EB-13: MASS SPECTROMETER HELIUM LEAK TEST PROCEDURE OUTBOARD

The purpose of this procedure is to define a method for mass spectrometer helium leak detection of high purity gas distribution components. This procedure is adapted from the Sematech Semaspec # 90120391B-STB.

DEFINITION:

Outboard testing is the measurement of leakage from inside to outside of the test component when the external pressure is less than the internal pressure of the test component.

TEST GAS:

High purity helium gas filtered to 0.02 microns. See **EB-12** for helium gas specifications.

LIMITATIONS:

Because of helium saturation of non-metallic materials used in some products, do not perform an internal or inboard leak test after an outboard leak test, and do not perform an inboard leak test after an internal leak test. The preferred order of testing:

1. inboard
2. internal
3. outboard

CALIBRATION:

Equipment calibration with a known reference standard leak must be performed prior to the beginning of the test day, and again at the close of the day. The standard leak calibrator must itself be calibrated on a regular basis.

RESULTS REPORTING:

If the actual leak rate is to be reported, the sensitivity of the equipment must be 5 times greater than the leak to be measured. If the sensitivity is not 5 times greater, the actual leak rate may be reported if the sensitivity of the detector is also reported.

TEST PROCEDURE

1. CONNECT O-RING TYPE QUICK TEST PLUGS TO OUTLET AND ANY GAUGE PORTS.
2. CONNECT LEAK TEST ADAPTER TO INLET PORT WITH O-RING TYPE QUICK TEST FITTING. CONNECT ADAPTER TO LEAK TEST MACHINE.
3. PLACE A PIECE OF TAPE OVER THE VENT HOLE IN THE BONNET OF THE CAP.
4. SCREW IN ADJUSTING SCREW ABOUT TWO TURNS, OR 1/2-TURN AFTER IT MAKES CONTACT WITH SPRING BUTTON.
5. BEGIN CYCLE ON MACHINE. USE ONLY IN DIRECT FLOW MODE.
6. SPRAY HELIUM AROUND FITTINGS AND BASE OF CAP FOR AT LEAST 30 SECONDS. IF MACHINE INDICATES A LEAK IMMEDIATELY STOP TEST.
7. REMOVE TAPE FROM VENT HOLE ON BONNET. INSERT HOSE INTO THE HOLE AND FILL BONNET WITH HELIUM FOR AT LEAST 30 SECONDS. IMMEDIATELY REAPPLY TAPE. WATCH FOR THE PRESENCE OF LEAKS FOR AT LEAST 2-1/2 MINUTES.
8. INSURE THAT INBOARD LEAKAGE DOES NOT EXCEED 1×10^{-9} ATM CC/SEC