VIEWPORTS

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.

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VIEWPORTS

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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.

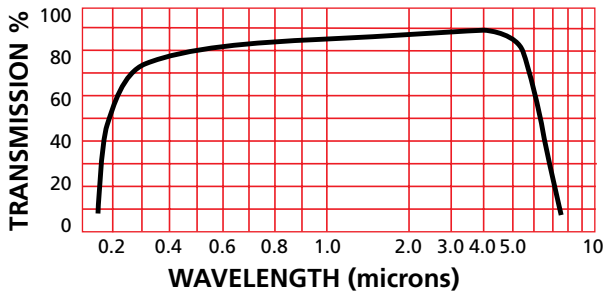
MPF also offers custom coating capabilities including single band, multi-band, broadband and specialty coatings on various materials. A design library of field-tested and proven sealed optical assemblies exists for an extensive list of optical materials (including many fluorides, oxides and semiconductor 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:	<2x10(-10) atm cc/sec He
Parallelism:	<3 Arc Minutes
Flange Material:	304/316 Stn. Stl.
Surface Finish:	50/20
Thermal Range:	-100˚C to 450˚C
Material:	Sapphire
UV Transmission:	50% @ 250nm (external)
Orientation:	0-90˚
Pressure:	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 25ºC per minute and may be damaged if this limit is exceeded.



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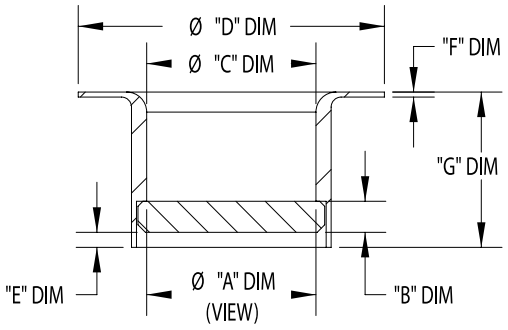
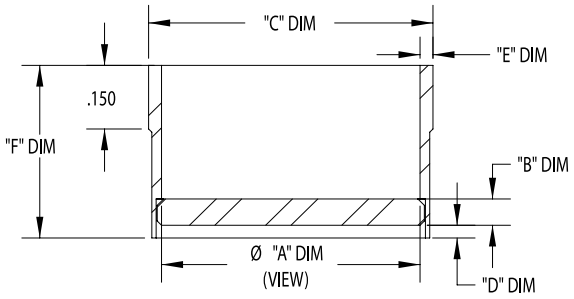


SLEEVE	Ø "A" DIM (VIEW)	B	C	D	E	F	G	PART #
Kovar	.34	.062	.38	.615	.030	.010	.31	A0711-1-W
Kovar	.46	.062	.51	.740	.030	.010	.31	A0711-2-W

WELDABLE



SLEEVE	Ø "A" DIM (VIEW)	B	C	D	E	F	PART #
Kovar	.59	.062	.66	.030	.030	.43	A0629-1-W

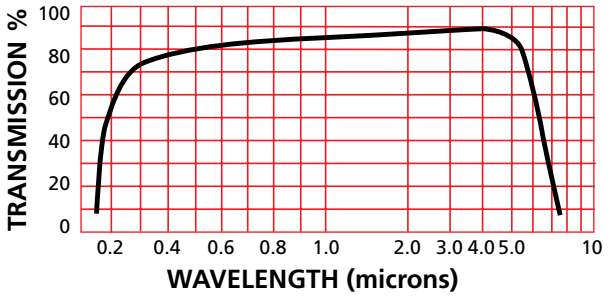
UV SAPPHIRE

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

SAPPHIRE (UV GRADE)



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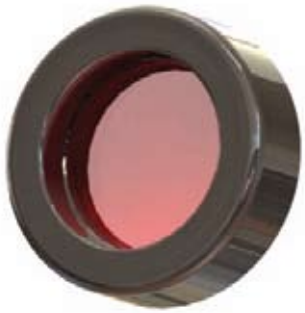
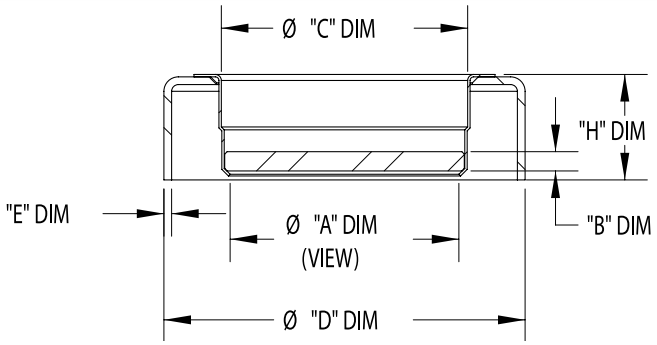
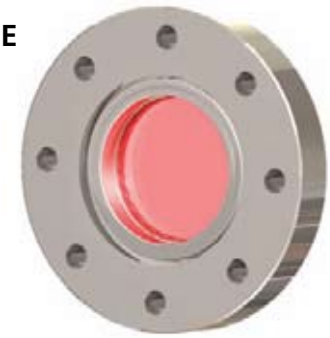
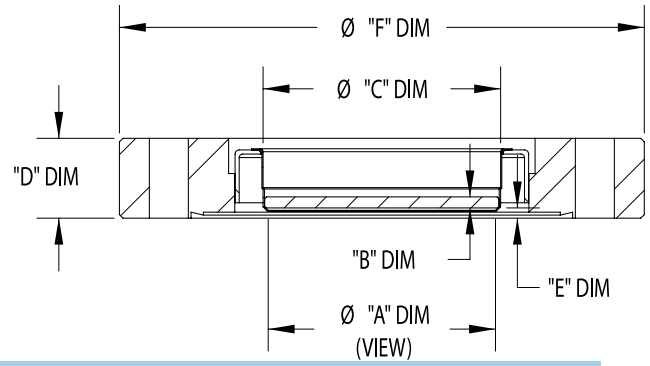




ADAPTER	Ø "A" DIM (VIEW)	B	C	D	E	H	PART #
STN. STL.	.69	.080	.77	1.500	.030	.44	A0633-1-W
STN. STL.	.94	.080	1.02	1.500	.030	.44	A0633-2-W
STN. STL.	1.44	.080	1.52	2.500	.030	.49	A0633-3-W
STN. STL.	1.94	.094	2.02	2.500	.030	.54	A0633-4-W
STN. STL.	2.95	.125	3.02	3.500	.030	.55	A1679-1-W

