INDUSTRIAL REVERSE OSMOSIS SYSTEMS

(250 - GPM RO System)

- Industrial Reverse Osmosis
PRODUCT OVERVIEW

The NECO NRO-8H Series Industrial Reverse Osmosis Systems are engineered to economically produce high purity water by removal of dissolved minerals, bacteria, particles, and organic impurities. Each NRO machine is constructed using the highest quality components and materials for reliable operation and exceptional performance. Our standard machines are available with product water outputs from 25-200 GPM (36,000-288,000 GPD). Contact the factory for larger flow rate requirements.

NECO also offers a wide variety of machine options, pre/post treatment equipment, distribution pumps, and integrated controls for a complete water treatment system. Our specialty is skid mounted, pre-piped, and pre-wired equipment allowing for quick installation and start-up time. Other types of membrane technology are also available including two-pass, cellulose acetate (CA), nanofiltration (NF), and ultrafiltration (UF) for custom applications. NECO engineers are ready to work with you to design a system meeting your water treatment requirements.

The following are just a few of the industrial applications that benefit from the use of reverse osmosis water:

- Boiler Feedwater
- Chemical Manufacturing
- Metal Plating / Finishing
- Ice-Making
- Bottled Water
- Small Municipalities
- Electronics Manufacturing
- Ink / Dye Production
- Food / Beverage Production
- Deionizer Pre-Treatment
SYSTEM FEATURES

**Skid and Frame Assembly**
All membrane systems are manufactured in a skid / frame design providing for ease of installation with minimum floor space requirement. Constructed of welded structural carbon steel tubing, finished with corrosion resistant epoxy paint coating. Stainless steel fastener hardware is standard for corrosion resistance.

**Cartridge Pre-Filtration Vessel**
Pre-filtration of the membrane feed is standard on all systems. Filter housing is constructed of 304 stainless steel. Filter cartridges are pure polypropylene with a 5.0-micron nominal rating.

**System Pressure Pump**
Standard pressure pumps are constructed with a 304 / 316 stainless steel housings and impeller / diffuser stage assemblies. Pumps are equipped with TEFC motors wired for 230 / 460 VAC voltage and rated for full load, continuous duty.

**Membrane Pressure Vessels**
All systems feature membrane pressure vessels constructed of fiberglass reinforced polyester (FRP) with 316 stainless steel side-entry feed / concentrate ports. Standard vessels have a white polyurethane finish. Operating rating of pressure vessels is 400 psig. Higher pressure ratings and ASME code-stamping is available on all pressure vessels.

**Membrane Elements**
Standard reverse osmosis (RO) membrane elements are high rejection, thin-film composite (TFC) type in a spiral-wound configuration. Membrane elements are tested at 99.5% average salt rejection. All membrane elements carry a three-year warranty against defects in quality and workmanship.

**Instrumentation**
All systems feature a complete instrumentation package for optimal performance monitoring. Each of the following instruments are completely panel-mounted and pre-wired:
- Pre/Post cartridge filter pressure gauges
- RO feed/interbank pressure gauges
- Product/reject pressure gauges
- RO inlet/pump discharge pressure switches
- Product/reject electronic flow meters
- Product conductivity monitor
- System temperature indicator
- Pump run hour meter

**System Control**
Operations of the system are automatically controlled through a comprehensive programmable logic controller (PLC) package housed in a NEMA-4 industrial electrical enclosure. The control system also includes a pre-wired motor starter, operator switches / pushbuttons, and status / alarm indicator lights. Standard systems include the following isolated alarm conditions:
- Low inlet pressure
- High pump discharge pressure
- High RO product conductivity

**System Piping and Valves**
All membrane systems are completely pre-piped to the fullest extent and installation ready. Schedule 80 PVC is standard material for all piping and valves under 75 psig operating pressure. Higher pressure piping and valves are constructed of 304 stainless steel using. The following valves are provided as standard for accurate flow/pressure control and convenient operation:
- Automatic inlet valve to prevent water flow through machine during shutdown
- Pressure pump discharge throttle valve
- RO reject/recirculation flow control valves
- Automatic system flush valve for prevention of membrane fouling and scale formation
- Pre/Post cartridge filter housing isolation valves
- Inlet, product, and reject sampling valves
- Individual membrane housing product sampling valves.
- Isolation valves and blind ports for use with membrane cleaning systems

SYSTEM OPTIONS

**Machine Hardware**
- 304 stainless steel skid and frame assembly
- 316 stainless steel pre-filter housing
- 316 stainless steel high pressure piping / valves
- Premium efficient pressure pump motor

**Instrumentation**
- Digital inlet feed-water pH monitor/controller
- Digital inlet feed-water ORP monitor/controller
- Inlet feed-water hardness monitor
- Inlet feed-water turbidity monitor
- Silt Density Index (SDI) test assembly
- High RO product pressure alarm / shutdown
- RO product divert valve
- Touch-screen operator control monitor

**RO Product Storage and Distribution Systems**
- FRP and HDPE storage tanks with level controls
- Repressurization pumps and controls

**Pre-Treatment Systems**
- Multi-media filters
- Activated carbon filters
- Water softener systems
- Inlet feed-water pH adjustment chemical addition
- Inlet feed-water anti-scalant chemical addition
- Inlet feed-water dechlorination chemical addition
- Inlet feed-water heat exchanger systems

**Post-Treatment Systems**
- Two-bed and mixed-bed deionization
- UV sterilization
- Polishing cartridge filter housings

**Membrane Cleaning and Maintenance**
- Skid mounted membrane Clean-In-Place (CIP) systems
- RO product water membrane flush system
- RO system performance evaluation software.
SPECIFICATIONS NRO-8H SERIES

