Donaldson
Ultrafilter®

Buran

Cycling Refrigerated Compressed Air Dryer With Ultra*pulse* Control

Intelligent Energy Management

Donaldson

The intelligent, energy efficient dryer.

ENERGY EFFICIENCY

Energy efficient operation remains of paramount importance with regard to any industrial machine and the process it supports. With the introduction of **Buran** cycling refrigerated air dryers with ***Ultrapulse*** technology, ***Ultrafilter*** *has made a major stride in reducing the power required to dry and filter compressed plant and process air*.

REAL-WORLD OPERATION

Standard refrigerated air dryers are designed to operate around a set of fixed conditions regardless of actual dryer load, changes in ambient conditions, or the needs of the process the dryer supports. In real-world applications this *results in inefficient operation, unnecessary power consumption and higher operating costs*.

INTELLIGENT DESIGN

The components of **Buran** cycling dryers have been designed, specified and integrated to take advantage of new developments in compressor life, heat exchanger design, computer control and real-world operating conditions.

INTELLIGENT CONTROL

Ultrafilter's ***Ultrapulse*** control technology not only cycles the dryer's compressor on and off in reaction to load changes, but also tracks and then proactively anticipates load trends and adjusts the cycle accordingly. This control logic avoids dew point spikes (sudden increases in dew point beyond acceptable limits) commonly associated with cycling dryers.

INTELLIGENT OPERATION

The combined outcome of intelligent design and control is intelligent operation. **Buran** dryers with ***Ultrapulse*** technology provide the user with three modes of operation – Standard, Summer and Flex – giving the *highest level of flexibility at the lowest possible energy consumption*, while maintaining the required level of compressed air quality.

Intelligent Design

REFRIGERANT COMPRESSOR

Lower quality refrigerant compressors cannot tolerate the on-off cycling that often results from changing loads on a dryer. Standard dryers utilize a hot gas bypass valve which allows the compressor to run continuously regardless of load. While this avoids a reduction in the life of the compressor, it *results in unnecessary power consumption* relative to actual load as the compressor runs continuously.

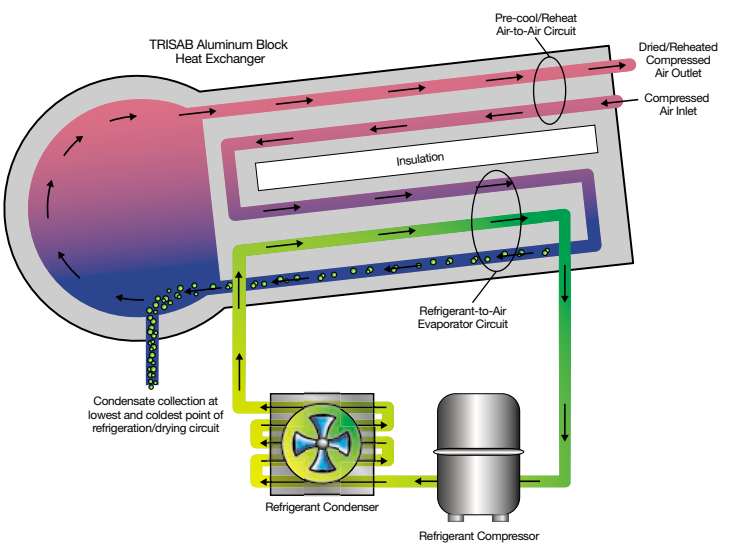
Buran dryers are built with the latest in high quality compressors whose service life is not shortened by power-reducing cycling. This has allowed for system designs that take advantage of the fact that most dryers are not required to operate at full capacity all of the time. The hot gas bypass valve is no longer needed and an operating cycle has been developed that turns the compressor on and off based on actual load. This in turn provides the user with *lower operating costs through reduced power consumption*.

All **Buran** cycling dryers use environmentally safe R134a refrigerant.

