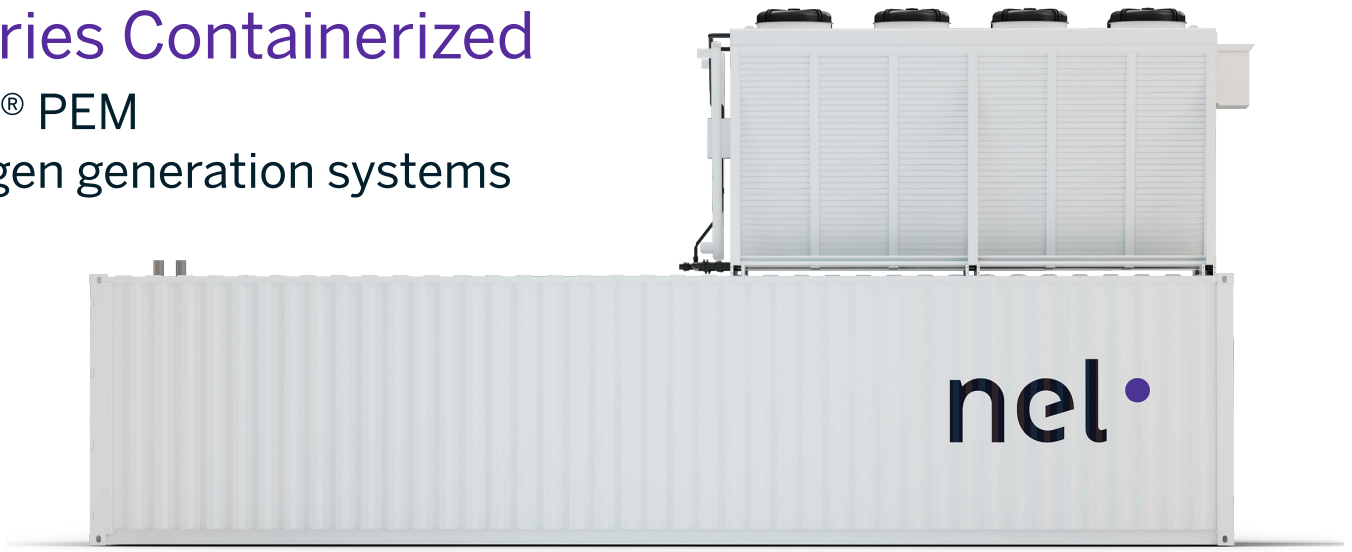
# M Series Containerized

## Proton® PEM
## Hydrogen generation systems




| MODEL | MC250 | MC500 |
|---|---|---|
| Class | 1.25 MW | 2.5 MW |
| Description | Fully-automated MW-class on-site hydrogen generator utilizing a modular containerized design for ease of installation and integration<br>Tri-mode operation (selectable):<br>• Command-following mode allows operation based on available input power<br>• Load following mode automatically adjusts output to match demand<br>• Tank filling mode operates with power-conservation mode during standby | |
| Electrolyte | Proton Exchange Membrane (PEM) – caustic-free | |
| **HYDROGEN PRODUCTION** | | |
| Net production rate<br>$Nm^3/h$ @ 0° C, 1 bar<br>SCF/h @ 70° F, 1 atm<br>kg/24 h | <br>246 $Nm^3/h$<br>9,352 SCF/h<br>531 kg/24 h | <br>492 $Nm^3/h$<br>18,704 SCF/h<br>1,062 kg/24 h |
| Delivery pressure – nominal | 30 barg (435 psig); full differential pressure $H_2$ over $O_2$ | |
| Average power consumption at stack per volume of $H_2$ gas produced[1] | 4.5 kWh/$Nm^3$ | |
| Average power consumption at stack per mass of $H_2$ gas produced[1] | 50.4 kWh/kg | |
| Purity (concentration of impurities) | 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) | ISO 14687:2019(E) Type I, Type II Grade D and SAE J-2719 Type I Grade L<br>99.9995% [$H_2O$ < 5 ppm, $N_2$ < 2 ppm, $O_2$ < 1 ppm, all others undetectable] | |
| Start-up time (from off state) | < 5 min | |
| Ramp-up time (minimum to full load) | < 15 sec | |
| Ramp rate (% of full-scale) | ≥ 15% per sec (power input mode) | |
| Production capacity dynamic range | 10 to 100% | |
| **DI WATER REQUIREMENT** | | |
| Consumption rate at maximum production | 222 l/h (58 gal/h) | 444 l/h (116 gal/h) |
| Temperature | 5 to 40°C (41 to 104°F) | |
| Input water quality | Required: ASTM Type II Deionized Water, < 1 µS/cm (> 1 MΩ-cm)<br>Preferred: ASTM Type I Deionized Water, < 0.1 µS/cm (> 10 MΩ-cm) | |
| Water purification system (included) | Reverse Osmosis/Electronic DI (RO/EDI) | |

