

Donaldson®
AirCel®

Donaldson®
Ultrafilter

Heatless Regenerative Desiccant Dryers

Ultrapac 2000 and AHLD Series



The highest standards
in the industry
**Built to
Exceed**


Donaldson

Heatless Regenerative Desiccant Dryers

Leading the Way in Air Purification

As one of the world's leading manufacturers of compressed air purification equipment, Donaldson has built a comprehensive engineering, manufacturing, and customer support network to meet the most demanding applications. With over 30 years of expertise in compressed air filtration and separation technologies, Donaldson manufactures a complete line of drying and filtration equipment using innovative designs that focus on energy efficient operation and reliable performance.

Our heatless and heated desiccant dryer offering ranges from a small, compact point-of-use dryer to large, special-engineered heated dryers designed per our customer's specification.

Heatless Systems

Ultrapac 2000 Series (3-60 scfm)
AHLD Series (80 - 5,000 scfm)
High/Low Pressure Gas/Air Systems & Specials

Heated* Systems

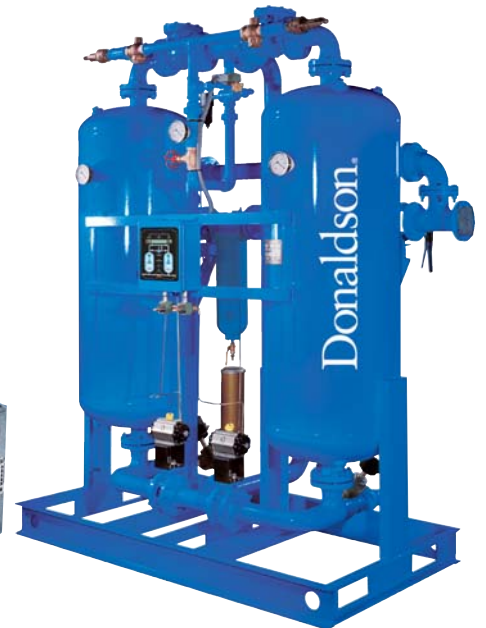
AEHD Externally Heated (150 - 3,000 scfm)
HRE Series Blower Purge (600 - 10,000 scfm)
HRS-L Series Zero Purge (600 - 10,000 scfm)
Heat of Compression Systems & Specials

Heatless desiccant dryers, like all adsorption type dryers, use a desiccant to adsorb the water vapor in the airstream. In the most commonly used twin-tower design, one tower dries the air from the compressor, while the desiccant in the other tower is being regenerated to provide continuous operation. In the heatless desiccant dryer design, no internal or external heaters are used. Regeneration is achieved by using a partial stream of the dried air, expanding it to atmospheric pressure, and running it through the desiccant bed that is being regenerated.

The standard regenerative desiccant dryer at 100 psig has a standard pressure dew point rating of -40°F and a dew point down to -100°F is available as an option.



UP0015-60 and
UP0020-60



AHLD-1000 with
optional filtration
package

* For more information on the Donaldson heated systems, please refer to respective brochure.

Heatless Regenerative Desiccant Dryers

Our Diversity is Your Advantage

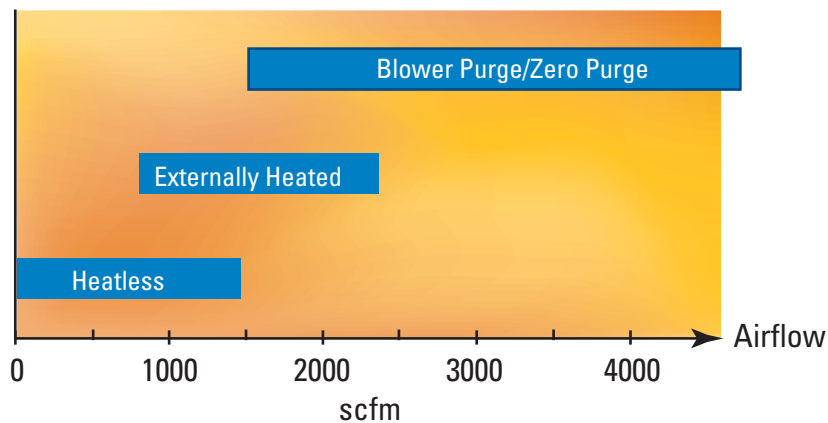
What determines the quality of a desiccant dryer and what is the best technology for your application?

