

Multi-CF™ UHV Vacuum Spherical Squares with 8.0", 6.0", 4.5", 2.75" and 1.33" CF Ports Large Diameter Internal Spherical Workspaces

FOR USE IN:

- Compact small UHV Vacuum Chambers
- Portable Low-cost UHV Systems
- High-complexity UHV Subsystems
- UHV Vacuum Manipulator Systems
- UHV Specimen Transfer Systems
- General UHV Vacuum Plumbing

FEATURES / OPTIONS:

- Easy Access, Unencumbered Large Diameter Spherical Workspace
- Annular port Grabber Grooves on all sealing ports (except 1.33")
- Multiple sealing surfaces cut on a hollow sphere
- Unitary stainless steel 316L construction (except as specifically noted)
- Titanium custom option also available
- No inside corners, highly polished
- Precise Port Alignment (<0.1 degrees)



Family of Multi-CF™ UHV Spherical Square Chamber Designs

Multi-CF™ Spherical Squares

The Spherical Square Multi-CF™ UHV vacuum chambers are based on a design of two main or primary CF sealing ports that are parallel and offset sections cut through a global hollow spherical form. A secondary series of four CF sealing surface ports are equally spaced in a plane perpendicular to the main surfaces and generally provides a polygon array of ports in the form of a *square*. Other additional ports can augment the design and are dispersed in the spaces between the main and secondary ports. These designs are precision CNC fabricated from a single piece of 316L Stainless Steel unless otherwise noted. The option of using Titanium is also available.

4.5" Multi-CF™ Spherical Squares

The MCF450 Spherical Squares are comprised of six to ten port small Multi-CF™ UHV vacuum chambers. Each chamber consists of a hollow sphere intersected by two 4.5" CF sealing

surfaces, four 2.75" CF sealing surfaces and zero to four 1.33" CF sealing surfaces.

The **MCF450-SphSq-E2C4** has two (2) 4.5" CF sealing ports and four (4) 2.75" CF ports. All



MCF450-SphSq-E2C4 Spherical Square Multi-CF™ UHV Vacuum Chamber

ports have Grabber Grooves for internal mounting of hardware and fixtures.

The **MCF450-SphSq-E2C3r1A4** has an extended 2.75" CF sealing surface that is rotatable and is the only part listed that has a weld.

Interior space has been greatly increased over previous designs. Each 4.5" CF sealing surface has one pair of Grabber Grooves, while each 2.75" CF sealing surface has one triplet of Grabber Grooves. The rotatable 2.75" CF has an additional pair located at the end of the extension tube next to the sealing surface.

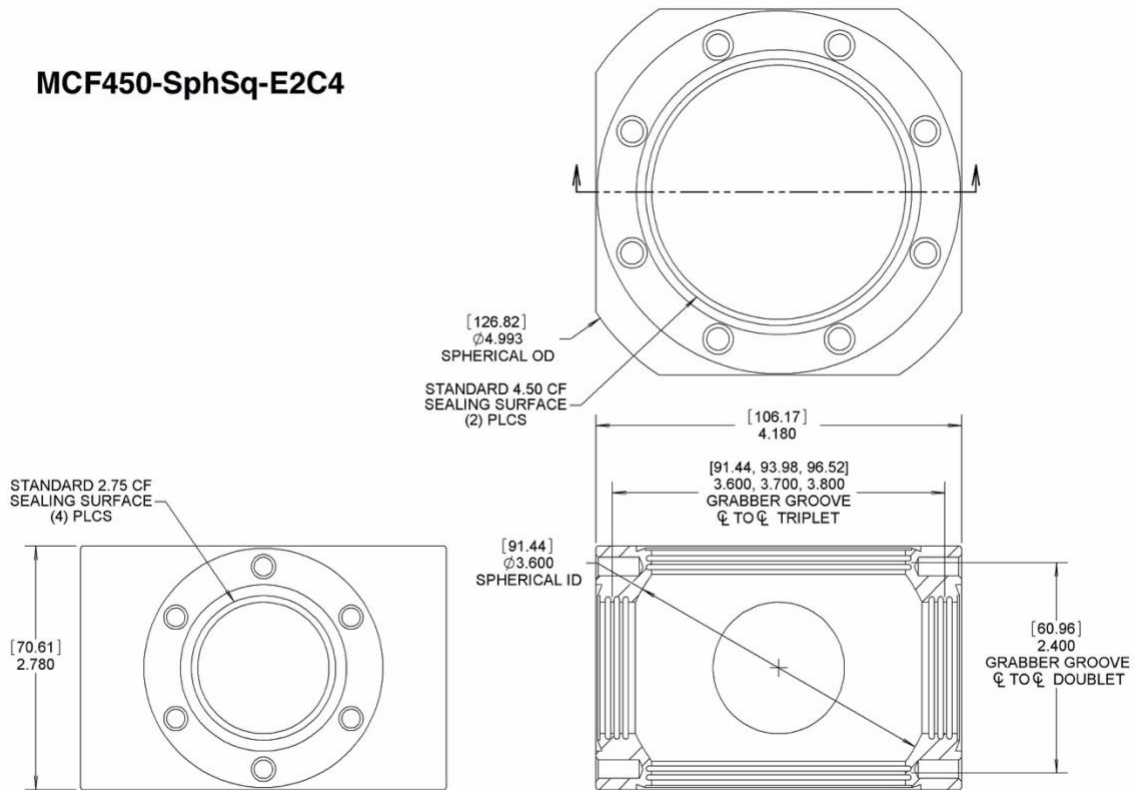
Please reach out to Kimball Physics to engage our specialists if you need a custom system for your specific application.



