KIN-TEK

The Calibration Specialists

Trace Source™ 57S Prefilled Gas Permeation Tube

Arsine and Other Toxic, Highly Reactive Gases

Trace Source™ 57S Prefilled Gas Permeation Tubes are used in KIN-TEK Gas Standard Generators to create gas standards ranging from <50 ppb to 5 ppm for Arsine and other hydride gases, as well as highly reactive gases such as HCl, HBr, and Oxygen. Because the high vapor pressure of these compounds make them unsuitable for use in disposable permeation tubes, KIN-TEK developed Trace Source™ 57S Prefilled Gas Permeation Tubes. These permeation tubes are capable of safely using the gas phase of high vapor pressure compounds.

Description

Trace Source™ 57S Prefilled Gas Permeation Tubes are small stainless steel cylinders (6" h x 1 ¾" dia.) with a permeation tube membrane sealed inside. These cylinders are prefilled with a small amount (<4 grams) of pure gas under 60 psig pressure. The gas surrounds the permeation tube membrane, permeates into the permeation tube, and mixes with a small portion of dilution gas that flows from the Gas Standard Generator through the inside of the permeation tube membrane. The Gas Standard Generator then introduces this mixture into a much larger flow of dilution gas to form a low concentration gas standard.

Each Trace Source™ 57S Prefilled Gas Permeation Tube is given a serial number and is laboratory certified. The certification data, which includes the permeation rate and the operating temperature of the tube, is recorded.

Benefits

The Trace Source™ 57S Prefilled Gas Permeation Tube design provides a safe calibration method for highly toxic and reactive compounds that cannot be used in a disposable permeation tube. With this method, the calibration standard is mixed at the point of use, which means the standard is fresh. This minimizes the possibility of contamination or deterioration of the test compound, and so provides a more accurate, repeatable standard. Because the total amount of toxic material is smaller than that contained in a gas cylinder and because the risk of deterioration is less, the Trace Source™ 57S Prefilled Gas Permeation Tube is a safer, more reliable standard.

Since a single Trace Source™ 57S Prefilled Gas Permeation Tube provides calibration for many different detection points, it eliminates the necessity of storing large numbers of gas cylinders to test each different detection point. Storing fewer gas cylinders also lowers the safety hazard risks and reduces cylinder storage and transport expenses.

Calibration for these gases:

- Arsine
- HCl
- HBr
- Oxygen
- CO
- NO
- N_2O
- CO_2
- CH_4
- Metal Hydride Gases
- Many Other Gases

Specifications:

Height: 6" for Base, 2-5" for fittings

Diameter: 1 ¾"

Concentrations: Sub ppb to 5 ppm

Membrane Length: 0.01 cm to 10.0 cm

Cylinder: Stainless Steel or Monel for corrosive chemicals

Used in: Any standard size KIN-TEK Oven

Safety Purge Kit required for special compounds

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Operation

When a Trace Source™ 57S Prefilled Gas Permeation Tube is installed in a KIN-TEK Gas Standard Generator, it is held at a constant temperature causing the gas surrounding the permeation tube membrane to permeate into the membrane at a known rate, measured in nanoliters per minute. The Gas Standard Generator introduces a portion of dilution flow into the permeation tube, then adds this mixture back into the larger, main dilution flow to form the calibration standard. The concentration of the calibration standard that is formed is controlled by the permeation rate of the gas into the membrane and the flow rate of the dilution gas.

The permeation rate of the gas is controlled by the temperature of the Trace Source™ 57S Prefilled Gas Permeation Tube. The Gas Standard Generator provides precise temperature and dilution flow control to allow accurate adjustment of concentration ranges. This can extend the concentration range of the permeation tube up to 5 ppm and allows multipoint calibration using one tube. The Trace Source™ 57S Prefilled Gas Permeation Tube gives the user the capability of generating accurate, custom, calibration standards.

Safety & Storage

Some Trace Source™ 57S Prefilled Gas Permeation Tubes that are filled with toxic chemicals are equipped with a specially designed purge kit, which enables the user to purge and vent the membrane safely with inert gas under a fume hood. All Trace Source™ 57S Prefilled Gas Permeation Tubes have special caps for storage when they are not in use. Tubes are stored safely at room temperature when securely capped.

NOTE: As the tube is used and the amount of gas contained in the Trace Source™ 57S Prefilled Gas Permeation Tube decreases, the permeation rate of the tube will change a predictable amount. Therefore, the tube can be used for a fixed period of time during which the accuracy will remain within known limits (e.g., ±1% or ±5%) before rate recalculation is necessary. Some typical emission rate change data are show in Table 1.

Estimated Emission Rate Change

Operation (days)	1 Emission (nl/min)	10 Emission (nl/min)	100 Emission (nl/min)	1000 Emission (nl/min)
30	Negligible	~ 0.1%	< 1%	~ 7%
90	Negligible	~ 0.25%	~ 2%	~ 22%
180	Negligible	~ 0.55%	~ 5%	–
360	<0.1%	~ 1%	~ 10%	–

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The KIN-TEK Analytical, Inc. Quality Management System is registered by Intertek as conforming to the requirements of ISO 9001:2015.

For more information: https://kin-tek.com/kin-tek-quality