



MARPOSS

He



LEAK TEST

Air



FAST MEASUREMENT

GLOBAL SERVICE

MULTI-SECTOR EXPERIENCE

<0,00001 mbar\*l/s

CUSTOMIZATION



# IN-LINE LEAK TESTING

ADVANCED INDUSTRIAL SOLUTIONS FOR THE HVAC INDUSTRY

# HARD VACUUM HELIUM LEAK DETECTION TECHNOLOGY

In this solution, the Hard Vacuum Helium Leak Detection System, applied to individual components as well as to the entire finished assembly, provides the most reliable method for detecting global leakage on circuits.

In the testing method the tracer gas is Helium 100% or mixtures He/N2 and the analysis system is the mass spectrometer measurement in a vacuum chamber; this method is the most performing among the various leak testing systems, aiming the detection of the smallest quantity of leak, values.

CONVERSION REFRIGERANT FLOW (IN WEIGHT) vs EQUIVALENT HELIUM FLOW (IN VOLUME)						
Refrigerant flow	HFC		HC			
	R134a	HFO 1234YF	R290	R600	R717	R744
[gr/y]	Helium equivalent flow [mbar l/s]					
1	3,68E-06	3,41E-06	6,26E-06	4,12E-06	1,89E-05	1,08E-05
2	7,37E-06	6,82E-06	1,25E-05	8,24E-06	3,77E-05	2,15E-05
3	1,11E-05	1,02E-05	1,88E-05	1,24E-05	5,66E-05	3,23E-05
4	1,47E-05	1,36E-05	2,50E-05	1,65E-05	7,54E-05	4,31E-05
5	1,84E-05	1,71E-05	3,13E-05	2,06E-05	9,43E-05	5,39E-05

Note:

- 1 | safe side calculation in laminar flow through the leak channel
- 2 | Hp: at 10 bar internal pressure test chamber pressure 0,1 mbar
- 3 | Ref temperature 20°C.

The in-line leak test machines are capable of testing components and assemblies with leak thresholds in the range of 10<sup>-5</sup> mbar<sup>\*</sup>l/s. For a better evaluation, compare this with a traditional nitrogen leak test in a water tank, which gives estimated results in the range of 10<sup>-2</sup> mbar<sup>\*</sup>l/s (one bubble with a radius of 2 mm in 1 second), but taking into account the totally human guesswork and then including undetected bubbles/leaks.

All parts and circuit connections must be guaranteed to have a total leakage lower than that permitted by law (specific thresholds for each chemical compound). That's why not only the components but also the final assembly must undergo this EOL leak test.

## SAVING COSTS EVEN WITH HIGH QUALITY PRODUCTION CONTROLS

A high efficiency (85-95%) helium recovery system connected to the leak test machines, either integrated or as a stand alone unit; the fully integrated process gives better reliability on the system with the shortest return on investment ever.

## HELIUM RECOVERY HIGHLIGHTS

- Recovers up to 95% of used helium
- Totally modular layout
- Able to handle different test stations
- Modular solutions, easy installation & maintenance
- Communication of He% data from HRS to HLT machine
- Possible upgrade from lower to higher capacity units
- Very short payback time evidence
- Wide range of Capacity (up to 1000 NI/m) and Operating pressure (up to 350 bar)





# MARPOSS OFFERS MEASUREMENT, INSPECTION AND TEST SYSTEMS FOR ALL PRODUCTION AREAS OF THE HVAC-R INDUSTRY

In the context of the HVAC-R industry, the leak test application is a high-tech end-of-line test that allows the manufacturer to guarantee very high quality in its final product, without sacrificing the high productivity that it must maintain to meet market demand with actual production sites.

## COMPONENTS TO BE TESTED

- FILTERS SYSTEMS
- CHILLERS
- COMPRESSORS
- CONDENSERS
- ELECTRONIC EXPANSION VALVES
- EVAPORATORS
- HEAT EXCHANGERS
- REFRIGERANT VALVES
- REFRIGERANT HOSES
- BOILER HOSES



## KEYWORDS ARE CLIMATE CONTROL, ENERGY EFFICIENCY, PRODUCT QUALITY

In the context of climate control and, ultimately, the increased attention being paid to the potential contribution of refrigerant compounds to global warming, only leak testing solutions that enable this will be more reliable and accurate.

The increasing demand for energy efficient heat exchange systems is one of the main drivers for high accuracy leak testing of HVAC products.

In order to achieve the efficiency of the thermal assembly in its final installation, leak testing provides important confirmation that the heat exchange efficiency will not degrade over a reasonable warranty period until the use and consumption of the parts becomes relevant.



