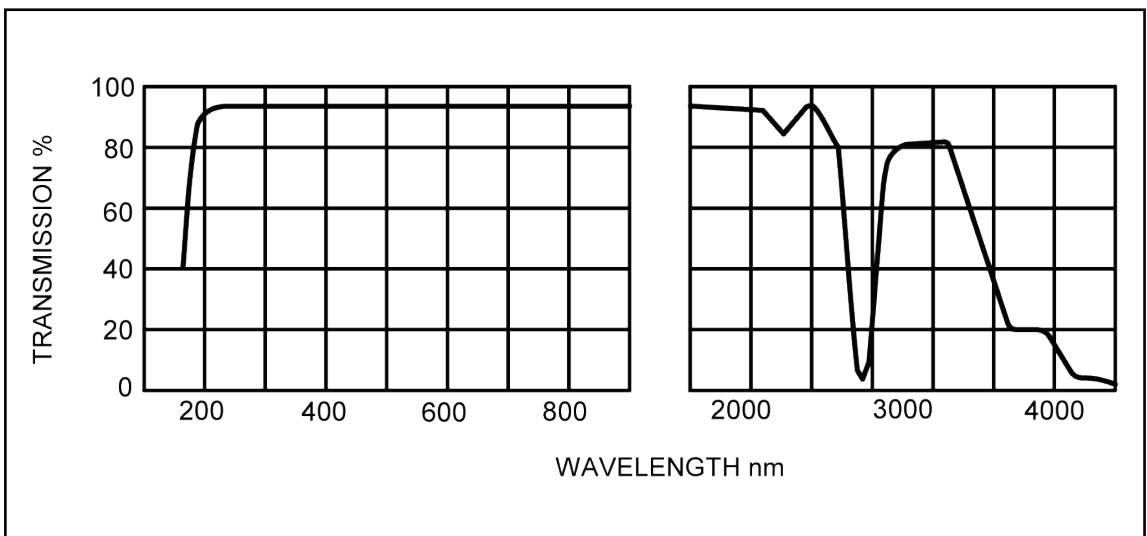


Specification	
Seal Type	Braze
Maximum Temperature	200°C (KF & ISO versions 150°C)
Minimum Temperature	minus 20°C
Maximum Rate of Temperature Change	3°C per minute
Leak Rate	<1x10 ⁻¹⁰ atm-cc/sec (He)
Pressure Range	1 bar to 1x10 ⁻¹¹ mbar
Surface Quality	20/10 scratch/dig
Parallelism	< 3 arc minutes
Flatness	< 8λ (λ/8 at 632.8nm over 75% of central area before brazing)
Laser Damage Threshold	CW Continuous Wave - 500W/cm ² at 530nm Pulsed 2 J/cm ² at 530nm and 10ns pulse width (note, varies with wavelength, pulse width, laser type and cleanliness of optic)

Torr Scientific fused silica viewports are offered in CF, ISO and KF flange styles. The viewports comprise a high purity laser quality fused silica optic with precise flatness, parallelism, scratch and dig specifications. The ultra high vacuum (UHV) CF versions are offered using high grade 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered for low energy applications or surface science applications needing low magnetic fields. The non-magnetic viewports use a tantalum weld ring instead of the regular kovar weld ring. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. TSL viewports are manufactured in cleanroom conditions and helium leak tested, cleaned and packed to UHV standards. The rugged construction of the fused silica viewports allows repeated bake-out with UHV performance, whilst the window offers broadband optical transmission through deep UV, visible to near infra-red. Various anti-reflective coatings to match customer reflectance requirements are processed at TSL and available as options listed in the AR coated viewport section of the catalogue. Laser viewports with a VAR coating optimised for specific customer specified laser wavelength, reducing reflectance to below 0.5% per face, are also offered. Non-standard viewports can be manufactured on request, including re-entrant style microscope/camera viewports. Annealed copper gaskets and other component accessories are also supplied by TSL.

