**nano R³ sizing & specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>outlet flow (scfm)</th>
<th>red flow (scfm)</th>
<th>cold duty cycle</th>
<th>dry thermal mass</th>
<th>output power (kw)</th>
<th>absorbed power (kw)</th>
<th>approx. weight</th>
<th>dimensions (inches)</th>
<th>inlet &amp; outlet dimensions (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NXC 2000</td>
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<td>NXC 30</td>
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<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
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</tr>
</tbody>
</table>

**Pressure correction factors**

- No correction factors apply when the inlet pressure is below 50 psig.
- When the inlet pressure is below 50 psig, correction factor = 1.1861.
- No correction factors apply when the inlet pressure is equal to or above 232 psig.
- When the inlet pressure is between 50 psig and 232 psig, correction factor = 1.2144.
- No correction factors apply when the inlet pressure is equal to or above 232 psig.
- When the inlet pressure is below 50 psig, correction factor = 1.1861.

**Inlet temperature correction factors**

- No correction factors apply when the inlet temperature is below 85°F.
- When the inlet temperature is below 85°F, correction factor = 0.75.
- No correction factors apply when the inlet temperature is equal to or above 160°F.
- When the inlet temperature is between 85°F and 160°F, correction factor = 1.27.
- No correction factors apply when the inlet temperature is equal to or above 160°F.
- When the inlet temperature is below 85°F, correction factor = 0.75.

**Ambient temperature correction factors**

- No correction factors apply when the ambient temperature is below 85°F.
- When the ambient temperature is below 85°F, correction factor = 0.75.
- No correction factors apply when the ambient temperature is equal to or above 160°F.
- When the ambient temperature is between 85°F and 160°F, correction factor = 1.27.
- No correction factors apply when the ambient temperature is equal to or above 160°F.
- When the ambient temperature is below 85°F, correction factor = 0.75.

**WARRANTY**

- *2 year warranty with pre-filtration and non-corrosive piping installed*
- *4 year warranty with pre-filtration and non-corrosive piping installed*
- *5 year warranty with pre-filtration and non-corrosive piping installed*
how do R1 cycling dryers save energy

Unlike direct expansion dryers which run continuously, when the NXC’s silica dry thermal mass reaches a set temperature, the compressor stops or cycles off but continues to provide clean and dry compressed air to your process. The thermal mass stores the cold energy and keeps the dew point at the desired temperature. Once the temperature of the dry thermal mass begins to rise, the refrigerant compressor cycles on. Refrigeration dryers must be sized to handle the worst case operating conditions they may encounter - the highest possible flow at the highest possible inlet temperature on the hottest day of the year. The power consumption needed to operate at these worst case conditions is far greater than what is typically required. Traditional air dryers operate at 100% power consumption at all times, even when the actual demand on the dryer could be far less than 100%.

The advanced dual transfer technology in the R1 cycling dryer allows it to automatically reduce its power consumption to meet the actual demand saving you up to 80% over a traditional dryer. As a result, the R1 energy saving cycling dryer is eligible for rebates in many parts of the country.

Dryer demand is a function of both required air flow and ambient conditions. Unless both of these variables are at their maximums at the same time, there are energy savings to be had. The R1 takes advantage of this savings opportunity by significantly reducing power consumption to match actual demand.

design
Our experienced team of design engineers are always looking for new and unique technologies and products to bring you the highest level of performance and lowest overall operating cost.

research & development
Our R&D team endeavors to provide solutions to our customers’ needs. We are continually researching new technologies which can provide unique advantages over competitive offerings.

manufacture
The reliable and energy saving R1 refrigeration dryers are manufactured in a state of the art facility to the highest standards of quality to ensure reliability and high levels of performance.

www.n-psi.com

leading edge technology and hundreds of years of experience... nano-purification solutions, your world-class provider of compressed air and gas solutions to industry. Our experienced team of design engineers are always looking for new and unique technologies and products to bring you the highest level of performance and lowest overall operating cost. Experience. Customer. Service…nano

nano realize that world-class customer experience is the most important component to any successful business. A wealth of experience and leading edge products are only part of the equation. We realize that world-class customer service is the most important component to any successful business.

clean and dry
Clean and dry compressed air is essential in every efficient and profitable manufacturing and process operation worldwide. The most common applications include food, beverage, chemical, laboratory, medical and natural gas applications. nano understand your needs and has created the nanoR range of high performance, energy saving compressed air and gas purification products to provide clean and dry compressed air at an affordable price with unrivaled reliability.

Compressed air savings can be calculated by matching the actual air flow conditions with the dryer performance validated for that air flow and then estimating the amount of energy saved. Savings are calculated using standard conditions of 100 scfm to warm air consumption conditions based on the dry cooler’s performance. 

