Nel Hydrogen Electrolysers

The World’s Most Efficient and Reliable Electrolysers
Empowering generations with clean energy forever is the vision of Nel Hydrogen.

Our technology allows people and businesses to make everyday use of hydrogen, the most abundant element in the universe.

Nel Hydrogen Electrolysers

With more than 3,500 reliable, cost efficient electrolysers installed around the globe, Nel Hydrogen is the recognized industry leader of Alkaline and PEM water electrolysis.

Since our founding in 1927, sustained R&D efforts have contributed to continual improvement of electrolyser technology, setting the benchmark in the market. Our electrolysis technology is today widely respected for its robustness, reliability and energy efficiency.

Our water electrolysers make a superior choice for Industry, Transport and Power-to-X applications. Multiple, scalable, flexible, modular product ranges are set to meet any customer requirements.
The Atmospheric Alkaline Hydrogen Plant

Nel Hydrogen Atmospheric Alkaline water electrolysers consist of standard modules of proven technology, critical for a hydrogen production process that is efficient, safe and reliable.

TRANSFORMER/RECTIFIER

The transformer and rectifier convert the AC voltage supply into DC current input.

ELECTROLYSER

The electrolyser is of the filter press type with bipolar electrodes separated by non-asbestos diaphragms. Hydrogen gas is generated at the cathode and the oxygen gas at the anode.

ELECTROLYTE SYSTEM

This module consists of two gas separators and the electrolyte recirculation system. The electrolyte is recovered in the separators, then chilled and recycled into the cell block.

SCRUBBER

The scrubber has 3 main functions:
- Remove residual traces of electrolyte
- Cool down the hydrogen
- Feed water tank

GAS HOLDER

The gas holder is a buffer tank installed between the electrolyser and the compressor or the process at site.

COMPRESSOR

If required, a compressor is installed to compress the gas from atmospheric pressure in the gas holder to the pressure required for the process or the storage vessel.
Electrolysis is the process of splitting the water molecule into hydrogen and oxygen using electricity. The inputs to this process are simply feed water and the current supplied to the electrolyser.

**DEOXIDIZER**

Hydrogen generated in the electrolyser is a very pure gas, saturated with water, and its oxygen content doesn’t exceed 0.2%. If higher purity is required, the last molecules of oxygen can be removed by catalytic reaction in a deoxidizer.

**DRYER**

The dryer will dry the gas to reach the suitable dew point. It consists of twin towers filled with a desiccant to absorb the water.

**H₂ STORAGE**

The gas storage provides a back-up solution or ensures the hydrogen make-up for batch applications with uneven gas consumption.

The world’s most energy efficient electrolyzers, the A Series features a cell stack power consumption as low as 3.8 kWh/Nm³ of hydrogen gas produced, up to 2.2 MW per stack. A Series electrolyzers can produce up to 3,880 Nm³/h of hydrogen or just over 8 ton per day. This robust system can be containerized, offering one of the world’s smallest footprints for high capacity electrolyser plants at 200 barg.

In some situations, customers may not have the plant space available to house a large scale electrolyser. At other times customers may want to configure an electrolyser for easy installation. That is where containerization can help. Our AC150 and AC300 units can be delivered and sited in free standing containers for maximum flexibility.
Tailored Solutions

Atmospheric Alkaline Electrolysers

The A Series represents the most reliable and efficient electrolysers in the world. Our modular concept enables us to deliver customized indoor hydrogen solutions for any application, configuration and size – anywhere. Nel Hydrogen tailors each delivery to any customer requirement, from complete installation of the entire electrolyser plant, to delivery of specific modules according to customer preferences.

