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COMPRESSED AIR TECHNOLOGY

Refrigerated Compressed Air Dryers

FLEX SERIES 127 - 3400 m³/h

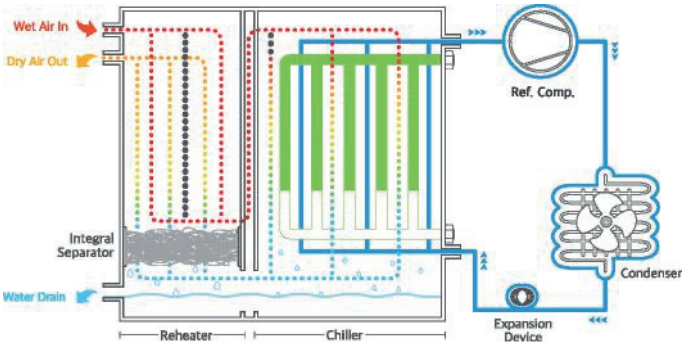
THE FLEX ADVANTAGE

UTILIZING THE LATEST ADVANCEMENTS IN HEAT TRANSFER TECHNOLOGY, FLEX SERIES REFRIGERATED DRYERS OFFER AN INNOVATIVE APPROACH TO EFFICIENTLY REMOVE LIQUID CONTAMINATION FROM COMPRESSED AIR.

FLEX Series dryers are designed with 4-in-1 heat exchangers (patent pending) and a phase change material (PCM) encapsulated between the refrigeration and compressed air circuits, serving as a highly effective reservoir for thermal storage.

The PCM possesses high latent heat properties which enables it to melt or freeze at a constant temperature. The phase change material will absorb heat from warm, moisture laden compressed air without a significant rise in temperature.

The phase change material stays colder for longer periods of time, cycling the refrigerant compressor less often than conventional energy saving designs.



Operating Principles

- The FLEX Series utilizes a phase change (PCM) heat transfer medium between the refrigeration and compressed air circuits that serves as a reservoir for thermal storage.
- The thermal reservoir is comprised of a patent pending heat exchanger filled with a phase change material that efficiently transfers heat energy through a “change of state”.

Phase Change: changing from liquid to solid back to liquid in a continuous cycle.

- The refrigeration circuit operates to cool down the PCM until it forms into a solid at which time the refrigeration system cycles off.
- As the compressed air enters the PCM to air section of the heat exchanger, the PCM media absorbs heat from the airstream and begins to melt the PCM media at a constant temperature.
- When most of the PCM media has turned to liquid the refrigeration system cycles on to again cool down the PCM media turning it back into a solid.
- This cycle repeats as required to meet the corresponding compressed air load on the FLEX dryer.

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ENERGY SAVING SOLUTIONS

THE FLEX SERIES LOWERS AIR SYSTEM POWER COSTS AND IMPROVES PRODUCTIVITY BY MATCHING POWER CONSUMPTION TO COMPRESSED AIR DEMAND. IN A TYPICAL MANUFACTURING FACILITY, UP TO 30% OF ELECTRICITY CONSUMED IS FOR GENERATING AND TREATING COMPRESSED AIR. TO REDUCE TOTAL COST OF OPERATION AND QUALIFY FOR UTILITY COMPANY INCENTIVE PROGRAMS, PROPER AIR TREATMENT EQUIPMENT SELECTION AND APPLICATION IS REQUIRED.

