Viewports

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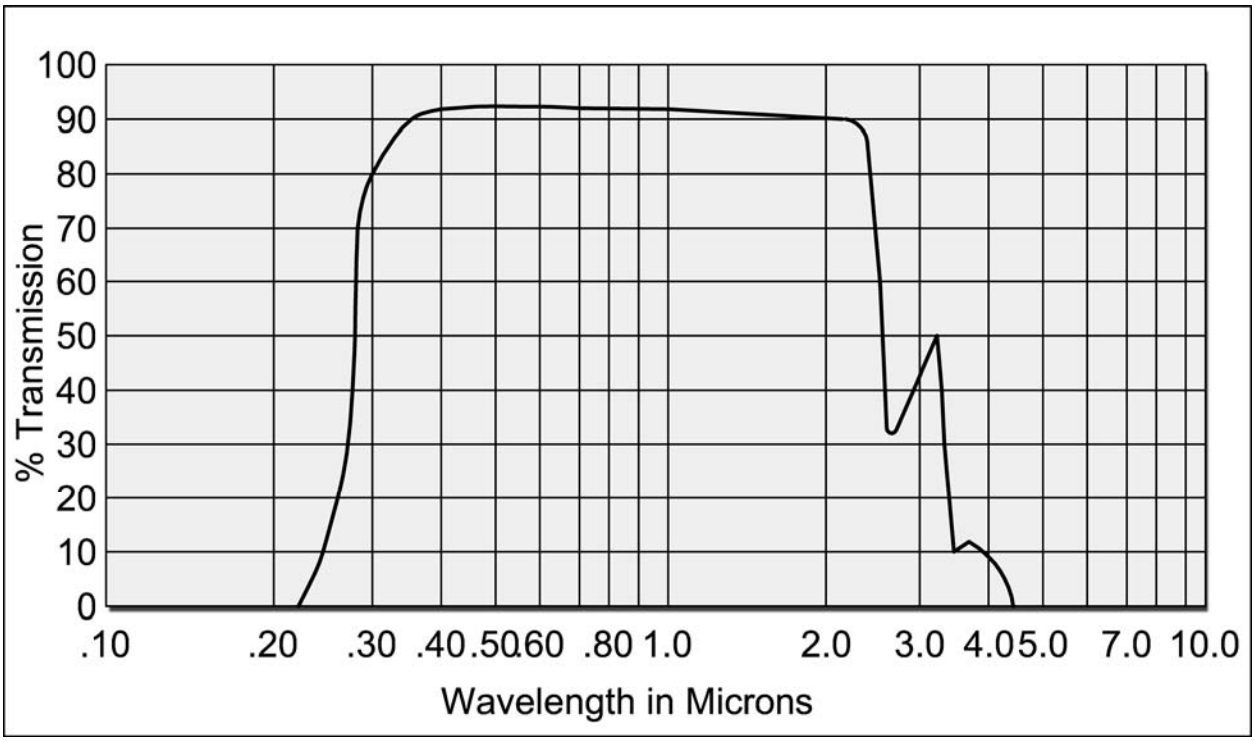
Kodial Zero Length Viewports

Torr Scientific kodial viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. The rugged construction of the Kodial viewports allows repeated bake-out with ultra high vacuum (UHV) performance, whilst the window offers broadband optical transmission from the visible to near infra-red. A non-magnetic range of kodial viewports is offered with mechanical seals. Various anti-reflective coatings to match customer reflectance requirements are processed at TSL and available as options listed in the thin-film section of the TSL catalogue. 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.

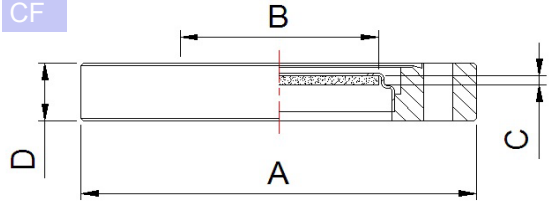
Transmission Curve– Kodial



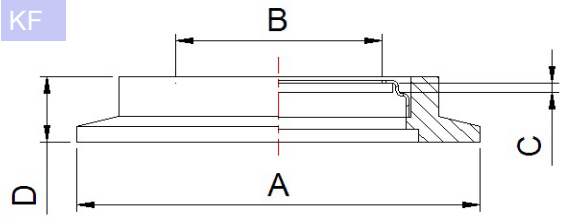
Please note that the optical transmission curves are approximations and should be used for reference only

Specification	
Seal Type	Braze
Temperature	Max 350°C (KF versions 150°C)
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	20 /10 scratch/dig
Flatness	< 8λ.

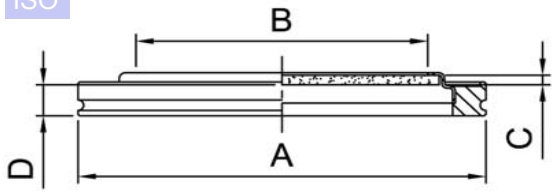
CF



KF



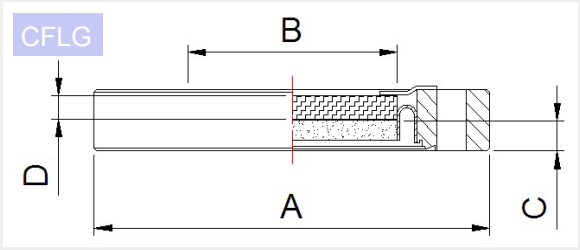
ISO

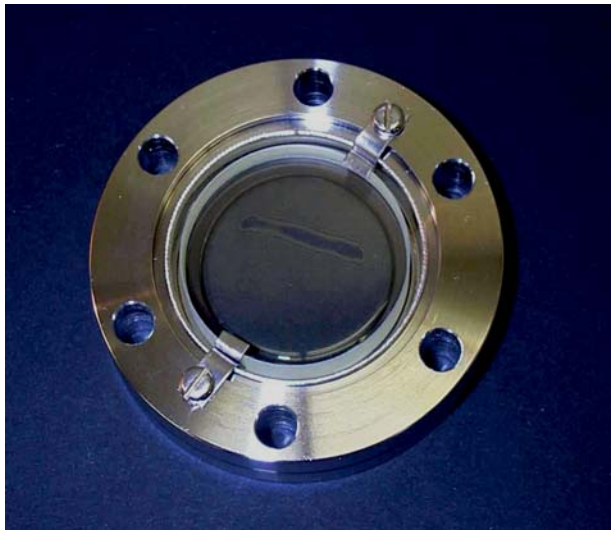


Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material
VPZ16	NW16CF	34	16	1	12.7	CF	304L	Kovar
VPZ16-LN	NW16CF	34	16	1	12.7	CF	316LN	Kovar
KVPZ25	KF25	40	20	1.5	18.5	KF	316L	Kovar
VPZ38	NW35CF	70	32	2.5	12.7	CF	304L	Kovar
VPZ38LA	NW35CF	70	38	3	12.7	CF	304L	Kovar
VPZ38-LN	NW35CF	70	32	2.5	12.7	CF	316LN	Kovar
VPZ38LA-LN	NW35CF	70	38	3	12.7	CF	316LN	Kovar
KVPZ40	KF40	55	38	3	18.5	KF	316L	Kovar
KVPZ50	KF50	75	38	3	15	KF	316L	Kovar
ISO63VPZ	ISO63	95	38	3	12	ISO	316L	Kovar
VPZ64	NW63CF	114	63	3	17.4	CF	304L	Kovar
VPZ64-LN	NW63CF	114	63	3	17.4	CF	316LN	Kovar
VPZ100	NW100CF	152	89	4	19.9	CF	304L	Kovar
VPZ100-LN	NW100CF	152	89	4	19.9	CF	316LN	Kovar
ISO100VPZ	ISO100	130	63	3	12	ISO	316L	Kovar
VPZ150	NW150CF	203	136	6.5	22.3	CF	304L	Kovar
VPZ150-LN	NW150CF	203	136	6.5	22.3	CF	316LN	Kovar
ISO160VPZ	ISO160	180	89	4	12	ISO	316L	Kovar

Kodial Zero Length Viewports With X-Ray Protection Lead Glass

Specification	
Seal Type	Braze
Temperature	Max 350°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	20 /10 scratch/dig
Flatness	< 8λ





Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material
VPZ16LG	NW16CF	34	16	1	6	CFLG	304L	Kovar
VPZ16LG-LN	NW16CF	34	16	1	6	CFLG	316LN	Kovar
VPZ38LG	NW35CF	70	32	2.5	6	CFLG	304L	Kovar
VPZ38LG-LN	NW35CF	70	32	2.5	6	CFLG	316LN	Kovar
VPZ64LG	NW63CF	114	63	3	6	CFLG	304L	Kovar
VPZ64LG-LN	NW63CF	114	63	3	6	CFLG	316LN	Kovar
VPZ100LG	NW100CF	152	89	4	6	CFLG	304L	Kovar
VPZ100LG-LN	NW100CF	152	89	4	6	CFLG	316LN	Kovar
VPZ150LG	NW150CF	203	136	6.5	6	CFLG	304L	Kovar
VPZ150LG-LN	NW150CF	203	136	6.5	6	CFLG	316LN	Kovar

Shielding characteristics

Thickness	Minimum lead equivalence (mm) for stated X-ray tube voltage					
mm	**100kV**	**110kV**	**150kV**	**200kV**	**250kV**	**300kV**
5-6.5	**1.7**	**1.6**	**1.5**	**1.3**	**1.3**	**1.3**

