



TGA 5000

Technical Description

The Valco Trace Gas Analyzer (TGA), a process gas chromatograph, has been in production for over 20 years. With a proven record of durability and unmatched reliability, many units are still in use after 20 years of continuous service. Valco TGA's are an industry standard for the trace detection of components in many specialty gas applications.

Detection

Detection is performed by VICI Pulsed Discharge Detectors (PDD). PDD's utilize a stable, low-powered, pulsed DC discharge in helium as an ionization source. Eluants from the column, flowing counter to the flow of helium from the discharge zone, are ionized by photons from the helium discharge.

The bias electrodes focus the resulting electrons toward the collector electrode, where they cause changes in the standing current which are quantified as the detector output. Performance is equal to or better than detectors with conventional radioactive sources.

The PDD is a universal, non-destructive, high sensitivity detector. The response to both inorganic and organic compounds is linear over a wide range. Response to fixed gases is positive (increase in standing current), with an LDL in the low ppb range.

Separation

Separation is accomplished using 1/8" packed columns which are custom manufactured in-house. Common packing materials include Molecular Sieve 5Å and various types of porous polymers from Hayes Separations Inc.

Furthermore, we process and treat all packing materials to obtain the best quality and repeatability. By using a combination of columns and valve configurations, we can develop various chromatographic applications such as Smart HeartCut, Foreflush, and Backflush, as well as direct injections.

Analysis of impurities in oxygen is accomplished utilizing a Valco DeOXO oxygen scrubbing system. The DeOXO scrubber uses a copper-based catalyst which we process in-house in order to give significantly better chromatographic performance than other oxygen scrubbing systems currently available. DeOXO traps are then treated to give accurate results with no residual components eluted.

Valves

Valco chromatography valves have been the industry standard worldwide for the past 30 years. Every valve used in these analyzers is subjected to the most stringent testing requirements available. They are individually leak tested and graded for trace gas analysis before being used in the analyzer.

Valves are actuated by standard Valco pneumatic actuators, which offer reliable, long-term performance under the most stringent conditions. The actuation gas used is helium, which is also used to supply a full box helium purge for the instrument.

The use of TGA-rated valves combined with the full box purge provides a completely leak-free system that will give many years of reliable, accurate performance.

Data Acquisition and Analysis

Data is collected by Clarity Chromatography Station, a fully-customizable universal chromatography software. Numerous features include: multi-speed analog-to-digital conversion at speeds of up to 200 Hz using highly accurate low-noise integrating a/d converters; a user-friendly interface which provides all options and setup possibilities with an intuitive, easy-to-use format; automatic post-run data processing enabling any number of automation possibilities; custom integration options; automatic calibration options; and many other features too numerous to list. We configure the Clarity software to work intimately with the Valco control software, providing seamless instrument control.

Instrument Control

All Valco Model 5000 TGA's are controlled by a custom user interface and control software developed specifically for use with our instruments. The software provides all aspects of instrument control including temperature control, valve control, analysis selection, and various automation options.

The control software is also integrated to work with optional instrument features such as adaptive 4-20 mA analog trending outputs, and autosampling control when paired with our Valco Gas Sampling System.

The software has been designed to allow total automation of the instrument with virtually no operator input. Many Valco TGA's run autonomously 24 hours a day, providing trouble-free, reliable results.

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