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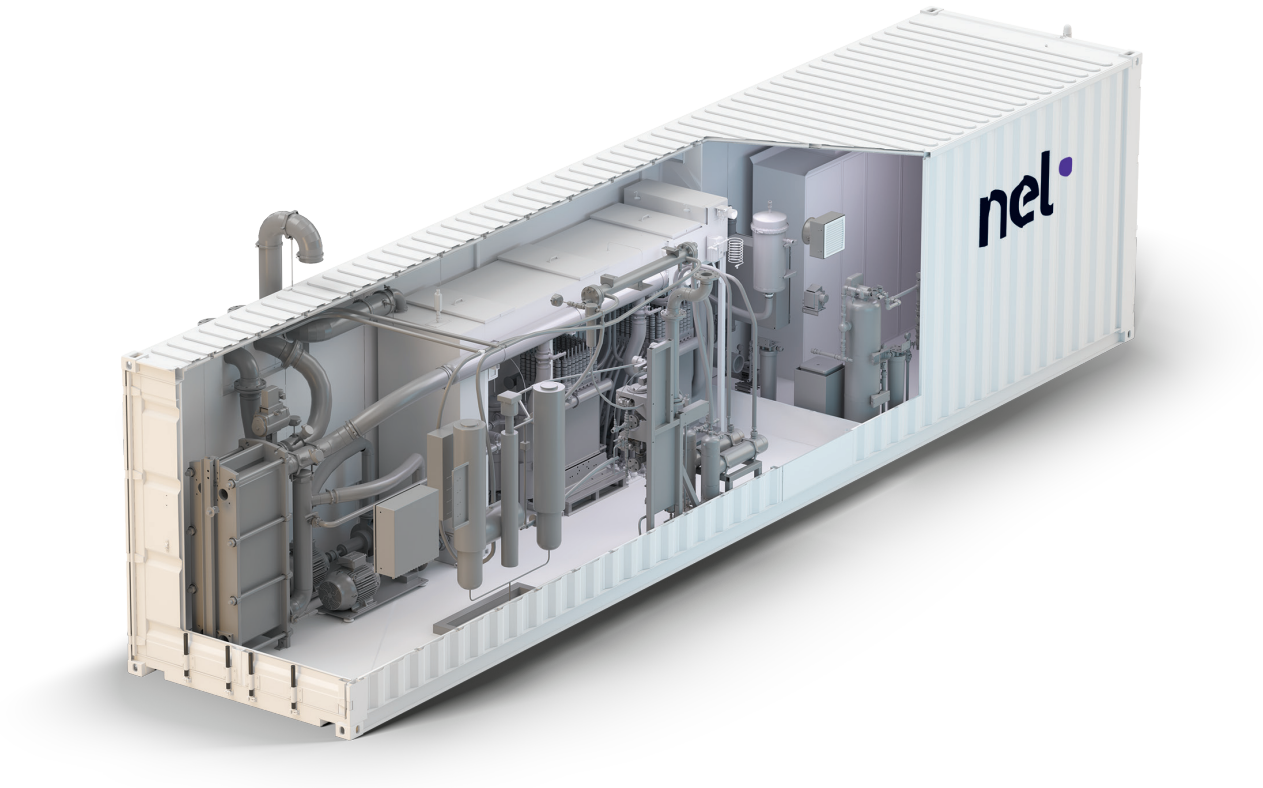
|---|---|---|
| **ELECTRICAL SPECIFICATIONS** | | |
| Electrical requirements | Typical installation: 6.6 to35 kV, three phase 50 Hz/60 Hz<br>Low voltage, three phase required for balance of plant and ancillary equipment | |
| Power quality | Total harmonic distortion: < 5%, power factor: > 0.9 nominal power, at normal power | |
| **PHYSICAL CHARACTERISTICS** | | |
| Electrolyser container[2] W x D x H | 12.2 m x 2.5 m x 3 m<br>(40 ft x 8 ft x 9.9 ft) | 12.2 m x 2.5 m x 3 m<br>(40 ft x 8 ft x 9.9 ft) |
| Rectifier/transformer container[2] W x D x H | 6.1 m x 2.5 m x 2.6 m<br>(20 ft x 8 ftx 8.5 ft) | 12.2 m x 2.5 m x 3 m<br>(40 ft x 8 ft x 9.9 ft) |
| **ENVIRONMENTAL CONSIDERATIONS – DO NOT FREEZE** | | |
| Standard siting location | Outdoor, pad mounted<br>Flatness 35/25 per ACI-117-10<br>Bottom access for AC and DC electrical connections, water and drains | |
| Storage/transport temperature | 5 to 60°C (41 to 140°F) | |
| Ambient temperature | -20 to 40°C (-4 to 104°F) | |
| Altitude range-sea level | 1,000 m (3,281 ft) | |
| **OPTIONS** | | |
| • Medium voltage input 4.16 to 6.6 kV | • Thermal control unit | • High purity hydrogen dryer with dew point meter |




*Representative views of MC500 – installation may vary.*

Specifications are subject to change based on siting and configuration.
Please contact Nel Hydrogen for solutions to best fit your needs.

[1] Dependent on configuration and operating conditions.
[2] Plus vent and rooftop equipment, site specific.

www.nelhydrogen.com | +1.203.949.8697 | info@nelhydrogen.com

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