Optical Properties

Refractive Index	1.76
Transmission % @ 550nm through 5mm path	>=85.0

Chemical Properties

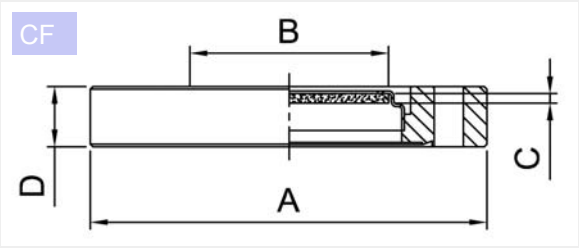
Lead (Pb)	48%
Barium (Ba)	15%

Mechanical Properties

Density (g/cm^2)	4.8
Knoop Hardness (kg/mm^2)	440
Young's Modulus (GPa)	62.7
Poisson's Ratio	0.23

Kodial Zero Length Viewports - Non-Magnetic

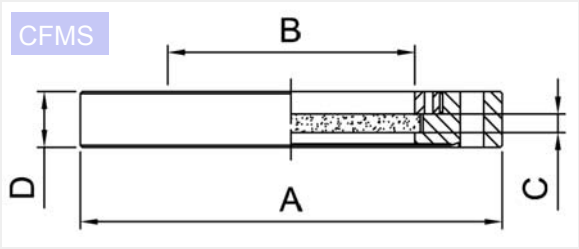
Specification	
Seal Type	Bond
Temperature	Max 120°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	20 /10 scratch/dig
Flatness	λ/4



Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material
BVPZ16-NM	NW16CF	34	16	1	12.7	CF	316LN	Tantalum
BVPZ38-NM	NW35CF	70	32	2.5	12.7	CF	316LN	Tantalum
BVPZ64-NM	NW63CF	114	63	3	17.4	CF	316LN	Tantalum
BVPZ100-NM	NW100CF	152	89	4	19.9	CF	316LN	Tantalum
BVPZ150-NM	NW150CF	203	136	6.5	22.3	CF	316LN	Tantalum

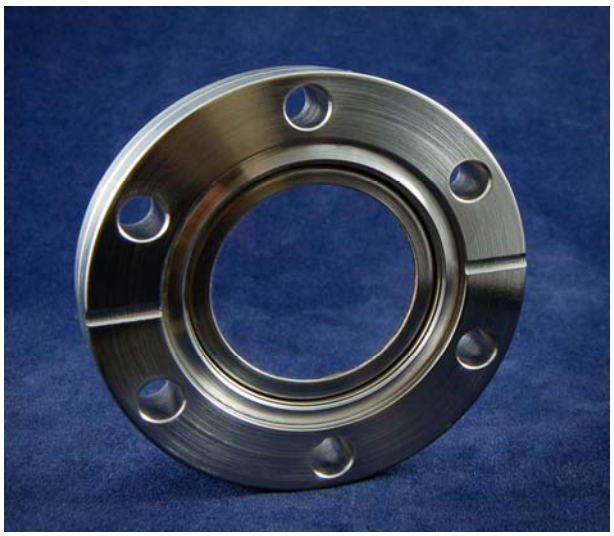
Kodial Zero Length Viewports - Mechanically Sealed

Specification	
Seal Type	Mechanically Sealed
Temperature	Max 130°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	20 /10 scratch/dig
Flatness	λ/4



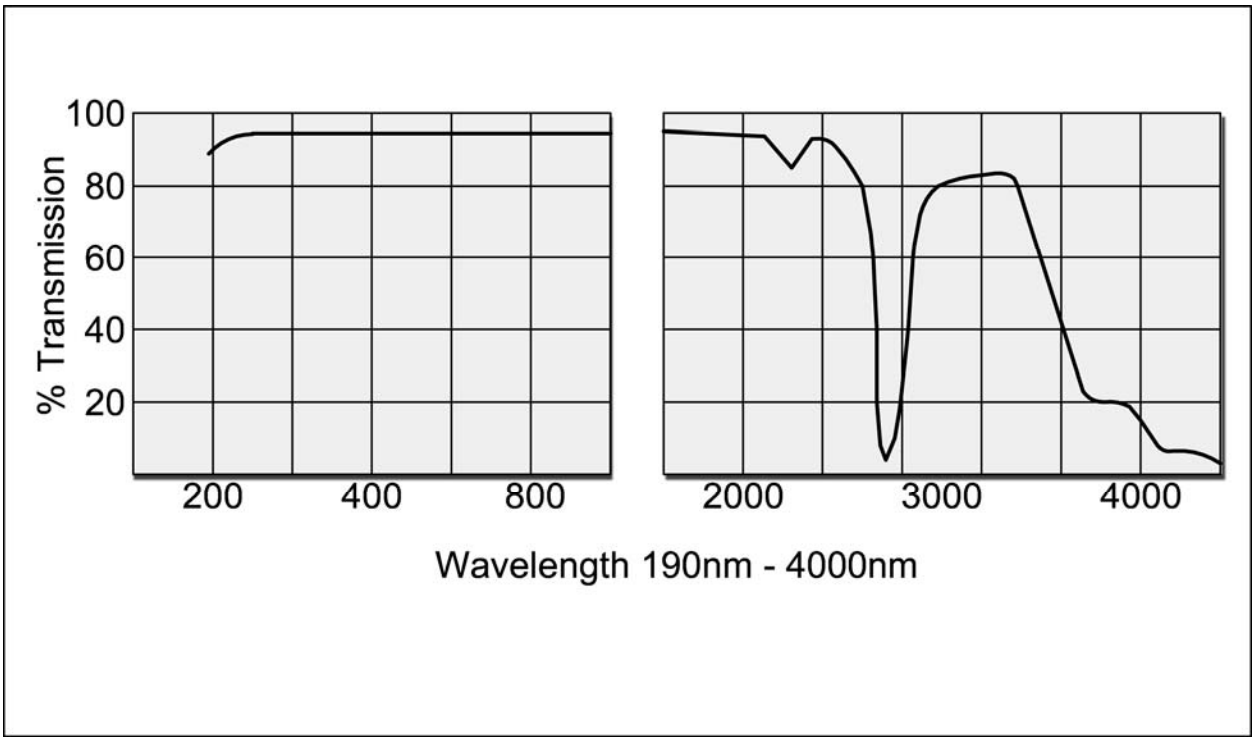
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ38-MS	NW35CF	70	32	2.5	12.7	CFMS	304L	n/a	
VPZ38-NM-MS	NW35CF	70	32	2.5	12.7	CFMS	316LN	n/a	Yes
VPZ64-MS	NW63CF	114	63	3	17.4	CFMS	304L	n/a	
VPZ64-NM-MS	NW63CF	114	63	3	17.4	CFMS	316LN	n/a	Yes
VPZ100-MS	NW100CF	152	89	4	19.9	CFMS	304L	n/a	
VPZ100-NM-MS	NW100CF	152	89	4	19.9	CFMS	316LN	n/a	Yes

Fused Silica Zero Length Viewports



Torr Scientific fused silica viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using 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. The rugged construction of the fused silica viewports allows repeated bake-out with ultra high vacuum (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 thin-film section of the TSL catalogue. 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.

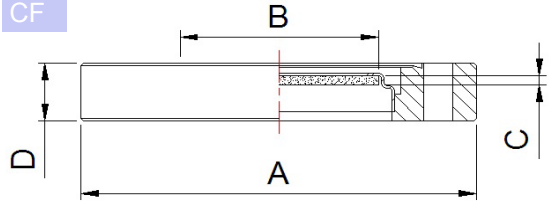
Transmission Curve– Fused Silica



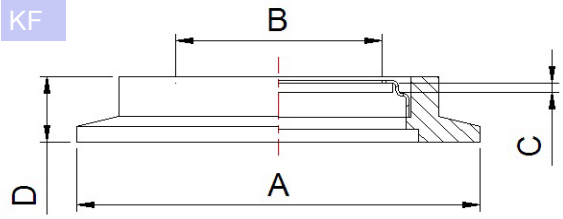
Please note that the optical transmission curves are approximations and should be used for reference only

Specification	
Seal Type	Braze
Temperature	Max 200°C (KF versions 150°C)
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	20 /10 scratch/dig
Flatness	< 8λ

