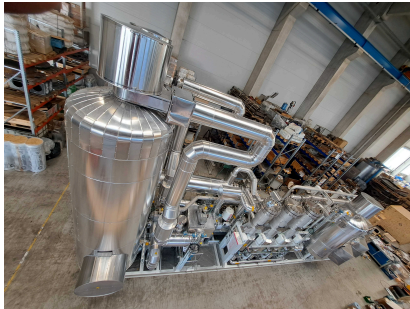


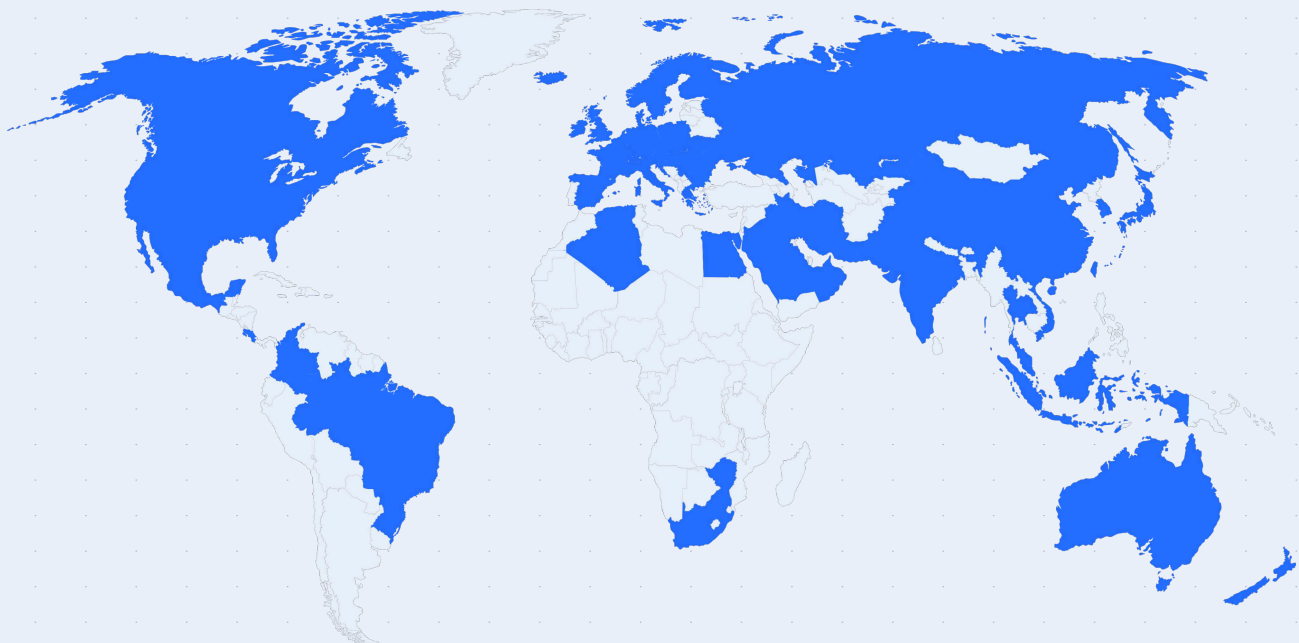
REICAT

Efficient hydrogen purification for Power-to-X

Leading companies rely on ReiCat - worldwide

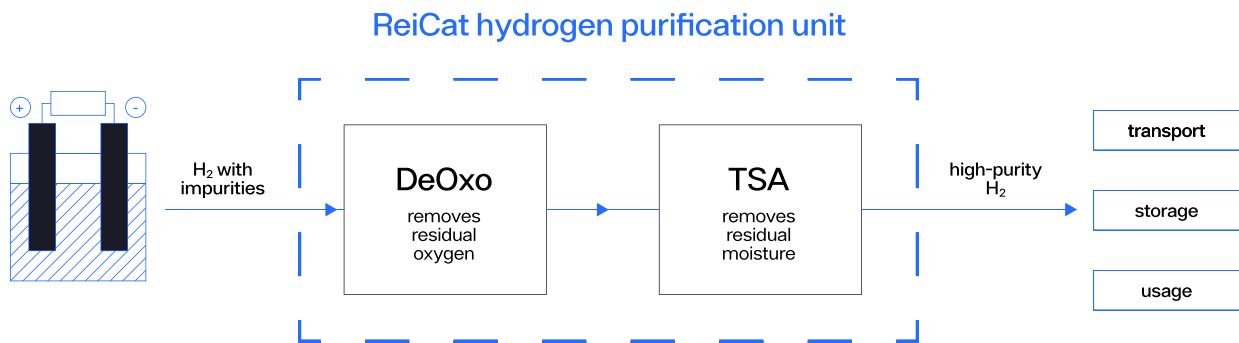


We are proud to count the most successful global corporations among our regular customers. Over 600 ReiCat systems operate in 59 countries worldwide.



