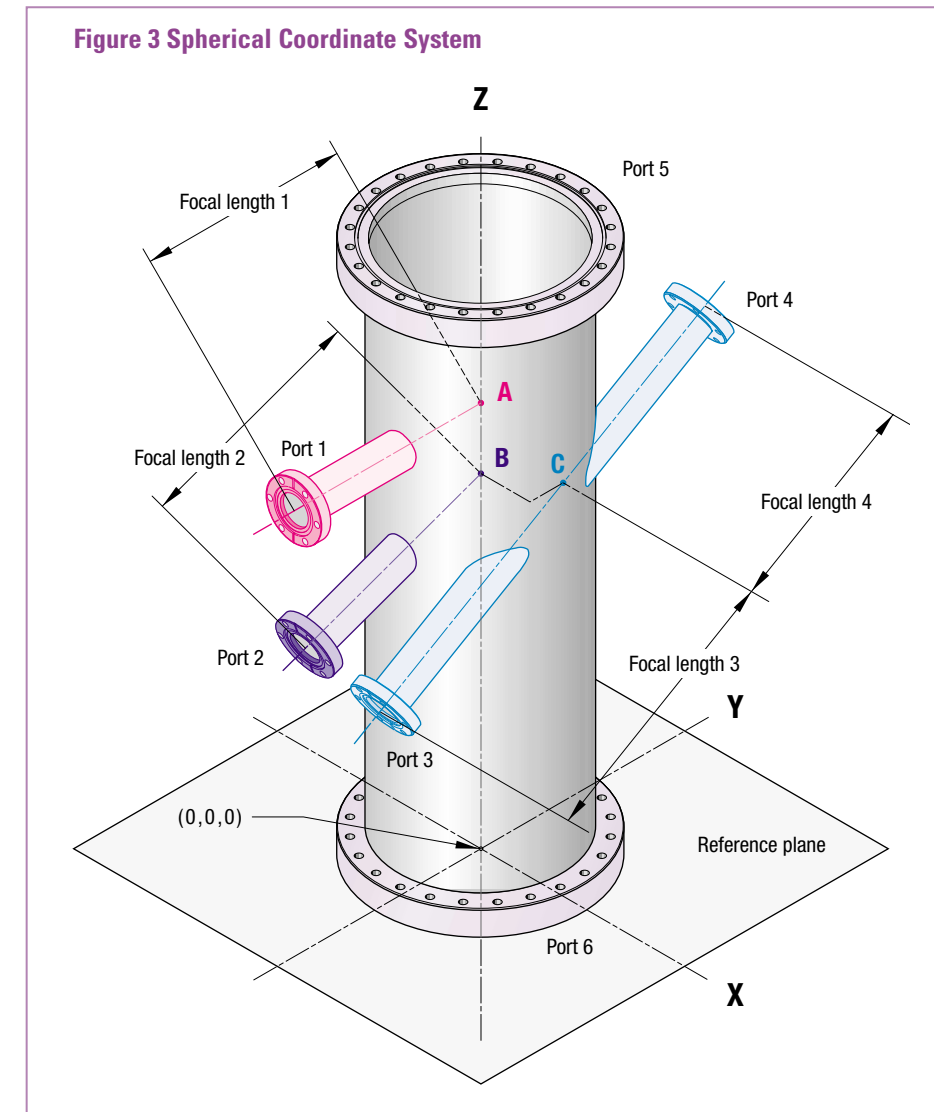


centreline, figures 4, 5 and 6 on facing page. The north position is 0° and the south position is 180°. A port is said to have a 90° polar angle when the port centreline lays on the focal plane, figure 4. Azimuthal angles discussed herein shall be measured in a counterclockwise direction with a 0° starting point and a full 360° scale. Azimuthal angle is a port's angular displacement about a vertical axis. This vertical axis intersects the port's focal point and is always parallel to the chamber's main Z axis. The azimuthal angle is projected onto the port's horizontal focal plane and measured in a counterclockwise direction beginning at the 0° or three o'clock position and ending at the port centreline or centreline projection. If a port has a polar angle equal to 90°, figure 4, the port's centreline will lay on the focal plane. If the polar angle is less than or greater than 90°, figures 5 and 6, the port's centreline will be

above or below the focal plane and must be projected onto it for a final azimuthal angle measurement.

Custom engineered chambers are designed and manufactured using state of the art metal machining equipment as well as conventional machining and welding tools. Unless specified otherwise the typical dimensional tolerances applied to all chamber fabrications shall be as follows:

Chamber fabrication tolerances have been optimized for cost-effectiveness and reproducibility. Chambers 900mm in length or shorter will carry a ± 0.5mm linear tolerance. All chambers will carry a minimum ± 0.50° angular tolerance. Deviations from these specifications must be discussed with the Caburn technical sales engineers for feasibility.



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