LOAD MATCHING PERFORMANCE

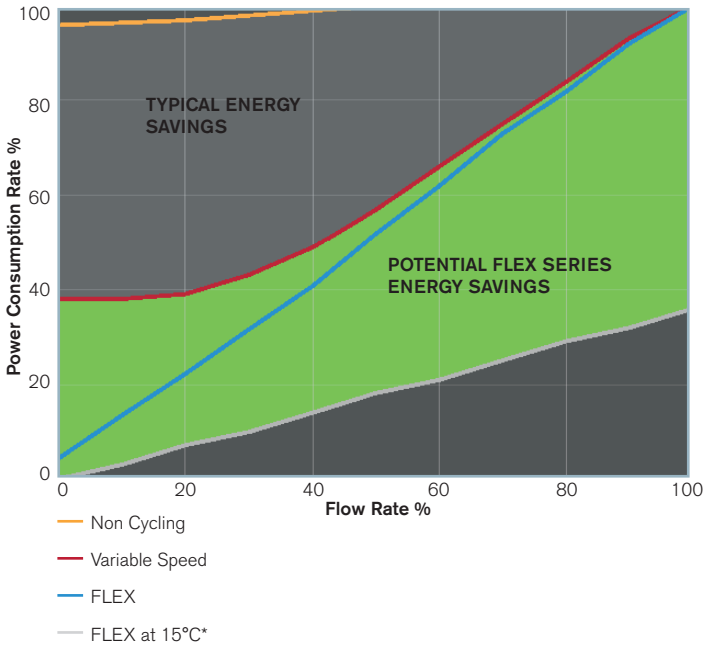
Compressed air load profiles in most manufacturing facilities fluctuate. The FLEX Series provides cost-effective energy savings by matching electrical power consumed in direct proportion to air demand. Linear load matching is achieved from 0% up to 100% demand.

Non-cycling dryers operate with the refrigeration compressor running continuously, regardless of inlet load conditions. Minimal energy savings are realized from 100% down to 0% inlet air load.

LINEAR ENERGY SAVINGS

FLEX Series dryers automatically cycle (on /off) the refrigeration compressor in response to inlet load conditions. As the inlet air load is reduced, the power requirement to dry the air is matched in proportion to the demand. For example, at 60% inlet air load, a non-cycling dryer consumes 96% of the full load power consumption, a 4% energy savings.

By comparison, at 60% inlet air load, the FLEX Series consumes only 60 % of the full load power, at 40% energy savings.



Dryers are rated in a accordance to ISO 7183 standard rating conditions A1. 35°C inlet

* FLEX Series also shown at an inlet temperature of 15°C. The power consumption data set for the above for non-cycling dryers and variable speed dryers was obtained from an article titled "Cycling Refrigerated Dryers – Are Savings Significant?" published in Compressed Air Best Practices in November 2011. The power consumption data set forth above for the FLEX dryer is based on laboratory testing performed on a FLX 1.2 model dryer. We expect that power consumption data between non cycling, variable speed and the FLEX dryer would be consistent regardless of the size of the dryer.

BETTER BY DESIGN

1. Stainless steel brazed plate 4-in-1 heat exchanger (patent pending), with phase change material reservoir

- The PCM thermal reservoir operates at a precise temperature to deliver a stable pressure dew point.
- Smooth, non-fouling stainless steel surfaces promote low resistance to flow, optimizing air system efficiency

2. No-air-loss, demand drain efficiently removes condensate without loss of compressed air

- Condensate drain lines terminate at discharge connections conveniently located on the side of the dryer
- Failure to discharge alarm on the operator interface enhances system reliability

3. High efficiency, up-flow aluminum air-cooled condenser

- Pulls ambient air through the condenser and releases out the top of the dryer condenser
- Provides cooler condensing air and greater efficiency

4. Reliable, semi-hermetic refrigerant compressors

- Environmentally friendly, globally accepted refrigerants
- Rugged design, for long-term operation

5. Moisture Separator

- Stainless steel mesh design for costant highest separation rates, independent of the flow rate and velocity

6. Controller with LCDdisplay provides ease of monitoring and operating status.

- Energy saving (%), dryer operating time, refrigeration compressor operating time, active fault message dew point status, and USB connection port to download operating data and upgrade firmware
- Remote monitoring capability – RS485 communications port

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INTERNATIONAL AIR QUALITY CLASS STANDARDS

FLEX SERIES REFRIGERATED AIR DRYERS OFFER THE PERFECT BALANCE BETWEEN TECHNOLOGY AND SIMPLICITY TO DRY COMPRESSED AIR SYSTEMS TO ISO 8573-1 AIR QUALITY CLASS 4-5 PRESSURE DEW POINTS.

