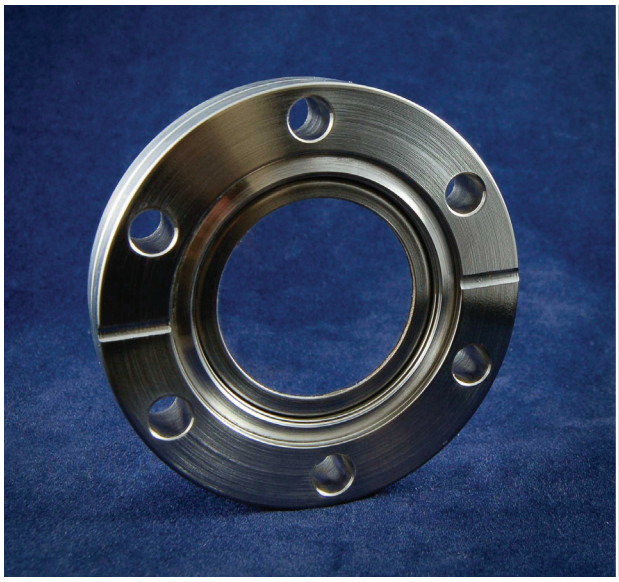
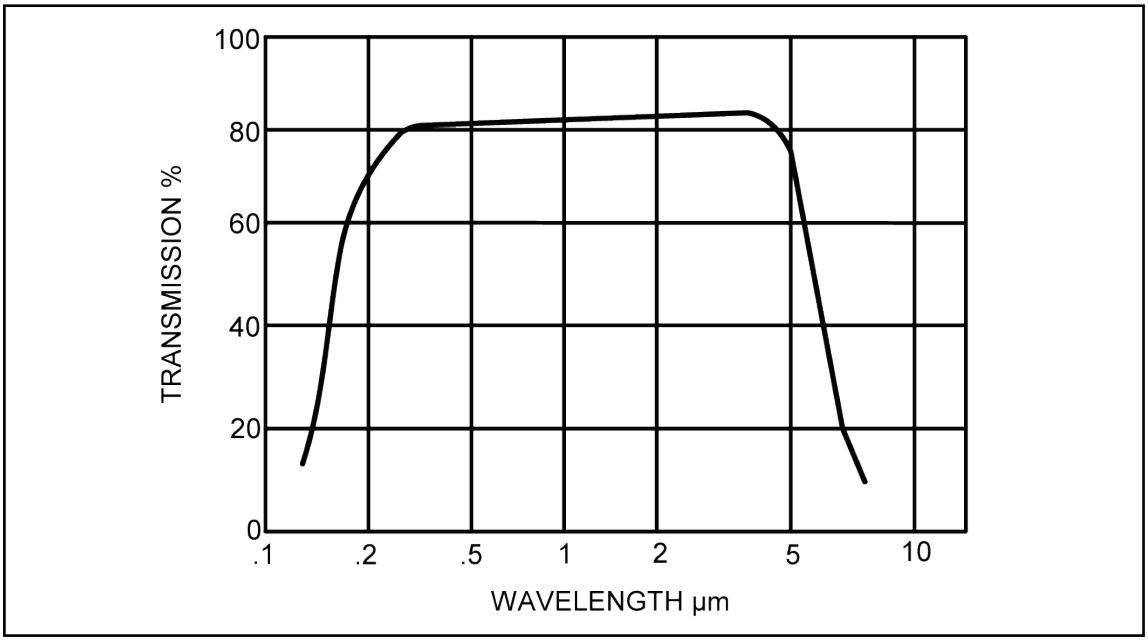
200°C Sapphire Zero Length Viewports



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	60 /40 scratch/dig
Flatness	< 8λ

Torr Scientific sapphire viewports are offered in CF, ISO and KF flange styles. The viewports comprise a high quality optic with precise flatness, parallelism, scratch and dig specifications. 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. Sapphire has a low coefficient of thermal expansion and low fluorescence, good resistance to thermal shock and scratching making this an excellent material for IR transmitting optics and robust applications. C-cut sapphire is selected for Torr Scientific sapphire viewports to minimise the effects of birefringence. 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 sapphire viewports allows repeated bake-out to 200°C with UHV performance, whilst the window offers broadband optical transmission through vacuum 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 data sheets. 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



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

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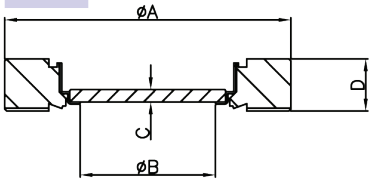
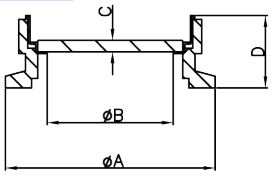
200°C Sapphire Zero Length Viewports

