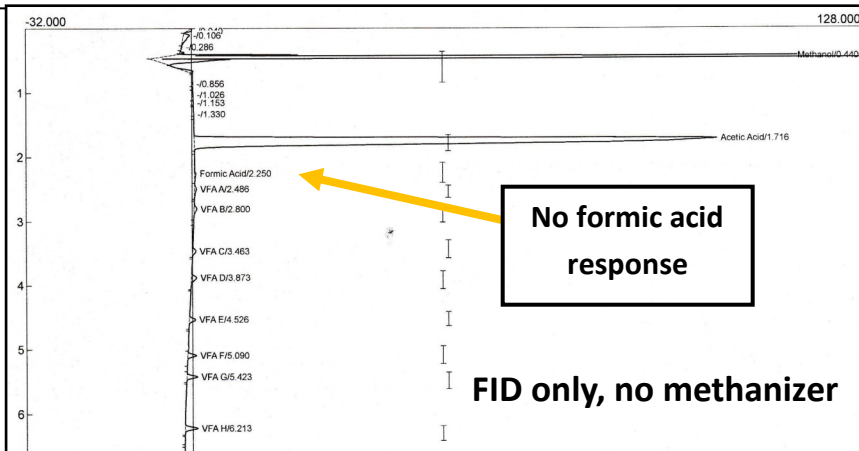


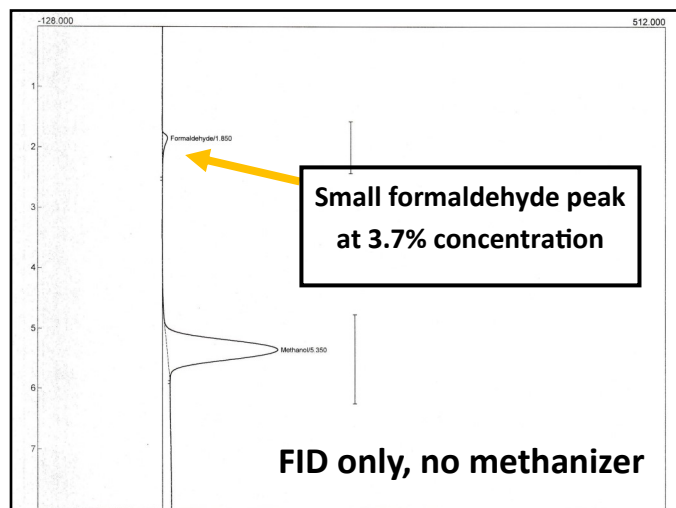
Detecting Formic Acid and Formaldehyde on SRI Instruments Gas Chromatograph and FID-Methanizer Detector

September 2023

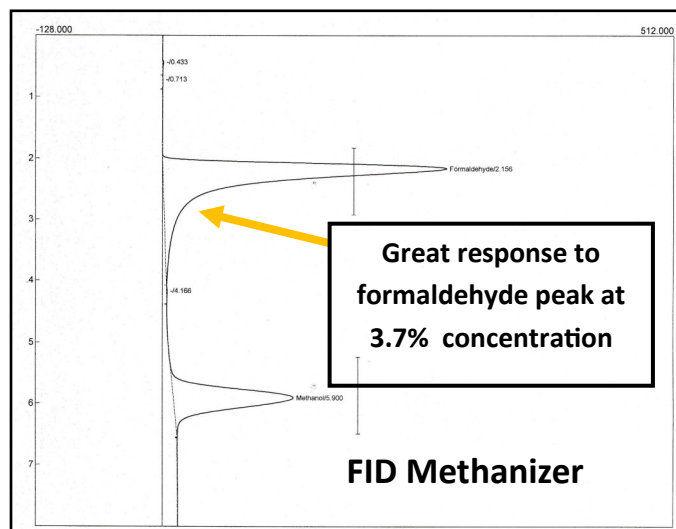
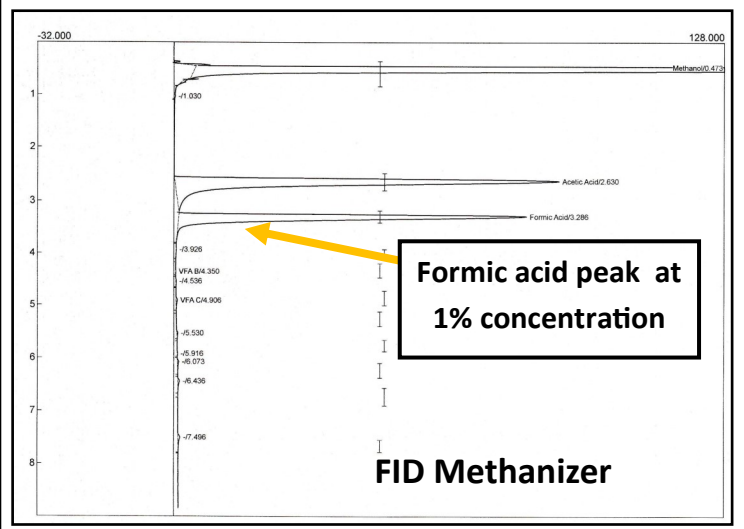
It is generally acknowledged that **detecting formic acid and formaldehyde using a gas chromatograph equipped with a flame ionization or FID detector is difficult, if not impossible.** Although formic acid and formaldehyde are both hydrocarbons, which generally respond well on an FID, these analytes have minimal response factors on a standard FID. For example, in the chromatogram to the right, when injecting a 1% solution of both formic acid and acetic acid on a standard FID, only the acetic acid is detected.



