

System Requirements

Components Not Included with the Detector System

- Carrier gas (99.999% purity is recommended)
- Ultra high purity grade gas pressure regulator with stainless steel diaphragm (recommended)
- Any special adapters required for connection to the gas regulator
- Flow measuring device
- Flow regulating device

System Purity

Since detection of low concentrations depends in part on the purity of the carrier, the purest carrier available must be used in order to achieve the lowest possible detection limit. To maintain carrier purity, extra care must be taken to assure that the delivery system is clean and free of leaks. Use stainless steel tubing (cleaned to removed manufacturing solvents) instead of nylon or Teflon® tubing, which can diffuse contaminants into the carrier.

Recommended Carrier Gas Purifiers

The Valco Helium Purifier (product number HP2) and Nitrogen Purifier (product number NP2), which utilize a rare earth gettering alloy to effectively remove contaminants, are recommended for ppm level analysis of permanent gases. For other applications, economical and convenient VICI Mat/Sen purifiers are appropriate. Order the P300-1 for nitrogen, P200-1 for hydrogen, or the P100-1 for helium and other inert carrier gases.

Carrier Gas Selection

The detector's response to a component is based upon the difference between the thermal conductivities of the component and the carrier gas: the greater the difference, the greater the response. The table below shows thermal conductivities for a variety of light gases.

Hydrogen	45.9
Helium	36.9
Neon	11.8
Methane	8.6
Oxygen	6.6
Air	6.4
Nitrogen	6.4
Carbon monoxide	6.2
Water	4.5
Argon	4.5
Carbon dioxide	4.2

As an example, note in the table that the thermal conductivity of hydrogen is 46 and helium is 37, while nitrogen is only 6 and argon is even lower at 4. Since the largest difference in thermal conductivity yields the best response, detection of small amounts of hydrogen is better done with argon or nitrogen carrier than with helium.