Wavelength REFERENCES

C-Band Wavelength Calibrator Acetylene Gas Cell $^{12}C_2H_2$

Gas cells are precision filters whose absorption wavelengths depend on specific molecular energy level transitions. $^{12}C_2H_2$ molecular absorption lines have been identified by national standards bodies as a primary wavelength reference in the band 1510nm to 1540nm.

Our NIST-traceable $^{12}C_2H_2$ gas cells are offered in a variety of standard configurations: 20 Torr and 50 Torr (matching NIST SRM 2517a) 5.5cm path length cells as well as a 'mini' 3cm path housing for 200 and 400 Torr cells. Generally, path length will affect measured absorption depth and pressure will affect the linewidth.

Gas cells are hard-sealed for long life and feature advanced optical design for very low level of interference artifacts.

The cells may be ordered fully fiber-coupled (single-mode fiber, with or without connectors), or with a built-in InGaAs photo-detector on one end for direct board mount.

We do many custom gas cells so please contact us with your specific requirements.

Specifications[1]

Gas Lines:		
Wavelength Range	nm	1510 to 1540
Wavelength Accuracy[2]	pm	< ± 0.3pm (expanded uncertainty)
Absorption line depth[3] (P9 line)	dB	8 (3cm; typ.) 8 (5.5cm, 20 Torr; typ.) 12 (5.5cm, 50 Torr; typ.)
Linewidth (50%, log scale) (P9 line)	pm	40 (400 Torr; typ.) 20 (200 Torr; typ.) 7pm (50 Torr; typ.) 5pm (20 Torr; typ.)
Temperature Dependence	pm	<0.01/°C
Gas Cell:		
Cell Transmission	%	>50; fiber to fiber
Spectral ripple (P-P)	dB	<0.1 P-P in any 2nm span
Cell Lifetime	years	>10
Operating temperature	°C	0 to +70
Storage temperature	°C	-40 to +85
Shock	g	>100, 3 axes
Connector Types		FCPC, FCAPC, SCPC, SCAPC, none, PD (photodetector)
Photodetector:		
Net Responsivity	A/W	>0.5
Capacitance (0V)	pF	4 typical
Shunt Resistance	MΩ	>5

1. 25 °C; Specifications subject to change without notice
2. Expanded uncertainty on least accurate lines for 50 Torr. See table next page.
3. For instruments with resolution better than the linewidth. Using lower resolution instruments could understate absorption.

Features

- **Hermetic seal, >10-year life**
- **Wedged windows and coated optics for minimum interference artifacts**
- **Our smallest fiber-coupled package – 3cm path length.**
- **Custom pressures and options available**
- **Low cost**
- **S and C band coverage**

Applications

- **Remote Optical Gas sensing systems**
- **Tunable laser calibration**
- **OSA or tunable filter calibration**
- **Wavelength/frequency locking**
- **Gas Bump Testing**

Ordering Information (example)

C2H2-12-H(5.5)-50-FCAPC

- Carbon isotope
- H(3):3cm path; H(5.5): 5.5cm path
- Pressure (Torr)
- Connector type (include /PD for photodetector)

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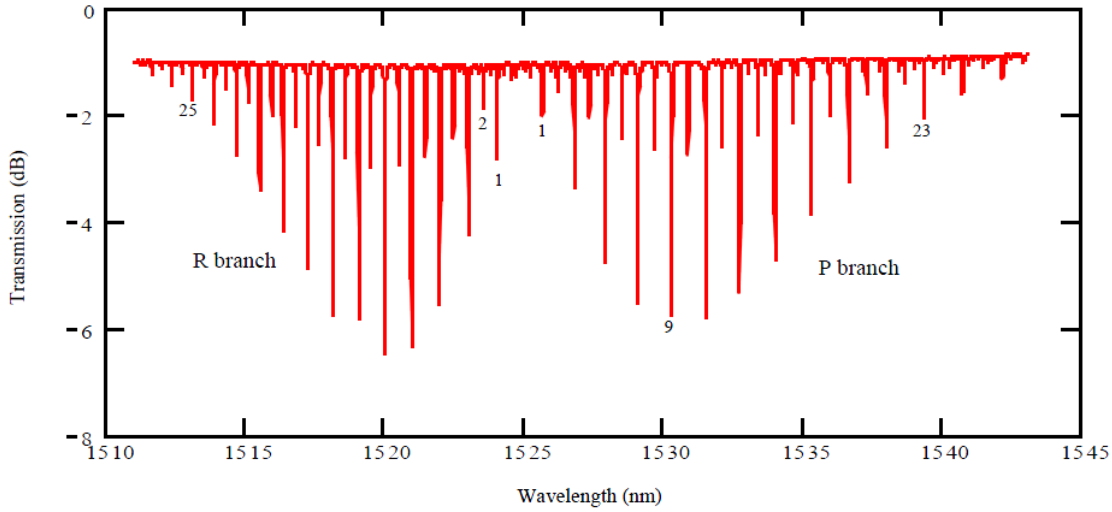


