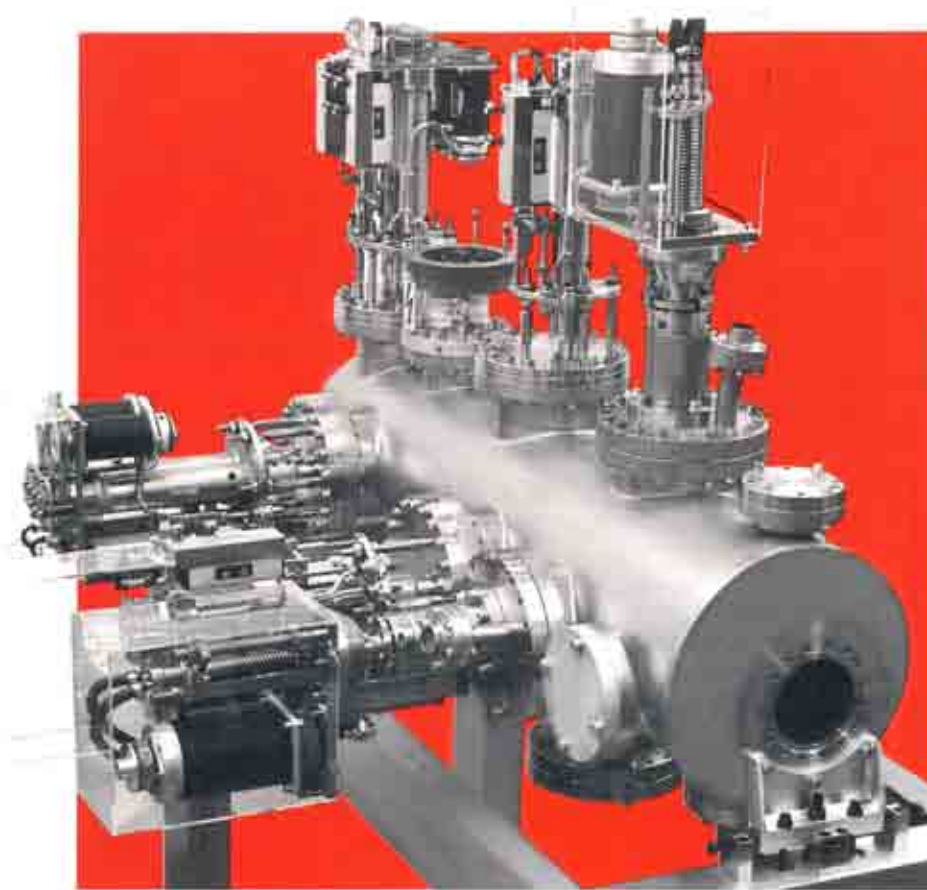


# Vacuum Chambers

Type DK 020.010/DK 070.010/DK 050.010



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## Vacuum Chambers

### Application:

Vacuum chambers are used for installation of beam diagnostic devices, vacuum gauges, electrical feedthroughs, and pumping aggregates.

### Design of Vacuum Chamber:

The distance between supporting flanges and beam axis should be uniform after optimization of various components, that must be attached. Universal elements such as compressed air actuated feedthroughs for example, can be designed with identical stroke and are subsequently exchangeable along the accelerator line. For the same reason, dimensions of supporting flanges should be uniform and should fit to a commercially available product. Considerations regarding parallelism of flanges, angular deviations, and accuracy of relevant dimensions should be constant overall in order to minimize manufacturing costs.

It is of considerable advantage, in terms of maintenance and exchange of components, if all chambers are aligned correctly to the beam axis.

