SAHARA
AIR PRODUCTS
HENDERSON

ISO 9001:2008
Certified
Certificate No. FM 589782

BLOWER PURGE REGENERATIVE COMPRESSED AIR DRYER

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The Need for Dryers

Compressed air is one of industry's most important utilities. Yet without proper air treatment, your compressed air system cannot deliver its full potential.

Moisture, dirt, oil; all pollutants, pollutants that contaminate your process. Frozen air lines, damaged instruments, product rejects; all problems caused by air contamination. Downtime, lost production, lost profits; the cost of air contamination.

The solution; a systems approach by an organization dedicated to solving air system problems one customer at a time.

Illustration: Joe Henderson, 1957

A Message from the Owners

"Our father taught us the importance of customer service", says Terry Henderson, President. "As a family business, we understand the needs of our customers and can respond quickly with the best solution for each individual application."

"I think one of the keys to our success is our approach to quality," says Chuck Henderson, Vice President. "In today's highly competitive economy, other dryer manufacturers are trying to build a cheaper product, sometimes sacrificing performance and reliability. While we realize the importance of initial price, we simply won't compromise the integrity or quality of our dryers."

SAHARA'S reputation for high quality, innovative products and customer loyalty quickly grew. Today, SAHARA is the world leader in regenerative dryer technology.

A History of Service

SAHARA AIR PRODUCTS, a Division of Henderson Engineering Co., Inc., was founded in 1957 by Joe Henderson to provide engineered solutions for air system problems. Joe 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. The trademark of engineered solutions exists at SAHARA today, as the next generation of Henderson's continue the tradition of product excellence and customer service.

The Sahara Team

Your SAHARA sales engineer has the expertise to review your plant air system and design the optimum engineered solution. ***This saves you time and money.***

All products are manufactured at the corporate headquarters in Sandwich, Illinois, 60 miles west of Chicago. Living and working in the country has proven to be a tremendous benefit. SAHARA employees are true team members concerned with providing our customers with high quality, responsive service. Because we have very little turnover, our experience is unmatched.

Illustration: Corporate headquarters in Sandwich, IL

The heart of our company has always been engineering; finding novel solutions to our customers' unique applications. We use the most modern tools available. Drawings are done on CAD and can be transmitted via email for immediate customer review and approval. Our reputation has been built by building dryers specially designed for each specific application. We are one of the few dryer manufacturers who can completely design and fabricate a dryer to each and every customer's specifications.

Visit SAHARA on the Internet at

www.saharahenderson.com

A Commitment to Customer Service

SAHARA products are used throughout the world. Customers in China, Thailand, Singapore, Malaysia, Mexico, Canada, Chile, Venezuela, Argentina, Puerto Rico, Panama, Saudi Arabia, Kuwait, Bahrain, South Africa, New Zealand, Australia, England, Italy, Germany, Greece, and every state in the U.S. successfully operate SAHARA dryers.

All SAHARA products are sold with our **guarantee of performance**. During commissioning, SAHARA sales engineers review the complete system and instruct operators in proper operation. After your dryer has been installed, our customer service team maintains regular contact to guarantee satisfaction.

We understand the difficulties you face every day trying to keep your plant up and running. We try to help you do your job better by making sure that your compressed air system does what it's supposed to do; reliably deliver clean, dry air.

We make it easier for you to do your best.

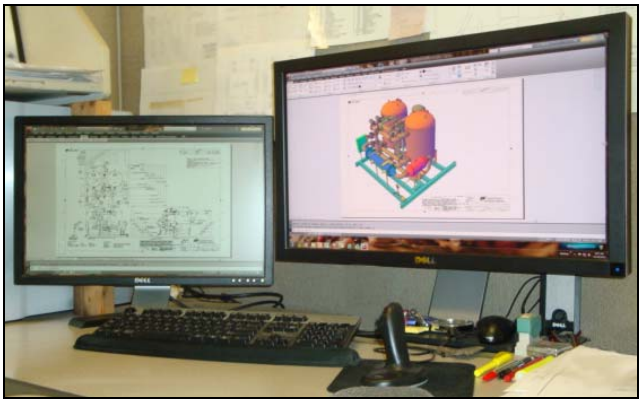


Illustration: CAD system

A Commitment to Quality

A total commitment to quality begins with the desire of every individual to deliver nothing less than their best. Our team is totally committed to quality products and customer satisfaction. Incoming materials are inspected and randomly tested. All welding is done in strict accordance with the ASME code. We weld our own pressure vessels, and we regularly perform radiographic examination. We can weld exotic materials; *what you want is what we deliver.*

Illustration: Quality inspection

Standards constantly evolve. SAHARA meets all existing quality specifications and is leading the industry towards the future.