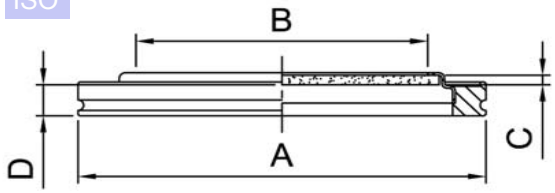
CF



KF

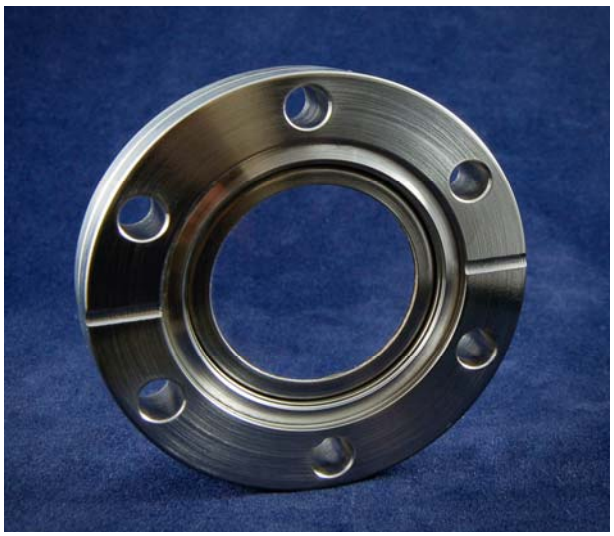


ISO



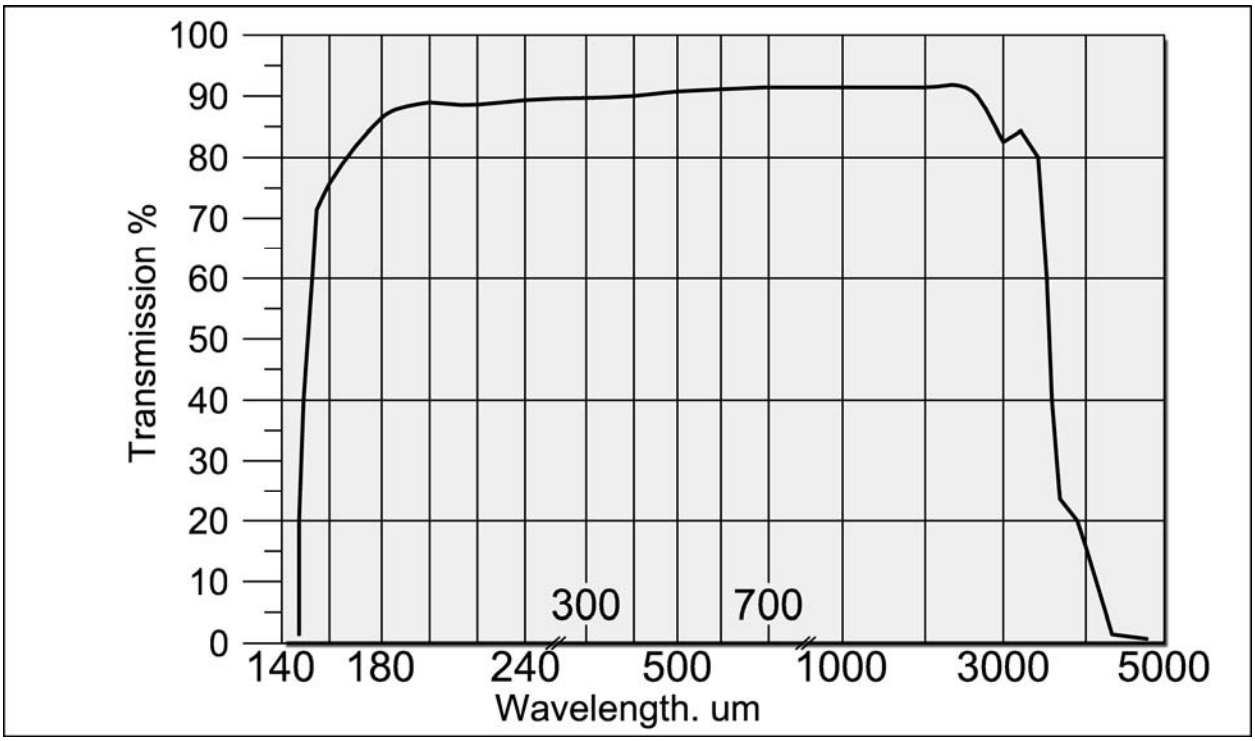
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ16Q	NW16CF	34	16	1.5	12.7	CF	304L	Kovar	
VPZ16Q-LN	NW16CF	34	16	1.5	12.7	CF	316LN	Kovar	
VPZ16Q-NM	NW16CF	34	16	1.5	12.7	CF	316LN	Tantalum	Yes
KVPZ25Q	KF25	40	20	2	18.5	KF	316L	Kovar	
VPZ38Q	NW35CF	70	32	3	12.7	CF	304L	Kovar	
VPZ38LAQ	NW35CF	70	38	3.5	12.7	CF	304L	Kovar	
VPZ38Q-LN	NW35CF	70	32	3	12.7	CF	316LN	Kovar	
VPZ38QLA-LN	NW35CF	70	38	3.5	12.7	CF	316LN	Kovar	
VPZ38Q-NM	NW35CF	70	32	3	12.7	CF	316LN	Tantalum	Yes
KVPZ40Q	KF40	55	38	3.5	18.5	KF	316L	Kovar	
KVPZ50Q	KF50	75	38	3.5	15	KF	316L	Kovar	
ISO63QVPZ	ISO63	95	38	3.5	12	ISO	316L	Kovar	
VPZ64Q	NW63CF	114	63	4.5	17.4	CF	304L	Kovar	
VPZ64Q-LN	NW63CF	114	63	4.5	17.4	CF	316LN	Kovar	
VPZ64Q-NM	NW63CF	114	63	4.5	17.4	CF	316LN	Tantalum	Yes
VPZ100Q	NW100CF	152	89	6	19.9	CF	304L	Kovar	
VPZ100Q-LN	NW100CF	152	89	6	19.9	CF	316LN	Kovar	
VPZ100Q-NM	NW100CF	152	89	6	19.9	CF	316LN	Tantalum	Yes
ISO100QVPZ	ISO100	130	63	4.5	12	ISO	316L	Kovar	
VPZ150Q	NW150CF	203	136	9.5	22.3	CF	304L	Kovar	
VPZ150Q-LN	NW150CF	203	136	9.5	22.3	CF	316LN	Kovar	
VPZ150Q-NM	NW150CF	203	136	9.5	22.3	CF	316LN	Tantalum	Yes
ISO160QVPZ	ISO160	180	89	6	12	ISO	316L	Kovar	

Quartz Natural Z-Cut Zero Length Viewports



Torr Scientific Z-Cut natural quartz viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using 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. The rugged construction of the quartz viewports allows repeated bake-out with ultra high vacuum (UHV) performance, whilst the window offers extended 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 thin-film section of the TSL catalogue. 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– Quartz Natural Z-Cut

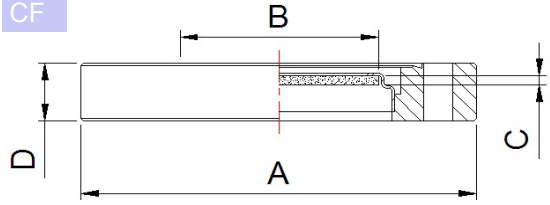


Please note that the optical transmission curves are approximations and should be used for reference only

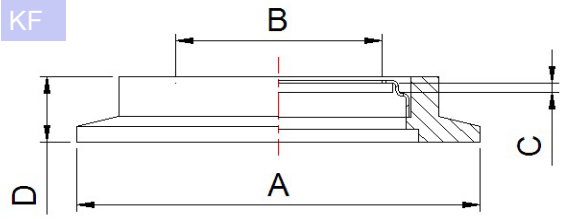
Quartz Natural Z-Cut Zero Length Viewports

Specification	
Seal Type	Braze
Temperature	Max 200°C (KF versions 150°C)
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	20 /10 scratch/dig
Flatness	< 8λ