Turnkey Solutions

Containerized Alkaline Electrolysers

The AC150 and AC300 wrap world-class electrolyser technology in containers, for fast and robust outdoor installations. This innovative, compact design makes a superior turnkey solution, with an output pressure of 30 barg/200 barg. Typical applications include on-site hydrogen gas supply for fueling stations and industrial processes.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>AC150</th>
<th>AC300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Production Rate</td>
<td>150 Nm³/h</td>
<td>300 Nm³/h</td>
</tr>
<tr>
<td>Production Capacity Dynamic Range</td>
<td>15-100% of flow range</td>
<td>15-100% of flow range</td>
</tr>
<tr>
<td>Power Consumption at Stack</td>
<td>3.8-4.4 kWh/Nm³</td>
<td>3.8-4.4 kWh/Nm³</td>
</tr>
<tr>
<td>O₂-Content in H₂</td>
<td>&lt; 2 ppm v</td>
<td>&lt; 2 ppm v</td>
</tr>
<tr>
<td>H₂O-Content in H₂</td>
<td>&lt; 2 ppm v</td>
<td>&lt; 2 ppm v</td>
</tr>
<tr>
<td>Delivery Pressure</td>
<td>30 barg/200 barg</td>
<td>30 barg/200 barg</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footprint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container 1 – W x D x H</td>
<td>12 m x 2.9 m x 3.6 m</td>
<td>13 m x 2.9 m x 3.6 m</td>
</tr>
<tr>
<td>Container 2 – W x D x H</td>
<td>9 m x 2.9 m x 3.2 m</td>
<td>9 m x 2.9 m x 3.2 m</td>
</tr>
<tr>
<td>Container 3 – W x D x H</td>
<td>NA</td>
<td>9 m x 2.9 m x 3.2 m</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>(-25)-35⁰ C</td>
<td>(-25)-35⁰ C</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>25% KOH aqueous solution</td>
<td>25% KOH aqueous solution</td>
</tr>
<tr>
<td>Feed Water Consumption</td>
<td>0.9 l/Nm³</td>
<td>0.9 l/Nm³</td>
</tr>
</tbody>
</table>

For reference only – specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.

¹ Total power consumption will be higher and dependent upon system configuration.
Large Scale Hydrogen Plants

Whether you need large quantities of hydrogen for industrial purposes, or utilization of excess renewable energy for energy storage – we have experience in both fields!

Nel Hydrogen is the acknowledged expert in large scale electrolyzers. The very nature of the A Series is seamless capacity upsizing from medium to large scale hydrogen plants based on water electrolysis technology.

Our experience in large scale plants is exemplified through historical plants exceeding 30,000 Nm³/h, as well as the recent installation of new plants with an energy capacity of more than 60 MW.

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow Range Nm³/h</th>
<th>15-100% of flow range</th>
<th>3.8-4.4 kWh/Nm³</th>
<th>99.99-99.999%</th>
<th>&lt; 2 ppm v</th>
<th>1–200 barg</th>
<th>Total Power Consumption kW</th>
<th>Temp °C</th>
<th>KOH Solution %</th>
<th>Liquid Flow l/Nm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>A100</td>
<td>600-970 Nm³/h</td>
<td>15-100% of flow range</td>
<td>3.8-4.4 kWh/Nm³</td>
<td>99.99-99.999%</td>
<td>&lt; 2 ppm v</td>
<td>1–200 barg</td>
<td>115 – 155 kWh</td>
<td>5-35⁰ C</td>
<td>25% KOH</td>
<td>0.9 l/Nm³</td>
</tr>
<tr>
<td>A300</td>
<td>300-485 Nm³/h</td>
<td>15-100% of flow range</td>
<td>3.8-4.4 kWh/Nm³</td>
<td>99.99-99.999%</td>
<td>&lt; 2 ppm v</td>
<td>1–200 barg</td>
<td>75 – 100 kWh</td>
<td>5-35⁰ C</td>
<td>25% KOH</td>
<td>0.9 l/Nm³</td>
</tr>
<tr>
<td>A485</td>
<td>150-300 Nm³/h</td>
<td>15-100% of flow range</td>
<td>3.8-4.4 kWh/Nm³</td>
<td>99.99-99.999%</td>
<td>&lt; 2 ppm v</td>
<td>1–200 barg</td>
<td>35 – 50 kWh</td>
<td>5-35⁰ C</td>
<td>25% KOH</td>
<td>0.9 l/Nm³</td>
</tr>
<tr>
<td>A150</td>
<td>50-150 Nm³/h</td>
<td>15-100% of flow range</td>
<td>3.8-4.4 kWh/Nm³</td>
<td>99.99-99.999%</td>
<td>&lt; 2 ppm v</td>
<td>1–200 barg</td>
<td>10 – 15 kWh</td>
<td>5-35⁰ C</td>
<td>25% KOH</td>
<td>0.9 l/Nm³</td>
</tr>
<tr>
<td>A3880</td>
<td>2,400-3,880 Nm³/h</td>
<td>15-100% of flow range</td>
<td>3.8-4.4 kWh/Nm³</td>
<td>99.99-99.999%</td>
<td>&lt; 2 ppm v</td>
<td>1–200 barg</td>
<td>250 – 350 kWh</td>
<td>5-35⁰ C</td>
<td>25% KOH</td>
<td>0.9 l/Nm³</td>
</tr>
</tbody>
</table>

