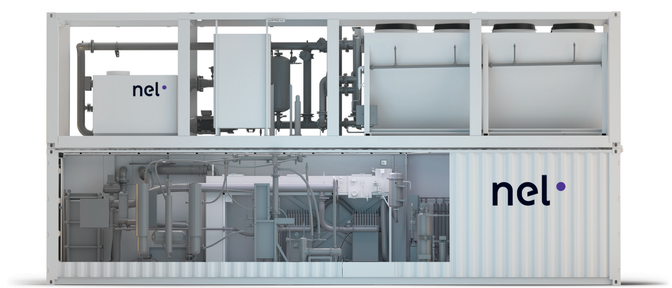
Containerized MW Scale Hydrogen Plants

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

With minimal maintenance and siting requirements, the MC Series electrolysers can produce up to 492 Nm^3/h of hydrogen gas at 99.999+% purity on-demand. Featuring a modular design with units that can be grouped together, these systems offer solutions that are well-suited for a variety of industrial applications.

SPECIFICATIONS		MC250 System	MC500 System
Net Production Rate		246 Nm^3/h – 531 kg/24 h	492 Nm^3/h – 1,061 kg/24 h
Turndown Range		10 to 100% (automatic)	10 to 100% (automatic)
Power Consumption at Stack at 100% Capacity[1]		4.5 kWh/Nm^3 – 51.2 kWh/kg	4.5 kWh/Nm^3 – 51.2 kWh/kg
Power Consumption by System at 100% Capacity[1]		5.0 kWh/Nm^3 – 56.8 kWh/kg	4.9 kWh/Nm^3 – 55.2 kWh/kg
Purity (concentration of impurities)		99.95% [H_2O < 500 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.95% [H_2O < 500 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]
Purity (concentration of impurities with optional high purity dryer)		99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]
Delivery Pressure		30 barg (435 psig)	30 barg (435 psig)
Dimensions W x D X H	Electrolyser Enclosure[2]	12.2 m x 2.5 m x 3 m (40 ft x 8 ft x 9.9 ft)	12.2 m x 2.5 m x 3 m (40 ft x 8 ft x 9.9 ft)
	Power Supply Enclosure	6.1 m x 2.5 m x 2.6 m (20 ft x 8 ft x 8.5 ft)	6.1 m x 2.5 m x 2.6 m (20 ft x 8 ft x 8.5 ft)
Ambient Temperature[3]		-20 to 40ºC (-4 to 104ºF)	-20 to 40ºC (-4 to 104ºF)
Electrolyte		Proton Exchange Membrane	Proton Exchange Membrane
Potable Water Consumption[4]		1.5 l/Nm^3 (0.4 gal/Nm^3) of H_2 15.9 l/kg of H_2 (4.2 gal/kg of H_2	1.5 l/Nm^3 (0.4 gal/Nm^3) of H_2 15.9 l/kg of H_2 (4.2 gal/kg of H_2

For reference only – specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.
[1] Dependent on configuration and operating conditions. [2] Plus vent, ground mounted HVAC and rooftop equipment, site specific.
[3] Additional low ambient and high ambient temperature options available. [4] Potable water quality can affect usage, see SFM1087.



Side cutaway view of MC500 Electrolyser Enclosure and optional Thermal Control System – installation may vary.

Find the Right Fit for Your Application

With more than 2,800 systems installed in over 75 countries and on all seven continents, our PEM water electrolysers are creating value around the world. These hydrogen generators offer clear advantages over older, conventional methods of hydrogen delivery. Our industrial customers are able to realize a rapid payback while dramatically improving plant safety by minimizing storage and handling. Whether your need is for a large scale hydrogen plant or a compact system, our engineers will custom tailor a solution to match your application.

Markets We Serve

- Additive manufacturing
- Ammonia and fertilizer
- Cement
- Chemical
- Crystal growth
- Distributed gasses
- Food and drug
- Glass
- Iron and steel
- Laboratory
- Leak detection
- Lower flammability limit detectors
- Meteorology
- Mining
- Petrochemical and refining
- Polysilicon
- Power generation
- Semiconductor
- Thermal processing
- Transport

