

VHD Series Heated Desiccant Dryers 300–750 SCFM

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VHD Series Dryers

Do you have?

- Sensitive applications
- Stringent process requirements
- Precision equipment

Do you work with?

- Food
- Paper
- Glass

- PaintingHospitals
- Chemicals
- Pharmaceutical
- Petrochemicals

Have you found that a refrigerated air dryer does not meet your needs?

You understand the need for clean, dry compressed air.

The VHD Series of blower purge desiccant air dryers can provide you with the dry air you require. The VHD can provide you with ISO 8573.1 Class 2 dewpoints.

Couple your VHD dryer with the appropriate VAF filtration to achieve up to ISO 8573.1 Class 1 for solids and oils.



		Solid Particles		Humidity &	Liquid Water	Oil		
Class	Pa	article Size, d (micro	n)	Dressure	Dow Doint	Total concentration,		
Class	0.10 < d ≤ 0.5	0.5 < d ≤ 1.0	Pressure	Dew Point	Aerosol, Liquid, and Vapor			
	Maximum Number of Particles per m ³		°C	°F	mg/m³	ppm w/w		
0		As Specified	As Sp	ecified	As Specified			
1	100	1	0	≤ -70	≤ -94	≤ 0.01	≤ 0.008	
2	100,000	1,000	10	≤ -40	≤ -40	≤ 0.1	≤ 0.08	
3	Not Specified	10,000	500	≤ -20	≤ -4	≤ 1	≤ 0.8	
4	Not Specified	Not Specified	1,000	≤ +3	≤ +38	≤ 5	≤ 4	
5	Not Specified	Specified Not Specified 20,000		≤ +7	≤ +45			
6			≤ +10	≤ +50				
				Liquid Water Co	ontent, Cw g/m ³			
7			Cw	≤ 0.5				
8				0.5 < Cw ≤ 5				
9				5 < C	<i>w</i> ≤ 10			

ISO 8573.1 Quality Classes

Per ISO 8573.1: 2001(E)

Energy Saving Features

Energy Management System

Select an EMS option package for fast returnson-investment. Energy saving logic controls and synchronizes the engagement cycles of the Free-Air-Supercharger (FAS) to mirror plant air demands. This design features a precision venturi blower assembly, engineered to drastically reduce purge air consumption.

The EMS uses rugged temperature and humidity sensing technology that does not require calibration. Constant desiccant bed monitoring ensures stable dew point control. Algorithm-based controls precisely engage the FAS when needed to manage the bed regeneration cycles and boost the airflow through the tower. Compressed purge air volume is reduced, further optimizing energy conservation.

In fact, a VHD Series dryer with an EMS package may enable the use of a smaller air compressor. Total system efficiency would then be superior due to the linear energy- saving potential of the dryer. Purge air savings of up to 15% are possible in direct proportion to demand when compared to typical heatless designs. Consistent -40° F pressure dew points and fast returns-on-investment are automatic year round.

Purge Air Operating Cost Comparison

Annual Cost of Compressed Purge Air²

Average Air Demand			Regeneration Cost by Technology ¹						
			Heatless Design	VHD Series	VHD Series				
flow	scfm	m³/h	Industry average 15% Purge	Standard 7% Purge	w/Free-Air Supercharger 6% Purge				
100%	525	892	\$10,293	\$4,803	\$4,117				
90%	473	803	\$10,293	\$4,803	\$3,705				
75%	394	669	\$10,293	\$4,803	\$3,088				
50%	263	446	\$10,293	\$4,803	\$2,059				
35%	184	313	\$10,293	\$4,803	\$1,441				
20%	105	178	\$10,293	\$4,803	\$823				

1 Assumes 8760 hours, 10 cents per KwH, 5 scfm (8.5 m³/h) per HP 2 Constant operation at average air demand

Slash Purge Air Energy Costs

Compressed Air Savings



Heatless Design (Industry average 19% purge)

Standard VHD Series Dryers

Global demand for Air Quality Class 2 and our advanced Free-Air Supercharger enables **hydrovane** to offer externally heated purge desiccant dryers with dew point performance guaranteed from 250 to 750 scfm (425 to 5,437 nm³/h).

Designed for applications that were previously forced to accept a -40° F (-40° C) pressure dew point when simple protection against seasonal freezing is the issue. The standard design delivers ISO 8573.1 dew points between Class 2 and Class 3 automatically. Class 2 (-40° F/-40° C) dew points protect against freezing during low ambient conditions and Class 3 (-4° F/-20° C) dew points keep your air system bone dry during the heat of summer. Applications that require Class 2 (-40° F/-40° C) dew points year round simply need to select the Free-Air Supercharger option package.

