ta3000R Method A-001

Determination of Trace Levels of H_2 and CO in the Atmosphere

Introduction

TheTrace Analytical™ ta3000R Reduction Gas Analyzer is ideally suited for the determination of ppb to ppm levels of H_2 and CO in atmospheric studies. CO is involved in ozone depletion, even at very low concentrations. In this analysis, the Reduction Gas Detector (RGD) is used to provide rapid and reproducible measurements. Several unique qualities of the RGD enable the quantitation of H_2 and CO to extremely low concentrations.

This system was designed for trace levels of H_2 and CO in the atmosphere, where there is a possibility of other high molecular weight pollutants that could interfere with the determination.

The Trace Analytical Method

The flow diagram for method A-001 is shown in Figure 1. Air carrier gas is preferred because it gives a minimum of upset in the baseline from the injection, is inexpensive and readily available.

A 10-port valve is used to inject samples from the sample loop to the stripper column 1. Lighter compounds such as H_2 and CO elute quickly from the stripper column into the analytical column 2, while higher molecular weight components such as hydrocarbons and moisture elute very slowly from the stripper column. After the light components have had sufficient time to elute from the stripper column into the analytical column, the 10-port valve returns to the load position. In addition to preparing the analyzer for the next sample injection, the valve in this position is used to backflush the higher molecular weight components from the stripper column to vent.

Backflushing of the stripper column accomplishes two objectives. It shortens the analysis time and it vents contaminants which can produce an unstable baseline away from the detector. O_2 and N_2 from the air will elute through the analytical column. However these components do not interfere with the determination of H_2 and CO because of the chromatography and the selectivity of the RGD.

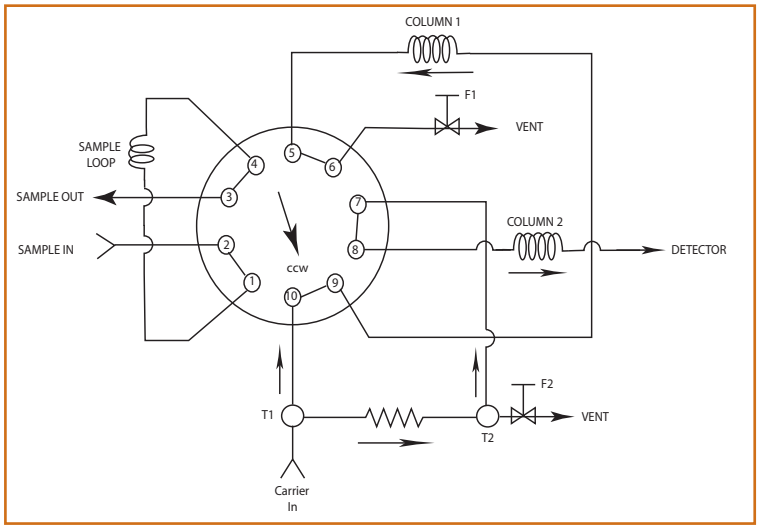
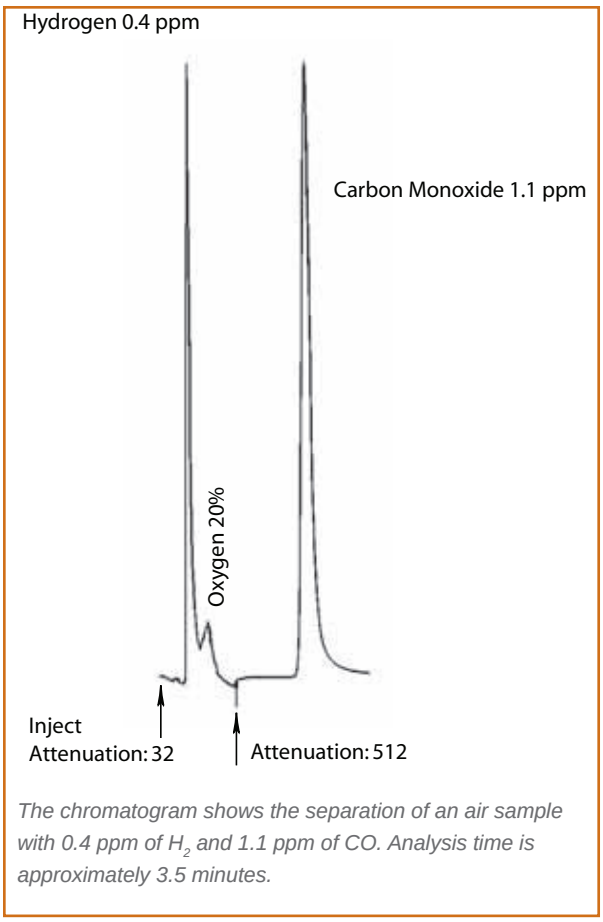


Figure 1. Flow diagram for method A-001.



The chromatogram shows the separation of an air sample with 0.4 ppm of H_2 and 1.1 ppm of CO. Analysis time is approximately 3.5 minutes.

Method A-001 is one of several application packages developed by Trace Analytical. Our applications group is always ready to consult with you about your specific analytical requirements. Please contact AMETEK Process Instruments or your local AMETEK representative for information on our Trace Analytical analyzers.

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Application Note

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