The reliable and energy saving R1 refrigeration dryers are manufactured in a state of the art facility to the highest standards of quality to ensure reliability and high levels of performance.

In most applications, the air flow varies significantly throughout the day reaching peak demand only for a very short time. Often times, demand can be close to zero overnight or during breaks. The R1 matches its power consumption to the air flow demand providing optimal energy savings. (example shown to right)

<table>
<thead>
<tr>
<th>Air flow</th>
<th>Electrical consumption</th>
<th>actual airflow</th>
<th>Energy savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% 0.5 hours</td>
<td>683 kWh</td>
<td>0.48 kWh</td>
<td>0.48 kWh</td>
</tr>
<tr>
<td>75% 1.5 hours</td>
<td>1033 kWh</td>
<td>1.06 kWh</td>
<td>1.06 kWh</td>
</tr>
<tr>
<td>50% 5.0 hours</td>
<td>4633 kWh</td>
<td>2.61 kWh</td>
<td>2.61 kWh</td>
</tr>
<tr>
<td>25% 10 hours</td>
<td>2693 kWh</td>
<td>0.73 kWh</td>
<td>0.73 kWh</td>
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<tr>
<td>0% 10 hours</td>
<td>2693 kWh</td>
<td>0.73 kWh</td>
<td>0.73 kWh</td>
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<tr>
<td>Daily total</td>
<td>18,689 kWh</td>
<td>6,486 kWh</td>
<td></td>
</tr>
</tbody>
</table>

In most applications, the air flow varies significantly throughout the day reaching peak demand only for a very short time. Often times, demand can be close to zero overnight or during breaks. The R1 matches its power consumption to the air flow demand providing optimal energy savings.

note: in many factories, the dryers are used 8 hours/day

<table>
<thead>
<tr>
<th>Dryer model</th>
<th>consumption/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>NXC 0100 dry</td>
<td>20,573 kW</td>
</tr>
<tr>
<td>NXC 0300 dry</td>
<td>40,146 kW</td>
</tr>
<tr>
<td>NXC 0500 dry</td>
<td>60,630 kW</td>
</tr>
<tr>
<td>NXC 0700 dry</td>
<td>80,108 kW</td>
</tr>
<tr>
<td>NXC 0900 dry</td>
<td>100,579 kW</td>
</tr>
</tbody>
</table>

Energy savings 80% - 20,573 kW

energy consumption according to air flow variations during the dry cooler's life:

Savings: peak demand is far less than 100%.

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the unique NXC dry thermal mass saves energy and money by utilizing dual transfer technology (DTT). NXC employs DTT which treats the compressed air according to actual air flow.

direct transfer: cold refrigerant comes into direct contact with the compressed air through the unique patented copper/aluminum heat exchanger making for the most efficient cooling method during periods of high air usage.

indirect transfer: excess refrigerant cools down the unique dry thermal mass allowing the compressor to cycle off during periods of lower compressed air consumption. This cycling feature ensures excellent dew point performance and low power consumption.

consistent dew point and low pressure drop

environmentally friendly

R134A or R407C refrigerant and non-toxic silica dry mass utilized in all models.

water cooled condensers - optional

copper fins

refrigerant gas

compressed air

wet cold refrigerant comes into direct contact with the compressed air through the unique patented copper/aluminum heat exchanger making for the most efficient cooling method during periods of high air usage.

direct transfer:

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optimum energy efficiency

lower electrical consumption from 0% to 100% duty cycle.

easy to install and start-up

thanks to the silica dry mass, no overnight precooling of thermal mass is required.

space saving design

fully packed into a simple compact design, NXC provides the best dew point performance, the fastest response times if demand increases suddenly and the lowest power consumption across the entire spectrum of operation.

benefits

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consistent dew point and low pressure drop

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nano R1® sizing & specifications

nano NIC uses a patented heat exchanger comprised of a separate air to air multi-tubular exchanger and an air to refrigerant exchanger immersed in an environmentally friendly and highly efficient silica dry mass thermal mass. This unique combination provides the best dew point performance, the fastest response times if demand increases suddenly and the lowest power consumption across the entire spectrum of operation.

nano filters to improve compressed air quality and ensure trouble-free operation.

space saving design

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total accessibility

all panels can be removed to facilitate maintenance.

nano F™ filter packages

nano filters to improve compressed air quality and ensure trouble-free operation.

nano R1® sizing & specifications

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copper tubes

copper fins

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R1

how do R1 cycling dryers save energy

Unlike direct expansion dryers which run continuously, when the NXC’s silica dry thermal mass reaches a set temperature, the compressor stops or cycles off but continues to provide clean and dry compressed air to your process. The thermal mass stores the cold energy and keeps the dew point at the desired temperature. Once the temperature of the dry thermal mass begins to rise, the refrigerant compressor cycles on.