Transmission Curve - Fused Silica



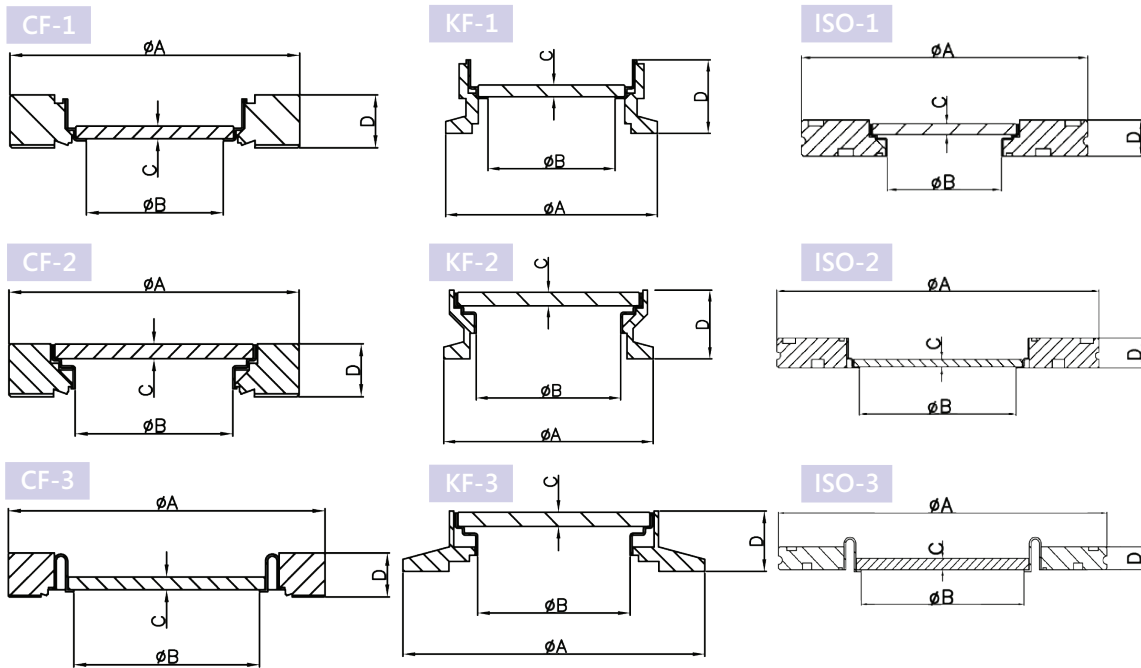
Please note that the optical transmission curves are approximations and should be used for reference only



