Blower Purge

Regenerative Compressed Air Dryer

SAHARA AIR PRODUCTS

Henderson Engineering Co.
815.786.9471 800.544.4379

Provides safety and reliability

Used for medium to high flow rates

Designed to provide years of trouble-free operation

World Leader in Regenerative Dryer Technology

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Most Economical

Typically used for drying medium to large volumes of air

Blower Purge (BP) air dryers are among the most economical to operate because there is no purge air loss during blower regeneration.

They're capable of delivering dew points of -40°F and, even as low as -100°F, when using exhaust purge cooling.

Sahara Air Products BP air dryers are designed to provide years of trouble-free operation and include many safety features.

A Long & Proud Company History

Sahara Air Products, a Division of Henderson Engineering Co., Inc., was founded in 1957 by Joe and Evelyn Henderson to provide engineered solutions for air system problems. Mr. Henderson's philosophy was to thoroughly examine the unique requirements of each customer and to develop the most economical and reliable system solution for that application. This trademark of engineered solutions exists at Sahara today, as the third generation of Hendersons continue the tradition of product excellence and customer service. Sahara's reputation for high quality, innovative products, and customer loyalty has continued to grow through the years.

As a family business, we know that our greatest assets are our employees. Most of our people have been with us for more than 20 years. There is no substitute for experience. Sahara employees are true team members who know what they're doing and they truly care about doing it right the first time. This means you get what you want; a drying system that delivers performance year after year, decade after decade.

Quality and old world craftsmanship never goes out of style

Custom Design

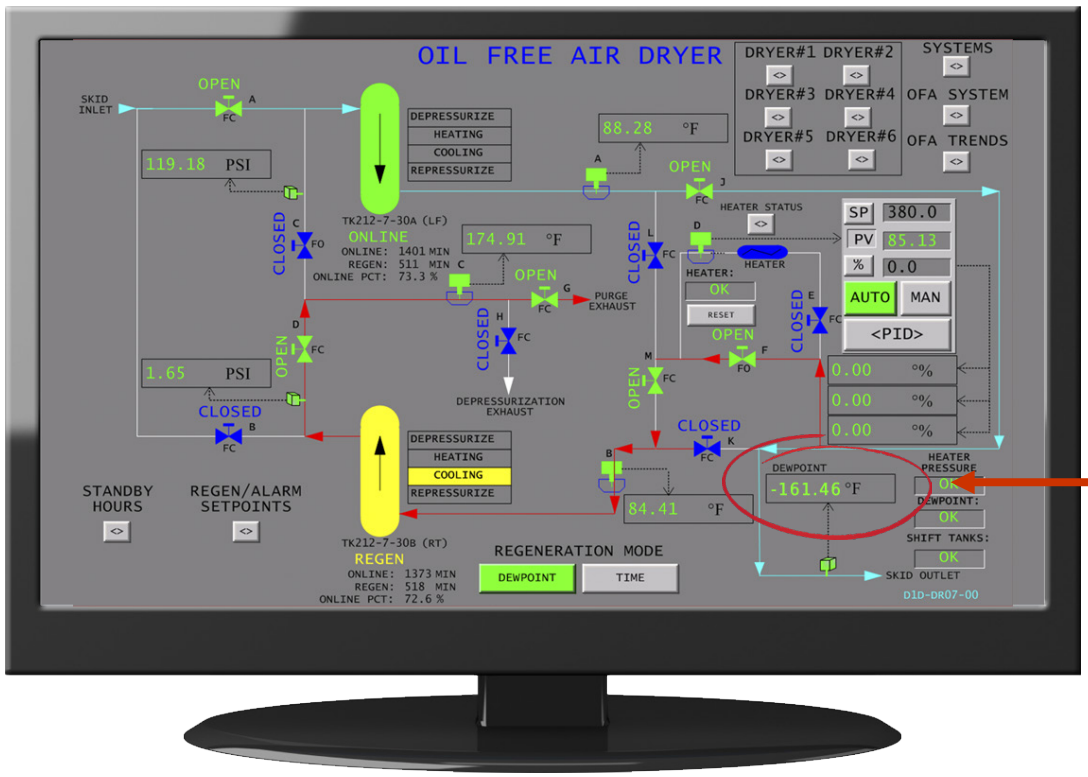
Dryers are purchased to solve plant air problems. The decision to buy is complex and involves many variables; initial price, vendor qualifications, delivery, performance, and operating cost, just to name a few. The selection of a SAHARA air dryer is a safe choice. Our sales engineers will help you select the right system for your application. They have the expertise to review your plant air system and design the optimum engineered solution.

Need your documentation and instruction manuals in your native language? Require instrumentation in dual scale? With Sahara's experience in designing and building our products for customers worldwide, we can provide that for you.

Applications

- We make dryers for instrument air, as well as a variety of special applications
- High pressure up to 5000 PSIG / 345 Bar(g)
- Low pressure down to 20 PSIG / 1.4 Bar(g) for ozone generators that deliver constant, flat line, not to exceed -100°F / -73°C dew points
- Gases other than air; N2, CO2, CH4
- We build dryers to API specifications
- We also make dryers for air separation companies
- Capable of delivering extremely low dew points
- Used in automotive paint applications, refineries, and all other industrial applications.

