



# Nirvana

*Cycling Refrigerated Dryers*



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*Ingersoll Rand's Nirvana Cycling Refrigerated Dryer provides reliability like no other dryer in its class: reliability that you can count on to protect your air system day in and day out; reliability built in by design.*



The Nirvana is a genuine cycling dryer, incorporating innovative features that make it not only the most reliable, but the most energy efficient, dryer in its class.

The key element central to the Nirvana's reliability and energy efficiency is its distinct, patented heat exchanger design. Providing high heat transfer with low pressure drop because of uniquely short flow length, the Nirvana heat exchanger presents a flow area three to five times that of an equivalent copper tubing exchanger, and it is self-cleaning, which greatly reduces the potential for fouling.

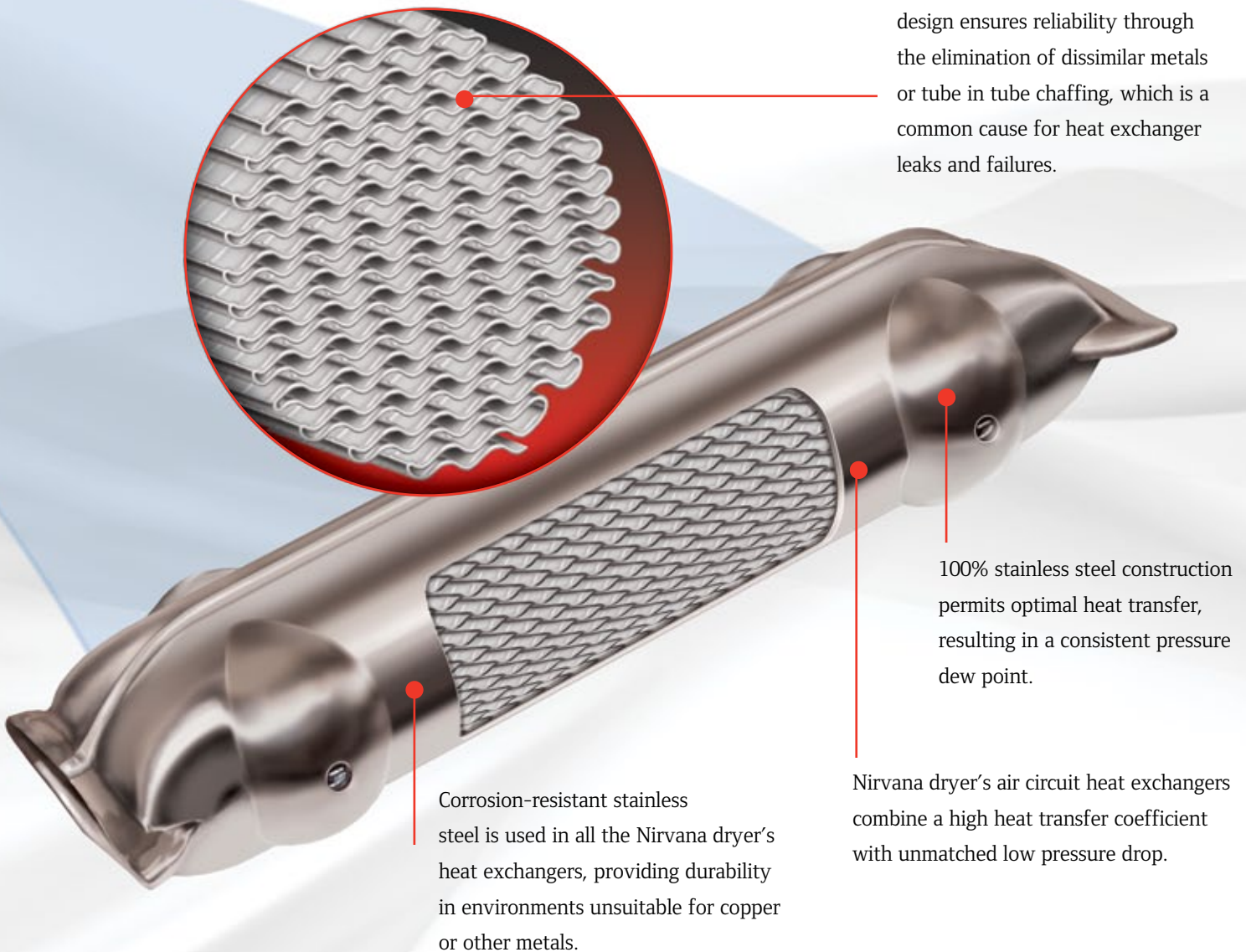
# Reliability Is Our Design

## High Heat Transfer at Work

The superior performance of the Nirvana dryer can be attributed to the effective heat transfer capabilities of the exchanger design, utilized throughout the compressed air circuit. The dryer design includes a pre-cooling system with stainless steel heat exchangers to properly condition the air for drying.