The design, components, and materials used for the desiccant dryer determine its overall value, and there are various methods used for regenerating the desiccant. Each method has a different value proposition of initial investment cost versus

operating cost of the system. The following table gives an overview of the most common desiccant dryer systems available and a general comparison of initial investment cost to operating and maintenance costs.

	Initial Investment Cost	Operating Cost	Maintenance Cost
Heatless Desiccant Dryer	Low	High	Low
Externally Heated Dryer	Medium	Medium	Medium
Blower Purge/Zero Purge	High	Low	Medium

This translates into certain size ranges where the different dryer types are commonly used:



Our expert sales engineers are available to evaluate your application requirements and help you choose the best desiccant dryer for your needs. Whatever model you select, all Donaldson compressed air dryers are built in accordance with our high quality standards, using only superior components to ensure the long-lasting high value of your investment.

Heatless Regenerative Desiccant Dryers

Highest Performance on Small Footprint

Donaldson is the expert in providing solutions for energy efficient, reliable and compact compressed air drying solutions. Our **Ultracac 2000 Series** of heatless adsorption dryers delivers the highest air purity level in a reliable, secure and economical unit. Engineered with intelligent technology that provides clean and dry compressed air, the Ultracac 2000 series offers the advanced features you need in one **complete and compact purification package**.



UP0020-60

Features & Benefits

- Easy installation and setup.
- Less maintenance.
- Minimal downtime for repairs.
- Increased cost savings.

The Donaldson Ultracac 2000 Series

of heatless adsorption dryers is a complete purification system including prefilter, dryer, afterfilter, control system, automatic condensate drain and silencer. All components are factory sealed, providing minimum installation requirements for fast start up. The desiccant is supplied in sealed cartridges, providing easy maintenance compared to loose desiccant.

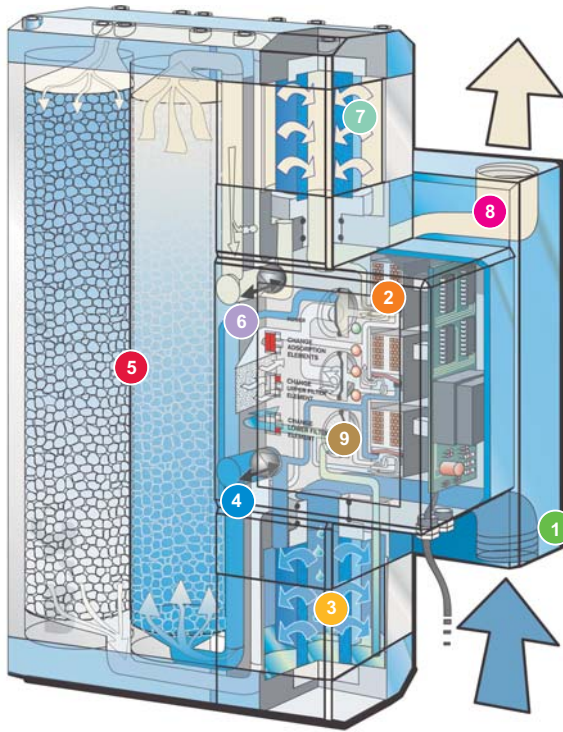
Desiccant cartridge – the easy solution:

Sealed desiccant provides minimum desiccant abrasion and long service life. Reduced storage, logistics and filter change requirements.