TRISAB HEAT EXCHANGER

Buran dryers (models SD 0050 AP-60 through SD 1000 AP-60) are built with Ultrafilter's proven TRISAB heat exchanger technology and take advantage of its aluminum mass for energy storage. The ability to store and use cooling energy adds to the power efficiency of **Buran** cycling dryers.

TRISAB is a three-stage aluminum block heat exchanger with integral pre-cooling of the process air, final cooling to the required dew point, and internal condensate collection.



It incorporates these additional features:

- Large heat exchanger surface area for rapid heat transfer
- Large smooth flow channels for very low pressure drop and energy conservation
- Discharge air is reheated as it pre-cools incoming process air, preventing pipe sweating and lowering energy consumption
- Corrosion resistant aluminum construction
- Condenser cooling air flows through front of dryer and out at the top allowing for flexibility in dryer location

For cycling dryers, TRISAB offers these additional advantages over more typical "thermal mass" cycling dryers:

- Direct cooling - more efficient operation
- No additional storage mass required - simplified lighter design
- Fast energy transfer - avoids dew point spikes and allows for faster start-up times
- No need to oversize compressor as required by other cycling dryer designs

Intelligent Control

A microprocessor-based controller gives **Buran** dryers (models SD 0030 AP-60 through SD 1000 AP-60) their energy efficient intelligence. The controller has been programmed to not only measure and respond to critical operating parameters, but to track and anticipate demand. This ability to learn and adjust the operating cycle accordingly *sets* **Buran** *Ultrapulse technology apart from the competition*. Thermal mass cycling dryers suffer from an inability to respond quickly to changes in operating conditions, resulting in inefficient operation and dew point spikes. ***Ultrapulse*** operating logic avoids dew point spikes while operating at the most energy efficient cycle.

Features of the **Buran** ***Ultrapulse*** microprocessor controller:

- Monitors all critical input and output parameters
- Continuous control of dryer by *calculating actual conditions*
- Continuous indication of operating parameters on multifunction display
- Provides operator with *three modes of operation* for highest flexibility and lowest power consumption (*Standard, Summer and Flex Mode*)

FUNCTION KEYS:

- On/Off Switch
- Data Selector Key

DIAGNOSTIC CODES:

- F1 Check Ambient Sensor
- F2 Check Dew Point Sensor
- EH EPROM Irregularity
- FH Refrigerant Overpressure
- EU Low Voltage
- H1 Dew Point Too High
- L1 Dew Point Too Low

DIGITAL DISPLAY:

- Dew Point Readout
- Operating Mode
- Total Hour Meter
- Percent Time Loaded
- Energy Consumption - Current Load %
- Refrigerant Compressor Running
- Maintenance Interval Exceeded
- System Interruption Indicator
- High-Pressure Alarm and Shutdown
- Alarm History

Intelligent Operation

The net result of a combination of high quality components, intelligent programming of control logic, and taking advantage of real-world operating conditions is a cycling refrigerated compressed air dryer capable of *intelligent operation* to provide consistent air *quality at the lowest possible cost.*

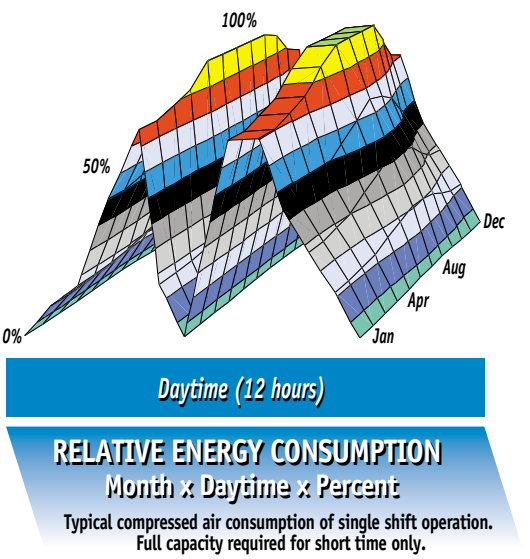
The essence of ***Ultrapulse*** technology is its ability to offer three modes of operation, depending on the needs of the process and changes in ambient conditions.