A re-heater section of the dryer's air side also uses these high performance heat exchangers to prepare the dried compressed air for re-entry into the air system. This prevents pipe sweating and readies the compressed air for use in process applications.

An innovative corrugated and folded stainless steel panel is stacked inside two stainless steel shells, then welded together to form a unitized heat exchanger. This design ensures reliability through the elimination of dissimilar metals or tube in tube chaffing, which is a common cause for heat exchanger leaks and failures.



Corrosion-resistant stainless steel is used in all the Nirvana dryer's heat exchangers, providing durability in environments unsuitable for copper or other metals.

100% stainless steel construction permits optimal heat transfer, resulting in a consistent pressure dew point.

Nirvana dryer's air circuit heat exchangers combine a high heat transfer coefficient with unmatched low pressure drop.

# Energy-Efficient Design

# Nirvana

An advanced cycling dryer, the Nirvana provides significant savings because it does not waste energy costs through continuous operation of its refrigeration system, as do traditional non-cycling dryers. Each component of the Nirvana has been designed to provide not only durability, but maximum energy efficiency. This combination of system design and individual component design adds up to the most energy efficient cycling refrigerated dryer available.



Factors contributing to the Nirvana's energy efficiency:

- Design includes a refrigeration system combined with a thermal mass that efficiently stores cold energy.
- Refrigeration compressor cycles off during periods of reduced load, while dryer continues to remove moisture and contaminants from the compressed air.
- Unique centrifugal separator design provides effective moisture separation maintaining consistent dew point, regardless of partial load operation.

### Optional Electronic No Air Loss (ENL) Drain

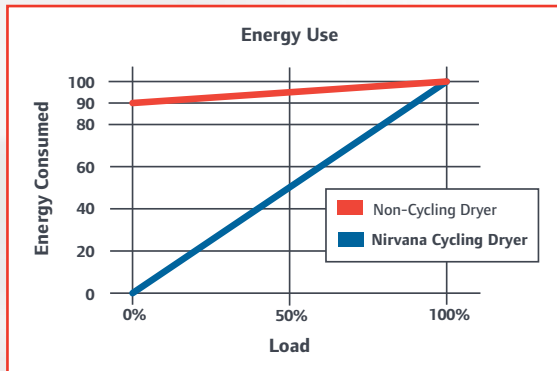
Nirvana cycling dryers up to 2,400 SCFM can be equipped with optional ENL condensate drains, which eliminate venting of compressed air to the atmosphere.



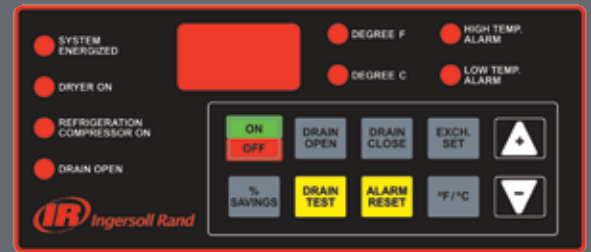
ENL Drain

### Best in Class Design

The Nirvana cycling dryer uses centrifugal separation to remove moisture from the chilled air. Separation occurs at the coldest point in the system by means of centrifugal acceleration, then expands into an area of low velocity containing a sump, and change of air flow direction. The result is highly-efficient moisture removal, providing exceptionally dry, clean air under all operating conditions.



Nirvana cycling dryers are highly efficient, providing dry, clean air under any operating conditions.



Microprocessor LED Controller up to NVC800 features a NEMA 1 package protection standard with an optional NEMA 4 rating.

## Microprocessor Controller

The easy-to-use controller automatically manages dryer operation for optimum air treatment and for maximum energy efficiency.