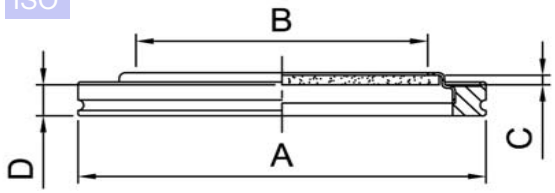
CF



KF

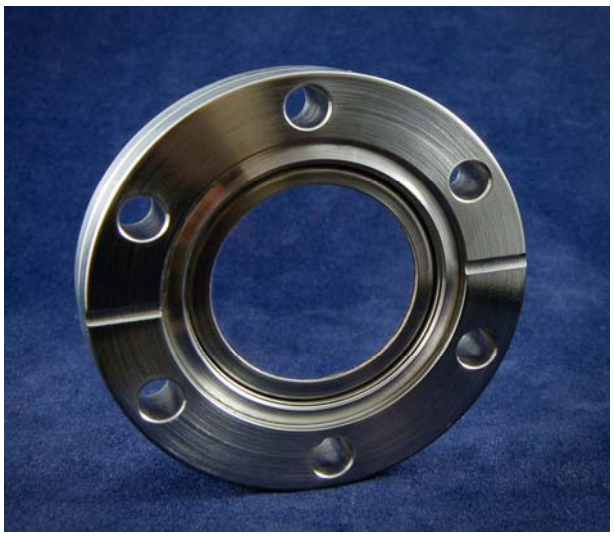


ISO



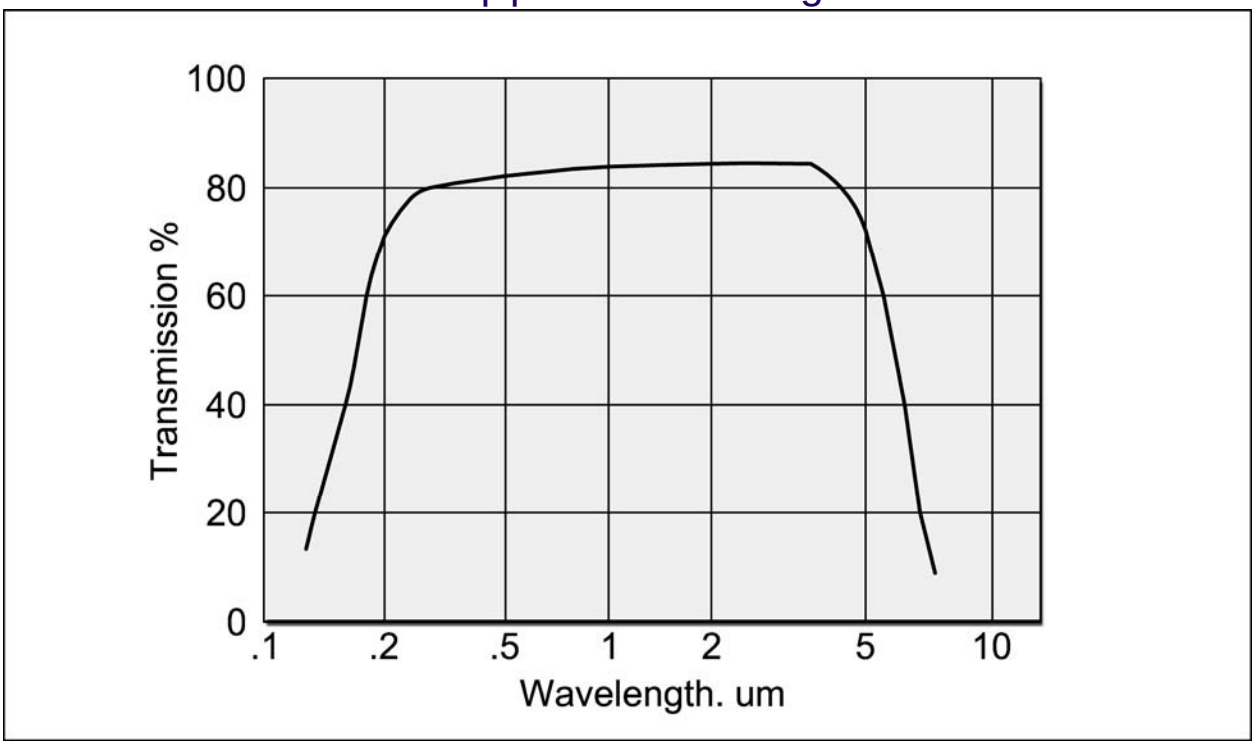
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ16NQZ	NW16CF	34	16	2	12.7	CF	304L	Kovar	
VPZ16NQZ-LN	NW16CF	34	16	2	12.7	CF	316LN	Kovar	
VPZ16NQZ-NM	NW16CF	34	16	2	12.7	CF	316LN	Tantalum	Yes
KVPZ25NQZ	KF25	40	20	2.5	18.5	KF	316L	Kovar	
VPZ38NQZ	NW35CF	70	32	3	12.7	CF	304L	Kovar	
VPZ38LANQZ	NW35CF	70	38	3.5	12.7	CF	304L	Kovar	
VPZ38LANQZAR	NW35CF	70	38	3.5	12.7	CF	304L	Kovar	
VPZ38NQZLAVAR	NW35CF	70	38	3.5	12.7	CF	304L	Kovar	
VPZ38LAMNQZBBAR	NW35CF	70	38	3.5	12.7	CF	304L	Kovar	
VPZ38NQZ-LN	NW35CF	70	32	3	12.7	CF	316LN	Kovar	
VPZ38NQZLA-LN	NW35CF	70	38	3.5	12.7	CF	316LN	Kovar	
VPZ38NQZ-NM	NW35CF	70	32	3	12.7	CF	316LN	Tantalum	Yes
KVPZ40NQZ	KF40	55	38	3.5	18.5	KF	316L	Kovar	
KVPZ50NQZ	KF50	75	38	3.5	15	KF	316L	Kovar	
ISO63NQZVPZ	ISO63	95	38	3.5	12	ISO	316L	Kovar	

Sapphire Zero Length Viewports



Torr Scientific sapphire viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using 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. The rugged construction of the sapphire viewports allows repeated bake-out with ultra high vacuum (UHV) performance, whilst the window offers broadband optical transmission through vacuum UV, visible to near infra-red. The single crystal sapphire windows have excellent optical, physical and chemical properties. The hardest of the oxide crystals, sapphire retains its high strength at high temperatures. Various anti-reflective coatings to match customer reflectance requirements are processed at TSL and available as options listed in the thin-film section of the TSL catalogue. 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.

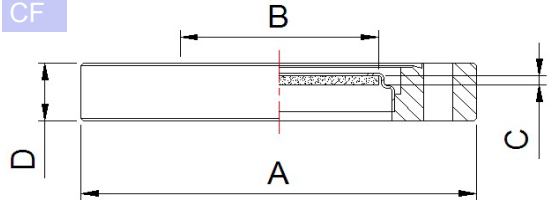
Transmission Curve– Sapphire Zero Length



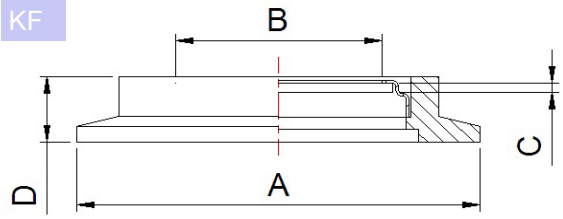
Please note that the optical transmission curves are approximations and should be used for reference only

Specification	
Seal Type	Braze
Temperature	Max 450°C (KF versions 150°C)
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	< 8λ

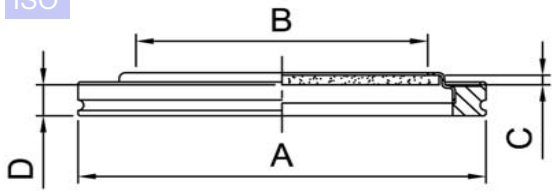
CF



KF

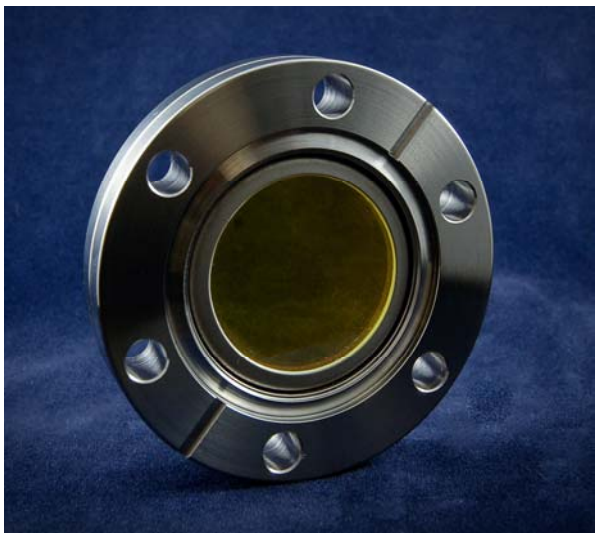


ISO



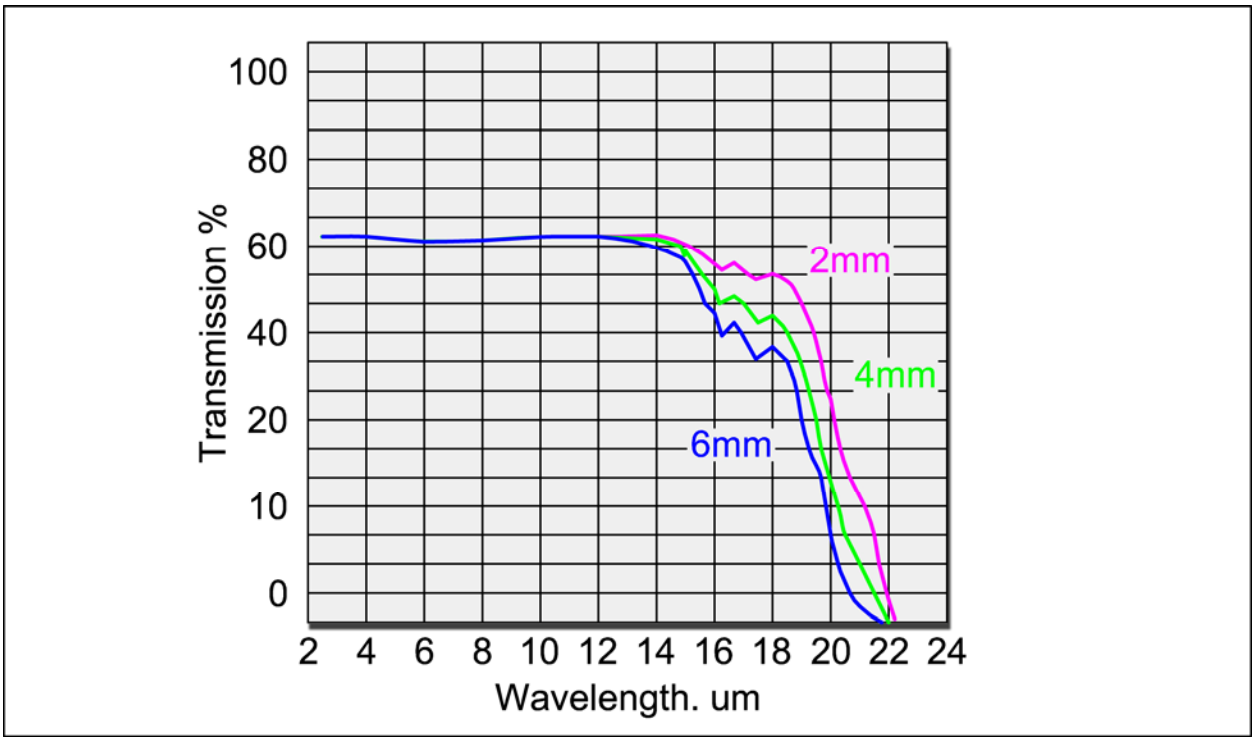
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ16S	NW16CF	34	16	1.5	12.7	CF	304L	Kovar	
VPZ16S-LN	NW16CF	34	16	1.5	12.7	CF	316LN	Kovar	
VPZ16S-NM	NW16CF	34	16	1.5	12.7	CF	316LN	Tantalum	Yes
KVPZ25S	KF25	40	20	1.5	18.5	KF	316L	Kovar	
VPZ38S	NW35CF	70	32	1.5	12.7	CF	304L	Kovar	
VPZ38LAS	NW35CF	70	38	1.5	12.7	CF	304L	Kovar	
VPZ38S-LN	NW35CF	70	32	1.5	12.7	CF	316LN	Kovar	
VPZ38LAS-LN	NW35CF	70	38	1.5	12.7	CF	316LN	Kovar	
VPZ38S-NM	NW35CF	70	32	1.5	12.7	CF	316LN	Tantalum	Yes
KVPZ40S	KF40	55	38	1.5	18.5	KF	316L	Kovar	
KVPZ50S	KF50	75	38	1.5	15	KF	316L	Kovar	
VPZ64S	NW63CF	114	63	2	17.4	CF	304L	Kovar	
VPZ64S-LN	NW63CF	114	63	2	17.4	CF	316LN	Kovar	
VPZ64S-NM	NW63CF	114	63	2	17.4	CF	316LN	Tantalum	Yes
ISO63SVPZ	ISO63	95	38	1.5	12	ISO	316L	Kovar	
VPZ100S	NW100CF	152	89	3	19.9	CF	304L	Kovar	
VPZ100S-LN	NW100CF	152	89	3	19.9	CF	316LN	Kovar	
VPZ100S-NM	NW100CF	152	89	3	19.9	CF	316LN	Tantalum	Yes
ISO100SVPZ	ISO100	130	63	2	12	ISO	316L	Kovar	
VPZ150S	NW150CF	203	136	4	22.3	CF	304L	Kovar	
VPZ150S-LN	NW150CF	203	136	4	22.3	CF	316LN	Kovar	
VPZ150S-NM	NW150CF	203	136	4	22.3	CF	316LN	Tantalum	Yes
ISO160SVPZ	ISO160	180	89	3	12	ISO	316L	Kovar	

