

INNOVATIVE COMPRESSED AIR SOLUTIONS

HeatSink™

REFRIGERATED COMPRESSED AIR DRYERS

WITH
TRUE-CYCLING™ OPERATION

75-2,400 scfm Capacity Models



CFX
STAINLESS STEEL
HEAT EXCHANGERS

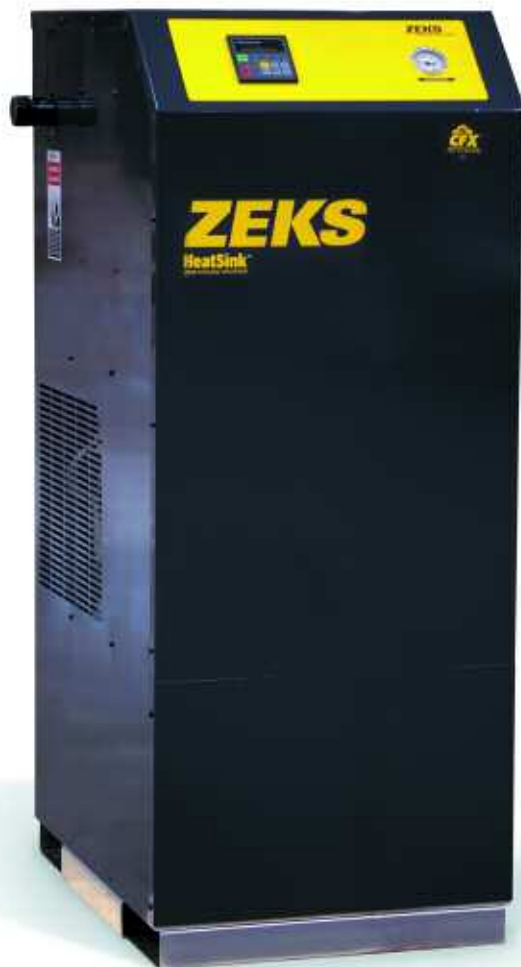


HeatSink™

True-Cycling™ Refrigerated Compressed Air Dryers

The Need For Air Treatment

Compressed air is a versatile energy resource ideal for production processes, powering tools and equipment, and actuating valves, among many other uses. In order for these processes and devices to operate at peak efficiency, the supply of compressed air must be clean and dry. Contaminants present at the intake of the air compressor can ultimately effect the operation of compressed air equipment. In addition, the compression process itself causes concentrations of water, compressor lubricant and air-borne particulate to increase to levels that can damage tools, increase maintenance requirements or spoil finished product. ZEKS HeatSink™ Refrigerated Air Dryers are designed to dry compressed air continuously, economically and reliably, thereby insuring the efficient operation of downstream equipment and processes.



400HSG shown in standard configuration

True-Cycling™ – The ZEKS Advantage

Common manufacturing practices, process machinery cycling and changing production requirements result in variable compressed air volume use. This, combined with periods of lower ambient and inlet air temperatures, results in reduced load on an air dryer. ZEKS HeatSink™ dryers use a refrigeration system to cool a thermal mass, which in turn cools the compressed air. Cooling causes moisture and contaminants present in the compressed air to condense so they can be removed in a high efficiency separator and then discharged via an automatic drain for disposal. Having the ability to store cool energy in the thermal mass fluid enables the HeatSink™ dryers to cycle off during periods of low demand while the dryer continues to remove moisture and contaminants from the air stream. This True-Cycling™ operation typically consumes far less energy than the equivalent non-cycling dryer that operates the refrigeration system continuously

- **Fully hermetic refrigeration systems minimize maintenance requirements**
- **Generously sized condensers deliver rated performance even in elevated ambient temperatures**
- **Components sized and matched to enable consistent dew point at full or partial moisture loading in all industrial environments**
- **Active circulation of thermal storage media optimizes operating efficiency**
- **ZEKS exclusive moisture separator design provides 99% separation efficiency**
- **ZEKS CFX®-based precooler/reheater conditions air to minimize energy consumption and eliminates pipe sweating**
- **Energy savings as high as 80% resulting from True-Cycling™ operation in variable moisture load conditions** (see Annual Energy Savings Chart)

