



Operating Manual High Performance Separator (HAD)

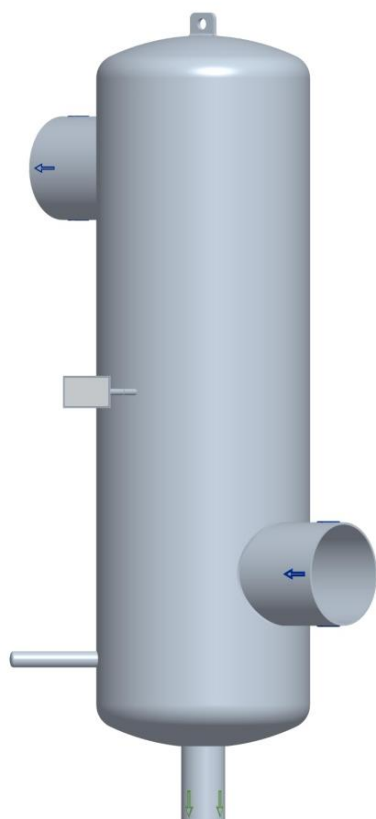
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Please read the operating manual carefully in full before you install or operate the high-performance separators (hereinafter also referred to as HAD)!



1 Intended use

The WITT HAD is a unique, highly efficient compact separator. The HAD reliably separates liquid refrigerant, meaning that the quantity of the existing separator can be increased to its maximum capacity.

The HAD can be used to extend existing systems, or anywhere where a dry suction line is required. The installation is done mostly in the existing piping system without the need for major assembly work.

2 Safety regulations

All the work carried out on refrigeration systems must be performed by qualified personnel, trained in handling refrigeration systems. The safety regulations and accident prevention measures that apply to the handling of refrigerants must be observed.

The applicable guidelines for setting up and operating refrigeration systems, e.g. EN 378, must be observed.

The legal regulations governing the commissioning and operation of pressure equipment valid at the site of the respective country must be followed.

Under no circumstances may temperature and pressure information specified on the nameplate and drawings be exceeded.

It must be ensured that emergency and escape routes are marked and their access is unrestricted.



Pressure vessels that can be shut off by other parts of the refrigeration system must be equipped with a pressure relief device to prevent an unacceptable increase in pressure in accordance with EN 378.



Welding work must not be carried out on the pressure vessel (other than on the designated connections), otherwise this will render the certificates invalid.



Only a qualified technician may change the filling capacity of the system! The level specified on the drawing must not be exceeded.



In order to protect people from burns or frostbite, a form of protection must be provided depending on the temperature (below -10°C or above $+60^{\circ}\text{C}$), e.g. insulation.

The corresponding fire safety precautions must be taken to prevent the pressure vessel from overheating.

The safety devices must be checked before commissioning the system. The safety devices must also be inspected after the system is disassembled or after a reaction.

3 Warranty provisions

In order to avoid accidents and to ensure the safety of the system, no modifications or changes may be made to the HAD that have not been expressly approved by TH.WITT KÄLTEMASCHINENFABRIK GmbH.

All the information and instructions for the operation and maintenance of the HAD are made to the best of our knowledge, based on our previous experience and knowledge.

All liability or warranty claims are excluded if:

- the references and instructions in the operating manual are not observed,



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- the HAD, including its equipment, is not operated correctly, or it has been handled in a way that does not correspond to the prescribed sequence,
- the HAD is used for purposes other than its intended use,
- safety devices are not used or are disabled,
- functional changes of any kind are made without our written consent,
- additional compressor power is connected or changes are made on the evaporator side so that the intended power is exceeded
- the relevant safety regulations and accident prevention regulations are not observed during the operation of the HAD.

4 Scope of delivery

- **HAD vessel made of steel**, manufactured according to AD2000 and DGRL module H1
- **Connection for suction gas humid**, inlet
- **Connection for suction gas dry**, outlet
- **Connection for condensate**, outlet
- **Connection DN32**, Reserve
- **2 mounting brackets**, U-profile
- **Lifting eyelets on top**

The angle of the connection and mounting brackets on the periphery can be freely selected

5 Technical data

The dimensions, year of manufacture, volume, maximum filling capacity, tare weight, pressure / temperature range, group of fluids to be used and the materials used are specified in the drawings and certificates of the order.