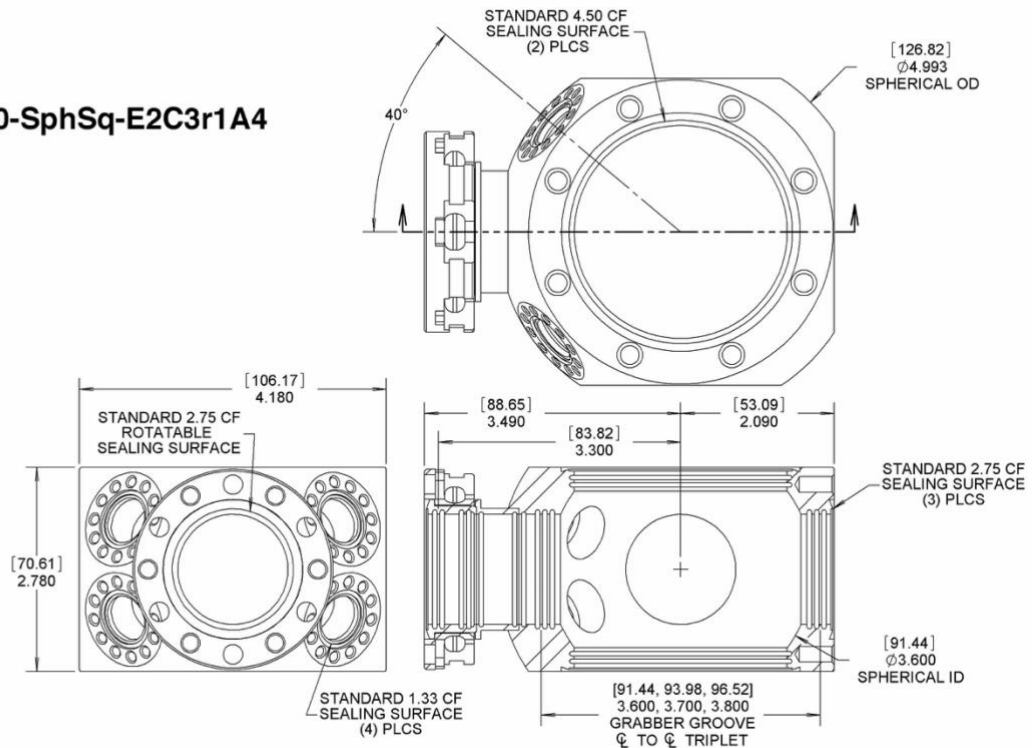
MCF450-SphSq-E2C3r1A4 Spherical Square Multi-CF™ UHV Vacuum Chamber

	MCF450-SphSq-E2C4	MCF450-SphSq-E2C3r1A4
Multi-CF™ FITTING	Spherical Square	
COMMON APPLICATION	UHV Vacuum Chamber	
CONSTRUCTION / MATERIAL	Stainless Steel 316L, various grades of Titanium available for custom fabrication.	
1.33" CF SEALING SURFACES	None	Four (4) CF Sealing Surfaces (A) with (12) #8-32 tapped bolt holes. No grabber grooves are available on 1.33" ports.
2.75" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (C) with (6) 1/4-28 tapped bolt holes, plus one triplet of Grabber Grooves (internal annular grooves) per sealing surface	Four (4) CF Sealing Surfaces (C) with (12) 1/4-28 tapped bolt holes -Three CF sealing surfaces each with 1 triplet of Grabber Grooves. -One rotatable CF sealing surface with (1) pair and (1) triplet of Grabber Grooves (internal annular grooves) per sealing surface
4.5" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (E) with eight (8) 5/16-24 tapped bolt holes, plus one pair of Grabber Grooves per sealing surface	Two (2) CF Sealing Surfaces with eight (8) 5/16-24 tapped bolt holes, plus one triplet of Grabber Grooves per sealing surface
INTERNAL WORKSPACE	Spherical I.D. 3.6 inch (91.4 mm) Internal volume 26.7 in ³ (437.5 cc)	Spherical I.D. 3.600 inch (91.4 mm) Internal volume 30.5in ³ (499.8cc)
EXTERNAL MOUNTING	External Mounting options are available utilizing port flanges. Please see Flange Adapters on Kimball Physics website.	External Mounting options are available utilizing port flanges. Please see Flange Adapters on Kimball Physics website.
WEIGHT	Weight: 4.68 lbs (2.12 kg)	Weight: 4.96 lbs (2.25 kg)

