

## Description Infrared Filters

### *Preliminary Version*



The filters of the detectors determine the frequency range of the infrared radiation which is detected by the sensitive element of the sensor. The wavelength range of the filters is mainly defined by the target application. The filters are primarily characterized by their centre wavelength and the full width at half maximum.

Micro-Hybrid Electronic GmbH offers the following different types of filters:

- a) Single crystal infrared filters
- b) Broad band pass filters (BBP)
- c) Narrow band pass filters (NBP)
- d) Specific filters provided by the customer

Not all filters can be combined with all detectors offered by MHE due to their different geometrical dimensions and environmental durability. Please confirm your selected filters with MHE before you finally order.

The following tables give an overview about our standard filters and their specific characteristics.

- a) Single crystal infrared filters

Material	Transmission range	Code	Comment
Sapphire	UV - 5 $\mu\text{m}$	A1	
Calcium fluoride	UV - 8 $\mu\text{m}$	A2	
Germanium	2 - 16 $\mu\text{m}$	A3	ARC

*Micro-Hybrid Electronic GmbH*

*Heinrich-Hertz-Straße 8  
D-07629 Hermsdorf*

*Tel +49 366 01 592 100  
Fax +49 366 01 592 110*

*Email: [infrared@micro-hybrid.de](mailto:infrared@micro-hybrid.de)  
Web: [www.micro-hybrid.de](http://www.micro-hybrid.de)*

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### b) Broad band pass filters (BBP)

Description	50% cut on	50% cut off	Code	Application
8-14 $\mu\text{m}$	8 $\mu\text{m}$	14 $\mu\text{m}$	B1	Temperature measurement

### c) Narrow band pass filters (NBP)

This NBP filters are mainly based on silicon, sapphire or germanium substrates. They have an excellent blocking behaviour in the range from UV-NIR.

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Centre Wavelength (CWL) [nm]	CWL Wavelength tolerance [nm]	Half Bandwidth [nm]	Half Bandwidth Tolerance [nm]	Code	Application
4280	+/- 40	207	+/- 20	C1	Flame detection
4990	+/- 50	265	+/- 35	C2	Flame detection
4000	+/- 40	80	+/- 15	D1	Reference
3910	+/- 20	80	+/- 10	D2	Reference
3910 <sup>1)</sup>	+/- 39	90	+/- 20	D3	Reference
4265	+/- 40	110	+/- 15	E1	CO <sub>2</sub>
4260	+/- 10	200	+/- 10	E2	CO <sub>2</sub>
4420	+/- 20	60	+/- 10	E3	CO <sub>2</sub>
4260 <sup>1)</sup>	+/- 43	180	+/- 20	E4	CO <sub>2</sub>
4650	+/- 40	180	+/- 20	F1	CO
4640 <sup>1)</sup>	+/- 46	180	+/- 20	F2	CO
3450	+/- 40	140	+/- 15	G1	HC
3400	+/- 20	140	+/- 20	G2	CH <sub>4</sub> & HC
3375 <sup>1)</sup>	+/- 34	190	+/- 10	G3	HC
3300 <sup>1)</sup>	+/- 66	160	+/- 20	G4	CH <sub>4</sub>
7300	+/- 20	180	+/- 20	H1	SO <sub>2</sub>

1) Only applicable for PS4x2C1-A-S1.4

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#### d) Specific filters provided by the customer

Micro-Hybrid Electronic Company offers the possibility to manufacture detectors with customer specific filters. Following points have to be considered:

- It is preferable that the filters are already cut to the size that is expected. The geometries and tolerances for the multichannel detectors are 2.0x2.0 mm with a tolerance of +0/-0.05 mm. The thickness should be 0.5 mm +/- 0.05 mm. For single channel detectors the size of the filters is mainly depending on the aperture opening of the cap. In general it is also possible that MHE takes over the cutting process which is charged with additional costs. In this case MHE cannot guarantee a defined yield of the cutting process due to difficulties observed by cracking of the substrate (for hard substrate material like sapphire) or peeling of filter layers. In general, please contact MHE regarding customized filters.
- The needed amount of filters according to the ordered detectors is an additional 10%. For sample orders (<10) 5 additional filters are necessary.
- The following packaging of the filters is preferred: waffle pack or wafer tape (on blue tape / UV tape foil)

The product code of the detectors is created in the following way:

Sensor Type (AA) Number of Channels (Bx) Chip type (CCCCC) - Package (D) - Aperture (EEE) - Thermistor (F) - Backfill Gas (GG) - Filters (H/H/H/H) - Extended Temperature Range (III)

For example: TS4xQ200B-A-S1.5-1-N2-A1/B1/C1/D1

The sensor package, the number of channels, the chip type, package and aperture are defined in the additional datasheets of the detectors.

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