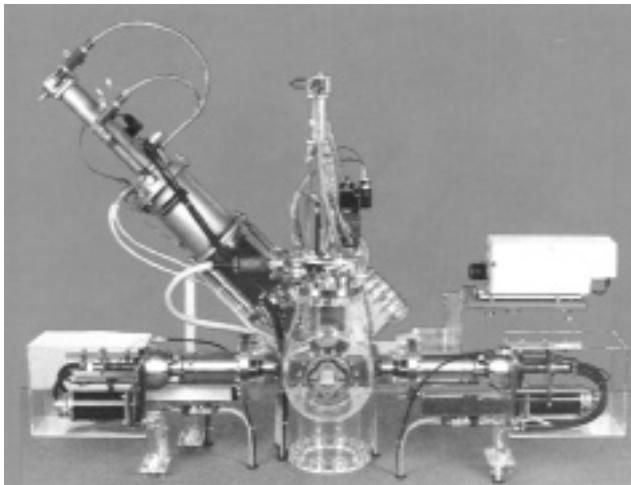


**Fig 1.**

### **Standard Diagnostic Chamber Model DK 020.010**

with a length of 9.45". The chamber shown is supported on an 8" O.D. (CF-150) pumping port. In this photo, four of five 6" O.D. (CF-100) flanges are visible. Flanges are provided for mounting of certain beam diagnostic elements. Also shown are one of the two 2" (CF-35) flanges.

*Cover Photograph: Vacuum Chamber with UHV ports for an Emittance Measurement System.*



**Fig. 2**

**Vacuum Chamber Model DK 020.010**  
 With beam diagnostic components  
 (acrylic material has been used for  
 demonstration purposes only)

### **Technical Specifications**

<b>Materials</b>	:	Stainless steel
<b>Overall length</b>	:	$9.45 \pm 0.02''$ or $13.39 \pm 0.02''$
<b><u>NOTE:</u></b>		Distance between two planes with flanges (2 x 45° and 3 x 90°) has been increased for the 13.39 inch version.
<b>Diameter of beam entrance/exit</b>	:	$3.937 \pm 0.004''$
<b>Chamber diameter</b>	:	$7.87 \pm 0.002''$
<b>Chamber height (incl. pumping port)</b>	:	$16.93 \pm 0.02''$
<b>Number of flanges (for installation of beam diagnostics)</b>	:	Five (5)
<b>Flange type</b>	:	6" O.D. ( CF-100 )
<b>Flange orientations</b>	:	Radial in two (2) planes: 1 = three (3) flanges (0°, 90°, 180°); 2 = two (2) flanges (45°, 135°)
<b>Spacing between flanges and beam axis</b>	:	$7.087 \pm 0.004''$
<b>Parallelism</b>	:	0.004"
<b>Angular accuracy vs. axis symmetry</b>	:	0.16°
<b>Number of flanges (for vacuum gauges and electrical feedthroughs)</b>	:	Two (2) 2" O.D. ( CF-35 )
<b>Orientation</b>	:	45° and 135°
<b>Spacing to beam axis</b>	:	$5.90 \pm 0.04''$

## **Technical Specifications (continued):**

<b>Clearance between flanges/beam axis</b>	:	7.087 ± 0.004"
<b>Parallelism</b>	.	0.004"
<b>Angular accuracy vs. axis symmetry</b>	:	0.160
<b>Number of flanges for vacuum gauges/ electrical feedthroughs</b>	:	2" ( CF-35 )
<b>Orientation</b>	:	45° and 135°
<b>Clearance to beam axis</b>	:	5.90 ± 0.004"
<b>Pumping port</b>	:	1 x 8" O.D. ( CF-150 )
<b>Clearance to beam axis</b>	:	9.84 ± 0.004"
<b>Sealing</b>	:	CF, Cu gaskets
<b>Leak rate (maximum)</b>	:	Torr x liters/second
<b>Surface treatment</b>	:	Glass bead blasting (dry procedure).

## **SLIT BOX Model DK 050.010**

### **Technical Specifications:**

<b>Material</b>	:	Stainless steel
<b>Overall length</b>	:	7.87 ± 0.02"
<b>Diameter of beam entrance/exit holes</b>	:	3.937 ± 0.004"
<b>Chamber diameter</b>	:	7.87 ± 0.02"
<b>Chamber height (incl. pumping port).</b>	:	16.93 ± 0.02"
<b>Number of flanges provided for slit system or diagnostics elements</b>	:	Three (3)
<b>Type of flanges</b>	:	6" O.D. ( CF-100 )
<b>Flange orientation</b>	:	Radial in two (2) planes; Two (2) flanges at 0° and 180° and one (1) flange at 90°.
<b>Displacement between both planes</b>	:	1.18"
<b>Clearance to beam axis</b>	:	7.087 ± 0.004"
<b>Parallelism</b>	.	0.004 inches
<b>Angular accuracy vs. axis symmetry</b>	:	0.16 °
<b>Number of flanges provided for vacuum gauges/current feedthroughs</b>	:	Two 2" ( CF-35 )

