

Introduction

Description and Operating Principle

The Thermal Conductivity Detector (TCD) has been one of the most popular GC detectors since the 1950's, second perhaps only to the Flame Ionization Detector (FID). The principal of operation is based on the relative change in the thermal conductivity of the gas passing across the detector filament as components elute from the column. Heat is lost continuously by the filament through the carrier gas to the cell wall of the detector. By measuring the amount of current required to maintain a constant filament temperature as gases of varying thermal conductivities cross the filament, a chromatographic signal is produced. This process is nondestructive of the sample and is concentration dependent.

The Valco Microvolume TCD is unique in its implementation. Since changes in conductivity are measured only by the change in current required to keep the filament at a constant temperature, each of the two filaments can be operated independently without referencing these changes to a matched filament with reference gas. This constant temperature provides longer filament life and safeguards it from the extremely high temperatures and oxidation which can occur with high concentrations of oxidative or corrosive components. Optional signal referencing is provided to minimize background variables such as column bleed and temperature programming.

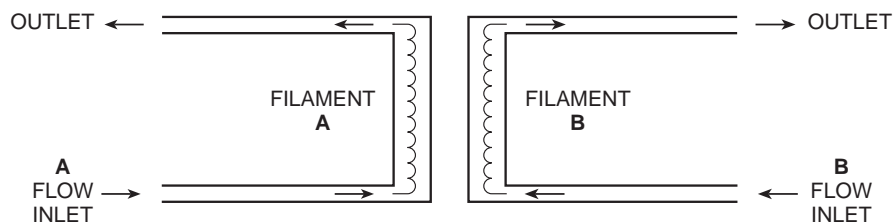


Figure 1: Unique dual filament design

Cell volume has been minimized to accommodate capillary column chromatography and optimize the sensitivity of the detector at low flow rates. (Carrier flow rates of 1 - 10 mL/min are recommended for best sensitivity.) Thermal stability is maintained in the detector cell to within 0.010°C drift, giving the detector a stable, noise-free signal.

The Model TCD2 is a stand-alone system which can be easily added to any chromatograph. It consists of a detector and a control module which incorporates the electrometer and temperature controls. The detector cell includes two separate filaments, capable of independent or referenced (differential) operation. Output signal is provided as 0-1 and 0-10 volt attenuated for chart recorders and 0-1 and 0-10 volts unattenuated for integrators and data systems.