CONFLAT FLANGE





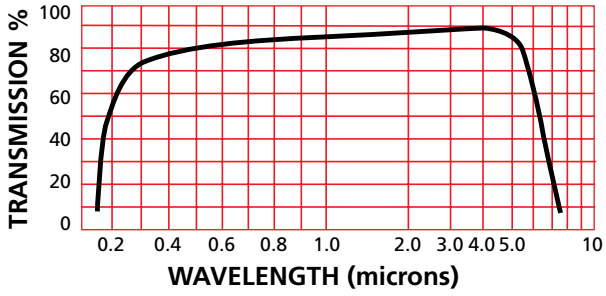
Ø "A" DIM (VIEW)	B	C	D	E	F	PART #
.46	.062	.510	.285	.080	1.33	A1858-1-CF
.59	.062	.600	.500	.100	1.33	A0808-1-CF
.69	.080	.770	.500	.080	2.75	A0810-1-CF
.94	.080	1.02	.500	.080	2.75	A0810-2-CF
1.44	.080	1.52	.500	.13	2.75	A6944-1-CF
1.44	.080	1.52	.680	.13	4.50	A0810-3-CF
1.94	.094	2.02	.680	.10	4.50	A0810-4-CF

UV SAPPHIRE

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

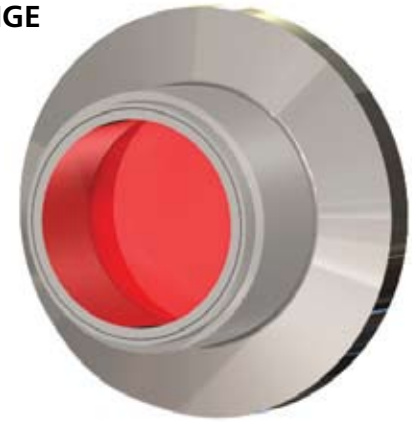
Operating Conditions

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

FIGURE 1



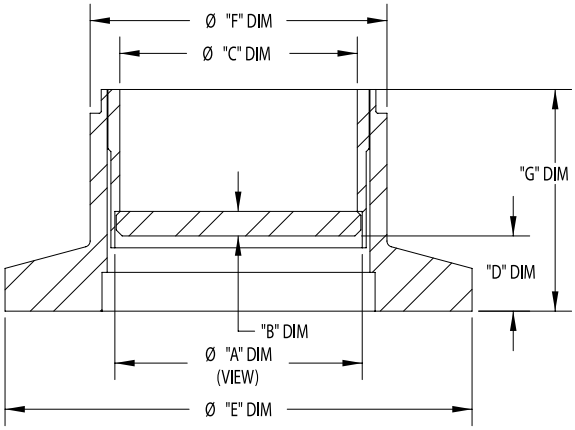
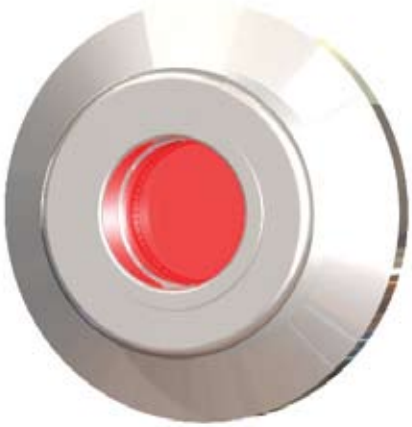
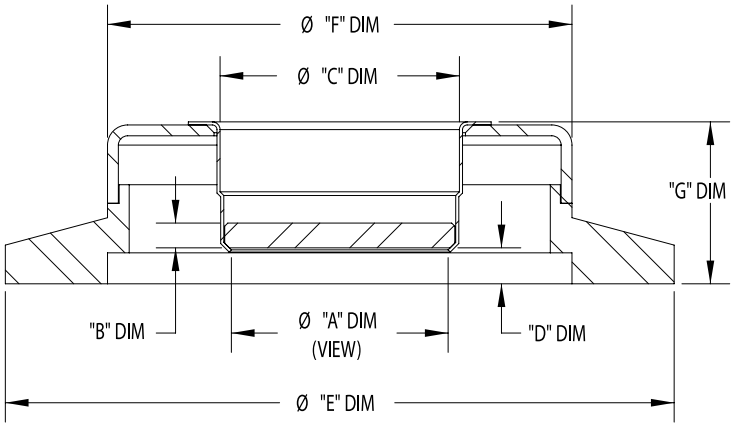


FIGURE 2





GRADE	FIG NO.	Ø "A" DIM (VIEW)	B	C	D	E	F	G	PART #
UV	1	.59	.062	.600	.13	1.18	.750	.56	A0813-1-QF
UV	2	.69	.080	.770	.13	2.16	1.50	.52	A0814-1-QF
UV	2	.94	.080	1.02	.13	2.16	1.50	.52	A0814-2-QF
UV	2	.94	.080	1.02	.13	2.95	2.00	.52	A1641-1-QF

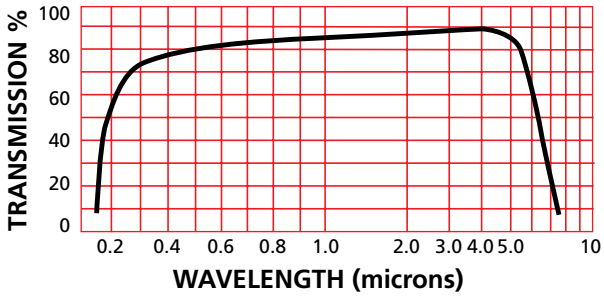
DUV SAPPHIRE

Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<3 Arc Minutes
Flange Material:	304/316 Stn. Stl.
Surface Finish:	20/10
Thermal Range:	-100˚C to 450˚C
Material:	Sapphire
UV Transmission:	70% @ 250nm (external)
Orientation:	0˚
Pressure:	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.

SAPPHIRE (DUV GRADE)



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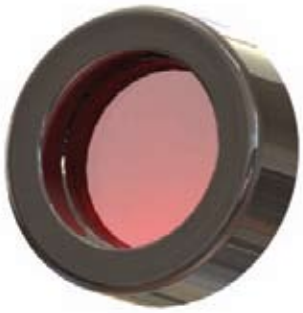
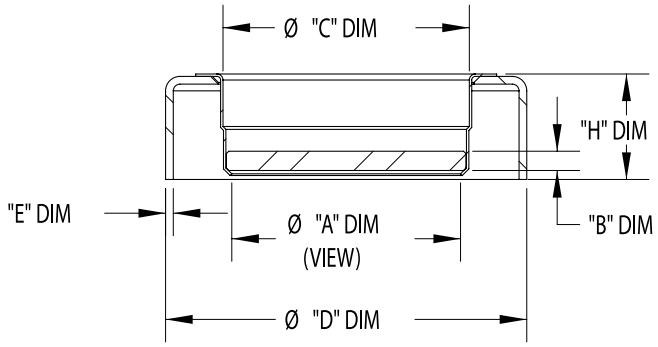
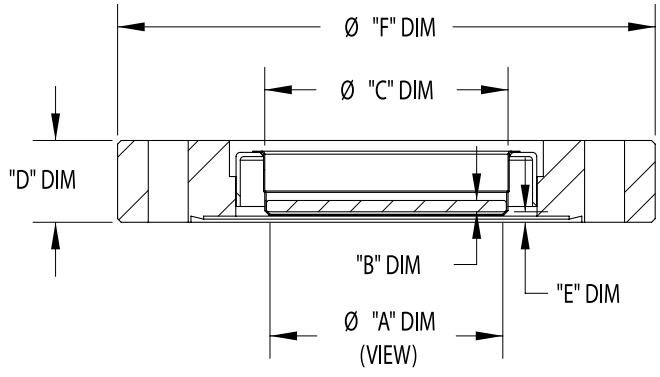