Delivering Innovation Through Design



VHD Features

- 1. Soft-seated check valves for tight shutoff and durability
- 2. Towers filled with extra, high-grade activated alumina to deliver superior performance
- Low-watt density heater saves energy and prevents premature desiccant aging
- 4. Heavy-duty air intake filter
- 5. High-quality pressure gauges display left tower, right tower, and purge pressure
- 6. Function indicator LEDs for easy monitoring
- 7. Easy-view vacuum fluorescent text display is visible under any condition
- Energy Management System advanced microprocessor-based control
- 9. NEMA 4 Construction
- Premium quality inlet switching/purge exhaust butterfly valves for long life on 3" and larger (Quality pneumatic angle-seated valves for smaller sizes)

How It Works

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VHD Operation

Standard Design

Moist, filtered compressed air enters the pressurized on-line desiccant-filled drying Tower 1 through valve (A). Up-flow drying enables the desiccant to strip the air stream of moisture. Clean, dry compressed air exits through valve (E) to feed the air system. Tower 2 (when in regeneration mode) closes valve (B), then depressurizes to atmosphere through muffler (C). Valves (D & G) open and the heater turns on. A portion of dry compressed air (purge air) is diverted before exiting (E) and passes through the heater. Hot dry purge air desorbs the moisture from the desiccant as it flows down through Tower 2 to exit at valve (D). Once desorbed, the heater turns off and cool dry purge air continues to pass until the desiccant bed is cooled. Finally, valve (D) closes and Tower 2 is repressurized. At a fixed time interval, valve (B) will open and Tower 2 will be placed on-line to dry the bed and valves (A & D) will close. Operations will switch and Tower 1 will be regenerated.

EMS Options with Free-Air Supercharger Design

Whereas the standard design operates on a fixed time interval basis, Free-Air Supercharger (FAS) versions manage the drying and regeneration cycles with precision for systems with variable air demands. The on-line Tower will continue to dry the air stream until the "moisture front" is detected. Only then will the switch-over sequence begin. In regeneration mode the FAS is engaged and a portion of dry purge air exits valve (F) to be injected into the Y-axis of the FAS. The FAS draws ambient air into the X-axis to desorb the desiccant at better than 1:1 amplification. Sensors detect the retreat of the moisture front, disengages the FAS, eliminates the purge air usage and, initiates the repressurization cycle. The dry, pressurized off-line Tower will remain ready and isolated until sensors detect that the on-line drying Tower is saturated. Then, the switch-over will occur and the process will repeat.



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Shown with optional Free-Air Supercharger

Reliability to Meet Your Operations

VHD Features		Controller Model					
		Standard	Option A	Option B			
Pressure Dew Point	ISO Class 3: -4° F (-20° C)	G	-	-			
per ISO 8573.1	ISO Class 2: -40° F (-40° C)	S	G	G			
Free-Air Supercharger	Venturi Blower	-	Х	Х			
EMS Control	Automatic Energy Savings	-	Х	Х			
	Digital Dew Point Monitoring	-	-	х			
Vacuum Fluorescent Text	2 Line, 16 Characters (high-visibility in darkness or sunlight)	х	x	x			
Languages	English, French, and Spanish	Х	Х	Х			
Power Recovery	Automatic Restart after Power Loss Remote Indication of Alarm	x	x	x			
Dry Contacts	Power On Heater On	x	x	x			
Overlay w/ Circuit Graphics & LED Indicators Alarm LEDs with Text Display	Tower Status (drying switchover heat, cool, etc.) Tower Switch-over Failure (low heater temp/high heater temp) Sensor Over-range & Under-range Service Reminder	х	х	х			

 $S = Seasonal \qquad G = Guaranteed \qquad X = Included$

VHD Series Options



Optional EMS Controlled Free-Air Supercharger To reduce purge costs

Tower Insulation

Provides insulation to the vessel shell and hot piping insulated from heater to vessels

Mounted Filter Packages

First option includes a mounted Grade E pre-filter and VAF afterfilter with drain valves A Controls: Energy Management System (EMS), monitors humidity and temperature for maximum energy savings. Sensor alarms for "over range" and "under range" conditions and high humidity alarm. Logic controls and synchronizes the engagement cycles of the EMS to mirror plant air demands. Controller A is precision engineered with venturi amplifier that uses ambient air to boost the bed regeneration flow capacity. Consistent -40° F dew point.

B Controls: Includes all of the features of the A controller plus, precision dew point transmitter, dew point displayed by vacuum fluorescent text.

