



Description

Hermetic Extended Range Transmission Ports

As its name suggests, an extended range transmission port is an optical component that provides for transmission of radiation in either the ultra violet or infrared portion of the electromagnetic spectrum. Standard viewports made of either fused silica or sapphire have useful transmission from .25 microns to 2.5 or 5.0 microns respectively. Extended range window materials have a combined transmission range from .12 microns to 18 microns.

Of course no single window material can offer good transmission over the entire spectrum. Alkali halides such as calcium fluoride, CaF_2 , or magnesium fluoride, MgF_2 , offer excellent transmission in the deep ultraviolet. Polycrystalline CVD grown infrared transmitting materials such as Zinc Sulfide, ZnS, and Zinc Selenide, ZnSe, transmit radiation out to 14 and 18 microns respectively.

Many factors govern the selection of optical materials for the construction of a high and ultra high vacuum assembly. Whereas quartz and sapphire can be readily metalized and sealed to vacuum flanges by brazing, most optical materials are too weak to join to by the high temperature joining processes. Further, many optically transmitting materials are strongly hygroscopic (such as sodium chloride) or melt at low temperatures (such as glass). The physical and chemical properties of CeramTec's extended range transmission ports have been selected on the basis of optical transmission, vacuum compatibility, strength of materials and widespread usage by optical engineers.

Accordingly, the following materials are offered standard as extended range transmission ports:

Zinc Selenide – Best transmission available at 10.6 micron (CO_2 laser fundamental line) and in the visible. It has some absorption in the blue-green causing it to appear yellow. The index of refraction is high and thus requires anti-reflection coatings on both sides for optimum performance. This polycrystalline, CVD grown material is strong, though relatively soft compared to other crystalline, optical materials. It is non-hygroscopic. ZnSe sublimates at 300°C and reacts violently with strong mineral acids.

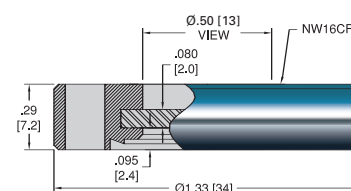
Cleartran™ Zinc Sulfide – Comparable to ZnSe in most respects, only slightly more absorbing at 10.6 microns. Advantage is the transmission in the visible is better, no absorption to only slight absorption in the blue-green thus appearing clear (i.e. not yellow). It is much harder than ZnSe and thus offers increased scratch resistance.

AR Coatings for both ZnSe and ZnS (Cleartran™) are standard and highly recommended for most applications. The exception is possibly for wide range pyrometry or spectrometry where artifacts from the coating materials leave a spectral "fingerprint" in regions beyond the useful transmission range of the coating. The standard coating has been specifically tailored to maximize transmission at 10.6 microns and will also transmit minimally 50% in the visible (i.e. remain at least partially transparent in the visible).

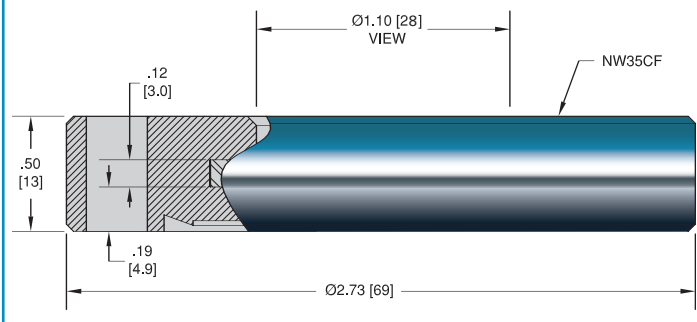
Calcium Fluoride – Best transmission by fluoride crystals in the UV (except very weak LiF). Relatively insoluble (non-to-very-low hygroscopic). Mechanically only slightly weaker than Zinc Selenide and slightly harder. Single crystal material with cubic symmetry, hence no birefringence. Calcium Fluoride is transparent in the visible (appears similar in color to quartz or glass) and in the UV down to 120nm, which services all excimer laser applications. Low index of refraction, which means that the windows rarely require anti-reflective coatings.

Magnesium Fluoride – Next best transmission of fluorides compared to CaF_2 and similar in all other characteristics with the following exceptions. MgF_2 is stronger and harder and is naturally, strongly birefringent.