- Simple and easily read interface with LED indication
- Digital display of chiller temperature available at a glance to ensure optimal dryer performance
- Percent of energy savings available at the touch of a button
- Dedicated buttons enable convenient adjustment of solenoid drain timing as well as drain function test
- Automatic dryer restart in the event of a sudden loss of power
- Adjustable chiller temperature set point to further reduce energy expense
- Microprocessor control constantly monitors dryer functions including thermal mass temperature and provides alarms to minimize dryer downtime

# Large Capacity from 3,250 to 8,000 SCFM

*Modular design for exceptional reliability and energy efficiency*

Nirvana large capacity cycling refrigerated compressed air dryers consist of multiple, independent air treatment modules, each with its own controls and refrigeration system, sharing a central thermal mass cold storage medium. Compressed air is cooled as it passes through the large capacity Nirvana dryer, causing moisture and contaminants to condense so they can be removed from the air in multiple high-efficiency centrifugal separators.

The moisture and contaminants are then automatically discharged from the system through pneumatic no air loss condensate drains to eliminate wasting valuable compressed air.

Clean, dry compressed air is warmed as it exits the dryer to prevent pipe sweating and to condition it for application. The refrigeration system in each module automatically cycles as needed to maintain cold stored energy, while active circulation of the thermal mass cold storage media contributes to the dryer's overall efficiency.

**Expandable Large Capacity Dryers** feature a modular design and individual controllers that provide redundancy for models starting at 3,250 SCFM.



Water-cooled Large Capacity Dryer

### Redundant Design for Reliability

The multiple modules of each Nirvana large capacity dryer are integrated to make a single dryer with air treatment capacities from 3,250 to 8,000 SCFM. (Larger dryer sizes upon request.) Modules share a single inlet header and a single outlet header, each with dual connection capability for installation versatility. Each module includes stainless steel heat exchangers and a high-efficiency centrifugal separator.

Because Nirvana large capacity dryers employ a shared, continuously-circulating thermal mass cold storage medium and integrated drying modules with individual electrical disconnects, the dryer can continue to operate and provide compressed air treatment even if a module must be isolated for maintenance or repair.

Dryer operation is coordinated through digital controls, fully adjustable to meet application requirements. The operation of individual modules can also be adjusted to make optimum use of the benefits associated with cycling refrigeration systems.

