Viewports are plane parallel windows hermetically-sealed to stainless steel mounts such as: Weld adapter (-W), Quick Flange (-QF) or Conflat Flange (-CF). These assemblies are specifically designed to conveniently port the transmission of electromagnetic radiation into and/or out of sealed systems. Several standard material options are offered covering various common transmission ranges and applications. Optical coatings are available to enhance and optimize viewport transmission. Narrow and broad band anti-reflective coatings are offered standard. All viewports are UHV compatible.

Other mounting options as well as non-standard materials, coatings and optical features may be customized to meet specific applications.

#### Sapphire and Fused Silica

MPF manufactures Sapphire and Fused Silica viewports using proprietary vacuum brazing and welding techniques. Sapphire viewports are available with view diameters up to 3 inches, and are bakeable to 450°C. Single crystal, sapphire windows, with either 0° or 90° orientation, offer excellent transmission from 250 nm to 4 microns.

Fused Silica viewport designs are available with diameters up to 8 inches and include zero length designs for low profile applications. These are all bakeable to 200°C. Several standard grades of Fused Silica windows are offered having excellent transmission from 193nm to 2 microns.

#### **Coated Fused Silica**

MPF offers a full line of tailored laser viewports designed specifically for a variety of popular high-power lasers. These viewports utilize optimum window and anti-reflective coating specifications to maximize performance at specific wavelengths. Supported wavelengths and laser applications are: 193nm-ArF Excimer, 248nm-KrF Excimer, 780nm-Diode and 1064nm YAG.

### **Extended Range Vacuum Optics**

These ultra-high vacuum (UHV) viewports employ window materials such as Zinc Selenide, Magnesium Fluoride and Calcium Fluoride. All-metal-sealed, extended-range optics are available in 1 inch and 2 inch view diameters with a combined transmission range of 120nm to 20 microns.

Coatings which enhance the transmission performance of many of these viewports are offered as standard options. Many non-standard materials, coatings and optical specifications may be reviewed and quoted to meet custom application requirements.

### **Specialized Optics**

See page 15 for more information on differentially pumped, non-magnetic, and re-entrant viewports.



### **Table of Contents**



VIEWPORT TYPE	NOMINAL VIEW DIAMETER	TRANSMISSION RANGE	THERMAL RATING	SECTION PAGES
Sapphire	.38″ to 3″	0.17 microns to 5 microns	Window: -100 to 450°C	1.1 4 - 7
Fused Silica	.75" to 8"	0.18 microns to 3.5 microns	Window: -100 to 200°C	<mark>1.2</mark> 8 - 11
BBAR Coated Fused Silica	1.5" to 2.5"	225nm to 450nm 425nm to 760nm 550nm to 1100nm	Window: -100 to 200°C	1.3 12
Laser Optics	1.5" to 2.5"	193, 248, 780 and 1064 nm	Window: -100 to 200°C	1.4 13
Extended Range Optics	1.0″ to 2.0″	0.13 microns to 18 microns	Window: -100 to 200°C	1.5 14
Specialized Optics	1.0" to 2.5"	See pages 16-18	See pages 16-18	<mark>1.6</mark> 15 - 18

### **MPF Custom Optics Capabilities**

Beyond its' extensive offering of standard optical products, MPF has custom design and manufacturing expertise and is capable of manufacturing hermetically-sealed, opto-mechanical assemblies that meet most combinations of customer specified form, fit and function. Non-magnetic, RoHS compliant, elevated pressure and temperature options are available for all window materials. Mounting size, design, and construction material as well as view diameter and location may be customer specified. Rigorous dimensional tolerances are available for all optical designs.

MPF also offers custom coating capabilities including single band, multi-band, broadband and specialty coatings on various materials. A design library of field-tested and proven sealed optical assemblies exists for an extensive list of optical materials (including many fluorides, oxides and semiconductor materials – both with and without optical coatings).

The optical finish (surface polish, flatness, parallelism, clear aperture, wedge angle, focal length, and thickness) may also be tailored to specific optical needs.



### **UV SAPPHIRE**

Leak Rate:
Parallelism:
Flange Material:
Surface Finish:
Thermal Range:
Material:
UV Transmission:
Orientation:
Pressure:

<2x10(-10) atm cc/sec He <3 Arc Minutes 304/316 Stn. Stl. 50/20 -100°C to 450°C Sapphire 50% @ 250nm (external) 0-90° Contact MPF Engineering

#### **Operating Conditions**

The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.