Type	Diameter [mm]	Height [mm]	Weight [kg]	Outlet on top Inlet below DN	Condensate below DN	PS (t ₀ 100) TS (t ₀ 100): -10°C/+50°C [bar]	PS (t ₀ 75) TS (t ₀ 75): -10°C/- 60°C [bar]
HAD-250	273	1520	90	150	50	-1 / 16	-1 / 12
HAD-400	406	1780	200	200	80	-1 / 16	-1 / 12
HAD-550	559	2140	320	250	100	-1 / 16	-1 / 12

The pressure vessel must be protected from higher temperatures by suitable measures (setup, insulation, etc.).

5.1 Approved media

The HAD can be operated with all common refrigerants (NH₃, HFC refrigerants, HFO refrigerants and FC refrigerants), taking into account the maximum permissible pressures. If a 25 bar application is required, this must be specified when placing the order.

With CO₂ as a refrigerant, a special 40 bar version can be requested from TH.WITT.

5.2 Materials used

Housing	1.0345 / 1.0425
Connections	1.0345
Internal parts	1.0038 / PE 1000 (PE-UHMW)



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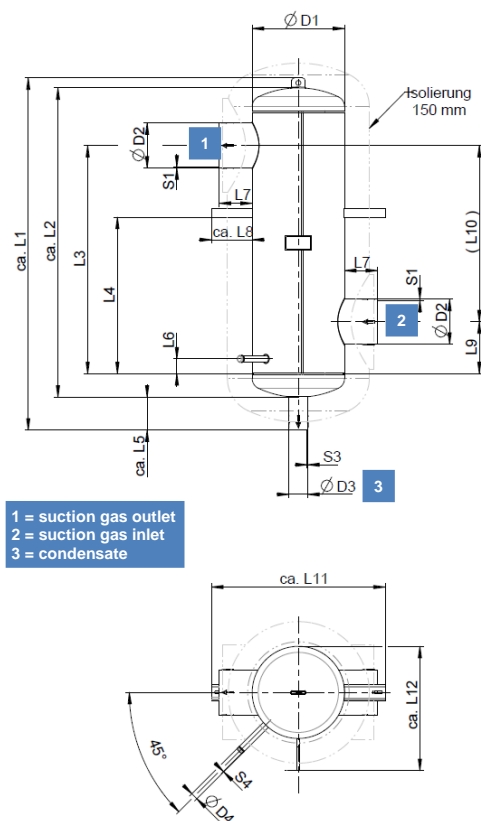
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5.3 Dimensions



Variable	Type			Unit
	HAD-250	HAD-400	HAD-550	
L1	1516	1778	2137	[mm]
L2	1255	1519	1877	[mm]
L3	945	1135	1385	[mm]
L4	600	750	950	[mm]
L5	201	199	200	[mm]
L6	45	60	90	[mm]
L7	200	200	200	[mm]
L8	246	246	246	[mm]
L9	180	235	315	[mm]
L10	765	900	1070	[mm]
L11	764	898	1052	[mm]
L12	469	602	755	[mm]
D1	273	406,4	559	[mm]
D2	168,3	219,1	273	[mm]
D3	60,3	88,9	114,3	[mm]
D4	42,4	42,4	42,4	[mm]
S2	4,5	6,3	6,3	[mm]
S3	2,9	3,2	3,6	[mm]
S4	2,6	2,6	2,6	[mm]

6 Functional description (retrofitting on existing systems)

6.1 Task

The high-performance HAD separator reliably separates liquid refrigerants in the suction line. A dry suction line prevents liquid slugging. In addition to this, a good separation is indispensable in order to increase the efficiency and service life of the compressor.

The filling capacity of an existing separator can be maximised by installing the HAD high-performance separator.

The system is usually installed in the existing pipeline system without the need for major installation work.