Heatless Regenerative Desiccant Dryers

How The Ultrapac 2000 Series Works



- 1 Dryer Inlet
- 2 Processor Control
- 3 Prefilter
- 4 Lower Shuttle Valve
- 5 Desiccant Cartridges
- 6 Upper Shuttle Valve
- 7 Afterfilter
- 8 Dryer Outlet
- 9 Condensate Drain

Dimensions & Specifications

Model	Capacity (scfm)	Connection (inches FNPT)	Dimensions (inches)			Weight (lbs)	Desiccant Cartridges		Prefilter Element (MF) Afterfilter Element (PE)	
			Height	Width	Depth		Size	Qty	Size	Qty (each)
UP0003-60	3	1/2	13.7	11.8	4.7	15	10/2	2	0205	1
UP0005-60	5	1/2	23.4	11.8	4.7	24	10/2	4	0305	1
UP0010-60	10	1/2	34.8	11.8	4.7	33	10/2	6	0410	1
UP0015-60	15	1/2	54.5	11.8	4.7	53	10/2	10	0610	1
UP0020-60	20	1	26.4	21.0	7.5	64	10/4	4	0420	1
UP0030-60	30	1	36.4	21.0	7.5	84	10/4	6	0520	1
UP0040-60	40	1	46.3	21.0	7.5	106	10/4	8	0525	1
UP0050-60	50	1	56.5	21.0	7.5	125	10/4	10	0725	1
UP0060-60	60	1	66.3	21.0	7.5	147	10/4	12	0725	1

* Capacity rated in accordance with CAGI ADF 200 @ 100 psig, 100°F inlet, 100° ambient, and a PDP of -40°F. A pressure dew point of -100°F can be achieved at a capacity decrease of 30%.

Ambient air temperature: 38°-125°F, inlet air temperature: 40-125°F, operating pressure: 60-225 psig.
Standard power supply: 110V/60 Hz, other options available.

Heatless Regenerative Desiccant Dryers

Reliability and Performance

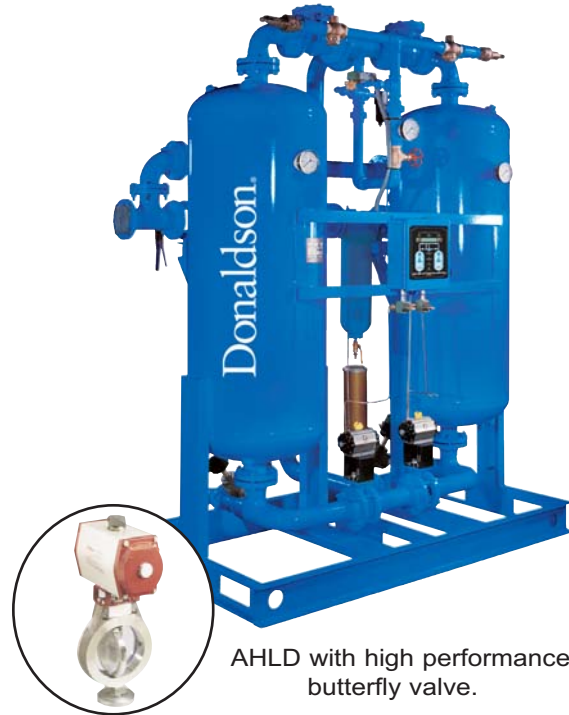
The Donaldson AHLD Series Heatless Desiccant Compressed Air Dryer

is based on the traditional twin-tower concept. Donaldson is one of a few dryer manufacturers with the engineering and manufacturing capability and experience to design dryer systems of any size – with pressures up to 10,000 psig and volumes up to 20,000 scfm.

We can design to NEMA 1, 4, 7, and 12 requirements, as well as to national and special industry codes. One of our specialties is the design of corrosion-resistant stainless steel systems for use in chemical or pharmaceutical applications or for off-shore oil rigs.

