

external heat regenerated dryer HRE

Type size 0375 up to 13600

The externally heat regenerated adsorption dryers of type HRE work according to the dynamic adsorption principle. Wet compressed air streams through a desiccant bed. While streaming through, moisture is drawn out of the compressed air. Since the adsorption capacity of the desiccant is limited, the flow direction has to be changed before the desiccant is completely saturated. Using two parallel adsorption vessels (adsorbers) with alternating function, the permanent supply of consumers with dried compressed air is guaranteed.

One adsorber is always available for drying the compressed air. The second adsorber is regenerated at the same time. The activation time respectively the regeneration time is always shorter than the loading time of the working adsorber.

The regeneration of the saturated desiccant is realized in two steps:



Figure: Detail „Ventilation Unit“



Figure: HRE 1950

- 1. Desorption in counter current flow** to the adsorption direction with externally heated blower air.
- 2. Cooling of the heated desiccant with a partial stream of dried compressed air**

A complete type series - with extraordinary design and equipment - guarantees high reliability and very economic operation at the same time.

Innovative variations allow customized solutions.

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| HRE | \dot{V}_{nom} at 7 bar(g) | | Connection PN16, DIN 2633 DN | Power Supply kW | weight kg | dimensions | | |
|-------|-----------------------------|------|------------------------------------|-----------------------|--------------|---------------|---------------|----------------|
| | m ³ /h | cfm | | | | A=width mm | B=depth mm | C=height mm |
| 0375 | 375 | 220 | DN 50 | 7,6 | 710 | 1430 | 800 | 2120 |
| 0550 | 550 | 325 | DN 50 | 11,2 | 920 | 1530 | 985 | 2340 |
| 0650 | 650 | 385 | DN 50 | 11,2 | 1050 | 1530 | 985 | 2260 |
| 0850 | 850 | 500 | DN 50 | 14,2 | 1140 | 1590 | 1060 | 2330 |
| 1000 | 1000 | 590 | DN 80 | 14,2 | 1210 | 1660 | 1120 | 2460 |
| 1350 | 1350 | 800 | DN 80 | 20,0 | 1480 | 1770 | 1190 | 2580 |
| 1650 | 1650 | 975 | DN 80 | 24,0 | 1790 | 1800 | 1340 | 2630 |
| 1950 | 1950 | 1150 | DN 100 | 32,5 | 2180 | 2040 | 1400 | 2720 |
| 2250 | 2250 | 1330 | DN 100 | 32,5 | 2360 | 2110 | 1410 | 2740 |
| 2750 | 2750 | 1620 | DN 100 | 38,0 | 2680 | 2260 | 1460 | 2790 |
| 3500 | 3500 | 2065 | DN 100 | 44,5 | 3180 | 3380 | 1830 | 2860 |
| 4000 | 4000 | 2360 | DN 150 | 52,5 | 3990 | 3490 | 1860 | 2980 |
| 5000 | 5000 | 2945 | DN 150 | 71,0 | 4820 | 3750 | 1950 | 3110 |
| 6000 | 6000 | 3535 | DN 150 | 86,0 | 5400 | 3880 | 2170 | 3210 |
| 7000 | 7000 | 4125 | DN 150 | 95,0 | 6200 | 4240 | 2270 | 3280 |
| 8750 | 8750 | 5155 | DN 200 | 115,0 | 8000 | 4570 | 2530 | 3420 |
| 10500 | 10500 | 6185 | DN 200 | 135,0 | 11200 | 4780 | 2600 | 3310 |
| 11200 | 11200 | 6775 | DN 200 | 153,0 | 12000 | 4970 | 2750 | 3350 |
| 13600 | 13600 | 8010 | DN 200 | 177,5 | 14000 | 5280 | 2975 | 3380 |

V_{nom} in m³/h related to compressor inlet at 20°C and 1 bar(a), an operating pressure of 7 bar(g) and a compressed air inlet temperature of +35°C (saturated).

Conversion factor (C1) for sizing, depending on dryer inlet temperature and operating pressure at a pressure dew point of -40°C:

| T _{inlet} °C | operating pressure bar (g) | | | | | | |
|--------------------------|----------------------------|------|------|-------------|------|------|------|
| | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 30 | 0,72 | 0,92 | 1,09 | 1,25 | 1,36 | 1,45 | 1,51 |
| 35 | 0,55 | 0,7 | 0,86 | 1,00 | 1,12 | 1,25 | 1,37 |
| 40 | 0,33 | 0,45 | 0,58 | 0,71 | 0,82 | 0,92 | 1,03 |

Tabelle 2

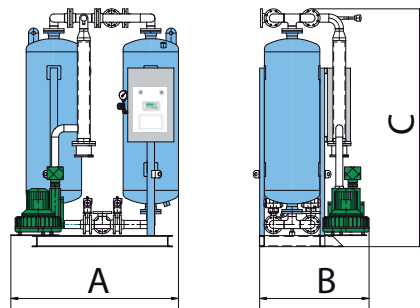
Sizing example:

real air flow \dot{V}_T : 3990 m³/h
 operating pressure: 6 bar g
 inlet temp.: 40 °C
 Factor C₁: 0,58