MCF450-SphSq-E2C4



MCF450-SphSq-E2C3r1A4



6.0" Multi-CF™ Spherical Squares

MCF600-SphSq-F2C4A8, MCF600-SphSq-F2E4A4, MCF600-SphSq-F2E4A8

The Kimball Physics **MCF600-SphSq-F2C4A8** is a 6.0" Spherical Square UHV Vacuum Chamber with two (2) 6.0" (F) main sealing surfaces, four (4) 2.75" (C) secondary CF sealing surfaces, and eight (8) 1.33" (A) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on the 6.0" and the 2.75" CF ports.

	MCF600-SphSq-F2C4A8
Multi-CF™ Fitting	Spherical Square
COMMON APPLICATION	Small UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L Titanium available as option)
1.33" CF SEALING SURFACES	Eight (8) CF Sealing Ports (A) with (12) #8-32 tapped bolt holes per sealing surface. No Grabber Grooves available.
2.75" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (C) with (6) 1/4-28 tapped bolt holes, plus one triplet of Grabber Grooves (internal annular grooves) per sealing surface
6.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (F) with (16) 5/16-24 tapped bolt holes, plus one pair of Grabber Grooves (internal annular grooves) per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 54.8 in ³ (898.0 cc) Spherical ID: 4.800 in (121.9 mm)
WEIGHT	8.20 lbs (3.72 kg)

The Kimball Physics **MCF600-SphSq-F2E4A4** is a 6.0" Spherical Square UHV Vacuum Chamber with two (2) 6.0" (F) main sealing surfaces, four (4) 4.5" (C) secondary CF sealing surfaces, and eight (4) 1.33" (A) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on the 6.0" and the 4.5" CF ports.



*MCF600-SphSq-F2C4A8
Spherical Square Multi-CF™
UHV Vacuum Chamber*



*MCF600-SphSq-F2E4A4
Spherical Square Multi-CF™
UHV Vacuum Chamber*

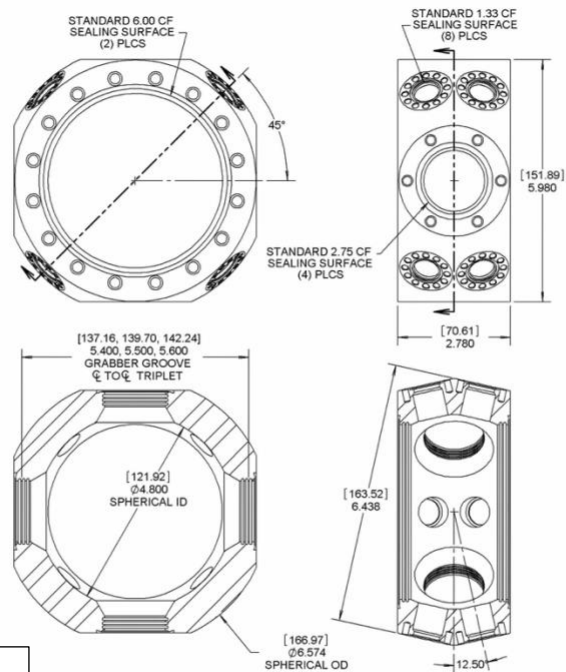
	MCF600-SphSq-F2E4A4
Multi-CF™ Fitting	Spherical Square
COMMON APPLICATION	Small UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L (titanium available as option)
1.33"CF SEALING SURFACES	Four (4) CF Sealing Ports (A) with (12) 8-32 tapped bolt holes per sealing surface. No Grabber Grooves available.
4.5" CF SEALING SURFACES	Four (4) CF Sealing Surfaces(E) with (16) 5/16-24 tapped bolt holes, plus one triplet of Grabber Grooves (internal annular grooves) per sealing surface
6.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (F) with (16) 5/16-24 tapped bolt holes, plus one pair of Grabber Grooves (internal annular grooves) per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 119.0 in ³ (1950 cc) Spherical ID: 5.9 in (149.86 mm)
WEIGHT	15.60 lbs (7.08 kg)

The Kimball Physics **MCF600-SphSq-F2E4A8** is a 6.0" Spherical Square UHV Vacuum Chamber with two (2) 6.0" (F) main sealing surfaces, four (4) 4.5" (E) secondary CF sealing surfaces, and eight (8) 1.33" (A) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on the 6.0" and the 4.5" CF ports.