ADAPTER	Ø "A" DIM (VIEW)	B	C	D	E	H	PART #
STN. STL.	.69	.080	.77	1.500	.030	.44	A8006-1-W
STN. STL.	.94	.080	1.02	1.500	.030	.44	A8006-2-W
STN. STL.	1.44	.080	1.52	2.500	.030	.49	A8006-3-W
STN. STL.	1.94	.094	2.02	2.500	.030	.54	A8006-4-W

CONFLAT FLANGE



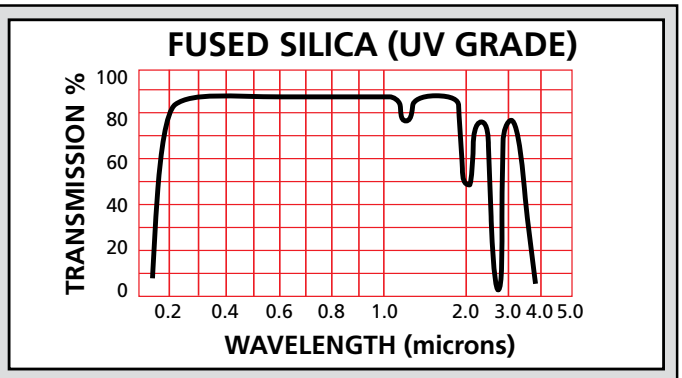
Ø "A" DIM (VIEW)	B	C	D	E	F	PART #
.69	.080	.770	.500	.080	2.75	A8007-1-CF
.94	.080	1.02	.500	.080	2.75	A8007-2-CF
1.44	.080	1.52	.680	.13	4.50	A8007-3-CF
1.94	.094	2.02	.680	.10	4.50	A8007-4-CF

UV FUSED SILICA

Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<30 Arc Minutes
Flange Material:	304/316 Stn. Stl.
Surface Finish:	40/20
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Fused Silica
Transmission:	>90% @ 250nm (external)
Homogeneity Grade:	F
Inclusion Class:	2

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 25ºC per minute and may be damaged if this limit is exceeded.



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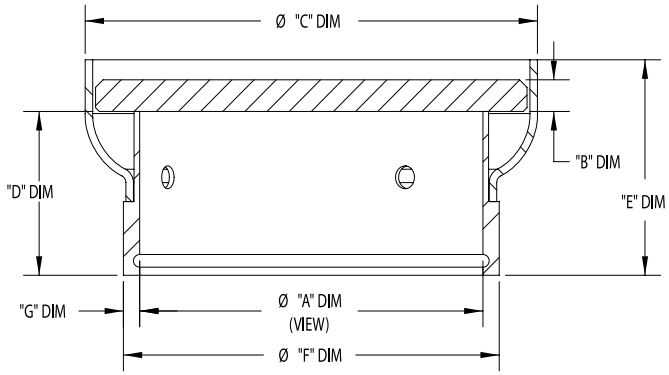
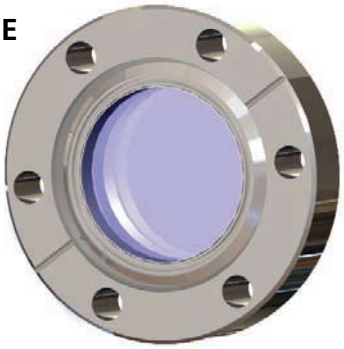
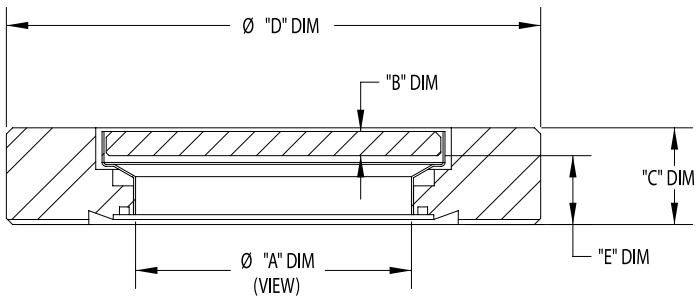


Ø "A" DIM (VIEW)	B	C	D	E	F	G	PART #
1.37	.13	1.76	.68	.85	1.500	.065	A0657-11-W
2.37	.25	2.88	.79	1.10	2.500	.065	A0657-12-W
3.84	.25	4.41	1.01	1.30	4.500	.085	A0657-13-W

CONFLAT FLANGE



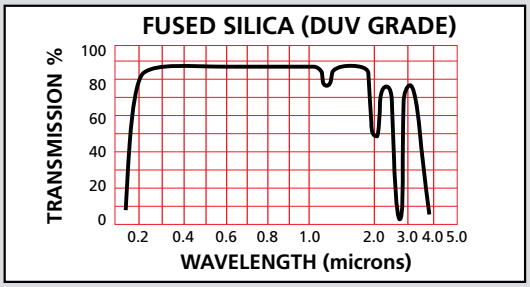


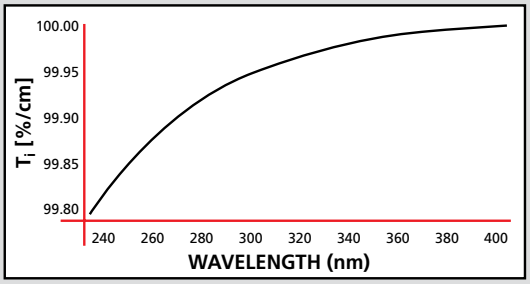
NOM. SIZE	Ø "A" DIM (VIEW)	B	C	D	E	PART #
3/4"	.63	.10	.29	1.33	.17	A1671-1-CF
1 1/2"	1.40	.13	.50	2.75	.35	A0651-1-CF
1 1/2"	1.40	.13	.62	3.37	.35	A0651-2-CF
2 1/2"	2.69	.25	.68	4.50	.41	A0651-3-CF
2 1/2"	2.69	.25	.75	4.62	.41	A0651-4-CF
4"	3.88	.25	.78	6.00	.51	A0651-5-CF
4"	3.88	.25	.84	6.75	.51	A0651-6-CF
6"	5.38	.37	.88	8.00	.48	A0651-7-CF
8"	7.78	.37	.97	10.00	.53	A0651-8-CF

DUV FUSED SILICA (LASER QUALITY)

Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<10 Arc Seconds
Flange Material:	304/316 Stn. Stl.
Flatness:	λ/4 @ 632nm Transmitted Wavefront
Surface Finish:	20/10
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Fused Silica
Transmission:	≥99.8% @ 248nm (internal)
Homogeneity Grade:	A
Inclusion Class:	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 25ºC per minute and may be damaged if this limit is exceeded.





