Model AGC 75-900 De-OX

Oxygen Removal System

The Model AGC 75-900 De-OX is designed to analyse oxygen purity with a gas chromatograph. It is used specifically for measuring very low concentrations of impurities in oxygen base gas such as Nitrogen, Argon, and Methane. Exposure of the oxygen sample to a catalyst after injection with a gas sample valve results in oxidation of the copperbased catalyst, leaving the remaining impurities in the sample/helium carrier stream.

$$(\text{Impurities} + O_2) + Cu \rightarrow CuO_2 + \text{Impurities}$$

The Trap can be regenerated after approximately 200 samples (using a 2 cc sample) by switching a valve that routes a reducing gas, i.e., H_2 or CO, over the catalyst. In a few hours, the AGC Model 75-900 De-OX is ready again for operation. The Trap can be cycled indefinitely unless abused.

$$H_2 + CuO \rightarrow Cu + H_2O$$

A special column configuration is required for use with the AGC Discharge Ionization Detector (DID)* used for the analysis of ppb levels of impurities in base gases. The AGC research in this application has shown that anomalous peaks can occur when analyzing the base oxygen.

The chromatography required for good analytical data is provided when purchasing the Model AGC 75-900 system. A 2m x 1/8" pre-column of molecular sieve will separate the impurities found in the Oxygen sample and those possibly manufactured impurities found in the reagent material used in the Trap. The pre-column is positioned after the gas sample valve and before the O_2 Trap. An injected gas sample passes through the pre-column then through the O_2Trap where the oxygen is captured. The impurities pass onto the analytical column, then into the detector. The precolumn will delay the sample impurities which will result in a longer retention time than any anomalous peaks generated by the catalytic reaction.

The AGC Model 75-900 De-OX detection limit for the impurities in Oxygen, such as N_2, Ar, and CH_4 is dependent upon the detection capability of the detector in the gas chromatograph. The Model ATC 75-900 de-OX and the AGC Series 100 DID Gas Chromatograph have demonstrated the analysis of Oxygen to the part-per-billion level.

A certified helium standard containing 2 ppm of N_2, Ar, CH_4, and CO should be analyzed first to determine retention times of each of the components.

This chromatogram shows the analysis of a commercially available high purity oxygen standard.

The pre-column has allowed baseline separation from the ppb Ar, N_2, and CH_4 impurities of the high purity Oxygen standard.

The anomalous peaks can be ignored and the resulting chromatogram is an analysis of part-per-billion levels of Ar, N_2, and CH_4 in O_2.

O_2

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