STANDARD MODE

When operating in Standard Mode, **Buran** dryers will provide a continuous supply of dry compressed air at 38°F pressure dew point (pdp) while adjusting its cycle to compensate for changes in load, resulting in reduced power consumption.

The reality is that compressed air dryers are rarely tasked with operating at full load conditions 24 hours a day, 7 days a week. Standard dryers, designed to operate around a narrow set of fixed conditions, cannot compensate for fluctuating demand and consume more power than is actually necessary to meet the requirements of the process. **Buran** dryers utilize a cycling controller to turn the refrigerant compressor on and off based on actual load. The energy storage capacity of TRISAB aluminum block heat exchangers allow **Buran** dryers to respond quickly to an increase in demand and avoid the dew point spike common to other cycling dryers.

Even in Standard Mode, **Buran** dryers with ***Ultrapulse*** technology save energy.



SUMMER MODE

Additional energy savings can be realized by taking advantage of the change in ambient conditions during the warmer months of the year. The standard pdp of 38°F was set to allow for most worst-case conditions with regard to ambient temperature and the need to preclude condensation in compressed air lines. However, when ambient temperatures rise, it is no longer necessary to maintain such a low pdp to avoid condensation.

Summer Mode sets **Buran** dryers to operate at a constant pdp of 45°F, *conserving energy* while providing a wide safety margin with regard to condensation and pipe corrosion.

FLEX MODE

The highest level of energy efficiency can be achieved by operating in *Flex Mode**. This mode of operation has been developed to address the fact that in many applications the process requires a set level of relative humidity (RH) as opposed to a set dew point.

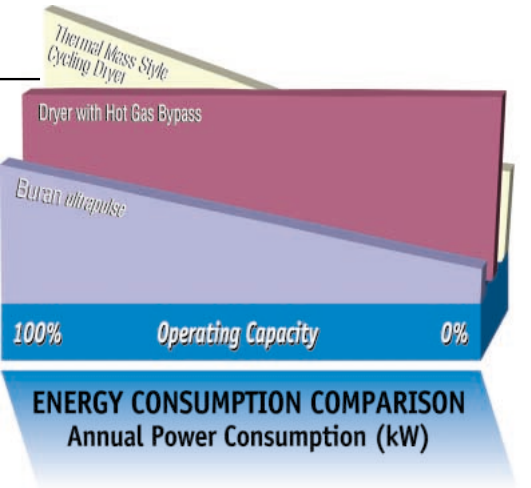
It has long been established that the rate of pipe corrosion greatly increases when the RH of process air rises above 50% (for added safety margin, an RH of 40% is used). Since the relative humidity relates to air temperature, the actual dew point of process air can be allowed to rise above 38°F (Standard Mode), 45°F (Summer Mode) or higher while still maintaining an RH of 40%. For example, if the actual ambient temperature is 75°F, dew point can be allowed to rise to 49°F. At 80°F, a pdp of 53°F will provide air at an RH of 40%.

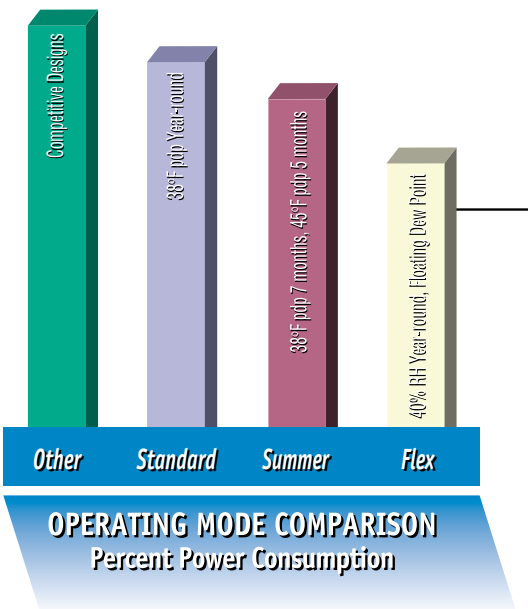
By controlling to relative humidity, and allowing dew point to vary accordingly, very high levels of energy savings can be achieved while preventing liquid condensation in the piping system.