Specifications

	Inlet	Flow	Heater				Dim	ensions			Inlet/Ou	tlet	Арс	prox.
Model	@ 100 100) psig, ⁰ F¹	Rated Output	Average		w		D		н	Connections		Weight	
	scfm	m³/h	kW	kW	in	mm	in	mm	in	mm	in	mm	lbs	kg
VHD300	300	510	4.5	200	48	1,219	46	1,168	98	2,489	1.5" NPT	38.1	1,400	635
VHD400	400	680	6.0	2.67	53	1,346	52	1,321	104	2,642	1.5" NPT	38.1	1,800	817
VHD500	500	850	6.0	3.34	53	1,346	52	1,321	105	2,667	2" NPT	50.8	1,800	817
VHD600	600	1,019	8.0	4.01	55	1,397	53	1,346	108	2,743	2" NPT	50.8	2,000	907
VHD750	750	1,274	10.0	5.01	60	1,524	59	1,499	114	2,896	3" FLG	76.2	2,400	1,089

1 Performance data per CAGI Standard ADF 200 for Desiccant Compressed Air Dryer. Rating conditions are 100° F (37.8° C) inlet 100 psig (7 kg/cm²) inlet pressure, 100% relative humidity, 100° F (37.8° C) ambient temperature, and 5 psig (0.35 bar) pressure drop.

*Consult factory for larger models.

Inlet Flow

Inlet Flow capacities shown in the specifications table have been established at an inlet pressure of 100 psig (7 kg/cm²) and a saturated inlet temperature of 100° F (38° C). To determine maximum inlet flow at other conditions, multiply the inlet flow from the specifications table by the multiplier from Table 1 that corresponds to your operating conditions.

Dew Point

Outlet pressure dew point at rated inlet conditions of 100 psig (7 kg/cm²) and 100° F (38° C) saturated. Dew point varies slightly at other conditions. Consult the factory to determine exact outlet pressure dew point at your operating conditions.

Table 1

Pre	essure			Inlet Ten	nperature	° F (° C)		
psig	kg/cm²	60 (15.6)	70 (21.1)	80 (26.7)	90 (32.2)	100 (37.8)	110 (43.3)	120 (48.9)
60	4.2	1.03	1.01	0.99	0.80	0.58	0.43	0.32
70	4.9	1.10	1.08	1.07	0.94	0.68	0.50	0.37
80	5.6	1.17	1.15	1.14	1.08	0.79	0.58	0.43
90	6.3	1.24	1.22	1.20	1.18	0.89	0.66	0.49
100	7.0	1.30	1.28	1.26	1.24	1.00	0.74	0.55
110	7.7	1.36	1.34	1.32	1.30	1.11	0.82	0.61
120	8.4	1.42	1.40	1.38	1.36	1.22	0.90	0.67
130	9.1	1.48	1.46	1.44	1.42	1.33	0.99	0.74
140	9.8	1.53	1.51	1.49	1.47	1.44	1.07	0.80
150	10.6	1.58	1.56	1.54	1.52	1.50	1.00	0.87

Operating Conditions*

Max. working press.		Min. operating press.		Max. inlet air temp.		Min. inlet air temp.		Max. ambient temp.		Min. ambient temp.	
psig	kg/cm ²	psig	kg/cm ²	° F	°C	° F	°C	° F	°C	°F	°C
150	10.5	60	4.2	120	48.9	40	4.4	120	48.9	40	4.4

*Applies to VHD models 300–750

Aftermarket Parts & Lubricants

Protect the investment in hydrovane

Regular maintenance and service of **hydrovane** product is critical to the performance and longevity of the equipment. Only **hydrovane** can provide the assurance that the investment will provide a lifetime of productivity.

Reliability

Only **hydrovane** can provide aftermarket parts and services that are engineered for use in hydrovane products. The parts and lubricant have been tested under rigorous conditions at the factory to the highest quality standards.

Performance

Only hydrovane can provide aftermarket parts designed specifically for the **hydrovane** product. Use of OEM parts ensures that the investment in **hydrovane** will continue to perform year in and year out with the same reliability and efficiency.

Ease of Doing Business

Only **hydrovane** can provide the peace of mind of turning to one supplier and one source for all aftermarket needs. **hydrovane** has the support network in place to handle all customer service, service and technical support needs.

Value

Only **hydrovane** can provide the high quality aftermarket parts and services for the life of the investment in **hydrovane**. Proper care of the hydrovane product is vital to the equipment's performance and efficiency. Lean on a trusted source—**hydrovane**.