Features

- The auxiliary-piloted, two-way, angle-body piston valve carries a 10-year warranty on 80 to 600 scfm models.
- Tower pressure relief valves.
- Purge adjustment valve to control purge flow.
- Purge flow indicator.
- Purge exhaust mufflers for quiet operation.
- Tower pressure gauges.
- Stainless steel desiccant supports and air diffusers to prevent channeling.
- Adjustable (5 min., 10 min.) microprocessor controlled sequence module.
- Controlled repressurization.
- Reliable non-lubricated high-performance butterfly valve (≥ 750 scfm models).
- Fail-safe design: failure of power and/or pilot air causes the purge exhaust valves to close.
- Control pilot air filter.
- Desiccant towers are designed and fabricated according to ASME code (6" vessels and larger).
- Desiccant fill and drain ports for ease of desiccant replacement.
- High quality, soft seat, check valves.
- Tower operating status lights.
- ON/OFF switch and power ON light.



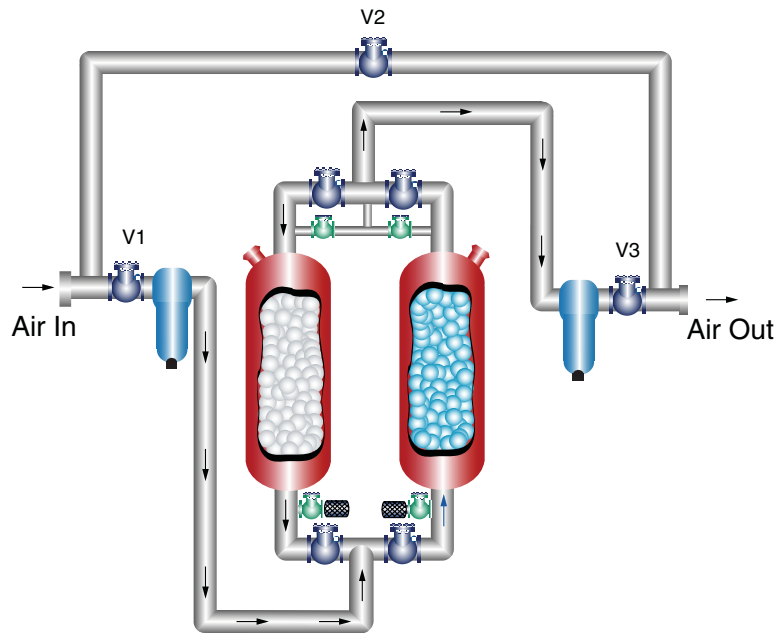
AHLD with high performance butterfly valve.