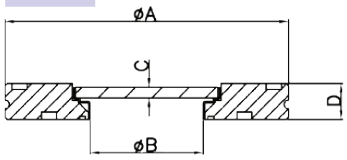
CF-1



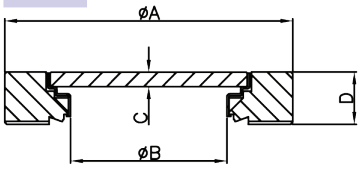
KF-1



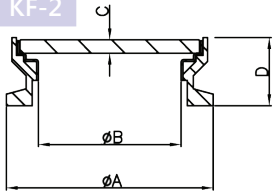
ISO-1



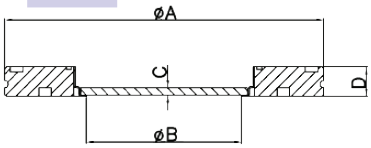
CF-2



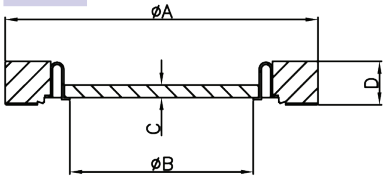
KF-2



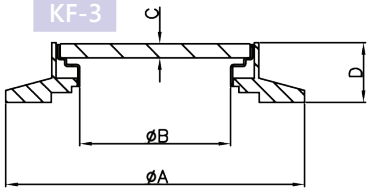
ISO-2



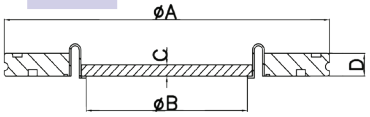
CF-3



KF-3

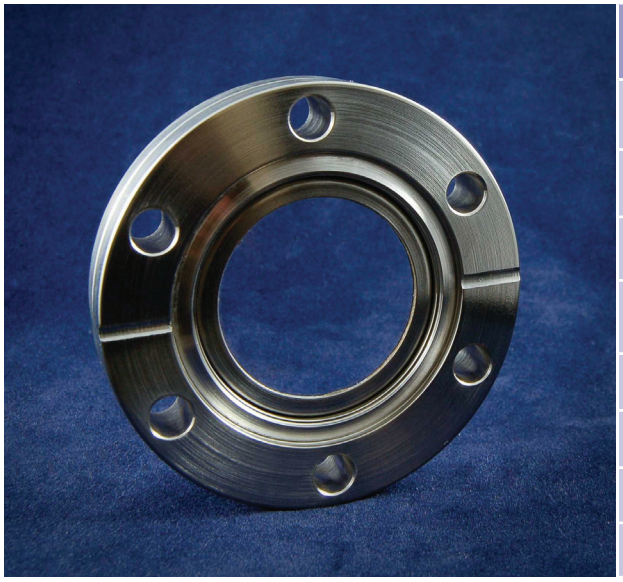


ISO-3



Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ16S-200	NW16CF	34	15	1.5	12.7	CF-1	304L	Kovar	
VPZ16S-LN-200	NW16CF	34	15	1.5	12.7	CF-1	316LN	Kovar	
VPZ16S-NM-200	NW16CF	34	15	1.5	12.7	CF-1	316LN	Tantalum	Yes
KVPZ16S-200	KF16	25	15	1.5	12.7	KF-1	304L	Kovar	
KVPZ25S-200	KF25	40	20	1.5	18.5	KF-2	304L	Kovar	
VPZ23S-200	NW35CF	70	23	1.5	12.7	CF-1	304L	Kovar	
VPZ38S-200	NW35CF	70	32	1.5	12.7	CF-3	304L	Kovar	
VPZ38LAS-200	NW35CF	70	38	1.5	12.7	CF-2	304L	Kovar	
VPZ38S-LN-200	NW35CF	70	32	1.5	12.7	CF-1	316LN	Kovar	
VPZ38LAS-LN-200	NW35CF	70	38	1.5	12.7	CF-2	316LN	Kovar	
VPZ38S-NM-200	NW35CF	70	32	1.5	12.7	CF-1	316LN	Tantalum	Yes
KVPZ40/32S-200	KF40	55	32	1.5	12.7	KF-1	304L	Kovar	
KVPZ40S-200	KF40	55	38	1.5	18.5	KF-3	304L	Kovar	
KVPZ50S-200	KF50	75	38	1.5	15	KF-3	304L	Kovar	
VPZ64S-200	NW63CF	114	63	2	17.4	CF-1	304L	Kovar	
VPZ64S-LN-200	NW63CF	114	63	2	17.4	CF-1	316LN	Kovar	
VPZ64S-NM-200	NW63CF	114	63	2	17.4	CF-1	316LN	Tantalum	Yes
ISO63SVPZ-200	ISO63	95	38	1.5	12	ISO-1	304L	Kovar	
VPZ100S-200	NW100CF	152	89	2.5	19.9	CF-3	304L	Kovar	
VPZ100S-LN-200	NW100CF	152	89	2.5	19.9	CF-3	316LN	Kovar	
VPZ100S-NM-200	NW100CF	152	89	2.5	19.9	CF-3	316LN	Tantalum	Yes
ISO100SVPZ-200	ISO100	130	63	2	12	ISO-2	304L	Kovar	
VPZ150S-200	NW150CF	203	136	4	22.3	CF-3	304L	Kovar	
VPZ150S-LN-200	NW150CF	203	136	4	22.3	CF-3	316LN	Kovar	
VPZ150S-NM-200	NW150CF	203	136	4	22.3	CF-3	316LN	Tantalum	Yes
ISO160SVPZ-200	ISO160	180	89	2.5	12	ISO-3	304L	Kovar	
VPZ200S-200	NW200CF	254	136	4	24.5	CF-3	304L	Kovar	

