

Pyroelectric and Multi-spectral Detectors

IR filters and windows

New extension code table (valid for all standard detectors)

Type	Old code	New code	Type	Old code	New code
Si ARC 2.0 - 5.0 μm	V	10	CaF ₂ 0.4mm thick	Q	60
Si ARC 3.0 - 5.5 μm	none	11	CaF ₂ 0.7mm thick	A	61
Si ARC 3.0-14.0 μm	P	12	CaF ₂ 1.0mm thick	none	62
Si WBP 3.0- 5.0 μm	S	13	BaF ₂ 0.4mm thick	M	63
Si WBP 8.0-14.0 μm	B	14	BaF ₂ 1.0mm thick	none	64
Si LWP 5.3 μm	W	15	CsI 0.8mm thick	K	65
Si LWP 6.5 μm	N	16	KBr 0.8mm thick	J	66
Si LWP 7.3 μm	O	17	KBr 1.0mm thick	none	67
			Sapphire 0.4mm thick	none	68
			Sapphire 0.6mm thick	R	69
			Si uncoated	none	70
Standard NBP					
Gas	Unmodified code	Gas	Unmodified code		
CO	I	HC	G		
CO ₂ high AOI	Z	Methane	C		
CO ₂ long path	E	NO _x	L		
CO ₂ narrow	T	Reference	H		
CO ₂ standard	D	SO ₂	U		
Flame (hydrocarbon)	F	customized detectors	X###		

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New, extended name generation for InfraTec standard detectors:

	Filter channels					Aperture
	Channel 1	Channel 2	Channel 3	Channel 4		
Single channel (LIE, LME)	X					
Examples:	LIE-316-10; LME-341-F					
Dual channel without Beamsplitter (LIM, LMM)	X	X				
Examples:	LIM-222-DI; LMM-242-ZH					
Dual channel with Beamsplitter (LIM)	X	X				X
Examples:	LIM-032-ZI-10; LIM-052-TH-10					
Quad channel without Beamsplitter (LIM, LMM)	X	X	X	X		
Examples:	LIM-314-GDIL; LMM-244-HDIL					
Quad channel with Beamsplitter (LIM)	X	X	X	X		X
Examples:	LIM-011-HGDL-11; LIM-054-HGEI-10					

The detector name will be determined by the detector type and the filter code according to the extended table code.

The filters will be arranged in ascending order of the center wave length (CWL).

In dual channel detectors Reference will always be placed in channel 2, in quad channel detectors Reference will always be placed in channel 1.

All other filter arrangements will result in customized X### detectors.

Please confirm description with InfraTec before ordering.

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New extension code table - multi-color detectors – conversion from old to new description :

	Old code	New Code	Channel 1	Channel 2	Channel 3	Channel 4	valid for
Dual channel detectors	A	DI	CO ₂ standard	CO	X	X	LIM-112; LIM-212; LIM-312; LIM-122; LIM-222; LIM-162; LIM-262; LMM-242
	B	DH	CO ₂ standard	Reference			
	C	IH	CO	Reference			
	D	GH	HC	Reference			
	E	LH	NO _x	Reference			
	F	EH	CO ₂ long path	Reference			
	G	TH	CO ₂ narrow	Reference			
	H	ZH	CO ₂ high AOI	Reference			
	X###	X###	customized detectors				
Dual channel detectors with beamsplitter	F	ZI-10	CO ₂ high AOI	CO	X	X	LIM-012; LIM-032; LIM-052
	G	IH-10	CO	Reference			
	H	GH-10	HC	Reference			
	I	TH-10	CO ₂ narrow	Reference			
	J	EH-10	CO ₂ long path	Reference			
	K	ZH-10	CO ₂ high AOI	Reference			
	L	CH-10	Methane	Reference			
	X###	X###	customized detectors				
Quad channel detectors without beamsplitter	A	HGDI	Reference	HC	CO ₂ standard	CO	LIM-114; LIM-214; LIM-314; LMM-244
	B	GDIL	HC	CO ₂ standard	CO	NO _x	
	C	HDIL	Reference	CO ₂ standard	CO	NO _x	
	D	HGIL	Reference	HC	CO	NO _x	
	E	HGDL	Reference	HC	CO ₂ standard	NO _x	
	F	HGEI	Reference	HC	CO ₂ long path	CO	
	X###	X###	customized detectors				
Quad channel detectors with beamsplitter	E	GZIL-11	HC	CO ₂ high AOI	CO	NO _x	LIM-011; LIM-054
	F	HGZI-10	Reference	HC	CO ₂ high AOI	CO	
	G	HZIL-11	Reference	CO ₂ high AOI	CO	NO _x	
	H	HGIL-11	Reference	HC	CO	NO _x	
	I	HGEI-10	Reference	HC	CO ₂ long path	CO	
X###	X###	customized detectors					