We can build a dryer to meet your strict performance requirements



-161.46 PDP
at one of our electronics customer's facilities

Quality and reliability are built into every SAHARA air dryer and performance is guaranteed

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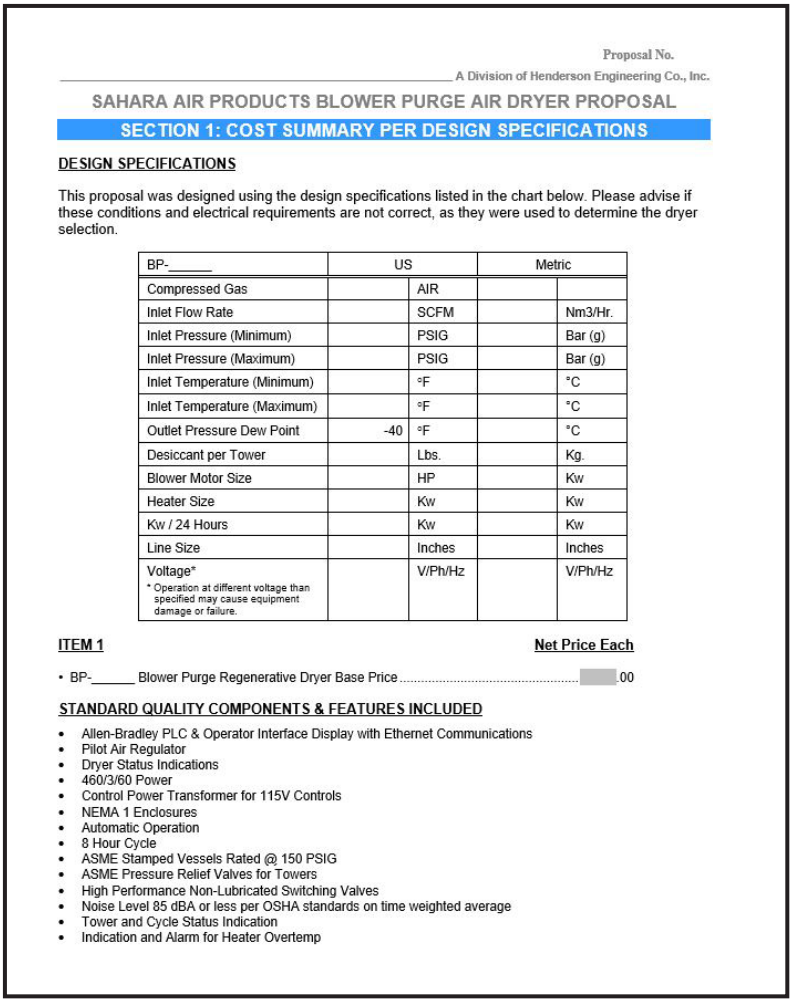
Engineered Solutions

Our inside sales engineering team has over 100 years collective experience to evaluate and quote in exact accordance with your detailed specifications.

Our ability to provide custom designs that comply with every specification is unmatched.

Our detailed proposal reviews your specification line item by line item and even calls out potential conflicts between various specifications and data sheets.

You see exactly what's in your specifications and you determine what you want to purchase.



Proposal No.

A Division of Henderson Engineering Co., Inc.

SAHARA AIR PRODUCTS BLOWER PURGE AIR DRYER PROPOSAL

SECTION 1: COST SUMMARY PER DESIGN SPECIFICATIONS

DESIGN SPECIFICATIONS

This proposal was designed using the design specifications listed in the chart below. Please advise if these conditions and electrical requirements are not correct, as they were used to determine the dryer selection.

BP-_____	US		Metric	
Compressed Gas		AIR		
Inlet Flow Rate		SCFM		Nm3/Hr.
Inlet Pressure (Minimum)		PSIG		Bar (g)
Inlet Pressure (Maximum)		PSIG		Bar (g)
Inlet Temperature (Minimum)		°F		°C
Inlet Temperature (Maximum)		°F		°C
Outlet Pressure Dew Point	-40	°F		°C
Desiccant per Tower		Lbs.		Kg.
Blower Motor Size		HP		Kw
Heater Size		Kw		Kw
Kw / 24 Hours		Kw		Kw
Line Size		Inches		Inches
Voltage* * Operation at different voltage than specified may cause equipment damage or failure.		V/Ph/Hz		V/Ph/Hz

