

Infrared Windows Assemblies for Thermal Imaging

Inspection

Inspection is necessary for high power and high voltage electric installations to avoid the possible accident, the thermal image is found to be the optimal and effective way for this application. In some countries, thermal image inspections is compulsory for accident insurance. And in some industrial equipment like the high temperature metallurgic oven, it is necessary to use the thermal image to watch its temperature inside. An **infrared windows** assembly is needed to be installed on the housing of the electric and industrial equipment as the viewport windows for **thermal image camera**.

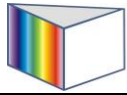
Features

Applications

- High power and high voltage electric installations, switch cabinet;
- High temperature metallurgic oven;
- Mineral and petroleum industry.

Design and standard

- The windows assembly consists of metal flange, crystals windows and metal protective cover;
- The protective cover is fixed by two small magnet nubs;
- The whole windows is fixed on the cabinet house by the flange, no screw is needed;
- Various types of infrared crystals is available: CaF₂; BaF₂; Germanium; Sapphire; Silicon; ZnS; ZnSe (Regarding selection of crystals materials, [Click here](#));
- Confirm to the dust tight standard IP67 of NF EN6052.



Specifications

Materials Used				
Flange	Metal			
Housing or Cover	Metal Materials			
Optics	CaF2, BaF2, Ge, Sapphire, silicon, ZnSe, ZnS windows			
Cover fixing	Fixed by Magnet nub			
Water and dust ingress	IP67 of NF EN60529			
Typical Dimensions				
Models	Body Diameter	Crystals Diameter	Viewing Diameter	Assembly Thickness
SHIRW-60	84 mm	60mm	55mm	22mm
SHIRW-75	99 mm	75mm	70mm	22mm
SHIRW-100	124 mm	100mm	95mm	22mm

Application notes

Installation steps

Step 1: Calculate and decide the position where the windows would be installed according to the view angle of the thermal imagine camera;

Step 2: Drill a hole according to the size of the windows assemblies;

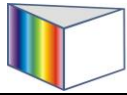
Step 3: Install the whole windows assemblies;

Step 4: Open the protective cover and make the testing of the inspection.

Select the suitable crystals materials for your applications:

Several factors you should take into consideration during the selection of crystals materials: Wavelength range, environment (temperature, humidity and vibration ect.) and cost. Here is the specification of the materials for your reference.

Specifications of Common Materials used in the infrared optics

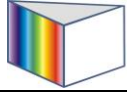


Material	Chemical Symbol	Transmission Wavelength μm	Reflection (Two Surfaces)	Knoop Hardness
Calcium Fluoride	CaF ₂	0.13-10	5%	158
Barium Fluoride	BaF ₂	0.15-12.5	7%	82
Germanium	Ge	1.8-23	53%	780
Zinc Selenide	ZnSe	0.5-22	29%	120
Sapphire	Al ₂ O ₃	0.15-5.5	14%	2000
Silicon	Si	0.14-6	29%	850
IR Polymer	N/A	0.15-22	21%	N/A

Fluoride crystals (CaF₂ and BaF₂) were most common used **infrared windows** materials. They are both hygroscopic, the transmission would be deteriorated for the moisture absorption, but the protective coating on the windows surface is available in Hangzhou Shalom EO to improve its moisture property. CaF₂ is good transmission from 0.2-8 μm , covers the UV to LWIR range, it is often used at the viewport windows in the electric power switch cabinet. BaF₂ is better in transmission (0.3-12 μm), it is often used in the petroleum industry applications.

Germanium and **ZnSe** are among the best broadband infrared transmitters available. The BBAR coated Germanium is good transmission at 1.8-23 μm , which covers the MWIR 3-5 μm and LWIR 7-14 μm range, for the hush environment application, a kind of diamond coating is available to improve its properties. The cost is relatively high for Germanium and ZnSe crystals, they are used in the military and other high demanding applications.

For the **MWIR** (3-5 μm) or middle-wave applications, the sapphire is a good candidate for its good transmission at 0.2-5.5 μm wavelength range and the incredible durability (large hardness), the Silicon crystals is also a good alternative for the MDIR applications, it has good transmission at 1.4-6 μm and it is lower in cost than the sapphire.



Shalom EO
Crystals, optics and components

Hangzhou Shalom Electro-optics Technology Co., Ltd.
