

HEATLESS COMPRESSED AIR ADSORPTION DRYER HDD-SERIES DATA

HDD SERIES DESICCANT DRYERS - SPECIFICATIONS

| Model Number | Volume Flow Rate ¹ | | | | Dimensions (mm) | | | Connection | Weight |
|--------------|-------------------------------|---------------------|--------------------|------|-----------------|-------|-------|------------|--------|
| | l/s | m ³ /min | m ³ /hr | cfm | A (D) | B (W) | C (H) | inch | kg |
| HDD0039 | 39 | 2.33 | 140 | 82 | 605 | 960 | 1915 | 1" | 204 |
| HDD0053 | 53 | 3.17 | 190 | 111 | 570 | 990 | 1925 | 1" | 274 |
| HDD0067 | 67 | 4.00 | 240 | 141 | 570 | 990 | 1925 | 1" | 274 |
| HDD0106 | 106 | 6.33 | 380 | 223 | 630 | 990 | 1965 | 1" | 370 |
| HDD0150 | 150 | 9.00 | 540 | 317 | 610 | 1090 | 2125 | 1 1/2" | 481 |
| HDD0181 | 181 | 10.83 | 650 | 382 | 655 | 1100 | 2140 | 1 1/2" | 553 |
| HDD0236 | 236 | 14.67 | 850 | 500 | 650 | 1245 | 2180 | 1 1/2" | 643 |
| HDD0292 | 292 | 17.50 | 1050 | 617 | 700 | 1320 | 2240 | 2" | 765 |
| HDD0389 | 389 | 23.33 | 1400 | 823 | 735 | 1510 | 2130 | DN80/3" | 956 |
| HDD0472 | 472 | 28.33 | 1700 | 1000 | 750 | 1610 | 2150 | DN80/3" | 1136 |
| HDD0569 | 569 | 34.17 | 2050 | 1206 | 780 | 1660 | 2155 | DN80/3" | 1272 |
| HDD0667 | 667 | 40.00 | 2400 | 1412 | 850 | 1710 | 2270 | DN80/3" | 1404 |
| HDD0778 | 778 | 46.67 | 2800 | 1647 | 905 | 1760 | 2200 | DN80/3" | 1547 |
| HDD0889 | 889 | 53.33 | 3200 | 1882 | 915 | 2080 | 2370 | DN100/4" | 1739 |
| HDD1028 | 1028 | 61.67 | 3799 | 2176 | 970 | 2155 | 2410 | DN100/4" | 1903 |
| HDD1167 | 1167 | 70.00 | 4200 | 2470 | 1020 | 2270 | 2430 | DN100/4" | 2074 |

¹ Based on -40°C pressure dew point with inlet conditions of 7 barg and 35°C.
Systems with higher flow rates and/or lower pressure dew points are available upon request.

Correction Factors for Sizing of HDD Dryers for Different Operating Temperatures and Pressures

| Pressure (barg) | Temperature (°C) | | | | | |
|-----------------|------------------|------|------|------|------|------|
| | 25 | 30 | 35 | 40 | 45 | 50 |
| 4 | 0.66 | 0.64 | 0.62 | 0.59 | 0.55 | 0.50 |
| 5 | 0.80 | 0.77 | 0.75 | 0.71 | 0.67 | 0.63 |
| 6 | 0.94 | 0.90 | 0.87 | 0.84 | 0.79 | 0.76 |
| 7 | 1.07 | 1.03 | 1.00 | 0.96 | 0.92 | 0.87 |
| 8 | 1.16 | 1.14 | 1.11 | 1.08 | 1.04 | 1.00 |
| 9 | 1.23 | 1.21 | 1.18 | 1.14 | 1.10 | 1.07 |
| 10 | 1.32 | 1.30 | 1.27 | 1.24 | 1.20 | 1.16 |

Example:

| | |
|--------------------|-----------------------|
| Flow rate | 550 m ³ /h |
| Pressure | 9 bar |
| Inlet temp | 35°C |
| Pressure dew point | -40°C |

Dryer capacity: $550/1.18 = 437 \text{ m}^3$
Therefore, selected dryer model = HDD 0150



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The Simple Philosophy of Heatless Desiccant Dryers for Compressed Air

Drying compressed air through adsorption represents a purely physical process in the course of which water vapour is bound to the drying medium (desiccant) through binding forces of molecular adhesion. For adsorption to take place, moist air is directed through the adsorber at various operating pressures. During this process, the moist compressed air comes into contact with the hydrophilic desiccant molecules when it flows from the bottom to the top of the vessel. The desiccant molecules will retain the moisture which results in dry compressed air leaving the vessel.

