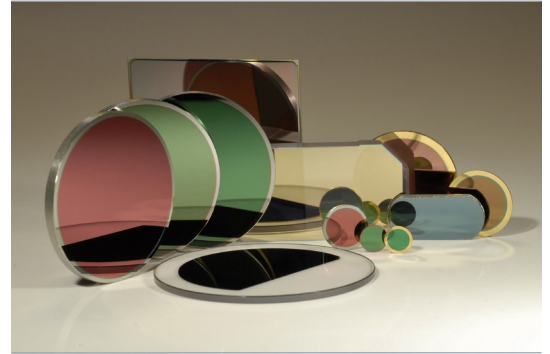




Mid-Wave Infrared Filters

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

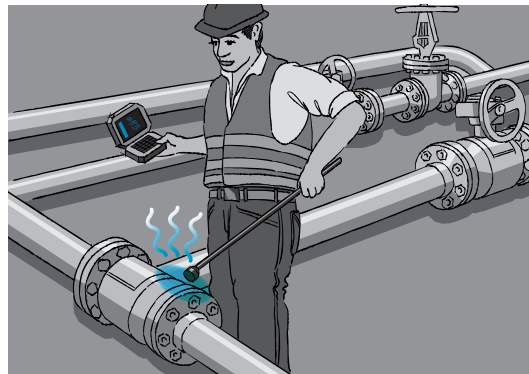
Applications

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.

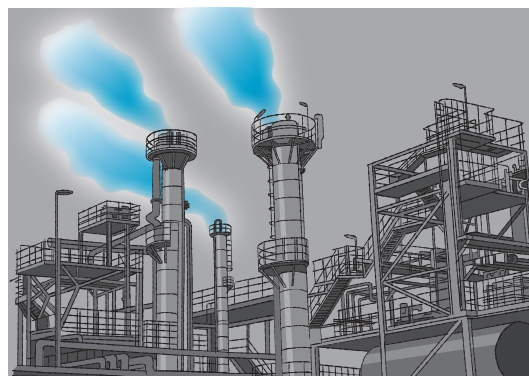
Technical Data

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 \O 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%

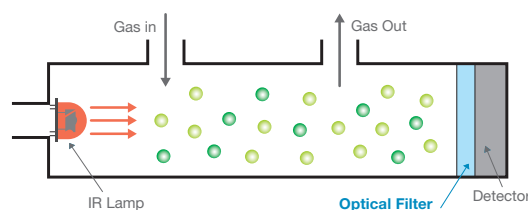
Quantitative Gas Measurement



Gas Sensing



Mid-Wave Infrared Filters to quantify gas concentration



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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

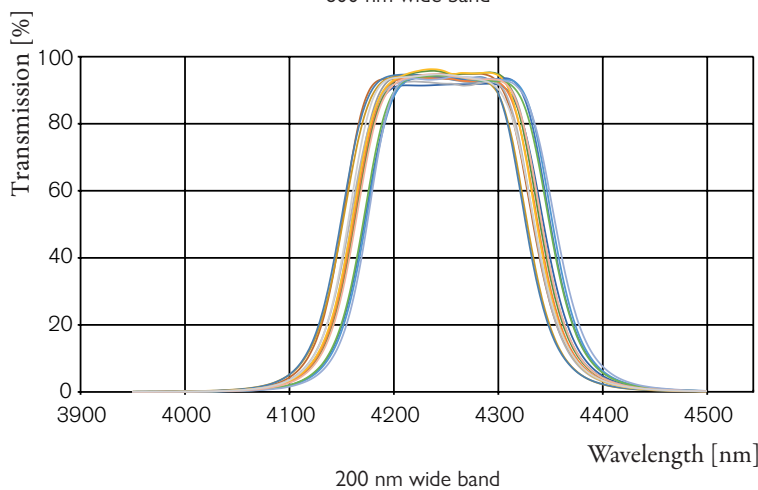
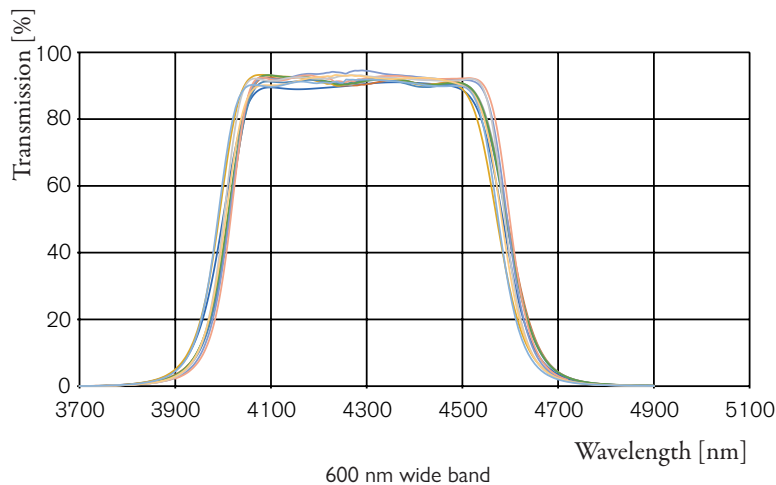


Fig. 1: Production data on CO₂ filters (CWL = 4260nm) with different pass bands. Spectra are from 10 different production runs + theoretical.

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