BRISE
CHEMICALS

PRODUCT BROCHURE
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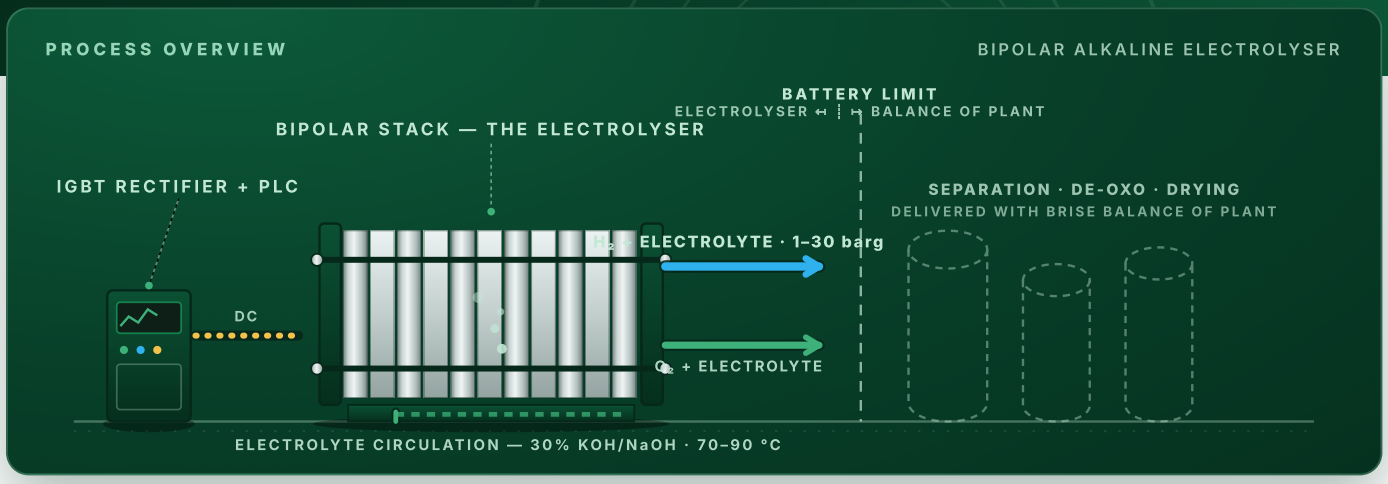
ALKALINE ELECTROLYSIS · GREEN HYDROGEN

Bipolar Alkaline Electrolyser

The most commercially proven route to large-scale green hydrogen — a pressurised bipolar stack, 100% designed and made in India.

3.8–4.4	6N	1–30	MW+
KWH/NM³ STACK ENERGY	H_2 PURITY WITH BOP TRAIN	BARG IN-STACK PRESSURE	MODULAR, PILOT TO MULTI-MW



01 Overview

The Brise Bipolar Alkaline Electrolyser is the electrochemical heart of a green hydrogen plant: the stack itself. It splits water into hydrogen and oxygen using DC electricity and a 30% w/w KOH/NaOH alkaline electrolyte — the most commercially proven and widely deployed technology for large-scale green hydrogen, with decades of industrial history and the lowest capital cost of any electrolyser class. Brise builds it end-to-end in India, with no import dependency.

Each bipolar plate operates as anode on one face and cathode on the other, separated by an advanced diaphragm. Cells connect electrically in series, cutting ohmic losses and lifting voltage efficiency well beyond monopolar designs — and the stack delivers its gas already pressurised at 1–30 bar. Downstream gas–liquid separation, scrubbing, De-Oxo purification, drying and water treatment are delivered by the matching Brise Balance of Plant, engineered as one system with the stack.

02 At a Glance

Stack-scope product
The electrolyser is the stack; separation, De-Oxo and purification come with the Brise Balance of Plant

100% Made in India
Proprietary bipolar plates and in-house electrode coating, incl. HVOF catalyst facility

Renewable-ready
Follows solar, wind and hybrid power profiles via Siemens PLC control

Pressurised stack
1–30 barg delivery without a separate compressor

03 Technology & Process

DC current applied across the bipolar cell stack reduces water at the cathode and oxidises hydroxide ions at the anode, while a porous diaphragm keeps the product gases apart yet ion-conductive. At the stack battery limit, the gas–electrolyte streams hand over to the Brise Balance of Plant, which separates, purifies and dries the hydrogen to up to 6N.

1

DC power to the stack

An IGBT rectifier feeds clean DC across the series-connected bipolar cells, supervised by dual-redundant Siemens PLC.

2

Electrolyte circulation

30% w/w KOH/NaOH circulates through every cell at 70–90 °C, carrying ions, heat and product gas.

3

Cathode — hydrogen evolution

Water is reduced on HVOF-coated cathode faces, releasing hydrogen at 0.2–0.4 A/cm².

4

Anode — oxygen evolution

Hydroxide ions oxidise on the opposite plate face, releasing oxygen into its own electrolyte circuit.

5

In-cell gas separation

The advanced diaphragm keeps H_2 and O_2 apart inside each cell while staying ion-conductive.

6

Pressurised handover to BoP

Gas–electrolyte mixtures leave the stack at up to 30 barg to the Balance of Plant for separation, De-Oxo and drying.