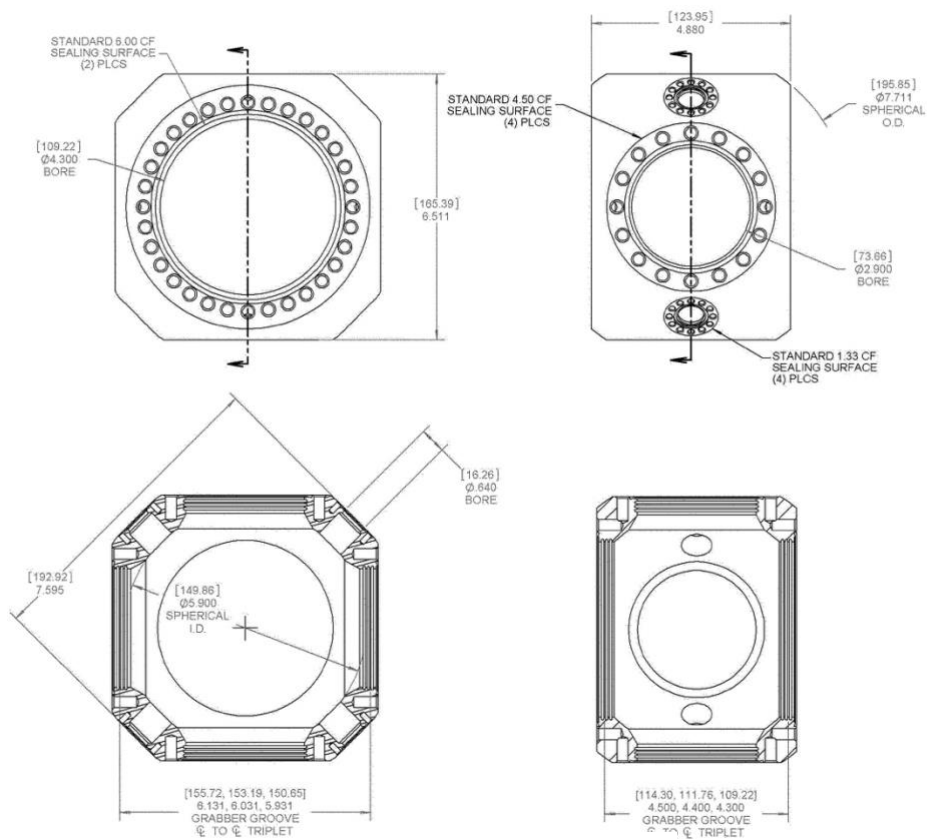
*MCF600-SphSq-F2E4A8
Spherical Square Multi-CF™
UHV Vacuum Chamber*

	MCF600-SphSq-F2E4A8
Multi-CF™ Fitting	Spherical Square
COMMON APPLICATION	UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L (Titanium available as option)
1.33"CF SEALING SURFACES	Eight (8) CF Sealing Surfaces (A) with (12) #8-32 tapped bolt holes per sealing surface. No Grabber Grooves available.
4.5" CF SEALING SURFACES	Four CF Sealing Surfaces (E) with (16) 5/16-24 tapped bolt holes, plus one triplet of Grabber Grooves per sealing surface
6.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (F) with (32) 5/16-24 tapped bolt holes, plus one triplet of Grabber Grooves per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 123.8 in ³ (2028.7 cc) Spherical ID: 5.90 in (149.86 mm)
WEIGHT	15.02 lbs (6.81 kg)