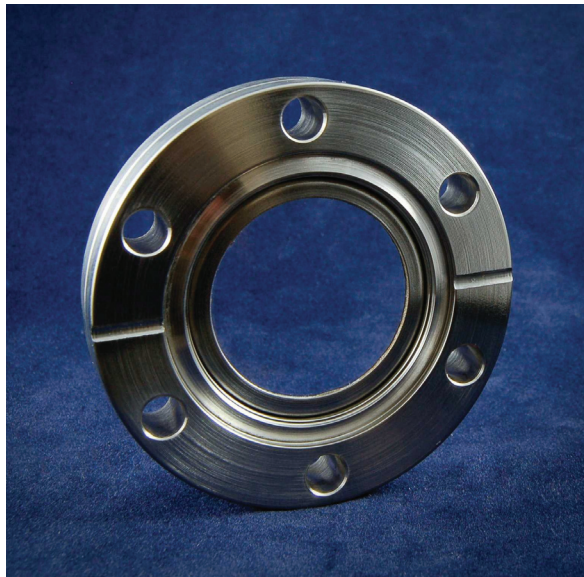
Fused Silica Zero Length Viewports



Fused Silica Zero Length Viewports



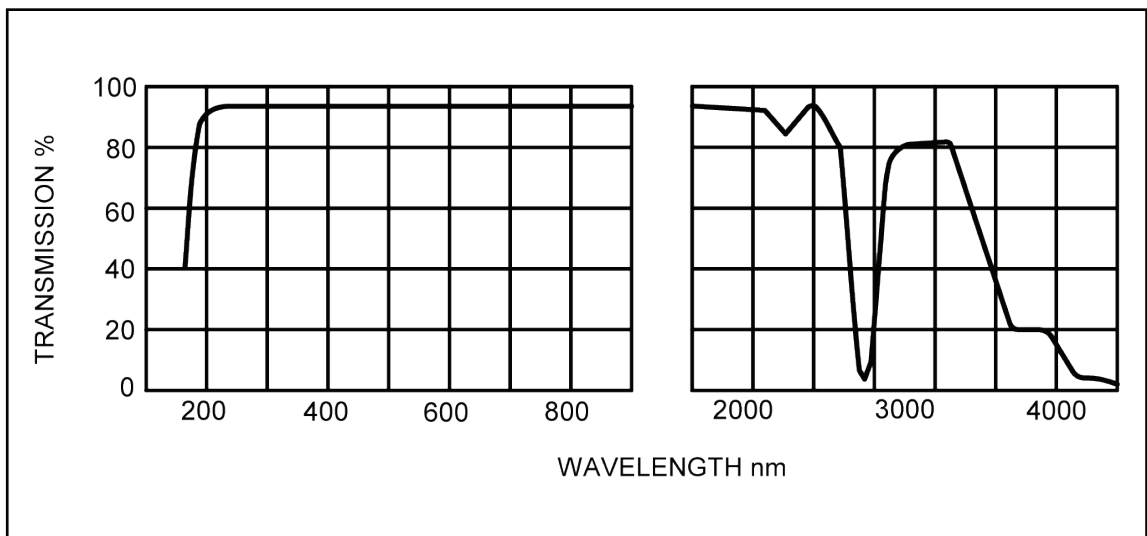
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ16Q	NW16CF	34	15	1.5	12.7	CF-1	304L	Kovar	
VPZ16Q-LN	NW16CF	34	15	1.5	12.7	CF-1	316LN	Kovar	
VPZ16Q-NM	NW16CF	34	15	1.5	12.7	CF-1	316LN	Tantalum	Yes
KVPZ16Q	KF16	25	15	1.5	15	KF-1	304L	Kovar	
KVPZ25Q	KF25	40	20	2	18.5	KF-1	304L	Kovar	
VPZ38Q	NW35CF	70	32	3	12.7	CF-1	304L	Kovar	
VPZ38LAQ	NW35CF	70	38	3.5	12.7	CF-2	304L	Kovar	
VPZ38Q-LN	NW35CF	70	32	3	12.7	CF-1	316LN	Kovar	
VPZ38QLA-LN	NW35CF	70	38	3.5	12.7	CF-2	316LN	Kovar	
VPZ38Q-NM	NW35CF	70	32	3	12.7	CF-1	316LN	Tantalum	Yes
KVPZ40/32Q	KF40	55	32	3	12.7	KF-1	304L	Kovar	
KVPZ40Q	KF40	55	38	3.5	18.5	KF-2	304L	Kovar	
KVPZ50Q	KF50	75	38	3.5	15	KF-3	304L	Kovar	
ISO63QVPZ	ISO63	95	38	3.5	12	ISO-1	304L	Kovar	
VPZ64Q	NW63CF	114	63	4.5	17.4	CF-1	304L	Kovar	
VPZ64Q-LN	NW63CF	114	63	4.5	17.4	CF-1	316LN	Kovar	
VPZ64Q-NM	NW63CF	114	63	4.5	17.4	CF-1	316LN	Tantalum	Yes
VPZ100Q	NW100CF	152	89	6	19.9	CF-3	304L	Kovar	
VPZ100Q-LN	NW100CF	152	89	6	19.9	CF-3	316LN	Kovar	
VPZ100Q-NM	NW100CF	152	89	6	19.9	CF-3	316LN	Tantalum	Yes
ISO100QVPZ	ISO100	130	63	4.5	12	ISO-2	304L	Kovar	
VPZ150Q	NW150CF	203	136	9.5	22.3	CF-3	304L	Kovar	
VPZ150Q-LN	NW150CF	203	136	9.5	22.3	CF-3	316LN	Kovar	
VPZ150Q-NM	NW150CF	203	136	9.5	22.3	CF-3	316LN	Tantalum	Yes
ISO160QVPZ	ISO160	180	89	6	12	ISO-3	304L	Kovar	
VPZ200Q	NW200CF	254	136	9.5	24.5	CF-3	304L	Kovar	



Specification	
Seal Type	Bonded
Maximum Temperature	120°C
Minimum Temperature	minus 20°C
Maximum Rate of Temperature Change	3°C per minute
Leak Rate	<1x10 ⁻¹⁰ atm-cc/sec (He)
Pressure Range	1 bar to 1x10 ⁻¹¹ mbar
Surface Quality	20/10 scratch/dig
Parallelism	< 3 arc minutes
Flatness	λ/8 at 632.8nm
Laser Damage Threshold	CW Continuous Wave - 500W/cm ² at 530nm Pulsed 2 J/cm ² at 530nm and 10ns pulse width (note, varies with wavelength, pulse width, laser type and cleanliness of optic)

