



## C Series

# Proton Exchange Membrane (PEM) Hydrogen Generation Systems



MODEL	C10	C20	C30
Description	On-site hydrogen generator in two integrated, automated, site-ready enclosures Load following operation automatically adjusts output 0 to 100% to match demand Full differential pressure, H <sub>2</sub> over O <sub>2</sub>		
Electrolyte	Proton Exchange Membrane (PEM) – caustic-free		
<b>HYDROGEN PRODUCTION</b>			
Nominal Production Rate Nm <sup>3</sup> /h(m <sup>3</sup> /h @ 0°C, 1 bar) SCF/h (ft <sup>3</sup> /h@ 70°F, 1 atm) kg/24 h	10 Nm <sup>3</sup> /h 380 SCF/h 21.6 kg/24 h	20 Nm <sup>3</sup> /h 760 SCF/h 43.3 kg/24 h	30 Nm <sup>3</sup> /h 1,140 SCF/h 65.0 kg/24 h
Delivery Pressure – Nominal	30 barg (435 psig)		
Power Consumption by System per Unit of H <sub>2</sub> Gas Produced <sup>1</sup>	6.2 kWh/Nm <sup>3</sup> (16.3 kWh/100 SCF) 69.9 kWh/kg	6.0 kWh/Nm <sup>3</sup> (15.8 kWh/100 SCF) 67.6 kWh/kg	5.8 kWh/Nm <sup>3</sup> (15.2 kWh/100 SCF) 65.5 kWh/kg
Purity (Concentration of Impurities)	ISO 14687-1 Type 1 grade C ISO 14687-2 Type 1 grade D 99.999+% [H <sub>2</sub> O < 2 ppm, -72°C (-98°F) Dew Point, N <sub>2</sub> < 2 ppm, O <sub>2</sub> < 1 ppm, all others undetectable]		
Turndown Range	0 to 100% net product delivery (automatic)		
Upgradeability	Field upgradeable to a maximum of 30 Nm <sup>3</sup> /h (1,140 SCF/h)		N/A
<b>DI WATER REQUIREMENTS</b>			
Consumption Rate 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)
Temperature	5 to 40°C (41 to 104°F)		
Pressure	1.0 to 4.1 barg (10 to 60 psig)		
Input Water Quality	Required: ASTM Type II Deionized Water, < 1 µS/cm (> 1 MΩ-cm) Preferred: ASTM Type I Deionized Water, < 0.1 µS/cm (> 10 MΩ-cm)		
<b>HEAT LOAD AND COOLANT REQUIREMENTS</b>			
Coolant <sup>2</sup>	Distilled water (with PPG up to 50% as required); non-freezing, non-fouling; 5 to 35°C (41 to 95°F)		
Maximum Heat Load (Cooling Requirement)	32 kW (109,189 BTU/h) (9.1 tons refrigeration)	64 kW (218,377 BTU/h) (18.2 tons refrigeration)	96 kW (327,566 BTU/h) (27.3 tons refrigeration)
Coolant Flow Rate	Up to 92 l/min (24.3 gal/min)	Up to 144 l/min (38 gal/min)	Up to 200 l/min (52.8 gal/min)
Pressure Drop (at Full Flow)	Up to ~1.1 barg (~14.5 psig)		
Maximum Pressure	4.1 barg (60 psig) continuous		
<b>ELECTRICAL SPECIFICATIONS</b>			
Maxium Power Required within Expected System Life	85 kVA	160 kVA	236 kVA
Electrical Requirements	380,400,415 VAC, three phase, 50/60 Hz (+/- 10% from nominal voltage) 480 VAC, three phase, 60 Hz (+/- 10% from nominal voltage)		

