

Nirvana Cycling REFRIGERATED AIR DRYER 150 SCFM, Model D255NC

Point of Manufacture – West Chester, PA, USA

Industrial Technologies
Davidson, NC 28036

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Cancels: All Previous

NIRVANA CYCLING PRODUCT SPECIFICATION

SCOPE

This specification describes a complete mechanical refrigerated drying system for the removal of moisture, oil aerosols and other contaminants from a compressed air stream. This is accomplished by cooling the air to a temperature at which the contaminants condense and are separated from the stream. The dryer shall be complete shall only require connection to utilities furnished by others.

OPERATING CONDITIONS & PERFORMANCE DATA

The dryer shall be rated for the following conditions:

Inlet Air Flow: XXX SCFM

Inlet Air Pressure: 100 psig

Inlet Air Temperature: 100 °F

Ambient Temperature: 100 °F

Outlet Pressure Dew Point: 38 °F

The maximum design pressure shall be 300 psig.

Internal and External Air Side Connections

All airside connections are made with 1-1/2" NPT for 60Hz designs and 50Hz designs. The piping connecting to the heat exchangers is carbon steel.

Electrical Connections

115V/1/60Hz dryers are supplied with a three wire, 115V cord assembly as standard.

COMPONENTS AND CONSTRUCTION

Each dryer shall be complete with the following items:

1. Precooler/Reheater exchanger.

2. Cycling refrigerated chiller
3. Refrigeration systems equipped with independent fully-hermetic compressor and air-cooled condensers.
4. Centrifugal air/moisture separator.
5. Timer solenoid condensate drain automatically discharges condensate.
6. Full cabinet enclosure to protect internal components.

PRECOOLER/REHEATER

Stainless steel heat exchangers precool the incoming compressed air using the exiting chilled, dry air allowing efficient heat exchange in the air to refrigerant circuit. The outgoing air, chilled to 38F, cools this incoming air and, while doing so, warms the exiting air to prevent condensation formation in the compressed air stream.

Air-to-air heat exchangers shall be designed to provide smooth, non-fouling exchange surfaces with minimal associated pressure drop.

CYCLING REFRIGERATED CHILLER

Compressed air from the precooler/reheater is delivered to the refrigerated chiller which consists of stainless steel heat exchangers, where heat from the compressed air is exchanged with the thermal mass fluid. Continuous circulation of the glycol mass permits consistent and reliable heat exchange allowing constant temperature and pressure dew point. The thermostatically controlled thermal mass allows the refrigeration

compressor to cycle on and off depending on the heat load to the dryer.

REFRIGERATION SYSTEM

The refrigeration system shall be designed to dry the rated amount of compressed air and will consist of one fully-hermetic reciprocating compressor, thermal mass circulation system, air-cooled condenser and refrigerant evaporator. Modulating device such as a hot-gas-bypass is not required. Refrigerant 404A shall be used to minimize environmental hazard.

Refrigeration System (Components) R404A Refrigerant

Environmentally friendly R404A, a non-ozone depleting refrigerant, is used in the Nirvana Cycling Dryer. R404A is not on any list for global obsolescence.

Compressor

A hermetically sealed reciprocating compressor is utilized throughout the Ingersoll Rand Nirvana Cycling design range. All compressors have primary external motor overload protection for single phase units or internal motor overload protection for three phase units. The compressor is installed on isolation mounts to reduce noise and vibration.

Piping

To ensure proper oil return to the compressor, all velocities through refrigeration piping meet or exceed the required specification.

Vibration isolation means have been added throughout the design to increase the refrigeration circuit's structural integrity by minimizing vibration transmissions and allowing for thermal expansion.

All suction-side refrigeration piping is covered with insulation to prevent condensation formation.

Thermal Mass Cooling System

The thermal mass cooling system consists of a thermal mass reservoir, thermal mass fluid and stainless steel evaporators. Evaporators shall exchange heat between the refrigerant and thermal mass fluid allowing the refrigerant compressor to cycle on and off automatically depending on the heat load to the dryer.

Thermal Mass Circulating System

Thermal mass fluid is transferred to the air heat exchanger via the thermal mass fluid pump. Pump shall be maintenance-free, cartridge circulator pump. Pump shall run continuously to maintain flow through the air chiller at all times.

CENTRIFUGAL AIR/MOISTURE SEPARATOR

A vertical air/moisture separator shall be located adjacent to the chiller section. Separation shall be performed at the coldest point in the system by means of centrifugal acceleration, expansion into an area of low velocity with isolated sump area and change of air flow direction. These separation mechanisms shall provide for separation efficiency in excess of 99%.

TIMED SOLENOID DRAIN

Condensate drain automatically discharges based on an adjustable timer setting that should be set basis the ambient conditions.

CONTROLS

The chiller section and refrigeration system shall be controlled and monitored by a thermostat to monitor and cycle the refrigeration system.

A suction pressure gauge, standard equipment, monitors the pressure of the refrigerant prior to entering the compressor.

A "High Temperature" alarm light indicates an elevated thermal mass temperature and will illuminate as the temperature approaches 50°F.

Lighted On-Off switch gives visual indication of dryer status.

Control System

The electrical enclosure includes both a solid-state compressor overload and fan motor overload protection (thermal and short circuit). The NEMA 1 electrical panel is ETL Listed to UL1995 and CAN/CSA C22.2 STD 236.

ENCLOSURE AND BASEPLATE

The fans, fan guards and cabinet form a NEMA 1 / IP 21 rated enclosure. Optional NEMA 4 enclosure is available.

The sheet metal enclosure is 16 and 18 gauge steel and is painted with electrostatically applied powder coat paint.

The metal cabinet is IR beige.

Paint specification:

Flexibility: ASTM D522

Adhesion: ASTM D3369 Method B

Hardness: 2H pencil hardness test to ASTM D3363

Impact Resistance: ASTM D2794

Salt spray and humidity resistance: ASTM B117, ASTM D2247

Surface Prep: SSPC-SP8

Dry Film Thickness (DFT): 2.0 - 3.0 MILS (typical)

Panel Filter (Optional)

An industrial grade panel filter is available for Nirvana Cycling dryers to help protect the refrigeration condenser from ingress of dust.

TESTING

Final package and functional testing is performed on all dryers:

- 100% electrical functionality test
- 100% tracer gas leak test to the refrigeration side
- 100% refrigeration leak test at designed system pressure and vacuum rate of rise leak test.
- 100% Airside pressure leak test at 125Psig /8.6 barg

All heat exchangers are trace gas leak tested at 550 psig / 37 barg.

All heat exchanger assemblies are leak tested at 275 psig / 19 barg and pressure tested under water for air leaks. All heat exchanger assemblies are tested under water at 400 psig / 27 barg for refrigerant leaks.

Conformance Compliance (60Hz)

The following codes shall apply:

- Performance Testing: ISO Guidelines, CAGI ADF-100
- Pressure Vessels: ASME Sec. 8, Div. 1 CRN/CSA (Canada)
- Electrical: NEMA 1 design is ETL Listed to UL1995 and CAN/CSA C22.2 STD 236.
- US/Canada/Mexico Free Trade: General Rule 2, Article 301-NAFTA
- ISO 8573.1 Class 4

WARRANTY

Standard Ingersoll Rand warranty is provided for the Nirvana Cycling Dryers, 50 and 60Hz designs.