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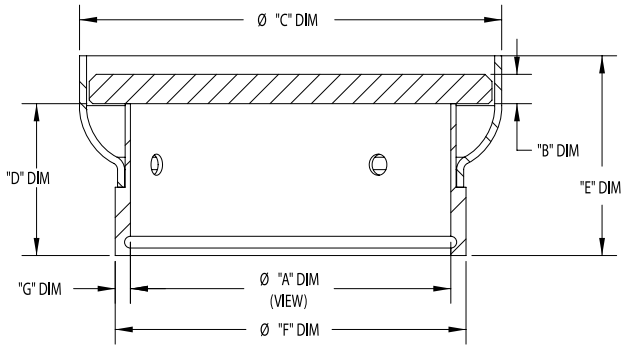
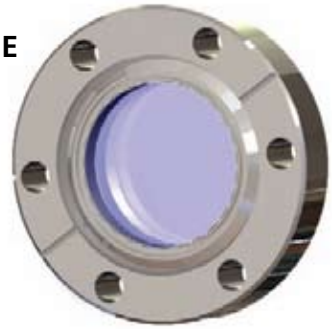
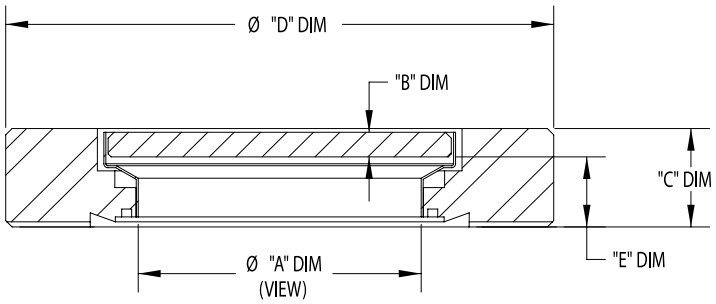


Ø "A" DIM (VIEW)	B	C	D	E	F	G	PART #
1.37	.13	1.76	.68	.85	1.500	.065	A0657-6-W
2.37	.25	2.88	.79	1.10	2.500	.065	A0657-7-W
3.84	.25	4.41	1.01	1.30	4.500	.085	A0657-8-W

CONFLAT FLANGE





NOM. SIZE	Ø "A" DIM (VIEW)	B	C	D	E	PART #
3/4"	.63	.10	.29	1.33	.17	A1671-2-CF
1 1/2"	1.40	.13	.50	2.75	.35	A0650-1-CF
1 1/2"	1.40	.13	.62	3.37	.35	A0650-2-CF
2 1/2"	2.69	.25	.68	4.50	.41	A0650-3-CF
2 1/2"	2.69	.25	.75	4.62	.41	A0650-4-CF
4"	3.88	.25	.78	6.00	.51	A0650-5-CF

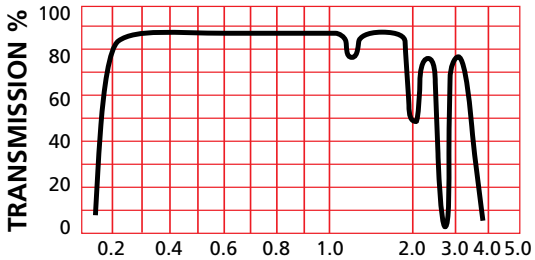
UV FUSED SILICA

Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<30 Arc Minutes
Flange Material:	304/316 Stn. Stl.
Surface Finish:	40/20
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Fused Silica
Transmission:	>90% @ 250nm (external)
Homogeneity Grade:	F
Inclusion Class:	2

Operating Conditions

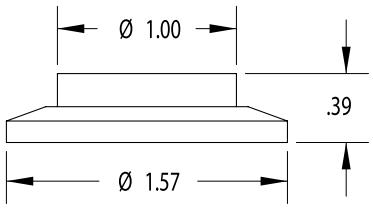
The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All assemblies have a maximum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

FUSED SILICA (UV GRADE)

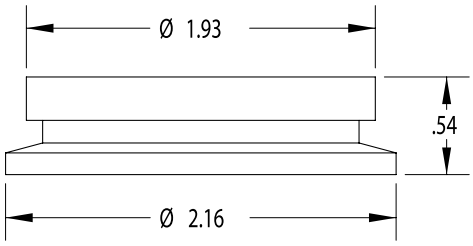


*See page 9 for DUV information.

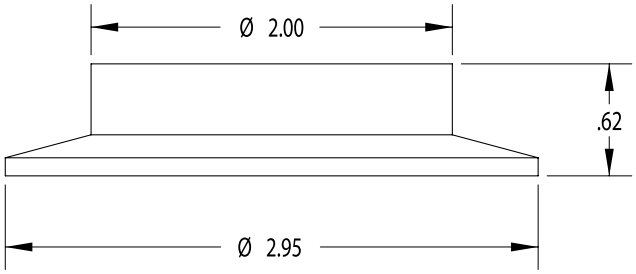
QUICK FLANGE



TYPE	NOM. SIZE	VIEW DIAMETER	FLANGE	PART #
UV Grade	5/8"	.63	QF-25	A4563-1-QF
*DUV Grade - Laser Quality	5/8"	.63	QF-25	A4563-2-QF



TYPE	NOM. SIZE	VIEW DIAMETER	FLANGE	PART #
UV Grade	1 1/2"	1.40	QF-40	A2206-1-QF
*DUV Grade - Laser Quality	1 1/2"	1.40	QF-40	A2206-2-QF

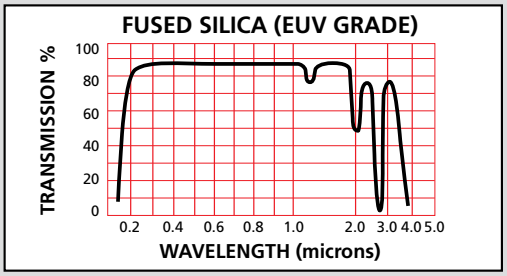


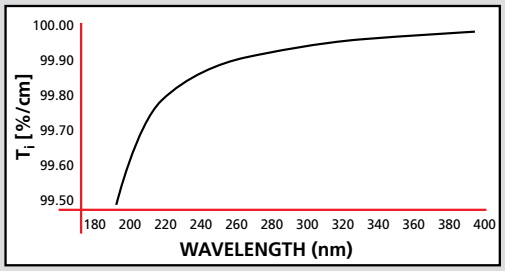
TYPE	NOM. SIZE	VIEW DIAMETER	FLANGE	PART #
UV Grade	1 1/2"	1.40	QF-50	A0816-1-QF
*DUV Grade - Laser Quality	1 1/2"	1.40	QF-50	A0816-2-QF

EUV FUSED SILICA (EXCIMER GRADE)

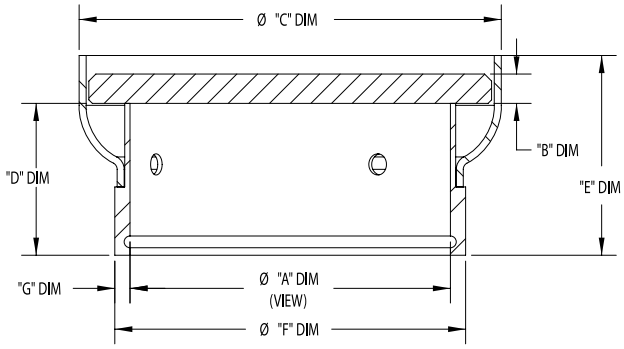
Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<10 Arc Seconds
Flange Material:	304/316 Stn. Stl.
Flatness:	λ/4 @ 632nm Transmitted Wavefront
Surface Finish:	20/10
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Excimer Grade 193 Fused Silica
Transmission:	≥99.5% @ 193nm (internal)
Homogeneity Grade:	A
Inclusion Class:	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.