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Design Capacity</th>
<th>Element Quantity</th>
<th>Vessel Staging</th>
<th>RO Feed (gpm)</th>
<th>RO Reject</th>
<th>System Piping Connections</th>
<th>Operating Pressure</th>
<th>Pump Hp</th>
<th>Approx. Ship Wt.</th>
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<tbody>
<tr>
<td>NRO-36K-8H</td>
<td>25</td>
<td>6</td>
<td>1/1</td>
<td>31-33</td>
<td>6-8</td>
<td>1 1/2&quot; Flg. 1 1/2&quot; Flg. 1&quot; Flg.</td>
<td>250 psi</td>
<td>10</td>
<td>3000 lb.</td>
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<tr>
<td>NRO-50K-8H</td>
<td>35</td>
<td>9</td>
<td>1/1/1</td>
<td>44-47</td>
<td>8-12</td>
<td>2&quot; Flg. 1 1/2&quot; Flg. 1&quot; Flg.</td>
<td>240 psi</td>
<td>15</td>
<td>3300 lb.</td>
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<tr>
<td>NRO-72K-8H</td>
<td>50</td>
<td>12</td>
<td>2/1/1</td>
<td>62-67</td>
<td>12-17</td>
<td>2&quot; Flg. 2&quot; Flg. 1&quot; Flg.</td>
<td>250 psi</td>
<td>20</td>
<td>3500 lb.</td>
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<tr>
<td>NRO-94K-8H</td>
<td>65</td>
<td>16</td>
<td>2/1/1</td>
<td>81-87</td>
<td>16-22</td>
<td>2 1/2&quot; Flg. 2&quot; Flg. 1 1/2&quot; Flg.</td>
<td>250 psi</td>
<td>25</td>
<td>3900 lb.</td>
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<tr>
<td>NRO-115K-8H</td>
<td>80</td>
<td>20</td>
<td>2/2/1</td>
<td>100-107</td>
<td>20-27</td>
<td>2 1/2&quot; Flg. 2 1/2&quot; Flg. 1&quot; Flg.</td>
<td>250 psi</td>
<td>25</td>
<td>4100 lb.</td>
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<tr>
<td>NRO-144K-8H</td>
<td>100</td>
<td>24</td>
<td>3/2/1</td>
<td>125-133</td>
<td>24-32</td>
<td>2 1/2&quot; Flg. 2 1/2&quot; Flg. 1&quot; Flg.</td>
<td>250 psi</td>
<td>30</td>
<td>4500 lb.</td>
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<tr>
<td>NRO-180K-8H</td>
<td>125</td>
<td>30</td>
<td>3/2</td>
<td>156-167</td>
<td>31-42</td>
<td>3&quot; Flg. 3&quot; Flg. 2&quot; Flg.</td>
<td>240 psi</td>
<td>40</td>
<td>4900 lb.</td>
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<tr>
<td>NRO-216K-8H</td>
<td>150</td>
<td>36</td>
<td>4/2</td>
<td>175-167</td>
<td>35-47</td>
<td>3&quot; Flg. 3&quot; Flg. 2&quot; Flg.</td>
<td>240 psi</td>
<td>50</td>
<td>5100 lb.</td>
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<tr>
<td>NRO-252K-8H</td>
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<td>42</td>
<td>4/3</td>
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<td>40-53</td>
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<td>50</td>
<td>5500 lb.</td>
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<tr>
<td>NRO-288K-8H</td>
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<td>48</td>
<td>5/3</td>
<td>250-267</td>
<td>50-67</td>
<td>4&quot; Flg. 4&quot; Flg. 2&quot; Flg.</td>
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<tr>
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<td>225</td>
<td>54</td>
<td>5/4</td>
<td>281-300</td>
<td>56-75</td>
<td>6&quot; Flg. 4&quot; Flg. 3&quot; Flg.</td>
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<td>2 @ 40</td>
<td>6600 lb.</td>
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<td>NRO-360K-8H</td>
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<td>60</td>
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<td>313-333</td>
<td>63-83</td>
<td>6&quot; Flg. 4&quot; Flg. 3&quot; Flg.</td>
<td>255 psi</td>
<td>2 @ 40</td>
<td>7300 lb.</td>
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</table>

* Contact factory for flow rates beyond 250-gpm.

OVERALL SYSTEM DIMENSIONS

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Length A</th>
<th>Width B</th>
<th>Height C</th>
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<tr>
<td>NRO-36K-8H</td>
<td>146&quot;</td>
<td>40&quot;</td>
<td>82&quot;</td>
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<tr>
<td>NRO-50K-8H</td>
<td>146&quot;</td>
<td>40&quot;</td>
<td>82&quot;</td>
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<td>146&quot;</td>
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<td>94&quot;</td>
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<td>86&quot;</td>
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<td>86&quot;</td>
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<tr>
<td>NRO-360K-8H</td>
<td>274&quot;</td>
<td>76&quot;</td>
<td>86&quot;</td>
</tr>
</tbody>
</table>

* Requires minimum of 45" additional length on each side of the skid for membrane installation or removal.

OPERATING PARAMETERS

- Operating Pressures: 240 – 255 psig (at projected 3 yr. membrane age)
- Minimum system inlet feed pressure: 30 psig
- Operating temperature range: 50 – 80° F. (10 – 27° C.)
- Maximum inlet free chlorine: <0.1 ppm
- Maximum inlet silt density index (SDI): 3.0
- Standard electrical power: 460 VAC, 3-phase, 60 Hz.
- Nominal system TDS reduction: 95% – 99%
- Nominal system overall recovery rate (product/feed): 75% – 80%
- Projected performance and operations based on inlet feed of 2000 ppm TDS.

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