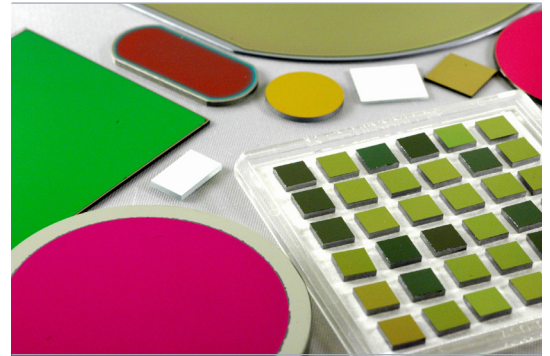




Long-Wave Infrared Filters

LWIR Filters

Materion Balzers Optics is the leading manufacturer of LWIR filters used for temperature measurement and thermal imaging. Our windows and filters can have engineered transmission and reflection between 8 and 14 μm . For LWIR cameras, a window can be coated with an anti-reflective coating on one face and a longpass filter on the other face. Our filters can be metallized to be compatible with hermetic solder assembly. Materion Balzers Optics can also supply LWIR windows soldered into a Kovar frame or conical housing. Materion Balzers Optics can coat $\text{\O} 200 \text{ mm}$ Si window cavity wafers for bonding onto microbolometer ROIC wafers. Narrow bandpass filters in the LWIR are also available, with a bandwidth to center wavelength ratio down to 1%.



Benefits

- High transmittance in the LWIR passband
- Blocking of shorter wavelengths
- Long-term, shift-free spectral performance
- High environmental stability
- Metallization to enable hermetic soldering
- Solder assembly into Kovar frames or housings
- $\text{\O} 200 \text{ mm}$ wafers for wafer-level packaging

Applications

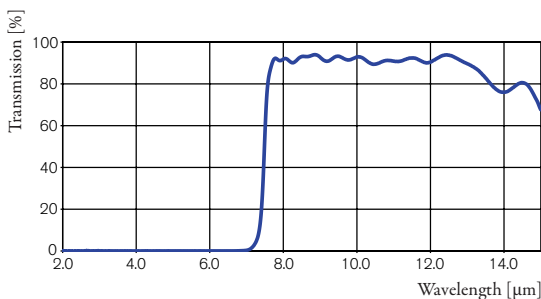
LWIR windows and filters are used for thermal imaging cameras. Such cameras can be used to measure the temperature of exposed human skin (e.g., foreheads) for the detection of fevers. LWIR cameras are also used to detect heat leaks in building insulation, overheated transformers or circuit breakers. LWIR cameras are used for surveillance, to detect humans and vehicles at night. LWIR cameras can also see through fog and are commonly used as a navigation aid aboard cars, trucks, ships and aircraft.

Technical Data

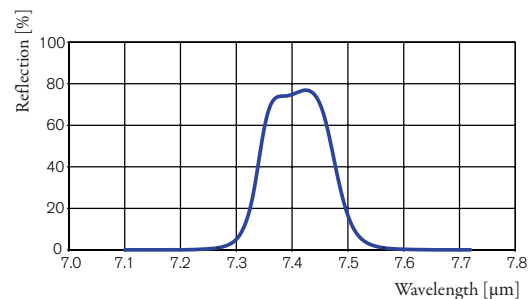
LWIR Window

Wavelength	8 to 12 μm
Transmittance	$T > 80\%$
Blocking	1 – 7 μm OD2 typical
Angle of Incidence	(according to requirements) standard 0° (different AOI on request)
Bandpass filter	Bandwidth/CWL ratio down to 1%
Substrate	Si, Ge or ZnS
Dimensions	Up to $\text{\O} 200 \text{ mm}$ Si, other sizes upon request
Surface Defects	S/D 40/20
Environmental Stability	Temperature -40°C to $+150^\circ\text{C}$ Humidity up to 99%

LWIR Window



Narrow Bandpass filter



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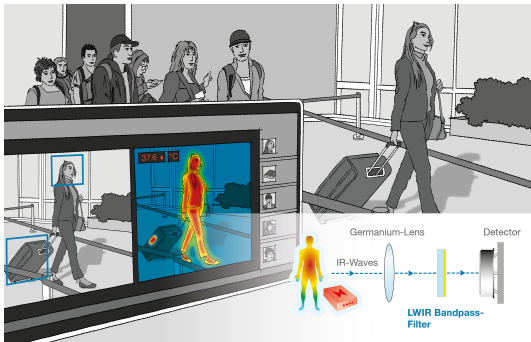


Fig. 1: LWIR filters are used in cameras for thermal imaging.

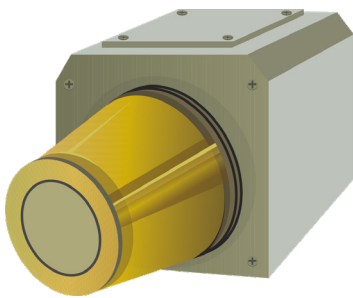


Fig. 2: MBO can solder the LWIR windows into Kovar cones for hermetic sealing onto LWIR detectors or cameras.