

TECHNICAL SPECIFICATION

PEM ELECTROLYZER STACK

English edition | For technical evaluation and project integration

500 Nm3/h

DOCUMENT IDENTIFIER: RATED HYDROGEN PRODUCTION

Rated hydrogen production	500 Nm3/h
Rated current	6384 A
DC energy consumption	<= 4.5 kWh/m3
Hydrogen-side working pressure	<= 1.6 MPa

Identification note: no independent sales model number is stated in the supplied source specification.
The rated production capacity is used as the document identifier. Values above match the body parameter table.

1. Scope

This specification describes the operating principle, technical requirements, test and inspection procedures, and safety requirements for the PEM electrolyzer.

This specification applies to a PEM water electrolyzer with a nominal hydrogen production capacity of 500 Nm³/h.

2. Operating Principle

2.1 Water electrolysis and oxygen evolution

At the anode, water (2H₂O) undergoes electrolysis under the action of the electric field and catalyst, producing protons (4H⁺), electrons (4e⁻), and gaseous oxygen (O₂): $2\text{H}_2\text{O} \rightarrow 4\text{H}^+ + 4\text{e}^- + \text{O}_2$.

2.2 Proton exchange

Protons pass through the solid proton exchange membrane (PEM), which contains sulfonic-acid functional groups, and migrate to the cathode under the electric field.

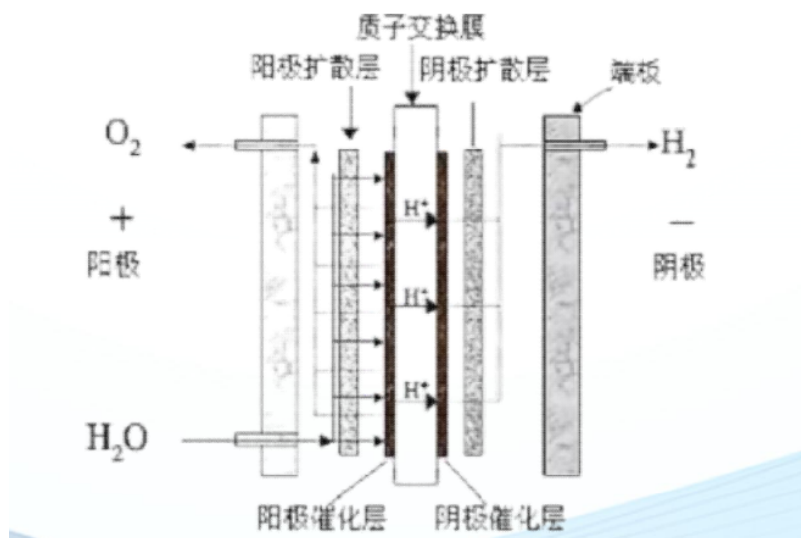
2.3 Electron conduction

Electrons travel from the anode to the cathode through the external electrical circuit.

2.4 Hydrogen evolution

At the cathode, protons combine with electrons to form hydrogen: $4\text{H}^+ + 4\text{e}^- \rightarrow 2\text{H}_2$.

Overall reaction: $2\text{H}_2\text{O} \rightarrow 2\text{H}_2\uparrow + \text{O}_2\uparrow$ (with electrical power).



3. Basic Parameters

Item	Specification
Hydrogen production	500 Nm³/h
Oxygen production	250 Nm³/h
Rated current	6384 A
Voltage range	342-475 V
Effective MEA area per cell	3192 cm²
Number of cells	190
Terminal lug	Included
Water pump flow	≥ 1330 L/min
DC energy consumption	≤ 4.5 kWh/m³
Operating temperature	40-45 °C (recommended: 40 °C)
Oxygen-side working pressure	≤ 0.5 MPa
Hydrogen-side working pressure	≤ 1.6 MPa
Water resistivity	≥ 15 MΩ·cm
Oxygen-side water inlet	130 clamp connection
Oxygen-side water outlet	130 clamp connection
Hydrogen outlet	1 inch × 2
Stack dimensions (excl. bolts/piping)	948 × 936 × 1595.8 mm
Weight	2344 kg

Energy unit follows source p3 (kWh/m³); reference conditions require confirmation. Water unit follows source p4.

4. Operating Requirements and Notes

Ambient air temperature: 5-40 °C; maximum relative humidity: 90%.

The installation area should be free of vapors, chemical deposits, dust, mold, explosive or corrosive media that could seriously affect operation, and should not be subject to severe vibration or shock. The source specification references GB 4962 and GB 9448.

Input supply voltage is to be determined by the user; recommended AC voltage levels are 220 V or 380 V, with voltage fluctuation below $\pm 10\%$.

Recommended cooling-water pressure: 0.2-0.4 MPa. Instrument/pneumatic air pressure shall be determined according to the relevant requirements; air quality shall comply with GB/T 4830 as stated in the source.