### WELDABLE





**SAPPHIRE (UV GRADE)** 

1.0

WAVELENGTH (microns)

2.0 3.0 4.0 5.0

10

SLEEVE	Ø "A" DIM (VIEW)	В	С	D	E	F	G	PART #	PRICE
Kovar	.34	.062	.38	.615	.030	.010	.31	A0711-1-W	\$140
Kovar	.46	.062	.51	.740	.030	.010	.31	A0711-2-W	\$165

0.2

0.4

0.6 0.8



### **UV SAPPHIRE**

Leak Rate:
Parallelism:
Flange Material:
Surface Finish:
Thermal Range:
Material:
UV Transmission:
Orientation:
Pressure:

<2x10(-10) atm cc/sec He <3 Arc Minutes 304/316 Stn. Stl. 50/20 -100°C to 450°C Sapphire 50% @ 250nm (external) 0-90° Contact MPF Engineering

**Operating Conditions** 

The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.







	── Ø "C" DIM ───	
		↓ "H" DIM
"E" DIM	Ø "A" DIM (VIEW)	■ "B" DIM
	✓ Ø "D" DIM	

ADAPTER	Ø "A" DIM (VIEW)	В	С	D	E	н	PART #	PRICE	
STN. STL.	.69	.080	.77	1.500	.030	.44	A0633-1-W	\$210	
STN. STL.	.94	.080	1.02	1.500	.030	.44	A0633-2-W	\$235	
STN. STL.	1.44	.080	1.52	2.500	.030	.49	A0633-3-W	\$520	
STN. STL.	1.94	.094	2.02	2.500	.030	.54	A0633-4-W	\$550	
STN. STL.	2.95	.125	3.02	3.500	.030	.55	A1679-1-W	\$1400	





					•		
Ø "A" DIM (VIEW)	В	С	D	E	F	PART #	PRICE
.46	.062	.510	.285	.080	1.33	A1858-1-CF	\$190
.59	.062	.600	.500	.100	1.33	A0808-1-CF	\$200
.69	.080	.770	.500	.080	2.75	A0810-1-CF	\$225
.94	.080	1.02	.500	.080	2.75	A0810-2-CF	\$255
1.44	.080	1.52	.500	.13	2.75	A6944-1-CF	\$600
1.44	.080	1.52	.680	.13	4.50	A0810-3-CF	\$600
1.94	.094	2.02	.680	.10	4.50	A0810-4-CF	\$700



## Sapphire

"G" DİM

"G" DİM

"D" DIM

### **UV SAPPHIRE**

Leak Rate: Parallelism: Flange Material: Surface Finish: Thermal Range: Material: UV Transmission: Orientation: Pressure: <2x10(-10) atm cc/sec He <3 Arc Minutes 304/316 Stn. Stl. 50/20 -100°C to 450°C Sapphire 50% @ 250nm (external) 0-90° Contact MPF Engineering

### Operating Conditions

The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.



### **QUICK FLANGE** Ø "F" DIM Ø "C" DIM **FIGURE 1** — "B" DIM Ø "A" DIM (VIEW) Ø "E" DIM Ø "F" DIM **FIGURE 2** Ø "C" DIM Ø "A" DIM "B" DIM "D" DIM (VIEW) Ø "E" DIM

GRADE	FIG NO.	Ø "A" DIM (VIEW)	В	С	D	E	F	G	PART #	PRICE	
UV	1	.59	.062	.600	.13	1.18	.750	.56	A0813-1-QF	\$200	
UV	2	.69	.080	.770	.13	2.16	1.50	.52	A0814-1-QF	\$225	
UV	2	.94	.080	1.02	.13	2.16	1.50	.52	A0814-2-QF	\$250	
UV	2	.94	.080	1.02	.13	2.95	2.00	.52	A1641-1-QF	\$255	

## Sapphire

### **DUV SAPPHIRE**

Leak Rate:
Parallelism:
Flange Material:
Surface Finish:
Thermal Range:
Material:
UV Transmission:
Orientation:
Pressure:

<2x10(-10) atm cc/sec He <3 Arc Minutes 304/316 Stn. Stl. 20/10 -100°C to 450°C Sapphire 70% @ 250nm (external) 0° Contact MPF Engineering

#### **Operating Conditions**

The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.