* Flex Mode should only be used if the ambient temperature surrounding the entire compressed air system never falls below the ambient temperature in the vicinity of the dryer itself.

COMPETITIVE EDGE

The unique mechanical design and control logic of **Buran** cycling refrigerated air dryers sets them apart from the competition in energy efficient operation. Even when operating at 100% capacity, **Buran** dryers with ***Ultrapulse*** technology consume less energy than traditional dryers utilizing hot gas bypass valves, and considerably less than thermal mass style cycling dryers. Power savings become even more apparent when operating at less than 100% capacity, as is often the case in real-world operation.



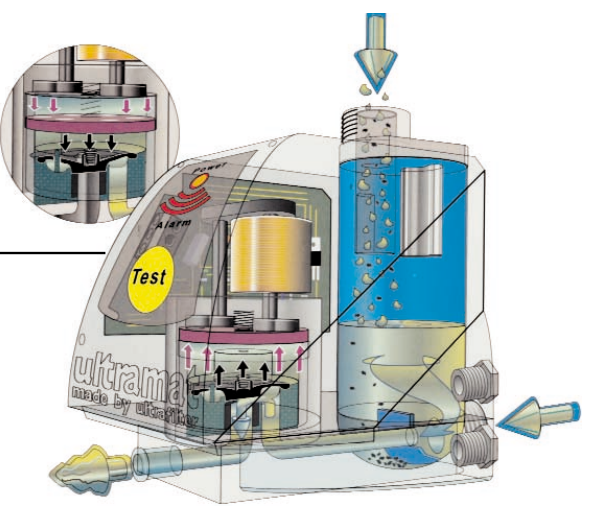


ADDITIONAL ENERGY SAVINGS

In addition to offering power savings over competitive designs, **Buran** dryers can be fine-tuned to your specific needs for even more efficient operation. In "Summer Mode," power consumption can be lowered by 7% or more, depending on local conditions. In "Flex Mode," power consumption can be lowered even more by controlling to relative humidity and allowing the dew point to vary.

ZERO-LOSS CONDENSATE DRAIN

Buran models SD 0030 AP-60 through SD 1000 AP-60 are equipped with the Ultramat UFM-T zero-loss condensate drain valve. Ultramat valves assure that no compressed air is lost when condensate is drained, resulting in significant energy savings.



Buran Cycling

REFRIGERATED COMPRESSED AIR DRYER
PRODUCT SUMMARY & AVAILABLE OPTIONS

PRODUCT SUMMARY

- Ultrapulse control (models SD 0030 AP-60 through SD 1000 AP-60) with three modes of operation for optimum performance and minimum energy consumption
- Ultramat zero-loss condensate drain for additional energy savings (models SD 0030 AP-60 through SD 1000 AP-60)
- TRISAB three-stage heat exchanger avoids dew point spikes through efficient design
- Environmentally save R134a refrigerant
- Wide range of models to match air compressor output
- cULus, CE listed

AVAILABLE OPTIONS

- Pre- and afterfilters for protection of dryer and downstream equipment (extended warranty on heat exchanger with purchase of Ultrafilter prefilter)
- External bypass
- External alarm contacts, including 0-10V analog signal for dew point
- Remote on/off control
- Annual service kits
- Special finish for corrosive environments
- Water-cooled heat exchanger (SD 300 AP-60 through SD 1000 AP-60)
- Alternate power supply
- NEMA 4 protection
- Frost protection

