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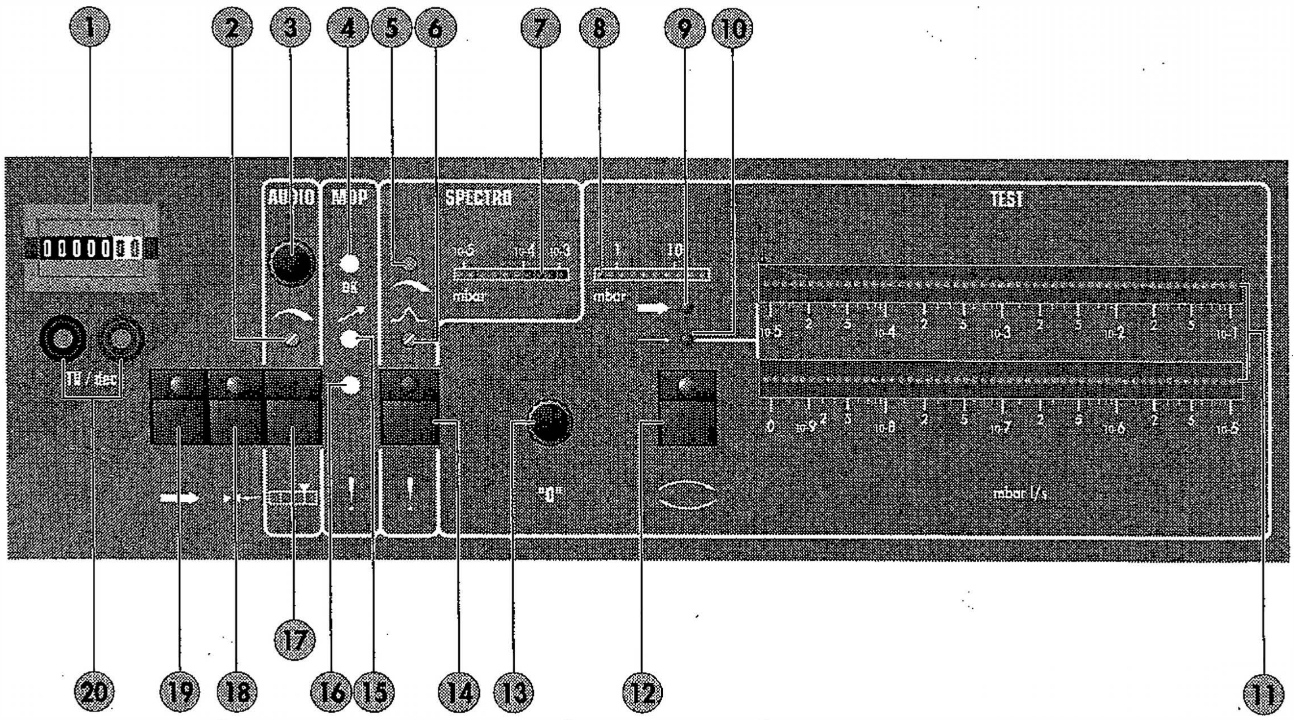
ACCREDITED
CERTIFICATE # 4265.01

