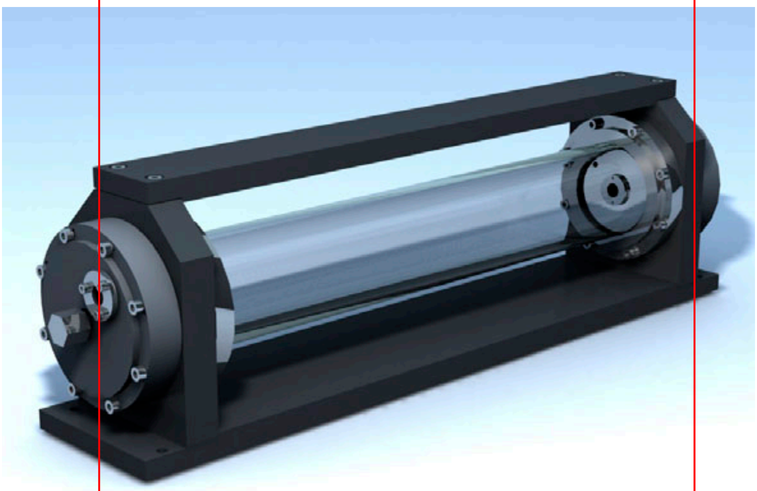
The world of diode lasers.

TOPTICA PHOTONICS



The Herriott cell with a total optical path of 30 m is suited for infrared absorption spectroscopy in scientific research and for monitoring tasks in industrial environments.

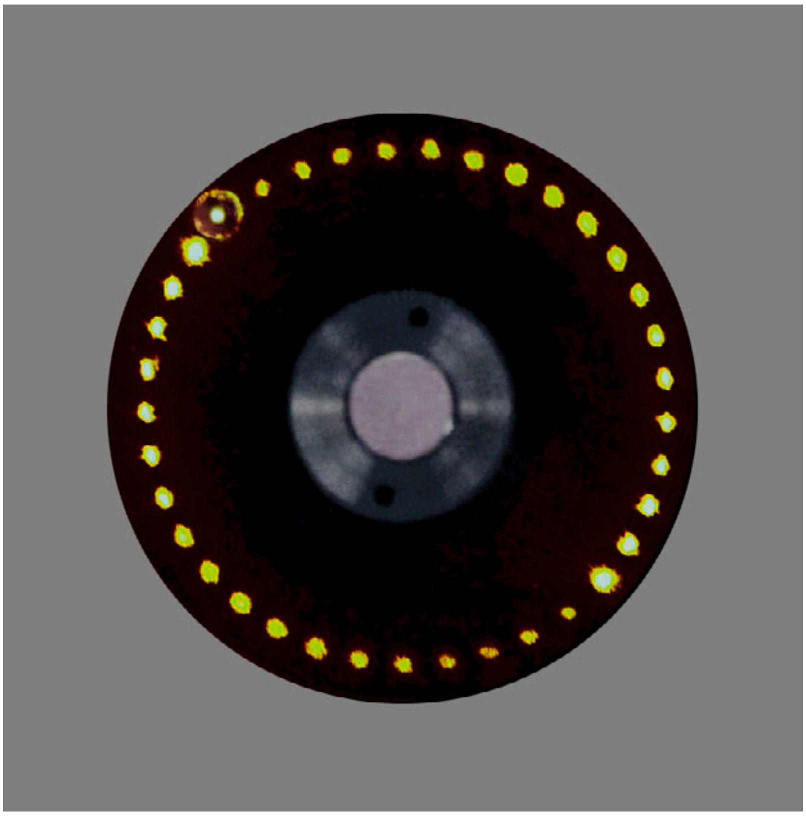
Herriott Type Cell

Multipass Cell

„The affordable, compact and versatile multi-pass cell for your application in absorption spectroscopy.“

Outstanding Features:

- Optical path length 30 m
- Clear input/output beam separation
- No interference fringes for $\lambda < 3\ \mu m$
- Small volume
- Easy maintenance and refurbishment of mirrors
- "In situ" removal of inner tube
- Compact and rugged design
- OEM version on request



Light pattern on the input mirror of the CPM-30 Herriott cell
when illuminated with a HeNe-laser

The *CMP-30 multipass cell* is a Herriott type absorption cell. It lends itself to applications which require a long interaction path between an electromagnetic wave and a gaseous sample, keeping the overall dimensions of the experimental apparatus reasonable. An incoming beam undergoes multiple reflections between two mirrors, describing two circles of spots on the mirror surfaces. The total number of 74 passes corresponds to an optical path length of 29.91 m. In one of the mirrors, a hole is provided for beam entrance and exit (diameter 4 mm). The dimensions of the mirrors, the separation of individual spots and the diameter of the entrance/exit hole have been chosen such as to avoid overlap of the spots up to a wavelength of 3 μm (distance between adjacent spots $\geq 6 \times$ beam waist).

The beam enters the cell in the horizontal plane. The fraction of the beam reflected by the entrance window also propagates in the horizontal plane and can be used for reference (e.g. wavelength measurement). The output beam travels upwards. Therefore, the three beams are clearly distinguished, which ensures an easy, accurate and unambiguous absorption measurement even in case of misalignment or incorrect focussing.

The cell base and the alignment tools have been designed to match the hole pattern of a metrical optical table (M6 thread, 25 mm separation). Upon request, base and tools for 1/4-20 holes on a 1-inch grid are available.

The cell is resistant to the most common chemicals. Materials in contact with the gas are Pyrex and BK7 glass, stainless steel (AISI 316), CaF_2, Gold, Viton and Teflon. The user may choose to operate at any pressure from 10^{-3} Torr up to one atmosphere. The upper plate prevents misalignment of the mirrors when the internal pressure is varied.

If necessary, the Pyrex pipe can be easily removed without dismounting the cell, in order to perform “room air” measurements.

The inner volume of the cell is 900 cm^3. Gas inlet and outlet ports are provided at each end of the cell, which allows for examining flowing gases. The standard connectors fit pipes of 10 mm outer diameter, the threads are NPT ¼". If necessary, the connectors can be replaced to match different gas delivery systems.

OEM cells and other types

The *CPM-30* is a multi purpose cell. Special versions like OEM cells or multipass cells for harsh environment or aeronautical applications are available on request.

General Specifications

Parameter	Value	Units
Optical path length	29.9	m
Volume	900	cm^3
Overall length	50.2	cm
Overall height	13.7	cm
Overall width	9.4	cm
Mirror reflectivity ($\lambda > 1\ \mu m$)	> 98.2	%
Transmission (window excluded, $\lambda > 1\ \mu m$)	> 26.6	%
Operating pressure	$10^{-3} \div 760$	Torr
Window transmission (CaF_2)	$0.2 \div 9.5$	μm

Comparison between different types of multipass cells

	CMP-30 multipass cell (Standard Herriott Cell)	Astigmatic Herriott Cell	White Cell
Pro	• No fringes within a given λ • Small volume • Path length 20% variable • Simple and unambiguous input/output separation • Easy maintenance of mirrors	• Very small volume • No fringes if well aligned	• Variable path length
Con	• Only a small part of the mirrors is exploited	• Very small transmission in the near IR • Expensive • Oxidation of metallic mirrors • Possibility of ambiguous alignment (beams not crossing the cell may reach the detector)	• Large volume • Generation of fringes

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