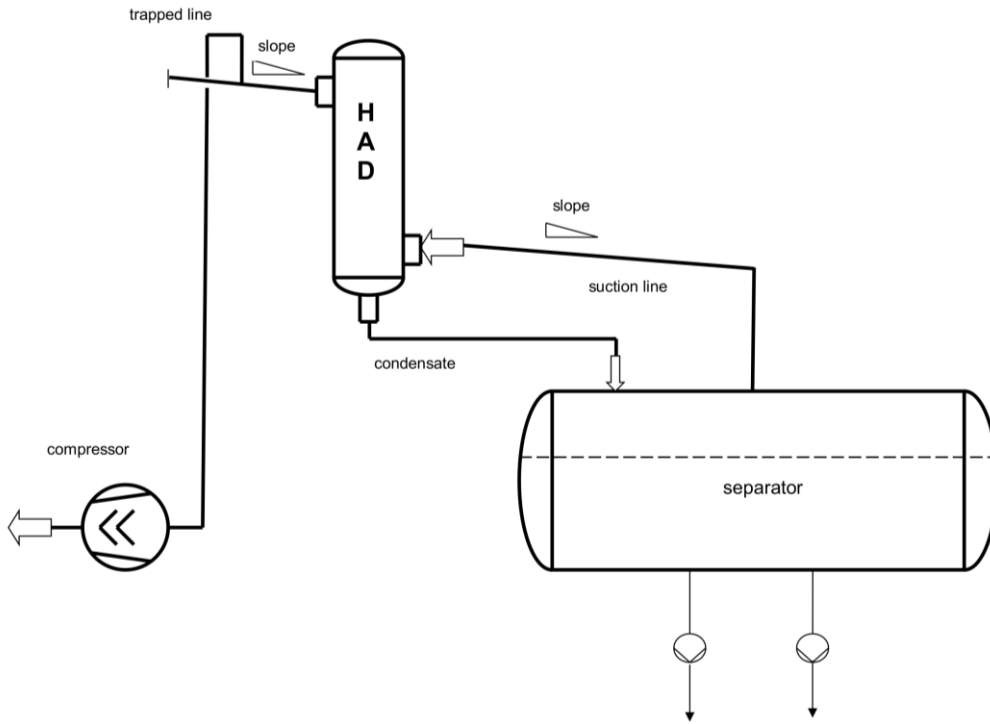


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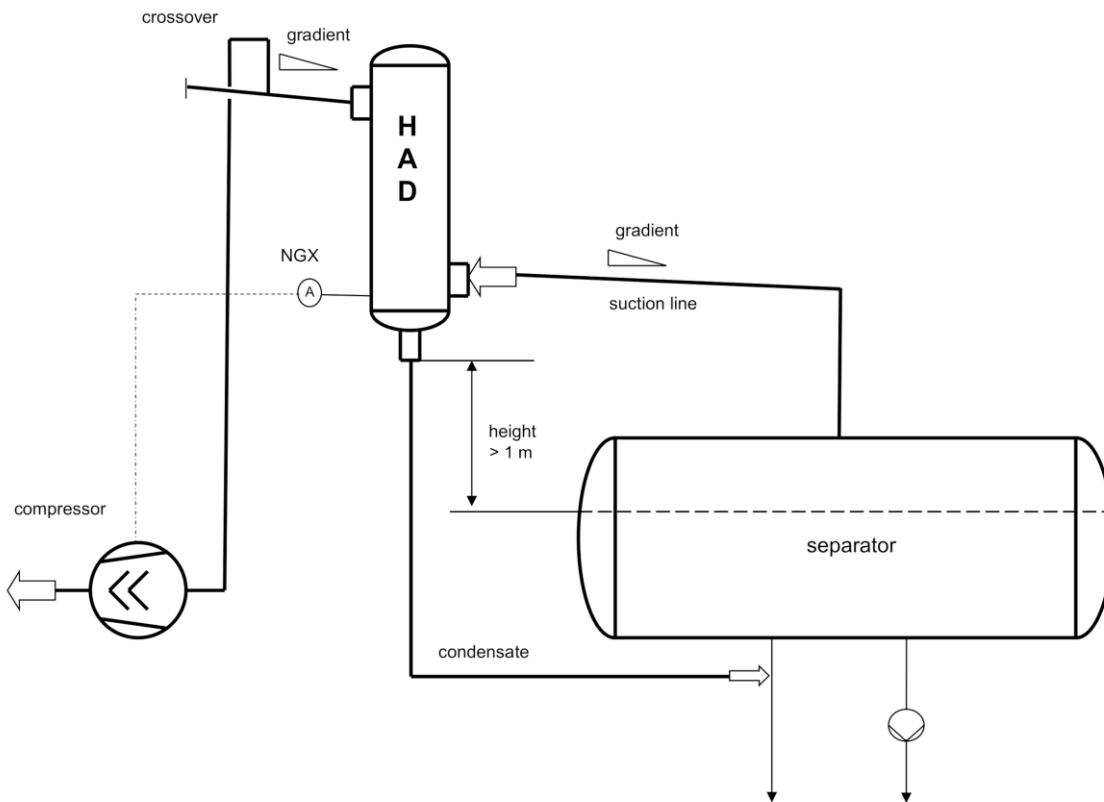
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6.2 Function within the system