### WELDABLE

1.94



.094

2.02



ADAPTER	Ø "A" DIM (VIEW)	В	С	D	E	н	PART #	PRICE
STN. STL.	.69	.080	.77	1.500	.030	.44	A8006-1-W	\$280
STN. STL.	.94	.080	1.02	1.500	.030	.44	A8006-2-W	\$315
STN. STL.	1.44	.080	1.52	2.500	.030	.49	A8006-3-W	\$730
STN. STL.	1.94	.094	2.02	2.500	.030	.54	A8006-4-W	\$825

#### Ø "F" DIM **CONFLAT FLANGE** Ø "C" DIM "D" DIM "B" DIM "E" DIM Ø "A" DIM (VIEW) Ø "A" DIM (VIEW) В С D Ε F PART # PRICE .080 .770 .080 A8007-1-CF \$295 .69 .500 2.75 .94 .080 1.02 .500 .080 2.75 A8007-2-CF \$335 1.44 .080 1.52 .680 .13 4.50 A8007-3-CF \$810

.680

.10

4.50

A8007-4-CF

\$975



#### **UV FUSED SILICA FUSED SILICA (UV GRADE)** Leak Rate: <2x10(-10) atm cc/sec He **%** <sup>100</sup> Parallelism: <30 Arc Minutes **TRANSMISSION** 80 304/316 Stn. Stl. Flange Material: Surface Finish: 40/20 60 -100°C to 200°C Thermal Range: Material: Corning HPFS 7980 Fused Silica 40 Transmission: >90% @ 250nm (external) 20 Homogeneity Grade: F 2 Inclusion Class: 0 0.2 0.4 0.6 0.8 1.0 2.0 3.0 4.0 5.0 **Operating Conditions** WAVELENGTH (microns) The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.





Ø "A" DIM (VIEW)	В	С	D	Е	F	G	PART #	PRICE	
1.37	.13	1.76	.68	.85	1.500	.065	A0657-11-W	\$240	
2.37	.25	2.88	.79	1.10	2.500	.065	A0657-12-W	\$475	
3.84	.25	4.41	1.01	1.30	4.500	.085	A0657-13-W	\$700	





NOM. SIZE	Ø "A" DIM (VIEW)	В	С	D	Е	PART #	PRICE	
3/4″	.63	.10	.29	1.33	.17	A1671-1-CF	\$180	
1 1/2″	1.40	.13	.50	2.75	.35	A0651-1-CF	\$200	
1 1/2″	1.40	.13	.62	3.37	.35	A0651-2-CF	\$220	
2 1/2″	2.69	.25	.68	4.50	.41	A0651-3-CF	\$650	
2 1/2"	2.69	.25	.75	4.62	.41	A0651-4-CF	\$665	
4″	3.88	.25	.78	6.00	.51	A0651-5-CF	\$800	
4″	3.88	.25	.84	6.75	.51	A0651-6-CF	\$850	
6″	5.38	.37	.88	8.00	.48	A0651-7-CF	\$1950	
8″	7.78	.37	.97	10.00	.53	A0651-8-CF	\$2500	

## **Fused Silica**



### WELDABLE





400

Ø "A" DIM (VIEW)	В	с	D	E	F	G	PART #	PRICE
1.37	.13	1.76	.68	.85	1.500	.065	A0657-6-W	\$390
2.37	.25	2.88	.79	1.10	2.500	.065	A0657-7-W	\$950
3.84	.25	4.41	1.01	1.30	4.500	.085	A0657-8-W	\$1350





NOM. SIZE	Ø "A" DIM (VIEW)	В	С	D	E	PART #	PRICE	
3/4″	.63	.10	.29	1.33	.17	A1671-2-CF	\$305	
1 1/2″	1.40	.13	.50	2.75	.35	A0650-1-CF	\$350	
1 1/2″	1.40	.13	.62	3.37	.35	A0650-2-CF	\$400	
2 1/2"	2.69	.25	.68	4.50	.41	A0650-3-CF	\$950	
2 1/2"	2.69	.25	.75	4.62	.41	A0650-4-CF	\$1025	
4″	3.88	.25	.78	6.00	.51	A0650-5-CF	\$1350	



#### **FUSED SILICA (UV GRADE) UV FUSED SILICA** 100 80 60 40 20 0 <2x10(-10) atm cc/sec He Leak Rate: Parallelism: <30 Arc Minutes 304/316 Stn. Stl. Flange Material: Surface Finish: 40/20 Thermal Range: -100°C to 200°C Material: Corning HPFS 7980 Fused Silica >90% @ 250nm (external) Transmission: Homogeneity Grade: F Inclusion Class: 2 0 3.0 4.0 5.0 0.6 0.8 2.0 0.2 0.4 1.0 **Operating Conditions** The thermal ratings specified are safe operating limits determined by various factors including WAVELENGTH (microns) material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded. \*See page 9 for DUV information. **QUICK FLANGE**