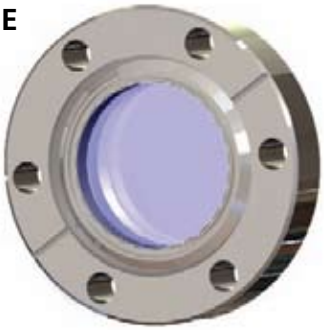


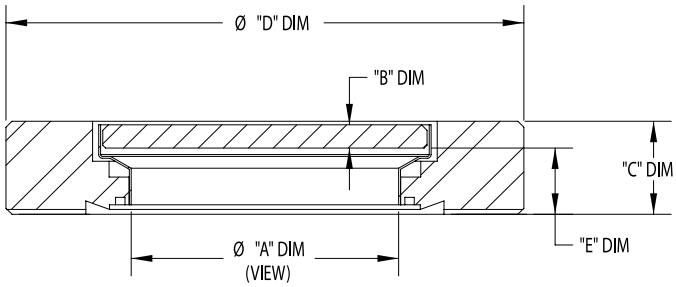
WELDABLE



Ø "A" DIM (VIEW)	B	C	D	E	F	G	PART #
1.37	.13	1.76	.68	.85	1.500	.065	A0657-16-W
2.37	.25	2.88	.79	1.10	2.500	.065	A0657-17-W

CONFLAT FLANGE



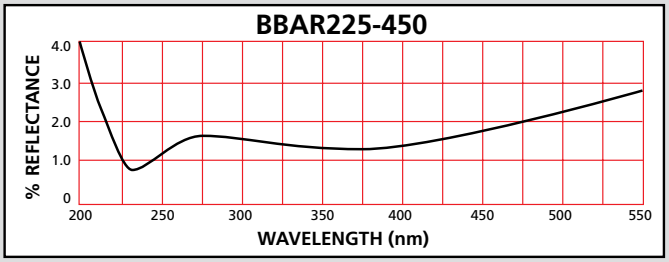


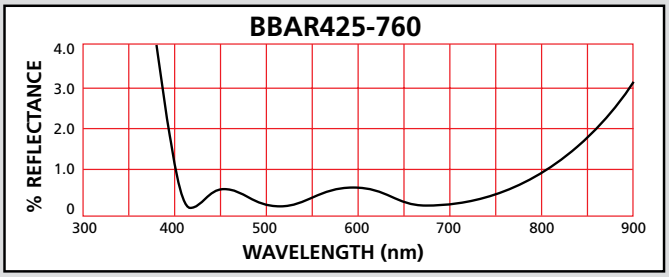
NOM. SIZE	Ø "A" DIM (VIEW)	B	C	D	E	PART #
1 1/2"	1.40	.13	.50	2.75	.35	A0652-1-CF
2 1/2"	2.69	.25	.68	4.50	.41	A0652-3-CF

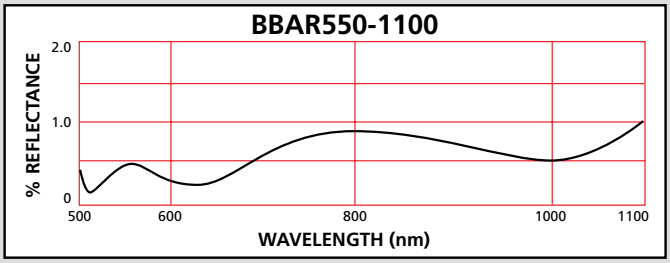
BBAR COATED FUSED SILICA

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

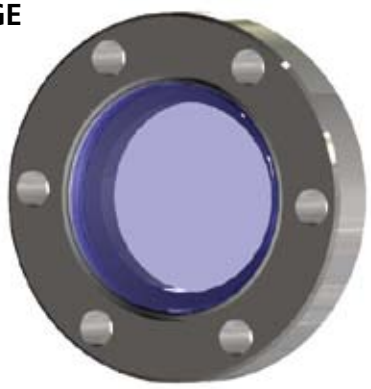
Operating Conditions
The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All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

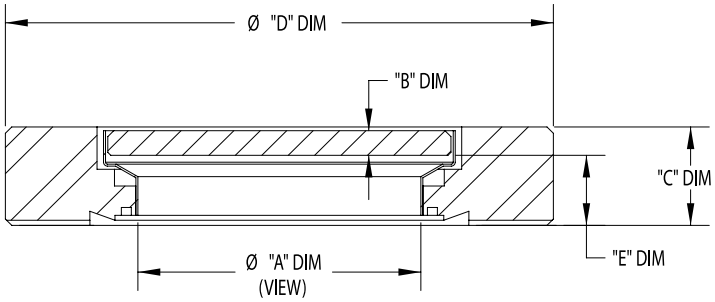






CONFLAT FLANGE



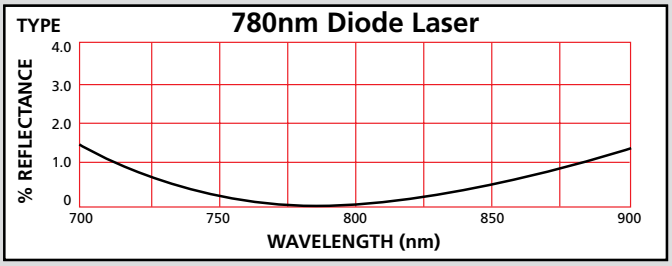


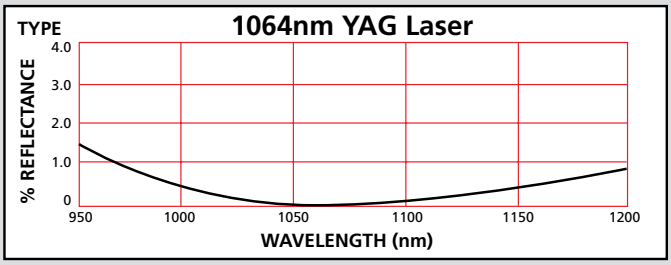
TYPE	Ø "A" DIM (VIEW)	B	C	D	E	PART #
225-450nm	1.40	.13	.50	2.75	.35	A8000-1-CF
225-450nm	2.69	.25	.68	4.50	.41	A8001-1-CF
425-760nm	1.40	.13	.50	2.75	.35	A8002-1-CF
425-760nm	2.69	.25	.68	4.50	.41	A8003-1-CF
550-1100nm	1.40	.13	.50	2.75	.35	A8004-1-CF
550-1100nm	2.69	.25	.68	4.50	.41	A8005-1-CF