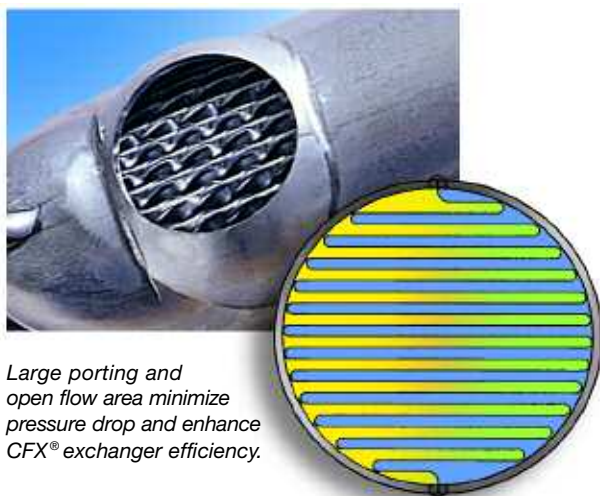


The Standard of Excellence For Heat Exchanger Design

ZEKS patented CFX[®] stainless steel heat exchangers have been engineered exclusively for compressed air drying to include a high heat transfer coefficient and industry-leading low pressure drop. A multi-path flow area that is 3–5 times that of the equivalent copper tube exchanger, combined with continuous self-cleaning action, minimizes fouling potential. Corrosion resistant 304L stainless steel is used in all air and refrigeration circuit exchangers. CFX[®] **C**orrugated, **F**olded heat **eX**changers provide durability in environments where copper or other metals are not suitable.



- **100% Stainless Steel Construction** - No copper brazed joints that compromise the integrity of the exchanger
- **Industry-Leading Low Pressure Drop** - Minimizes energy consumption and the need for greater compressor horsepower
- **Less Prone To Fouling Than Copper Or Aluminum Exchangers** - Maintains optimal performance
- **ZEKS Exclusive 10-Year Warranty** - A testament to the durability and efficiency of this robust component



Large porting and open flow area minimize pressure drop and enhance CFX[®] exchanger efficiency.

Digital Performance Control

HeatSink[™] dryer operation is automatically controlled to optimize air treatment and manage energy consumption. The digital performance controller which is optional on the 75-150 models and standard on the 200-2400 models combines PLC technology with an integrated HMI (human machine interface) that provides enhanced monitoring capabilities. A LCD display and keypad enable convenient monitoring or adjustment of these dryer functions:

Digital Display of:	HeatSink [™] Model			
	75-150	200-400	500-800	1000-2400
• Chiller Temperature	0	S	S	S
• % Energy Savings	0	S	S	S
• Refrigerant Suction Pressure	S (Gauge)	S (Gauge)	S (Gauge)	S
• Refrigerant Suction Temperature	NA	+	+	S
• Refrigerant Discharge Pressure	NA	+	S	S
• Dryer Compressor Running Time	0	S	S	S
• Dryer Running Time	0	S	S	S
• Diagnostic Memory	0	S	S	S
• Inlet Air Pressure	NA	+	+	+
• Outlet Air Pressure	NA	+	+	+
• Inlet Air Temperature	NA	+	+	+
• Outlet Air Temperature	NA	+	+	+
Condensate Drain Time Adjustment	0	S	S	S
Automatic Dryer RESTART	0	S	S	S
Remote Alarm Contact	0	S	S	S
Remote Dryer START/STOP	0	S	S	S
MODBUS Communication-Ready	0	S	S	S
Condensate Level Alarm-Ready	0	S	S	S
Auto. Refrig. Compressor Heater Delay	NA	NA	NA	S

S - Standard Feature
 0 - Optional Feature
 NA - Not Applicable
 + - Included with DPC PLUS Option

HeatSink™ Standard and Optional Features

Standard:

- **Stainless Steel CFX® Heat Exchangers**
- **Fully Hermetic Refrigeration Compressor**
- **Digital Performance Control** (optional on the 75-150)
- **High Efficiency Moisture Separator**
- **Timed Electric Condensate Drain**
- **Food-Grade Propylene Glycol Thermal Storage Media**
- **Water Cooled or Air Cooled Condensers**
(air cooled only on the 75-150)
- **Thermal Storage Circulation Pump**
- **NEMA 1 Electrics**
- **Full Powder-Coated Cabinet**
- **Galvanized Internal Structure**

Optional:

- **Digital Compressed Air Temperatures and Pressures**
- **Complete Stainless Steel Air Circuit**
- **Prefilter and Afterfilter To Meet Application Requirements**
- **CME™ Cold Mist Eliminator – 99% removal of air compressor lubricant carryover** (available on the 200-400)
- **High Condensate Level Alarm**
- **NEMA 4/12 Electrics**
- **Automatic Demand Drain**
- **Refrigeration Condenser Filter**

Exclusive Warranty

In addition to the standard warranty on all HeatSink™ dryers, the refrigeration compressor is warranted for five years and the CFX® Heat Exchangers for ten years.

HeatSink™

**REFRIGERATED
COMPRESSED AIR DRYERS**

***Reliability
Efficiency
Innovation***

Annual Energy Savings of HeatSink™ Dryers

The example below calculates the annual energy savings of a HeatSink dryer compared to a non-cycling design. The factors can be replaced with those of any compressed air system.

A. Determine Maximum Capacity of The Dryer

Assume a maximum capacity of 1000 scfm for this example

B. Determine Weekly Compressed Air Volume

Multiply the number of hours worked per week on all shifts times the compressed air volume (scfm x 60 min.) used on each shift. Total all shift numbers to determine the actual compressed air volume used per week:

Shift	Hours	(60 min.)	scfm	Air Volume
FIRST	35	x 60	x 800	= 1,680,000
SECOND	35	x 60	x 600	= 1,260,000
THIRD	35	x 60	x 400	= 840,000
SATURDAY	7	x 60	x 200	= 84,000
Weekly Compressed Air Volume				3,864,000

C. Calculate Weekly Air Treatment Potential of The Dryer

Multiply the total number of hours per week (168 assuming the equipment is ON, 24/7) times the maximum capacity of the dryer:

$$\text{Weekly Air Treatment Potential} = 168 \text{ hrs.} \times 1,000 \text{ scfm} \times 60 \text{ min.} = 10,080,000$$

D. Calculate The Plant Operation Factor

Divide the total compressed air volume used per week by the total weekly air treatment potential to determine the plant operation factor:

$$\text{Plant Operation Factor} = \frac{3,864,000}{10,080,000} = .383$$

E. Select Ambient Air Temperature Reduction Factor

The factor varies based on geographic location and takes into account the impact of lower ambient temperatures on energy consumption. Typical factors are:

Northern US Climate –.24 Central US Climate –.31 Southern US Climate –.34

F. Calculate Utilization Factor

This incorporates all of the above:

$$\text{Plant Operation Factor} \times \text{Ambient Air Temperature Reduction Factor}$$

If we assume the plant is in the Southern US, the Utilization Factor will be:

$$\text{Utilization Factor} = .383 \times .34 = .13 \text{ (13\%)}$$

G. Estimate Annual Savings

Refer to the following table for a 1000 scfm dryer and interpolate between a 10% and 20% utilization factor:

Estimated Annual Savings (\$) From True-Cycling Operation* (Based on \$.10/kWh)

Dryer Size (scfm)	Utilization Factor					
	10%	20%	30%	40%	50%	60%
75HSG	520	451	383	314	245	177
100HSG	825	740	656	571	487	402
125HSG	994	876	758	640	521	403
150HSG	999	886	773	659	546	433
200HSG	1345	1200	1054	908	762	617
250HSG	1218	1042	867	691	515	339
300HSG	1633	1410	1187	964	741	518
400HSG	2767	2484	2200	1917	1633	1349
500HSF	2752	2356	1960	1564	1168	772
600HSF	3522	3100	2678	2255	1833	1411
700HSF	4210	3704	3197	2690	2183	1676
800HSF	4334	3765	3196	2626	2057	1488
1000HSF	4824	4209	3594	2978	2363	1747
1200HSF	5876	5112	4349	3585	2821	2058
1600HSF	7646	6641	5635	4629	3623	2617
2000HSF	7628	6474	5319	4165	3011	1857
2400HSF	10050	8798	7546	6294	5042	3790

