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VARIAN

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FIELD INSTRUCTION SHEET

Instructions for Calibrated Helium Leak

Manual No. 699909988
Revision A
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Field Instruction Sheet
Varian Vacuum Technologies

Instructions for Calibrated Helium Leak

INTRODUCTION:

The calibrated helium leak is designed for use in calibrating healium leak detectors. It is equipped with an integral helium reservoir and an isolating valve, and is furnished with either an NW25 or a 1-1/8 inch diameter sealing surface to fit the test port of any Varian Leak Detector.

USE:

The details of tuning and calibration of the leak detector are described in the appropriate section of the leak detector manual. When the calibrated leak is not in use, it should always be left with the valve **open**, and be stored at the same temperature at which it will be used.

PRINCIPLES OF OPERATION:

The helium reservior consists of the nickel-plated cylinder to which the label adheres. The valve communicates with a hollow pyrex-glass finger which protrudes into the helium reservior.

Helium atoms permeate through glass, moving through the inter-molecular spaces in th eglass. This permeation rate is dependent on th pressure of helium on each side of the glass and on the are, thickness and teperature of the glass.

If the valve of the calibrating leak is left closed, helium will continue to leak into the glass finger until the helium pressure inside the finger is equal to that in the reservior (this would take about a year, in fact). As this pressure builds up, however, helium would eb absorbed on the metal walls, and the inter-molecular spaces in the glass will become saturated. For both these reasons, a high leak rate will be apparent for sonme time after re-opening the valve, so it is recommended that the valve be left open.

The leak rate of the calibrated leak is very stable, and is not affected by moisture or dust which can migrate in during periods of disuse. The leak rate is dependant of two effects, however.

A. Depletion.

There is some finite depletion of the reservior over time. This is a function of the leak rate and the volume of helium in the reservior. The table below shows typical depletion rates in percent per year for some typical leak rates.

P/N Suffix	-320	-301/-321	-302/-322	-303/-323	-304/-324
Nominal Leak Rate	$10^{-5/6}$	10^{-7}	10^{-8}	10^{-9}	10^{-10}
Depletion % per Year (approx)	**	3%	2.5%	< 0.1%	< 0.1%

**Refer to chart attached to neck of Calibrated Helium Leak.

B. Temperature.

The rate at which helium permeates the pyrex is affected by the temperature of the glass. The actual leak rate increases with increased temperature at 3% per degree (Celcius). About one tenth of this is attributable to increase of the helium pressure with increased temperature.

Technical Assistance

The final page of this document lists all the Varian offices from which you can obtain technical assistance.
In the United States, contact Varian Vacuum Technologies Customer Service at 1-800-8Varian or on-line at vpl.customer.support@varianinc.com.

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