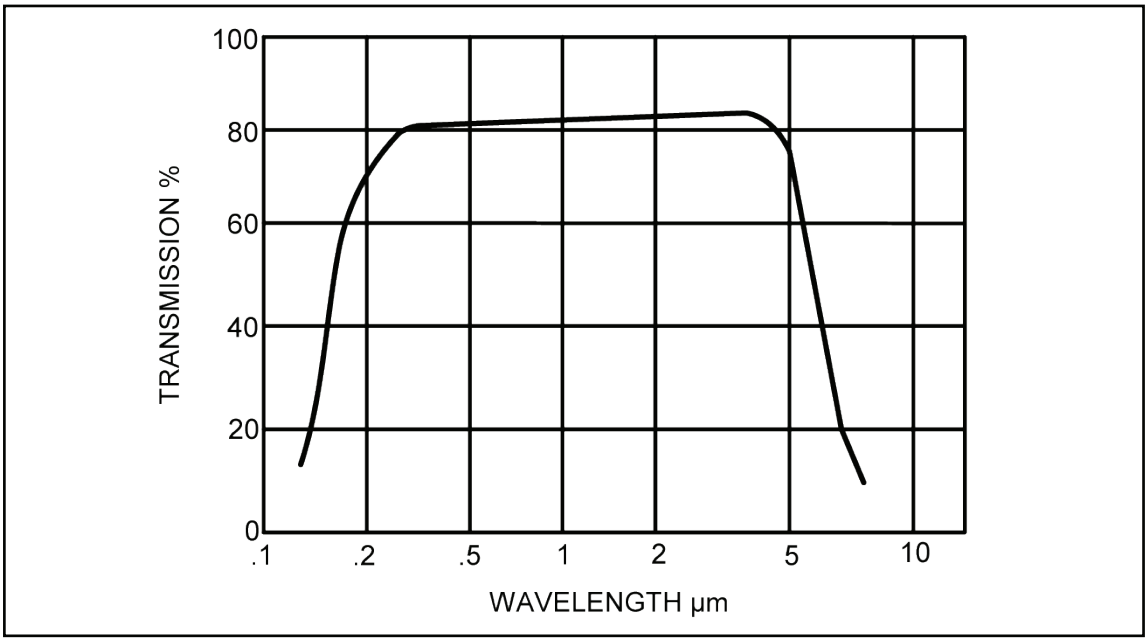
High Temperature Sapphire Zero Length Viewports



Specification	
Seal Type	Braze
Maximum Temperature	450°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	60 /40 scratch/dig
Flatness	< 8λ

Torr Scientific sapphire viewports are offered in CF, ISO and KF flange styles. The viewports comprise a high quality optic with precise flatness, parallelism, scratch and dig specifications. 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. Sapphire has a low coefficient of thermal expansion and low fluorescence, good resistance to thermal shock and scratching making this an excellent material for IR transmitting optics and robust applications. C-cut sapphire is selected for Torr Scientific sapphire viewports to minimise the effects of birefringence. 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 sapphire viewports allows repeated bake-out to 450°C with UHV performance, whilst the window offers broadband optical transmission through vacuum 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 data sheets. 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



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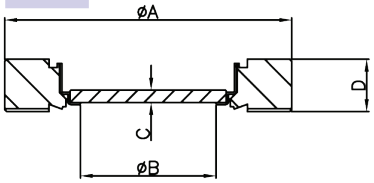
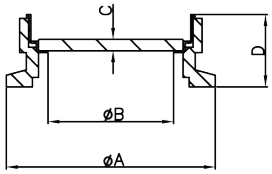
High Temperature Sapphire Zero Length Viewports