Zinc Selenide Zero Length Viewports



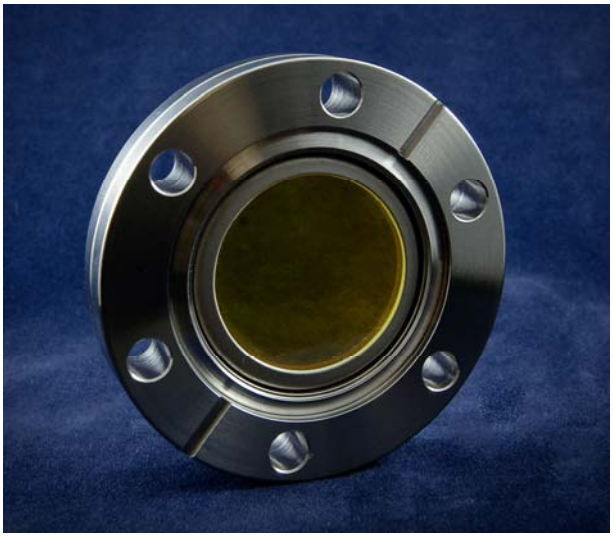
Torr Scientific Zinc Selenide viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using a tantalum weld ring instead of the regular kovar weld ring. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. The rugged, bonded construction of the Zinc Selenide viewports allows bake-out to a maximum of 120 degrees C with ultra high vacuum (UHV) performance whilst the window offers extended broadband optical transmission to the extreme infra-red. A mechanically sealed range is also offered with increased temperature specification to 130 degrees C. Two types of anti-reflective coatings are available as options listed in the thin-film section of the TSL catalogue, a 10.6 micron coating or a broadband 2 to 15 micron coating. 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– Zinc Selenide



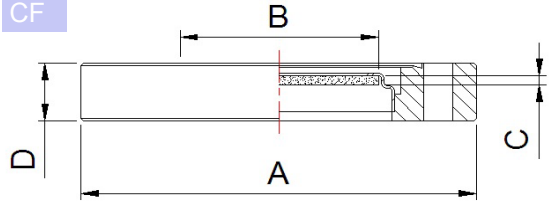
Please note that the optical transmission curves are approximations and should be used for reference only

Zinc Selenide Zero Length Viewports

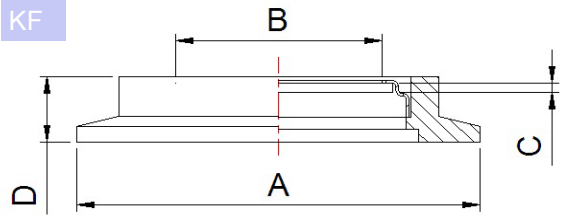


Specification	
Seal Type	Bond
Temperature	Max 120°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	<2λ

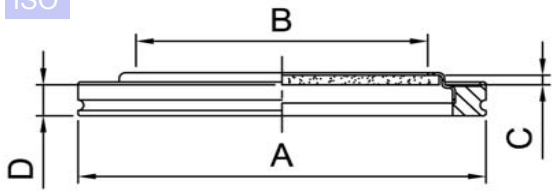
CF



KF



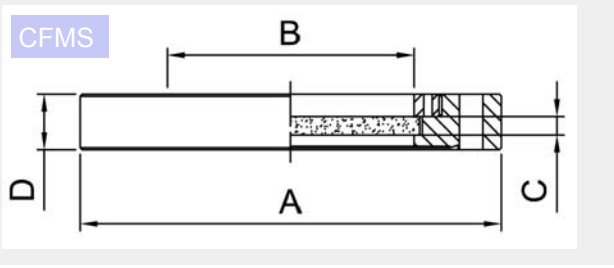
ISO

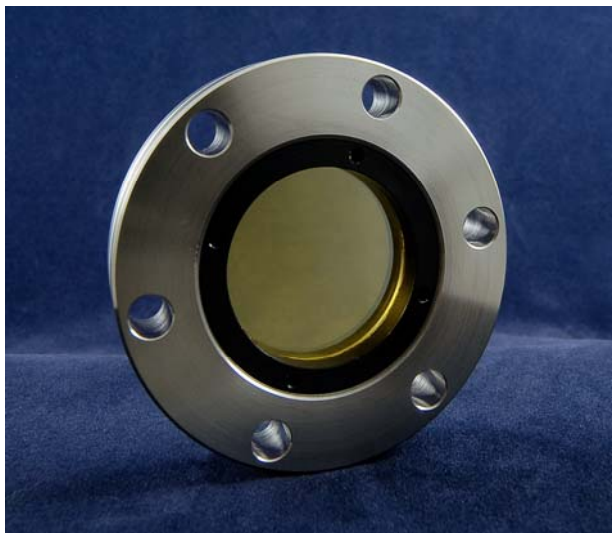


Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
BVPZ16ZnSe	NW16CF	34	16	1.5	12.7	CF	304L	Kovar	
BVPZ16ZnSe-LN	NW16CF	34	16	1.5	12.7	CF	316LN	Kovar	
BVPZ16ZnSe-NM	NW16CF	34	16	1.5	12.7	CF	316LN	Tantalum	Yes
BKVPZ25ZnSe	KF25	40	20	2	18.5	KF	316L	Kovar	
BVPZ38ZnSe	NW35CF	70	32	3	12.7	CF	304L	Kovar	
BVPZ38LAZnSe	NW35CF	70	38	3.75	12.7	CF	304L	Kovar	
BVPZ38ZnSe-LN	NW35CF	70	32	3	12.7	CF	316LN	Kovar	
BVPZ38LAZnSe-LN	NW35CF	70	38	3.75	12.7	CF	316LN	Kovar	
BVPZ38ZnSe-NM	NW35CF	70	32	3	12.7	CF	316LN	Tantalum	Yes
BKVPZ40ZnSe	KF40	55	38	3.75	18.5	KF	316L	Kovar	
BKVPZ50ZnSe	KF50	75	38	3.75	15	KF	316L	Kovar	
BVPZ64ZnSe	NW63CF	114	63	5	17.4	CF	304L	Kovar	
BVPZ64ZnSe-LN	NW63CF	114	63	5	17.4	CF	316LN	Kovar	
BVPZ64ZnSe-NM	NW63CF	114	63	5	17.4	CF	316LN	Tantalum	Yes
BISO63VPZZnSe	ISO63	95	38	3.75	12	ISO	316L	Kovar	
BVPZ100ZnSe	NW100CF	152	89	6.5	19.9	CF	304L	Kovar	
BVPZ100ZnSe-LN	NW100CF	152	89	6.5	19.9	CF	316LN	Kovar	
BVPZ100ZnSe-NM	NW100CF	152	89	6.5	19.9	CF	316LN	Tantalum	Yes
BISO100VPZZnSe	ISO100	130	63	5	12	ISO	316L	Kovar	
BVPZ150ZnSe	NW150CF	203	136	9.5	22.3	CF	304L	Kovar	
BVPZ150ZnSe-LN	NW150CF	203	136	9.5	22.3	CF	316LN	Kovar	
BVPZ150ZnSe-NM	NW150CF	203	136	9.5	22.3	CF	316LN	Tantalum	Yes
BISO160VPZZnSe	ISO160	180	89	6.5	12	ISO	316L	Kovar	