Quick Reference Guide
Using a Sniffer Probe with
Alcatel model ASM121H

1. Power up the leak detector and wait approximately 3-5 minutes, until the leak rate display lights up
2. In the standby mode the leak detector will read a residual or background helium.
3. Plug in the sniffer probe into the quick disconnect fitting located on the left side of the machine. The unit now begins to monitor atmospheric helium.
4. With normal amounts of helium in air (about 5 ppm) the leak detector will read between f and 3 x 10-9 mbarliter/s c (or atmcc/sec).
5. To insure the probe is functioning properly place your finger over the tip to block flow and insure that the signal on the display drops. Release your finger and the display should rise.
6. If a calibrated leak &tandard (it is recommended that the leak standard be at or near the sensitivity or reject limit that is being tested to) is available then place the probe at the outlet of the leak standard and insure the display rises. You may wait several seconds until the signal stabilizes, then note the actual value. There is an offset built into the display, thus the readout will not match the calibrated leak standard. Use the calibrated leak standard to determine the correction factor for the display. The correction factor is typically about 1,000 or 3 decades (a reading of 2 x 10-9 is actually about 2 x 20-6).
7. The leak detector may be used for monitoring helium concentration (PPM) over time. In this case, the flow rate of the sniffer probe is 1 cc/sec. Thus, after calculating the offset (see above), then the leak rate reading (mbarliter/sec or atmcc/sec - they are the same) is actually the concentration in atmospheres or PPM (5 ppm = 5 x 10-6 atm).
8. If no calibrated leak is available for calibrating the sniffer, then place the leak detector in an area (preferably outside) where it is known NOT to be contaminated with helium. The natural reading of the sniffer probe will be 5 ppm or 5 x 10-6 atmcc/sec when sampling the air. If, under these conditions the leak detector reading is 2 x 10-9 atrncc/sec, then the correction factor would be 5 x 10-6 I 2 x 10-9 = 2,500.
9. If using the analog output (0-8 volts DC) to monitor leak rate, use the following equation to convert form a linear voltage output to leak rate (or concentration).
   a. Leak Rate = InvLog (Volts) x 10^{-10} (1.39 volts = 2.45 x 10-9).
   b. NOTE: If using a correction factor (see above), then multiply the correction factor on the calculated leak rate NOT on the raw voltage.

Operator interface



1 Hour counter
2 Set point adjustment
3 Audio signal volume adjustment
4 MDP normal speed light
5 Cell emission current adjustment
6 Helium peak adjustment
7 Cell pressure display
8 Inlet pressure display
9 Gross leak "ready" light
10 Fine leak "ready" light
11 Helium signal displays
12 Cycle control button
13 Helium zero adjustment
14 Triode pressure fault light; filament reset and "off" button
15 MDP acceleration light
16 Converter fault light
17 Set point display control
18 Inlet venting control button
19 Gross leak control button
20 Recording outputs 1 V per decade

User's Manual
ASM 120 H - ASM 121 H

Operation:

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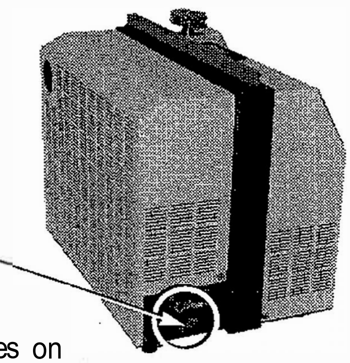
Starting up the detector

In G 10, the user will find a view of the operator interface.
It can be used to identify the operational parts of the control panel.

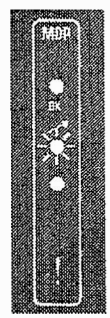
> ⚠ **Before starting up the detector, check that the roughing pump oil level is correct**
> ***(see sheet B 50).***



Power-up

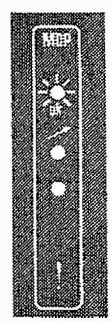
Set the circuit-breaker switch to I

(left-hand side of unit)
The light built into the switch comes on



The primary pumping is started

The orange light B comes on and the secondary pumping (MDP 5006 pump) is started.



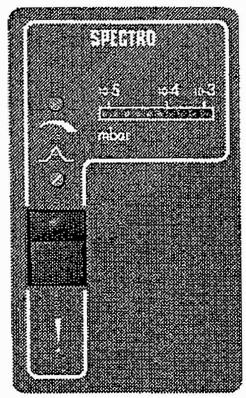
The secondary pump is in the acceleration phase

It reaches its nominal rotation speed in 2 to 3 minutes.
When the pump has reached its speed (27000 rpm) the green light g comes on.

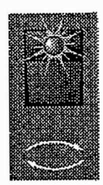
Starting up the detector

- The secondary pump has reached its nominal speed and the pressure (measured at the inter-stage of the MDP) is $\leq 10^{-1}$ mbar.