How Does AFE HDD Desiccant Dryer Works?

Two vessels connected in parallel are required for the continuous operation of drying via the adsorption process. Each vessel is filled with desiccants which act as the drying medium. AFE desiccant dryers use high performance molecular sieve which have a long service life at high input temperatures, resulting in very low pressure dew points.

Stage 1: The drying of compressed air takes place in vessel A and simultaneously, desorption (re-generation of the desiccant) occurs in vessel B. The desorption process in vessel B occurs in a counter flow direction by using a small flow of dry compressed air channeled from the outlet of vessel A. The mode of operation of pressure change desorption corresponds to almost isothermal desorption through partial pressure drop in the adsorbing component by means of pure purge gas.

Stage 2: Upon completion of the re-generation cycle, re-pressurization takes place in vessel B until both vessels equalize in pressure. At this stage, the vessels are ready to switch over.

Stage 3: The air from vessel A will purge out and the drying cycle switches to vessel B. Vessel A will now undergo the desorption cycle to re-generate the desiccants.

The entire process will repeat itself to continuously dry the compressed air.

All AFE dryers are installed with coalescing pre-filters and particle after-filters to provide clean and dry compressed air (CDA).

AFE HDD Dryer Control Systems for Heatless Desiccant Dryers

AFE offers two control systems for the HDD desiccant dryers:

1. PLC (Programmable Logic Controller System)

The HDD dryer is available with a time based PLC Control as standard. The standard cycle times are 5 minutes of adsorption followed by 4 minutes of regeneration and 1 minute for pressure build up.

2. LCS (Load Control System)

The LCS is a more economical system with energy saving features. Instead of re-generating every 5 minutes in a time controlled PLC system, the LCS uses a dew point sensor which detects the moisture load of the compressed air at the outlet. The system then re-generates only when the dew point is higher than the set level. This saves purge flow and therefore energy.

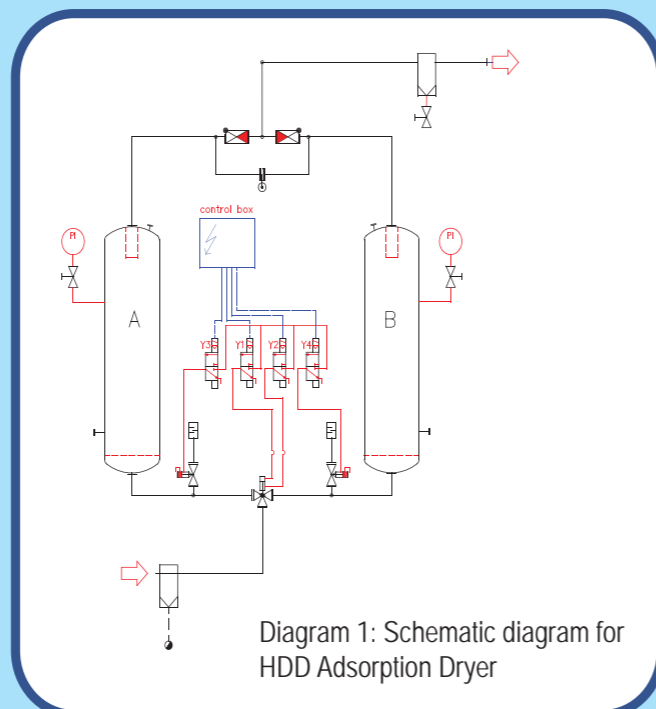


Diagram 1: Schematic diagram for HDD Adsorption Dryer

AFE manufactured desiccant dryers are fully tested and are produced in accordance to the ISO 9001 quality system.



Features and Advantages of the HDD Series Desiccant Dryers

- **Welded vessels designed according to ASME VIII Div1. Standards. (other designs and approvals on request)**
- **Usage of self cleaning stainless steel wedge wire in the wet area allows an even distribution of air flow with low differential pressure across the system.**
- **Indication lights for dryer ON/OFF mode, adsorption, re-generation and LED display available for the dew point (if dew point meter is installed).**
- **Usage of high performance molecular sieve which are suitable for application in a wide range of operating conditions.**
- **Usage of standard industrial valves which are readily available and easily maintained.**
- **Load Control System (LCS) display available as an economical and energy saving option.**
- **Customized dryers according to OEMs' requirements are available upon request.**



The HDD Series of Desiccant Dryers manufactured by AFE benefit from a simple but effective design which has been studied and improved with many years of experience in the compressed air industry. AFE dryers are manufactured to cater to a wide range of applications and the main benefits are:

- proven technology
- robust construction
- reliable performance
- easy maintenance