

MIRAN SapphIRe Technical Note General Halocarbon Analysis/Medical Air Monitoring

MIRAN-TN-001

Definition

The MIRAN SapphIRe's "General Halocarbon Analysis" feature detects levels of halogenated hydrocarbons in a background of ambient air while operating the infrared optical filter at 13.058 μm . At this wavelength, some of the more prevalent halogenated hydrocarbons such as chloroform, carbon tetrachloride, and methylene chloride will absorb infrared energy and be detected.

Application Intent:

For monitoring a class of similar gases, a specific calibration gas and measurement wavelength must be selected that represents the "typical" response for that class of compounds. For example, total hydrocarbons can be measured at a wavelength of 3.33 μm because all hydrocarbons have absorbance properties at this wavelength (response varies by compound). For measuring total halocarbons, however, finding a single wavelength to operate at is more difficult because there is no single wavelength where all halocarbons show infrared absorbance. While a great number of halocarbons are "seen" at the 8.9 μm region, these are typically associated refrigerant and anesthetic gases. For this specific application, we selected a chloroform calibration gas at 13.058 μm as this permits the detection of several other common combustion by-product gases seen in applications such as NPFA 99.

In the General Halocarbon Analysis, chloroform was used to develop the application parameters and the table below shows how this calibration responds to other halocarbons that might be present. Note that the screen response (and logged data) represents a total response. If more than one gas is present, the reading is a cumulative value...if only a single gas is present, it would provide a response to the chloroform parameters. Using carbon tetrachloride as an example, a true reading of 2.0 PPM would display as 0.95 PPM on the SapphIRe.

Compound	True Concentration	Instrument Response
Chloroform	2ppm	2 ppm
Carbon Tetrachloride	2ppm	0.95 ppm
1,1,2,2-Tetrachloroethane	2ppm	0.19 ppm
Methylene Chloride	2ppm	0.18 ppm

When required, the SapphIRe can provide specific concentration readings for a mixture of gases through its multi-gas application function. In other applications the desired output is "total" or "general", and the results may be prone to over or under reporting. In the specific instance of medical air monitoring, the intent is to check for combustion by-products from the braising of piping and the general wavelength at 13.058 μm provides the best utility for this determination.

Questions or concerns please contact technical service at 1-866-282-0430 or 1-508-553-0430.