Heatless Regenerative Desiccant Dryers

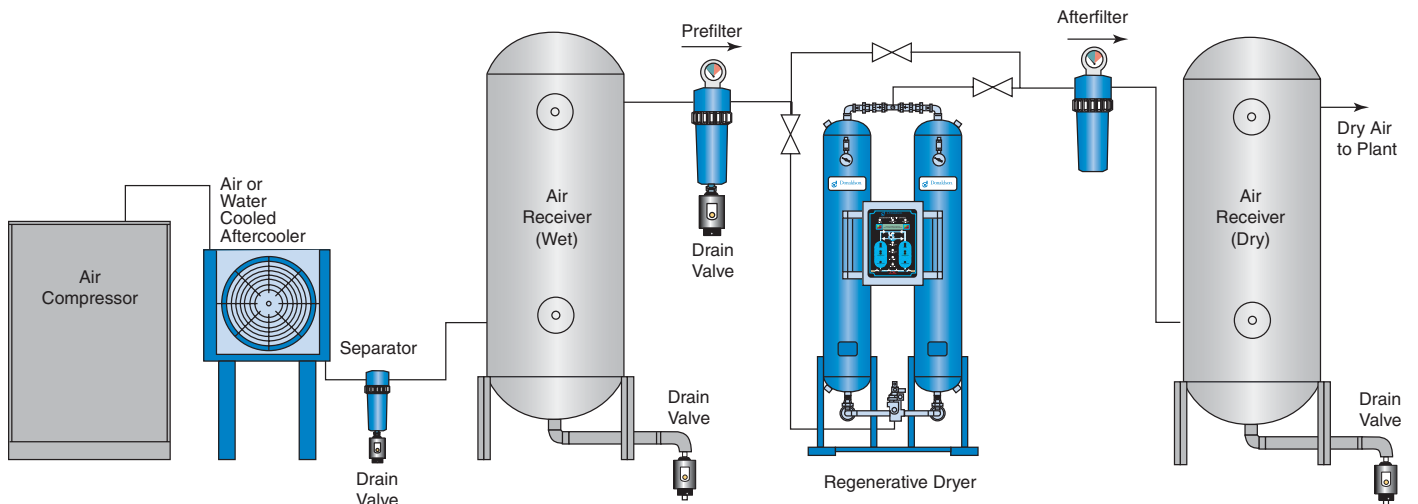
How The AHLD Series Works

Hot, saturated compressed air is filtered in our 0.01 micron high-efficiency coalescing prefilter (recommended option) before entering the dryer. Our up-flow drying design with counter-current regeneration provides peak performance with the lowest possible energy consumption. The adjustable purge control valve allows for customized set up to minimize purge loss.

Stainless steel piston valves up to 600 scfm ensure long-lasting, trouble-free operation even in harsh conditions. Our high-efficiency particulate is recommended as an afterfilter to prevent any desiccant being carried downstream.



Recommended Installation



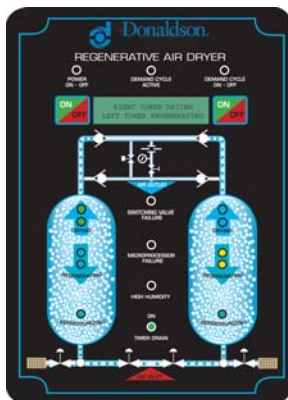
Heatless Regenerative Desiccant Dryers

Energy-Saver Demand Cycle Control



The **optional energy-saver demand cycle control** reduces purge air consumption and optimizes dryer performance by monitoring the actual dew point at the outlet of the dryer.