**Large Capacity Nirvana Cycling Refrigerated Dryers** are also available in an air-cooled design.



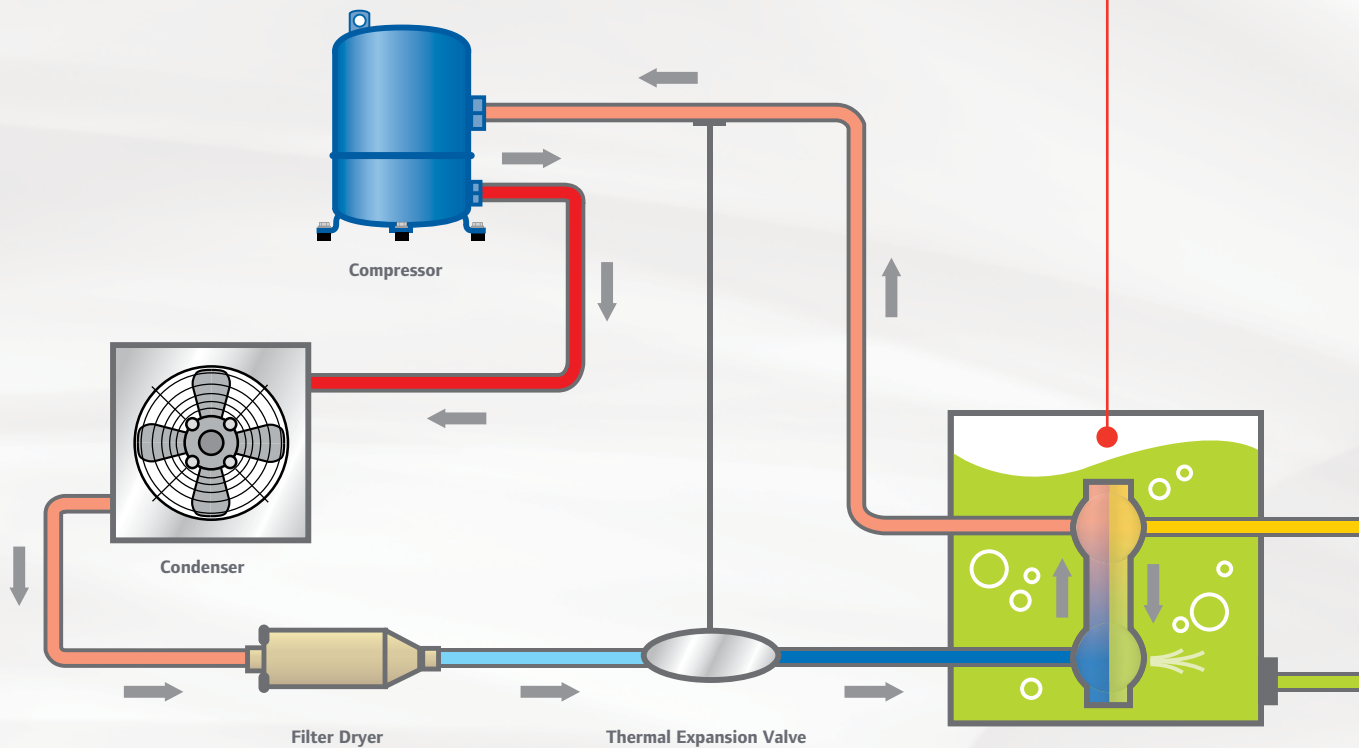
Controller for NVC1000 and larger

## Microprocessor Controller

- Backlit LCD with integrated keypad allows viewing of dryer parameters regardless of environmental lighting
- MODBUS compatible via RS232/485-remote communication - ready connection port
- Remote alarm contact available and remote start/stop ready
- Advanced diagnostic memory with failure code storage
- Percentage of energy savings available at the touch of a button

# How They Work

**Submerged Evaporator Thermal Mass Storage Tank** is fully insulated to maintain a consistently cold propylene glycol-water mixture for continuous pressure dew point control. The thermal tank temperature is monitored by the controller permitting the refrigerant compressor to cycle off during low heat loads resulting in energy savings.