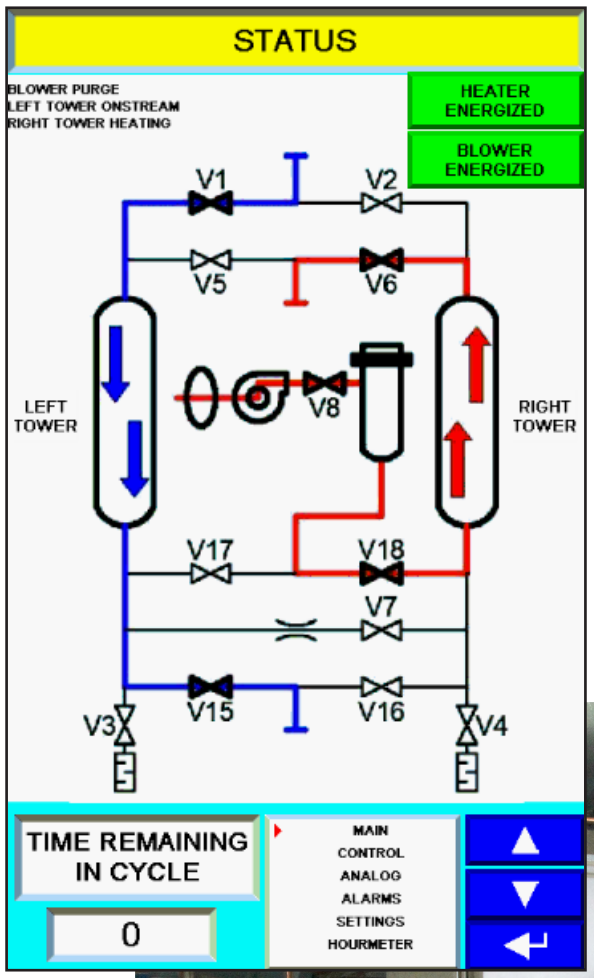
ITEM 1 Net Price Each

• BP-_____ Blower Purge Regenerative Dryer Base Price ..... .00

STANDARD QUALITY COMPONENTS & FEATURES INCLUDED

- Allen-Bradley PLC & Operator Interface Display with Ethernet Communications
- Pilot Air Regulator
- Dryer Status Indications
- 460/3/60 Power
- Control Power Transformer for 115V Controls
- NEMA 1 Enclosures
- Automatic Operation
- 8 Hour Cycle
- ASME Stamped Vessels Rated @ 150 PSIG
- ASME Pressure Relief Valves for Towers
- High Performance Non-Lubricated Switching Valves
- Noise Level 85 dBA or less per OSHA standards on time weighted average
- Tower and Cycle Status Indication
- Indication and Alarm for Heater Overtemp

Controller Comes Standard



- The standard PLC controls the dryer's operation
- Ethernet communication
- The standard operator interface for local control of the air dryer
- Housed in a NEMA 1 enclosure, the operator interface uses a touch sensitive screen with control functions performed by touching on-screen display buttons to change screens, modify settings, or enter values
- Dryer cycle indication
- P&ID for each cycle on operator interface screen
- Other controllers available, per customer specifications

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Safety and Reliability

Pressure Switch Control

Safety and reliability are our most important concerns. All of our dryers are designed and fabricated to provide you with this assurance. Our blower purge dryers are a prime example of this fact. The purge exhaust valves, V3 and V4, are not controlled by a timer like most other dryer manufacturers. They are controlled by a pressure switch that measures the pressure in the regenerating tower as it depressurizes. Once the pressure has dropped to 10 PSIG, the pressure switch allows the purge exhaust valves to open and turns on the heater and blower. Competitive dryers typically allow their purge exhaust valves to open 30 seconds after depressurization. What if a valve fails or even if a valve leaks? Air takes the path of least resistance. With a competitive dryer, if a valve fails you could vent all of your compressed air to atmosphere. Downstream you have no air flow or air pressure. This can have catastrophic consequences. SAHARA prevents this with our exclusive pressure switch control. This design also minimizes bed velocity during depressurization and reduces noise.

Derated Heaters

Our electric heaters are derated to operate at 14 watts/sq. in. This conservative watt density means that heater burnout rarely occurs. Additionally, the heater is manufactured using Inconel, an extremely high temperature material. Heater burnouts and hot spots are virtually eliminated by this conservative design.

