Annual cost of operation based on:

- Air flow: 1000 scfm
- Cost of power: $0.10 kWh
- Operating time: 8000 hours

Where Ideas Meet Industry

Pneumatic Products’ NRG-LES Series heat of compression desiccant air dryers provide a cost effective solution to remove moisture from compressed air. The sustainable energy saving design reduces operating costs and delivers instrument quality air.

Thermal energy generated during the air compression process is effectively utilized to regenerate the off-line desiccant bed. Ideally suited for oil-free air compressors, NRG-LES Series dryers turn “waste heat” into energy savings.

Advantages:

- Delivers ISO 8573.1: 2010 Air Quality Class 2 to 4 pressure dew point (-40°F to +37°F), dependent on air compressor discharge temperature
- Minimal power required, providing low cost of operation and rapid return on investment
- Desiccant in the off-line tower is regenerated without the use of purge air, requiring no increase in air compressor capacity
- Low outlet pressure dew points achieved without the use of blowers or booster heaters
- Fully packaged, skid mounted design, provides ease of installation

Reduce Life Cycle Costs

The NRG-LES consumes under 50 watts, less than the power requirement of a typical lap-top computer.

The energy efficient design offers the lowest cost of operation as compared to conventional dehydration technology.
Better By Design

Standar Features:

- Pressure vessels are designed in accordance with the ASME Boiler and Pressure Vessel Code Section VIII Division 1
- ASME rated pressure relief valves control pressure build-up due to process upset
- Expanded metal personnel protection and hot pipe insulation provides added safety measures
- NEMA4/4X, IP66 rated controller, polycarbonate enclosure for protection in corrosive environments
- Flow models 350 to 450 scfm employ angle seat valves for reliable operation
- Flow models 600 to 10000 scfm utilize non-lubricated, high performance butterfly valves
- Front panel is equipped with left and right tower pressure gauges and moisture indicator for “at a glance” performance
- Towers are filled with high grade desiccant maintaining optimal performance under high temperatures
- 316 AISI stainless steel, brazed plate heat exchanger provides efficient cooling and corrosion resistance
- Fully insulated filter/separator removes bulk liquids and solid particles greater than 3.0 micron in size
- An electric demand drain serves as the primary drain, efficiently removing condensate without loss of air
- A timed electric drain acts as back-up, providing fail safe operation
- Factory mounted high temperature after-filter, rated for 450°F, removes solid particles 1.0 micron and larger

Options:

- Tower insulation
- Moisture sensing dew point demand control with alarm
- Valve failure to shift alarm
Putting Waste Heat to Good Use

**How the NRG-LES Series Works:**

1. Hot oil-free air, generated by the air compressor, is directed into the dryer by a high performance switching valve.
2. The hot air flows downward through the off-line tower, effectively regenerating the desiccant bed.
3. Hot, moist air then travels to the water-cooled heat exchanger. The cooling water runs counter-flow to the hot air causing water vapor in the air to condense.
4. Condensed liquid is removed in a high performance, two-stage filter/separator. Bulk liquid and solid particles 3.0 micron and larger are captured.
5. Condensate is discharged by an energy efficient, no-air-loss demand drain. The system is equipped with a back-up drain providing fail safe operation.
6. The pre-cooled air flows upward through the on-line tower and is dried to the specified pressure dew point.
7. Air travels through a high temperature after-filter removing solid particles 1.0 micron and larger. Dry, oil-free air enters the system for use.
8. The cycle is reversed based on a one hour fixed time (30 minutes regenerating/30 minutes drying), or on an extended cycle. The cycle is extended based on the regenerating tower temperature or optional pressure dew point.
Understanding Dew Point Performance

The Air Compression Process
Site conditions are important when understanding dew point performance of heat of compression air dryers. The NRG-LES flow ratings are based on an ambient air temperature of 85°F (29°C) and 60% relative humidity. When compressed to 100 psig (7 bar) and heated to 350°F (160°C), the air leaving the compressor will possess a relative humidity of 3%. The dry, hot discharge air effectively regenerates the off-line desiccant bed.

The Effect of Regeneration Temperature
The NRG-LES utilizes recoverable heat energy from the air compressor to regenerate the off-line bed.

- Higher inlet air temperatures improve regeneration efficiency, delivering lower pressure dew points.
- Cooler inlet air temperatures decrease regeneration efficiency, delivering higher pressure dew points.

Performance Basis:
* Operating Pressure: 100 psig (7 bar)
* Ambient Air Temperature: 85°F (29°C)
* Ambient Relative Humidity: 60%
* Ambient Dew Point: 70°F (21°C)

Pressure Dew Point Performance

The chart above demonstrates the effect of cooling water temperature & compressor discharge temperatures to pressure dew point.

How to use the Dew Point Performance Chart:
1. Locate the cooling water temperature on the X-axis. Note: Inlet temperature to drying tower equals cooling water temperature plus 10°F.
2. Proceed vertically up the graph line to where the cooling water temperature and compressor discharge temperature intersect.
3. From this coordinate, advance laterally across the graph line to the Y-axis to determine pressure dew point (°F).

Example:
1. Cooling water temperature = 85°F
2. Compressor discharge temperature = 350°F
3. Resulting pressure dew point = -33°F
Ease of Monitoring

The NRG-LES controller is furnished with a comprehensive diagnostic system that provides real-time operating status, service due messages and fault conditions. Information is communicated in a highly visible, two (2) line—sixteen (16) character vacuum florescent text display screen. The controller is equipped with an RS 232 communications port and Modbus registers for remote monitoring.

**Status Text Display Screens**
- Tower drying (left/right)
- Tower regenerating (left/right)
- Hours to service (filters/valves/desiccant)
- Inlet air temperature (°F/°C)
- Outlet air temperature (°F/°C)
- Left tower temperature (°F/°C)
- Right tower temperature (°F/°C)

**Dryer Alarm Text Display Screens**
- Demand drain failure
- Low inlet air temperature (°F/°C)
- High drying temperature (°F/°C)
- Service due (filters/valves/desiccant)
- Temperature sensor failure

**Optional:**
- Outlet pressure dew point alarm (°F/°C)
- Valve position sensing- alarms on failure to shift

**Indicating Lights (LED)**
- Tower status (drying/regenerating)
- Power on (green)
- Master alarm light (red)
- Service due (amber)

**Panel Mounted Instrumentation**
- Left and right tower pressure gauges
- Color change moisture indicator

**Optional Dew Point Demand Control System**
A dew point demand control system automatically extends the drying cycle to compensate for changes in operating conditions. By sampling exit air from the drying tower, the Demand Control System delays tower switchover until the moisture content at the sample port rises to the predetermined set point.
### Product Specifications

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1 Flow ratings based on 100 psig operating pressure; 85°F cooling water; 95°F air temperature into drying tower.

2 Shipping weight includes factory mounted 1.0 micron after-filter.
## ISO Quality Classes

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<th>Air Quality</th>
<th>Solid Particles</th>
<th>Water</th>
<th>Oil</th>
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<td>Vapor Pressure Dew Point</td>
<td>Total Oil Concentration: Aerosol, Liquid and Vapor</td>
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<td>°F</td>
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## ISO Quality Class Performance:

NRG-LES with After-Filter
- Class 2: Solids
- Class 2-4: Pressure Dew Point

## Correction Factors

**Flow Multiplier for Dryer Selection**

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<tr>
<th>INLET TEMP TO DRYING TOWER °F (°C)</th>
<th>85°F (29°C)</th>
<th>90°F (32°C)</th>
<th>95°F (35°C)</th>
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* Inlet temperature to drying tower = cooling water temperature + 10°F

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