Recommended Prefilters & Afterfilters

DRYER MODEL	PREFILTER	AFTERFILTER
SD 0005 A-60	FF 3/8"	SMF 3/8"
SD 0010 A-60	FF 3/8"	SMF 3/8"
SD 0015 A-60	FF 1/2"	SMF 1/2"
SD 0020 A-60	FF 1/2"	SMF 1/2"
SD 0030 AP-60	FF 3/4"	SMF 3/4"
SD 0040 AP-60	FF 3/4"	SMF 3/4"
SD 0050 AP-60	FF 3/4"	SMF 3/4"
SD 0060 AP-60	FF 1"	SMF 1"
SD 0070 AP-60	FF 1"	SMF 1"
SD 0085 AP-60	FF 1"	SMF 1"
SD 0100 AP-60	FF 1"	SMF 1"
SD 0125 AP-60	FF 1 1/2"	SMF 1 1/2"
SD 0175 AP-60	FF 1 1/2"	SMF 1 1/2"
SD 0200 AP-60	FF 1 1/2"	SMF 1 1/2"
SD 0250 AP-60	FF 1 1/2"	SMF 1 1/2"
SD 0300 AP-60	FF 2"	SMF 2"
SD 0400 AP-60	FF 2"	SMF 2"
SD 0450 AP-60	FF 2"	SMF 2"
SD 0500 AP-60	FF 2"	SMF 2"
SD 0600 AP-60	FF 2 1/2"	SMF 2 1/2"
SD 0700 AP-60	FF 2 1/2"	SMF 2 1/2"
SD 0800 AP-60	FF 2 1/2"	SMF 2 1/2"
SD 0900 AP-60	FF 2 1/2"	SMF 2 1/2"
SD 1000 AP-60	FF 2 1/2"	SMF 2 1/2"

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Specifications and Engineering Data

	MODEL	CAPACITY* SCFM	AP PSI	POWER SUPPLY V/60HZ	REF. COMP. HP	POWER CONSUMPTION – KW 100% FULL LOAD	50% PART LOAD	0% ZERO LOAD	AIR CONNECTION NPT	WEIGHT LB	DIMENSIONS (IN.) WIDTH	HEIGHT	DEPTH
COMPACT**	SD 0005 A-60	5	1.19	115-1 Ph	1/10	0.12	0.10	0.09	3/8"	48	14	15	12
	SD 0010 A-60	10	3.37	115-1 Ph	1/10	0.13	0.11	0.10	3/8"	51	14	15	12
	SD 0015 A-60	15	2.93	115-1 Ph	1/6	0.16	0.14	0.12	1/2"	55	14	16	14
	SD 0020 A-60	20	4.90	115-1 Ph	1/6	0.17	0.15	0.13	1/2"	57	14	16	14
CLASSIC	SD 0030 AP-60	30	3.81	115-1 Ph	1/5	0.25	0.14	0.03	3/4"	88	18	20	18
	SD 0040 AP-60	40	4.69	115-1 Ph	1/5	0.26	0.15	0.03	3/4"	90	18	20	18
	SD 0050 AP-60	50	1.76	115-1 Ph	1/4	0.39	0.22	0.04	3/4"	97	18	20	18
	SD 0060 AP-60	60	2.20	115-1 Ph	1/4	0.40	0.23	0.04	1"	106	24	22	18
	SD 0070 AP-60	70	2.93	115-1 Ph	1/2	0.43	0.24	0.04	1"	110	24	22	18
	SD 0085 AP-60	85	3.37	115-1 Ph	1/2	0.70	0.39	0.07	1"	115	24	22	18
	SD 0100 AP-60	100	3.95	115-1 Ph	1/2	0.75	0.41	0.08	1"	117	24	22	18
	SD 0125 AP-60	125	2.93	230-1 Ph	1/2	0.80	0.44	0.08	1 1/2"	154	24	26	24
	SD 0175 AP-60	175	3.51	230-1 Ph	3/4	1.11	0.61	0.11	1 1/2"	176	24	26	24
	SD 0200 AP-60	200	3.66	230-1 Ph	3/4	1.13	0.62	0.11	1 1/2"	209	24	26	242
	SD 0250 AP-60	250	2.05	230-1 Ph	1	1.30	0.72	0.13	1 1/2"	214	24	26	24
	SD 0300 AP-60	300	2.78	230-1 Ph/480-1 Ph	1	1.40	0.78	0.14	2"	331	35	48	31
	SD 0400 AP-60	400	3.08	230-1 Ph/480-1 Ph	1	1.42	0.78	0.14	2"	335	35	48	31
	SD 0450 AP-60	450	3.96	460-3 Ph	2	1.50	0.78	0.14	2"	366	35	48	31
	SD 0500 AP-60	500	4.25	460-3 Ph	3	2.50	0.99	0.18	2"	386	35	48	31
	SD 0600 AP-60	600	3.96	460-3 Ph	3	2.90	1.54	0.28	2 1/2"	390	35	48	31
	SD 0700 AP-60	700	4.25	460-3 Ph	4	3.00	1.65	0.30	2 1/2"	397	35	48	31
	SD 0800 AP-60	800	3.08	460-3 Ph	5	3.40	1.87	0.34	2 1/2"	408	35	48	31
	SD 0900 AP-60	900	3.66	460-3 Ph	5	3.50	1.98	0.36	2 1/2"	419	35	48	31
	SD 1000 AP-60	1000	3.81	460-3 Ph	6	4.40	2.20	0.40	2 1/2"	432	35	48	31