- **After a time delay of 5 minutes, the filament is started up.**



- The detector is ready to be used, the "Cycle start" key is now active.



Hour counter The hour counter is started up when the unit is switched on.

Detector calibration

Preparation

- Disconnect the leak detector from the installation.

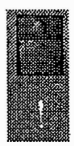
- Fit a calibrated helium leak of a precisely known value (approx. 10^{-7} mbar.1/s) on the detector inlet flange.

- The detector should be in operation for at least one half-hour.

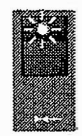
Electrical zero setting

- Switch off the filament using the key (keep the key pressed down). I

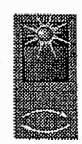
- Set the electrical zero using the potentiometer. I
  • so that only two bars are lit opposite the "0" on the display (ref. **11**).

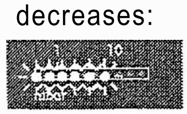
- Release the key  to reset the filament.

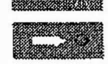
Measurement start-up

- Press down the "air vent" key 

  • the key stays pressed down.
  • the inlet pressure display (ref. 8) indicates the atmospheric pressure:

- Check that the calibrated leak valve is open
Press the cycle start key.
  • the light on the key comes on. 
  • the value on the inlet pressure display decreases:



- at **10 mbar,** the GROSS LEAK light comes on. 
- at **2.10^{-1} mbar,** the FINE LEAK light comes on  and the GROSS LEAK light goes off. 

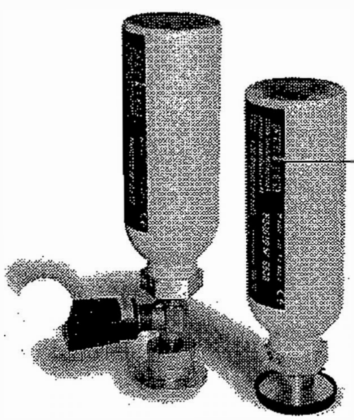
Detector calibration

Helium spectrometer calibration

- Set the helium peak Ill , search its maximum on the helium signal display

- Set the filament current II , to adiust its value.

- **In order to read, on the detector bargraph, the helium signal corresponding to the value of the calibrated leak (CL) used for the calibration, corrected in terms of temperature and time.**



Example

- *CL* = *3.* 10^{-7} mbar.1/s *at T* = **20°C**, *25/11/95*
- *Temperature coefficient* = *+3% per* °C
- Loss *coefficient* = *-2% per year*

On 25/11/96, at T = 35°C:

CL (corrected) = *CLI x (1+0.03x15) x /1-0.02)*

CL (corrected) **=** ***4.26. 10-7 mbar.l/s***

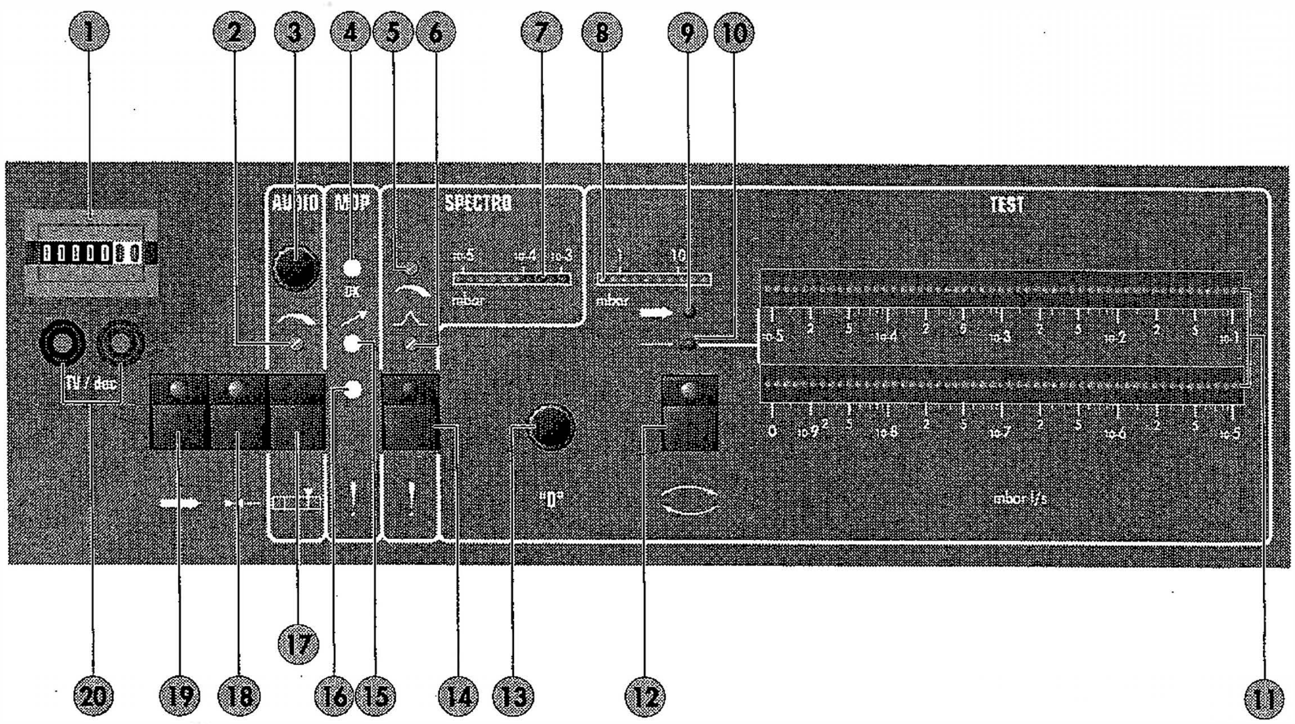
Repeat the settings several times, ending with the helium peak setting

- Press the cycle start key Ill to release and stop the test cycle

  - the light on the key goes off,
  - the helium signal display returns to its initial position, indicating the background noise of the detector only.
  - the inlet pressure display indicates the atmospheric pressure.

Note:
The calibration is made in FINE LEAK test mode.

Detector calibration



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18 Venting control button
19 Gross leak control button
20 Recording outputs I V per decade

Detector operation

In G 10, the user will find a view of the operator interface.
It can be used to identify the operational parts of the control panel.

The following pages contain:

Working in vacuum test mode

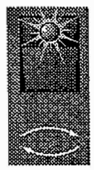
Make sure that the parts can withstand the difference in internal/external pressure to which they are subjected.

Connect the test part

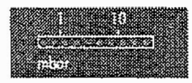
It is recommended to connect the test part with a connector of the same diameter (DN 25) and to limit line lengths as much as possible.

Detector operation

Start up pumping of the line and the part

Run a cycle by pressing 

The pressure drop is displayed on the control panel.



As a function of the characteristics of the test part and, therefore, of the pressure reached, the unit is set automatically to gross leak or fine leak mode.

Gross Leak (GL) mode:
10 mbar > P > 2.10^{-1} mbar

Fine Leak (FL) mode:
P < 2.10^{-1} mbar

Note: To run a cycle, the filament must be on.

- The light Kfi indicates that the detector is operational in gross leak "GL" mode

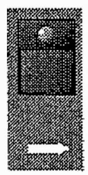
- The light 11111 indicates that the detector is operational in fine leak "FL" mode

Detector operation

Working in GROSS LEAK mode

It is sometimes preferable to work in gross leak mode, in order to shorten the cycle time or to pretect the unit against possible accidental pressure rise.

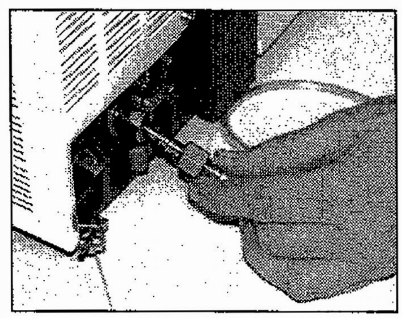
Gross leak mode can be preset by validating



In GROSS LEAK test mode, the helium signal displayed must be multiplied by 10 approximatif to obtain the actual leak value.