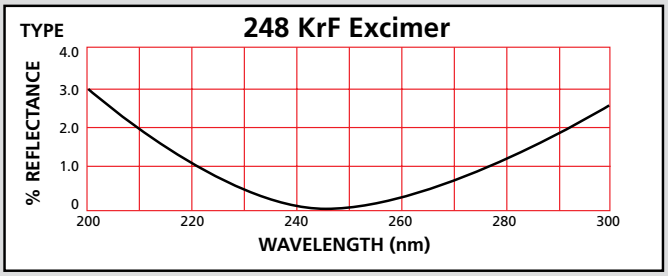
LASER OPTICS

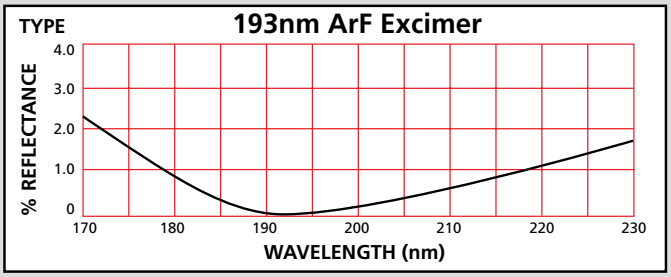
Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<10 Arc Seconds
Flange Material:	304/316 Stn. Stl.
Flatness:	λ/4 @ 632nm Transmitted Wavefront
Surface Finish:	20/10
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Fused Silica
Homogeneity Grade:	A
Inclusion Class:	0
Laser Damage Threshold:	
780nm Diode Laser:	10 J/cm² for 10 ns Pulse
1064nm YAG Laser:	10 J/cm² for 10 ns Pulse
193nm Arf Excimer:	1 J/cm² for 10 ns Pulse
248nm KrF Excimer:	10 J/cm² for 10 ns Pulse

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.

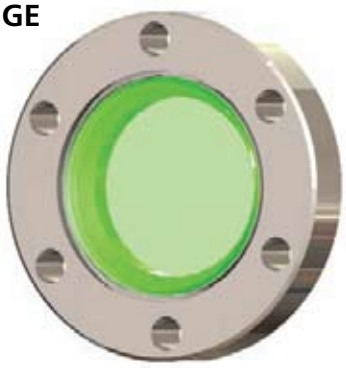


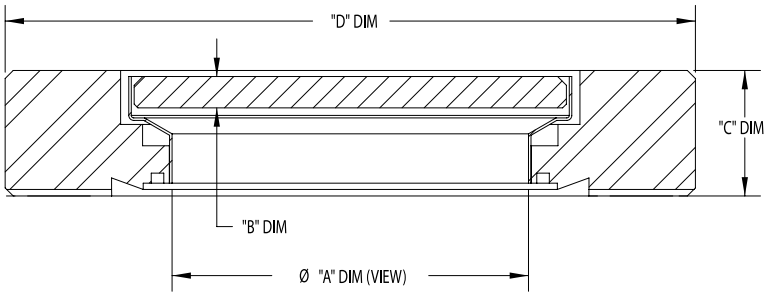






CONFLAT FLANGE





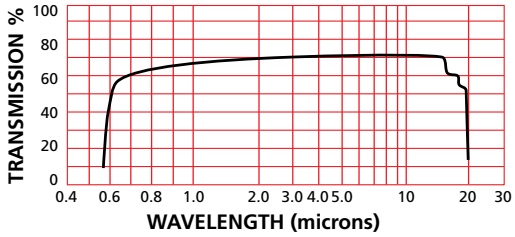
TYPE	COATING	Ø "A" DIM (VIEW)	B	C	D	PART #
780nm Diode Laser	V-Coat 780nm R<0.25%	1.4	.125	.500	2.75	A4546-1-CF
780nm Diode Laser	V-Coat 780nm R<0.25%	2.69	.125	.500	4.5	A5802-1-CF
1064nm YAG Laser	V-Coat 1064nm R<0.25%	1.4	.125	.500	2.75	A4545-1-CF
1064nm YAG Laser	V-Coat 1064nm R<0.25%	2.69	.125	.500	4.5	A5803-1-CF
193nm ArF Excimer	V-Coat 193nm R<0.25%	1.4	.125	.500	2.75	A4548-1-CF
193nm ArF Excimer	V-Coat 193nm R<0.25%	2.69	.125	.500	4.5	A5800-1-CF
248 KrF Excimer	V-Coat 248nm R<0.25%	1.4	.125	.500	2.75	A4547-1-CF
248 KrF Excimer	V-Coat 248nm R<0.25%	2.69	.125	.500	4.5	A5801-1-CF

EXTENDED RANGE OPTICS

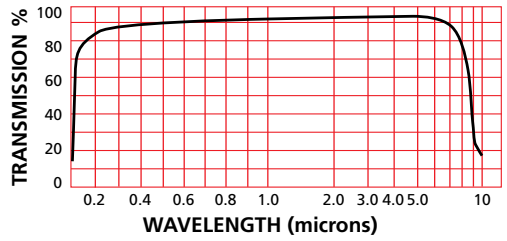
Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<3 Arc Minutes
Flange Material:	304/316 Stn. Stl.
Flatness:	λ/4 @ 632nm Transmitted Wavefront
Surface Finish:	Zinc Selenide: 40/20 Scratch/Dig Calcium Flouride: 20/10 Scratch/Dig Magnesium Flouride: 20/10 Scratch/Dig AR Coated Zinc Selenide: 40/20 Scratch/Dig
Thermal Range:	-100˚C to 200˚C AR Coated Zinc Selenide: -100˚C to 150˚C

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.