6.2.1 Single-level system (standard arrangement)



6.2.2 Missing connection at the vessel





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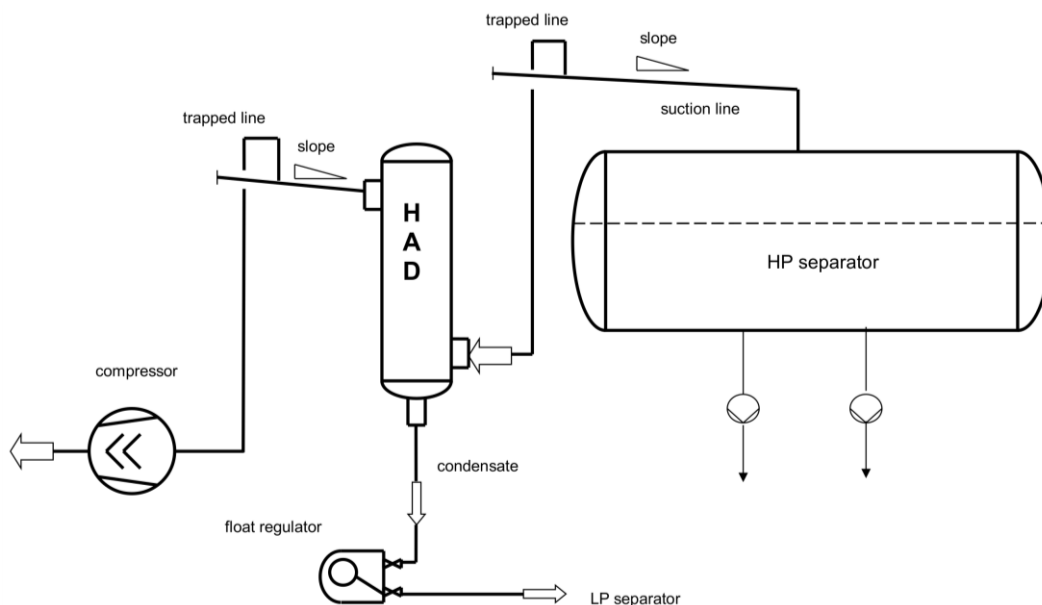
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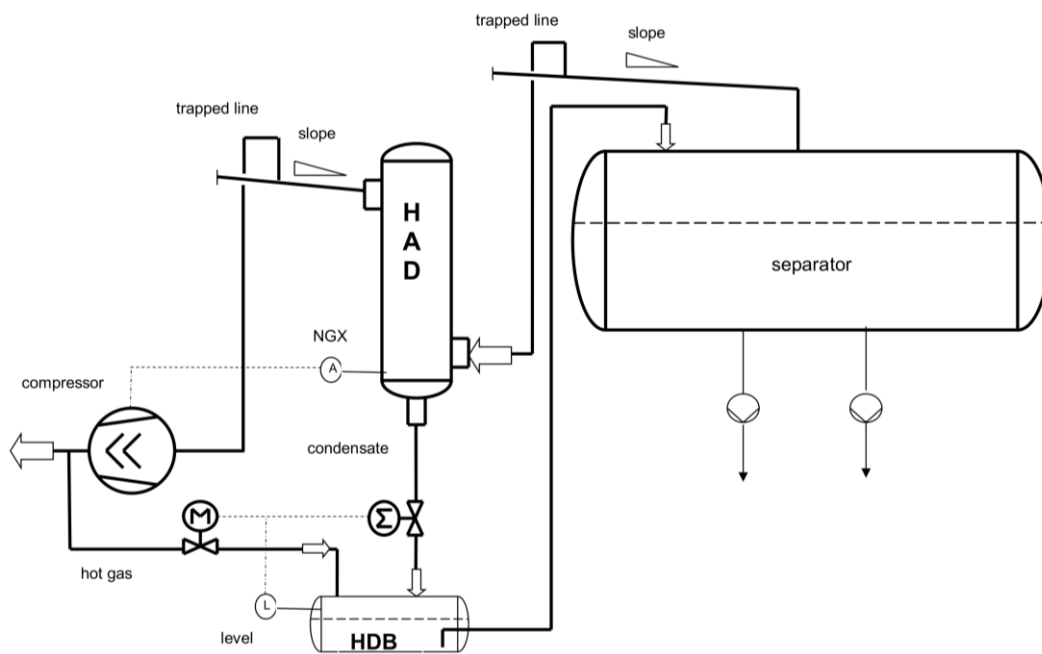
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6.2.3 Two-level system