Redundant Temperature Controls

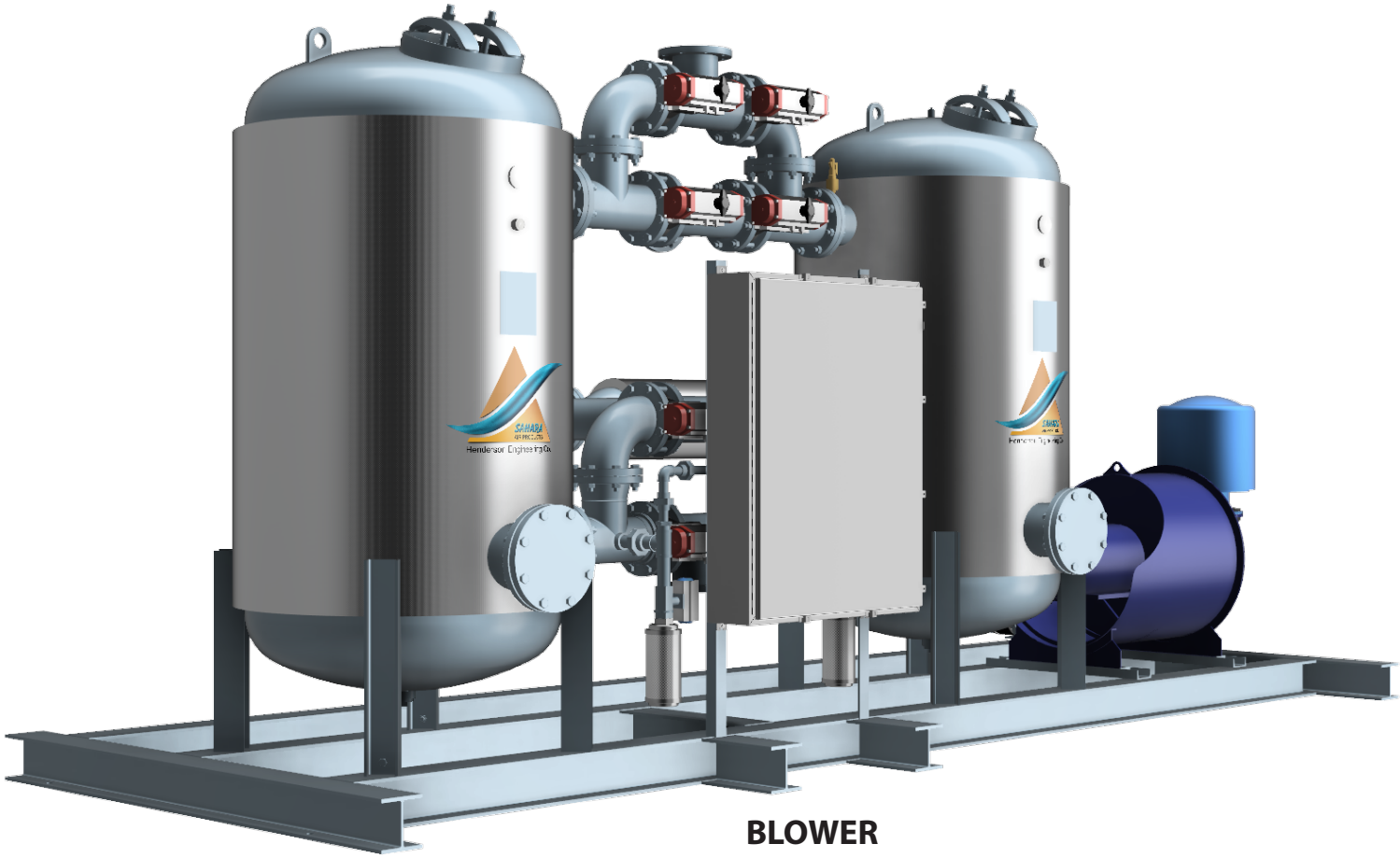
Our heaters are controlled by a triple redundant control system. The primary temperature controls are temperature transmitters. One is located at the discharge of the heater and regulates the temperature of the regeneration air. The dual setpoint of this transmitter provides extra protection; if the temperature rises past the primary setpoint, the secondary setpoint turns the heater off before a problem can develop. If for any reason this controller should fail, or if the air flow from the blower is interrupted, a second heater transmitter is located at the inlet of the heater. This triple redundant heater control virtually guarantees optimum performance and safety.

Sahara's BP design stresses safety and reliability, eliminating the possibility of heater burnout and, more importantly, safeguards against catastrophic heater fire by implementing backup systems.

The use of an external heater eliminates the problems associated with internal heat-reactivated dryers. The externally mounted heater is not in contact with the desiccant which increases the desiccant life. In addition, the inconel-sheathed heater is derated to 14 watts/sq. in., virtually eliminating the possibility of heater burnout.

The heater is controlled by a dual setpoint transmitter, with additional protection provided by a transmitter located in the heater's cold zone.

There is a third temperature transmitter located in the purge exhaust to monitor bed regeneration temperature.



LOW PRESSURE DROP

Complete system designed to keep pressure drop low. The pressure drop is calculated at <3 PSID.

CONTROLLED BLOWDOWN

To prevent shocking or fluidization of the desiccant, separate depressurization and purge exhaust valves are used. Controlled depressurization occurs before opening the purge exhaust valve for regeneration.

EASE OF MAINTENANCE

Where necessary, when valves are mounted between towers, instead of welding both towers to the structural steel base, we weld one and BOLT the other tower. Valve maintenance is made much simpler by being able to remove one tower.

BLOWER

Quiet and reliable centrifugal blower provides years of trouble-free service. This blower design allows us to meet the low dBa noise level specifications required in today's environments without additional sound proofing.


SAHARA
AIR PRODUCTS
A
B
C

Quality Integral Components & Features

SWITCHING VALVES

- Reliable 2-way non-lubricated
- Directs air to the drying tower
- 2" & smaller are 2-way rack and pinion actuated bronze ball valves
- 3" & larger are high performance butterfly valves w/SS internals and reinforced teflon seat

ELECTRICAL

- Housed in a NEMA 1 enclosure
- Built to latest NEC Guidelines

ELECTRIC HEATER

- Derated to a maximum of 14 watts/sq. in. density for longer life
- Inconel sheathed
- Heating elements not in direct contact with desiccant

PRESSURE SWITCH

- Controls purge exhaust valve
- Prevents heater from being energized until tower is depressurized
- Prevents catastrophic air loss in the event of valve failure

DEPRESSURIZATION MUFFLERS

- Utilized on the blowdown, keeps noise levels to a minimum
- Complies with OSHA standards by keeping noise tolerance at <85 dBA on a time-weighted average

DIN RAIL MOUNTED TEMPERATURE TRANSMITTER

- For heater control & cold zone
- Transmitter regulates heater outlet temperature
- Temperature indication and alarms displayed on PanelView screen
- A separate transmitter located in the cold zone of the heater provides additional protection, in case of low or lost flow
- A third temperature transmitter for the purge exhaust to monitor bed regen temperature

SEPARATE PILOT AIR FILTER

- With pressure gauge and block valve to protect dryer control system

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Other options available.