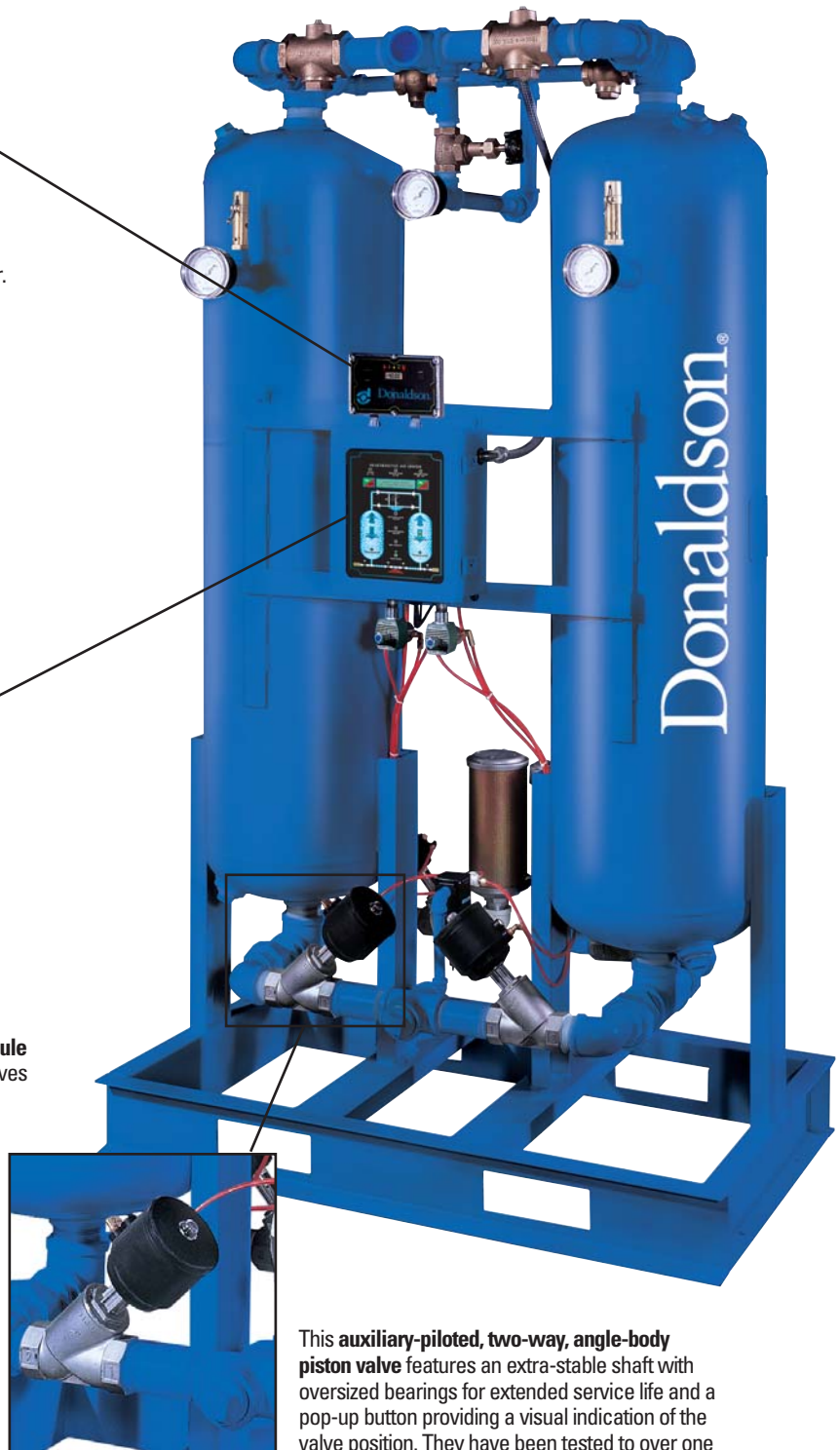
- A.C.T. (Advanced Capacitive Transducer)
- Adjustable Demand Cycle Control set point
- Range: -130°C to +20°C dew point
- Accuracy: +/- 2°C
- Repeatability: +/- 0.5°C
- Alarm: SPDT, 1A @ 120 VAC
- Output: 0-10 VDC or 4-20 mA
- Enclosure: NEMA 4



Microprocessor control panel with built-in timing module indicates sequence of operation for both towers. Improves reliability and performance.

Dryer sequence indicators for ease of operation and troubleshooting listed below:

- Power ON/OFF switch and light
- Demand cycle ON/OFF switch and light
- Left tower drying light
- Right tower drying light
- Left tower regenerating light
- Right tower regenerating light
- Re-pressurization lights
- Timer drain light
- Common alarm dry contact
- Switching valve failure alarm (optional)
- Microprocessor failure alarm (optional)
- High humidity alarm (optional)



This **auxiliary-piloted, two-way, angle-body piston valve** features an extra-stable shaft with oversized bearings for extended service life and a pop-up button providing a visual indication of the valve position. They have been tested to over one million cycles and carry a 10-year warranty (80-600 scfm models).*

* Refer to warranty manual for details.