ReiCat's state-of-the-art H₂ purification systems

We combine DeOxo catalysts and TSA dryers to purify hydrogen to quality 5.0



Scope of supply

DeOxo unit: catalytic reactor, chiller, demister for condensate separation; in some cases: pre-demister + heater to prevent water formation in the reactor

TSA dryer: 2x drying vessels, chiller, demister, filter; for regeneration: heater, and in some cases blower

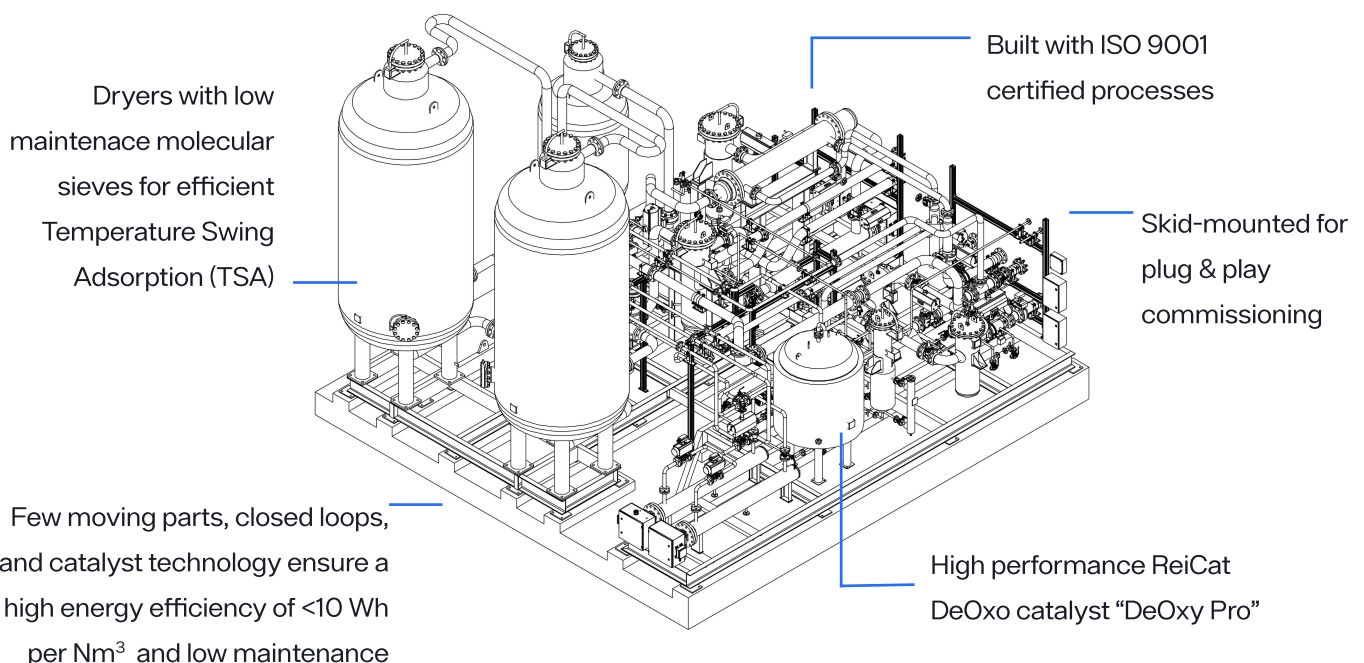
If no chilled water is available, external chiller if necessary

Analysis unit for O₂, H₂O

All interconnecting piping and instrumentation within the skid

Control system

We build according to all major standards



Proven technology tailored to your needs

A modular system allows us to customize our units according to your specifications



Capacity

250 Nm³ - 20,000 Nm³
per unit



Pressure

Operating pressure
0.5 bar - 400 bar



Optional Efficiency

Zero to minimum losses
thanks to ReiCat Closed
Loop Technology



Optional Flexibility

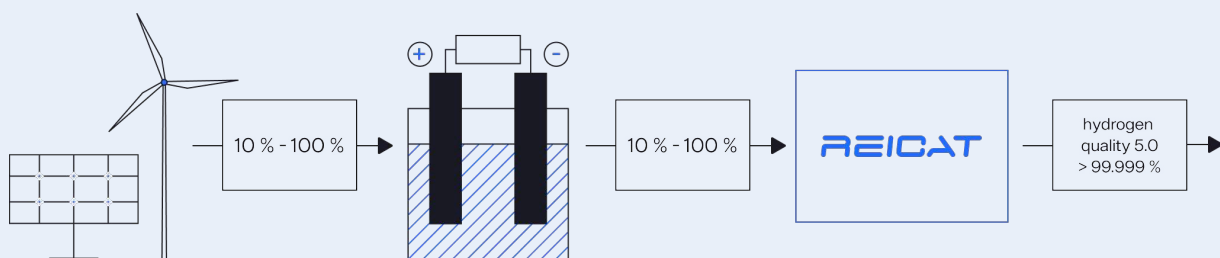
Dynamic load balancing for
PtX with ReiCat HighFlex
H₂® Technology

