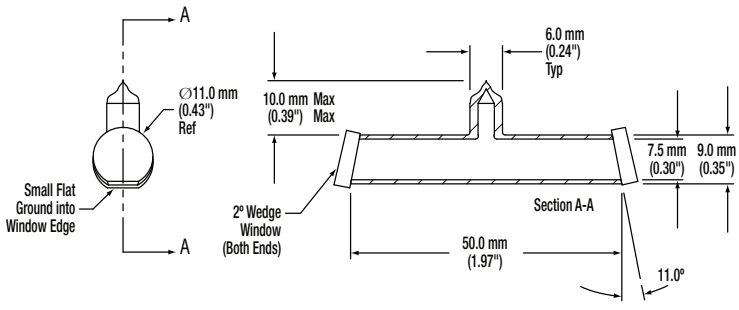
Molecular Gas Cells

Molecular gases have complex absorption line spectra, making them excellent fill materials for reference cells used to calibrate the absolute wavelength of light over a 0.5 to 10 µm wavelength range. The wavelength operating range of these cells are reduced due to their windows, but custom cells with windows for use in the MIR are available. The multitude of absorption lines is a result of the large number of allowed transitions between the various rotational and vibrational energy levels.

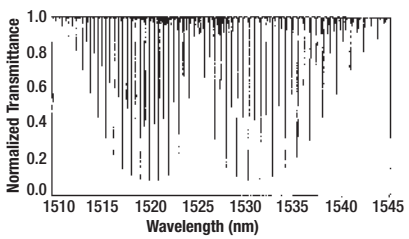
Due to the number of absorption lines in the NIR region of the electromagnetic spectrum, molecular gas reference cells make excellent calibration sources for the light sources and test equipment used in the Telecom industry. The National Institute of Standards and Technology (NIST) has created wavelength reference standards for the Telecom industry based on the following Standard Reference Materials (SRM): 2515 (carbon monoxide), 2517a (Acetylene), and 2519 (hydrogen cyanide). In addition to these gases, Thorlabs also sells molecular gas reference cells filled with carbon dioxide, nitrogen dioxide, or methane. Each cell's pressure is given at 25 °C.

Mechanical Drawings Available on the WEB

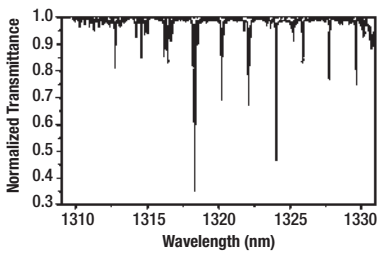


CQ09050-CH12

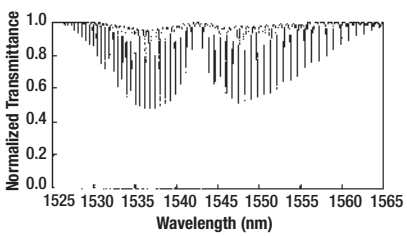
Custom molecular gas reference cells are available by request. For example, reference cells can be created with a mixture of gases at different pressures to create a calibration source with absorption lines in more than one spectral region. A plot of the absorption spectrum of a cell that contains a mixture of acetylene and methane gas is shown below. Absorption lines are present in the 1510 to 1545 nm and 1630 to 1670 nm ranges due to the co-existence of acetylene and methane gas in the same cell. Other common gas mixtures used include HCN and carbon monoxide ($^{12}C^{16}O$), or HCN and carbon monoxide ($^{13}C^{16}O$).



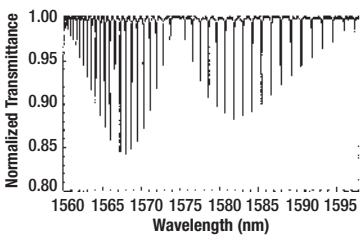
Acetylene Isotope 13 Absorption (CQ09050-CH13)



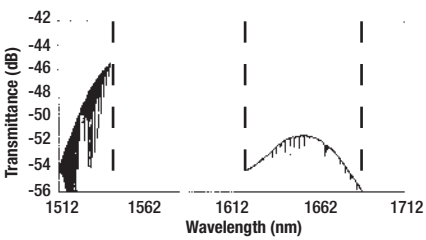
Methane Absorption Spectrum (CQ09075-CH4)



HCN Absorption Spectrum (CQ09075-HCN13)



Carbon Monoxide Isotope 12 Absorption Spectrum (CQ09050-CO12)



Methane-Acetylene Mixture Absorption Spectrum

ITEM #	$	£	€	RMB	PRESSURE	DESCRIPTION
CQ09050-CH12	$ 465.00	£ 334.80	€ 404,55	¥ 3,706.05	50 Torr	Quartz Ref. Cell, Ø9 x 50 mm, Acetylene ($^{12}C_2H_2$)
CQ09050-CH13	$ 465.00	£ 334.80	€ 404,55	¥ 3,706.05	50 Torr	Quartz Ref. Cell, Ø9 x 50 mm, Acetylene ($^{13}C_2H_2$)
CQ09075-CH4	$ 465.00	£ 334.80	€ 404,55	¥ 3,706.05	200 Torr	Quartz Ref. Cell, Ø9 x 75 mm, Methane (CH_4)
CQ09075-HCN13	$ 465.00	£ 334.80	€ 404,55	¥ 3,706.05	100 Torr	Quartz Ref. Cell, Ø9 x 75 mm, Hydrogen Cyanide ($H^{13}C^{14}N$)
CQ09150-CO12	$ 465.00	£ 334.80	€ 404,55	¥ 3,706.05	600 Torr	Quartz Ref. Cell, Ø9 x 150 mm, Carbon Monoxide ($^{12}C^{16}O$)
CQ09150-CO2	$ 465.00	£ 334.80	€ 404,55	¥ 3,706.05	200 Torr	Quartz Ref. Cell, Ø9 x 150 mm, Carbon Dioxide (CO_2)
CQ09150-NO2	$ 750.00	£ 540.00	€ 652,50	¥ 5,977.50	400 Torr	Quartz Ref. Cell, Ø9 x 150 mm, Nitrogen Dioxide (NO_2)