We can custom build a dryer to meet your strict performance requirements. Contact us and our sales engineers will help you select the right system for your application.

Standard Options

A SAHARA DEW POINT DEMAND SYSTEM

Energy conservation has always been a strong design consideration of Sahara Air Products. The Dew Point Demand System measures the dew point of the outlet air, overriding the timer, eliminating unnecessary switching of towers resulting in considerable savings through reduction of regeneration cost. Additional savings can be realized with this system by reducing wear on component parts, as well as extending the life of desiccant.

The SAHARA Dew Point Demand System utilizes a state-of-the-art moisture transmitter to accurately measure the actual PRESSURE DEW POINT the dryer is delivering at all times. The instrument reads directly to the PLC and is displayed on the Panel View screen, which constantly keeps you informed of dryer performance. An adjustable set point allows you to set the precise dew point for tower switching. Tower switching can be activated anywhere within the broad range of -148ºF to +86ºF.

B FAIL-TO-SHIFT ALARM INDICATION

Indication that malfunction has occurred, preventing towers from shifting at the proper time or dew point sequence.

C MOISTURE INDICATOR

Visual indication of outlet air moisture content by means of color change media.

D DRAIN TRAP

We recommend utilizing a drain trap on each coalescing prefilter.

E NEMA 4, 7, or 12 ELECTRICAL CONSTRUCTION

F COALESCING PREFILTER

For optimum performance of a regenerative dryer application, we recommend a prefilter upstream of the dryer to protect the desiccant bed from contamination by oil, entrained water, or other contaminants. For this duty, we offer a Sahara high efficiency oil coalescing prefilter (HEF). This unit is constructed of carbon steel to ASME standards and is designed to filter oil to 1 PPM and dirt particles to 0.3 micron with a 75 PSIG differential collapse pressure.

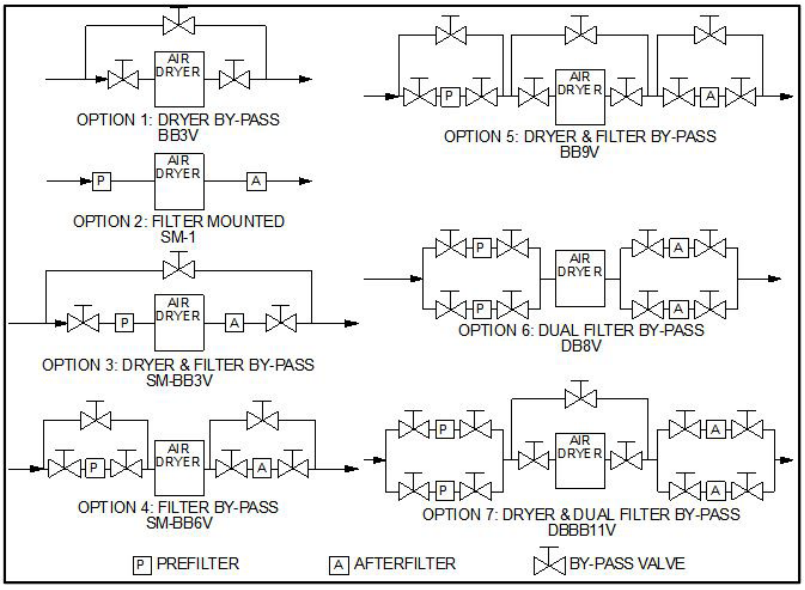
G HIGH TEMPERATURE PARTICULATE AFTERFILTER

We recommend an afterfilter downstream of the dryer to eliminate the possibility of desiccant dust carryover into the air system. For this duty, we offer a Sahara high temperature particulate afterfilter (HAF). This unit is constructed of carbon steel to ASME standards and the elements are designed to filter particles to 0.9 micron.

H FILTER MOUNTING

Filters may be mounted on dryer skid for ease of installation.