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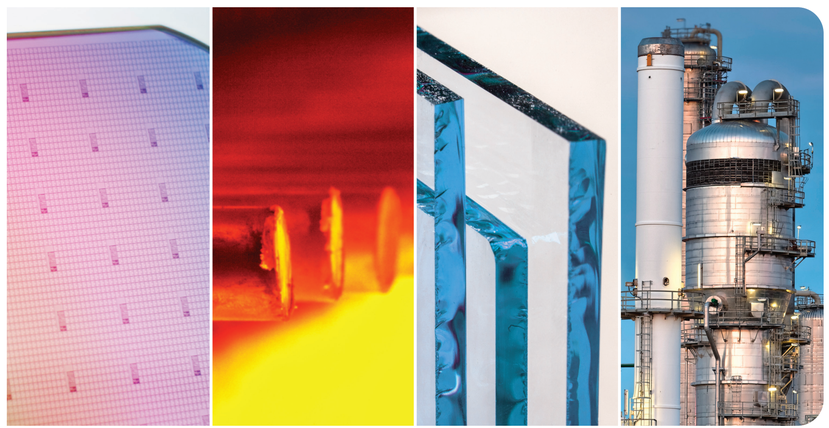
Hydrogen Generators

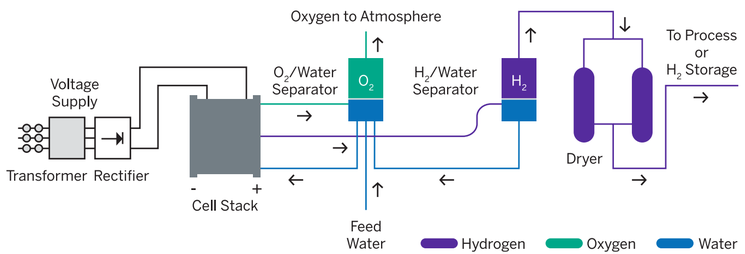


For High Purity Industrial Applications

number one by nature®

Proton Exchange Membrane (PEM) Hydrogen Generator

Nel Hydrogen PEM water electrolysers are designed to meet the specific needs of high purity industrial applications. They provide fast response times and production flexibility without producing carbon dioxide – carbon intensity of hydrogen reflects electrical energy input. These state-of-the-art units offer turnkey solutions for the growing need for reliable, cost-effective hydrogen supply.



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 electrical current supplied to the electrolyser.

TRANSFORMER/RECTIFIER

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

CELL STACK

The cell stack is based upon proton exchange membrane technology. Hydrogen gas is generated at the cathode at customer convenient pressures. Oxygen gas is produced at the anode at pressures close to ambient. The full differential pressure design provides for safe, simple operation.

H_2/WATER SEPARATOR

The H_2/Water Separator removes liquid water from the high pressure hydrogen and recycles it back to the system water tank.

DRYER

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

Compact Hydrogen Generators

The C, H and S Series water electrolysers feature state-of-the-art PEM technology in integrated, compact packages. They are easy to site in indoor areas.

- Pure hydrogen at process pressure – up to 30 barg (435 psig) hydrogen and 99.999+% purity, depending on unit
- Economical hydrogen supply – tracks with electric costs
- Increased safety – no caustic chemicals
- Virtually zero on-board hydrogen – less than one empty cylinder
- Small footprint – fraction of space needed compared to cylinders or trailers
- Reliable hydrogen generation – field-proven track record
- Fast and easy installation – place virtually anywhere in a facility
- Automated – safe, unattended operation
- Low maintenance – requires as little as 4 hours of maintenance per year

C Series

C Series electrolysers produce up to 30 Nm^3/h of hydrogen gas at 99.999+% purity. They are ideal for a variety of industrial applications. These units replace the need for hydrogen tube trailers or liquid hydrogen storage, reducing operational safety risks associated with delivered hydrogen. They are easy to install and operate.

H Series

H Series electrolysers offer turnkey solutions for small-scale applications requiring up to 6 Nm^3/h of hydrogen gas at 99.999+% purity. These units make a minimal impact on facility floor space and are easy to maintain.

S Series

S Series electrolysers produce up to 1.05 Nm^3/h of hydrogen gas at 99.999+% purity, They replace the need for hydrogen cylinders in a variety of industrial processes. Each unit is low maintenance, compact, quiet, and can be installed virtually anywhere in a facility.