Refrigeration dryers must be sized to handle the worst case operating conditions they may encounter - the highest possible flow at the highest possible inlet temperature on the hottest day of the year. The power consumption needed to operate at these worst case conditions is far greater than what is typically required. Traditional air dryers operate at 100% power consumption at all times, even when the actual demand on the dryer could be far less than 100%.

The advanced dual transfer technology in the R1 cycling dryer allows it to automatically reduce its power consumption to meet the actual demand saving you up to 80% over a traditional dryer. As a result, the R1 energy saving cycling dryer is eligible for rebates in many parts of the country.

Dryer demand is a function of both required air flow and ambient conditions. Unless both of these variables are considered, energy savings cannot be accurately predicted.

In most applications, the air flow varies significantly throughout the day reaching peak demand only for a very short time. Off-peak, demand can be close to zero overnight or during breaks. The R1 matches its power consumption to the air flow, demanding optimal energy savings. (Example shown to right)

at 0.08 per kWh for a plant running 24/7, the NXC dryer saves the company nearly $37,422 in electrical costs annually. A similarly installed 500 scfm dryer would save over $1,000 annually.

how it works

1. Most compressed air enters the separate air to refrigerant exchange where it is precooled.
2. Precipitated condensed air then enters the air to refrigerant exchanger where it is its coldest point and achieves lowest dew point.
3. Condensed moisture is removed by an integrated moisture separator and condensate drain prior to recirculating the air to air heat exchanger where inlet air exiting the exchanger is reheated.
4. The refrigerant comes into direct contact with both the silica dry mass and compressed air inside the air to refrigerant exchanger.
5. Demand drops and compressed air flow rate is reduced, the refrigerant compressor cycles and the silica dry mass is employed to continue drying the air.

This dual transfer technology

Product information is subject to change. Always consult your sales representative for complete information.

www.n-psi.com
Leading edge technology and hundreds of years of experience… nano-purification solutions, your world-class provider of nano-purification solutions

Our commitment at nano is to work alongside our customers and provide unique solutions with the highest quality products to solve your specific challenges.

A result of experience and leading edge products are only part of the equation. nano realize that world-class customer service is the most important component to any successful business.

Experience. Customer. Service…nano

how do R1 cycling dryers save energy

Unlike direct expansion dryers which run continuously, when the NXC’s silica dry thermal mass reaches a set temperature, the compressor stops or cycles off. This makes cycling dryers ideal for applications where there is no continuous demand for clean, dry compressed air. The seasonal duty cycle of a facility can vary from 0% to 100%.

Nano R1 cycling dryers are capable of saving significant energy by reducing power consumption to match actual demand. The R1 dryer is designed to provide the lowest possible cost of ownership and maximum energy efficiency throughout its operation.

R1 dryer model consumption/year

<table>
<thead>
<tr>
<th>Year model</th>
<th>consumption/kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>NXC 0325 cycling</td>
<td>37,422 kW</td>
</tr>
<tr>
<td>NXC 0325 direct</td>
<td>25,689 kW</td>
</tr>
<tr>
<td>NXC 0325 thermal</td>
<td>18,036 kW</td>
</tr>
</tbody>
</table>

Nano R1 dryers are eligible for rebates in many parts of the country. By purchasing a Nano purifier, you can take advantage of these incentives and save money on your energy costs.

clean and dry

Clean and dry compressed air is essential in every efficient and profitable manufacturing and process application worldwide. Nano offers a complete range of products, including dryers, filters, and accessories, to ensure that you have the cleanest possible air for your specific application.

R1 dryer model energy savings

<table>
<thead>
<tr>
<th>Year model</th>
<th>energy savings/kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>NXC 0325 cycling</td>
<td>27,422 kW (72.4%)</td>
</tr>
<tr>
<td>NXC 0325 direct</td>
<td>17,433 kW (72.4%)</td>
</tr>
<tr>
<td>NXC 0325 thermal</td>
<td>10,445 kW (72.4%)</td>
</tr>
</tbody>
</table>

In most applications, the air flow demand is a function of both required air flow and ambient conditions. The R1 dryer is capable of optimizing energy consumption according to the air flow variations during the day.

