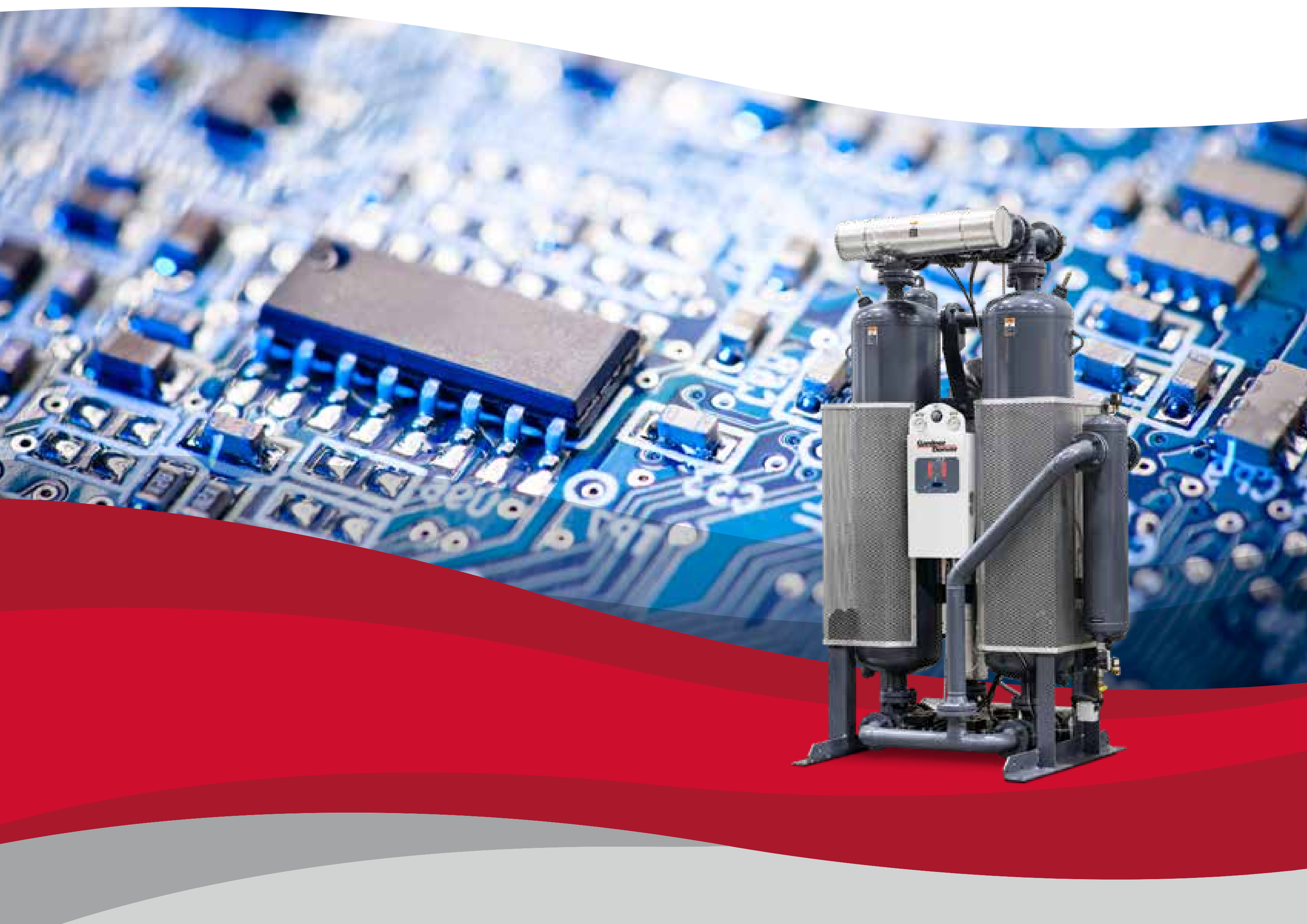
Gardner Denver

HEAT OF COMPRESSION | DESICCANT AIR DRYERS

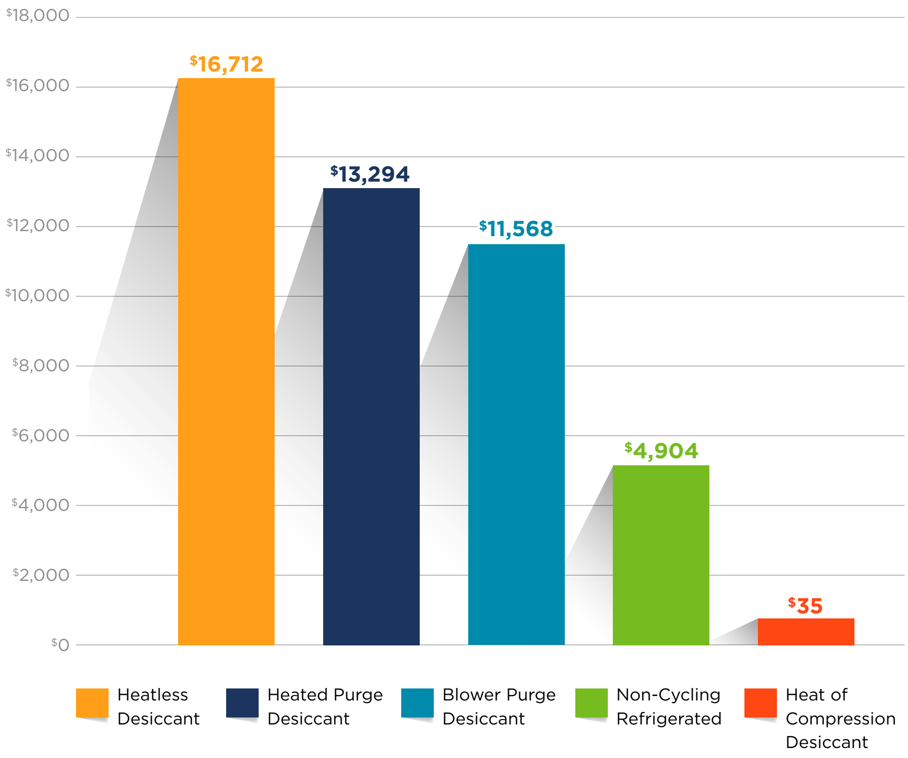
DHC Series



Why Heat of Compression?

The DHC Series heat of compression desiccant air dryers from Gardner Denver provide an energy efficient solution to remove moisture from compressed air. Thermal energy generated during the air compression process of the compressor is utilized to regenerate the offline desiccant tower. Consuming under 50 watts, the energy efficient design offers the lowest cost of operation when compared to conventional dehydration technologies. Ideally positioned for use with oil-free compressors, the DHC Series turns "waste heat" into energy savings that will directly impact the bottom line.

Annual Energy Costs



- Air flow: 1000 scfm
- Cost of power: $0.10 kWh
- Operating time: 8000 hours

Benefits

- Minimal power required, providing low cost of operation and rapid return on investment
- The desiccant bed in the offline tower is regenerated without the use of purge air, requiring no adjustment in compressed air capacity
- Achieves low outlet pressure dew points without the use of blowers or booster heaters
- Fully packaged, skid-mounted design that delivers ease-of-installation
- Delivers ISO 8573.1: 2010 Air Quality Class 2 to 4 pressure dew point

Designed to Perform

Quality Tower Design

- Pressure vessels designed in accordance with ASME Boiler and Pressure Vessel Code Section VIII Division 1
- ASME rated pressure relief valves control pressure build-up due to process issues
- Metal personnel protection and hot pipe insulation provides added safety measures
- Finished with heat resistant coating

