



Mid-Wave Infrared Filters

MWIR Filters

Materion Balzers Optics is a leader in MWIR filters used for a wide variety of applications. We offer a number of narrowband filters for measurement of various gases and vapors by non-dispersive infrared spectroscopy. We also offer narrow and wideband filters used for measurement of temperature and flame detection. For MWIR cameras, a window can be coated with an anti-reflective coating on one face and a longpass filter on the other face.



Benefits

- Highly repeatable center wavelength
- Narrow bandwidth available
- High transmittance in the passband
- Long-term, shift-free spectral performance
- High environmental stability
- Customized filter sizes
- Anodized Al rings available for round filters

Applications

Non-dispersive infrared spectroscopy is used to detect and quantify the concentration of a wide variety of gases and vapors. Medical applications include quantitative measurement of CO₂ in a person's exhaled breath for capnography, and quantitative sensing of various anesthesia gases. Industrial applications include sensing of CH₄, C₂H₆O, CO, NO, NO₂ and other gases. MWIR cameras are used for a variety of applications, including identifying and quantifying methane emissions, flame detection as well as for night vision.

Technical Data

Wavelength	3 to 5 μm
Transmittance	T > 80 – 95% (depending on wavelength range)
Blocking	up to OD4
Angle of Incidence	standard 0° (different AOI on request)
Bandwidth	down to 25 nm, typical
Substrate	Fused Silica, Sapphire, Si, Ge or ZnS
Dimensions	Up to Ø 200 mm Si, other sizes upon request
Surface Defects	S/D 40/20
Environmental Stability	Temperature -40 °C to +150 °C Humidity up to 99%

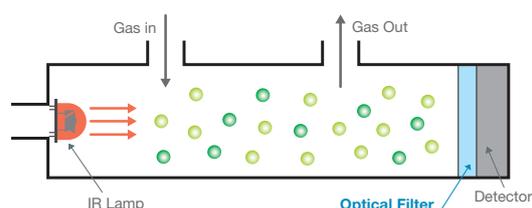
Quantitative Gas Measurement



Gas Sensing



Mid-Wave Infrared Filters to quantify gas concentration



Center Wavelength	Vapor or Gas	Application
NB – 1640 nm	H ₂ O	Chemicals and minerals
NB – 1810 nm		Tobacco products
NB – 1940 nm		Lumber
NB – 4530 nm	N ₂ O	Combustion Effluent
NB – 5300 nm	NO	Combustion Effluent
NB – 6100 nm	N ₂ O	Combustion Effluent
NB – 7350 nm	SO ₂	Steel Production
NB – 8400 nm	Freon	Refrigeration
NB – 10270 nm		
NB – 10900 nm		
NB – 4640 nm	CO	Air quality, mining
NB – 4260 nm	CO ₂	Capnography
NB – 3450 nm	C ₂ H ₆ O	Breathalyzer
NB – 3330 nm	CH ₄	Natural Gas Leak Detection
NB – 10530 nm	NH ₃	Industrial

Table 1: MWIR Narrowband filters are available to detect these common vapors and gases.

Performance and Repeatability

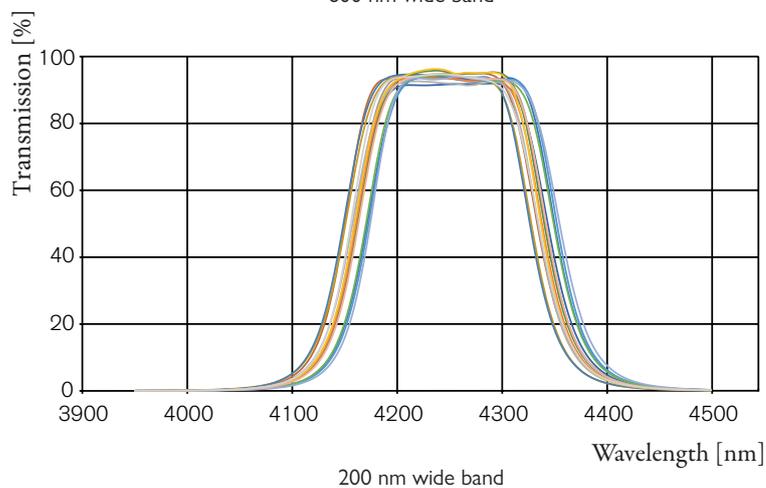
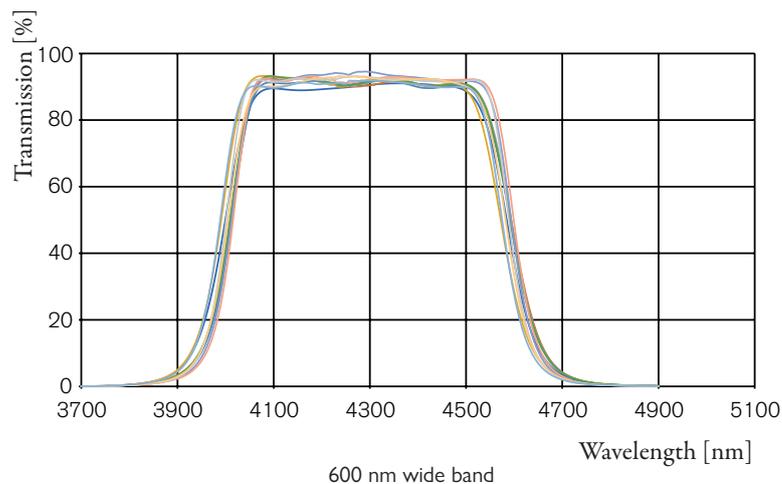


Fig. 1: Production data on CO₂ filters (CWL = 4260nm) with different pass bands. Spectra are from 10 different production runs + theoretical.