SPECIFICATIONS		C10 System	C20 System	C30 System
Nominal Production Rate		10 Nm^3/h	20 Nm^3/h	30 Nm^3/h
Turndown Range		0 to 100% (automatic)	0 to 100% (automatic)	0 to 100% (automatic)
Power Consumption by System[1]		6.2 kWh/Nm^3	6.0 kWh/Nm^3	5.8 kWh/Nm^3
Purity		99.999+% [H_2O < 2 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 2 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 2 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]
Delivery Pressure		30 barg (435 psig)	30 barg (435 psig)	30 barg (435 psig)
Dimensions W x D x H	Electrolyser Enclosure	2.5 m x 1.2 m x 2 m (8.2 ft x 3.9 ft x 6.6 ft)	2.5 m x 1.2 m x 2 m (8.2 ft x 3.9 ft x 6.6 ft)	2.5 m x 1.2 m x 2 m (8.2 ft x 3.9 ft x 6.6 ft)
	Power Supply Enclosure	1.7 m x 1 m x 2 m (5.6 ft x 3.3 ft x 6.6 ft)	1.7 m x 1 m x 2 m (5.6 ft x 3.3 ft x 6.6 ft)	1.7 m x 1 m x 2 m (5.6 ft x 3.3 ft x 6.6 ft)
Ambient Temperature		5 to 40ºC (41 to 104°F)	5 to 40ºC (41 to 104°F)	5 to 40ºC (41 to 104°F)
Electrolyte		Proton Exchange Membrane	Proton Exchange Membrane	Proton Exchange Membrane
Feed Water at Maximum Production		9 l/h (2.4 gal/h)	17.9 l/h (4.7 gal/h)	26.9 l/h (7.1 gal/h)

SPECIFICATIONS	H2 System	H4 System	H6 System
Nominal Production Rate	2 Nm^3/h	4 Nm^3/h	6 Nm^3/h
Turndown Range	0 to 100% (automatic)	0 to 100% (automatic)	0 to 100% (automatic)
Power Consumption by System[1]	7.3 kWh/Nm^3	7.0 kWh/Nm^3	6.8 kWh/Nm^3
Purity	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]
Delivery Pressure[2]	15 barg (218 psig)	15 barg (218 psig)	15 barg (218 psig)
Dimensions – W x D x H	1.8 m x 0.8 m x 1.9 m (5.9 ft x 2.6 ft x 6.2 ft)	1.8 m x 0.8 m x 1.9 m (5.9 ft x 2.6 ft x 6.2 ft)	1.8 m x 0.8 m x 1.9 m (5.9 ft x 2.6 ft x 6.2 ft)
Ambient Temperature	5 to 50ºC (41 to 122°F)	5 to 50ºC (41 to 122°F)	5 to 50ºC (41 to 122°F)
Electrolyte	Proton Exchange Membrane	Proton Exchange Membrane	Proton Exchange Membrane
Feed Water at Maximum Production	1.83 l/h (0.48 gal/h)	3.66 l/h (0.97 gal/h)	5.5 l/h (1.45 gal/h)

SPECIFICATIONS	S10 System	S20 System	S40 System
Nominal Production Rate	0.27 Nm^3/h	0.53 Nm^3/h	1.05 Nm^3/h
Turndown Range	0 to 100% (automatic)	0 to 100% (automatic)	0 to 100% (automatic)
Power Consumption by System[1]	6.1 kWh/Nm^3	6.1 kWh/Nm^3	6.1 kWh/Nm^3
Purity	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]	99.999+% [H_2O < 5 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]
Delivery Pressure	13.8 barg (200 psig)	13.8 barg (200 psig)	13.8 barg (200 psig)
Dimensions – W x D x H	0.8 m x 1 m x 1.1 m (2.6 ft x 3.3 ft x 3.6 ft)	0.8 m x 1 m x 1.1 m (2.6 ft x 3.3 ft x 3.6 ft)	0.8 m x 1 m x 1.1 m (2.6 ft x 3.3 ft x 3.6 ft)
Ambient Temperature[3]	5 to 40ºC (41 to 104°F)	5 to 40ºC (41 to 104°F)	5 to 40ºC (41 to 104°F)
Electrolyte	Proton Exchange Membrane	Proton Exchange Membrane	Proton Exchange Membrane
Feed Water at Maximum Production	0.26 l/h (0.07 gal/h)	0.47 l/h (0.13 gal/h)	0.94 l/h (0.25 gal/h)

For reference only – specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.
[1] Beginning of life and dependent on configuration and operating conditions. [2] 30 barg (435 psig) option. [3] 5 to 50ºC (41 to 122ºF) option for S10.