*Consult factory for calculation details

Results shown for air cooled models

Heat load on refrigerated compressed air dryers is based on the combination of inlet air flow volume, inlet air temperature, ambient air temperature, and compressed air pressure. Of these, inlet air flow volume (scfm) and inlet air temperature have the greatest effect. Even a slight reduction of inlet air temperature will greatly reduce the heat load on a dryer. Dryer model selection is based on capacity sufficient to handle the heat load during the hottest months of the year. Cycling operation provides the greatest way to realize energy savings as inlet air temperature drops.

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HeatSink™ Sizing and Selection

HeatSink™ dryers are rated in accordance with Compressed Air and Gas Institute (CAGI) Standard ADF-100, for air with 38°F pressure dew point (PDP) at the following conditions: 100°F inlet air temperature; 100 psig inlet air pressure; 100°F ambient air temperature. Select a model that has the required treatment capacity (scfm) from the Technical Specifications Chart below.

Use the following Correction Factors to select a model that provides 38°F PDP for an application that deviates from the standard rating conditions (Selection example provided):

Dryer Selection Example		Inlet Air Temperature	Correction Factor	Inlet Air Pressure	Correction Factor	Ambient Air Temperature	Correction Factor
Air Volume Requirement:	375 scfm	80°F	.61	50 psig	1.29	80°F	.80
Inlet Air Temperature:	110°F	90°F	.79	75 psig	1.10	90°F	.89
Inlet Air Pressure:	150 psig	100°F	1.00	100 psig	1.00	100°F	1.00
Ambient Air Temperature:	90°F	110°F	1.23	150 psig	0.86	110°F	1.16
		120°F	1.51	250 psig	.79	120°F	1.30

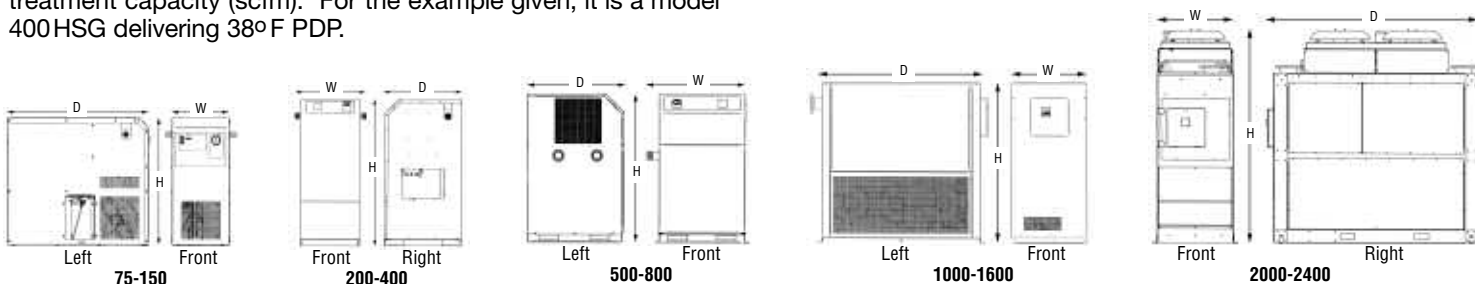
With the correction factors selected, corrected scfm can be calculated:

$$1.23 \times .86 \times .89 \times 375 \text{ scfm} = 353 \text{ scfm corrected}$$

Select the HeatSink™ model that matches or exceeds the corrected treatment capacity (scfm). For the example given, it is a model 400HSG delivering 38°F PDP.

Overall dimensions indicated.

Air, electric service, and drain connection configurations vary per model. Contact factory for details.