Illustration: Ensuring quality standards

SAHARA is proud to be certified to the ISO 9001:2008 Quality Management Systems standards and guidelines.

SAHARA also provides our customers with **UL fabricated electrical panels**. We are meeting standards before they become required practice.

Innovative technology and quality engineering; trademarks from SAHARA.

Quality Components

Valves

Incredibly reliable 2-way, butterfly valves are high performance, non-lubricated. These valves are rated bubble tight shutoff and are even fire safe. Dryers under 3" use diaphragm angled globe valves. All valves can be serviced in the field.

Check valves are spring actuated with high temperature soft seats. Because the highest differential pressure on any of our switching valves at tower shift is 10 PSIG, valve wear due to differential pressure is eliminated.

Our valves work, so you can relax.

Electrical

UL fabricated panels may be provided with a simple cam timer or your choice of PLC. Individual valve position indication is available both on the valves and on the electrical panel.

Heater

Heaters are specially designed for dryer service, derated to 14 watts/sq. in. Construction material is inconel.

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.

Optional Steam Heater

Instead of an electric heater, steam may be used to regenerate the desiccant. If 150 PSIG steam is available, a steam to air heat exchanger may be used to reduce the operating cost of the drying system. A SAHARA exclusive is a bypass of the heat exchanger during cooling to prevent thermal cycling of the heat exchanger.

Extended life and reliability,
more benefits from SAHARA.

The Brains Behind the Dryer

PLC with Allen–Bradley PanelView Component C400 Operator Interface

A programmable logic controller with individual input/output modules controls the dryer's operation. The operator interface to this controller is the Allen-Bradley PanelView Component C400.

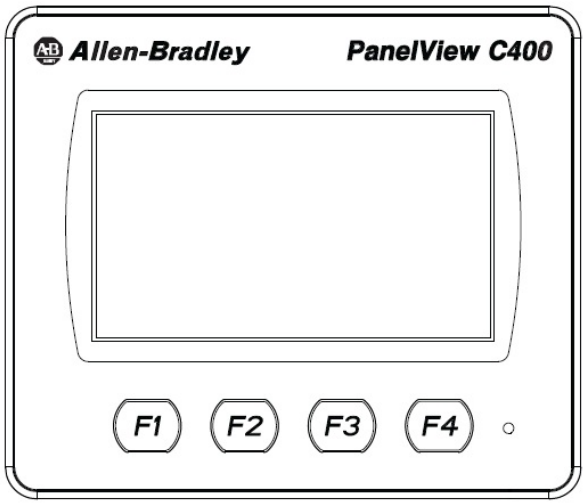


Illustration: PanelView C400 Operator Interface

Housed in a NEMA 4 enclosure (indoor), this operator interface uses a touch sensitive screen. All control functions are performed by touching the appropriate on-screen button or display; to change screens, modify a setting, or enter a value.

Optional Dew Point Demand System

All of our dryers are designed to operate economically. We realize that energy consumption is a serious concern and have designed all of our systems to minimize energy consumption. One of our energy management devices is the optional Dew Point Demand System.

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 Dew Point Demand System utilizes a state-of-the-art SAHARA Moisture Transmitter (SMT) 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 PanelView 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 -148˚F to +86˚F. Unless otherwise requested, it is factory preset at -20˚F.

The system comes standard with a 4-20 mA output, which can be connected to a chart recorder. Alarm contacts are also provided as standard for audio and visual warning of high dew point condition.