Working in Sniffer mode (LDS) (standard)

----------< DETECTOR NOT IN CYCLE----



Conned the probe to the quick connector

The detector is operational immediately.

The signal of the helium flow measured is displayed on the helium signal displays.

Flow measured: The natural concentration of helium in the air is of the order of 5.10^{-6} to 5.10^{-5}

When the LDS probe is placed in the ambient air, the He signal displayed is between: 2.10^{-9} mbar.l/s and 4.10^{-9} mbar.l/s

Detector operation

High performance sniffing (optional)

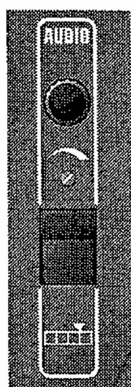
This option enables a gain in sensitivity (used to detect leaks of the order of 10-7 mbar.1/s).

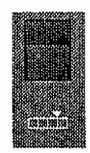
If this option is installed :

- the detector inlet must be blocked
- the detector must be in FL test mode
- the electrical zero setting is possible.

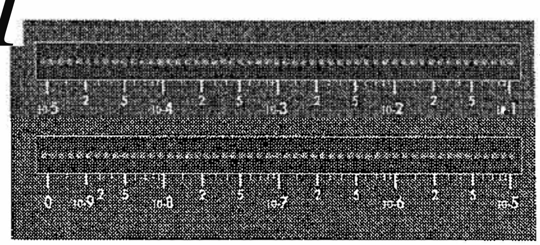
Audio signal

The audio signal is triggered when the leak rate exceeds the rejection threshold.
The frequency of the audio signal depends on the leak flow measured by the unit (the higher the flow, the higher the frequency of the signal will be).



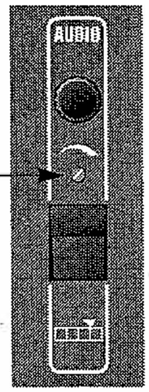
Display the triggering threshold by pressing 

t hold is displayed on element displays

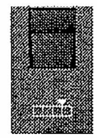


Detector operation

Set the audio alarm triggering threshold



- Set the threshold using a screwdriver by turning the potentiometer

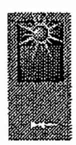
- Release the key 

Adjust the audio volume

Adjust the volume of the audio signal with the knob on the audio section.
When this knob is at the minimum setting ("0"), the audio signal is switched of.

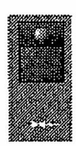
In the case of **the** "90 db" **option** this audio signal can reach 90 decibels.

Enable the inlet vent



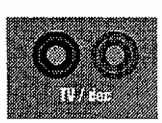
When the inlet vent indicator light is lit, at the end of the cycle, the inlet vent valve is open.

Disable the inlet vent



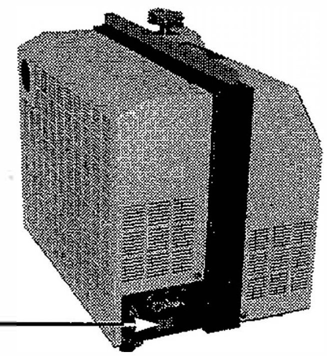
It is possible to disable the opening of this valve by releasing the key. The indicator light goes out.
This function is important to prevent the installation from returning to atmospheric pressure by mistake.

Record the helium signal



This analog output supplies a voltage of 0 to BV.
The response curve is logarithmic (I volt per decade).

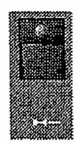
Switching off the detector



The unit can be switched off at any time by setting the circuit-breaker switch to O.

To keep the connection lines clean, it is recommended to leave them under vacuum when the detector is shut off.

To maintain a vacuum, the inlet vent key must be off.