Technical Specifications

MODEL	CAPACITY* SCFM 38°F	PRESSURE DROP**	DIMENSIONS			SHIP WT.		AIR CONNECT IN/OUT	DRAIN CONNECT FPT	REFRIG COMP		OPERATING KW***		REFRIG TYPE	MAX WORKING PRESSURE †	VOLTAGES
			W IN.	D IN.	H IN.	AIR COOL LBS.	WATER COOL LBS.			AIR COOL HP	WATER COOL HP	AIR COOL	WATER COOL			
75HSG	75	1.5	14	35	31	265	NA	1" MPT	1/4"	.4	NA	.78	NA	R404	300 psig	115-1-60 208/230-1-60 220-1-50
100HSG	100	2.1	14	35	31	265	NA	1" MPT	1/4"	.5	NA	.96	NA	R404	300 psig	
125HSG	125	1.9	14	35	31	300	NA	1 1/2" MPT	1/4"	.8	NA	1.35	NA	R404	300 psig	
150HSG	150	2.6	14	35	31	300	NA	1 1/2" MPT	1/4"	1.0	NA	1.29	NA	R404	300 psig	
200HSG	200	1.6	28	30	58	620	540	1 1/2" MPT	1/4"	1.3	1.3	1.66	1.06	R404	300 psig	208/230-3-60 220-3-50 460-3-60 380-3-50 575-3-60
250HSG	250	2.7	28	30	58	670	570	1 1/2" MPT	1/4"	1.5	1.5	2.01	1.39	R404	300 psig	
300HSG	300	2.1	28	30	58	735	630	2" MPT	1/4"	2.0	2.0	2.54	1.65	R404	300 psig	
400HSG	400	2.9	28	30	58	745	670	2" MPT	1/4"	2.5	2.5	3.24	2.19	R404	300 psig	
500HSF	500	2.9	42	40	62	1105	1120	3" MPT	1/4"	3.5	3.5	4.52	2.80	R404	300 psig	
600HSF	600	3.0	42	40	62	1275	1270	3" MPT	1/4"	4.0	4.0	4.82	3.14	R404	300 psig	
700HSF	700	2.7	42	40	62	1320	1300	3" MPT	1/4"	4.5	4.5	5.79	3.58	R404	300 psig	
800HSF	800	2.9	42	40	62	1415	1300	3" MPT	1/4"	5.0	5.0	6.50	4.16	R404	300 psig	
1000HSF	1,000	2.4	32	72	69	2315	2355	4" FLG	1/4"	6.0	5.0	7.03	4.48	R22	220 psig	
1200HSF	1,200	3.1	32	72	69	2435	2435	4" FLG	1/4"	8.0	6.0	8.72	5.48	R22	220 psig	
1600HSF	1,600	3.3	32	72	69	2785	2615	4" FLG	1/4"	10.5	8.0	11.48	7.34	R22	220 psig	
2000HSF	2,000	3.5	32	91	90.68‡	3925	3925	6" FLG	1/4"	13.0	10.5	13.18	9.09	R22	220 psig	
2400HSF	2,400	3.5	32	91	90.68‡	4150	4015	6" FLG	1/4"	13.0	10.5	14.29	9.59	R22	220 psig	

* Performance data obtained and presented in accordance with CAGI Standard No. ADF 100, "Refrigerated Compressed Air Dryers - Methods for Testing and Rating." Pressure dew point at 100 psig inlet air pressure, 100°F inlet air temperature, 100°F ambient air temperature.

** Pressure drop ±.5 psi

*** Average kilowatts per hour of dryer operation at full rated capacity

† Maximum working pressure is limited to drain rating

200-400 scfm units equipped with CME™ Cold Mist Eliminator limited to drain rating of 230 psi.

‡ Air cooled dimension. Water cooled dimension 76.12"

NEMA 1 electrical enclosures standard.

Dimensions subject to change without notice.

Standard 75-800 scfm models ETL-Certified
 1000-2400 models UL 508 Panels.

NA indication = Not Applicable

Protected under U.S. Patent
 Nos. 6,186,223 and 6,244,333

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 COMPRESSED AIR DRYERS
 75 - 2,400 scfm



ZEKS
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1302 Goshen Parkway
 West Chester, PA 19380

Phone: 610-692-9100 800-888-2323
 Fax: 610-692-9192
 Web: www.zeks.com

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