CELL REACTIONS

CATHODE	$2H_2O(l) + 2e^- \rightarrow H_2(g) + 2OH^-(aq)$
ANODE	$2OH^-(aq) \rightarrow \frac{1}{2}O_2(g) + H_2O(l) + 2e^-$
OVERALL	$H_2O(l) \rightarrow H_2(g) + \frac{1}{2}O_2(g)$

Engineered for variable renewable power

The integrated PLC distributes variable DC input across stacks, keeping production stable as solar or wind output swings:

100% rated power	Both stacks operate at full capacity
50–100%	Both stacks run at reduced current density
20–50%	One stack in hot-standby, one at reduced load
Below 20%	Safe shutdown with automatic restart
Power restored	Auto ramp-up and standby reactivation

WATER BALANCE (PLANT LEVEL)

Theoretical	**9.0 L / kg H_2**
Practical industrial	**10–11 L / kg H_2**
Incl. cooling circuit	**15–18 L / kg H_2**

04 Technical Specifications

PARAMETER	SPECIFICATION
Product scope	Bipolar electrolyser stack (pressurised); BoP separate
Electrolyte	30% w/w aqueous KOH / NaOH
Stack energy consumption	3.8–4.4 kWh/Nm³ H_2
Operating temperature	70–90 °C (ambient design range 5–35 °C)
Operating pressure	1–30 barg, generated inside the stack
Cell voltage / stack current	230–420 V · 100–12,000 A
Current density	0.2–0.4 A/cm² (optimal band 0.4–0.6)
Cell active area	125–30,000 cm²
H_2 purity — with Brise BoP train	99.99% (4N) to 99.9999% (6N)
O_2 in H_2 / moisture — post-BoP	<2 ppmv / <2 ppmv
Power source	IGBT rectifier (DC)
Control system	Dual-redundant Siemens PLC + SCADA

Budgetary guidance: ≈ ₹2.5–8 crore per MW at commercial scale, depending on capacity, pressure, purity and site conditions. Figures shown are design values from Brise Chemicals product documentation; final specifications are confirmed during detailed engineering.

05 Key Features

Class-leading efficiency
3.8 kWh/Nm³ specific stack consumption cuts electricity cost — the dominant OPEX — by up to 15%.

One system with Brise BoP
Pairs seamlessly with the Brise Balance of Plant — separation, scrubbing, De-Oxo and drying to 4N–6N hydrogen.

Pressurised by design
1–30 bar production inside the stack removes the external compressor for most applications.

100% Made in India
Proprietary bipolar plates and in-house HVOF electrode coating — zero import dependency.

Renewable-ready control
Siemens PLC variable-power logic pairs cleanly with solar PV, wind and hybrid plants.

Modular & scalable
Standardised stacks scale from pilot units to multi-MW industrial installations.

06 Applications & Industries

On-site industrial hydrogen
Continuous captive H_2 for process industries

Mobility & fuel cells
Buses, trucks, trains and marine fuel-cell fleets

Steel — DRI
Green hydrogen for direct reduced iron production

Refining & petrochemicals
Hydrocracking and hydrotreating make-up hydrogen

Green ammonia & methanol
Feedstock for downstream green synthesis plants

Energy storage & grid
P2H2P storage and grid-balancing duty cycles

Pharma, food & electronics
High-purity hydrogen for regulated industries

07 Scope of Supply

- Bipolar electrolyser stack — cells, diaphragms, endplates & tie rods
- Proprietary bipolar plates with HVOF-coated electrodes
- IGBT rectifier and dual-redundant Siemens PLC + SCADA
- Stack instrumentation, interlocks & hydrogen safety systems
- Integration engineering with Brise (or third-party) Balance of Plant
- Commissioning, PG testing, training, AMC/CMC & stack refurbishment

CERTIFIED & COMPLIANT

ISO 9001:2015 · ISO 14001:2015 · ISO 45001:2018

Designs compliant with PESO, IEC, ATEX & IS safety standards

08 About Brise Chemicals

Brise Chemicals Pvt. Ltd. is a technology-driven OEM and industrial gas plant technology owner, founded by professionals with deep experience across turbo-machinery, oil & gas, refineries and the industrial gas sector. From our engineering and fabrication base in Pune, India, we design, engineer, manufacture, install and commission cryogenic and non-cryogenic gas plants — spanning alkaline electrolysis, gas generation, gas purification, ammonia and methanol synthesis, air separation and hydrogen liquefaction.

Our name derives from the ballet step “Brisé” — a reminder that precision, integrity and discipline underpin everything we build. With in-house fabrication, certified welding, an HVOF catalyst-coating facility and rigorous QA/QC, we deliver complete EPC projects and stand behind them through long-term AMC/CMC support.

09 The Brise EPC Lifecycle

1 Pre-FEED / Concept
Technology selection, plant sizing, site assessment

2 FEED Study
P&IDs, plot plans, equipment lists, CAPEX estimates

3 Basic Engineering
Process design, instrumentation philosophy, safety studies

4 Detailed Engineering
Construction drawings, datasheets, 3D models

5 Procurement & Supply
Core equipment, BoP packages, electrical panels

6 Construction
Civil, mechanical, piping and electrical installation

7 Commissioning
Pre-checks, wet commissioning, performance-guarantee tests

8 Training
Operations and maintenance team instruction

9 AMC / CMC
Predictive maintenance, spares and long-term support

10 Industries We Serve

- Healthcare & Medical
- Oil & Gas
- Steel & Metal Processing
- Chemical & Petrochemical
- Energy & Power
- Food & Beverage
- Electronics & Semiconductor
- Automotive & Manufacturing

Let’s engineer your plant.

Request a detailed proposal, FEED study or site consultation for the Bipolar Alkaline Electrolyser.

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