Tailored to any demand
- Turnkey solutions
- Large capacity at minimum footprint
- High pressure for storage and distribution
- Scaled to any capacity
- More efficient than any other electrolyser

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Total power consumption will be higher and dependent upon system configuration.
The Proton Exchange Membrane (PEM) Hydrogen Plant

Nel Hydrogen Proton® PEM water electrolysers are designed to meet the specific needs of high purity industrial applications. These state-of-the-art units offer turnkey solutions for the growing need for stable, cost-effective, high volume hydrogen supply.

**Transformer/Rectifier**

The transformer and rectifier convert the AC voltage supply into DC current input.

**Electrolyser**

The electrolyser is based upon proton exchange membrane technology. Hydrogen gas is generated at the cathode at elevated pressures up to 30 barg. Oxygen gas is produced at the anode at pressures close to ambient. The near infinite bubble point of the membrane prevents oxygen from entering the hydrogen stream. The full differential pressure design provides for safe, simple operation.

**M Series**

With minimal maintenance and siting requirements, M Series electrolysers can produce up to 4,000 Nm³/h of hydrogen gas at 99.9998% purity on-demand. Featuring a scalable modular design that can be containerized, these systems offer solutions that are well-suited for a variety of industrial, fueling and renewable energy applications.

**M Series – Containerized**

In situations where plant space is at a premium, customers may want to site their electrolysers outside. At other times customers may want to configure an electrolyser for a more turnkey operation. To satisfy those needs, we suggest containerization. All M Series units can be delivered and sited in free standing containers for maximum flexibility.
Electrolysis is the process of splitting the water molecule into hydrogen and oxygen using electricity. The inputs to this process are simply feed water and the current supplied to the electrolyser.

**DRYER**

The dryer will dry the gas to reach the suitable dew point. It consists of multiple beds filled with a desiccant to absorb the water.

**H₂/WATER SEPARATOR**

The H₂/Water Separator removes liquid water from the high pressure hydrogen and safely recycles it back to the system water tank.

**H₂ STORAGE**

The gas storage provides a back-up solution or ensures the hydrogen make-up for batch applications with uneven gas consumption.

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**C Series**

The C Series electrolysers are ideal for a variety of industrial applications. Producing up to 30 Nm³/h of hydrogen gas at 99.998% purity, these units replace the need for hydrogen tube trailers or liquid hydrogen storage. They can be containerized, offering facilities flexible siting and reduced operational safety risks associated with delivered hydrogen.

**H Series**

H Series electrolysers offer turnkey solutions for small-scale applications requiring up to 6 Nm³/h of hydrogen gas at 99.9995% purity. These units make a minimal impact to facility floor space, are easy to maintain and can be installed within hours.

