

# IR PENFRARED

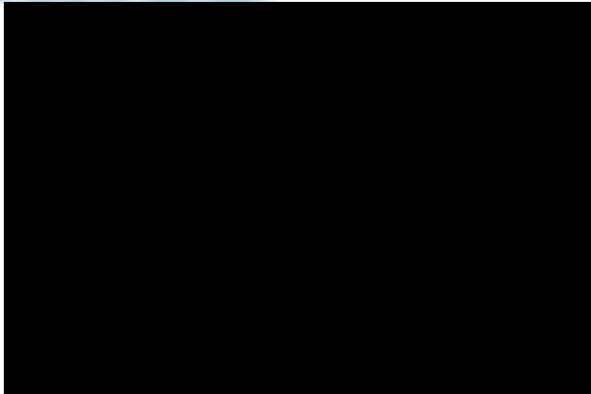
There are a number of crystals available for use as lenses in infrared viewing panes, the most common being Calcium Fluoride (CaF<sub>2</sub>). This has been used for many years in different applications as it has the additional benefit of being transparent and therefore is also used for visual inspections as well as infrared.

We are able to use this material at present as crystals are at present exempt from impact test (if over 1.4 mm) and the impact and flammability requirement is only required on polymeric materials. This standard is for switchgear up to 1.5 kV. This is an area that requires immediate rectification as crystal can not take any form of impact and we are therefore producing IR Viewing Panes using crystals with no structural integrity.

Above 1.5 kV IR Viewing Panes manufacturers can certify to IEEE requirements for Visual Viewing Panes (IEEE standard C37.20.2, specifically the specification required for section A.3.6.) the standard which specifies the minimum MANDATORY test requirement for a viewing pane (see IEEE datasheet). This is the standard that the VPFR and VP12 infrared viewing panes have been built to.

Another disturbing issue is that far too often companies purchase crystal infrared viewing panes as they want to complete the visual inspection of the switchgear and LOTO operations. The crystal can not meet the minimum requirement for impact under the mandatory requirement of IEEE and as such these companies may indeed have inadvertently de-rated their switchgear, infrared viewing panes are not exempt the tests that visual viewing panes require, especially when used in this manner.

The fact that Calcium Fluoride cannot resist impact should be enough to discount it from use in industrial infrared viewing panes, however there are other disturbing issues regarding is that it is hygroscopic (absorbs water) and is affected by high frequency vibration levels. The image to the left is of a Calcium Fluoride crystal in an air-conditioned cabinet that was damaged by moisture, after 2 years the window had zero infrared or visual transmission. We can coat crystals to reduce the ingress of water but this only puts off the inevitable, it is for these reasons that IRISS do not recommend the use of crystals in infrared viewing panes.



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