Torr Scientific fused silica viewports are offered in CF, ISO and KF flange styles. The viewports comprise a high purity laser quality fused silica optic with precise flatness, parallelism, scratch and dig specifications. The ultra high vacuum (UHV) CF versions are offered using high grade 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered for low energy applications or surface science applications needing low magnetic fields. The non-magnetic viewports use a tantalum weld ring instead of the regular kovar weld ring. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. TSL viewports are manufactured in cleanroom conditions and helium leak tested, cleaned and packed to UHV standards. The bonded construction of the fused silica viewports allows repeated bake-out to a maximum of 120°C with UHV performance, whilst the window offers broadband optical transmission through deep UV, visible to near infra-red. Various anti-reflective coatings to match customer reflectance requirements are processed at TSL and available as options listed in the AR coated viewport section of the catalogue. Laser viewports with a VAR coating optimised for specific customer specified laser wavelength, reducing reflectance to below 0.5% per face, are also offered. Non-standard viewports can be manufactured on request, including re-entrant style microscope/camera viewports. Annealed copper gaskets and other component accessories are also supplied by TSL.

Transmission Curve - Fused Silica



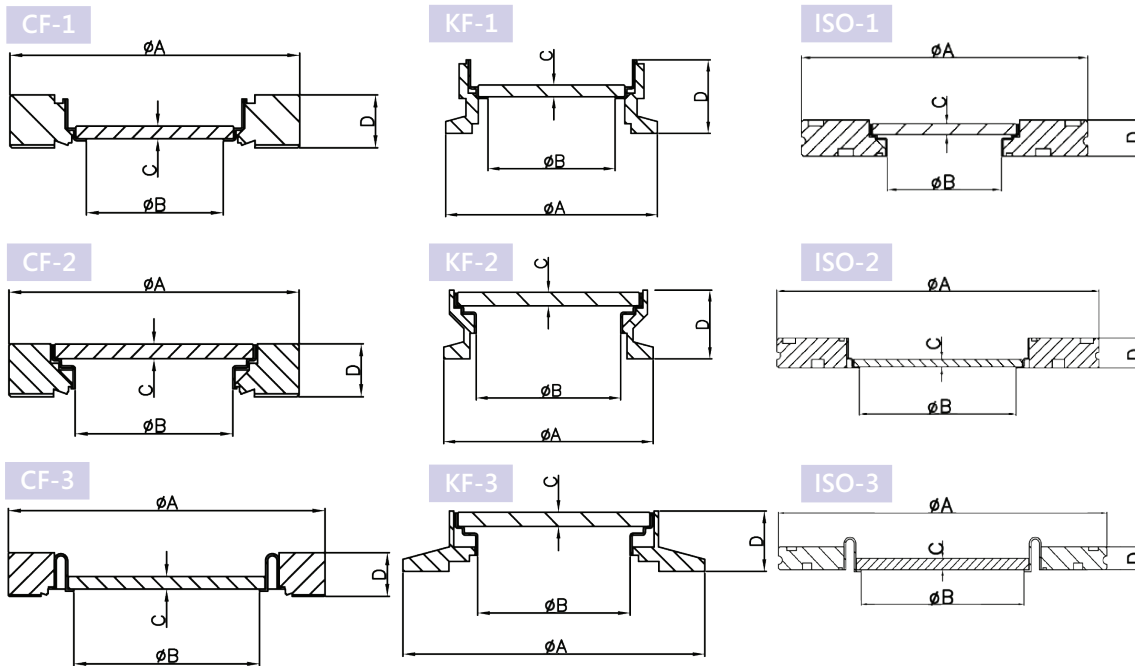
Please note that the optical transmission curves are approximations and should be used for reference only



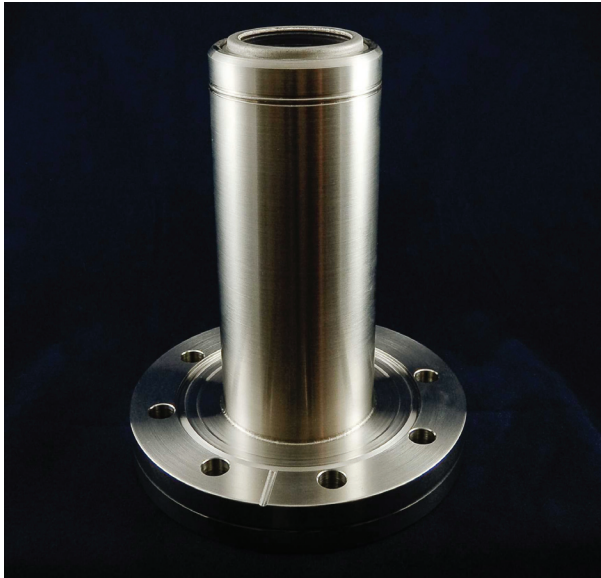
Bonded Fused Silica Zero Length Viewports