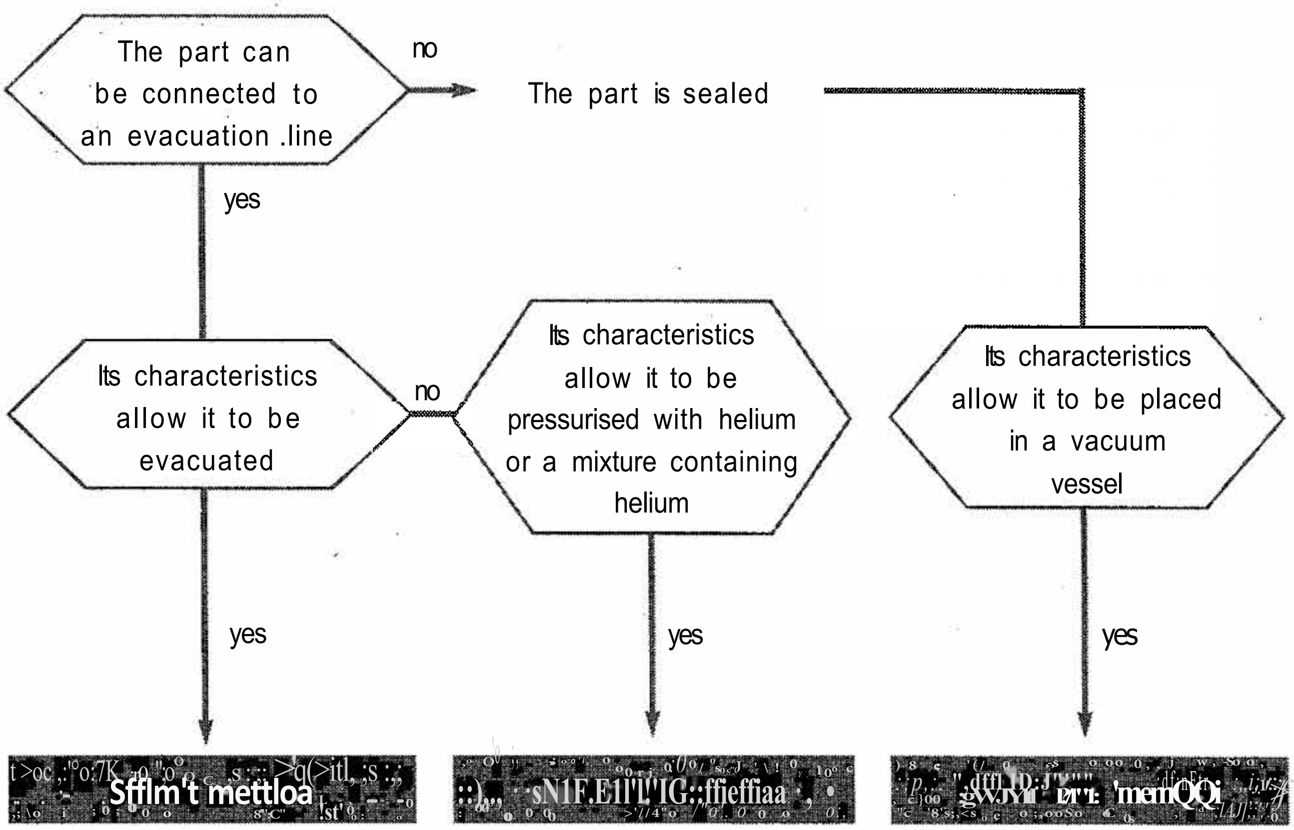


Testing methods

Leak detection is used to detect micro-openings, porosities, etc. in test parts. The detection of these passages involves the use of a light gas, which is capable of infiltrating the smallest passages quickly: **Helium.**

The detector samples and measures the helium flow rate entering the test part via the leak(s).

