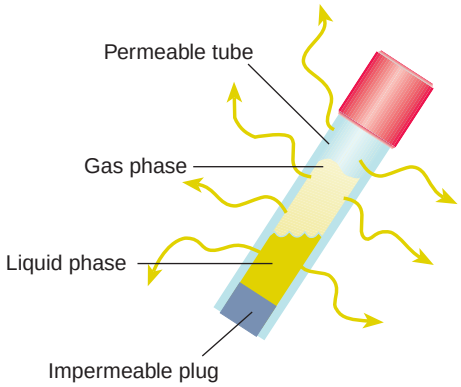
Dynacal Permeation Devices

Basics

Dynacal permeation devices are small, inert capsules containing a pure chemical compound in a two phase equilibrium between its gas phase and its liquid or solid phase. At a constant temperature, the device emits the compound through its permeable portion at a constant rate. Devices are typically inserted into a carrier flow to generate test atmospheres for calibrating gas analyzer systems, testing hazardous gas alarms, or conducting long-term studies of effects on materials or biological systems – in short, any situation requiring a stable concentration of a specific trace chemical.



Accuracy and Stability of Concentration

The purpose of a calibration gas standard is to establish a reference point for the verification of an analysis. With a bottled gas standard, the concentration can be verified only by analysis – a classic case of the dog chasing its tail. Permeation device rates can be certified using standards traceable to NIST by the most basic and accurate laboratory procedure – measuring the gravimetric weight loss over a known period of time at a known temperature.

The concentration in a gas cylinder changes as the trace components adsorb onto the cylinder walls or react with the dilution components. This effect can be especially pronounced with highly reactive components, such as Cl_2, NO_2, H_2S, and ETO. With permeation devices, the reactive component is in its most stable form as a pure substance, and encased in an inert capsule of Teflon® or stainless steel.

Safety and Convenience

Gas cylinders can be dangerous – a leak or broken connection can cause a sudden release of a large volume of toxic, corrosive, odorous, or otherwise hazardous gas. Permeation devices usually contain less than one gram of the pure substance, and are permanently sealed, virtually unbreakable, and safe to handle.

Gas cylinders are also big and heavy. They take up a lot of space (which often limits the number of standards in inventory), and shipment is slow and expensive. The small permeation devices are easy to handle and transport. Their size and long shelf life allow you to inventory as many compounds as you might ever require, *and* you can forget about disposal fees and monthly rental charges.

Availability and Delivery

With gas cylinders, production of a new mixture requires stability testing and the development of an analytical technique to verify the concentration (which often involves the use of a certified permeation device). Permeation rate data is already established for hundreds of different compounds, and rates for new compounds can be easily certified using NIST-traceable standards. Their small size and inherent stability allow us to inventory thousands of devices for delivery from stock, and because of the size and the limited quantity of chemical fill, we can offer overnight delivery via air express.

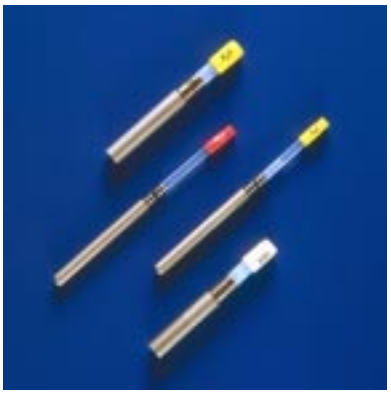
Generate your own calibration gas standards with high precision and traceability

Types of Devices

Tubular Device

The tubular device, a sealed permeable cylinder containing the desired permeant gas, is the most widely used of the various permeation devices. Release of the chemical fill occurs by permeation through the wall of the Teflon tube for the entire length between the impermeable plugs. A wide range of rates can be achieved by varying the length and thickness of the tube, with typical rates ranging from 5 ng/min to 50,000 ng/min. We can supply tubular permeation devices with active lengths (the length of the permeable section) ranging from 0.5 cm to 20 cm.

Extended Life Tubular Device



Our unique extended life tubular (XLT) device is essentially a standard tubular device coupled to an impermeable stainless steel reservoir. This design offers a range of permeation rates corresponding to a tubular device, but with significantly enhanced lifetime – by a factor of 3 for a 5 cm (active length) device or a factor of 12 for a 1 cm device.

Wafer Device

Wafer devices have only a small permeable window, or wafer, so permeation rates are typically lower than rates for tubular devices by an order of magnitude. Since permeation occurs only through the polymeric wafer, the permeation rate is controlled by varying the wafer material, the thickness of the wafer, and the diameter of the permeation opening. Gases whose high vapor pressure at normal permeation temperatures prevent their containment in a tubular device can be contained in a wafer device. Wafer devices are available in different styles to allow use in calibrators made by various manufacturers.

For information about a specific compound, fill out the Fax Request Form and fax it to us at (408) 737-0346

Flexible device configuration to give the rate you need

Part Numbering System

1XX-XXX-XXXX-[XXXX]

Dynacal Permeation Device

Device Type

0	Tubular Device - High Emission
1	Tubular Device - Standard Emission
2	Tubular Device - Low Emission
3	Tubular Device - Special
4	Wafer Device
5	Wafer Device - Special
7	XLT Device - Standard Emission
8	XLT Device - Special

Certification

0	Uncertified
1	Tubular high range (> 500 ng/min)
2	Tubular mid range (101 - 500 ng/min)
3	Tubular low range (20 - 100 ng/min)
4	Wafer high range (> 100 ng/min)
5	Wafer low range (20 -100 ng/min)
6	Tubular or wafer ultra low range (5 - 19 ng/min)
7	Special temperatures, ranges, or accuracies

Permeation rate determining factor

002 to 200	Active tube length in mm
5 – –	Wafer device with “T” wafer
6 – –	Wafer device with “F” wafer
7– –	Wafer device with special wafer
– y –	Wafer thickness (.0y")
– – z	Wafer diameter (z/16")

Permeant gas designation*

0001-0199	Inorganic compounds
0200-0499	Organo-metallic compounds
0500-1999	Hydrocarbons
2000-3999	Hydrocarbons containing oxygen
4000-4999	Hydrocarbons containing halogen
5000-5999	Hydrocarbons containing nitrogen
6000-6999	Hydrocarbons containing sulfur
7000-9999	Other organic compounds

[XXXX] Special configuration identities

This overview of our permeation device part numbering system is provided to indicate the vast number of permutations available. When you let us know *your* needs via the enclosed Fax Request Form,** we'll do the research and the arithmetic and call you back with a part number and price.

*Contact Metronics for a complete listing of each of the groups listed above.
**Contact Metronics for additional Fax Request Forms.

VICI
Metronics Inc.
2991 Corvin Drive
Santa Clara, CA 95051 U.S.A.
Phone: (408) 737-0550
Fax: (408) 737-0346