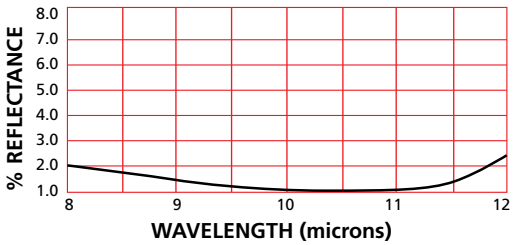
ZINC SELENIDE



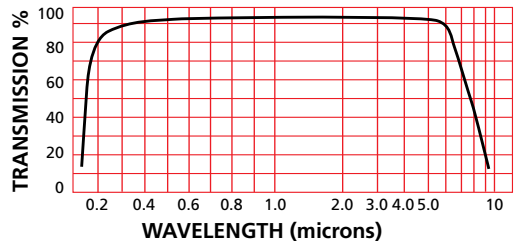
CALCIUM FLUORIDE



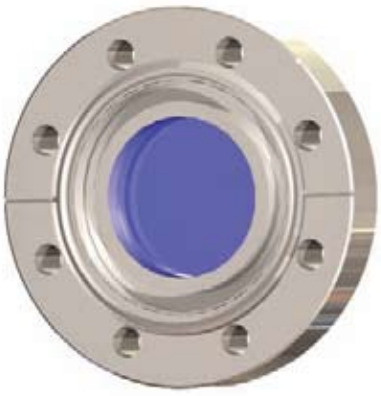
AR Coated Zinc Selenide

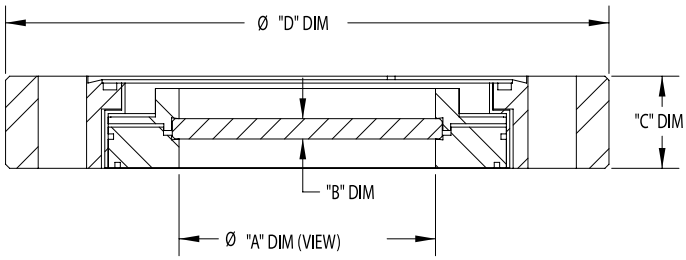


MAGNESIUM FLUORIDE



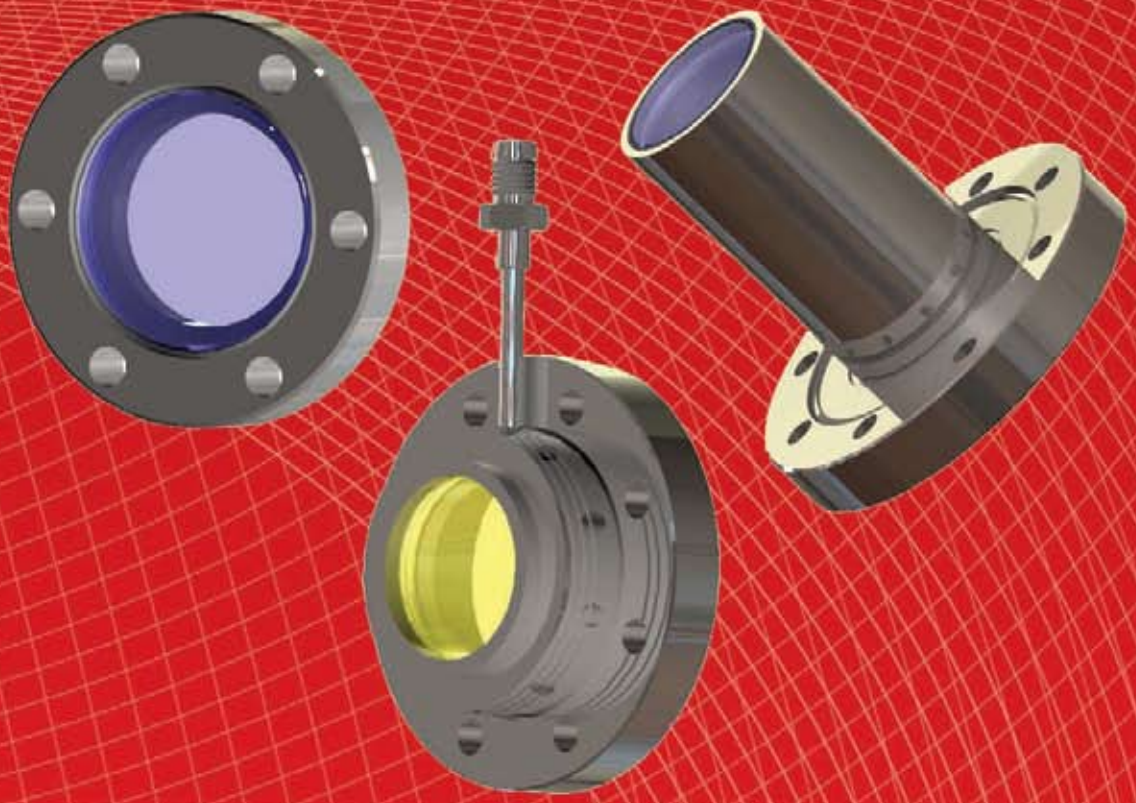
CONFLAT FLANGE





Vacuum Optics – UHV Grade

WINDOW MATERIAL	AR COATED	Ø "A" DIM (VIEW)	B	C	D	PART #
Zinc Selenide	-	.90	.098	.500	2.75	A3982-1-CF
Calcium Flouride	-	.90	.098	.500	2.75	A4531-1-CF
Magnesium Flouride	-	.90	.098	.500	2.75	A4530-1-CF
AR Coated Zinc Selenide	8 - 12 Microns	.90	.098	.500	2.75	A4539-1-CF
Zinc Selenide	-	1.88	.150	.680	4.5	A4584-1-CF
Calcium Flouride	-	1.88	.150	.680	4.5	A4594-1-CF
Magnesium Flouride	-	1.88	.150	.680	4.5	A4595-1-CF
AR Coated Zinc Selenide	8 - 12 Microns	1.88	.150	.680	4.5	A4297-1-CF



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

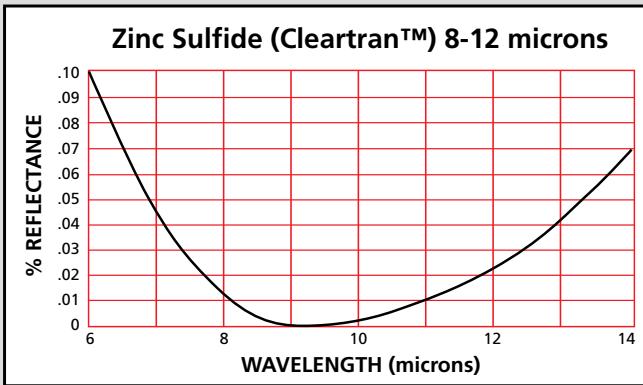
MPF is now offering popular window designs, standard on re-entrant tubing designs. Available in sapphire, fused silica and extended range viewport configurations, these designs are useful for coupling complex lens assemblies such as cameras, telescopes and zoom lenses with applications where reach into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

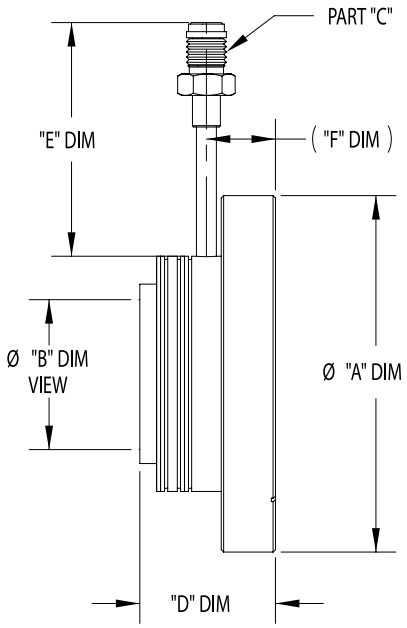
DIFFERENTIALLY PUMPED

Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	<3 Arc Minutes
Flange Material:	304/316 Stn. Stl.
Flatness:	λ/4
Surface Finish:	40/20 Scratch/Dig
Bake Out Temp:	200˚C
Coating:	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.