6.2.4 Height problems (with HDB and hotgas return)





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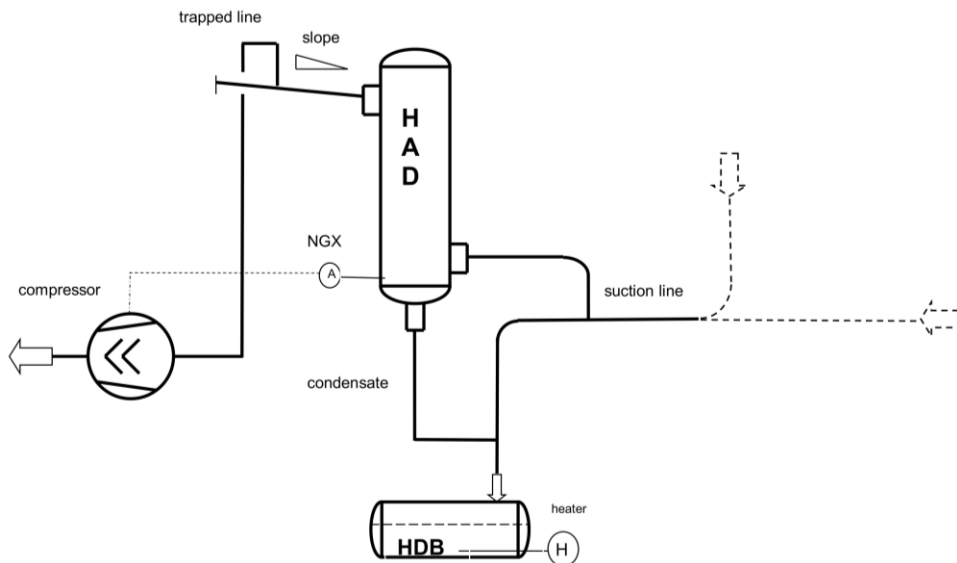
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6.2.5 Safety separator DX (with HDB and heater)



7 Transport and storage

All openings (connections, etc.) are fitted with yellow plastic protective caps to prevent the entry of water, dirt particles, etc.

It should be stored in a dry location and protected from dirt. If the HAD is to be stored for more than two months or it has to be transported overseas, the HAD must be filled with inert gas to protect it from corrosion.

