

# Application report

## Helium recovery system (HRS)

The perfect technology from GHS Vakuumtechnik GmbH to reduce helium costs.



The reduction of operating costs, the optimization of work processes and the conscious use of limited resources are important requirements for the equipment of modern helium leak testing systems. Especially dealing with concise resources the awareness of economical use of the materials used onsite the plant of operators and manufacturers had become equally essential. One such important resource is the tracer gas helium, which is used for leak detection in customer-specific leak testing systems from GHS Vakuumtechnik GmbH. To make the processes as efficient and resource-saving as possible, GHS Vakuumtechnik GmbH has developed helium recovery systems that make the gas used for leak detection recyclable after the end of the test and thus recover it for reuse.

In this process, the helium recovered by the leak testing systems is first collected in an application-specific storage vessel. At the same time, the current concentration of helium gas is checked and, if necessary, automatically remixed to the adjusted parameter value. This procedure ensures that an identical helium concentration is used for each measurement. A qualitatively constant helium concentration is a basic requirement to be able to carry out reproducible measurements. Finally, the gas mixture is compressed to the required process pressure and made available to the helium leak detection systems in a closed circuit. Especially regarding environmental certifications according to DIN EN ISO 14001 and resource saving, the recovery of already used helium is an essential must. The systems are designed as stand-alone systems and recover the (test) gas helium independently of the connected leak test systems.

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Management System  
ISO 9001:2015

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The achievable recovery rate is up to 98% at helium concentrations between 10-95%, depending on process conditions. The values depend on the type or design of the helium recovery, parameter settings and the helium tightness of the connected test systems. The possible maximum working pressures of the systems are optionally up to 500 bar. Depending on the pressure level and design of the system, the maximum helium throughput is 170 – 2600 standard litres per minute.

Basically, two principles of helium recovery are available: "balloon recovery" and "vessel recovery". They are based on the formula  $p \times V = \text{constant}$ . In balloon recovery, the helium is first collected in a balloon, which expands by filling. This means that with this principle, the storage in the balloon is realized via the volume, so the pressure remains constant under atmospheric conditions. In vessel recovery, the helium is compressed directly into a pressure vessel, which has a constant volume, but the pressure increases steadily.

The balloon recovery system is characterized by a very good price-performance ratio, while the vessel recovery system convinces above all with a small footprint and works with a dry compressor. In addition, alternative solutions tailored to specific customer requirements can also be implemented on request.



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Brief technical profile of the helium recovery systems available as standard:

Ballon HRS	X	Compressor capacity [NI/min]	Tank HRS	X	Compressor capacity [NI/min]
HRS-S7	0	above 1000	HRS-S9	0	above 1000
HRS-S7	1	up to 100	HRS-S9	1	up to 100
HRS-S7	2	up to 299	HRS-S9	2	up to 299
HRS-S7	3	up to 399	HRS-S9	3	up to 399
HRS-S7	4	up to 499	HRS-S9	4	up to 499
HRS-S7	5	up to 599	HRS-S9	5	up to 599
HRS-S7	6	up to 699	HRS-S9	6	up to 699
HRS-S7	7	up to 799	HRS-S9	7	up to 799
HRS-S7	8	up to 899	HRS-S9	8	up to 899
HRS-S7	9	up to 999	HRS-S9	9	up to 999

**Customer benefits:**

- Minimizing operating costs
- Reduction of dependence on availability up-and downturns on the world market
- Stand-alone system, independent of the connected test systems
- Compliance with environmental requirements through resource-saving use of helium (e.g. DIN EN ISO 14001)
- Fully automatic operation
- Automatic re-evacuation of the test specimens from connected test systems

**Typical applications:**

- Automotive industry (e.g. airbags, aluminum rims, fuel system components, air conditioning components and air suspension systems)
- Refrigeration/air conditioning technology (e.g. evaporators, compressors)
- Vacuum and overpressure technology (e.g. fittings, fittings)
- Packaging (e.g. for pharmaceutical products, foodstuffs)
- Energy technology
  - (e.g. for medium-voltage switches, surge arresters)
- Research facilities and laboratories
- Accelerator
- .....others.....

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