**Technical Specifications** (continued):

<b>Orientation</b>	:	Radial at 45° and 135°
<b>Clearance to beam axis</b>	:	5.90 ± 0.04”
<b>Pumping port</b>	:	One 8” O.D. ( CF-150 )
<b>Clearance to beam axis</b>	:	9.84 ± 0.04”
<b>Leak rate (maximum)</b>	:	10 <sup>-9</sup> Torr x liters/second
<b>Surface treatment</b>	:	Glass bead blasting (dry procedure)



**Fig. 3**

Slit Box as shown is provided for support of slit system applicable for UHV feedthroughs (DL series)

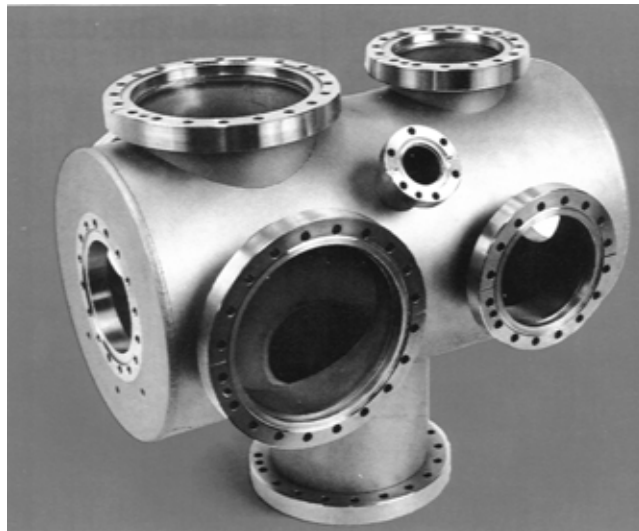
**EMITTANCE MEASUREMENT CHAMBER** Model DK 070.010

**Technical Specifications:**

<b>Material</b>	:	Stainless Steel
<b>Overall length</b>	:	(18.50 ± 0.02) inches
<b>Diameter of the beam entrance- and exit holes</b>	:	(3.937 ± 0.004) inches
<b>Diameter of the chamber</b>	:	(9.8843 ± 0.02) inches

## Technical Specifications (continued)

<b>Height of the chamber (including the pumping port)</b>	:	(16.929 ± 0.02) inches
<b>Number of flanges provided for the installation of emittance measurement devices and beam diagnostics elements</b>	:	6
<b>Orientation of flanges</b>	:	radial in 2 planes 1. plane 3 x 8" O.D. ( CF-150 ) 2. plane 3 x 6" O.D. ( CF-100 )
<b>Clearance between flanges and the beam axis</b>	:	(7.087 ± 0.004) inches
<b>Parallelism</b>	:	0.004 inches
<b>Angular accuracy versus the symmetry axis</b>	:	0.16°
<b>Number of flanges provided for vacuum gauges or current feedthroughs</b>	:	2" O.D. ( CF- 35 )
<b>Orientation</b>	:	45° and 135°
<b>Clearance to the beam axis</b>	:	(5.90 ± 0.04) inches
<b>Pumping port</b>	:	1 x 8" O.D. ( CF-150 )
<b>Clearance to the beam axis</b>	:	(9.84 ± 0.84) inches
<b>Sealing</b>	:	CF, Cu-gaskets
<b>Maximum leakrate</b>	:	10 <sup>-9</sup> Torr l/s
<b>Treatment of surface</b>	:	Glass bead blasting (dry procedure)



**Fig. 4**

Emittance Measurement Chamber with ports for two(2) emittance measurement Systems. High parallelism of main flanges is of extreme importance.