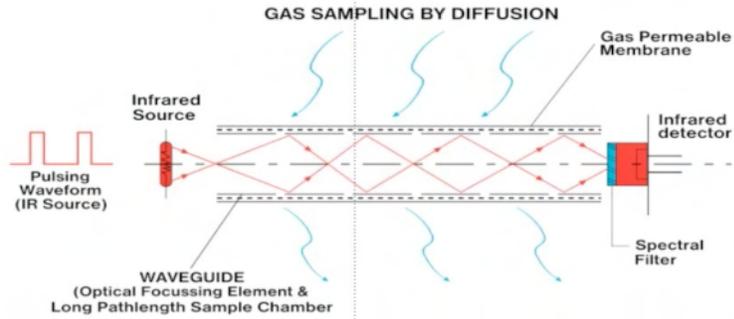


Length Does Matter... Particularly When It Comes to CO₂ Sensing

Not all infrared CO₂ sensors are equal, particularly when it comes to path length!

How Infrared Sensor Work

All infrared gas sensors are based on the fact that gases like CO₂ will absorb light at a specific wavelength in the infrared light spectrum. As a result, most devices utilize a reflective chamber with a light source at one end and a light detector at the other end. Air from the general atmosphere is designed to diffuse into the space between the light source and the detector. An optical filter placed over the detector only measures the infrared light affected by CO₂. The net increase or decrease of light traveling through the sample will indicate the CO₂ concentration.



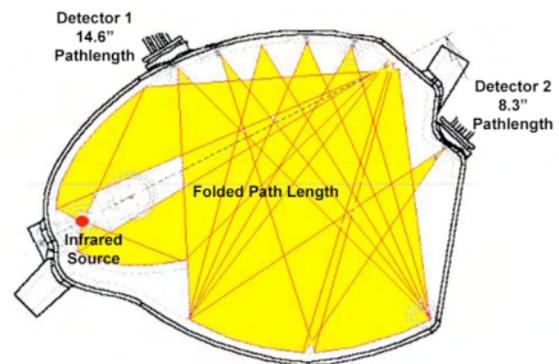
Why Path Length Is Important

Path length reflects how much of the air is sampled to make a measurement. A longer path length provides a stronger signal for the sensor to analyze. A stronger signal means better accuracy, less drift and less interference from electronic noise in the sensor electronics. This translates into a more accurate, dependable sensor.

Most CO₂ sensors utilize a traditional straight-path approach as in the illustration above with the light source at one end of the sensor and the detector at the other end. Some additional path length can be gained from bouncing the light off the walls (typically a 50% increase) but this design is constrained by the dimensions of the packaging for the sensor.

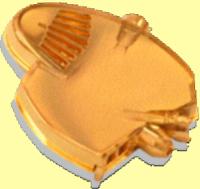
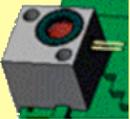
More Length = More Signal = Better Performance

AirTest has developed a better way to get more path length in a smaller package through the use of a family of unique, patented optical sensor that can bounce the light a number of times through the sample before it reaches the detector. This design folds an extended path length into a small package. Using a variety of different designs it is possible to optimize path length for the concentrations and type of gas measured. At the right is the actual size of a optical sensor that can provide two different path lengths of 14.6" and 8.3" in a package that is less than 2" X 2" X 1/4". This new optical sensor will measure dew point and CO₂.



The table on the next page shows the different optical sensors used in AirTest products and their path lengths. To compare AirTest path length with traditional straight path CO₂ sensors, take actual linear length of the competitive sensor and multiply by 1.5 . Most competitive sensors will measure up at under 2". You will see how length does matter.

AirTest Optical Sensor For Gas Measurement

Ideal Measurement Range	Path Length	Optical Sensor	AirTest Products
CO ₂ : 200 – 5,000 ppm H ₂ O: 0 – 122°F Dew Point	14.6"		CO ₂ & Dew Point Sensor TR9800 (new)
CO ₂ :300-8,000 ppm	8.3"		
CO ₂ : 500 – 14,000 ppm	4.7"		CO ₂ For Building Control & Agriculture TR9200 TR9500
CO ₂ : 0.15% - 4%	1.6"		CO ₂ For Health & Safety, Industrial Applications & Incubators TR9300 TR9500
CO ₂ : 1.5% - 10%	0.3"		Customized OEM Platforms
CO ₂ : 2.5% - 20%	0.16"		Customized OEM Platforms

A Few More Reasons To Consider AirTest

- **Gold Plated Optical Sensor:** Ensures long-term stability, even in adverse environments. This means you are installing a dependable sensor that will not age over time.
- **ISO 9001 Manufactured:** ISO 9001 ensures high quality by requiring consistent manufacturing processes are use for every sensor manufactured. This means less call-backs.
- **Self-Calibrating:** All sensors integrate a self-calibration feature that has been proven over 10 years of operation in thousands of application. This means a maintenance free sensor.
- **Support:** AirTest offers a wide variety of gas and humidity sensors for all types of building and industrial applications. We support what we sell and have experienced application support available should you need it.

Resources:

AirTest Web Site: www.AirTestTechnologies.com

The AirTest Virtual Product Catalog: www.airtest.ca/docs/vcatalog.pdf

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