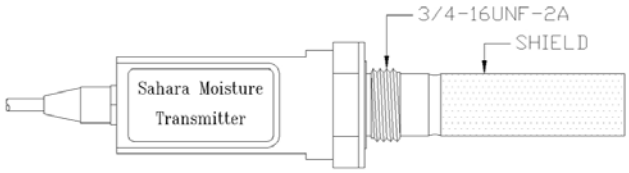
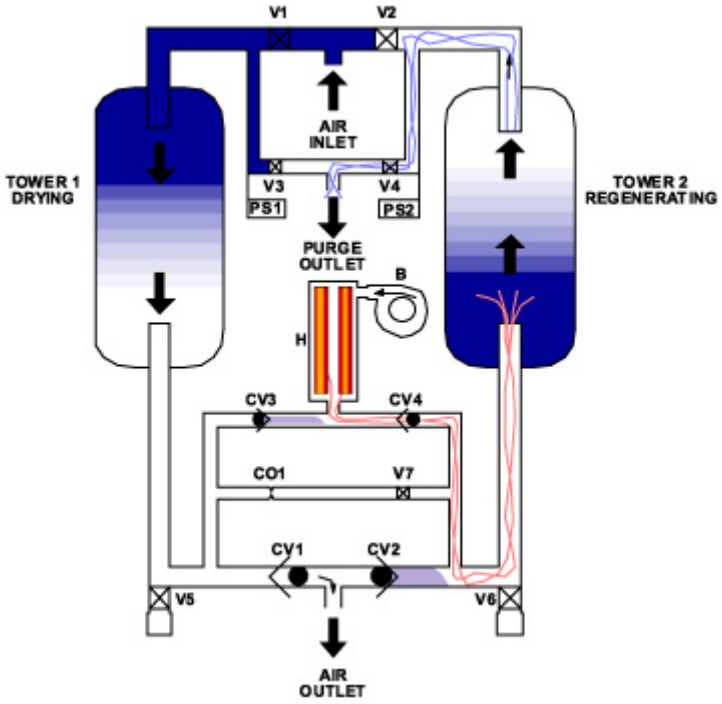


Illustration: Sahara Moisture Transmitter (SMT)

Theory of Operation

Blower Purge dryers are typically used for drying large volumes of air. They are among the most economical dryers to operate because there is no purge air loss during blower regeneration.

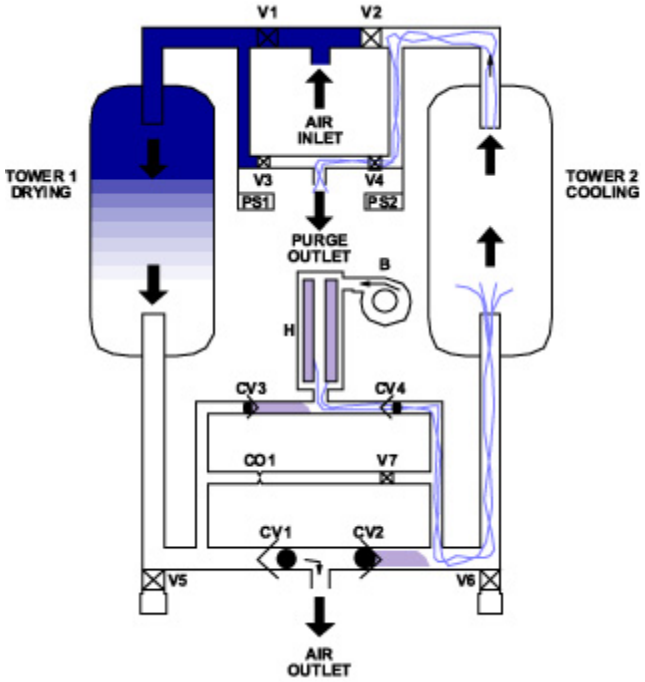
Blower Purge dryers are capable of delivering dewpoints of -40°F, and even as low as -100°F when using exhaust purge cooling.



Left Tower Drying; Right Tower Heating

Wet air enters the dryer and is directed into the drying tower through valve V1. The wet air is dried in tower T1 and exits the dryer through check valve CV1. Regeneration of tower T2 is accomplished by drawing ambient air into a centrifugal blower B, increasing the pressure to 2.5 psig and blowing this ambient air into heater H. The regeneration air is heated to 375°F and is directed into tower T2, where it removes the water from the desiccant. The hot, wet regeneration air exits the dryer through valve V4. After 3 hours of heating, the heater is turned off and the dryer enters the cooling cycle.

Theory of Operation



SAHARA Blower Purge dryers are designed to provide years of trouble-free operation and include many safety features.

SAHARA's rugged construction features rigid copper tubing mounted on vibration isolated supports.