**S Series**

Producing high purity hydrogen of 99.9995% at up to 1.05 Nm³/h, S Series electrolysers replace the need for pressurized hydrogen cylinders in a variety of industrial processes. Each unit is low maintenance, compact, quiet, and can be installed within hours virtually anywhere in a facility.
Tailored Solutions

Proton PEM Electrolysers

The M Series provides fast response times and production flexibility making it ideal for hydrogen generation utilizing renewable power sources. The M Series compact modular skid based platform can be scaled to fit any customer requirement and application.

Turnkey Solutions

Containerized Proton PEM Electrolysers

MC electrolysers deliver the M Series platform in a containerized form for easy outdoor installations. The M Series Proton PEM Technology makes for a reliable and turnkey solution with minimal maintenance. Typical applications include renewable energy storage, industrial process gas, and hydrogen fueling.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>MC100</th>
<th>MC200</th>
<th>MC400</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Production Rate</strong></td>
<td>103 Nm³/h</td>
<td>207 Nm³/h</td>
<td>413 Nm³/h</td>
</tr>
<tr>
<td><strong>Production Capacity Dynamic Range</strong></td>
<td>10-100%</td>
<td>10-100%</td>
<td>10-100%</td>
</tr>
<tr>
<td><strong>Average Power Consumption at Stack</strong></td>
<td>4.53 kWh/Nm³</td>
<td>4.53 kWh/Nm³</td>
<td>4.53 kWh/Nm³</td>
</tr>
<tr>
<td><strong>Purity</strong> – with optional high purity dryer</td>
<td>99.9998%</td>
<td>99.9998%</td>
<td>99.9998%</td>
</tr>
<tr>
<td><strong>O₂-Content in H₂</strong></td>
<td>&lt; 1 ppm v</td>
<td>&lt; 1 ppm v</td>
<td>&lt; 1 ppm v</td>
</tr>
<tr>
<td><strong>H₂O-Content in H₂</strong></td>
<td>&lt; 2 ppm v</td>
<td>&lt; 2 ppm v</td>
<td>&lt; 2 ppm v</td>
</tr>
<tr>
<td><strong>Delivery Pressure</strong></td>
<td>30 barg</td>
<td>30 barg</td>
<td>30 barg</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Footprint</strong></td>
<td>3.5 m x 3 m x 3 m</td>
<td>3.5 m x 3 m x 3 m</td>
<td>4 m x 3.5 m x 3.5 m</td>
</tr>
<tr>
<td><strong>Rectifier Transformer Area – W x D x H</strong></td>
<td>12.2 m x 2.5 m x 3 m</td>
<td>12.2 m x 2.5 m x 3 m</td>
<td>12.2 m x 2.5 m x 3 m</td>
</tr>
<tr>
<td><strong>Electrolyser Container – W x D x H</strong></td>
<td>12.2 m x 2.5 m x 3 m</td>
<td>12.2 m x 2.5 m x 3 m</td>
<td>12.2 m x 2.5 m x 3 m</td>
</tr>
<tr>
<td><strong>Power Supply Container – W x D x H</strong></td>
<td>(-20)-40⁰ C</td>
<td>(-20)-40⁰ C</td>
<td>(-20)-40⁰ C</td>
</tr>
<tr>
<td><strong>Ambient Temperature</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrolyte</strong></td>
<td>Proton Exchange Membrane</td>
<td>Proton Exchange Membrane</td>
<td>Proton Exchange Membrane</td>
</tr>
<tr>
<td><strong>Feed Water Consumption</strong></td>
<td>0.9 l/Nm³</td>
<td>0.9 l/Nm³</td>
<td>0.9 l/Nm³</td>
</tr>
</tbody>
</table>

For reference only – specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.

M Series electrolysers are available from 103-413 Nm³/h, in increments of ~ 50 Nm³/h. Contact Nel Hydrogen for details.