I ISOLATION & BYPASS PIPING



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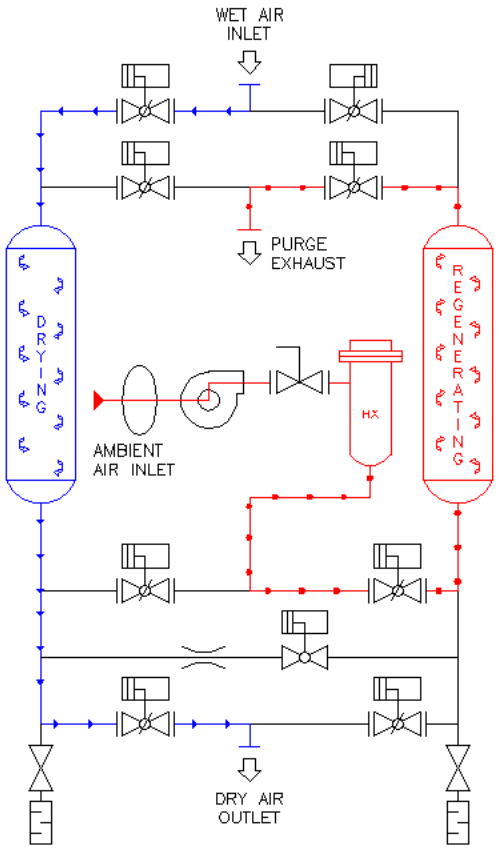
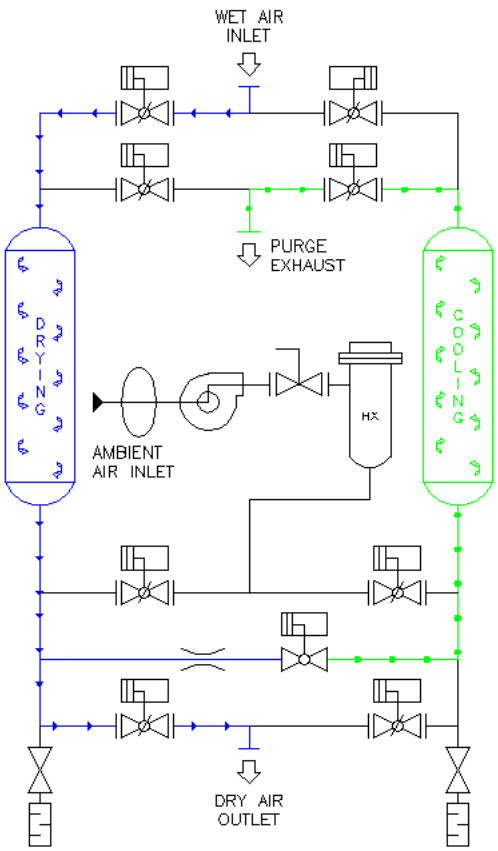
Theory of Operation

While the desiccant in one tower is onstream drying the air, the desiccant in the other tower is offstream being regenerated. The two towers are linked using switching valves, so that when the desiccant in the drying tower is saturated, the valves switch the flow into the tower that's just been regenerated. Because the towers alternate, the air stream is always exposed to dry desiccant.

LEFT TOWER DRYING; RIGHT TOWER HEATING

Wet air enters the dryer and is directed into the drying tower through the left inlet switching valve. The wet air is dried in the left tower and exits the dryer through the left outlet switching valve.
Regeneration of the right tower is accomplished by drawing ambient air into a centrifugal blower, increasing the pressure to 2.5 psig and blowing this ambient air into the heater. The regeneration air is heated to 365°F and is directed into the right tower, where it removes the water from the desiccant. The hot, wet regeneration air exits the dryer through the right purge exhaust valve. After 3 hours of heating, the heater is turned off and the dryer enters the cooling cycle.





LEFT TOWER DRYING; RIGHT TOWER EXHAUST COOLING

Wet air continues to be dried in the left tower. During cooling, you have a choice of cooling methods. You can select blower cooling or exhaust purge cooling. During blower cooling, the heater is turned off and air continues in the same flow pattern. If the dryer is located in a warm, humid environment, the use of blower cooling will cause an increase in dew point at tower shift. To provide continuous low dew point, you may select exhaust purge cooling (illustrated). When this mode of operation is selected, the heater and blower are turned off at the end of 3 hours. The repressurization valve is opened and a small portion of dry air (5%) is directed into the right tower to cool the desiccant bed. After one hour of cooling, the purge exhaust valve is closed, the tower repressurizes, and the dryer is ready to shift towers.

Worldwide Installations

Commitment to Customer Satisfaction

"Our Sahara dryer has been in service for 3 years without failure. We've had other dryers in the plant and it seemed like we were constantly fixing something. Having any product perform better than what the manufacturer promised has been very refreshing. We would buy another Sahara dryer without any reservations." – Plant Engineer, Automotive Assembly Plant

"Our brewery has used several different dryers during the past 10 years. The Sahara Blower Purge dryer has worked the best. We use a PLC to control the cycle, plus there's a dewpoint analyzer that indicates the outlet dewpoint. We have this tied into our PC's so I can check system performance at any time. The exhaust purge cooling cycle is used in the summer so we maintain -60°F dewpoints all year. Our other dryers didn't have dewpoint analyzers so we really didn't even know how bad they were. After operating the Sahara for 2 years, we hired them to retrofit our other dryers with new controls, valves, and a new regeneration skid. The only thing we kept from the old dryers were the tanks. Everything fit together and now all of our dryers work just like new." – Utility Engineer, Brewery

"We have a Henderson Blower Purge dryer model BP-5000. The unit has been operating for approximately 15 months processing our entire plant air system. We have had no downtime on the unit during this period, except to change filter elements. The dewpoint of the air leaving the unit typically ranges from -50°F and lower. Our unit is equipped with a digital dewpoint readout which also controls the valve shifting. The dryer has a very low pressure drop, in the range of 3 to 5 psi. The butterfly valves have performed flawlessly. The workmanship throughout the unit is excellent and well thought out. This unit was picked because of our past experience with Henderson's equipment at another facility by one of our staff engineers. Our choice of Henderson has no regrets." – Power Department Engineer, Pulp and Paper Mill