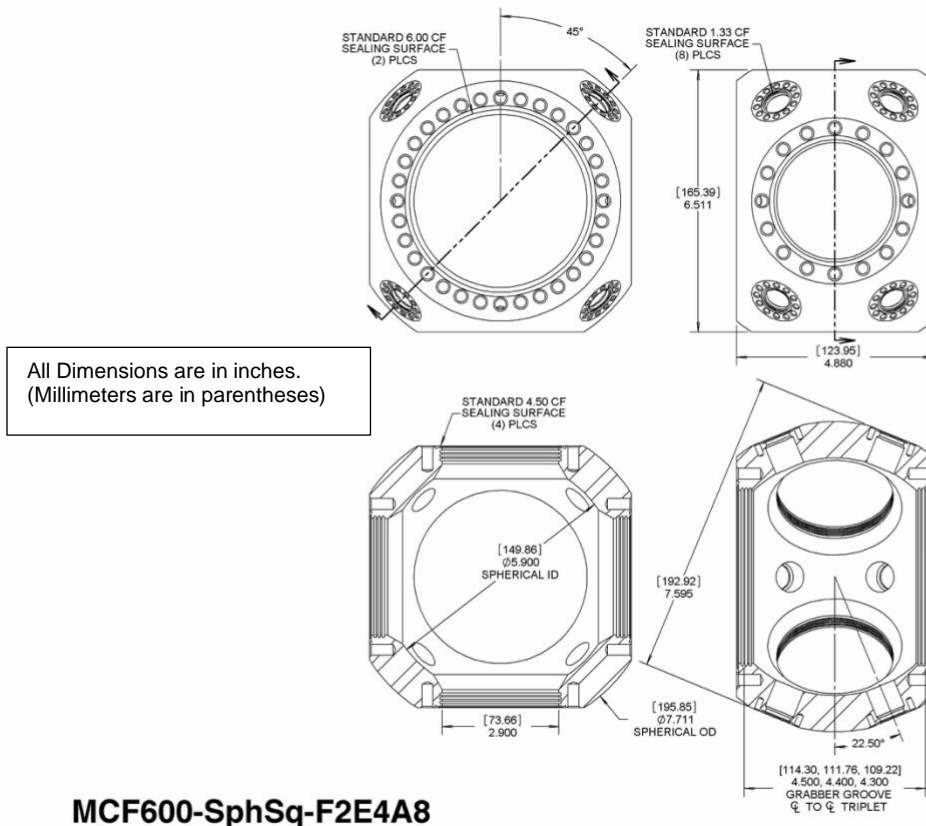


All Dimensions are in inches.
(Millimeters are in parentheses)

MCF600-SphSq-F2C4A8



MCF600-SphSq-F2E4A4



8.0" Multi-CF™ Spherical Squares

**MCF600-SphSq-G2E4, MCF800-SphSq-G2E4C4,
MCF800-SphSq-G2E4C4A16, MCF800SphSq-G2F4**

The Kimball Physics **MCF800-SphSq-G2E4** is a 8.0" Spherical Square UHV Vacuum Chamber with two (2) 8.0" (G) main sealing surfaces, four (4) 4.5" (E) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on all the 8.0" and the 4.5" CF ports.



*MCF800-SphSq-G2E4
Spherical Square Multi-CF™
UHV Vacuum Chamber*

	MCF800-SphSq-G2E4
Multi-CF™ Fitting	Spherical Square
COMMON APPLICATION	UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L (Titanium available as option)
4.5" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (E) with (16) 5/16-24 tapped bolt holes, plus one pair of Grabber Grooves per sealing surface
8.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (G) with (40) 5/16-24 tapped bolt holes, plus one quadruplet of Grabber Grooves (internal annular grooves) per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 222.2 in ³ (3641.2 cc) Spherical ID: 8.0 in (206.4 mm)
WEIGHT	26.22 lbs (11.89 kg)

The Kimball Physics **MCF800-SphSq-G2E4C4** is a 8.0" Spherical Square UHV Vacuum Chamber with two (2) 8.0" (G) main sealing surfaces, two (2) 4.5" (E) sealing surfaces, and four (4) 2.75" (C) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on all the 8.0", 4.5" and the 2.75" CF ports.



*MCF800-SphSq-G2E4C4
Spherical Square Multi-CF™
UHV Vacuum Chamber*

	MCF800-SphSq-G2E4C4
Multi-CF™ Fitting	Spherical Square
COMMON APPLICATION	UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L (Titanium available as option)
2.75" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (C) with (12) 1/4-28 tapped bolt holes, plus one pair of Grabber Grooves (internal annular grooves) per sealing surface
4.5" CF SEALING SURFACES	Four CF Sealing Surfaces (E) with (16) 5/16-24 tapped bolt holes, plus one pair of Grabber Grooves (internal annular grooves) per sealing surface
8.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (G) with (40) 5/16-24 tapped bolt holes, plus one quadruplet of Grabber Grooves (internal annular grooves) per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 228.1 in ³ (3737.8 cc) Spherical ID: 8.000 in (203.2 mm)
WEIGHT	23.58 lbs (10.70 kg)

The Kimball Physics **MCF800-SphSq-G2E4C4A16** is a 8.0" Spherical Square UHV Vacuum Chamber with two (2) 8.0" (G) main sealing surfaces, two (2) 4.5" (E) sealing surfaces, four (4) 2.75" (C) sealing surfaces and sixteen (16) 1.33" (A) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on all the 8.0", 4.5" and the 2.75" CF ports.



