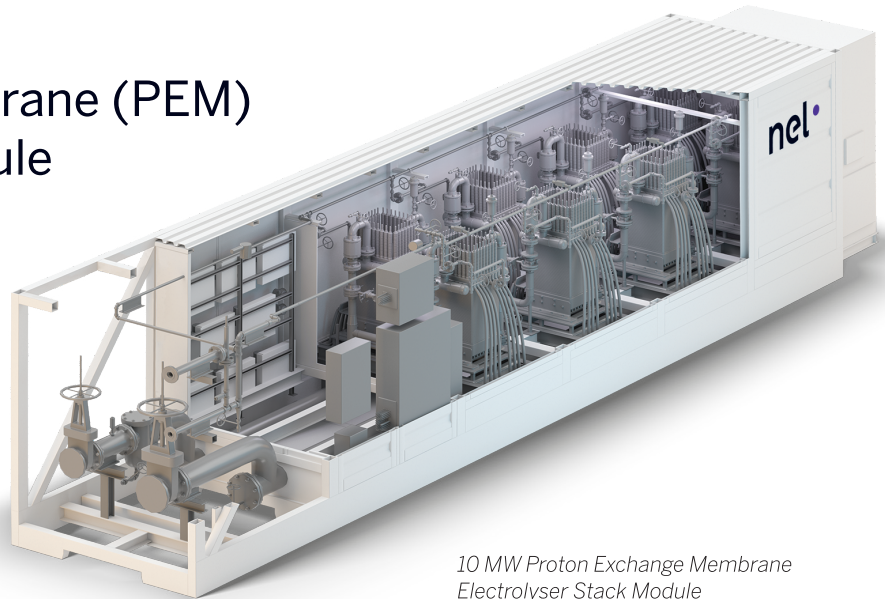




PSM Series

Proton Exchange Membrane (PEM) Electrolyser Stack Module



10 MW Proton Exchange Membrane Electrolyser Stack Module

The PSM is a proton exchange membrane (PEM) based water electrolyser module that integrates eight 1.25 MW cell stacks to generate hydrogen from deionized (DI) water and four DC electrical power inputs. The PSM includes the PEM cell stacks, associated piping, DC power connections, and related critical monitoring instrumentation.

The PSM employs a modular approach to hydrogen production designed to offer guaranteed, repeatable performance per module to provide a cost-effective solution for hydrogen production at all scales.

- Containerized electrolyser stack module for easy plant integration
- Site ready design eliminates the need for a building and reduces construction cost
- Pre-integrated stacks reduce installation time and risk
- Instrumentation for critical process and safety monitoring included in package
- Assembled and pre-tested at factory to assure quality control