Bonded Fused Silica
Zero Length Viewports



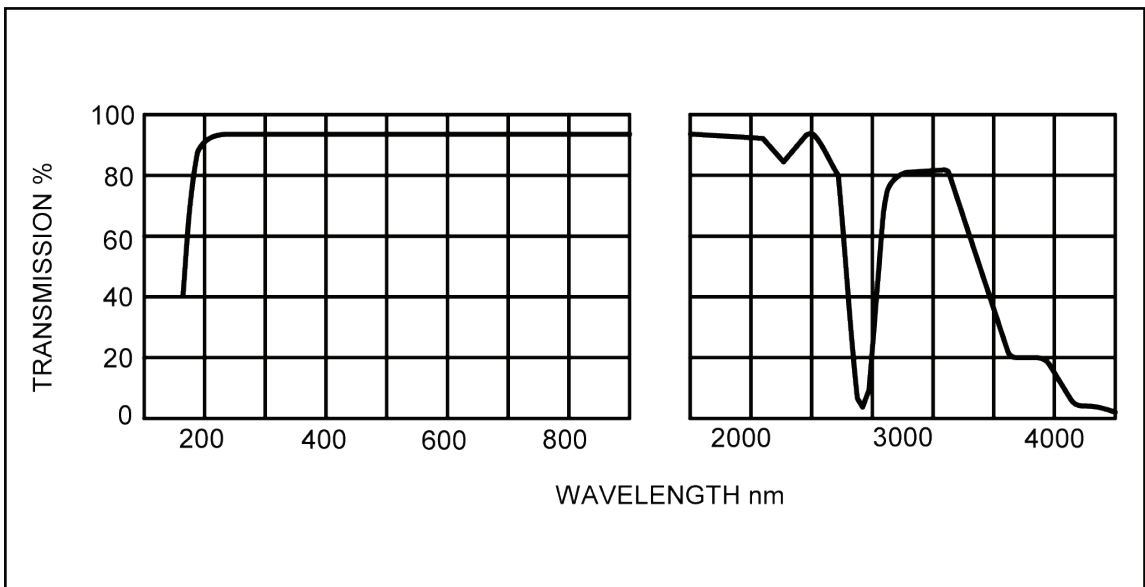
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
BVPZ16Q	NW16CF	34	15	1.5	12.7	CF-1	304L	Kovar	
BVPZ16Q-LN	NW16CF	34	15	1.5	12.7	CF-1	316LN	Kovar	
BVPZ16Q-NM	NW16CF	34	15	1.5	12.7	CF-1	316LN	Tantalum	Yes
BKVPZ16Q	KF16	25	15	1.5	15	KF-1	304L	Kovar	
BKVPZ25Q	KF25	40	20	2	18.5	KF-1	304L	Kovar	
BVPZ38Q	NW35CF	70	32	3	12.7	CF-1	304L	Kovar	
BVPZ38LAQ	NW35CF	70	38	3.5	12.7	CF-2	304L	Kovar	
BVPZ38Q-LN	NW35CF	70	32	3	12.7	CF-1	316LN	Kovar	
BVPZ38QLA-LN	NW35CF	70	38	3.5	12.7	CF-2	316LN	Kovar	
BVPZ38Q-NM	NW35CF	70	32	3	12.7	CF-1	316LN	Tantalum	Yes
BKVPZ40/32Q	KF40	55	32	3	12.7	KF-1	304L	Kovar	
BKVPZ40Q	KF40	55	38	3.5	18.5	KF-2	304L	Kovar	
BKVPZ50Q	KF50	75	38	3.5	15	KF-3	304L	Kovar	
BISO63QVPZ	ISO63	95	38	3.5	12	ISO-1	304L	Kovar	
BVPZ64Q	NW63CF	114	63	4.5	17.4	CF-1	304L	Kovar	
BVPZ64Q-LN	NW63CF	114	63	4.5	17.4	CF-1	316LN	Kovar	
BVPZ64Q-NM	NW63CF	114	63	4.5	17.4	CF-1	316LN	Tantalum	Yes
BVPZ100Q	NW100CF	152	89	6	19.9	CF-3	304L	Kovar	
BVPZ100Q-LN	NW100CF	152	89	6	19.9	CF-3	316LN	Kovar	
BVPZ100Q-NM	NW100CF	152	89	6	19.9	CF-3	316LN	Tantalum	Yes
BISO100QVPZ	ISO100	130	63	4.5	12	ISO-2	304L	Kovar	
BVPZ150Q	NW150CF	203	136	9.5	22.3	CF-3	304L	Kovar	
BVPZ150Q-LN	NW150CF	203	136	9.5	22.3	CF-3	316LN	Kovar	
BVPZ150Q-NM	NW150CF	203	136	9.5	22.3	CF-3	316LN	Tantalum	Yes
BISO160QVPZ	ISO160	180	89	6	12	ISO-3	304L	Kovar	
BVPZ200Q	NW200CF	254	136	9.5	24.5	CF-3	304L	Kovar	