*MCF800-SphSq-G2E4C4A16
Spherical Square Multi-CF™
UHV Vacuum Chamber*

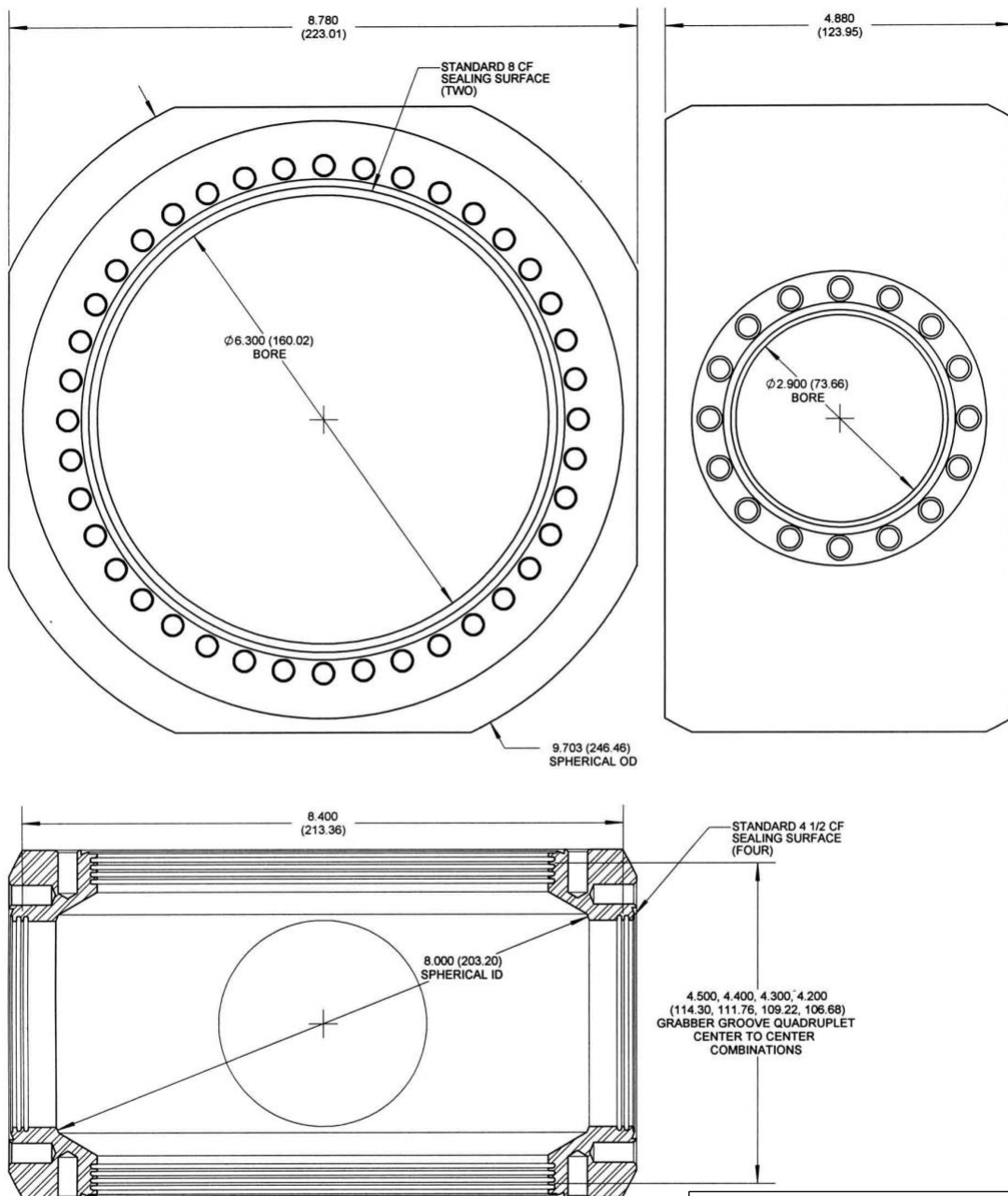
	MCF800-SphSq-G2E4C4A16
Multi-CF™ Fitting	Spherical Square
COMMON APPLICATION	UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L (Titanium available as option)
1.33" CF SEALING SURFACES	Sixteen (16) CF Sealing Surfaces (A) with (12) #8-32 tapped bolt holes per sealing surface. No Grabber Grooves available.
2.75" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (C) with (12) 1/4-28 tapped bolt holes, plus one pair of Grabber Grooves (internal annular grooves) per sealing surface
4.5" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (E) with (16) 5/16-24 tapped bolt holes, plus one pair of Grabber Grooves per sealing surface
8.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (G) with (40) 5/16-24 tapped bolt holes, plus one quadruplet of Grabber Grooves (internal annular grooves) per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 232.3 in ³ (3806.7 cc) Spherical ID: 8.0 in (203.2 mm)
WEIGHT	21.08 lbs (9.56 kg)

The Kimball Physics **MCF800-SphSq-G2F4** is a 8.0" Spherical Square UHV Vacuum Chamber with two (2) 8.0" (G) main sealing surfaces, two (2) 4.5" (E) sealing surfaces, and four (4) 2.75" (C) sealing surfaces. Grabber Grooves (internal mounting grooves) are present on all the 8.0", 4.5" and the 2.75" CF ports.