<table>
<thead>
<tr>
<th>Air flow</th>
<th>Energy Consumption according to Air Flow Variations during the Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>14.0 hours 13.44 kWh 0.00 kWh</td>
</tr>
<tr>
<td>25%</td>
<td>5.0 hours 4.80 kWh 2.40 kWh</td>
</tr>
<tr>
<td>50%</td>
<td>1.5 hours 1.44 kWh 0.72 kWh</td>
</tr>
<tr>
<td>75%</td>
<td>0.5 hours 0.68 kWh 0.48 kWh</td>
</tr>
<tr>
<td>100%</td>
<td>14.0 hours 13.44 kWh 0.00 kWh</td>
</tr>
<tr>
<td>Daily total</td>
<td>26.0 hours 22.04 kWh 6.68 kWh</td>
</tr>
</tbody>
</table>

The advanced dual transfer technology in the R1 dryer allows it to automatically reduce its power consumption to meet the actual demand saving you up to 80% over a traditional dryer. As a result, the R1 energy saving cycling dryer is eligible for rebates in any part of the country.

Dryer demand is a function of both required air flow and ambient conditions. Unless both of these variables are at their maximums at the same time, there are energy savings to be had.

1. In demanding applications, such as large facilities, the R1 dryer can save up to 80% of base power consumption.
2. In extreme conditions, the R1 dryer can save over 90% of base power consumption.
3. The R1 dryer is designed to provide the lowest possible cost of ownership and maximum energy efficiency throughout its operation.

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nano R™ sizing & specifications

nano R™ uses a patented heat exchanger comprising of a separate air to air multi-tubular exchanger and an air to refrigerant exchanger immersed in an environmentally friendly and highly efficient silica dry thermal mass. This unique combination provides the best dew point performance, the fastest response times if demand increases suddenly and the lowest power consumption across the entire spectrum of operation.

**energy savings**

- Consistent dew point and low pressure drop
- Environmentally friendly R134A or R407C refrigerant and non-toxic silica dry mass utilized in all models
- Water cooled condensers - optional

**optimum energy efficiency**

- Lower electrical consumption from 0% to 100% duty cycle
- Easy to install and start-up
- Thanks to the silica dry thermal mass, precooling of thermal mass is required

**space saving design**

- Fully packaged into a simple compact design, NXC
- All panels can be removed to facilitate maintenance
- Total accessibility

**Cycling refrigerated compressed air dryers**

- Flow capacity: 20 - 2000 scfm (32 - 3210 Nm³/hr)

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**next generation**

**nano R™ dry thermal mass**

- Saves energy and money by utilizing dual transfer technology (DTT). NXC employs DTT which treated the compressed air according to actual air flow

**direct transfer:**

- Cold refrigerant comes into direct contact with the compressed air through the unique patented copper/aluminum heat exchanger making for the most efficient cooling method during periods of high air usage

**indirect transfer:**

- Excess refrigerant cools down the unique dry thermal mass allowing the compressor to cycle off during periods of lower compressed air consumption. This cycling feature ensures excellent dew point performance and low power consumption.

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**Table of Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>1/2”</th>
<th>1”</th>
<th>1-1/2”</th>
<th>2”</th>
<th>2-1/2”</th>
<th>3”</th>
<th>4”</th>
<th>5”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
<th>12”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal inlet pressure (psig)</td>
<td>58</td>
<td>72</td>
<td>87</td>
<td>100</td>
<td>115</td>
<td>130</td>
<td>145</td>
<td>160</td>
<td>175</td>
<td>190</td>
<td>204</td>
<td>218</td>
</tr>
<tr>
<td>Nominal outlet pressure (psig)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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</tr>
<tr>
<td>Nominal inlet temperature (°F)</td>
<td>85</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td>105</td>
<td>110</td>
<td>115</td>
<td>120</td>
<td>125</td>
<td>130</td>
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<tr>
<td>Nominal inlet temperature correction factor</td>
<td>1.39</td>
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<td>1.18</td>
<td>1.08</td>
<td>0.93</td>
<td>0.72</td>
<td>0.57</td>
<td>0.53</td>
<td>0.50</td>
<td>0.46</td>
<td>0.41</td>
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<tr>
<td>Nominal outlet temperature (°F)</td>
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<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
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<tr>
<td>Nominal outlet temperature correction factor</td>
<td>1.29</td>
<td>1.33</td>
<td>1.39</td>
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<td>1.75</td>
<td>1.82</td>
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<td>2.06</td>
</tr>
</tbody>
</table>

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**Warranty**

- 2 year warranty with pre-filtration and non-corrosive piping installed

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**Contact Information**

- NANO-PURIFICATION SOLUTIONS
  - USA: Charlotte, NC 28269
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**Publication Reference**

- nano R™ Generation 1
- Title: Cycling refrigerated compressed air dryers
- Publication: 16-03-us
- For specific details, contact support@n-psi.com

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**Web**: www.n-psi.com