1 Total power consumption will be higher and dependent upon system configuration.

2 Additional low ambient and high ambient temperature options available for MC units.
Large Scale Hydrogen Plants

Large scale renewable energy storage, grid management or industrial applications that demand fast response times or compressor-less operation should consider our Proton PEM hydrogen plant for their hydrogen production needs.

Nel Hydrogen is the acknowledged expert in large scale electrolysers. The M Series modular skid based platform enables flexible plant configuration and installation for medium to large scale hydrogen plants based on water electrolysis technology.

<table>
<thead>
<tr>
<th>Model</th>
<th>Power (Nm³/h)</th>
<th>Efficiency (10-100%)</th>
<th>Hydrogen (4.53 kWh/Nm³)</th>
<th>Purity (99.9998%)</th>
<th>Impurities (&lt; 1 ppm v, &lt; 2 ppm v)</th>
<th>Pressure (30 barg)</th>
<th>Dimensions (~m²)</th>
<th>Maintenance (NA)</th>
<th>Temperature (10-40⁰ C)</th>
<th>Membrane Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>M100</td>
<td>103 Nm³/h</td>
<td>10-100%</td>
<td>4.53 kWh/Nm³</td>
<td>99.9998%</td>
<td>&lt; 1 ppm v, &lt; 2 ppm v</td>
<td>30 barg</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Proton Exchange Membrane</td>
</tr>
<tr>
<td>M200</td>
<td>207 Nm³/h</td>
<td>10-100%</td>
<td>4.53 kWh/Nm³</td>
<td>99.9998%</td>
<td>&lt; 1 ppm v, &lt; 2 ppm v</td>
<td>30 barg</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Proton Exchange Membrane</td>
</tr>
<tr>
<td>M400</td>
<td>413 Nm³/h</td>
<td>10-100%</td>
<td>4.53 kWh/Nm³</td>
<td>99.9998%</td>
<td>&lt; 1 ppm v, &lt; 2 ppm v</td>
<td>30 barg</td>
<td>~160 m²</td>
<td>NA</td>
<td>NA</td>
<td>Proton Exchange Membrane</td>
</tr>
<tr>
<td>M4000</td>
<td>4,000 Nm³/h</td>
<td>10-100%</td>
<td>4.53 kWh/Nm³</td>
<td>99.9998%</td>
<td>&lt; 1 ppm v, &lt; 2 ppm v</td>
<td>30 barg</td>
<td>~540 m²</td>
<td>NA</td>
<td>NA</td>
<td>Proton Exchange Membrane</td>
</tr>
</tbody>
</table>
## Compact Scale Hydrogen Plants