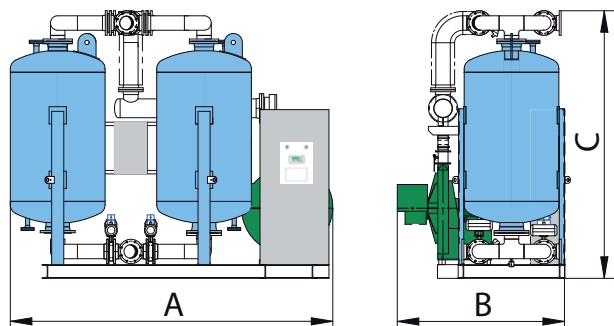
$$\dot{V}_{corr} = \frac{\dot{V}_T}{C_1} = \frac{3990 \text{ m}^3/\text{h}}{0,58} = 6879 \text{ m}^3/\text{h}$$

Chosen: HRE 7000

up to 2750



from 3500



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Adsorption Dryer HRE

1. Process Characteristics

- Desorption in counterflow to the adsorption direction
- Cooling with an expanded portion of compressed air
- Designed for automatic and continuous operation

2. Standard Conditions

- Pressure dewpoint: -40°C
 - Operation pressure: 7 bar(g)
 - Inlet temperature: +35°C
 - Inlet humidity: saturated
 - Average cooling air consumption: appr. 2% related to \dot{V}_{nom}
- Selection at different operating conditions by correction factor C1 according to table 2.

3. Operating Limits

- Media: compressed air/nitrogen
 - Operating pressure: 4-10 bar(g)
 - Inlet temperature: 5-40°C
 - Ambient temperature: 5-40°C
 - max. blower inlet: 35°C/45% to 30°C/60% r.H.
 - Installation: indoor
- Design for operating conditions beyond specified application limits on request.

4. Standard Design

Control

- Design: acc. to VDE/IEC
- Power supply: 3 Ph / 400 V - 50 Hz
- Control voltage: 24 V DC / 230 V - 50 Hz
- PLC: Siemens S7-200 with CPU 224
- Text display: Siemens TD 200
- Protection: IP 55, acc. to IEC 529
- Control panel: C-steel sheet, powder coated, RAL7035
- Potential free common alarm contact: incl.
- Main switch: incl.

Adsorption Vessel

- Material: carbon steel
- Design data: 11 bar(g), 230°C für 0375 - 2750
10 bar(g), 200°C für 3500 - 13600
- Design, manufacturing and testing: acc. to AD-2000
- Approval: acc. to PED 27/23/EC
- Desiccant: incl.
- gas distributor: incl. (stainless steel)

Piping

- Nominal pressure: PN 16
- Material: carbon steel
- Design, manufacturing and testing: acc. to AD-2000
- Approval: acc. to PED 27/23/EC

Heat insulation

Electrical flange heater

Regeneration blower

heater to regeneration inlet valves
with overheat protection
with suction filter

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Adsorption dryer HRE

continuation of standard design

| | |
|--|---|
| Pneumatically operated butterfly valves | internals made of stainless steel |
| Non-return valves | with PTFE- gaskets |
| Pressure release valves | with silencers |
| Pressure equalization valves | incl. |
| Resistance thermometer | Pt 100 - measuring and control devices |
| Pressure transmitter | for pressure and changeover control |
| Manometer with shut-off valve | per adsorption vessel |
| Control air unit | incl. valve manifold with multipole connection and control air filter |
| Pneumatic box | to house the control air unit (sizes 3500 and up) |
| End position monitoring | of inlet butterfly valves with limit switches (sizes 3500 and up) |
| Control air piping | up to size 2750 with PVC-pipe; with galvanized steel pipe (sizes 3500 and up) |

5. Standard Options (upon request)

- Dewpoint dependent control ,ultraconomy‘
- Mounting of prefilter system incl. piping
- Mounting of afterfilter system incl. piping
- System bypass with 3 manual valves
- Bus interface
- Desorption air heating with steam heater instead of electrical heater
- Desorption air heating with steam and electrical heater
- Heat insulation of adsorption vessel
- 16 bar version
- Status information by light indicators
- Control air piping made of stainless steel
- Changeover monitoring and limit switches for additional butterfly valves
- Monitoring of dryer inlet temperature
- Free of silicone / separating agents
- Alternative power supply
- Pressure dew point below -40°C
- Frost protection down to -20°C
- Outdoor installation
- Special noise reduction

6. Filter

Please select the necessary prefilter and afterfilter systems from our comprehensive filter product range.

7. Condensate

For necessary and economical draining as well as conditioning of accumulated condensate, we recommend our condensate technology range of products.