"Reliable, clean, and dry compressed air is very critical to our painting process, since water and/or oil causes rejected parts due to "fisheyes" and other imperfections. Our Sahara BP-4000 blower purge air dryer has been in operation over 2 years, 24 hours per day, 365 days per year. The pressure dewpoints have never exceeded -50°F and are usually below -100°F most of the year. We have not experienced any mechanical or electrical failures other than the time we allowed the intake air filter to become clogged. The design and construction of the Sahara dryer obviously makes for a very "maintenance friendly" dryer. We are pleased with the performance and reliability of our Sahara dryer and would recommend it without hesitation. It is obvious to us why Sahara is considered a leader in their industry." – Facilities Engineer, Moulding Company

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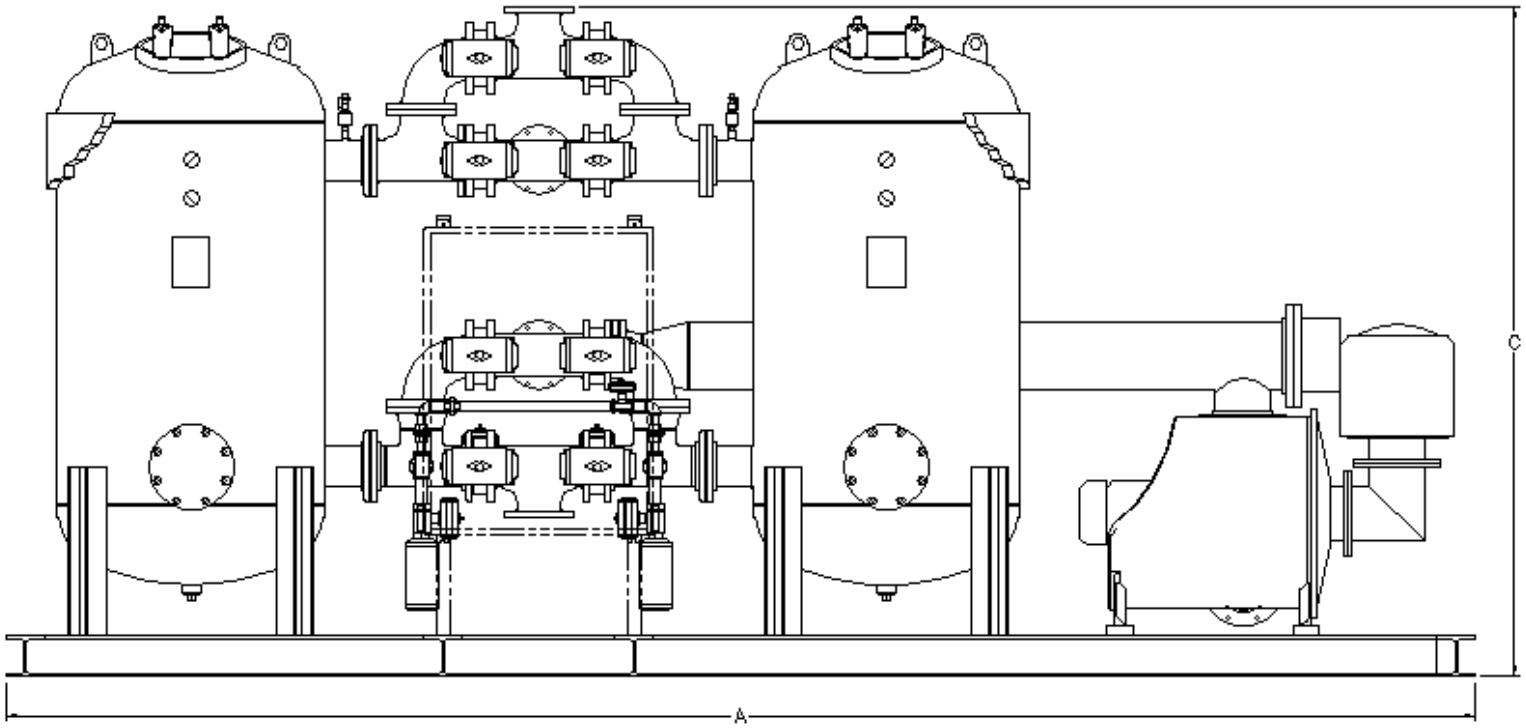
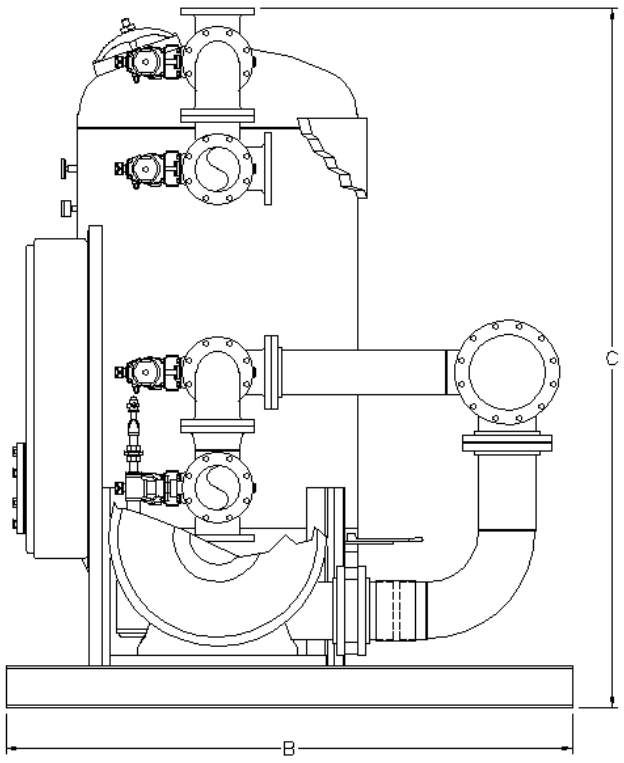
Specifications





