ZEKS COMPRESSED AIR SOLUTIONS®

# HeatSink™

*75–2,400 scfm Models*

## TRUE-CYCLING™ REFRIGERATED COMPRESSED AIR DRYERS

***Independently Verified Performance***
*(200-1000 scfm models)*

Performance Tested and Rated in Accordance with
ISO 7183
200-1000 SCFM
CAGI Refrigerated Dryer Performance Verification Program
CAGI
Program administered by Intertek Testing Services


CFX®
STAINLESS STEEL HEAT EXCHANGERS

MADE IN USA

# HeatSink™

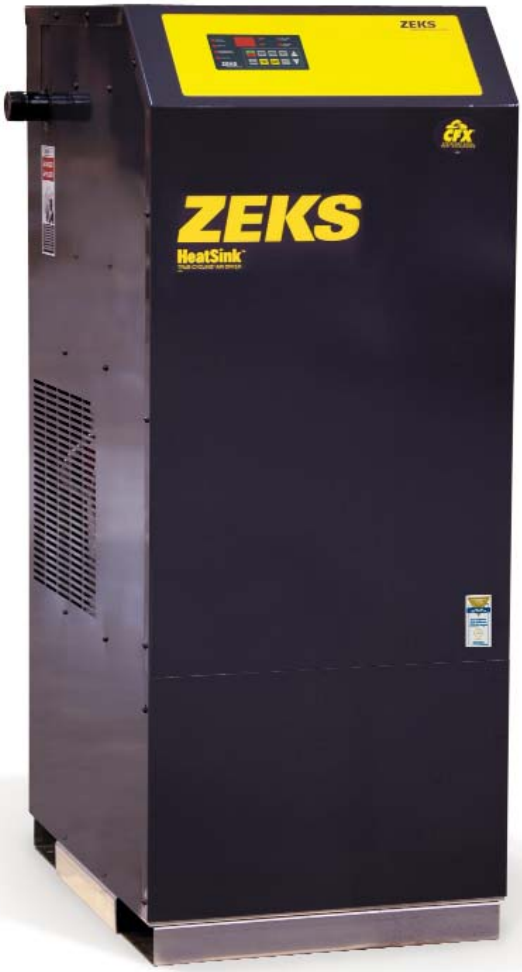
## True-Cycling™ Refrigerated Compressed Air Dryers

### 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.

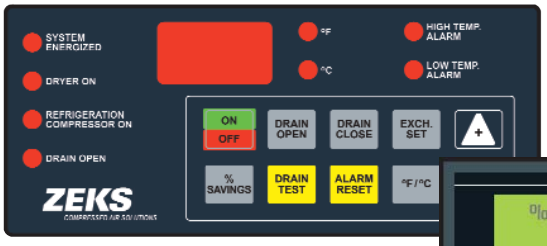
### True-Cycling™– The ZEKS Advantage

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 be discharged through an automatic drain for disposal. Having the ability to store cool energy in the thermal mass fluid enables HeatSink™ dryers to cycle off during periods of low demand while they continue 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.




400 HSG shown in standard configuration

- ***Fully hermetic refrigeration system minimizes maintenance requirements***
- ***Generously sized condenser delivers 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)*



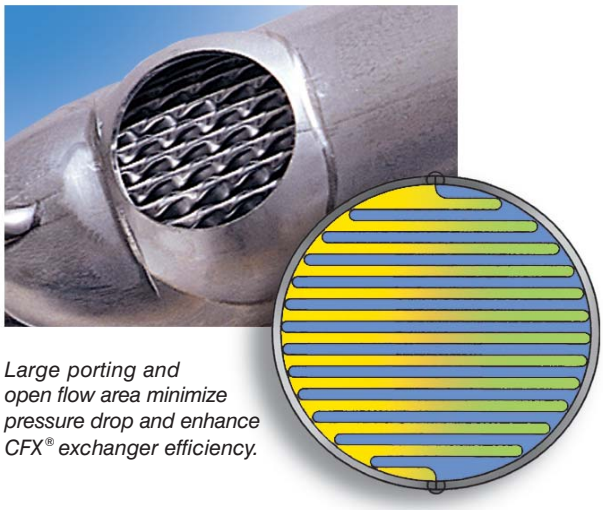

***Compustat*** *- Standard on 200-800*


***DPC*** *- Standard on 1000-2400, optional on 75-150*

## *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, minimize fouling potential. Corrosion resistant 304L stainless steel is used in all air and refrigeration circuit exchangers. CFX® Corrugated, Folded heat eXchangers 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.*

## *Electronic Performance Control*

HeatSink™ dryer operation is automatically controlled to optimize air treatment and manage energy consumption. In addition, both the Compustat and DPC controllers enable the user to adjust the operating parameters based on specific application requirements, optimizing energy usage.