ТҮРЕ	NOM. SIZE	VIEW DIAMETER	FLANGE	PART #	PRICE
UV Grade	5/8″	.63	QF-25	A4563-1-QF	\$205
*DUV Grade - Laser Quality	5/8″	.63	QF-25	A4563-2-QF	\$355





ТҮРЕ	NOM. SIZE	VIEW DIAMETER	FLANGE	PART #	PRICE
UV Grade	1 1/2″	1.40	QF-40	A2206-1-QF	\$205
*DUV Grade - Laser Quality	1 1/2″	1.40	QF-40	A2206-2-QF	\$355





ТҮРЕ	NOM. SIZE	VIEW DIAMETER	FLANGE	PART #	PRICE
UV Grade	1 1/2″	1.40	QF-50	A0816-1-QF	\$250
*DUV Grade - Laser Quality	1 1/2″	1.40	QF-50	A0816-2-QF	\$400

## **Fused Silica**

2.0

180 200 220 240 260 280 300 320 340 360 380 400

WAVELENGTH (nm)

3.0 4.0 5.0



#### **Operating Conditions**

The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.

### **WELDABLE**





99.60

99.50

Ø "A" DIM (VIEW)	В	С	D	E	F	G	PART #	PRICE	
1.37	.13	1.76	.68	.85	1.500	.065	A0657-16-W	\$610	
2.37	.25	2.88	.79	1.10	2.500	.065	A0657-17-W	\$1410	





NOM. SIZE	Ø "A" DIM (VIEW)	В	С	D	E	PART #	PRICE	
1 1/2″	1.40	.13	.50	2.75	.35	A0652-1-CF	\$650	
2 1/2"	2.69	.25	.68	4.50	.41	A0652-3-CF	\$1450	



### **BBAR Coated Fused Silica**

#### **BBAR COATED FUSED SILICA**

Leak Rate: Parallelism: Flange Material: Flatness: Surface Finish: Thermal Range: Material: Homogeneity Grade: Inclusion Class: <2x10(-10) atm cc/sec He
<10 Arc Seconds
304/316 Stn. Stl.
λ/4 @ 632nm Transmitted Wavefront
20/10
-100°C to 200°C
Corning HPFS 7980 Fused Silica
A
0</pre>

#### Operating Conditions

The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.







TYPE	Ø "A" DIM (VIEW)	В	С	D	E	PART #	PRICE
225-450nm	1.40	.13	.50	2.75	.35	A8000-1-CF	\$695
225-450nm	2.69	.25	.68	4.50	.41	A8001-1-CF	\$1245
425-760nm	1.40	.13	.50	2.75	.35	A8002-1-CF	\$695
425-760nm	2.69	.25	.68	4.50	.41	A8003-1-CF	\$1245
550-1100nm	1.40	.13	.50	2.75	.35	A8004-1-CF	\$695
550-1100nm	2.69	.25	.68	4.50	.41	A8005-1-CF	\$1245

## **Laser Optics**

#### 780nm Diode Laser LASER OPTICS ТҮРЕ 4.0 Leak Rate: <2x10(-10) atm cc/sec He % **REFLECTANCE** Parallelism: <10 Arc Seconds 3.0 304/316 Stn. Stl. Flange Material: 2.0 $\lambda/4$ @ 632nm Transmitted Wavefront Flatness: 1.0 20/10 Surface Finish: Thermal Range: -100°C to 200°C 0 Corning HPFS 7980 Fused Silica 700 750 800 850 900 Material: WAVELENGTH (nm) Homogeneity Grade: А Inclusion Class: 0 Laser Damage Threshold: 1064nm YAG Laser TYPE 780nm Diode Laser: 10 J/cm<sup>2</sup> for 10 ns Pulse 4.0 1064nm YAG Laser: 10 J/cm<sup>2</sup> for 10 ns Pulse % **REFLECTANCE** 193nm Arf Excimer: 1 J/cm<sup>2</sup> for 10 ns Pulse 3.0 10 J/cm<sup>2</sup> for 10 ns Pulse 248nm KrF Excimer: 2.0 **Operating Conditions** 1.0 The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. 0 Temperature ratings for various mounting options may reduce the operating range of a 950 1000 1050 1100 1150 1200 window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and WAVELENGTH (nm)