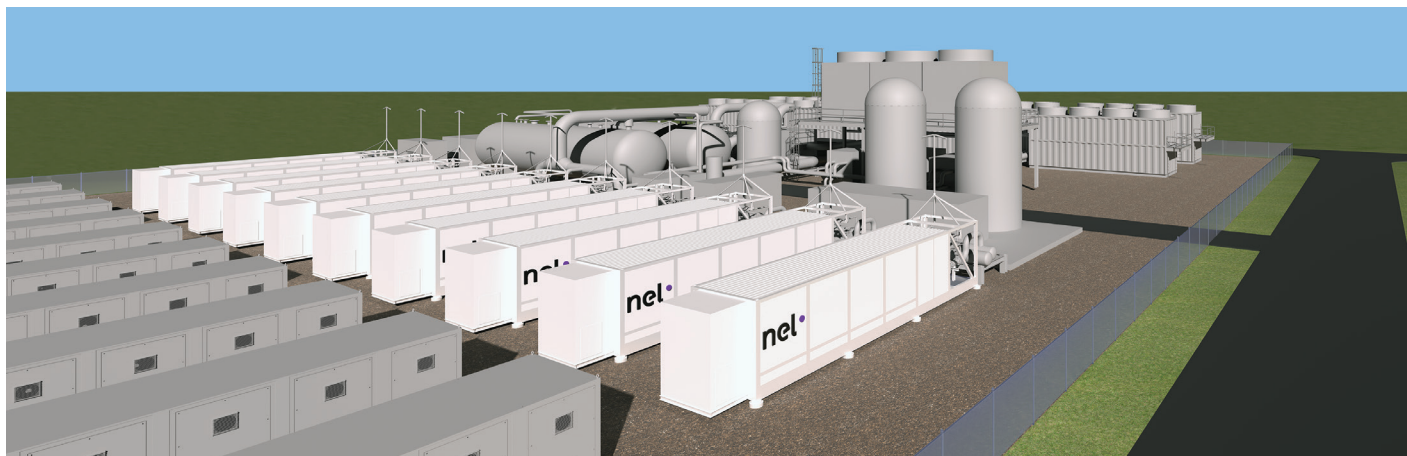
MODEL	PSM
Class	10 MW
Description	MW-class PEM Stack Module (PSM) for on-site hydrogen generation utilizing a modular containerized design for ease of installation and integration with the balance of plant
Electrolyte	Proton Exchange Membrane (PEM) – caustic-free
HYDROGEN PRODUCTION	
Nominal Production Rate Nm ³ /h (m ³ /h @ 0°C, 1 bar) kg/24 h	2,020 Nm ³ /h 4,300 kg/24 h
Operating Pressure – Nominal	30 barg (435 psig); full differential pressure H ₂ over O ₂
Power Consumption at Stack per Unit of H ₂ Gas Produced at 100% Capacity ¹	4.5 kWh/Nm ³ 51.2 kWh/kg
Purity (concentration of impurities)	99+% [saturated gas with liquid water, N ₂ < 2 ppm, O ₂ < 1 ppm, all others undetectable]
Ramp Rate (% of full-range)	≤ 10% per sec
Turndown Range	10 to 100%

DI WATER REQUIREMENTS		
Consumption, electrolysis	0.9 l/Nm ³ of H ₂ (0.24 gal/Nm ³ of H ₂) 10 l/kg of H ₂ (2.64 gal/kg of H ₂)	
Temperature	Startup 5 to 54°C (41 to 129°F) Normal operations 51 to 54°C (124 to 129°F)	
Pressure	3.5 barg (50 psig) Maximum design pressure 10 barg (145 psig)	
Input Water Quality	Required: ASTM Type II Deionized Water, < 0.125 µS/cm (> 8 MΩ-cm) Preferred: ASTM Type I Deionized Water, < 0.1 µS/cm (> 10 MΩ-cm)	
ELECTRICAL SPECIFICATIONS		
Electrical Requirements	DC (Cell Stack) ¹	4 x 800 to 920 VDC; 300 to 3,000 A Detailed DC power specifications to be provided separately
	Ancillary ²	400 VAC, three phase plus neutral and protective earth, 50 Hz (±10% from nominal voltage) or 480 VAC, three phase plus neutral and protective earth, 60 Hz (±10% from nominal voltage)
PHYSICAL CHARACTERISTICS		
Dimensions W x D x H	13.4 m x 2.4 m x 2.9 m (44 ft x 7.9 ft x 9.5 ft), without vent stack	
Weight	14,832 kg (32,700 lbs), without cell stacks 22,997 kg (50,700 lbs), with cell stacks	
ENVIRONMENTAL CONSIDERATIONS – DO NOT FREEZE		
Standard Siting Location	Outdoor, pad mounted or concrete pier mounted Flatness 35/25 per ACI-117-10 Bottom access for AC and DC electrical connections and drains	
Storage/Transport Temperature	5 to 60°C (41 to 140°F)	
Ambient Temperature	-30 to 50°C (-22 to 122°F)	
Altitude Range ³	Sea level to 1,000 m (3,281 ft)	

Utility Requirements

Nel provides specifications for utility requirements, but it is the responsibility of the buyer to design for and provide them. With Nel's standard scope, the following utilities shall be provided by the buyer:

- Deionized water
- Backup power (for container HVAC)
- Input power switchgear (MV & LV)
- Nitrogen for occasional purging
- DC power for the stacks
- Process cooling



100 MW PEM electrolysis plant featuring ten PSM containerized modules.



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 50 kVA to provide backup HVAC and control during blackout conditions as required.
- ³ Consult Nel Hydrogen Applications Engineering Department for installations above 1,000 m (3,281 ft).