



# Process Flow Cells

EMPOWERING ENGINEERS TO INCREASE PERFORMANCE AND EFFICIENCY  
BY PAT THROUGH OPTICAL SPECTROSCOPY

Process Analytical Technologies (PAT) will help you keep an eye on your production process. With their process flow cells and immersion probes, Hellma provides the optical equipment best suited to the requirements of your specific process.

With optical in-line measurements you will receive continuous information about the quality of your product. Within seconds this data can be turned into action to control and adjust your process to give a consistent and reproducible end-product.

Key to success is a precise yet robust spectroscopic interface. The process flow cells can be placed in a pipe directly in the product stream. Choosing the suitable measurement setup and compatible materials, enables the flow cells to be tailored to your specific needs.

## Benefits:

- // Wide configuration to meet varied customer demands
- // Built from standard parts and materials
- // Precise alignment through fixed components
- // Robust construction with brazed windows

Beside of the standard flow cells Hellma offers an engineering service to design customized solutions. These may vary in form or material to offer the optimal solution to your requirements.





MODEL	e			<b>E</b> Excalibur (transmission)
	f			<b>F</b> Falcata (Optical path length = 2 x gap distance)
	g			<b>G</b> Gladius (reflection)
	k			<b>K</b> Katana (ATR)
OPTICAL PATH LENGTH	e			<b>G</b> 0.5 mm
	e	f		<b>A</b> 1 mm
	e	f		<b>B</b> 2 mm
	e			<b>H</b> 3 mm
	e			<b>I</b> 4 mm
	e	f		<b>C</b> 5 mm
	e	f		<b>D</b> 10 mm
	e	f		<b>E</b> 20 mm
MEASURING		g		<b>A</b> Distance (2 mm)
		g		<b>B</b> Contact
ATR-PRISM			k	<b>A</b> 3-Bounce
OPTICAL MATERIAL		g		<b>Q</b> Quartz
	e	f	g	<b>S</b> Sapphir
BODY MATERIAL	e			<b>E</b> Stainless Steel 1.4571 (316 Ti)
	e	f	g	<b>H</b> Hastelloy C-22 (2.4602)
		f	g	<b>E</b> Stainless Steel 1.4435 (316 L)
		f	g	<b>T</b> Titanium Grade 2
SEALING	e	f	g	<b>B</b> Brazed
				Sealed: with flange adapter and PG13,5 probe from configurator
FIBER OPTICAL				NIR (400 nm – 2300 nm) 7 x 200 / 1 x 600 (2 x SMA)
CABLE CONFIGURATION		g		<b>J</b> NIR (400 nm – 2300 nm) 7 x 400 / 1 x 600 (2 x SMA)
		g		<b>K</b> NIR (400 nm – 2300 nm) 7 x 600 / 7 x 600 (2 x SMA)
		g		<b>L</b> NIR (400 nm – 2300 nm) 7 x 600 / 7 x 600 (14 x SMA)
		g		<b>M</b> UVs/Vis (240 nm – 1100 nm) 7 x 200 / 1 x 600 (2 x SMA)
		g		<b>O</b> UVs/Vis (240 nm – 1100 nm) 7 x 400 / 1 x 600 (2 x SMA)
		g		UVs/Vis (240 nm – 1100 nm) 7 x 600 / 1 x 600 (2 x SMA)
SPECTRAL RANGE	e	f	k	<b>N</b> NIR (400 nm – 2300 nm)
	e	f	k	<b>L</b> UVs/Vis low solarization (240 nm – 1100 nm)
FIBER OPTICAL CONNECTION	e			Female sockets for SMA (no external fibers) and PMA NW 17 housing
	e			Female sockets for SMA (no external fibers) and ATEX PMA NW 17 housing
		f	k	<b>S</b> Female sockets for SMA (no external fibers) and PMA NW 23 housing
		f	k	<b>A</b> Female sockets for SMA (no external fibers) and ATEX PMA NW 23 housing
		g		<b>E</b> 2 m fiber optical cables with SMA connectors and PMA NW 23 housing
		g		<b>B</b> 2 m fiber optical cables with SMA connectors and ATEX PMA NW 23 housing
	e	f	k	<b>E</b> 2 m fiber optical cables with SMA connectors and PMA NW 17 housing
	e	f	k	<b>B</b> 2 m fiber optical cables and with SMA connectors ATEX PMA NW 17 housing
		g		<b>F</b> Female sockets for SMA (no external fibers) and PMA NW 23 housing (only for 7*200/1*600 configuration)
PROCESS CONNECTION	e	f	g	<b>B</b> Similar EN 1092-1/05/A/DN 25/PN 40 with flange thickness 30 mm
	e	f	g	<b>L</b> Similar EN 1092-1/05/A/DN 40/PN 40 with flange thickness 30 mm
	e	f	g	<b>C</b> Similar EN 1092-1/05/A/DN 50/PN 40 with flange thickness 30 mm
	e	f	g	<b>D</b> Similar EN 1092-1/05/A/DN 80/PN 40 with flange thickness 30 mm
	e	f	g	<b>E</b> Similar ANSI/ASME B16.5/1"/150 lbs/RF with flange thickness 30 mm
	e	f	g	<b>F</b> Similar ANSI/ASME B16.5/1.5"/150 lbs/RF with flange thickness 30 mm
	e	f	g	<b>H</b> Similar ANSI/ASME B16.5/2"/150 lbs/RF with flange thickness 30 mm
	e	f	g	<b>I</b> Similar JIS B 2220 with flange thickness 30 mm (details on request)
	e	f	g	<b>J</b> Similar GOST 12815-80 with flange thickness 30 mm (details on request)
TEMPERATURE RANGE	e	f	g	<b>L</b> 5 °C to 180 °C
	e	f	g	<b>H</b> -80 °C to 300 °C (only with brazed Titanium and Sapphire)
PRESSURE RANGE	e	f	g	According to flange specifications
INNER DIAMETER	e	f	g	<b>X X X</b> 010 mm – 090 mm (depending on flange size)
PURGING	e	f	g	<b>N</b> No
	e	f	g	<b>Y</b> Yes
ARTICLE-NO.				

**If you have any questions please feel free to contact us.**  
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