Sample transmission spectrum of a $^{12}C_2H_2$ cell.

R Branch	Wavelength (nm)	P Branch	Wavelength (nm)
27	1512.45273(12)	1	1525.7599(6)
26	1512.8232(3)	2	1526.3140(3)
25	1513.2000(3)	3	1526.87435(10)
24	1513.5832(3)	4	1527.44114(10)
23	1513.9726(3)	5	1528.01432(10)
22	1514.3683(3)	6	1528.59390(10)
21	1514.7703(3)	7	1529.1799(3)
20	1515.1786(3)	8	1529.7723(3)
19	1515.5932(3)	9	1530.3711(3)
18	1516.0141(3)	10	1530.97627(10)
17	1516.44130(11)	11	1531.5879(3)
16	1516.8747(3)	12	1532.2060(3)
15	1517.3145(3)	13	1532.83045(10)
14	1517.7606(3)	14	1533.46136(10)
13	1518.2131(3)	15	1534.0987(3)
12	1518.6718(3)	16	1534.7425(3)
11	1519.13686(11)	17	1535.3928(3)
10	1519.6083(3)	18	1536.0495(6)
9	1520.0860(3)	19	1536.7126(3)
8	1520.5700(3)	20	1537.3822(3)
7	1521.06040(10)	21	1538.0583(3)
6	1521.5572(3)	22	1538.7409(3)
5	1522.0603(3)	23	1539.42992(11)
4	1522.5697(3)	24	1540.12544(11)
3	1523.0855(3)	25	1540.82744(11)
2	1523.6077(3)	26	1541.5359(3)
1	1524.13609(10)	27	1542.2508(3)

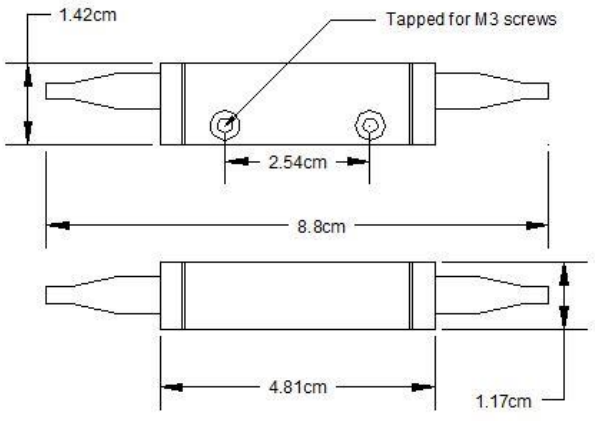
50 Torr $^{12}C_2H_2$ NIST Center Wavelengths

Values as stated by NIST. Expanded (2 sigma) uncertainties are stated in parenthesis and apply to least significant digits.

NIST Traceability

The resulting absorption spectra exhibited by Wavelength References $^{12}C_2H_2$ Cells are determined by fundamental molecular energy level transitions that have been well characterized by standards bodies such as NIST. As such, the presence of $^{12}C_2H_2$ at a specified pressure guarantees repeatable absorption spectra characteristics. Our pressure uncertainty of +/-10% falls within NIST's stated uncertainty of +/-20%. We can therefore state with assurance that our cells are NIST-traceable.

H(3): 3cm 'mini' Package



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