View Diameter: .50 [13]



View Diameter: 1.10 [28]



Specifications

Materials

Flange: 304 Stainless steel
O-ring: Viton®
Optics: See Table
Magnetic Materials: Yes

Transmission Range 0.12 to 20 Microns (See table)

Temperature Range -8°C to 204°C

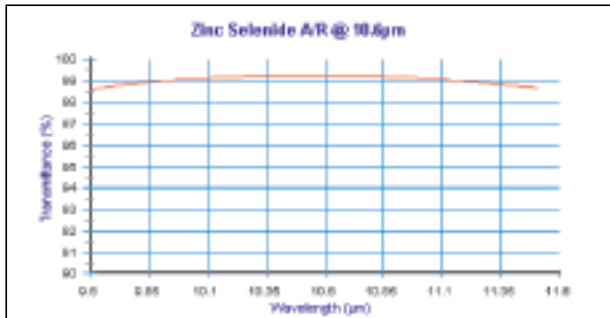
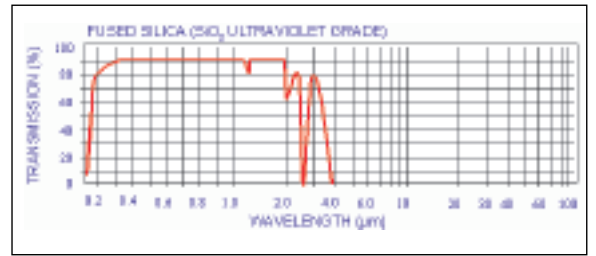
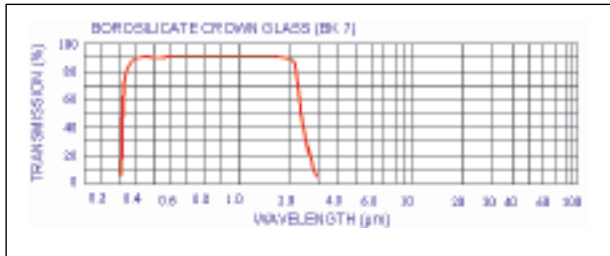
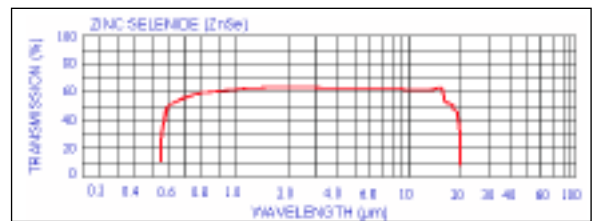
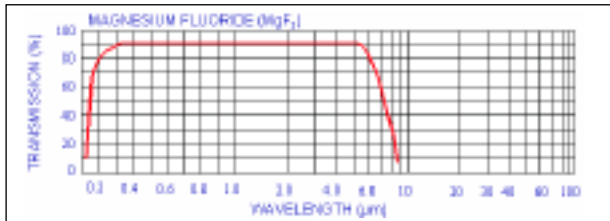
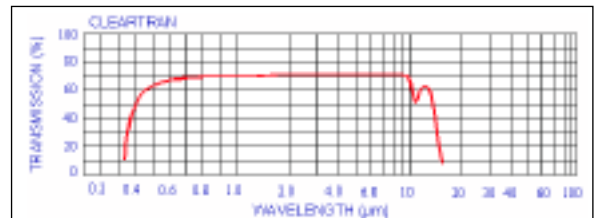
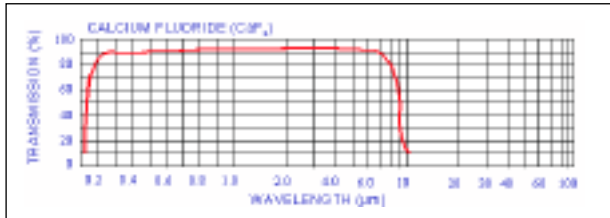


MATERIAL	INSTALLATION	ANTI-REFLECTIVE COATINGS	TRANSMISSION RANGE	TRANSMISSION %MIN	PART NUMBER
Zinc Selenide	1 1/3" (NW16CF)	10.6 Micron	10.6 Micron optimized	98	19485-01-CF
Cleartran™	1 1/3" (NW16CF)	10.6 Micron	10.6 Micron optimized	98	19485-02-CF
Magnesium Fluoride	1 1/3" (NW16CF)	No	0.12 to 7 Microns	-	19485-03-CF
Calcium Fluoride	1 1/3" (NW16CF)	No	0.12 to 9 Microns	-	19485-04-CF
Zinc Selenide	1 1/3" (NW16CF)	No	0.55 to 18 Microns	-	19485-05-CF



Zinc Selenide	2 3/4" (NW35CF)	10.6 Micron	10.6 Micron optimized	98	19163-01-CF
Cleartran™	2 3/4" (NW35CF)	10.6 Micron	10.6 Micron optimized	98	19163-02-CF
Magnesium Fluoride	2 3/4" (NW35CF)	No	0.12 to 7 Microns	-	19163-03-CF
Calcium Fluoride	2 3/4" (NW35CF)	No	0.12 to 9 Microns	-	19163-04-CF
Zinc Selenide	2 3/4" (NW35CF)	No	0.55 to 18 Microns	-	19163-05-CF

Extended Range Transmission Curves



Transmission charts are for reference only. These transmission curves are based on a 10mm window thickness. Thermal gradient should not exceed 10°C/minute.

VIEWPORT

