

FLAME IONIZATION DETECTOR CAPABILITIES

The flame ionization detector (FID) is a widely used detector in gas chromatography. Its linear response to hydrocarbons over many orders of magnitude lends significant analytical capability to numerous routine gas analysis applications.

The FID used in AMETEK's gas purity analyzers is a very sensitive detector that is used to detect traces of hydrocarbons and carbon dioxide in normal air constituents (oxygen, nitrogen, etc.) and inert gases

How the FID works

The hydrocarbons in the sample gas are burned in a hydrogen flame to ionize the carbon atoms, which then emit free electrons. These electrons are measured as a current that is in direct proportion to the concentration of the hydrocarbons burned. Normal air constituents, including carbon monoxide (CO) and carbon dioxide, do not emit electrons and therefore give no response to the FID. Consequently, these gases do not interfere with the measurement. This lack of interference enables the FID to measure hydrocarbons at low ppb levels.

When a measurement of CO is desired, a methanizer is used to convert the CO in the sample into methane (CH₄) which is then measured by the FID. The CH₄ created and measured is in direct proportion to the CO in the sample gas.

The AMETEK FID is an ultra-sensitive device that, together with the methanizer, enables the determination of CO, CH₄, and non-methane hydrocarbons (NMHC) in various gases such as air, hydrogen, oxygen, nitrogen, helium and argon. The typical lower detection limits of the FID range from <0.5 to 5 ppb for each listed compound.

When used to measure total hydrocarbons (THC), the FID-equipped analyzer provides the total hydrocarbon measurement divided into CH₄ and NMHC concentrations. The FID can measure these organic compounds in other matrices as well when configured with an application-specific set of valves and columns.



AMETEK ta3000F, ta5000F, ta7000F

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