If the high-performance HAD separator has been filled with inert gas in the factory, the bleeder chokes must be removed immediately before the HAD is incorporated into the refrigeration circuit. It is important that no chips or dirt get into the HAD! If necessary, the pressure vessel should be thoroughly cleaned inside.

When transporting, only the designated lifting eyelets are to be used for the lifting; s, pipelines, valves etc. must not be used for this purpose.

Ropes should never be used. If transport belts are used, make sure that the anti-corrosive coating is not damaged.

8 Assembly

Packing material and the yellow plastic protective caps used to protect all openings (connections, etc.), must be removed immediately before assembly.

Please follow the instructions on the drawings relating to the order when assembling the system! The refrigeration engineer responsible for the planning has to ensure that the necessary equipment with safety devices and control elements is adapted to the individual requirements.

The high-performance HAD separator is designed to be installed in buildings. (Earthquakes, traffic, wind and snow loads are not included in the statics). It is only possible to install the system externally with the written permission of TH.WITT KÄLTEMASCHINENFABRIK GmbH.



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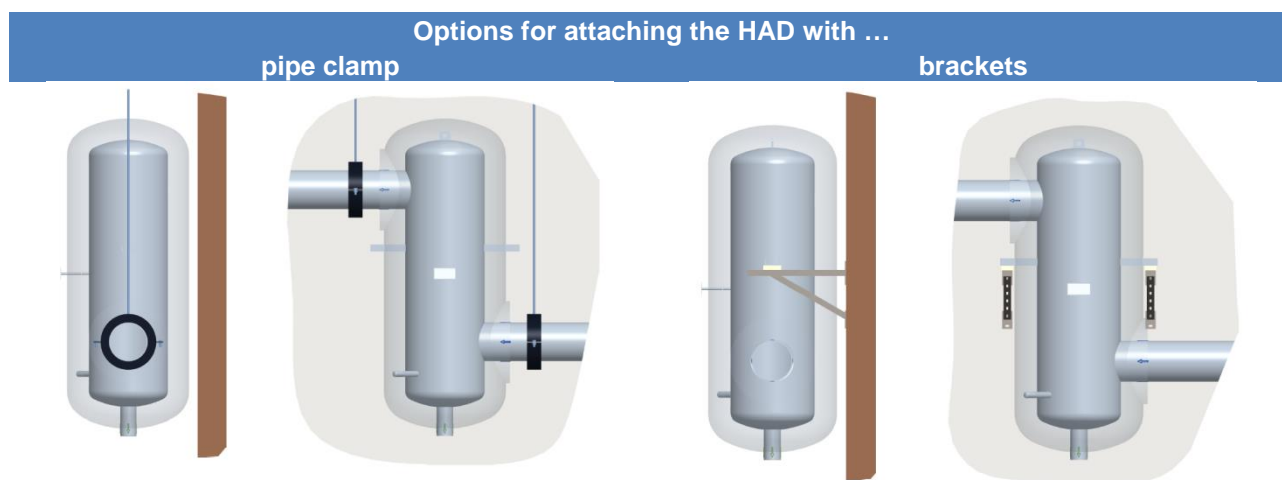
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Since the HAD is usually installed in the existing pipeline system, the following installation and / or interception options are provided:



Pipe clamps and/or brackets and insulating plates are not included in the scope of delivery.

The HAD is installed in the existing pipeline according to the latest technology and practices. The AD2000 data sheets for the series HP 100 R and EN378 need to be followed in particular.



All the exhaust lines must be routed in accordance with the recognised rules of engineering (e.g. EN 378) so that nobody is put at risk.

Ensure there is sufficient space for inspections, maintenance work and insulation. The discharge valves, safety valves and quick-release valves must be easily accessible.



When welding the piping to the connections (or valves) provided for this purpose, ensure that the installation is not under strain or stress!



No additional forces may be applied to the connections or the HAD.

9 Before commissioning

After it has been assembled, the entire pipeline system must undergo a thorough visual inspection. All the screwed and flanged connections must be tightened. A leak and pressure test must then be carried out and documented. At this stage, particular attention should be paid to the welded seams created after the factory test and to any flanged or screwed connections.

