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**PRODUCT SPECIFICATION**

**NCH Series NON-CYCLING REFRIGERATED AIR DRYER (75-200 SCFM)**

This Product Specification is for a complete mechanical refrigerated drying system for the removal of moisture, oil vapor and other contaminants from a compressed air or gas stream. This process is accomplished by cooling the gas with a refrigeration unit to a temperature at which the contaminants condense and are separated from the gas stream. The Specification includes information for a range of dryers that can be applied to air systems of varying sizes.

**SCOPE**

The dryer shall be complete in all respects, including integral component equipment, inter-connecting piping, wiring and controls. The dryer shall only require connection to utilities furnished by others.



For reference only

**EXCHANGER TECHNOLOGY**

The dryers shall be provided with a multi-function compact heat exchanger that is comprised of a pre-cooler / re-heater, chiller section, moisture separator, condensate discharge section, and internal flow path in a single device.

The heat exchanger sections are comprised of a stacked array of extruded aluminum plates that contain a plurality of uniform internal passages for optimal heat transfer. The plates are fully brazed to ensure that the fluid flow paths are properly segregated.

The pre-cooler / re-heater and chiller sections are brazed to aluminum end-plates which unify the assembly and create the internal flow path through the entire exchanger assembly.

**COMPONENTS AND CONSTRUCTION**

Each dryer system shall be complete with the following items:

* Integral heater exchanger that incorporates a Pre-cooler / Re-heater exchanger, chiller section (direct expansion – refrigerant to air), condensate removal section, and internal flow path section.
* Refrigeration system equipped with hermetically sealed compressor and air cooled condensing system
* Electric solenoid drain with clean out port
* Full featured electronic controller with LED display and digital temperature sensors.

**PRECOOLER / REHEATER SECTION**

The air-to-air heat exchanger shall simultaneously pre-cool the incoming hot & saturated compressed air stream and reheat the outgoing compressed air utilizing the cool air leaving the chiller section. The pre-cooler / re-heater reduces the compressor capacity required for drying the compressed airstream.

**CHILLER SECTION**

The chiller section of the heat exchanger is comprised of two isolated fluid circuits; i.e. compressed air and refrigerant.

The cooled compressed air leaving the pre-cooler / re-heater section enters the chiller section via an internal flow path between each section.

**CHILLER SECTION (Continued)**

The compressed airstream is then cooled through a heat transfer process as it contacts the cold surface of the chiller section. The cold surface is generated by the cold refrigerant gas which is continuously circulated through the other side of the chiller section in a counter flow fluid path.

As the air temperature is lowered, the pressure dew-point will be reduced as moisture is condensed from the airstream. As the air and moisture exits the chiller section, the condensate will then separate through gravity and collect at the bottom of the sump.

The cool, dried airstream is then directed to the inlet of the pre-cooler / re-heater section after this process.

The refrigeration system will operate continuously to meet varying compressed air load conditions (based on a properly sized dryer) and the unit is provided with controls to bypass capacity at lower load conditions.

**CONDENSATE REMOVAL**

Condensate that is removed from the air stream by mechanical cooling is designed to collect at the bottom of the internal sump. The condensate is discharged from the sump through a solenoid drain that is operated by the main unit controller.

**REFRIGERATION SYSTEM**

The refrigeration system shall be designed to dry a set amount of compressed air. The refrigeration system shall consist of one hermetic reciprocating type compressor, refrigerant feed system, and air cooled condensing system.

The dryer controller will modulate the speed of the condenser fan to automatically maintain a pre-defined evaporator temperature at varying load conditions from no-load to full load.

A hot gas bypass valve is also provided on the 150 & 200 SCFM models as an additional means of capacity control. The hot gas bypass valve incorporates external pressure equalization and a remote temperature measurement bulb that provides for stable refrigerant control in a compact design. The hot gas valve shall be factory set and incorporates an adjustment feature.

Refrigerant R-134A shall be used to minimize environmental hazard. The refrigeration system shall be designed with a critical charge in order to minimize the amount required and the system shall be charged to a pre-determined weight.

**CONTROLS AND INSTRUMENTATION**

The dryer shall be provided with an electronic controller that automatically operates the refrigeration system, modulates the condenser fan, and the timed operation of the condensate drain valve. The controller shall utilize a temperature sensor to continuously monitor the temperature of the liquid refrigerant line in order to:

* Modulate the condenser fan speed in order to maintain a pre-set evaporator temperature at varying load conditions.
* Protect against freezing of the evaporator

A high pressure cut-out switch shall be provided to disable the refrigeration system in the event of a failure with the condenser fan or if the condenser becomes clogged with debris. This switch also meets the safety criteria defined by the UL safety standard for refrigeration system design.

The controller shall be provided with a display that provides operational status and functional alarms and incorporate function keys that permit the user to activate the dryer for operation, adjust drain timing settings, and activate the solenoid drain valve.

END PRODUCT SPECIFICATION