Reliable Components

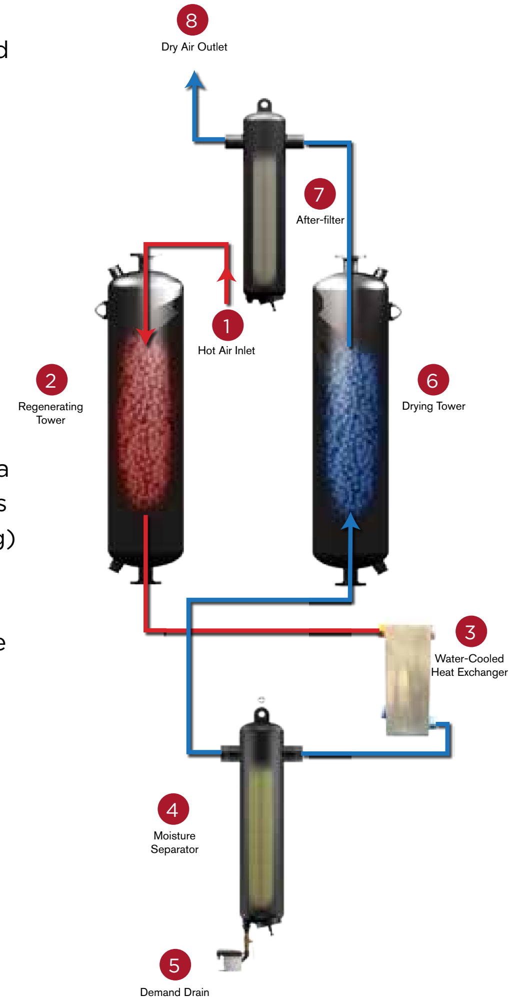
- NEMA4/4X, IP66 rated controller, with polycarbonate enclosure
- Models DHC350 to 450 employ angle seat valves
- Models DHC600 to 10,000 utilize non-lubricated, high performance butterfly valves
- Towers are filled with high-grade desiccant to maintain optimal performance under elevated temperatures
- Fully insulated filter/separator removes bulk liquids and solid particles greater than 3.0 micron
- Factory-mounted high temperature after-filter, rated for 450°F, removes solid particles 1.0 micron and larger
- Equipped with redundant drain system to provide fail-safe operation
- 316 AISI stainless steel, brazed-plate heat exchanger provides efficient cooling and corrosion resistance

Optional Features

- Tower insulation
- Moisture-sensing dew point demand control with alarm
- Valve failure-to-shift alarm

Heat of Compression Operation

1. Hot, oil-free compressed air is directed into the inlet of the dryer by a high-performance switching valve.
2. The hot air flows downward through the offline tower effectively regenerating the desiccant bed.
3. Hot, moist, compressed air travels to the water-cooled heat exchanger. The cooling water runs counter-flow to the hot air causing water vapor in the air to condense.
4. The condensed liquid is removed in a high-performance, two-stage filter/separator. Bulk liquid and solid particles 3.0 micron and larger are captured.
5. Condensate is discharged by an energy-efficient, no-air-loss demand drain. The DHC Series is equipment with a backup drain providing fail-safe operation.
6. The pre-cooled air flows upward through the online tower and is dried to the specified pressure dew point.
7. Air travels through a high-temperature after-filter, which removes solid particles 1.0 micron and larger.
8. Dry, oil-free, compressed air travels downstream for use.
9. The cycle is reversed based on a one hour fixed time (30 minutes regenerating/30 minutes drying) or on an extended cycle. The cycle is extended based on the regenerating tower temperature or optional pressure dew point.



ISO 8573-1: 2010 AIR QUALITY CLASSES

AIR QUALITY CLASSES	SOLID PARTICLES — MAXIMUM NUMBER OF PARTICLES PER M³			WATER VAPOR PRESSURE — DEW POINT		OIL — TOTAL OIL CONCENTRATION AEROSOL, LIQUID & VAPOR	
	0.10-0.5 MICRON	0.5-1.0 MICRON	1.0-5.0 MICRON	°F	°C	MG/M³	PPM W/W
0	As specified by the equipment user or supplier and more stringent than class 1						
1	≤ 20,000	≤ 400	≤ 10	≤ -94	≤ -70	0.01	0.008
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40	≤ -40	0.1	0.08
3	-	≤ 90,000	≤ 1,000	≤ -4	≤ -20	1	0.8
4	-	-	≤ 10,000	≤ +37	≤ +3	5	4
5	-	-	≤ 100,000	≤ +45	≤ +7	-	-

ISO Quality Class Performance: DHC with After-Filter
- Class 2: Solids
- Class 2-4: Pressure Dew Point

Take Control of Monitoring

The controller for the DHC Series is equipped with a comprehensive diagnostic system that provides real-time operating status, service reminders and fault conditions. Information is communicated to the user with a highly visible two line, sixteen character vacuum florescent text display screen. The dryer comes furnished with solid-state controls located in a polycarbonate, NEMA4/4X, IP66 rated enclosure. The controller includes an RS 232 communications port and Modbus registers for remote monitoring. As standard, voltage-free dry contacts provide remote alarm capabilities.