Left Tower Drying; Right Tower Cooling

Wet air continues to be dried in tower T1. During cooling, you have a choice of cooling methods. You can select blower cooling or exhaust purge cooling. If the dryer is located in a warm, humid environment, the use of blower cooling will cause an increase in dewpoint at tower shift. To provide continuous low dewpoint, you may select exhaust purge cooling. When this mode of operation is selected, the heater and blower are turned off at the end of 3 hours. Valve V7 is opened and a small portion of dry air (5%) is directed into tower T2 to cool the desiccant bed. After one hour of cooling, the valve is closed and the dryer is ready to shift towers.

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.

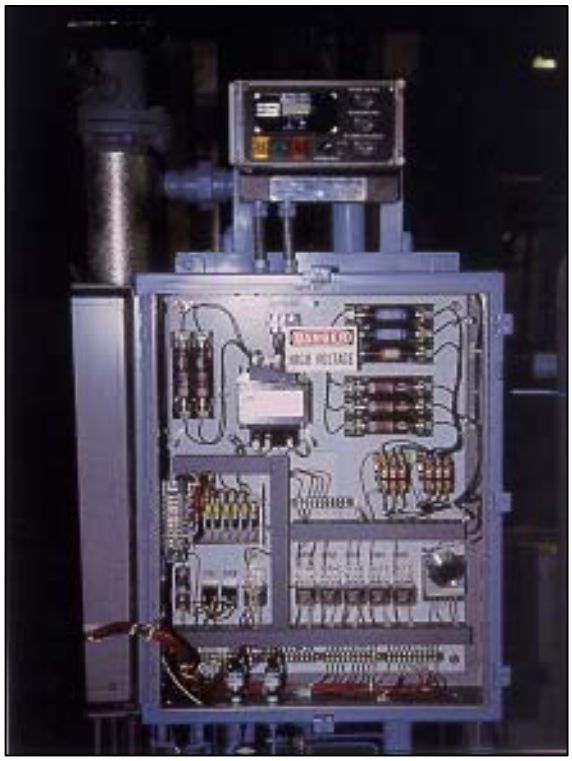


Illustration: Electrical panel

Redundant Temperature Controls

Our heaters are controlled by a triple redundant control system. The primary temperature controller is a dual set point, indicating temperature controller. It is located at the discharge of the heater and regulates the temperature of the regeneration air. The dual set point provides extra protection; if the temperature rises past the primary set point, the secondary set point 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 controller is located at the inlet of the heater. This triple redundant heater control virtually guarantees optimum performance and safety.

Custom and Standard Designs

We build dryers for a variety of gases, pressures, and applications. Our dryers are used for drying CO_2, nitrogen, natural gas, argon, and other gases. Dryers may be designed to withstand pressure up to 5000 psig.

We are not just a dryer manufacturer; our engineering department has the expertise to review your application and to wok with you to design the optimum solution.

We can build a dryer to meet your strict performance requirements.
Quality and reliability are built into every SAHARA blower purge dryer.

Illustration: BP-50,000

Illustration: BP-6000

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 dryer is a safe choice; your SAHARA sales engineer will help you select the right system for your application, and performance is guaranteed.

Specifications

Model	Avg. Power (KWH/24 Hrs) *	Inlet/Outlet Size (Inches)	Lbs. Desiccant Per Tower	Blower Size (HP)	Heater Size (KW)	A = Length (Inches)	B = Width (Inches)	C = Height (Inches)	Weight (Lbs.)
BP-100	40	1	60	1/2	3	48	26	67	510
BP-210	84	1 ½	120	1/2	5	64	38	67	890
BP-350	140	2	200	1	10	93	49	84	1330
BP-700	280	2	400	4.5	24	97	59	95	2450
BP-980	393	3	560	7	24	146	63	88	3360
BP-1260	505	3	720	10	30	156	64	86	3890
BP-1540	617	4	880	10	30	178	64	92	5250
BP-2100	841	4	1200	15	50	182	72	92	6640
BP-2520	1010	6	1400	20	60	202	72	117	8420
BP-3080	1234	6	1760	20	75	210	78	115	9100
BP-3500	1402	6	2020	25	90	228	70	106	14,100
BP-4000	1603	6	2310	25	90	228	70	106	16,700
BP-4500	1803	6	2600	30	100	243	80	108	19,300
BP-5000	2003	6	2890	30	130	243	84	108	20,200
BP-5500	2204	6	3180	30	130	243	84	112	22,700
BP-6000	2404	6	3470	40	150	256	85	108	23,500
BP-6500	2604	6	3760	40	150	256	85	108	24,600
BP-7000	2805	6	4050	50	175	256	92	107	25,700
BP-7500	3005	8	4340	50	175	258	92	114	28,900
BP-8000	3205	8	4630	50	200	258	92	116	30,100
BP-9000	3606	8	5200	60	200	290	106	123	32,500
BP-10,000	4007	8	5780	60	250	300	110	128	35,800