The C, H and S Series electrolysers feature state-of-the-art PEM technology in compact forms. They are easy to site with most installations taking only hours.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Nominal Production Rate</th>
<th>Production Capacity Dynamic Range</th>
<th>Power Consumption by System</th>
<th>Purity</th>
<th>( \text{O}_2 )-Content in ( \text{H}_2 )</th>
<th>( \text{H}_2\text{O} )-Content in ( \text{H}_2 )</th>
<th>Delivery Pressure</th>
<th>Dimensions – ( \text{W} \times \text{D} \times \text{H} )</th>
<th>Ambient Temperature</th>
<th>Electrolyte</th>
<th>Feed Water Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C10</strong></td>
<td>10 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>6.2 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 2 ppm v</td>
<td>30 barg</td>
<td>2.5 m x 1.2 m x 2 m</td>
<td>5-40(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>C20</strong></td>
<td>20 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>6.0 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 2 ppm v</td>
<td>30 barg</td>
<td>2.5 m x 1.2 m x 2 m</td>
<td>5-40(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>C30</strong></td>
<td>30 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>5.8 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 2 ppm v</td>
<td>30 barg</td>
<td>2.5 m x 1.2 m x 2 m</td>
<td>5-40(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>H2</strong></td>
<td>2 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>7.3 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 5 ppm v</td>
<td>15 barg/30 barg option</td>
<td>1.8 m x 0.8 m x 1.9 m</td>
<td>5-50(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>H4</strong></td>
<td>4 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>7 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 5 ppm v</td>
<td>15 barg/30 barg option</td>
<td>1.8 m x 0.8 m x 1.9 m</td>
<td>5-50(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>H6</strong></td>
<td>6 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>6.8 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 5 ppm v</td>
<td>15 barg/30 barg option</td>
<td>1.8 m x 0.8 m x 1.9 m</td>
<td>5-50(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>S10</strong></td>
<td>0.27 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>6.1 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 5 ppm v</td>
<td>13.8 barg</td>
<td>0.8 m x 1 m x 1.1 m</td>
<td>5-40(^\circ) C/5-50(^\circ) C option</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>S20</strong></td>
<td>0.53 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>6.1 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 5 ppm v</td>
<td>13.8 barg</td>
<td>0.8 m x 1 m x 1.1 m</td>
<td>5-40(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
<tr>
<td><strong>S40</strong></td>
<td>1.05 ( \text{Nm}^3/\text{h} )</td>
<td>0-100%</td>
<td>6.1 kWh/( \text{Nm}^3 )</td>
<td>99.9995%&lt; 1 ppm v</td>
<td>&lt; 5 ppm v</td>
<td>13.8 barg</td>
<td>0.8 m x 1 m x 1.1 m</td>
<td>5-40(^\circ) C</td>
<td>Proton Exchange Membrane</td>
<td>0.9 l/( \text{Nm}^3 )</td>
</tr>
</tbody>
</table>

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Are You Next?

Hydrogen Business Development

Moving into hydrogen implies new territory and many opportunities. Investing in renewable hydrogen infrastructure requires solid solutions for operation, maintenance, ownership and financing. We realize technological advancement takes place in a wider context in which we can give advice, facilitate and play different roles.

Committed to the success of every customer, Nel Hydrogen has valuable experience across categories, covering most aspects of hydrogen entrepreneurship.

Nel Hydrogen builds hydrogen production facilities of all sizes and configurations. Our largest hydrogen plants to date: 135 MW. Challenge us, and we will be happy to discuss what solutions will fit your needs.

Markets We Serve

- Additive Manufacturing
- Ammonia and Fertilizer
- Chemical
- Crystal Growth
- Distributed Gasses
- Food and Drug
- Glass
- Laboratory
- Leak Detection
- Lower Flammability Limit (LFL) Detectors
- Meteorology
- Polysilicon
- Power Generation
- Refinery and Petrochemical
- Renewable Energy Grid Management
- Renewable Energy Storage
- Semiconductor
- Steel
- Thermal Processing
- Transport
Our World of Electrolysers
Case Studies

Southern California Gas
Country: United States
Product: C10
Capacity: 10 Nm³/h
Application: Power-to-Gas
Installed: 2016

Southern California Gas is the largest natural gas utility in the United States, and is part of the Sempra Group, which owns both gas and electric utility companies. This ground-breaking pilot project is the first implementation of power-to-gas in the United States, using surplus renewable electricity from the University of California Irvine (UCI) campus microgrid to power the C10 electrolyser. The hydrogen produced is then injected directly into the natural gas line feeding the combined cycle turbine generator at the campus central plant, thereby “greening” the fuel supply for power generation. As part of the project, the electrolyser has also been manipulated to respond to a variety of renewable energy profiles, showing the utility of the equipment for different energy storage use cases.

“UCI’s power-to-gas project is showing that there are technologies in development today that offer ways to drastically increase the use of environmentally sensitive wind and solar resources in power generation and delivery. It’s particularly rewarding to see this exciting technology being implemented and evaluated right here.”