Control Features

- Panel-mounted instrumentation
- Operating status text display screens
- Alarm text display screens
- Power on, master alarm and service reminder indicating LED lights
- Optional outlet pressure dew point and failure to shift alarms

Operating Modes

- Fixed Cycle
- Standard Cycle
- Optional Dew Point Control

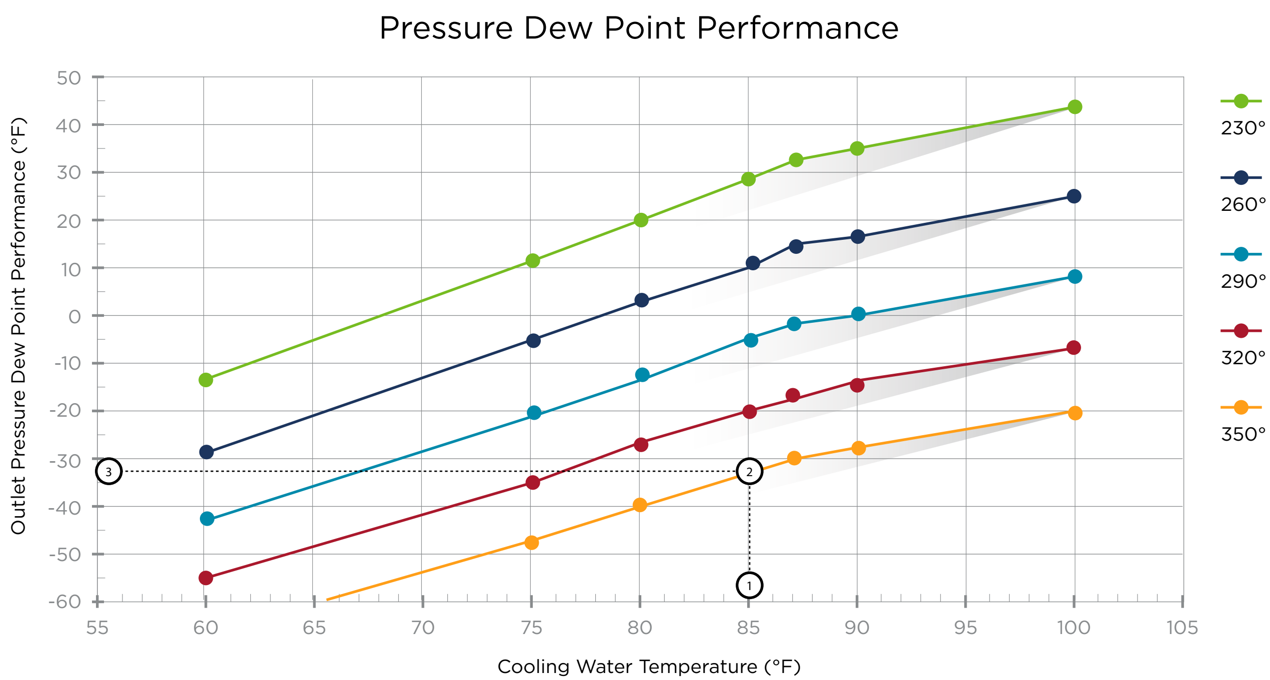
Optional Dew Point Demand Control System

A dew point demand control system automatically extends the drying cycle to compensate for changes in operating conditions. By sampling the compressed air exiting the drying tower, the demand control system delays tower switchover until the moisture content at the sample port rises to the predetermined set point.

Understanding Dew Point Performance

Site conditions are very important when understanding heat of compression pressure dew point performance. The DHC Series flow ratings are based on an ambient air temperature of 85°F (29°C) and 60% relative humidity. When compressed to 100 PSIG (7 Bar) and heated to 350°F (160°C), the air leaving the compressor will possess a relative humidity of 3%.

The DHC Series utilizes recoverable heat energy from the air compressor to regenerate the offline desiccant bed. It is important to understand that higher inlet air temperatures improve regeneration efficiency and deliver lower pressure dew points, while cooler inlet air temperatures decrease regeneration efficiency and deliver higher pressure dew points.