* Capacity based on compressed air inlet temperature 100°F, operating pressure 100 psig, ambient temperature 100°F, pressure dew point 38°F, measured at dryer outlet in accordance with DIN ISO 7183/CAGI ADF 100. Ambient temperature: min. 35°F – max. 120°F; max. operating pressure: 250 psig, higher pressure on request; inlet temperature: max. 140°F.

** Buran Compact dryers do not include Ultrapulse control or Ultramat Zero-loss drains. For higher pressures or temperatures refer to Ultrafilter Bora HPD and Corus HTD dryer lines.

Capacity Correction Factors

WORKING PRESSURE

PSIG	30	45	60	75	90	100	115	125	145	160	175	190	200	220	250
FACTOR	0.60	0.70	0.80	0.88	0.94	1.00	1.04	1.06	1.09	1.10	1.12	1.14	1.15	1.16	1.17

DEW POINT

TEMP °F	38	41	45	50	60
FACTOR	1.00	1.12	1.24	1.36	1.45

AMBIENT TEMPERATURE

TEMP °F	75	85	100	105	115	120
FACTOR	1.10	1.07	1.00	0.96	0.82	0.50

COMPRESSED AIR INLET TEMPERATURE

TEMP °F	85	100	105	115	120	130	140
FACTOR	1.28	1.00	0.90	0.82	0.58	0.48	0.38

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: SD 0085 AP-60
Standard Capacity: 85 scfm
Actual Operating Conditions: 130 psig working pressure ***(cf 1.06)***
45°F pdp ***(cf 1.24)***
85°F ambient temperature ***(cf 1.07)***
105°F inlet temperature ***(cf 0.90)***
Adjusted Capacity = 85 scfm x 1.06 x 1.24 x 1.07 x 0.90 = **108 scfm**

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

EXAMPLE: Given Flow: 250 scfm
Actual Operating Conditions: 75 psig working pressure ***(cf 0.88)***
50°F pdp ***(cf 1.36)***
75°F ambient temperature ***(cf 1.1)***
85°F inlet temperature ***(cf 1.28)***
Adjusted Capacity = 250 scfm / 0.88 / 1.36 / 1.1 / 1.28 = **148 scfm**
Selected Dryer Model: **SD 0175 AP-60**

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