ISO 8573-1 AIR QUALITY STANDARD

ISO 8573-1, the international standard for compressed air quality, defines the amount of contamination permissible in compressed air. The ISO standard identifies three primary forms of contamination in compressed air systems – solid particles, water and oill Contaminants are classified and assigned a quality class, ranging from Class 0, the highest purity level, to Class 6, the most relaxed.

FILTRATION OPTIONS

Option Pre-Filtration

NGF series – PF grade filtration – removes solid and oil contaminants from the air stream before entering the dryer.

ISO Air Quality Class:

- Solids – Class 2
- Remaining Oil – Class 4
- Removes solids 1.0 micron and larger
- Remaining oil content 2.0. mg/m³

Option After-Filtration

NGF series – HF grade filtration – provides high efficiency oil removal protecting down-stream equipment.

ISO Air Quality Class:

- Solids – Class 1
- Remaining Oil – Class 1
- Removes solids 99.999+% of solids ≥ 0.01 micron
- Remaining oil content< 0.01 mg/m³

Product specifications

Model	Flow Rate*	Pressure Loss	Voltages	Connection	Op. Power	Dimensions (mm)			Weight	Cooling
	m³/h	bar	V		Kw	A	B	C	Kg	
FLX 1.1	127	0,23	230/1/50	1"	0,43	603	363	751	62	R134a
FLX 1.2	170	0,21	230/1/50	1"	0,43	781	363	711	69	R134a
FLX 1.5	255	0,15	230/1/50	2"	0,59	901	443	761	81	R407C
FLX 2.1	340	0,15	230/1/50	2"	0,85	961	443	761	82	R407C
FLX 3.1	510	0,16	230/1/50	2"	1,30	1.111	493	911	126	R407C
FLX 4.1	680	0,17	230/1/50	2"	1,66	1.111	493	911	153	R407C
FLX 5.5	934	0,23	230/1/50	2"	2,00	1.203	493	1.032	178	R407C
FLX 8.1	1360	0,28	400/3/50	DN80	2,70	1.494	800	1488	479	R513a
FLX 10.1	1700	0,28	400/3/50	DN80	3,80	1.572	850		549	
FLX 15.1	2550	0,3	400/3/50	DN100	6,00		1000		801	
FLX 20.1	3400	0,3	400/3/50	DN100	7,30	1.742			920	

* ISO 7183: Based on the intake volume of the compressor at +20°C and 1 bar (g), operating pressure 7 bar (g), inlet temperature +35°C, ambient or cooling water temperature at +25°C, pressure dew point +3°C. Technical data and specifications are subject change without prior notice.

Correction factors for different operating pressures in bar (g) (F_1)/ Korrekturfaktor für abweichende Betriebsdrücke in bar (ü) (F_1)					
bar (g)/ bar (ü)	5	**7**	8	10	16
FLX 1.1 – 5.5	0,92	**1**	1,03	1,1	1,24

bar (g)/ bar (ü)	3	4	5	6	**7**	8	9	10	13	16
FLX 8.1 – 20.1	0,65	0,75	0,84	0,92	**1,00**	1,03	1,07	1,09	1,18	1,23

Correction factors for different inlet temperatures in °C (F_2)/ Korrekturfaktor für abweichende Eintrittstemperaturen in °C (F_2)						
°C	+25	+30	**+35**	+40	+45	+50
FLX 1.1 – 5.5	1,30	1,15	**1,00**	0,85	0,71	0,63
FLX 8.1 – 20.1	1,41	1,26	**1,00**	0,82	0,68	0,58

Correction factors for different ambient temperatures in °C (F_3)/ Korrekturfaktor für abweichende Umgebungstemperaturen in °C (F_3)							
°C	+20	**+25**	+30	+35	+40	+45	+50
FLX 1.1 – 5.5	1,05	**1,00**	0,92	0,85	0,80	0,79	0,78
FLX 8.1 – 20.1	1,05	**1,00**	0,92	0,85	0,78	0,72	0,65

Factor	Calculation
Compressor capacity (V_1)	$V_2 = \frac{V_1}{F_1 \cdot F_2 \cdot F_3}$
Operating pressure (F_1)	
Inlet temperature (F_2)	
Ambient temperature (F_3)	
Required dryer capacity (V_2)	

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