The chart above demonstrates the effect of cooling water temperature & compressor discharge temperatures to pressure dew point

How to use the Dew Point Performance Chart

1. Locate the cooling water temperature on the X-axis. ***Note: Inlet temperature to drying tower equals cooling water temperature plus 10° F.***
2. Proceed vertically up the graph line to where the cooling water temperature and compressor discharge temperature intersect.
3. From this coordinate, advance laterally across the graph line to the Y-axis to determine pressure dew point (° F).

Example

1. Cooling water temperature = 85° F
2. Compressor discharge temperature = 350° F
3. Resulting pressure dew point = -33° F

Product Specifications

OPERATING CONDITIONS	MINIMUM	DESIGN	MAXIMUM
Regeneration Temperature	200°F / 93°C	Customer Specific	450°F / 232°C
Inlet Air Pressure	60 PSIG / 4 BAR	100 PSIG / 7 BAR	150 PSIG / 10 BAR
Ambient Air Temperature	40°F / 4°C	85°F / 29°C	120°F / 49°C
Ambient Relative Humidity	-	60%	-
Inlet Air Temperature (drying)	50°F / 10°C	95°F / 35°C	120°F / 49°C
Cooling Water Temperature	40°F / 4°C	85°F / 29°C	110°F / 43°C

MODEL	RATED FLOW (1)		DIMENSIONS						APPROXIMATE WEIGHT		INLET/OUTLET CONNECTIONS	COOLING WATER FLOW
			H		W		D					
	SCFM	NM³/HR	IN	MM	IN	MM	IN	MM	LB	KG	IN	GPM @ 85°F
DHC350	350	560	96	2438	54	1372	43	1092	1794	814	2 / 3" NPT	8.7
DHC450	450	720	96	2438	56	1422	43	1092	1794	814	2 / 3" NPT	11.0
DHC600	600	960	105	2667	63	1600	50	1270	2294	1041	3" FLG / 3" NPT	15.0
DHC800	800	1280	105	2667	63	1600	50	1270	2518	1142	3" FLG / 3" NPT	20.0
DHC1025	1025	1640	108	2743	65	1651	48	1219	2818	1278	3" FLG / 3" NPT	26.0
DHC1300	1300	2080	115	2921	71	1803	62	1575	3438	1559	4" FLG	32.0
DHC1500	1500	2400	114	2896	77	1956	62	1575	4038	1832	4" FLG	37.0
DHC1800	1800	2880	119	3023	79	2007	62	1575	4538	2058	4" FLG	45.0
DHC2100	2100	3360	114	2896	87	2210	62	1575	5572	2527	4" FLG	52.0
DHC2400	2400	3840	116	2946	89	2261	67	1702	6472	2936	4" FLG	60.0
DHC3250	3250	5200	134	3404	99	2515	68	1727	7878	3573	6" FLG	81.0
DHC3700	3700	5920	126	3200	98	2489	85	2159	9638	4372	6" FLG	92.0
DHC4425	4425	7080	Consult Factory									
DHC5000	5000	8000										
DHC6100	6100	9760										
DHC7500	7500	12000										
DHC8500	8500	13600										
DHC10000	10000	16000										

1. Flow ratings based on 100 PSIG operating pressure, 85°F cooling water and 95°F air temperature into drying tower
2. Shipping weight includes factory mounted 1.0 micron after-filter

Correction Factors

FLOW MULTIPLIER FOR DRYER SELECTION

	INLET TEMPERATURE TO DRYING TOWER*	85°F (29°C)	90°F (32°C)	95°F (35°C)	100°F (38°C)	105°F (41°C)	110°F (43°C)
PRESSURE PSIG (BAR)	60 (4)	1.2	1.4	1.7	2.0	2.3	2.8
	70 (5)	1.0	1.2	1.4	1.7	2.0	2.4
	80 (6)	0.9	1.1	1.3	1.5	1.7	2.1
	90 (6)		0.9	1.1	1.3	1.6	1.8
	100 (7)		0.8	1.0	1.2	1.4	1.7
	110 (8)			0.9	1.1	1.3	1.5
	120 (8)			0.8	1.0	1.2	1.4
	130 (9)			0.8	0.9	1.1	1.3
	140 (10)			0.7	0.8	1.0	1.2

* Inlet temperature to drying tower = cooling water temperature +10°F

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by continuously improving all business processes
with a focus on innovation and velocity

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