Zinc Selenide Zero Length Viewports - Mechanically Sealed

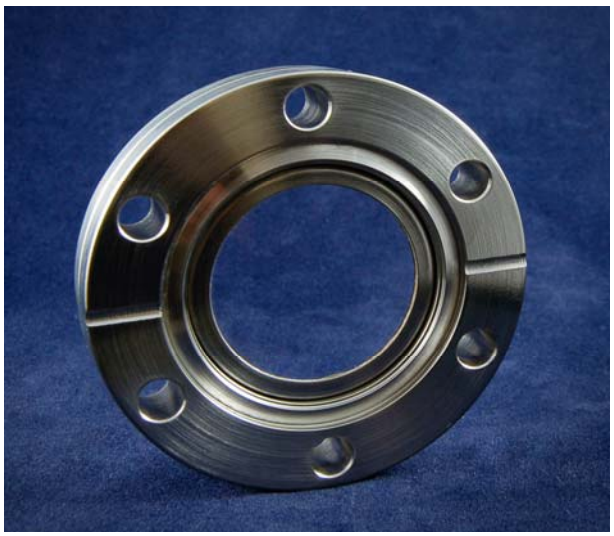
Specification	
Seal Type	Mechanically Sealed
Temperature	Max 130°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	<2λ





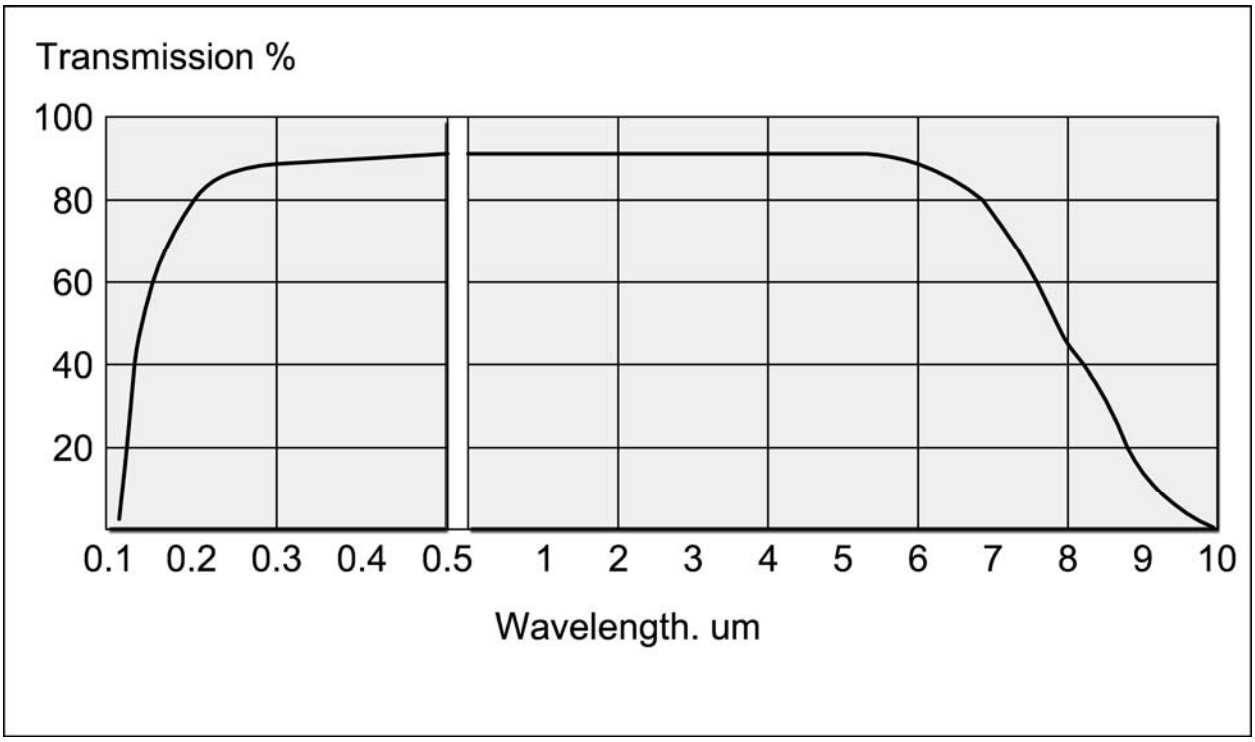
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ38ZnSeMS	NW35CF	70	32	3	12.7	CFMS	304L	n/a	
VPZ38ZnSeMS-NM	NW35CF	70	32	3	12.7	CFMS	316LN	n/a	Yes
VPZ64ZnSeMS	NW63CF	114	63	5	17.4	CFMS	304L	n/a	
VPZ64ZnSeMS-NM	NW63CF	114	63	5	17.4	CFMS	316LN	n/a	Yes
VPZ100ZnSeMS	NW100CF	152	89	6.5	19.9	CFMS	304L	n/a	
VPZ100ZnSeMS-NM	NW100CF	152	89	6.5	19.9	CFMS	316LN	n/a	Yes

Magnesium Fluoride Zero Length Viewports



Torr Scientific Magnesium Fluoride viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using a tantalum weld ring instead of the regular stainless steel weld ring. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. The rugged, bonded construction of the Magnesium Fluoride viewports allows bake-out to a maximum of 120 degrees C with ultra high vacuum (UHV) performance whilst the window offers extended broadband optical transmission from deep UV to the infra-red. A mechanically sealed range is also offered with increased temperature specification to 130 degrees C. Specially coated optics optimised to minimise reflectance at customer specified wavelengths can be quoted on request. 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– Magnesium Fluoride

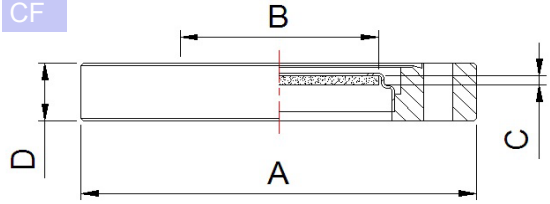


Please note that the optical transmission curves are approximations and should be used for reference only

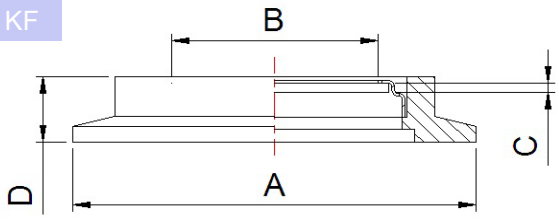
Magnesium Fluoride Zero Length Viewports

Specification	
Seal Type	Bond
Temperature	Max 120°C
Leak Rate	$<1x10^{-10}$ atm-cc/sec (He)
Pressure range	$<1x10^{-11}$ Torr
Surface quality	60 /40 scratch/dig
Flatness	λ/4

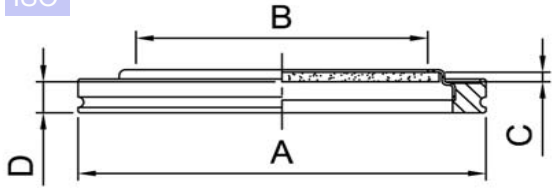
CF



KF



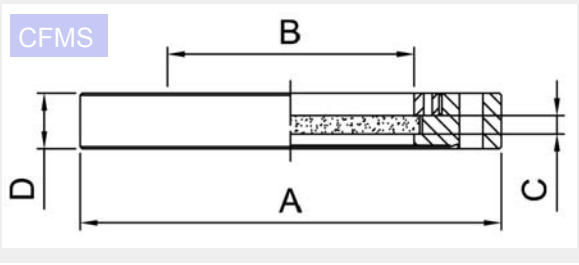
ISO



Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
BVPZ16MgF2	NW16CF	34	16	2.5	12.7	CF	304L	304SS	
BVPZ16MgF2-NM	NW16CF	34	16	2.5	12.7	CF	316LN	Tantalum	Yes
BKVPZ25MgF2	KF25	40	20	3	18.5	KF	316L	304SS	
BVPZ38MgF2	NW35CF	70	32	3	12.7	CF	304L	304SS	
BVPZ38MgF2-NM	NW35CF	70	32	3	12.7	CF	316LN	Tantalum	Yes
BKVPZ40MgF2	KF40	55	38	4	18.5	KF	316L	304SS	
BKVPZ50MgF2	KF50	75	38	4	15	KF	316L	304SS	
BVPZ64MgF2	NW63CF	114	63	5	17.4	CF	304L	304SS	
BVPZ64MgF2-NM	NW63CF	114	63	5	17.4	CF	316LN	Tantalum	Yes
BISO63VPZMgF2	ISO63	95	63	5	12	ISO	316L	304SS	
BVPZ100MgF2	NW100CF	152	89	6.5	19.9	CF	304L	304SS	
BVPZ100MgF2-NM	NW100CF	152	89	6.5	19.9	CF	316LN	Tantalum	Yes
BISO100VPZMgF2	ISO100	130	89	6.5	12	ISO	316L	304SS	
BVPZ150MgF2	NW150CF	203	136	9.5	22.3	CF	304L	304SS	
BVPZ150MgF2-NM	NW150CF	203	136	9.5	22.3	CF	316LN	Tantalum	Yes
BISO160VPZMgF2	ISO160	180	136	9.5	12	ISO	316L	304SS	