**Refrigeration System** employs a reliable, time-proven hermetic reciprocating compressor.

**Thermal Mass Cooling System** circulates the thermal mass fluid to provide a continuous cold medium for heat transfer.

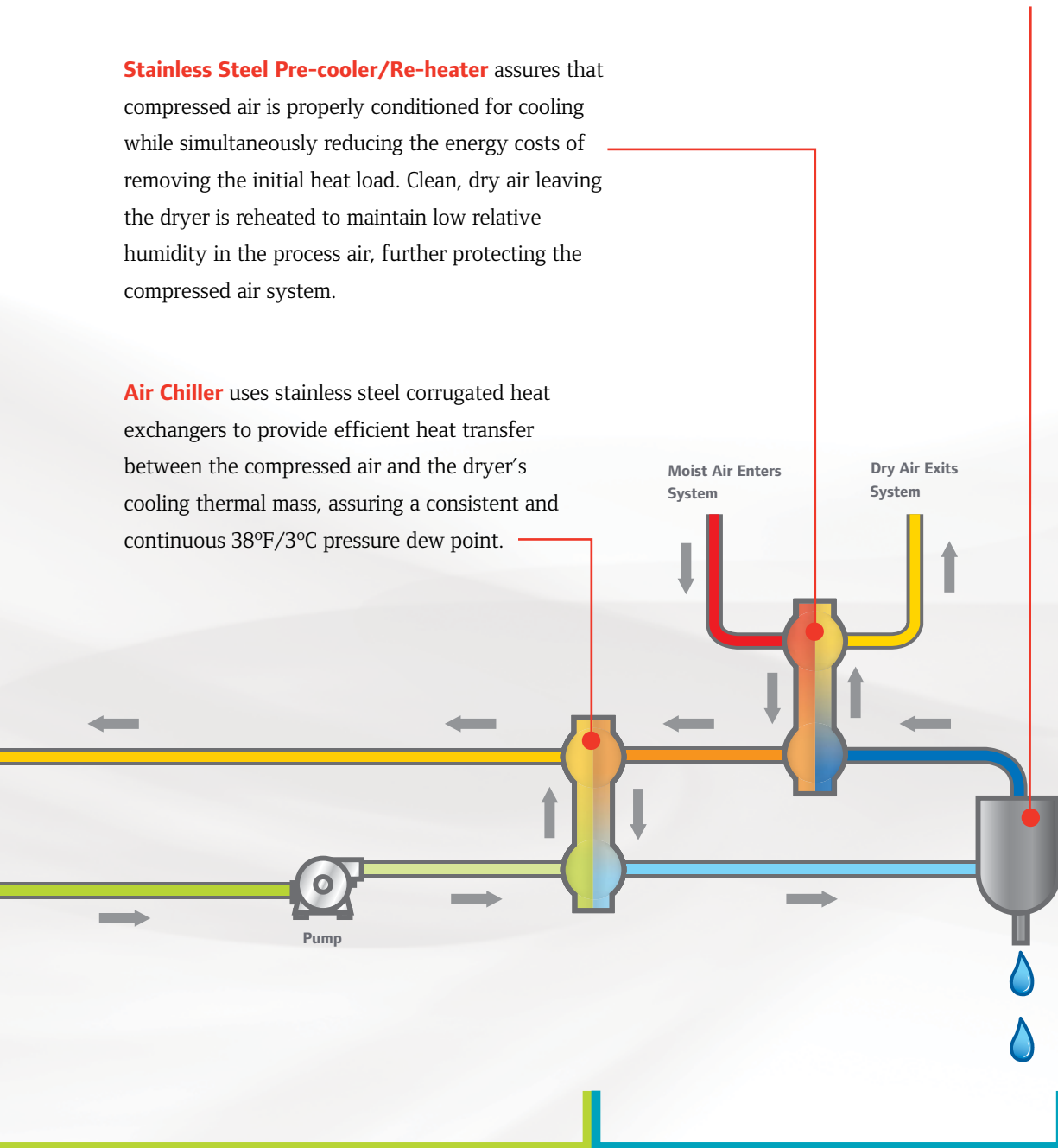


### Centrifugal Air/Moisture Separator

efficiently and effectively removes moisture for all applications even under partial load conditions.

**Stainless Steel Pre-cooler/Re-heater** assures that compressed air is properly conditioned for cooling while simultaneously reducing the energy costs of removing the initial heat load. Clean, dry air leaving the dryer is reheated to maintain low relative humidity in the process air, further protecting the compressed air system.

**Air Chiller** uses stainless steel corrugated heat exchangers to provide efficient heat transfer between the compressed air and the dryer's cooling thermal mass, assuring a consistent and continuous 38°F/3°C pressure dew point.



**Compressed Air Side System** pre-cools the inlet air, chills the air to 38°F/3°C, removes moisture through the centrifugal separator and is re-heated for process use.

# Global Reach

## Unsurpassed Local Customer Support

*Ingersoll Rand provides its products and services directly or through distributors to customers in close to 200 countries. We focus on providing innovation to increase your productivity and profitability. Expect more with Ingersoll Rand. We are your total solutions provider.*

### **Long-term Value**

There is more to value than simply price. The commitment of many thousands of dedicated compressed air specialists, either directly employed or members of a select market channel partnership, mean that friendly Ingersoll Rand support is close at hand. In addition to parts availability, qualified on-site service is available globally.



### **Preventative Maintenance and Warranty**

Factory training and certified Ingersoll Rand technicians can protect your investment by providing high-quality preventative maintenance. In addition, we can offer a comprehensive seven-year parts and labor warranty.

### **Replacement Parts Made Easy**

Ensure that you have all the right parts on hand with our simplified ordering. Ingersoll Rand's reputation for dryer parts availability is second to none.



