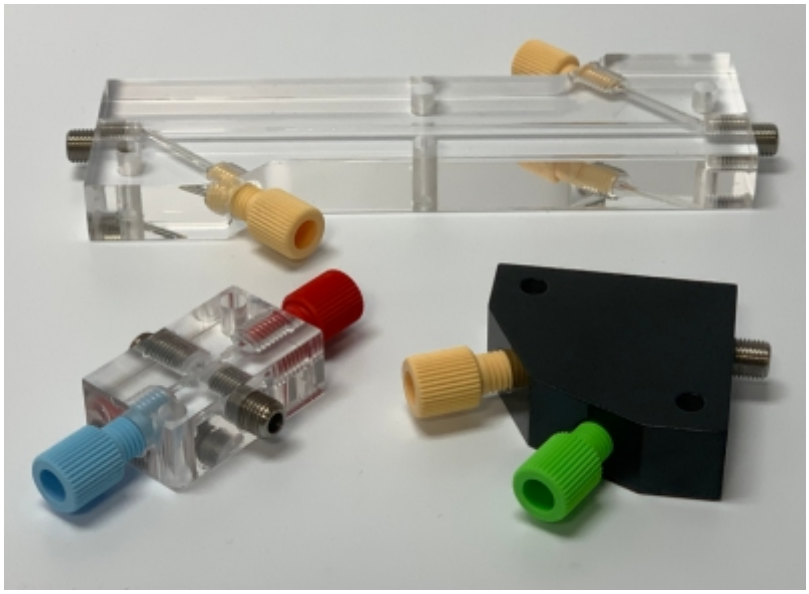
# Let it Flow! Explore Avantes Flow Cells



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Part of the value of optical spectroscopy is in its ability to be integrated inline or in-process to provide for real-time data and controls over processes. An invaluable tool in this endeavor for real-time spectral information is the flow cell. Given the variety of environments where spectroscopy can be applied to liquid and gas phase samples, there is an equally broad variety of flow cell options to consider.

**Industrial Measurements**

Inline industrial measurements often require high-performance flow cells which are designed for long term reliability under harsh conditions. Avantes offers the Flowcell-1/4", Flowcell-1/2", Flowcell-1" for entry-level industrial flow cells. These cells are relatively high capacity (62 - 248 microliter range) cells built from Swagelok 316 Stainless components. These cells are designed for a maximum of 80 degrees C temperature and 10 bar pressure. These cells are designed for coupling into line sizes ranging from ¼" to 1". For medium duty applications, the Flowcell-1/4"-5/5-HPHT high temperature and pressure cells are offered. These cells support 200 degrees C and 100 bar pressure and may be used for gas or liquid phase samples. For customers with more demanding applications in harsh environments, Avantes USA offers the Flowcell-1/4"-IND-HPHT which is a specialized cell which can be configured to a range of pathlengths from 0.05 – 1000 mm and are rated for pressure up to 207 bar and temperature up to 280 degrees C. All industrial flow cells are designed for coupling to any of our fiber optic cables which feature our unique broadband fiber which is suitable for transmission from 200-2500 nm.

**Microfluidic Laboratory and Industrial Cells**

Many biomedical and specialty chemical applications require low volume cells for analysis. Microflow cells provide for the ideal solution for low volumetric flow rates. Avantes offers a variety of microfluidic cells to support these applications. The flowcell-z-10 and Flowcell-1.5 are low cost PEEK flow cells designed for use with Avantes specialized stainless steel ferrule terminated fibers (eg – FC-UV400-1-FIA) which serve as the optical windows for the cells. For biological applications or where contact with metal may not be suitable for the sample the Flowcell-1mm-PEEK, Flowcell-5mm-PEEK and Flowcell-10mm-PEEK are designed for coupling with SMA terminated fibers and feature replaceable compression o-ring sealed windows. The Flowcell-FL-Ultem is a micro-flow cell designed for fluorescence applications.

# For more information about flow cell applications and options, please contact a Sales Engineer at infousa@avantes.com.

Chemical compatibility with base materials, o-rings, and adhesives for the flow cells can be a critical factor for safety and product longevity and should be discussed with an Application Engineer when specifying a flow cell. Alternative materials such as Hastelloy, plexiglass, and others may be available for some of the flow cells offered by Avantes.

| Model | Line size | Wavelength Range | Optical path | Sample Volume | Temperature Pressure | Material |
|---|---|---|---|---|---|---|
| ¼" Flow cell | 1/4" | 200-2500 nm | 5 mm | 62 µl | 80°C/ 10 bar | Stainless 316 with fixed windows |
| ½" Flow Cell | ½" | 200-2500 nm | 10 mm | 124 µl | 80°C/ 10 bar | Stainless 316 with fixed windows |
| 1" Flow Cell | 1" | 200-2500 nm | 20 mm | 248 µl | 80°C/ 10 bar | Stainless 316 with fixed windows |
| Flowcell-1/4"-FL | ¼" | 200-2500 nm | NA | | 80°C/ 10 bar | Stainless 316 with fixed windows |
| Flowcell-1/4"5-HPHT | ¼" | 200-2500 nm | 5 mm | 124 µl | 200°C/ 200 bar | Stainless 316 with fixed windows |
| Flowcell-1/4"50-HPHT | ¼" | 200-2500 nm | 50 mm | 500 µl | 200°C/ 200 bar | Stainless 316 with fixed windows |
| Flowcell-1/4"-IND-HPHT* | ¼" | 200-2500 nm | 0.01-1000 mm | Variable dep. On pathlength | 280°C/ 207 bar | Stainless 316 with compression o-ring windows (replaceable) |
| Flowcell-Z-10 | 1.5 mm | 200-2500 nm | 10 mm | 18 µl | 10 bar | Peek body, Windowless design with metal fiber ferrule serving as optical surface |
| Flowcell-1.5 | 1.5mm | 200-2500 nm | 1.5 | 3 µl | 10 bar | Peek body, Windowless design with metal fiber ferrule serving as optical surface |
| Flowcell-1mm-PEEK* | 1.5 mm | 200-2500 nm | 1 mm | 1 µl | 10 bar | Peek; O-ring compressed windows |
| Flowcell-5mm-PEEK* | 1.5 mm | 200-2500 nm | 5 mm | 13 µl | 7 bar | Peek, O-ring compressed windows |
| Flowcell-10mm-PEEK* | 1.5 mm | 200-2500 nm | 10 mm | 26 µl | 7 bar | Peek, O-ring compressed window |
| Flowcell-50mm-PEEK* | 1.5 mm | 200-2500 nm | 50 mm | 130 µl | 7 bar | Peek, O-ring compressed window |
| Flowcell-FL-Ultem* | 1.5 mm | 200-2500 nm | NA | 10 µl | 7 bar | Ultem, O-ring compressed window |

*Only available from Avantes North America

## Flow Cells In Action

This dissolution monitoring system uses several flow cells, enabling a multi-channel system to take sequential measurements at different process stages.