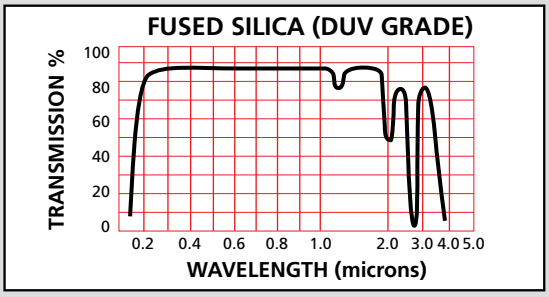


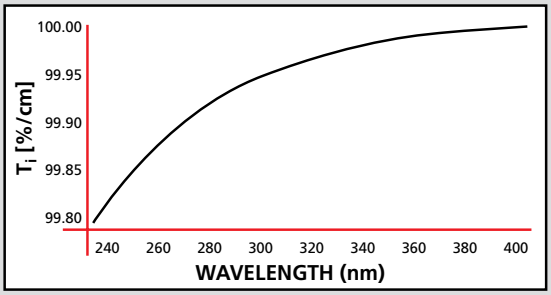
Ø "A" DIM	Ø "B" DIM (VIEW)	PART "C"	"D" DIM	"E" DIM	"F" DIM	PART #
2.75	.93	1/8" Male VCR	.94	1.80	.77	A7845-1-CF
2.75	.93	1/8" Female VCR	.94	1.80	.77	A7845-2-CF
2.75	.93	1.33" C.F.	.94	1.80	.77	A7845-3-CF
2.75	.93	OMIT	.94	1.80	.77	A7845-4-CF
4.50	1.88	1/4" Male VCR	1.70	2.90	.87	A4523-1-CF
4.50	1.88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

NON-MAGNETIC, FUSED SILICA

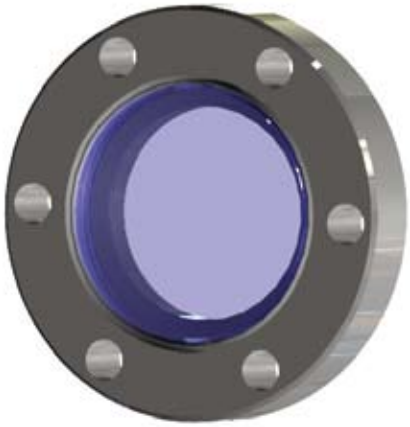
Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	
UV Grade:	<30 Arc Minutes
DUV Grade:	<10 Arc Seconds
Flange Material:	316 LN Stn. Stl.
Flatness:	DUV: λ/4 @ 632nm Transmitted Wavefront
Surface Finish:	
UV Grade:	40/20
DUV Grade:	20/10
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Fused 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

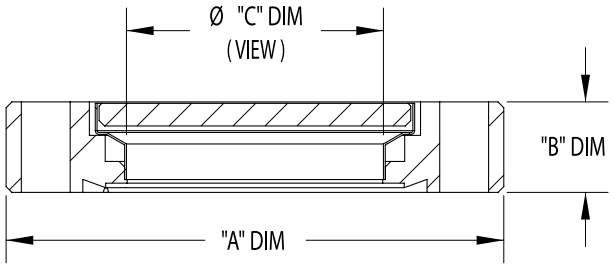
Operating Conditions
The thermal ratings specified are safe operating limits determined by various factors including material properties, mechanical design, and the intended operating environment. Temperature ratings for various mounting options may reduce the operating range of a window assembly. All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





CONFLAT FLANGE





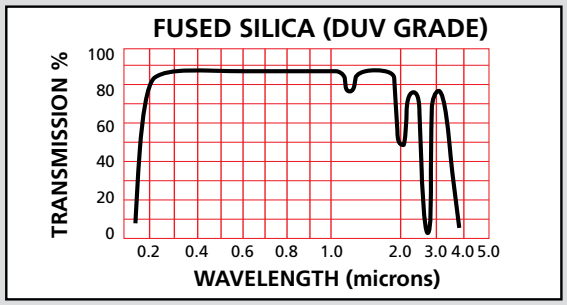
Non-Magnetic

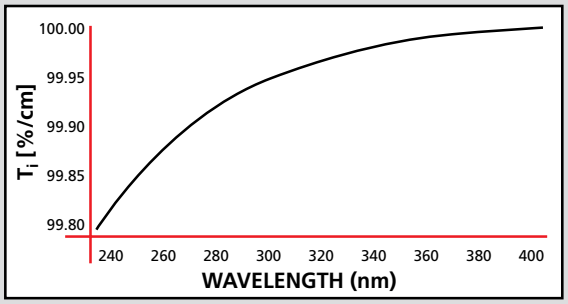
SLEEVE	FLANGE	GRADE	Ø "A" DIM	"B" DIM	Ø "C" DIM (VIEW)	PART #
Titanium	316LN STN. STL.	UV	1.33	.35	.63	A7154-1-CF
Titanium	316LN STN. STL.	UV	2.75	.50	1.40	A7981-1-CF
Titanium	316LN STN. STL.	UV	4.50	.68	2.69	A8711-1-CF
Titanium	316LN STN. STL.	DUV	1.33	.35	.63	A7154-2-CF
Titanium	316LN STN. STL.	DUV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

RE-ENTRANT, FUSED SILICA

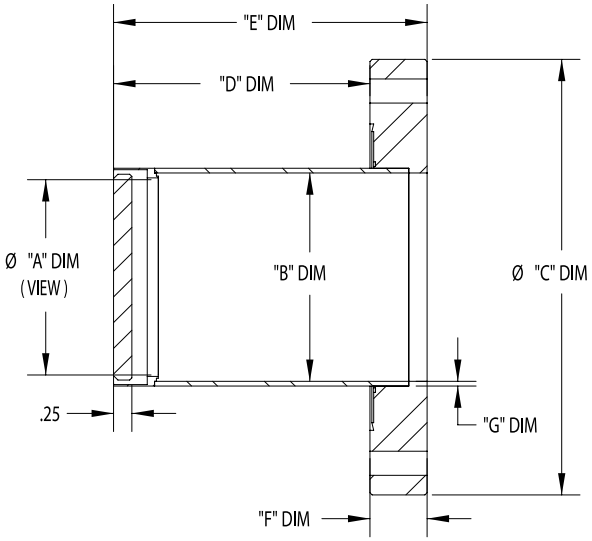
Leak Rate:	<2x10(-10) atm cc/sec He
Parallelism:	
UV Grade:	<30 Arc Minutes
DUV Grade:	<10 Arc Seconds
Flange Material:	304/316 Stn. Stl.
Flatness:	DUV: λ/4 @ 632nm Transmitted Wavefront
Surface Finish:	
UV Grade:	40/20
DUV Grade:	20/10
Thermal Range:	-100˚C to 200˚C
Material:	Corning HPFS 7980 Fused 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 assemblies have a maximum thermal gradient of 25°C per minute and may be damaged if this limit is exceeded.





CONFLAT FLANGE



Re-Entrant

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