TYPE	COATING	Ø "A" DIM (VIFW)	B	C	D	PART #	PRICE	
	CoAning		5	-	5	TANT #	THICL	
780nm Diode Laser	V-Coat 780nm R<0.25%	1.4	.125	.500	2.75	A4546-1-CF	\$695	
780nm Diode Laser	V-Coat 780nm R<0.25%	2.69	.125	.500	4.5	A5802-1-CF	\$1245	
1064nm YAG Laser	V-Coat 1064nm R<0.25%	1.4	.125	.500	2.75	A4545-1-CF	\$695	
1064nm YAG Laser	V-Coat 1064nm R<0.25%	2.69	.125	.500	4.5	A5803-1-CF	\$1245	
193nm ArF Excimer	V-Coat 193nm R<0.25%	1.4	.125	.500	2.75	A4548-1-CF	\$795	
193nm ArF Excimer	V-Coat 193nm R<0.25%	2.69	.125	.500	4.5	A5800-1-CF	\$1345	
248 KrF Excimer	V-Coat 248nm R<0.25%	1.4	.125	.500	2.75	A4547-1-CF	\$695	
248 KrF Excimer	V-Coat 248nm R<0.25%	2.69	.125	.500	4.5	A5801-1-CF	\$1245	



## **Extended Range Optics**



### **CONFLAT FLANGE**





### Vacuum Optics – UHV Grade

WINDOW MATERIAL	AR COATED	Ø "A" DIM (VIEW)	В	С	D	PART #	PRICE
Zinc Selenide	-	.90	.098	.500	2.75	A3982-1-CF	\$595
Calcium Flouride	-	.90	.098	.500	2.75	A4531-1-CF	\$595
Magnesium Flouride	-	.90	.098	.500	2.75	A4530-1-CF	\$595
AR Coated Zinc Selenide	8 - 12 Microns	.90	.098	.500	2.75	A4539-1-CF	\$795
Zinc Selenide	-	1.88	.150	.680	4.5	A4584-1-CF	\$2350
Calcium Flouride	-	1.88	.150	.680	4.5	A4594-1-CF	\$1950
Magnesium Flouride	-	1.88	.150	.680	4.5	A4595-1-CF	\$2350
AR Coated Zinc Selenide	8 - 12 Microns	1.88	.150	.680	4.5	A4297-1-CF	\$3200

## **Specialized Optics**



### **MPF Specialized Optics**

### **Differentially Pumped**

Specifically designed for extreme high vacuum applications such as Geochronology, MPF's differentially pumped windows employ all-metal, dual-seals having a port that accesses the resulting cavity between the seals. The port can be attached to an auxiliary pump to extend the vacuum range beyond UHV. This design has become the standard for geologists studying argon and helium dating.

### Non-Magnetic

For optical applications involving strong magnetic fields or those that are exceedingly sensitive to residual magnetism, MPF offers standard fused silica and extended range viewports made using non-magnetic mounting materials such as 316 LN stainless steel, CP titanium and aluminum.

### **Re-Entrant**

MPF is now offering popular window designs, standard on re-entrant tubing designs. Available in sapphire, fused silica and extended range viewport configurations, these designs are useful for coupling complex lens assemblies such as cameras, telescopes and zoom lenses with applications where reach into a vacuum system is important.



### **DIFFERENTIALLY PUMPED**

Leak Rate: Parallelism: Flange Material: Flatness: Surface Finish: Bake Out Temp: Coating: <2x10(-10) atm cc/sec He <3 Arc Minutes 304/316 Stn. Stl.  $\lambda/4$ 40/20 Scratch/Dig 200°C AR Coated (8-12 Microns)

Operating Conditions The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.