Components contacting corrosive media shall have valid quality certificates. Electrical component temperature rise shall satisfy continuous-operation requirements.

With electrolyte present, insulation resistance between the electrolyzer and frame, electrolyzer and ground, and relevant vessels/components and frame shall be $\geq 5 \text{ M}\Omega$. Insulation resistance between the rectifier/control circuit and frame shall be $\geq 200 \text{ M}\Omega$.

Instrument display accuracy for the water-electrolysis hydrogen/oxygen generator shall be Class 2.5 or better.

Feed-water quality

Parameter	Unit / Requirement
Resistivity	$\text{M}\Omega\cdot\text{cm} / \geq 15$
Iron ion content	$\text{mg/L} / < 1$
Chloride ion content	$\text{mg/L} / < 2$
Suspended solids	$\text{mg/L} / < 1$

Hydrogen production calculation

$Q = I \times n \times \eta / 2390$, where Q is hydrogen production (m^3/h), I is DC operating current (A), n is the number of cells, and η is current efficiency.

At standard conditions, the theoretical charge required to produce $1 \text{ m}^3 \text{ H}_2$ is 2390 Ah/m^3 . For $I = 6384 \text{ A}$ and $n = 190$: $Q = 6384 \times 190 \times 1 / 2390 = 507.5 \text{ m}^3/\text{h}$.

5. Energy Consumption and Testing

Unit DC energy consumption for hydrogen production

$$W_{H_2} = I \times U \times T / (Q_{H_2} \times 10^3)$$

For $I = 6384$ A, $U = 342$ V, $T = 1$ h, and $Q_{H_2} = 507.5$ m³/h: $W_{H_2} = 4.31$ kWh/m³.

Pressure resistance test

After passing visual inspection, nitrogen at 3.5 MPa is introduced sequentially into the anode and cathode inlets. Hold at test pressure for 10 min, reduce to design pressure, and inspect all connections. The test passes if no gas leakage is found.

Gas-tightness test

After the pressure resistance test, conduct a nitrogen leak-tightness test at 3 MPa. Raise pressure slowly, hold for 30 min, and inspect all connections. The test passes if no leakage is found.

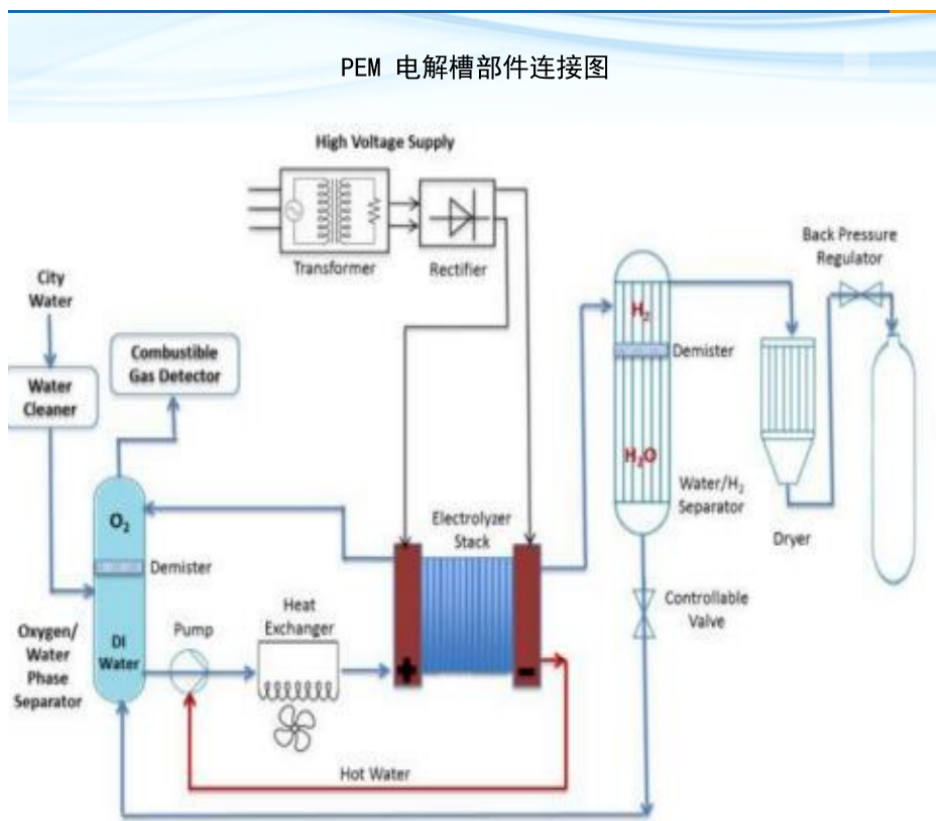
Performance test

Connect the test bench and power supply; verify normal tank level and secure, leak-free connections. Start water circulation and heating and bring the system to rated operating temperature. Operate in constant-current mode, beginning at 10% of rated current, and continue loading after voltage stabilizes.