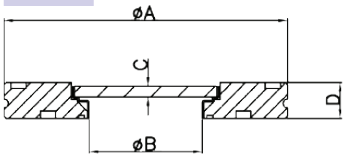
CF-1



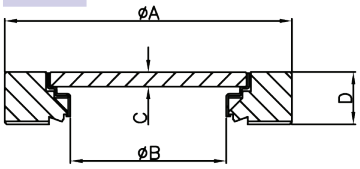
KF-1



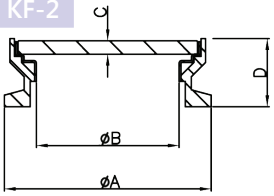
ISO-1



CF-2



KF-2



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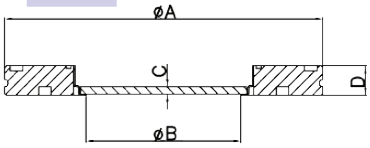
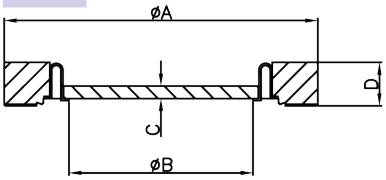
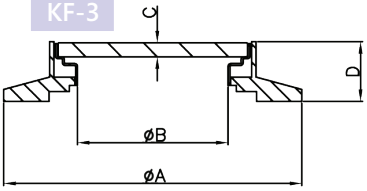


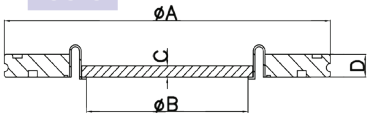
CF-3



KF-3



ISO-3



Part Number	Flange Type	A	B	C	D	Diagram	Flange Material	Weld Ring Material	Non-Magnetic
VPZ16S	NW16CF	34	15	1.5	12.7	CF-1	304L	Kovar	
VPZ16S-LN	NW16CF	34	15	1.5	12.7	CF-1	316LN	Kovar	
VPZ16S-NM	NW16CF	34	15	1.5	12.7	CF-1	316LN	Tantalum	Yes
KVPZ16S	KF16	25	15	1.5	12.7	KF-1	304L	Kovar	
KVPZ25S	KF25	40	20	1.5	18.5	KF-2	304L	Kovar	
VPZ23S	NW35CF	70	23	1.5	12.7	CF-1	304L	Kovar	
VPZ38S	NW35CF	70	32	1.5	12.7	CF-3	304L	Kovar	
VPZ38LAS	NW35CF	70	38	1.5	12.7	CF-2	304L	Kovar	
VPZ38S-LN	NW35CF	70	32	1.5	12.7	CF-1	316LN	Kovar	
VPZ38LAS-LN	NW35CF	70	38	1.5	12.7	CF-2	316LN	Kovar	
VPZ38S-NM	NW35CF	70	32	1.5	12.7	CF-1	316LN	Tantalum	Yes
KVPZ40/32S	KF40	55	32	1.5	12.7	KF-1	304L	Kovar	
KVPZ40S	KF40	55	38	1.5	18.5	KF-3	304L	Kovar	
KVPZ50S	KF50	75	38	1.5	15	KF-3	304L	Kovar	
VPZ64S	NW63CF	114	63	2	17.4	CF-1	304L	Kovar	
VPZ64S-LN	NW63CF	114	63	2	17.4	CF-1	316LN	Kovar	
VPZ64S-NM	NW63CF	114	63	2	17.4	CF-1	316LN	Tantalum	Yes
ISO63SVPZ	ISO63	95	38	1.5	12	ISO-1	304L	Kovar	
VPZ100S	NW100CF	152	89	2.5	19.9	CF-3	304L	Kovar	
VPZ100S-LN	NW100CF	152	89	2.5	19.9	CF-3	316LN	Kovar	
VPZ100S-NM	NW100CF	152	89	2.5	19.9	CF-3	316LN	Tantalum	Yes
ISO100SVPZ	ISO100	130	63	2	12	ISO-2	304L	Kovar	
VPZ150S	NW150CF	203	136	4	22.3	CF-3	304L	Kovar	
VPZ150S-LN	NW150CF	203	136	4	22.3	CF-3	316LN	Kovar	
VPZ150S-NM	NW150CF	203	136	4	22.3	CF-3	316LN	Tantalum	Yes
ISO160SVPZ	ISO160	180	89	2.5	12	ISO-3	304L	Kovar	
VPZ200S	NW200CF	254	136	4	24.5	CF-3	304L	Kovar	