Heatless Regenerative Desiccant Dryers

Dimensions & Specifications

Model	Capacity ¹ (scfm)	Connection (inches FNPT/ANSI)	Dimensions (inches)			Weight (lbs)
			Height	Width	Depth	
AHLD-80	80	3/4	75	32	24	324
AHLD-100	100	1	74	42	30	529
AHLD-150	150	1	74	42	30	569
AHLD-200	200	1-1/2	75	42	30	650
AHLD-250	250	1-1/2	75	45	42	772
AHLD-300	300	1-1/2	75	45	42	825
AHLD-350	350	2	75	45	42	875
AHLD-450	450	2	80	45	42	1050
AHLD-500	500	2	90	45	42	1250
AHLD-600	600	2	92	58	45	2300
AHLD-750	750	3 FLG	92	58	45	2560
AHLD-1000	1000	3 FLG	95	80	60	3900
AHLD-1250	1250	3 FLG	95	80	60	4090
AHLD-1500	1500	4 FLG	105	89	59	4360
AHLD-2000	2000	4 FLG	106	93	69	4985
AHLD-2500	2500	4 FLG	106	93	69	6500
AHLD-3000	3000	6 FLG	108	98	75	7900
AHLD-3500	3500	6 FLG	108	98	75	8300
AHLD-4000	4000	6 FLG	120	115	85	9500
AHLD-4500	4500	6 FLG	125	120	99	11000
AHLD-5000	5000	6 FLG	125	120	99	12300

¹ Capacity rated in accordance with CAGI ADF 200 @ 100 psig, 100°F inlet, 100° ambient, and a PDP of -40°F.

Ambient air temperature: 38°-125°F, inlet air temperature: 40-125°F, operating pressure: 60-225 psig.
Standard power supply: 110V/60 Hz, other options available.

Optional Features

- NEMA 4/12 electrical construction.
- NEMA 7 (explosion proof) electrical construction.
- -100°F pressure dew point.
- Failure to shift alarm.
- High inlet temperature alarm.
- Dew point* monitor.
- Demand cycle control with dew point monitor.
- Pre-piped filters and by-pass valve packages.
- Visual moisture indicator.
- High inlet pressure up to 10,000 psig.
- All-pneumatic control package (no electricity required).
- Programmable logic controller (PLC).

* According to ISA. "The temperature referred to at a specific pressure at which water vapor condenses" is called dew point.

Heatless Regenerative Desiccant Dryers

Custom-Designed High Pressure Dryers

Donaldson High Pressure Adsorbent Dryers are designed for reliable treatment of compressed air in a high pressure range from 200 to 10,000 psig and low pressure dew point from -40°F to -100°F. Our dryer designs are the result of many years of experience in manufacturing high performance reliable adsorption dryers. Donaldson's fully automatic state-of-the-art technology twin tower dryers require very low regeneration purge. As a result, the power requirement of the compressor is noticeably reduced. The heat-assisted purge system (1000 psig and up) reduces the purge gas even more and ensures complete regeneration and steady pressure dew point. This provides an extremely reliable and efficient dryer to fulfill the requirements of the highest industry standards for high pressure compressed air.



Custom Stainless Steel
AHLD-50 rated for 5,000 psig



Coalescing, Dust, and High Pressure
Elements and Filters

Protection for your Investment

To protect the desiccant bed, the compressed air piping and the application itself, it is highly recommended that each desiccant dryer should be equipped with a high-efficiency prefilter and afterfilter. Both are already incorporated in our Ultrapac 2000 dryer package for your convenience!

The **Donaldson Ultradepth® coalescing prefilter element** provides excellent protection against liquid oil and water filtrate as well as particulate contamination. This is the perfect prefilter protection for the drying agent in your system. The retention rate of 0.01 micron particles is a remarkable 99.999%, made possible through our patented Ultraair® binder-free borosilicate glass filter media that also allows for a very low pressure drop.

The **Donaldson Ultrapoly® particulate afterfilter element** is made from sintered polyethylene media for effective filtration. In this package, it is used as a final filter to protect the downstream airflow.