The testing method is selected according to the test part and the measurement accuracy required:



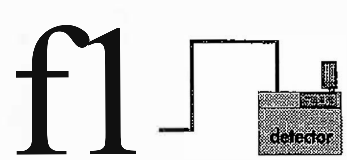
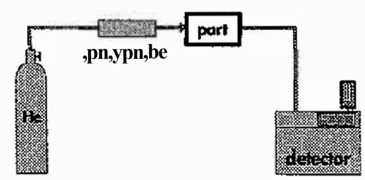
Leak rate measurement from 10^{-10} to 10^{-1} mbar and possibility of locating the leak

Minimum detectable leak of 10^{-6} mbar and possibility of locating the leak

Leak not located

Testing methods

Spray method This involves removing air from the test part, connecting it to the analyzer and then spraying helium over the outer surface.

Global test		Spray test
	or	
The part is placed under a cover, into which helium is iniected.		Areas liable to leak are sprayed with helium.
The leak cannot be located.		The leak can be located.

The detector measures the flow of helium penetrating the part.

Response time When spraying starts, the leak signal is not displayed instantaneously on the analyzer:
there is a response time which depends on the volume V being tested and the helium pumping speed S of the system at the opening of the part, according to the following relation:

$$T = \frac{V}{S}$$ (T in seconds, V in litres, S in 1/s)

T is the time required for the signal to reach 63 % of the final value.

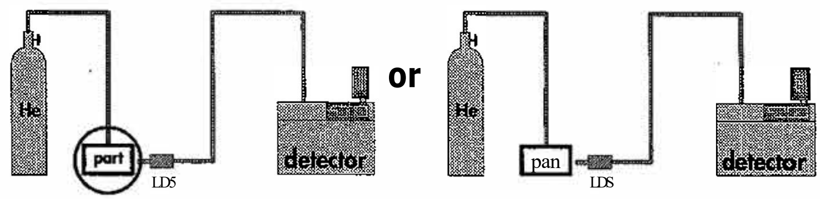
03 - May 97

Testing methods

Sniffer method

The test part is pressurized with helium. The detector, via an LDS (Long Distance Sniffer) probe, collects the helium escaping from the part.

Global lest **Local sniffing lest**



The part is placed under a cover containing a sniffer probe.

The leak cannot be located.

The helium from the leak accumulates over time inside the cover. The detector measures the concentration.

The sniffer probe is moved over areas likely to contain leaks.

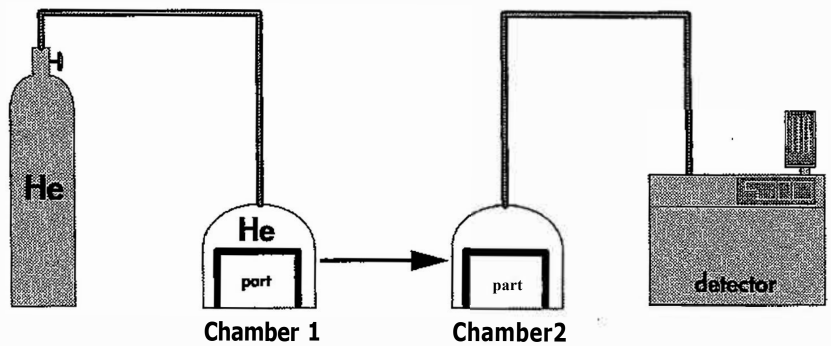
The leak can be located.

The signal supplied by the analyzer is not a direct measurement of the leak. The sniffer probe only collects part of the helium escaping from the part depending on the distance separating the leak from the tip of the probe.

Testing methods

Bombing method

This method is used for sealed obiects that cannot be connected directly to the detector (semiconductors, waterproof watches, etc.).



The part is placed in a vessel containing pressurised helium.

The helium penetrates the part if it has a leak.

The part is then removed from the vessel and placed in another vacuum vessel which is connected to the detector. The helium escapes from the part through the leak and produces a signal.

This signal is not a direct measurement of **the leak** as the helium pressure inside the part is difficult to determine. It depends on the pressurisation time, pressurisation pressure, internal volume of the part, dwell time before vacuum test and size of the leak.