Aqualyzer™

Large-scale alkaline water electrolyzer system for producing hydrogen
Aqualyzer™
Global Solution Provider for Electrolyzer Systems

Capability and Experience electrolysis business

>45 years experience
supplying high reliability electrolyzer systems

Membrane supply
Aciplex™-F membranes are also supplied to Chlor-Alkali customers

Worldwide
installations at 167 end user plants

>1GW of electrolyzer
with Chlor-Alkali business

Scalable module concept

Cell
10 MW module
100 MW multi module

Total Solution Provider

Operation control and predictive maintenance through remote monitoring

In-house RD&D in Japan

Data-driven service

Maintenance, spare parts

Actual size pilot electrolyzer system

Customer
Asahi Kasei’s Alkaline Water Electrolyzer System

- Commercialization

Large scale multi-module system development with partners
Asahi Kasei will develop a large-scale alkaline water electrolyzer system under the NEDO\textsuperscript{1} /Green Innovation Fund\textsuperscript{2}.

Asahi Kasei is trying to develop several theme:
• Technological development for scale-up and modularization of the alkaline water electrolyzer system
• Development of constituent technology for large alkaline water electrolyzers
• Feasibility study and technological demonstration of green chemical plants

Together with Gentari and JGC, demonstration in Malaysia using a 60 MW-scale alkaline water electrolysis plant to supply \(\approx8,000\) t/y of hydrogen to chemical plant (2027–2030).

A pilot plant to demonstrate a multi module control system is under construction in Asahi Kasei’s Kawasaki plant. It will be in operation by Spring 2024.

Experience of operating large AWE
Fukushima Hydrogen Energy Research Field (FH2R) in Fukushima, Japan, constructed with a renewable energy hydrogen production unit as a technology development project\textsuperscript{3} by NEDO.

Asahi Kasei Group built the 10 MW-class large scale alkaline water electrolyzer system and started hydrogen production demonstration using renewable energy from March 2020.

Demonstration with European partners in Germany
Asahi Kasei Europe participated in the European multi-partner project ALIGN-CCUS, which started operation our electrolyzer from 2020.

ALIGN-CCUS took over the project into TAKE-OFF.

Hydrogen from Asahi Kasei's electrolyzer is combined with CO\textsubscript{2} captured from power plants to synthesize Sustainable Aviation Fuel (SAF).
Specifications of Alkaline Water Electrolyzer System (under developing)

<table>
<thead>
<tr>
<th></th>
<th>Aqualyzer 10</th>
<th>Aqualyzer 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>H₂ production rate</td>
<td>2,000Nm³/h</td>
<td>20,000Nm³/h</td>
</tr>
<tr>
<td>Number of modules</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>H₂ production ratio</td>
<td>15-100%</td>
<td>15-100%</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>4.4 kWh/Nm³ (DC)</td>
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</tr>
<tr>
<td>H₂ pressure (stack discharge)</td>
<td>0.5barG</td>
<td>0.5barG</td>
</tr>
<tr>
<td>Deionized Water consumption</td>
<td>0.9L/Nm³</td>
<td>0.9L/Nm³</td>
</tr>
<tr>
<td>H₂ purity (dry basis)</td>
<td>&gt; 99.75%</td>
<td>&gt; 99.75%</td>
</tr>
<tr>
<td>H₂ purity (with optional purification)</td>
<td>up to 99.999%</td>
<td>up to 99.999%</td>
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</tbody>
</table>

Note: all figures above are to be understood as “expected values” and may vary depending on operating conditions.

Easy Replacement System for a safe and stable hydrogen production

Asahi Kasei’s electrolyzer system provides:

/ Efficient and high-volume hydrogen production
/ H₂ purity and pressure conditions adapted to customer needs by designing the entire system
/ Easy on-site replacement of membrane components
We, the Asahi Kasei Group, contribute to life and living for people around the world.

Diversified chemical company with three business sectors.

Asahi Kasei Corporation

<table>
<thead>
<tr>
<th>Operating function</th>
<th>Holding company function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Solutions</td>
<td>Asahi Kasei Pharma Corp. Pharmaceuticals</td>
</tr>
<tr>
<td>Mobility &amp; Industrial</td>
<td>Asahi Kasei Medical Co., Ltd. Medical Care</td>
</tr>
<tr>
<td>Life Innovation</td>
<td>ZOLL Medical Corporation Acute Critical Care</td>
</tr>
<tr>
<td>Asahi Kasei Microdevices Corp.</td>
<td>Veloxis Pharmaceuticals, Inc. Pharmaceuticals</td>
</tr>
</tbody>
</table>

- Material
- Homes
- Health Care

Net sales\(^1\):
- ¥2,726.5 billion (FY 2022)
- Homes 33%
- Material 49%
- Health Care 26%

Operating income\(^1\):
- ¥128.4 billion (FY 2022)
- Homes 48%
- Material 26%
- Health Care 26%

\(^1\) Excluding "Others" category and "corporate expenses and eliminations."