Scott Samuelsen, Advanced Power and Energy Program Director and Professor of Mechanical and Aerospace Engineering

Illovo Sugar SA (Ltd)
Country: South Africa
Product: A485
Capacity: 360 Nm³/h
Application: Production of Furfuryl Alcohol
Installed: 1983

Illovo Sugar is Africa’s largest producer of sugar and downstream products. The hydrogen is used for the production of furfuryl alcohol. During a plant expansion in 1983, a Nel Hydrogen A485 with a capacity of 360 Nm³/h of hydrogen was purchased and commissioned.

“The original electrolyser is still in operation today and is extremely reliable. The electrolyser runs at full capacity 24 hours a day. No significant maintenance is required on the unit until the planned routine overhaul. Since sanctions were lifted in South Africa, Nel Hydrogen has been providing Illovo Sugar with spares and proficient professional expertise also through the company RTS that was appointed Nel Hydrogen representative in South Africa in 1996.”

Alastair Warman, Engineering Manager, Downstream Products

Industria de Aceite Fino S.A.
Country: Bolivia
Product: A300
Capacity: 300 Nm³/h
Application: Edible Oils & Fats
Installed: 2012

Industrias de Aceite Fino, part of the Peruvian Romero Group, is a manufacturer of edible oils and fats, margarine and soap. In 2012 they modernized their hydrogen-production by replacing five smaller electrolysers from various manufacturers with a new Nel Hydrogen A300.

“The refurbished electrolyser plant works perfectly for us. It is very easy and safe in operation compared to what we were used to. In addition we have made savings in our energy costs with this electrolyser.”

Cesar Campoverde, Production Manager

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Countries with installed Nel Hydrogen electrolysers

**ASKO Midt-Norge AS**

- **Country:** Norway
- **Product:** AC150
- **Capacity:** 150 Nm³/h
- **Application:** Transport – H₂ Mobility
- **Installed:** 2017

Norway’s largest grocery wholesaler, ASKO, is committed to becoming climate neutral through zero emission transportation. With more than 600 trucks on the road every day, ASKO is also one of the largest transport companies in the country. At their distribution hub in Trondheim, 3 Scania distribution trucks as well as 10 forklift trucks will run on hydrogen produced by Nel Hydrogen’s new containerized unit, the Nel AC150. In addition, a Nel Hydrogen H2Station® with 3 separate dispensers will fuel cars, trucks and forklift trucks.

“ASKO searched the market for producers who have built and commissioned larger hydrogen production plants and fueling station solutions with strong operating results, and after an extensive tendering process the choice fell on Nel.”

Jørn Arvid Endresen, CEO

**Guardian – Egyptian Glass Company**

- **Country:** Egypt
- **Product:** A150
- **Capacity:** 120 Nm³/h
- **Application:** Float Glass
- **Installed:** 1998

Guardian is one of the major global float glass manufacturers with numerous factories worldwide. As reliable supply of hydrogen is extremely critical for the continuous operation of these large glass factories, many companies install full redundancy on their electrolyser plant. Egyptian Glass has however been relying 100% on one electrolyser only – a Nel Hydrogen A150.

"Since the start-up of the plant in May 1998, we have enjoyed a stable production with high gas purity, without any problems whatsoever.”

Ihab Ishak, Utility Manager

**Northern Power Station, Port Augusta**

- **Country:** Australia
- **Product:** H2
- **Capacity:** Total – 4 Nm³/h
- **Application:** Generator Cooling
- **Installed:** 2011

The Northern Power Station in Port Augusta is responsible for supplying up to 30% of South Australia’s power through two 260 MW turbines. They sought to reduce the number of cylinders used in their facility, and to ensure that gas was always available when needed. Two Nel Hydrogen Proton PEM H2 electrolysers with StableFlow® hydrogen control systems were installed. This simple installation provided NPS with a more cost-effective and safe option to cool their generators while improving the quality of their hydrogen gas.

"The electrolysers are very easy to maintain and we’ve met our objectives and improved the quality of our hydrogen gas.”

Darwin Chellanchamy, Production Manager