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<b>INTERFACE CONNECTIONS – CONSULT MECHANICAL INTERFACE DIAGRAM DRAWING PD-9900-0085 FOR DETAILS</b>				
H <sub>2</sub> Product Port	3/8" compression tube fitting, SS			
H <sub>2</sub> Vent Port	1" compression tube fitting, SS			
O <sub>2</sub> Vent Port	1" compression tube fitting, SS			
DI Water Port	1/2" FNPT, SS			
Coolant Supply and Return Ports	Electrolyzer Enclosure: 1 1/2" MNPT, brass (Cell Stack); 1/2" FNPT, brass (Hydrogen Dryer) Power Supply Enclosure: 1 1/2" MNPT, brass (Power Supply Cooling)			
Drain Port	1/2" FNPT, brass			
Electrical	Electrical terminals at fused disconnect inside power supply enclosure			
Communications	Modbus TCP/IP, 24 VDC dry contacts			
<b>CONTROL SYSTEMS</b>				
Standard Features	<ul style="list-style-type: none"> <li>Fully automated, push button start/stop</li> <li>Automatic fault detection and system depressurization</li> <li>E-stop</li> </ul>		<ul style="list-style-type: none"> <li>Remote start/stop</li> <li>On-board H<sub>2</sub> leak detection</li> <li>Remote communications</li> </ul>	
Remote Alarm and Status	Form C relay, 5 A, 250 V, 150 W Maximum rated switching			
Remote Shutdown	Hardwire input to safety PLC			
<b>PHYSICAL CHARACTERISTICS</b>				
Dimensions W x D x H	Product	Electrolyzer Enclosure: 252 cm x 116 cm x 201 cm (99" x 46" x 79") Power Supply Enclosure: 169 cm x 103 cm x 201 cm (67" x 41" x 79")		
	Est. Shipping	Electrolyzer Enclosure: 269 cm x 122 cm x 225 cm (106" x 48" x 89") Power Supply Enclosure: 269 cm x 122 cm x 225 cm (106" x 48" x 89")		
Weight	Product	2,734 kg (6,026 lbs)	2,924 kg (6,446 lbs)	3,076 kg (6,781 lbs)
	Est. Shipping	2,876 kg (6,340 lbs)	3,089 kg (6,810 lbs)	3,241 kg (7,145 lbs)
IP Rating	Overall unit rating of IP44			
<b>ENVIRONMENTAL CONSIDERATIONS – DO NOT FREEZE</b>				
Standard Siting Location	Indoor/sheltered; level ±1°, 0 to 95% RH non-condensing, non-hazardous/non-classified environment			
Storage/Transport Temperature	5 to 60°C (41 to 140°F)			
Ambient Temperature Range <sup>3</sup>	5 to 40°C (41 to 104°F)			
Altitude Range <sup>3</sup>	Sea level to 2,000 m (6,562 ft)			
Room Ventilation	Proper ventilation must be provided from a non-hazardous area, at a rate greater than or equal to the required cabinet ventilation listed below			
<b>SAFETY AND REGULATORY CONFORMITY</b>				
Maximum On-board H <sub>2</sub> Inventory at Full Production	0.13 Nm <sup>3</sup> 4.9 SCF 0.011 kg	0.17 Nm <sup>3</sup> 6.4 SCF 0.015 kg	0.18 Nm <sup>3</sup> 7 SCF 0.016 kg	
Cabinet Ventilation with Environment	Vent fan draws fresh air up to 9.9 m <sup>3</sup> /min (350 ft <sup>3</sup> /min)			
Noise dB(A) at 1 Meter	< 75			
Conformity	TUVus (UL and CSA equivalent), CE (PED, Mach. Dir., EMC), ISO 22734, EN 60204-1			
<b>OPTIONS</b>				
<ul style="list-style-type: none"> <li>Factory matched RO/DI water system</li> <li>Factory matched cooler/chiller</li> </ul>	<ul style="list-style-type: none"> <li>Dew point monitoring</li> <li>Equipment orientation</li> </ul>	<ul style="list-style-type: none"> <li>Low ambient temperature package (-10°C to 40°C)</li> </ul>	<ul style="list-style-type: none"> <li>Current command</li> </ul>	

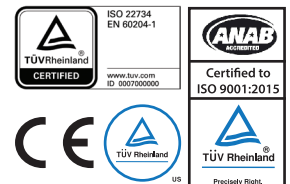


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Specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.

- Beginning of life and dependent on configuration and operating conditions.
- Consult Nel Hydrogen Applications Engineering Department for specific requirements and cooling water temperatures other than 35°C.
- Consult Nel Hydrogen Applications Engineering Department for specific altitude and temperature combinations.



MADE IN USA

PD-0600-0068 Rev K