Heatless Regenerative Desiccant Dryers

Capacity Correction Factors

The leading manufacturers of compressed air and gas equipment in North America are organized in the Compressed Air & Gas Institute (CAGI). As the premier industry organization, CAGI has developed standards to protect users of this equipment. ADF 200 is the current standard for desiccant compressed air dryers. ADF 200 specifies the dryers performance to be rated

at 100°F inlet temperature, 100°F ambient temperature, and 100° psig system pressure. To adjust the dryer capacity from these “CAGI conditions” to your specific application, please use the correction factors below for differing inlet air temperatures (C1) and system pressures (C2).

Capacity Correction Factors Ultrapac 2000 Heatless Dryers

Capacity correction factors for system air pressure (C1)

System Pressure (psig)	60	75	90	100	115	130	150	160	175	190	200	220	225
Correction Factor	0.63	0.75	0.88	1	1.12	1.25	1.38	1.5	1.63	1.75	1.88	2	2.13

Capacity correction factors for inlet air temperature (C2)

Inlet Temperature (°F)	68	77	86	100	104	115	125
Correction Factor	1.1	1.1	1.1	1	0.8	0.7	0.5

Capacity Correction Factors AHLD Heatless Dryers

Capacity correction factors for system air pressure (C1)

System Pressure (psig)	60	70	80	90	100	110	120	130	140	150
Correction Factor	0.65	0.73	0.82	0.91	1	1.09	1.18	1.27	1.35	1.44

Capacity correction factors for inlet air temperature (C2)

Inlet Temperature (°F)	70	80	90	100	105*	110*	115*	120*
Correction Factor	1.2	1.15	1.10	1	0.9	0.8	0.7	0.6

* For inlet temperature above 100°F, molecular sieve desiccant is required.

To Size the Dryer Capacity for Actual Conditions

Adjusted Capacity = scfm x C1 x C2

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

EXAMPLE: Dryer Model: AHLD-100
 Standard Capacity: AHLD-100
 Actual Operating Conditions: 120 psig working pressure: **C1 = 1.18**
 100°F inlet temperature: **C2 = 1.0**
 Adjusted Capacity = 100 scfm x 1.18 x 1.0 = **118 scfm**

To Select the Dryer Model for Actual Conditions

Adjusted Capacity = scfm/C1/C2

To choose a dryer based on a given flow at non-standard operating conditions, divide the given flow by the appropriate correction factor(s).

EXAMPLE: Given Flow: 350 scfm
 Actual Operating Conditions: 120 psig working pressure: **C1 = 1.18**
 100°F inlet temperature: **C2 = 1.0**
 Adjusted Capacity = 350 scfm / 1.18 / 1.0 = **296.6 scfm**
 Selected Dryer Model: AHLD-300

Trust Donaldson Compressed Air & Gas to deliver a complete range of compressed air purification solutions that improve air quality throughout your plant - from the compressor room to all points of use. With over 30 years of expertise in compressed air filtration and separation, Donaldson manufactures a complete line of drying and filtration equipment in an innovative, cutting-edge design with energy efficient operation and reliable performance to increase your productivity and lower your operating cost for the air volume that fits your needs.

Donaldson Compressed Air & Gas offers a wide variety of solutions to reduce your energy costs, improve your productivity, guarantee production quality and help preserve the environment.

PRODUCTS

- Activated carbon filters
- Adsorption dryers
- Breathing-air purifiers
- Cartridge filters
- Chillers
- Condensate drains
- Coolers
- Cyclone separators
- Demisters
- Disposable filters
- Elements
- Emulsion separators
- Filters
- Fine filters
- Filter housing
- High-performance filters
- High-pressure filters
- Medical vacuum filters
- Membrane dryers
- Oil/vapor absorbers
- Oil/water separation systems
- Pre-filters
- Pre-separators
- Process filter elements
- Process filter housing
- Pure gas filters
- Refrigeration compressed air dryers
- Silicon-free filters
- Steam filters
- Sterile filters
- Submicro filters
- Systems engineering
- System solution
- Vacuum filters
- Vent filters

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