*The best overall value is getting the most out of your investment. Ingersoll Rand customer support teams will help you protect your investment.*

Nirvana Cycling Refrigerated Dryer Specifications										
Model	Air Capacity m <sup>3</sup> /min @ 3°C/ SCFM @ 38°F	Pressure Drop		Operating kW		Dimensions		Approximate Ship Weight		Air In/Out in
		bar g	psig	Air Cooled	Water Cooled	Width x Depth x Height mm	in	kg	lb	
NVC200	5.7/200	0.11	1.6	2.10	1.88	711 x 762 x 1,473	28 x 30 x 58	282	620	1.5 NPT
NVC300	8.5/300	0.14	2.1	2.80	2.10	711 x 762 x 1,473	28 x 30 x 58	334	735	2 NPT
NVC400	11.3/400	0.20	2.9	3.30	2.72	711 x 762 x 1,473	28 x 30 x 58	339	745	2 NPT
NVC500	14.1/500	0.20	2.9	4.66	3.90	1,067 x 1,016 x 1,575	42 x 40 x 62	501	1,105	3 NPT
NVC600	17.0/600	0.21	3.0	5.00	4.36	1,067 x 1,016 x 1,575	42 x 40x 62	580	1,275	3 NPT
NVC700	19.8/700	0.19	2.7	6.10	4.99	1,067 x 1,016 x 1,575	42 x 40 x 62	600	1,320	3 NPT
NVC800	22.7/800	0.20	2.9	6.70	5.63	1,067 x 1,016 x 1,575	42 x 40 x 62	643	1,415	3 NPT
NVC1000	28.3/1,000	0.17	2.5	8.90	6.90	813 x 1,829 x 1,753	32 x 72 x 69	1,052	2,315	4 FLG
NVC1200	34.0/1,200	0.21	3.1	10.50	6.90	813 x 1,829 x 1,753	32 x 72 x 69	1,107	2,435	4 FLG
NVC1600	45.3/1,600	0.23	3.3	13.10	7.70	813 x 1,829 x 1,753	32 x 72 x 69	1,266	2,785	4 FLG
NVC2000	56.7/2,000	0.24	3.5	13.50	10.40	813 x 2,311 x 2,311	32 x 91 x 91	1,780	3,925	6 FLG
NVC2400	68.0/2,400	0.24	3.5	15.80	11.40	813 x 2,311 x 2,311	32 x 91 x 91	1,886	4,150	6 FLG
NVC3250	92.1/3,250	0.24	3.5	24.10	15.30	1,981 x 2,438 x 2,540	78 x 96 x 100	2,957	6,520	8 FLG
NVC4000	113.3/4,000	0.24	3.5	27.00	20.70	1,981 x 2,438 x 2,540	78 x 96 x 100	3,048	6,720	8 FLG
NVC4800	136.0/4,800	0.24	3.5	31.60	22.80	1,981 x 2,438 x 2,540	78 x 96 x 100	3,121	6,880	8 FLG
NVC6000	170.0/6,000	0.24	3.5	40.50	31.10	2,794 x 2,489 x 2,591	110 x 98 x 102	4,400	9,700	10 FLG
NVC8000	226.6/8,000	0.24	3.5	54.00	41.40	3,632 x 2,515 x 2,616	143 x 99 x 103	5,906	13,020	12 FLG

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

Maximum working pressure: NVC200-800 (STD Solenoid Drain), 20.7 bar g (300 psig); NVC200-800 (OPT No Air Loss Drain), 15.2 bar g (220 psig); NVC1000-8000, 15.2 bar g (220 psig).

Weights and dimension shown for NVC200-2400 air-cooled, NVC3250 and larger in water-cooled.

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

Standard NVC200-800 SCFM models ETL-certified, NVC1000-2400 models UL 508 panels.

Available voltages 460-3-60, 575-3-60, 380-3-50. NVC200-400 available in 230-3-60 and 220-3-50. NVC200 available in 230-1-60.

Pressure drop ± 0.03 bar g (± 0.5 psig).

Correction Factors						
	Inlet Air Temperature	Correction Factor	Inlet Air Pressure	Correction Factor	Ambient Air Temperature	Correction Factor
<b>Dryer Selection Example:</b>	80°F	1.64	75 psig	0.91	80°F	1.25
	90°F	1.27	100 psig	1.00	90°F	1.12
500 SCFM	100°F	1.00	<b>125 psig</b>	<b>1.08</b>	<b>100°F</b>	1.00
110°F inlet	<b>110°F</b>	<b>0.81</b>	150 psig	1.16	110°F	0.86
125 psig						
100°F ambient	120°F	0.66	225 psig	1.22	120°F	0.77
<b>Calculation:</b>	Dryer Size = 500/(0.81 x 1.08 x 1.00) = 572 SCFM = NVC600					



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