Increase current progressively at 10% of rated current per minute until rated current is reached. Measure total stack voltage and individual-cell voltage every hour and record the results. Aging test duration is 16 h. During shutdown, decrease current at 10% of rated current until 0 A, then switch off the power supply.

Purge both hydrogen and oxygen sides with nitrogen at 10 L/min for 5 min.

6. System Connection and After-Sales Service



六、售后服务

After-sales service

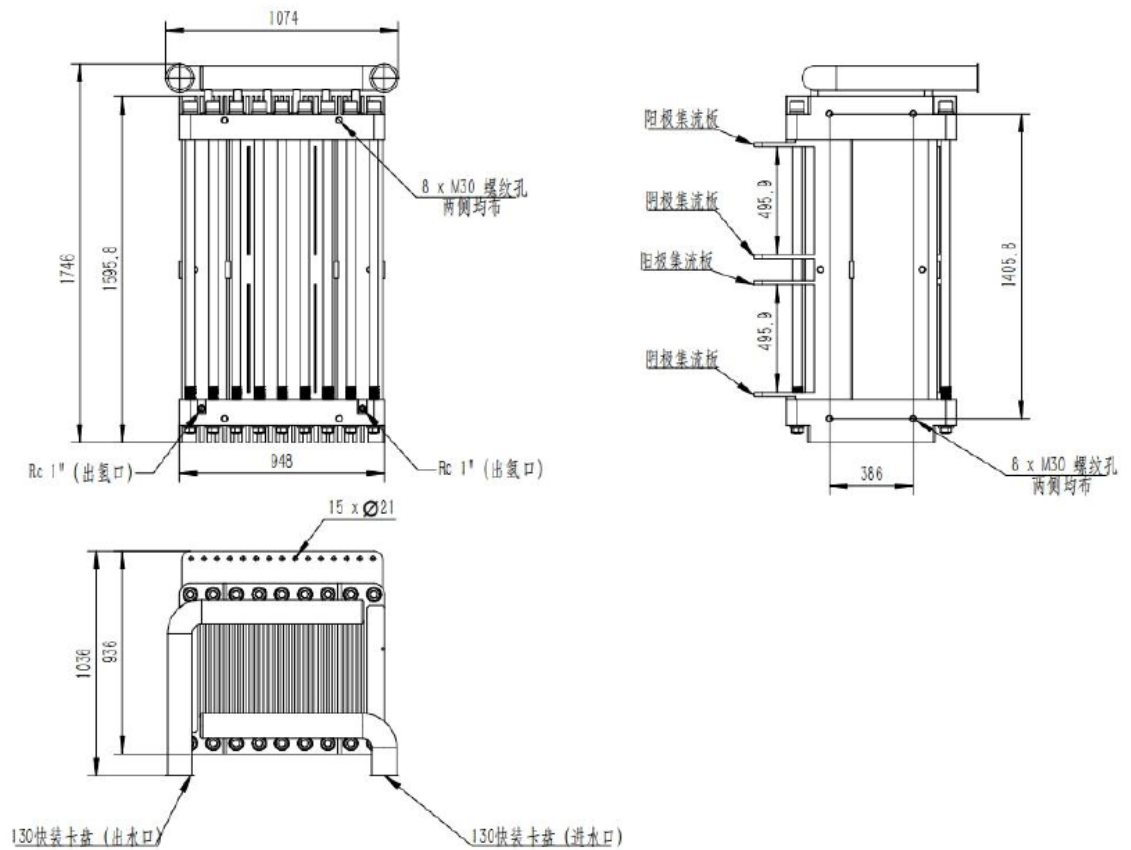
One-year warranty is provided for the PEM electrolyzer. During the warranty period, failures caused by product-quality issues are covered by free repair or replacement service.

Technical support is available on a 24-hour response basis. Periodic customer follow-up, rapid fault response, and original spare-parts support are provided as required. If a fault cannot be resolved remotely, an on-site service plan will be coordinated with the customer.

GreenMaker OEM documentation also commits to compliant operation, professional technical support, lifecycle after-sales support, and strict protection of customer commercial and technical information.

7. 500 Nm³/h Stack Structure Drawing

500Nm³/h 槽体结构图



Dimensional drawing reproduced from the source specification. Refer to the approved manufacturing drawing for fabrication and installation dimensions.

GREENMAKER

OEM HYDROGEN TECHNOLOGY

500 Nm³/h PEM Electrolyzer

Technical Specification

GreenMaker OEM

Technical documentation for project evaluation, system integration, and OEM supply.

Document language: English