OEM Calibrators: Hydrogen Fluoride Gas Cell HF

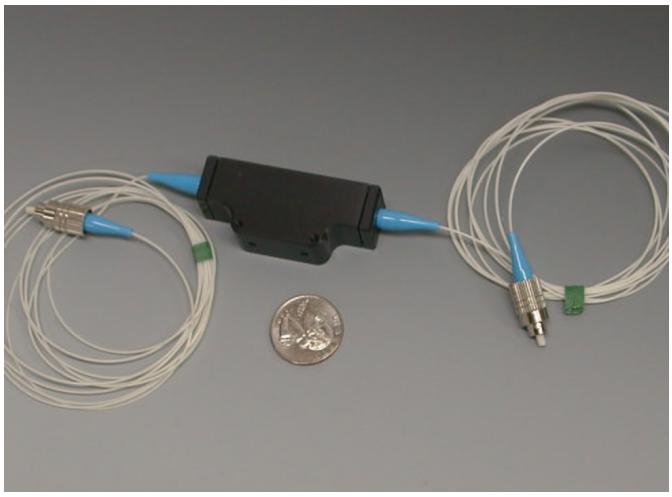
Hydrogen Fluoride gas absorption has been widely researched and identified by national standards bodies as a wavelength reference in the wavelength range from 1260nm to 1350nm.

The cells are sealed for long life and feature advanced optical design with wedged sapphire windows for very low level of interference artifacts. The cells are offered in pressures that are suitable for the particular user application.

The cells are offered in two configurations:

1. A sub miniature package with built in photodiode.
2. With fiber input and output for applications needing optical output or desiring the flexibility of this configuration.

The units may be ordered with a metal instrument housing which is useful to protect the cell pigtails in a laboratory setting



Specifications (preliminary)[1]

Gas Lines:		
Wavelength Range	nm	1255nm to 1351
Wavelength Accuracy	nm nm	±0.0003 (1 sigma, 50 Torr) ±0.0001 (1 sigma, 10 Torr)
Temperature dependence	nm	<0.00001/°C
Atmospheric pressure or humidity dependence		not detectable
Linewidth (-3dB)	nm nm	0.030 typical (50Torr) 0.008 typical (10 Torr)
HF Pressure (25 °C)	Torr	10 to 200 ±10% (custom)
Absorption line depth (P5)[2]	dB dB	4 typical (50 Torr) 3 typical (10 Torr)
Interference artifacts	dB	<0.1
Cell Lifetime	years	>20
Photodiode:		
Net responsivity	A/W	>0.5
Capacitance (0V)	pf	80 typical
Shunt resistance	MΩ	>5

1. Specifications subject to change without notice
2. For instruments that have resolution better then the line width. When probed with lower resolution devices contrast is reduced

Features

- **Reliable tube, >20 year life**
- **AR coated optics and wedged sapphire windows for low level of spectral artifacts**
- **Rugged miniaturized package**
- **Custom pressure and connectors**
- **Low cost, aggressive volume discounts**
- **Convenient mounting**

Applications

- **Embedded calibrator for tunable laser or OSA**
- **Wavelength locker**
- **Out of band calibration source for tunable etalon filters (see our Reference Design)**
- **Laboratory Calibration source**

Ordering Information (example)

HF - C - 50 - None

Type:
Cell with pigtails: C
Photodiode output: CP
With metal housing: CH

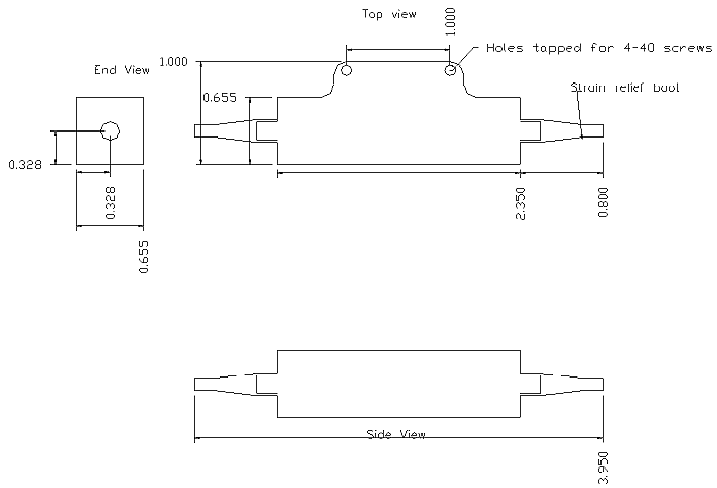
Pressure:
Torr

Connector(s):
FCPC
FCAPC
SCPC
SCAPC
None

Wavelength References
14711 S Buckner Creek Rd
Mulino, OR 97042 USA
Tel: (503) 632-5240 632-5215(fax)
Email: sales@wavelengthreferences.com

Line	Wavelength[1] (nm)	Pressure Shift[2] pm/Torr	Intensity[3] dB/cm
R(8)	1253.84373	+0.0038	0.01
R(7)	1255.29999	+0.0043	0.05
R(6)	1257.75174	+0.0048	0.2
R(5)	1260.74150	+0.005	0.5
R(4)	1264.27199	+0.0048	1.2
R(3)	1268.34679	+0.0032	2.2
R(2)	1272.97030	+0.0	3
R(1)	1278.14782	-0.0008	3.1
R(0)	1283.88556	-0.0056	1.9
P(1)	1297.07004	+0.0045	1.6
P(2)	1304.53367	-0.0008	2.2
P(3)	1312.59085	-0.0016	1.9
P(4)	1321.25235	-0.0016	1.1
P(5)	1330.52989	-0.0016	0.5
P(6)	1340.43632	-0.0020	0.2
P(7)	1350.98564	-0.0027	0.05
P(8)	1362.19301	-0.0032	0.01

1)Wavelengths stated for low pressures (<10 Torr). Accuracy ±0.05pm
2)Accuracy ±0.001 pm/Torr
3)Intensity given valid for pressures greater then 25 Torr at 25 degC. For lower pressures intensity is reduced



HF fiber coupled gas cell
Note miniature photodiode coupled cell is considerable smaller

Hydrogen Fluoride absorption spectra vacuum wavelengths and pressure shift. Line data derived from the HITRAN, a spectroscopic database involving research and standards bodies worldwide. It is headquarted at the Harvard Smithsonian Center for Astrophysics and contains the most accurate spectroscopic data in the world. The pressure shift data is from Herget et al "Infrared Spectrum of Hydrogen Fluoride", J Opt Soc America Vol 52 #10 pp1113-19 October 1962.
Note that the dimer H_2F_2 is generally present to varying concentrations depending on gas pressure and temperature. For room temperature (25 degC) at 100 Torr pressure the concentration of dimer will be in the neighborhood of 25%. For pressures below 25 Torr the dimer concentration is generally negligible at room temperature and above. The presence of the dimer effectively reduces the concentration of the monomer but does not change the wavelength of the absorption lines except through the weak dependence on pressure shift. The most evident effect will be the absorption width getting larger at higher temperatures due to the increase in monomer concentration.