Similarly, in the chromatogram to the right, there is only a very small peak when injecting a relatively large amount of formaldehyde (3.7% in methanol and water solution). This makes it difficult to detect low levels of formaldehyde with just a standard FID detector.



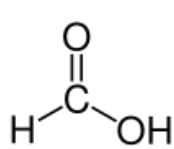
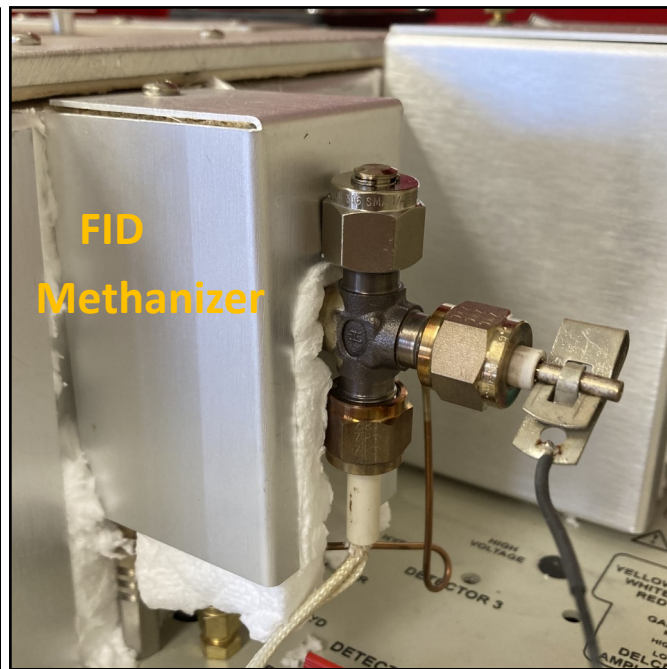
However, an **SRI Instruments Gas Chromatograph** equipped with an **FID-Methanizer**, heated to 300°C and equipped with the proper columns (MXT-Wax for Formic Acid and Hayesep T for Formaldehyde) can **detect formic acid down to the 1 part per million and formaldehyde down to the 20 ppm level.** The SRI Instruments FID Methanizer makes for a simple, reliable, and cost-effective method of measuring formic acid and formaldehyde. An SRI Instruments Gas Chromatograph that can detect one or both analytes can be purchased for approximately \$13,000 (in 2023 prices). Please visit our website at www.srigc.com for more information or to request a quote.



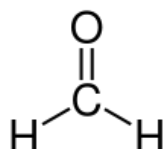
SRI Instruments 310-214-5092 email: sales@srigc.com
20720 Earl St. Torrance CA 90503 website: www.srigc.com

Detecting Formic Acid and Formaldehyde on SRI Instruments Gas Chromatograph and FID-Methanizer Detector September 2023

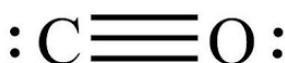
An FID equipped with a methanizer is commonly used to detect carbon monoxide and carbon dioxide, which do not respond on a standard FID detector, which generally operates by combusting hydrocarbons and measuring the response. The FID methanizer works by passing a sample through a heated tube (generally 300°C) filled with a nickel powder. This reduces carbon monoxide and carbon dioxide to water and methane, which the FID can detect. While the exact chemical process is not yet fully understood, SRI Instruments believes that the methanizer also reduces formic acid and formaldehyde to a detectable hydrocarbon, which is detected on the FID. Whatever the process, these analytes have a strong response on an FID methanizer.