Specification	
Seal Type	Braze
Maximum Temperature	200°C
Minimum Temperature	minus 20°C
Maximum Rate of Temperature Change	3°C per minute
Leak Rate	<1x10 ⁻¹⁰ atm-cc/sec (He)
Pressure Range	1 bar to 1x10 ⁻¹¹ mbar
Surface Quality	20 /10 scratch/dig
Flatness	< 8λ

Torr Scientific fused silica re-entrant viewports are typically used for inserting microscopes or cameras in to UHV/Vacuum systems. The re-entrant viewports are offered in CF flanges as standard, but custom designed viewports can be manufactured using ISO and KF flange styles on request. The viewports comprise a high purity laser quality fused silica optic with precise flatness, parallelism, scratch and dig specifications which are vacuum brazed in to a kovar weld ring to form an optic assembly. The optic assemblies are TIG welded in to the tube assembly and are helium leak tested and cleaned for ultra high vacuum (UHV) conditions. The CF versions are offered using 304L stainless steel flanges, but 316LN flanges can be offered on request. The rugged construction of the fused silica viewports allows repeated bake-out with UHV performance, whilst the window offers broadband optical transmission through deep UV, visible to near infra-red. Various anti-reflective coatings to match customer reflectance requirements are processed at TSL and available as options. Laser viewports with a VAR coating optimised for specific customer specified laser wavelength, reducing reflectance to below 0.5% per face, are also offered. Please advise the wavelength or wavelength ranges of your application and a reflectance curve will be prepared. Annealed copper gaskets and other component accessories are also supplied by TSL. Please contact Torr Scientific if you require a quotation for a re-entrant viewport with a different length or different dimensions.

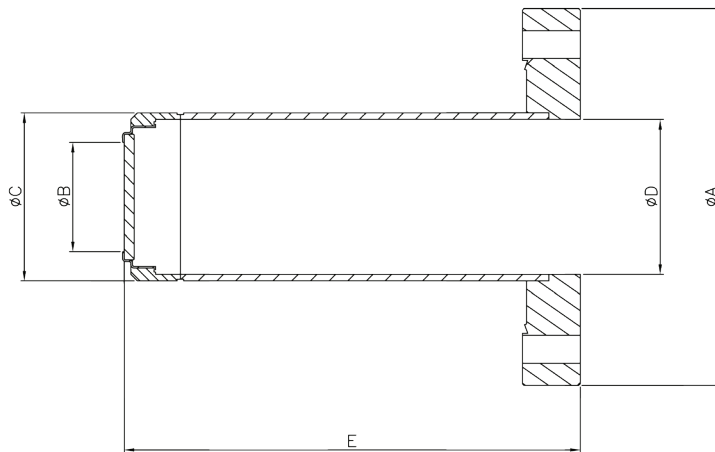
Transmission Curve - Fused Silica



Please note that the optical transmission curves are approximations and should be used for reference only



Fused Silica Re-Entrant Viewports



Fused Silica
Re-Entrant
Viewports

Part Number	Flange Type	A	B	C	D	E	Material	Weld Ring Material
VPR38-111-Q	NW35CF	70	15	22.5	20.2	111	304L	Kovar
VPR64-138-Q	NW63CF	114	32	50.8	47.5	138	304L	Kovar
VPR64/38-80-Q	NW63CF	114	38	57.2	53.2	80	304L	Kovar
VPR100-201-Q	NW100CF	152	63	76.2	70.2	201	304L	Kovar
VPR150-330-Q	NW150CF	203	63	108	102	330	304L	Kovar
VPR200-330-Q	NW200CF	254	89	159	153	330	304L	Kovar