

IR Filters and Windows

Description:

The detector window has to fulfill two functions:

- Define the spectral sensitivity of the pyroelectric chip according to the purpose of the application (between UV to far IR)
- Provide a reliable hermetic seal of the optical interface between detector and environment (leakage rate < $5 \cdot 10^{-9}$ Pa·l/s Helium)

Thermopile detectors are available with the following window versions:

- Standard single crystal windows
- Silicon Windows
- Standard narrow band pass filters (NBP)
- Custom-designed filters or filters provided by the customer

The following is an overview of standard filters and their typical spectral scans.

Crystal windows:

Description	Transmission	Transmission Range	Environment Resistance
Calcium fluoride CaF ₂	+	UV ... 9µm	0
Calcium fluoride CaF ₂	+	UV ... 8µm	0
Barium fluoride BaF ₂	+	UV ... 12µm	0
Cesium iodide, protected CsI	0	UV ... 50µm	-
Potassium bromide, protected KBr	+	UV ... 30µm	-
Sapphire uncoated	-	UV ... 5µm	+
Silicon uncoated Si	-	1.1 ... 50µm	+

Coated silicon windows:

Description	Transmission Type	Transmission Range	Environment Resistance
Coated silicon	Antireflection	2.0 ... 5.0 µm	+
Coated silicon	Antireflection	3.0 ... 14.0 µm	+
Silicon WBP	Band Pass	8.0 ... 14.0 µm	+

Durability:

Adhesion MIL-F-48616 / section 4.6.8.1.

Humidity MIL-F-48616 / section 4.6.8.2.

Abrasion resistance MIL-F-48616 / section 4.6.8.3.



Electro Optical Components, Inc

5460 Skylane Boulevard, Santa Rosa, CA 95403

Phone: (707) 568-1642 • FAX: (707) 568-1652

www.eoc-inc.com

Narrow Band Pass Filters (NBP)

NBP Filters are made by default from silicon or germanium substrate. These filters feature an excellent blocking in the short-wave (UV to NIR). Please note that an out-of-band transmission in the range > 10 μ m (long wave IR) is an always existing undesirable side effect and not shown in scans of this catalog.

Gas	CWL / μ m	Tolerance of CWL / nm	HPBW / nm	Tolerance of HPBW / nm
CO	4.66	\pm 40	180	\pm 20
CO ₂ high AOI	4.27	\pm 30	170	\pm 20
CO ₂ long path	4.45	\pm 20	60	\pm 20
CO ₂ narrow	4.24	\pm 40	90	\pm 20
CO ₂ standard	4.24	\pm 40	180	\pm 20
Flame (hydrocarbon)	4.30	\pm 30	600	\pm 30
HC	3.40	\pm 30	120	\pm 20
Methane	3.33	\pm 20	160	\pm 20
NO _x	5.30	\pm 40	180	\pm 20
Reference	3.95	\pm 40	90	\pm 20
SO ₂	7.30	\pm 40	200	\pm 30

Durability :

Adhesion MIL-F-48616 / section 4.6.8.1.
Humidity MIL-F-48616 / section 4.6.8.2.
Abrasion resistance MIL-F-48616 / section 4.6.8.3.

Temperature shift of CWL:

+0.1 ... +0.9 nm/K

CWL shift:

-10 ... -30 nm at 15° AOI
-40 ... -100 nm at 30° AOI
-100 ... -180nm at 45° AOI



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