***Compustat*** – Digital controller standard on 200-800 models. Includes LED display to communicate operating status and energy savings.

***DPC Controller*** – Optional on 75-150 models. Enhanced version standard on 1000-2400 models. Includes backlit LCD to communicate operating status and refrigeration system parameters.

***DPC Plus Controller*** – Optional on 200-2400 models. Provides all the features of the DPC Controller, with the addition of air temperature and pressure displays.

| | Dryer Model | | |
|---|---|---|---|
| ***Display of:*** | **75-150** | **200-800** | **1000-2400** |
| • Chiller Temperature | O | S | S |
| • % Energy Savings | O | S | S |
| • Refrigerant Suction Pressure | S (Gauge) | + | S |
| • Refrigerant Suction Temperature | NA | + | S |
| • Refrigerant Discharge Pressure | NA | + | S |
| • Dryer Compressor Running Time | O | + | S |
| • Dryer Running Time | O | + | S |
| • Diagnostic Memory | O | + | S |
| • Inlet Air Pressure | NA | + | + |
| • Outlet Air Pressure | NA | + | + |
| • Inlet Air Temperature | NA | + | + |
| • Outlet Air Temperature | NA | + | + |
| ***Condensate Drain Time Adjustment*** | O | S | S |
| ***Automatic Dryer RESTART*** | O | S | S |
| ***Remote START/STOP-Ready*** | O | S | S |
| ***Remote Alarm Contact*** | O | S | S |
| ***MODBUS Communication-Ready*** | O | + | S |

S - Standard feature with either Compustat or DPC
O - Option provided by DPC
NA - Not Applicable
\+ - Included with DPC Plus Option

ZEKS
COMPRESSED AIR SOLUTIONS®

## *HeatSink™ Standard and Optional Features*

### *Standard:*

- **Stainless Steel CFX® Heat Exchangers**
- **Fully Hermetic Refrigeration Compressor**
- **Electronic 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**
- **Environmentally Friendly R-404 Refrigerant**

### *Optional:*

- **Digital Compressed Air Temperatures and Pressures** (200-2400 only)
- **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** (1000-2400 only)
- **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.

*Refer to ZEKS Product Warranty Policies and Procedures.*

*ZEKS Performance Has Been*

## *Independently Verified!*

Through participation in the Compressed Air and Gas Institute (CAGI) Performance Verification Program, actual performance and energy consumption of 200-1000 scfm HeatSink™ dryers have been independently validated against CAGI Data Sheets. Visit www.zeks.com to view ZEKS refrigerated dryer Data Sheets.

***Insist upon a dryer with performance that has been independently validated.***


# HeatSink™

***REFRIGERATED COMPRESSED AIR DRYERS***

## *Reliability*
## *Efficiency*
## *Innovation*

# Annual Energy Savings of HeatSink™ Dryers

ZEKS COMPRESSED AIR SOLUTIONS®

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 1,000 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:

**Weekly Air Treatment Potential = 168 hrs. x 1,000 scfm x 60 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:

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

**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:

Plant Operation Factor x Ambient Air Temperature Reduction Factor

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

**Utilization Factor = .383 x .34 = .13 (13%)**

**G. *Estimate Annual Savings***
Refer to the following table for a 1,000 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% |
|---|---|---|---|---|---|---|
| **75 HSG** | 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** | 4914 | 4135 | 3355 | 2575 | 1796 | 1016 |
| **1200HSF** | 7402 | 6482 | 5563 | 4643 | 3723 | 2803 |
| **1600HSF** | 8751 | 7604 | 6456 | 5309 | 4161 | 3013 |
| **2000HSF** | 10862 | 9636 | 8410 | 7183 | 5957 | 4730 |
| **2400HSF** | 12807 | 11423 | 10039 | 8655 | 7271 | 5887 |

*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.

**HeatSink™**
***REFRIGERATED COMPRESSED AIR DRYERS***

***Reliability***
***Efficiency***
***Innovation***

# *HeatSink™ Sizing and Selection*

HeatSink™ dryer performance is rated per ISO 7183, Table 2, Option A2, 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* | |
|---|---|
| Air Volume Requirement: | **375 scfm** |
| Inlet Air Temperature: | **110°F** |
| Inlet Air Pressure: | **150 psig** |
| Ambient Air Temperature: | **90°F** |

| *Inlet Air Temperature* | *Correction Factor* |
|---|---|
| 80°F | .61 |
| 90°F | .79 |
| 100°F | 1.00 |
| **110°F** | **1.23** |
| 120°F | 1.51 |

| *Inlet Air Pressure* | *Correction Factor* |
|---|---|
| 50 psig | 1.29 |
| 75 psig | 1.10 |
| 100 psig | 1.00 |
| **150 psig** | **0.86** |
| 250 psig | .79 |

| *Ambient Air Temperature* | *Correction Factor* |
|---|---|
| 80°F | .80 |
| **90°F** | **.89** |
| 100°F | 1.00 |
| 110°F | 1.16 |
| 120°F | 1.30 |