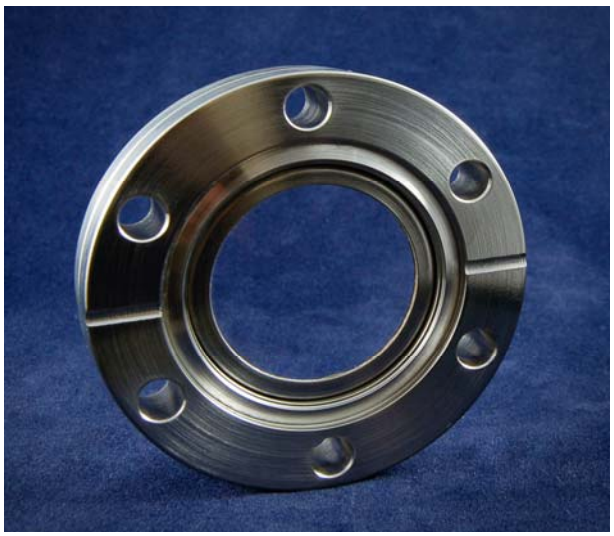
Magnesium Fluoride Zero Length Viewports - Mechanically Sealed

Specification	
Seal Type	Mechanically Sealed
Temperature	Max 130°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	λ/4



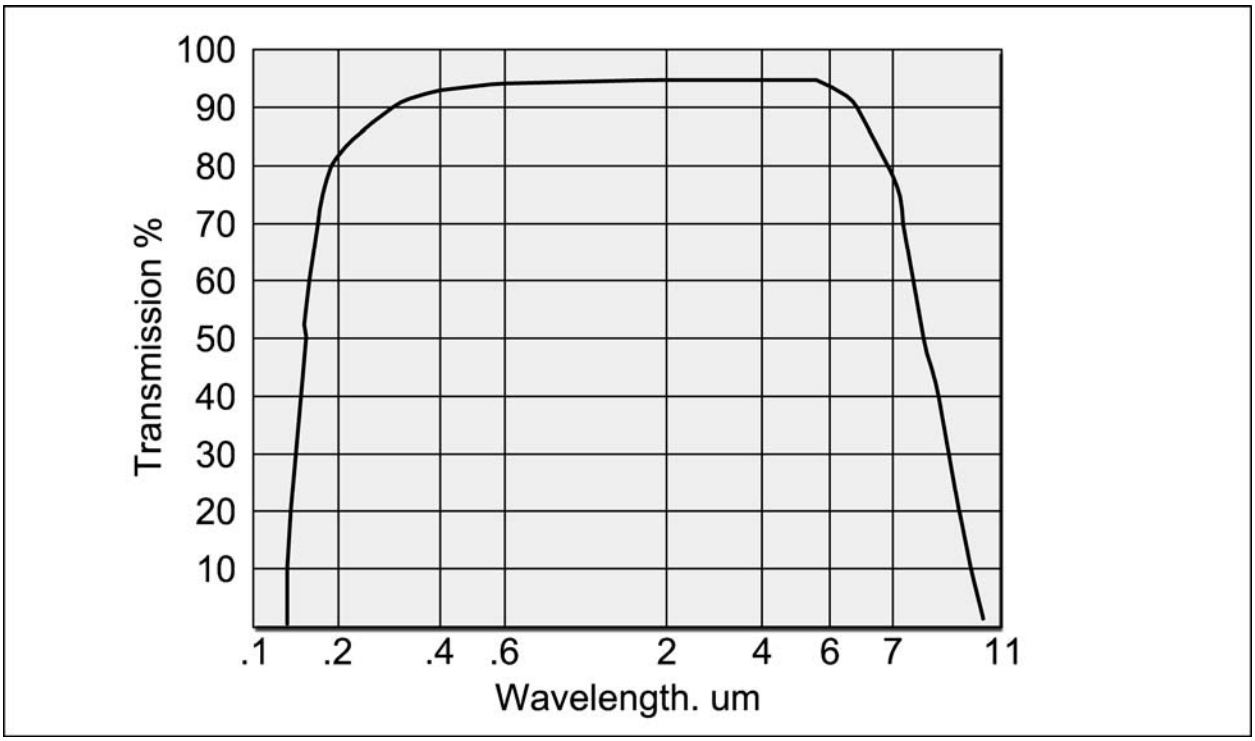
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ38MgF2MS	NW35CF	70	32	3	12.7	CFMS	304L	n/a	
VPZ38MgF2MS-NM	NW35CF	70	32	3	12.7	CFMS	316LN	n/a	Yes
VPZ64MgF2MS	NW63CF	114	63	5	17.4	CFMS	304L	n/a	
VPZ64MgF2MS-NM	NW63CF	114	63	5	17.4	CFMS	316LN	n/a	Yes
VPZ100MgF2MS	NW100CF	152	89	6.5	19.9	CFMS	304L	n/a	
VPZ100MgF2MS-NM	NW100CF	152	89	6.5	19.9	CFMS	316LN	n/a	Yes

Calcium Fluoride Zero Length Viewports



Torr Scientific Calcium Fluoride viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using a tantalum weld ring instead of the regular stainless steel weld ring. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. The rugged, bonded construction of the Calcium Fluoride viewports allows bake-out to a maximum of 120 degrees C with ultra high vacuum (UHV) performance whilst the window offers extended broadband optical transmission from deep UV to the infra-red. A mechanically sealed range is also offered with increased temperature specification to 130 degrees C. Specially coated optics optimised to minimise reflectance at customer specified wavelengths can be quoted on request. 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– Calcium Fluoride

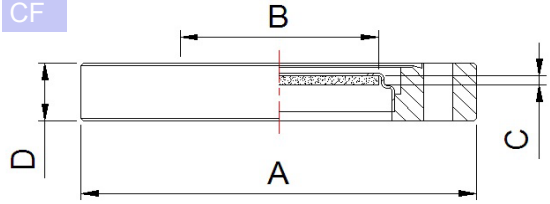


Please note that the optical transmission curves are approximations and should be used for reference only

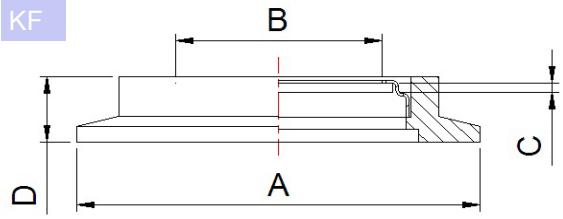
Calcium Fluoride Zero Length Viewports

Specification	
Seal Type	Bond
Temperature	Max 120°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	λ/4

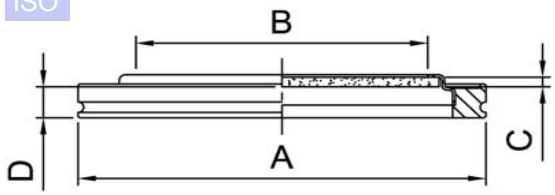
CF



KF



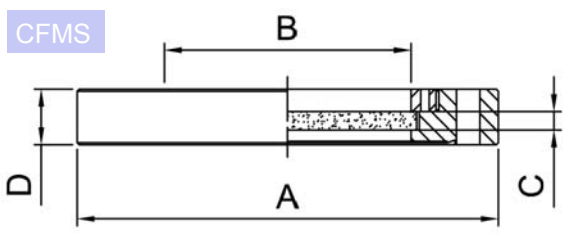
ISO



Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
BVPZ16CaF2	NW16CF	34	16	1.5	12.7	CF	304L	304SS	
BVPZ16CaF2-NM	NW16CF	34	16	1.5	12.7	CF	316LN	Tantalum	Yes
BKVPZ25CaF2	KF25	40	20	2	18.5	KF	316L	304SS	
BVPZ38CaF2	NW35CF	70	32	3	12.7	CF	304L	304SS	
BVPZ38CaF2-NM	NW35CF	70	32	3	12.7	CF	316LN	Tantalum	Yes
BKVPZ40CaF2	KF40	55	38	3.5	18.5	KF	316L	304SS	
BKVPZ50CaF2	KF50	75	38	3.5	15	KF	316L	304SS	
BVPZ64CaF2	NW63CF	114	63	5	17.4	CF	304L	304SS	
BVPZ64CaF2-NM	NW63CF	114	63	5	17.4	CF	316LN	Tantalum	Yes
BISO63VPZCaF2	ISO63	95	63	5	12	ISO	316L	304SS	
BVPZ100CaF2	NW100CF	152	89	7	19.9	CF	304L	304SS	
BVPZ100CaF2-NM	NW100CF	152	89	7	19.9	CF	316LN	Tantalum	Yes
BISO100VPZCaF2	ISO100	130	89	7	12	ISO	316L	304SS	