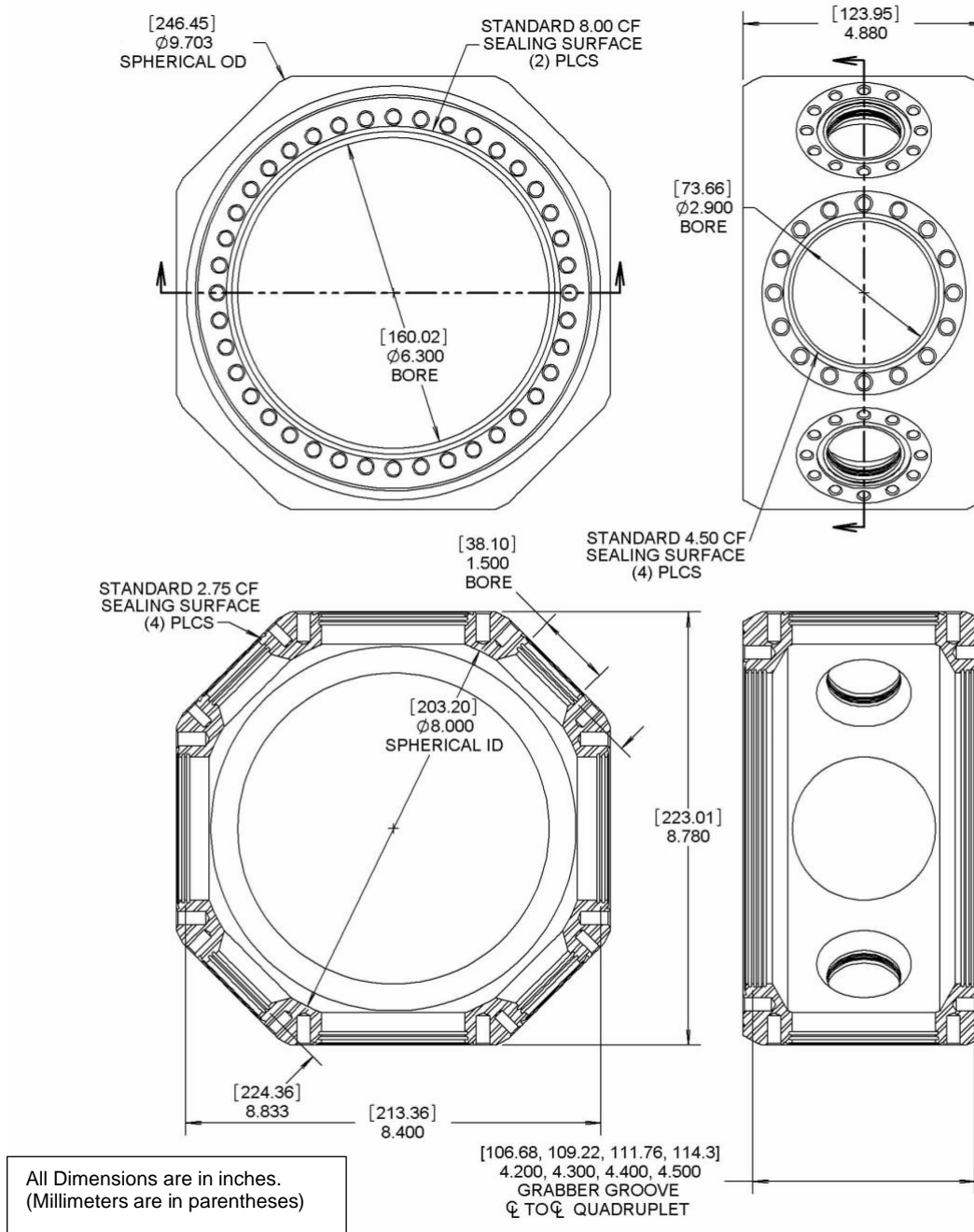
*MCF800-SphSq-G2F4
Spherical Square Multi-CF™
UHV Vacuum Chamber*

	MCF800-SphSq-G2F4
Multi-CF™ Fitting	Spherical Octagon
COMMON APPLICATION	Small UHV Vacuum Chamber
CONSTRUCTION / MATERIAL	Unitary Stainless Steel 316L (titanium available as option)
6.0" CF SEALING SURFACES	Four (4) CF Sealing Surfaces (F) with (32) 5/16-24 tapped bolt holes, plus one set of Grabber Grooves (internal annular grooves) per sealing surface
8.0" CF SEALING SURFACES	Two (2) CF Sealing Surfaces (G) with (40) 5/16-24 tapped bolt holes, plus one set of Grabber Grooves (internal annular grooves) per sealing surface
EXTERNAL MOUNTING	No mounting holes. See website for options using Flange Adapters and External Mounting Brackets.
INTERNAL WORKSPACE	Internal Volume: 303.6 in ³ (4973.5 cc) Spherical ID: 8.400 in (213.36 mm)
WEIGHT	27.6 lbs (12.5 kg)