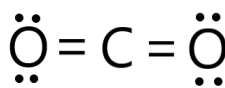
Formic Acid



Formaldehyde

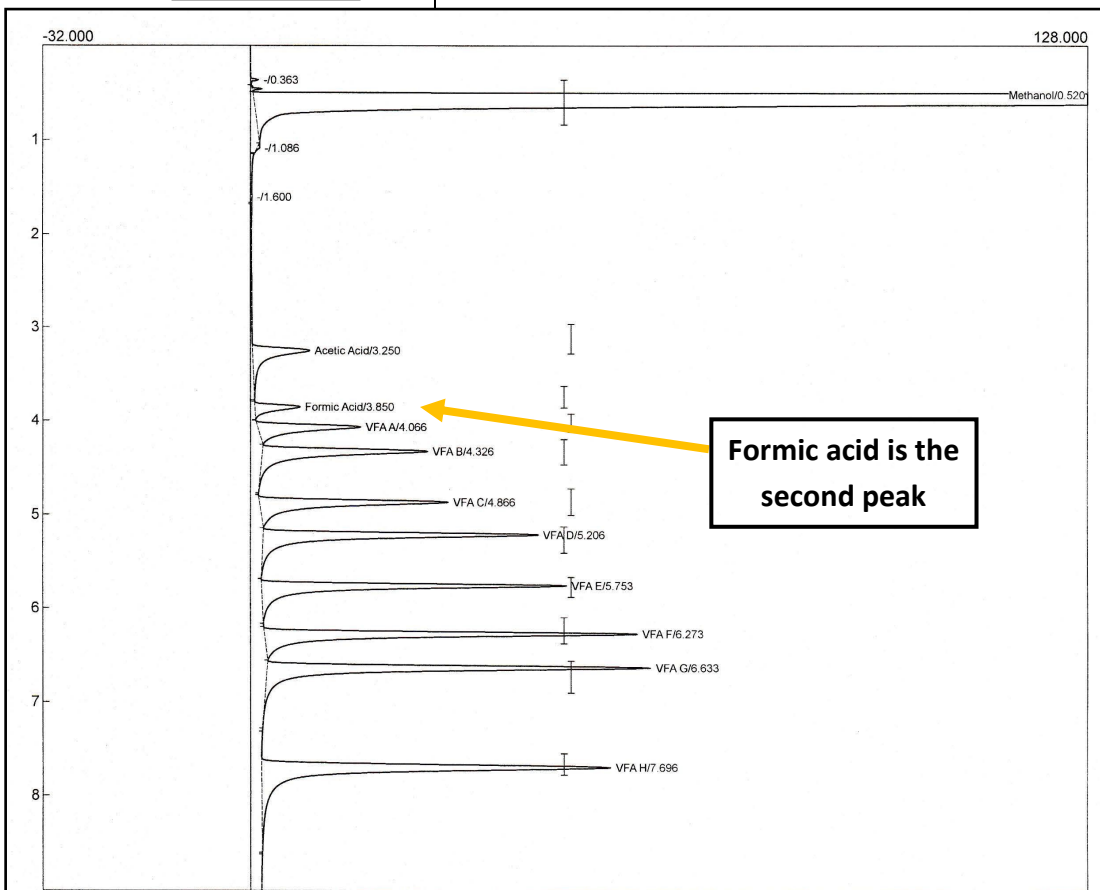


Carbon Monoxide



Carbon Dioxide

Here is a chromatogram of a mixture of 10 volatile fatty acids, including formic acid, on the FID methanizer. On a regular FID, only nine peaks appear, the formic acid peak is missing.