Ratings based on 100 psig & 100°F.
Other pressures available.
Larger sizes available.
Weights and dimensions are estimated.
Metric dimensions available upon request.
Consult factory for additional information.
Sahara reserves the right to make changes without notification.
* Average power usage does not include savings by using Sahara's Optional Dew Point Demand System.

Dimensions

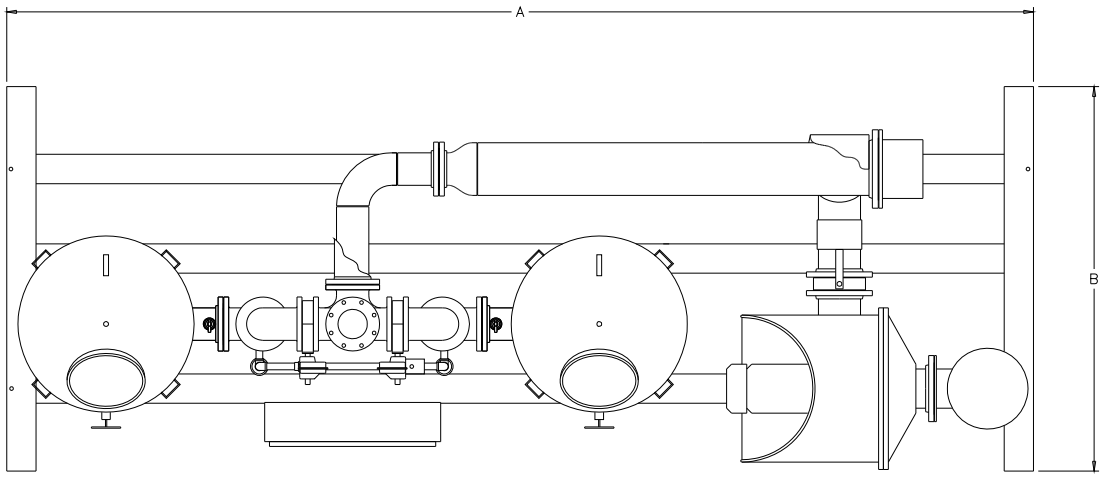


Illustration: BP Top View

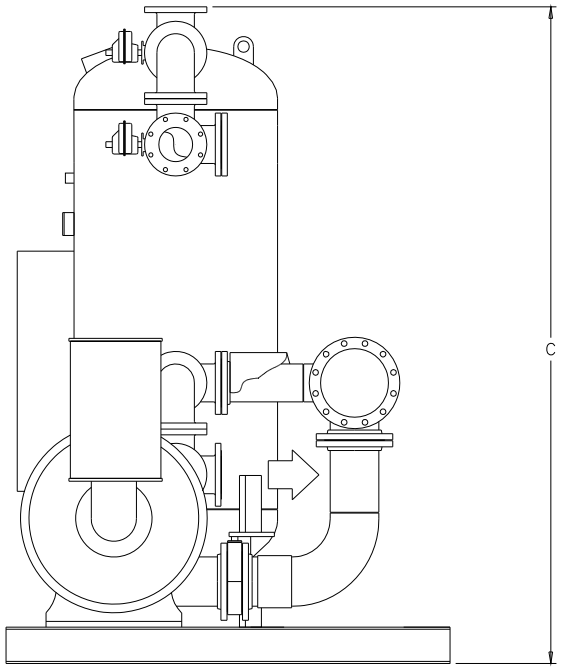


Illustration: BP Side View

Sample drawings to illustrate (A) Length, (B) Width, and (C) Height.
Actual drawings will vary by model.

Commitment to Customer Satisfaction

For over 35 years, we have been building dryers and making customers happy.

Our best sales force is our existing customers.

Here's what they have to say about SAHARA dryers.

"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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