Once the leak and pressure tests have been successfully carried out, ensure that the system has been sufficiently dried out. To achieve this, the system has to be vacuumed to below 675 Pa (NH₃) or below 270 Pa (Frigene) during the vacuum test. The period for which the vacuum is maintained depends on the size and complexity of the system.



Large pressure vessels are not dried out in a heated vacuum, as is the case with small appliances. WITT pressure vessels are emptied as much as possible after the water pressure test using tried and tested crane movements and then dried with hot air for at least 5 hours. Despite all the care taken during this procedure, it cannot be excluded with certainty that water residues will remain in pouch-shaped areas. If a particularly thorough drying process is required (e.g. when using ester oils in refrigerants), this must already be ordered when placing the order.

When emptying the system that has not been insulated, observe the drop in pressure. If the pressure display remains at the steam pressure of the water pressure (see table) proceed as follows:

Heat the deepest areas where you think there may still be residues of water, one after the other, at approx. 30 to 40°C with a soft flame (do not damage the anti-corrosive coating in the process!). If the pressure increases, continue applying the heat until the water residue evaporates.



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Remember that the pipelines installed may also contain condensation or other water meaning that 24 hours or more is required to dry the system to exhaust it to under 675 Pa and/or to 270 Pa. A thorough exhaust process should therefore be taken into consideration during the scheduling before the insulation work!

Ambient temperature	[°C]	5	10	20	40
Steam pressure water	[mbar]	9.0	12.3	23.4	73.8

Before commissioning it must be checked, in particular, that:

- all the piping has been connected according to the technical drawings
- the necessary safety devices have been installed and tested

10 Insulation

Insulated plant components are highly susceptible to corrosion especially in the dew point area and with varying internal temperatures due to condensation or the formation of ice. The HAD is fitted with a permanently sealed and elastic anti-corrosion coating. All the welded seams and any damage to the coating must be carefully reworked in accordance with DIN EN ISO 12944 before the insulation work can proceed.

If, at the customer's request, the HAD has only been prepared for the coating system (e.g. only with the primer), then the coating system must be supplemented according to DIN EN ISO 12944.

If an insulation has been applied, it must be designed according to the state of the art methods and materials (e.g. DIN 4140) and must be sufficiently sealed against moisture (vapour barrier). The mounts should not break or damage the insulation.

If the HAD has already been insulated in the factory, take extra care during transport to protect the insulation from damage.

11 Commissioning

The HAD must not be commissioned until a safety analysis of the entire system has been carried out.

11.1 Approved media

The WITT high-performance separator HAD is suitable for all common evaporating refrigerants, e.g. NH₃, R134a, R404, R407c, R507, etc. (see 5.1 Approved media).

12 Operation

The HAD may only be operated within the range of its design data. The cooling engineer responsible for the planning together with the operator, must ensure by taking the appropriate measures (maintaining the permissible filling level, setting the respective control units, etc.) that the overfilling of the HAD is excluded at all times.

The pressure relief device must be set up and adjusted according to the rules and standards / local regulations (this must never exceed the max. permissible pressure as specified on the nameplate!)

The pressure device is designed for predominantly static pressure loads with a maximum of 1000 full load changes. The range of the change in pressure must not exceed 10% of the maximum permissible pressure.



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13 Maintenance and inspection

The inspection of the HAD, including the safety devices attached, must be carried out on a regular basis in accordance with the applicable legal provisions and/or regulations and technical rules and standards.



If maintenance work has to be carried out on the HAD, the pressure must be released from the system and the refrigerant must be completely sucked out before any screwed connections are loosened. Under no circumstances must you remove all the screws when any refrigerant or pressure is still in the system.



The HAD has to undergo, for example, a visual inspection on a regular basis, in accordance with DIN EN 378-2. (This includes, for example, an external visual inspection for corrosion.)

A corrosion allowance of 1mm is taken into account for all pressure-bearing components made of carbon steel. The corrosion allowance for pressure-bearing components made of stainless steel is 0 mm.

If the corrosion protection is damaged, this must be repaired immediately.

14 Address

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