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Description:

The detector window has to fulfill two functions:

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

InfraTec detectors are available with the following window versions:

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

The following pages will provide an overview of our standard filters and their typical spectral scans.

Standard crystal windows:

Type	Code	Description	Transmission	Transmission range	Environment resistance
CaF ₂ 0.4mm thick	60	calcium fluoride	+	UV... 9μm	o
CaF ₂ 0.7mm thick	61	calcium fluoride	+	UV... 8μm	o
CaF ₂ 1.0mm thick	62	calcium fluoride	+	UV... 8μm	o
BaF ₂ 0.4mm thick	63	barium fluoride	+	UV... 12μm	o
BaF ₂ 1.0mm thick	64	barium fluoride	+	UV... 12μm	o
CsI 0.8mm thick	65	cesium iodide, protected	o	UV... 50μm	-
KBr 0.8mm thick	66	potassium bromide, protected	+	UV... 30μm	-
KBr 1.0mm thick	67	potassium bromide, protected	+	UV... 30μm	-
sapphire 0.4mm thick	68	sapphire uncoated	-	UV ... 5μm	+
sapphire 0.6mm thick	69	sapphire uncoated	-	UV... 5μm	+
Si uncoated	70	silicon uncoated	-	1.1... 50μm	+

Standard coated silicon windows

Type	Code	Description	Transmission type	Transmission range	Environment resistance
Si ARC 2.0 - 5.0μm	10	coated silicon	antireflection	2.0... 5.0μm	+
Si ARC 3.0 - 5.5μm	11	coated silicon	antireflection	3.0... 5.5μm	+
Si ARC 3.0 -14.0μm	12	coated silicon	antireflection	3.0... 14.0μm	+
Si WBP 3.0 - 5.0μm	13	silicon WBP	band pass	3.0... 5.0μm	+
Si WBP 8.0-14.0μm	14	silicon WBP	band pass	8.0... 14.0μm	+
Si LWP 5.3μm	15	silicon LWP	long wave pass	6.0... 15.0μm	+
Si LWP 6.5μm	16	silicon LWP	long wave pass	7.0... 14.0μm	+
Si LWP 7.3μm	17	silicon LWP	long wave pass	8.0... 15.0μm	+

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.

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Standard narrow band pass filters:

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 $> 10\mu\text{m}$ (long wave IR) is an always existing undesirable side-effect and not shown in scans of this catalog.

Gas	Code	CWL / μm	Tolerance of CWL / nm	HPBW / nm	Tolerance of HPBW / nm
CO	I	4.66	± 40	180	± 20
CO ₂ high AOI	Z	4.27	± 30	170	± 20
CO ₂ long path	E	4.45	± 20	60	± 20
CO ₂ narrow	T	4.24	± 40	90	± 20
CO ₂ standard	D	4.24	± 40	180	± 20
Flame (hydrocarbon)	F	4.30	± 30	600	± 30
HC	G	3.40	± 30	120	± 20
Methane	C	3.33	± 20	160	± 20
NO _x	L	5.30	± 40	180	± 20
Reference	H	3.95	± 40	90	± 20
SO ₂	U	7.30	± 40	200	± 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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