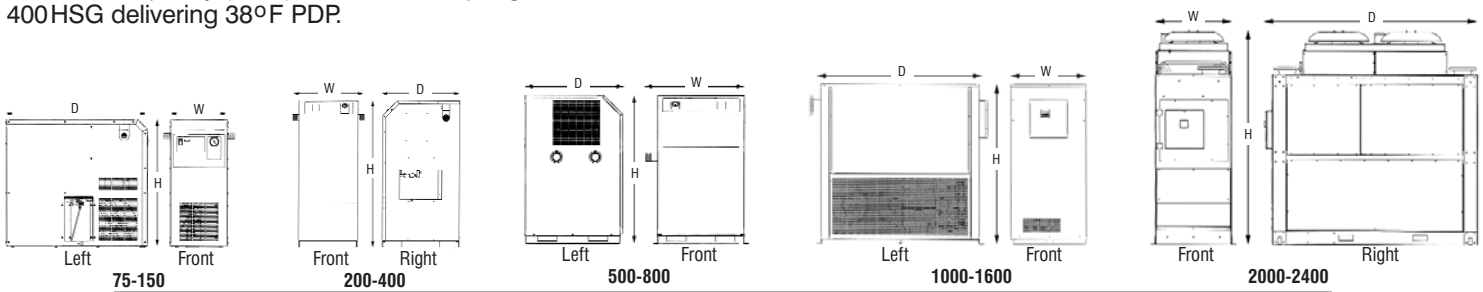
With the correction factors selected, corrected scfm can be calculated:

**1.23 x .86 x .89 x 375 scfm = 353 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.




**75-150** **200-400** **500-800** **1000-1600** **2000-2400**

*Technical Specifications*

| MODEL | CAPACITY* SCFM 38°F | PRESSURE DROP** | DIMENSIONS W IN. | D IN. | H IN. | SHIP WT. AIR COOL LBS. | WATER COOL LBS. | AIR CONNECT IN/OUT | DRAIN CONNECT FPT | REFRIG COMP AIR COOL HP | WATER COOL HP | OPERATING KW*** AIR COOL | WATER COOL | REFRIG TYPE | MAX WORKING PRESSURE | VOLTAGES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **75HSG** | 75 | 1.5 | 14 | 35 | 31 | 265 | NA | 1" MPT | 1/4" | .4 | NA | .78 | NA | R404 | 300 psig | 115-1-60<br>208/230-1-60<br>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 | |
| **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 | 208/230-3-60<br>220-3-50<br>460-3-60<br>380-3-50<br>575-3-60 |
| **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" | 6.5 | 5.0 | 8.9 | 6.9 | R404 | 220 psig | |
| **1200HSF** | 1,200 | 3.1 | 32 | 72 | 69 | 2435 | 2435 | 4" FLG | 1/4" | 8.0 | 6.0 | 10.5 | 8.0 | R404 | 220 psig | |
| **1600HSF** | 1,600 | 3.3 | 32 | 72 | 69 | 2785 | 2615 | 4" FLG | 1/4" | 10.5 | 8.0 | 13.1 | 8.4 | R404 | 220 psig | |
| **2000HSF** | 2,000 | 3.5 | 32 | 91 | 90.68‡ | 3925 | 3925 | 6" FLG | 1/4" | 13.0 | 10.5 | 14.0 | 11.0 | R404 | 220 psig | (230-3-60 not available on the 2000-2400 models) |
| **2400HSF** | 2,400 | 3.5 | 32 | 91 | 90.68‡ | 4150 | 4015 | 6" FLG | 1/4" | 13.0 | 10.5 | 15.8 | 13.0 | R404 | 220 psig | |

* Performance data obtained as per ISO 7183, Table 2, Option A2.
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

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

**HeatSink™**

***REFRIGERATED COMPRESSED AIR DRYERS***

***75 – 2,400 scfm***

50 ZEKS Celebrating Our Fiftieth Anniversary 1959-2009

MEMBER COMPRESSED AIR AND GAS INSTITUTE CAGI www.cagi.org


**ZEKS**
***COMPRESSED AIR SOLUTIONS®***

1302 Goshen Parkway
West Chester, PA 19380

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