Ø "A" DIM	Ø "B" DIM (VIEW)	PART "C"	"D" DIM	"E" DIM	"F" DIM	PART #	PRICE
2.75	.93	1/8" Male VCR	.94	1.80	.77	A7845-1-CF	\$1950
2.75	.93	1/8" Female VCR	.94	1.80	.77	A7845-2-CF	\$1950
2.75	.93	1.33" C.F.	.94	1.80	.77	A7845-3-CF	\$1950
2.75	.93	OMIT	.94	1.80	.77	A7845-4-CF	\$1950
4.50	1.88	1/4" Male VCR	1.70	2.90	.87	A4523-1-CF	\$2495
4.50	1.88	1/4" Female VCR	1.70	2.90	.87	A4523-2-CF	\$2495
4.50	1.88	1.33″ C.F.	1.70	2.90	.87	A4523-3-CF	\$2495
4.50	1.88	OMIT	1.70	2.90	.87	A4523-4-CF	\$2495

## **Specialized Optics**

<b>NON-MAGNET</b>	IC, FUSED SILICA					
Leak Rate:	<2x10(-10) atm cc/sec He					
Parallelism:						
UV Grade:	<30 Arc Minutes					
DUV Grade:	<10 Arc Seconds					
Flange Material:	316 LN Stn. Stl.					
Flatness:	DUV: λ/4 @ 632nm Transmitted Wavefront					
Surface Finish:						
UV Grade:	40/20					
DUV Grade:	20/10					
Thermal Range:	-100°C to 200°C					
Material:	Corning HPFS 7980 Fused Silica					
Transmission:	-					
UV Grade:	>90% @ 250nm (external)					
DUV Grade:	≥99.8% @ 248nm (internal)					
Homogeneity Grade:						
UV Grade:	F					
DUV Grade:	A					
Inclusion Class:						
UV Grade:	2					
DUV Grade:	0					
Operating Conditions						
The thermal ratings specified are safe operating limits determined by various factors						
including material properties, mechanical design, and the intended operating environment.						
Temperature ratings for various mounting options may reduce the operating range of a						
window assembly. All assembl	ies nave a maximum mennal uragent of 25 C per minute and					
Imperature ratings for variou window assembly. All assembl	Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and					



### **CONFLAT FLANGE**





### Non-Magnetic

SLEEVE	FLANGE	GRADE	Ø "A" DIM	"B" DIM	Ø "C" DIM (VIEW)	PART #	PRICE
Titanium	316LN STN. STL.	UV	1.33	.35	.63	A7154-1-CF	\$480
Titanium	316LN STN. STL.	UV	2.75	.50	1.40	A7981-1-CF	\$575
Titanium	316LN STN. STL.	UV	4.50	.68	2.69	A8711-1-CF	\$1425
Titanium	316LN STN. STL.	DUV	1.33	.35	.63	A7154-2-CF	\$590
Titanium	316LN STN. STL.	DUV	2.75	.50	1.40	A7981-2-CF	\$710
Titanium	316LN STN. STL.	DUV	4.50	.68	2.69	A8711-2-CF	\$1710



## **Specialized Optics**

<b>RE-ENTRANT</b> ,	FUSED SILICA					
Leak Rate:	<2x10(-10) atm cc/sec He					
Parallelism:						
UV Grade:	<30 Arc Minutes					
DUV Grade:	<10 Arc Seconds					
Flange Material:	304/316 Stn. Stl.					
Flatness:	DUV: $\lambda/4$ @ 632nm Transmitted Wavefront					
Surface Finish:						
UV Grade:	40/20					
DUV Grade:	20/10					
Thermal Range:	-100°C to 200°C					
Material:	Corning HPFS 7980 Fused Silica					
Transmission:	-					
UV Grade:	>90% @ 250nm (external)					
DUV Grade:	≥99.8% @ 248nm (internal)					
Homogeneity Grade:						
UV Grade:	F					
DUV Grade:	A					
Inclusion Class:						
UV Grade:	2					
DUV Grade:	0					
Operating Conditions						
The thermal ratings specified	are safe operating limits determined by various factors					
including material properties	, mechanical design, and the intended operating environment.					
Temperature ratings for various mounting options may reduce the operating range of a						
window assembly. All assemblies have a maximum thermal gradient of 25°C per minute and						



### CONFLAT FLANGE

may be damaged if this limit is exceeded.





### **Re-Entrant**

GRADE	Ø "A" DIM (VIEW)	Ø "B" DIM	Ø "C" DIM	"D" DIM	"E" DIM	"F" DIM	"G" DIM	PART #	PRICE
UV	1.40	1.90	4.50 C.F.	3.50	4.18	.68	.05	A6665-1-CF	\$700
UV	2.69	2.87	6.00 C.F.	3.50	4.28	.78	.07	A6667-1-CF	\$1150
DUV	1.40	1.90	4.50 C.F.	3.50	4.18	.68	.05	A6665-2-CF	\$850
DUV	2.69	2.87	6.00 C.F.	3.50	4.28	.78	.07	A6667-2-CF	\$1450