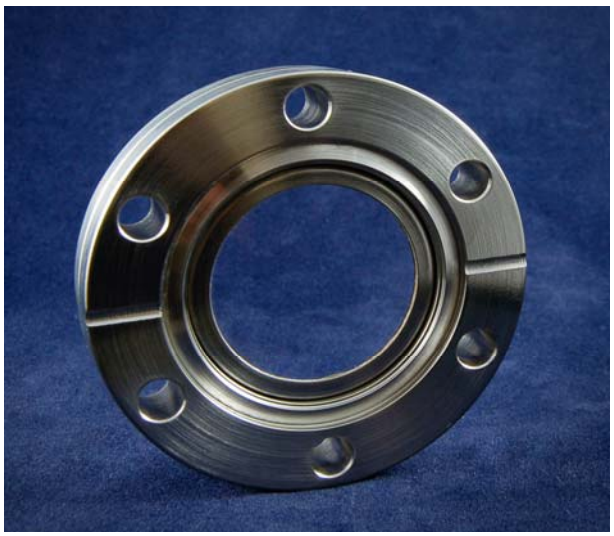
Calcium Fluoride Zero Length Viewports - Mechanically Sealed

Specification	
Seal Type	Mechanically Sealed
Temperature	Max 130°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	λ/4



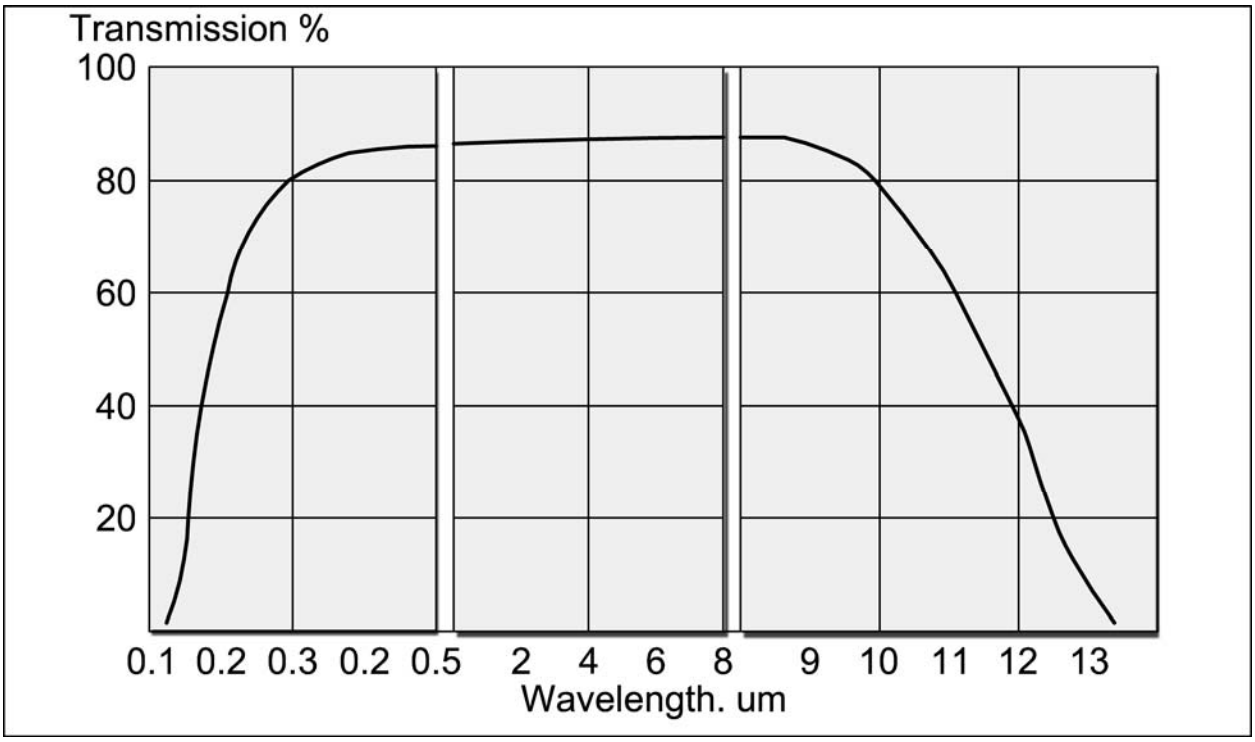
Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ38CaF2MS	NW35CF	70	32	3	12.7	CFMS	304L	n/a	
VPZ38CaF2MS-NM	NW35CF	70	32	3	12.7	CFMS	316LN	n/a	Yes
VPZ64CaF2MS	NW63CF	114	63	5	17.4	CFMS	304L	n/a	
VPZ64CaF2MS-NM	NW63CF	114	63	5	17.4	CFMS	316LN	n/a	Yes
VPZ100CaF2MS	NW100CF	152	89	7	19.9	CFMS	304L	n/a	
VPZ100CaF2MS-NM	NW100CF	152	89	7	19.9	CFMS	316LN	n/a	Yes

Barium Fluoride Zero Length Viewports



Torr Scientific Barium Fluoride viewports are offered in CF, ISO and KF flange styles. The clean, UHV CF versions are offered using 304L or 316LN stainless steel flanges. Non-magnetic viewports are offered as standard using a tantalum weld ring instead of the regular stainless steel weld ring. Flanges in 316L stainless steel are used for the high vacuum KF and ISO viewports. The rugged, bonded construction of the Barium Fluoride viewports allows bake-out to a maximum of 120 degrees C with ultra high vacuum (UHV) performance whilst the window offers extended broadband optical transmission from deep UV to the infra-red. A mechanically sealed range is also offered with increased temperature specification to 130 degrees C. Specially coated optics optimised to minimise reflectance at customer specified wavelengths can be quoted on request. 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.

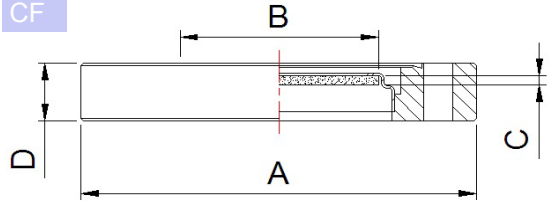
Transmission Curve– Barium Fluoride



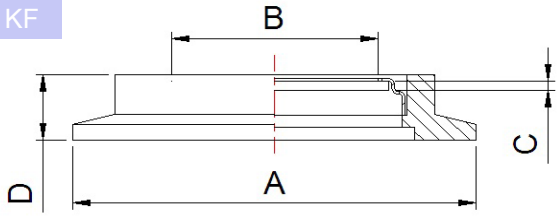
Please note that the optical transmission curves are approximations and should be used for reference only

Specification	
Seal Type	Bond
Temperature	Max 120°C
Leak Rate	$<1x10^{-10}$ atm-cc/sec (He)
Pressure range	$<1x10^{-11}$ Torr
Surface quality	60 /40 scratch/dig
Flatness	λ/4

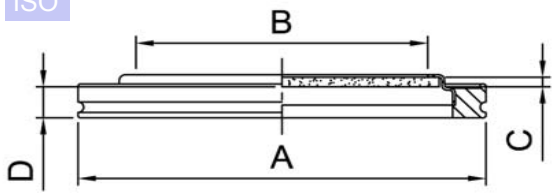
CF



KF



ISO

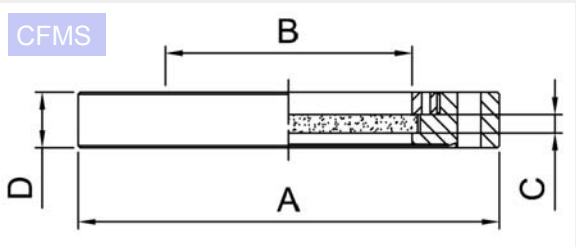


Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
BVPZ16BaF2	NW16CF	34	16	2	-	CF	304L	304SS	
BVPZ16BaF2-NM	NW16CF	34	16	2	-	CF	316LN	Tantalum	Yes
BKVPZ25BaF2	KF25	40	20	3	-	KF	316L	304SS	
BVPZ38BaF2	NW35CF	70	32	4	-	CF	304L	304SS	
BVPZ38BaF2-NM	NW35CF	70	32	4	-	CF	316LN	Tantalum	Yes
BKVPZ40BaF2	KF40	55	38	5	-	KF	316L	304SS	
BKVPZ50BaF2	KF50	75	38	5	-	KF	316L	304SS	
BVPZ64BaF2	NW63CF	114	63	7	-	CF	304L	304SS	
BVPZ64BaF2-NM	NW63CF	114	63	7	-	CF	316LN	Tantalum	Yes
BISO63VPZBaF2	ISO63	95	63	7	-	ISO	316L	304SS	
BVPZ100BaF2	NW100CF	152	89	9	-	CF	304L	304SS	
BVPZ100BaF2-NM	NW100CF	152	89	9	-	CF	316LN	Tantalum	Yes
BISO100VPZBaF2	ISO100	130	89	9	-	ISO	316L	304SS	

Barium Fluoride Zero Length Viewports - Mechanically Sealed

Specification	
Seal Type	Mechanically Sealed
Temperature	Max 130°C
Leak Rate	<1x10^{-10} atm-cc/sec (He)
Pressure range	<1x10^{-11} Torr
Surface quality	60 /40 scratch/dig
Flatness	λ/4

CFMS



Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ38BaF2MS	NW35CF	70	32	4	12.7	CFMS	304L	n/a	
VPZ38BaF2MS-NM	NW35CF	70	32	4	12.7	CFMS	316LN	n/a	Yes
VPZ64BaF2MS	NW63CF	114	63	7	17.4	CFMS	304L	n/a	
VPZ64BaF2MS-NM	NW63CF	114	63	7	17.4	CFMS	316LN	n/a	Yes
VPZ100BaF2MS	NW100CF	152	89	9	19.9	CFMS	304L	n/a	
VPZ100BaF2MS-NM	NW100CF	152	89	9	19.9	CFMS	316LN	n/a	Yes

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