Model	Rated Flow (SCFM)	A = Length (Inches)	B = Width (Inches)	C = Height (Inches)	Approx. Weight (Lbs.)	Conn. Size (Inches)	Desiccant per Tower (Lbs.)	Blower HP	Heater Size (KW)	Avg. Power * (KW/24 Hrs.)
BP-70	70	58	48	72	545	¾	40	0.5	2	36.37
BP-100	100	62	50	72	725	1	60	0.5	3	48.12
BP-140	140	58	50	65	798	1	80	1	4	72.74
BP-210	210	80	48	72	875	1 ½	120	2.5	5	127.01
BP-280	280	80	48	105	1238	1 ½	160	2.5	7.5	154.43
BP-350	350	92	48	82	1368	2	200	2.5	10	181.85
BP-420	420	92	48	84	1537	2	240	4.5	10	245.07
BP-490	490	92	48	84	1760	2	280	4.5	12	272.49
BP-560	560	99	48	96	2002	2	320	7	15	344.67
BP-630	630	101	48	100	2306	3	360	7	15	372.09
BP-700	700	103	54	96	2426	3	400	7	24	399.5
BP-770	770	105	60	96	3019	3	440	10	24	480.63
BP-840	840	105	66	98	3140	3	480	10	24	508.05
BP-980	980	153	80	85	3533	3	560	7.5	24	518.13
BP-1120	1120	170	65	85	3792	3	640	7.5	30	572.97
BP-1260	1260	170	65	85	4103	3	720	10	30	672.56
BP-1400	1400	170	70	90	4898	3	800	10	40	727.4
BP-1540	1540	185	75	90	5225	4	880	10	40	782.24
BP-1680	1680	185	75	90	5535	4	960	10	40	837.08
BP-1820	1820	185	80	90	5840	4	1040	15	40	981.43
BP-1960	1960	192	90	92	6083	4	1120	15	50	1036.27
BP-2100	2100	206	95	113	6765	4	1200	15	50	1091.1
BP-2380	2380	206	100	113	6989	4	1360	20	60	1290.29
BP-2520	2520	216	75	113	7535	6	1440	20	60	1345.13
BP-2660	2660	216	75	113	7917	6	1520	20	60	1399.97
BP-2800	2800	210	85	113	8206	6	1600	20	75	1454.81
BP-2940	2940	210	85	113	8425	6	1680	20	75	1509.65
BP-3080	3080	210	85	113	8585	6	1760	20	75	1564.48
BP-3220	3220	210	85	113	9070	6	1840	20	75	1619.32
BP-3360	3360	210	85	113	9330	6	1920	25	75	1763.67
BP-3500	3500	240	85	104	20020	6	2020	25	90	1818.51
BP-4000	4000	240	85	104	21120	6	2310	25	90	2014.36
BP-4500	4500	255	90	104	22910	6	2600	30	100	2299.72
BP-5000	5000	260	90	104	23430	6	2890	30	130	2495.57
BP-5500	5500	260	90	104	24640	6	3180	30	130	2691.43
BP-6000	6000	265	90	110	25850	6	3470	40	150	3066.3
BP-6500	6500	265	90	110	27060	6	3760	40	150	3262.15
BP-7000	7000	270	95	115	28270	6	4050	50	180	3637.02
BP-7500	7500	275	95	115	29920	8	4340	50	180	3832.87
BP-8000	8000	275	95	115	31130	8	4630	50	180	4028.72
BP-8500	8500	280	95	115	31900	8	4910	50	200	4224.58
BP-9000	9000	300	100	120	33495	8	5200	60	200	4599.44
BP-9500	9500	300	105	120	34210	8	5500	60	250	4795.3
BP-10000	10000	330	120	135	35200	8	5780	60	250	4991.15

Sahara reserves the right to make changes without notification. Some models not shown. Other sizes and pressures available. Metric dimensions available upon request. Ratings are based on 100 PSIG, 100°F.

** Average power usage does not include savings by using Sahara's optional Dew Point Demand System*

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One of the world's largest heat-of-compression installations; operating at nearly zero cost.

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ISO 9001

Henderson Engineering Co., Inc., is proud to be certified to the ISO 9001 Quality Management System standards and guidelines