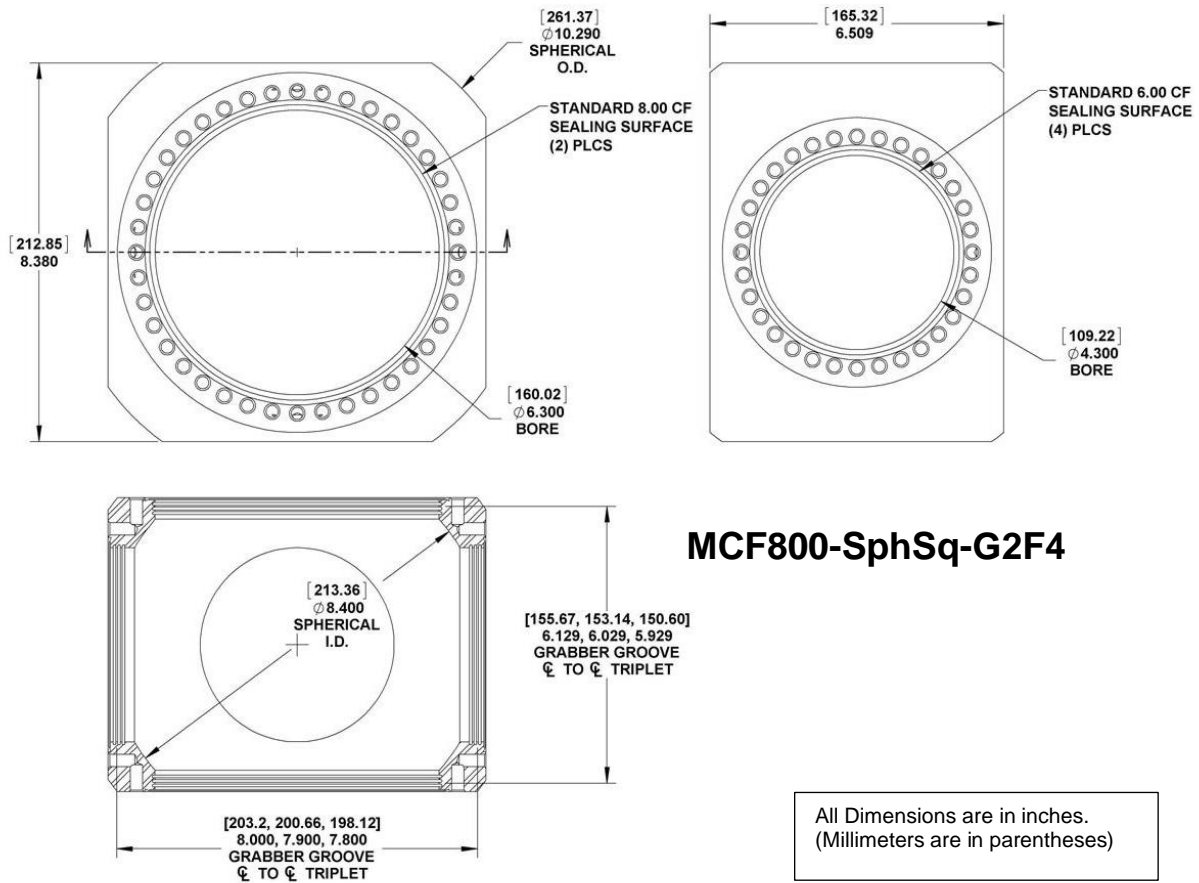


All Dimensions are in inches.
(Millimeters are in parentheses)

MCF800-SphSq-G2E4



MCF800-SphSq-G2E4C4



Category	Product Description	Model	Other Features	Port Code, Dimension (inches) and Number of Ports					
Spherical Square				A 1.33"	C 2.75"	E 4.5"	F 6.0"	G 8.0"	H 10.0"
	4.5" Spherical Square	MCF450-SphSq-E2C4			4	2			
	4.5" Spherical Square Rotatable	MCF450-SphSq-E2C3r1A4	Rotatable, Pumping Port	4	3+1r	2			
	6.0" Spherical Square	MCF600-SphSq-F2C4A8		8	4		2		
	6.0" Spherical Square	MCF600-SphSq-F2E4A4		4		4	2		
	6.0" Spherical Square	MCF600-SphSq-F2E4A8		8		4	2		
	8.0" Spherical Square	MCF800-SphSq-G2E4				4		2	
	8.0" Spherical Square	MCF800-SphSq-G2E4C4			4	4		2	
	8.0" Spherical Square	MCF800-SphSq-G2E4C4A16		16	4	4		2	
	8.0" Spherical Square	MCF800-SphSq-G2F4					4	2	

References

For more information about Multi-Port CF (MCF) Vacuum Chambers and Accessories, visit our website at: Multi-CF Hardware (MCF™ Hardware and Accessories)

Other References:

MCF Vacuum Chambers Overview (Vacuum Chambers and Accessories)

Spherical Octagon- Multi-CF Hardware

Spherical Cube- Multi-CF Hardware

Spherical Cube Expanded- Multi-CF Hardware

Spherical Hexagon- Multi-CF Hardware

Thin Flange- Multi-CF Hardware

Close Coupler (non-rotatable)- Multi-CF Hardware

Notes:

1. Cautions:

- Silver Plated Bolts or Equivalent Lubrication must be used.
- Please carefully measure the hole depth and other flange / copper ring /part thicknesses
- Choose a correct bolt length such that the bolt doesn't bottom in the tapped hole prior to tightening the structure.

2. 3D Solid Models of all parts shown are available as STEP files.

They can be downloaded from Kimball Physics Website for interactive visualization and measurements in your CAD software environment.

3. Specifications Subject to Change Without Notice.

4. Images are not to scale

5. DE Altobelli, DT Taylor 2/22/2023

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