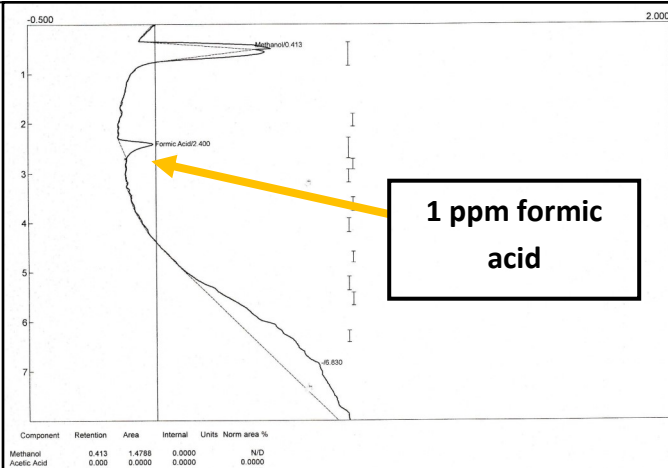
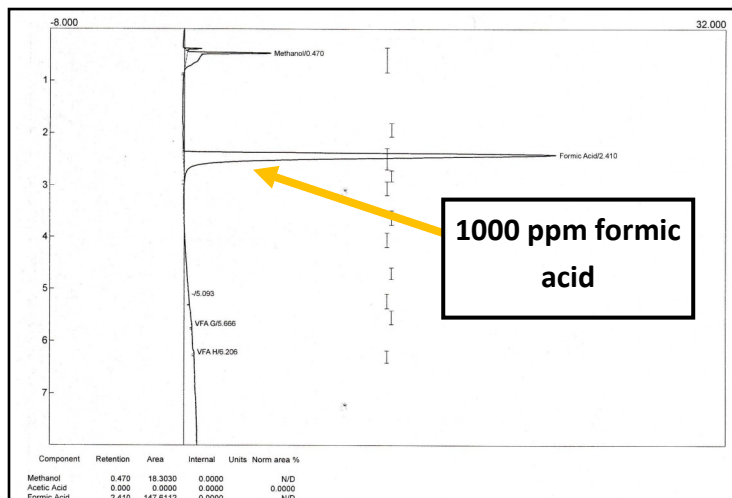
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Detecting Formic Acid and Formaldehyde on SRI Instruments

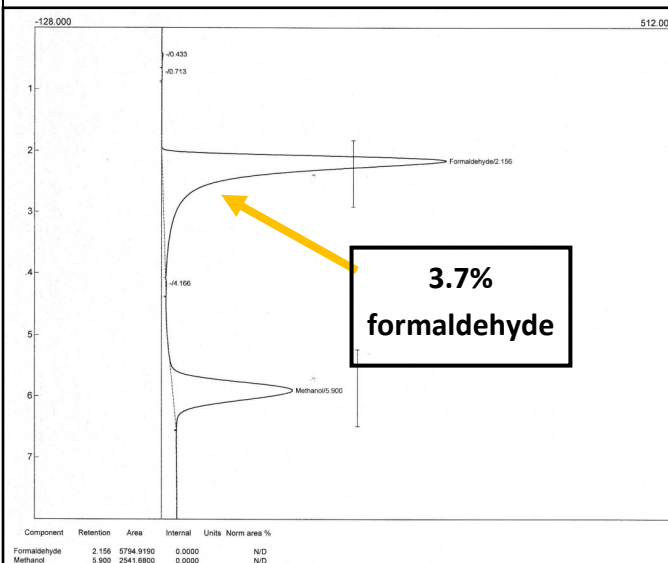
Gas Chromatograph and FID-Methanizer Detector

September 2023

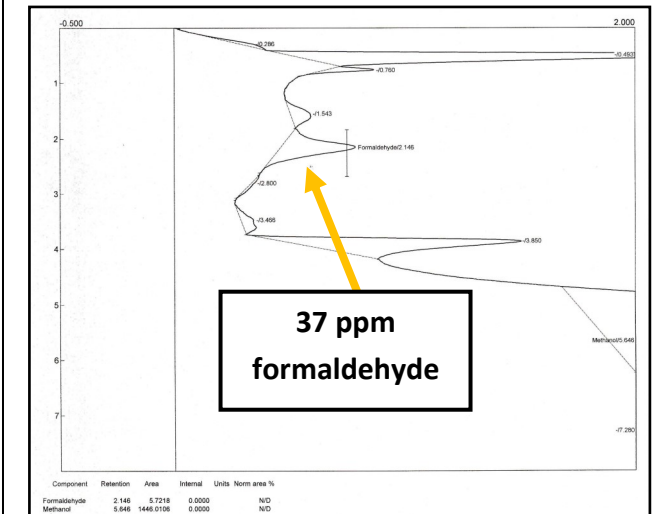
The chromatogram below shows a **1000 ppm solution of formic acid** in water. The chromatogram to the right shows **1 ppm of formic acid**, which is close to the detectable limit on a standard FID-Methanizer equipped GC.



The chromatogram to the right shows a **3.7% formaldehyde solution** in methanol and water.



This chromatogram shows **37 ppm of formaldehyde** which is close to the lower detection limits of formaldehyde on a basic FID-Methanizer equipped GC.



Please visit www.srigc.com for more information, documents, and chromatograms.



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