- COMPONENT: **BELLOWS**  
AIR TEST PRESSURE: 6 – 21 bar  
He TEST PRESSURE: 0,5 – 7 bar  
LEAK RATE:  $5,4 \times 10^{-7}$  mbar l/s  
PRODUCTIVITY: 850 pcs / h



- COMPONENT: **HEAT PUMPS**  
AIR TEST PRESSURE: max 50 bar  
He TEST PRESSURE: max 50 bar  
LEAK RATE:  $1 \times 10^{-5}$  mbar l/s  
CYCLE TIME: 3 mm



- COMPONENT: **REFRIGERATION VALVES**  
AIR TEST PRESSURE: 140 bar  
He TEST PRESSURE: 50 bar  
LEAK RATE:  $1,2 \times 10^{-5}$  mbar l/s  
PRODUCTIVITY: 1 pcs / 21 sec

# OUR CONTRIBUTION TO ENERGY SAVING AND ENVIRONMENTAL RESPONSIBILITY

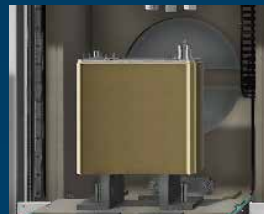


COMPONENT: **CONDENSING HEAT EXCHANGER**

TRACE GAS: 10% He/ 90% N<sub>2</sub>

LEAK RATE: Water 1,29 cc/min | (1,48E-2 mbar\*l/s of He @ 6 bar a)  
Air 6 cc/min | (1,84E-2 mbar\*l/s @ 0,5 bar a)

PRODUCTIVITY: 1 pcs / 20 sec



COMPONENT: **HEAT EXCHANGER**

He TEST PRESSURE: up to max. 30 bar ▲▲

NITROGEN TEST PRESSURE: up to max. 80 bar ▲

REJECT THRESHOLD: 1,0E-5 mbar\*l/s of helium

PRODUCTIVITY: 40 pcs / h



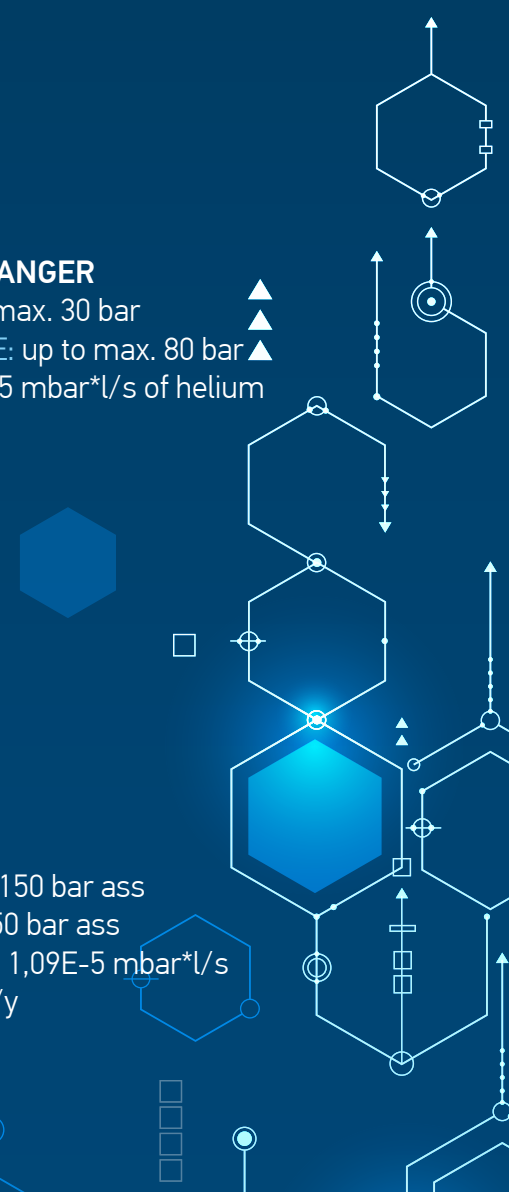
COMPONENT: **CDU CO<sub>2</sub>**

AIR TEST PRESSURE: max 150 bar ass

He TEST PRESSURE: max 50 bar ass

REJECT THRESHOLD: CDU: 1,09E-5 mbar\*l/s

PRODUCTIVITY: 23.100 pcs/y



# MEASUREMENT, INSPECTION AND TEST FOR QUALITY AND PROCESS CONTROL



worldwide present in

**34**  
countries

offices worldwide

**80**

exports

**94%**

approx.

**3,500**  
employees

**1,240**

Italy

**1,110**

Asia

**810**

Rest of  
Europe

**340**

Americas

**30**

key acquisitions since 2000

**8%**

resources invested in R&D

Marposs was founded in 1952 and since then has provided shop-floor solutions for the quality control in the production environment. Marposs' solutions include gauging equipment of mechanical components, before, during, and after the production process, monitoring solutions on machine tools, assembly, and testing systems, automatic machines, and checking stations for production lines.

Marposs is one of the main suppliers of the top automotive manufacturers, but operates as well in the aerospace, biomedical, HVAC-R, hi-tech, and glass industries.

Marposs Group's employees are more than 3500, located around the world, with presence in thirty-four countries with more than eighty sales offices.



**MARPOSS**

For a full list of address locations, please consult the Marposs official website

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