Optional add-ons for maximum performance

Our HighFlex H₂® Technology and our Closed Loop Technology can be added to any unit

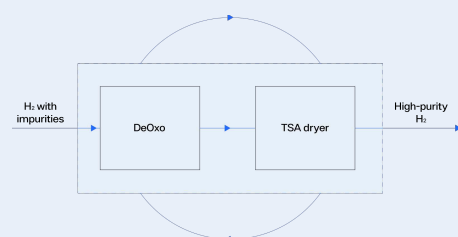
HighFlex H₂® Technology

Dynamic load balancing between 10 - 100 % for PtX



Closed Loop Technology

Removes impurities with minimal to zero losses



Our four design standards are tailored to different setups

Internal blower

- ✓ minimal losses & high energy efficiency
- ✓ can operate in start-stop modus
- ✓ independent regeneration from gas flow
- ✓ popular among PtX customers

Booster / compressor

- ✓ zero losses
- ✓ also suitable when a compressor is already present in your system

Regulator

- ✓ zero losses
- ✓ low maintenance
- ✓ minimum pressure losses

Suction side on-site compressor

- ✓ zero losses & highest energy-efficiency
- ✓ low maintenance
- ✓ can achieve H₂ quality of 6.0
- ✓ suitable when a compressor is already present in your system

Key benefits of ReiCat's H₂ purification solution

ReiCat's H₂ purification solution

Best performing DeOxo catalyst

Proprietary, field-proven
high-performance DeOxo catalyst
DeOxy Pro

Low maintenance molecular sieve

Specialized molecular sieve with a
service life of 10 years in line with the
legally required periodic inspections of
pressure vessels

Lowest OPEX due to energy-optimized design

Energy-efficient design with heat
recovery – average energy
consumption of 6 - 10 Wh/Nm³

Drawing from technical gas expertise

More than 600 industrial-scale
purification plants for technical gases
and exhaust air delivered worldwide

High flexibility and minimum loss

HighFlex H₂[®] technology allows the
system to operate with a minimum
outlet flow rate of 10 % and ReiCat
Closed Loop TSA technology
minimizes H₂ losses down to 0 %

Proven production setup ensures quality

A proven production setup in Germany,
developed over more than 40 years,
together with a highly specialized team
and state-of-the-art equipment,
ensures the highest quality standards

Competitor H₂ purification solutions

Standard catalyst from supplier - often
with limited tolerance of catalyst
poisons and lower performance

Use of desiccants like silica or alu gel
with a service life of appr. 2 years
→ results in drastically higher
downtime and maintenance cost

Energy consumption of 15 Wh/Nm³ or
higher

Often background in natural gas but
limited long-time experience with technical
gases OR industrial-scale systems

Conventional purification systems are
limited to a minimum flow rate of 20 %
and operate with standard TSA
technology, resulting in up to 3 % gas
loss

Often newly set-up production facilities
with less mature production processes

We delivered more than 60 H₂ treatment units

Selected references:

Industry	Application	Flow rate Nm ³ /h	Pressure bar(g)	Country of installation
Energy	Power-to-X	21,574	40	Germany
Technical gas production	Chlorine-alkali-electrolysis	16,593	25	Belgium
Chemistry	Chlorine-alkali-electrolysis	15,000	20	Germany
Energy	Power-to-X	10,506	48	Denmark
Metal & automotive	Tungsten powder production	10,000	0.5	confidential
Chemistry	Chlorine-alkali-electrolysis	10,000	20	Germany
Chemistry	Chlorine-alkali-electrolysis	6,000	60	Germany
Chemistry	Fine chemical production	4,000	4	USA
Technical gas production	Water electrolysis	2x 2,000	10	Eastern Europe
Technical gas production	Chlorine-alkali-electrolysis	3,500	300	Germany
Chemistry	Fine chemical production	3,000	4	Spain
Energy	Power-to-X	3,000	35	Denmark
Technical gas production	Cylinder filling	2,000	250	Hungary
Energy	Power-to-X	1,830	36	Germany
Technical gas production	Electrolysis / cylinder filling	300	5	South Africa
Energy	Power-to-X	250	30	Netherlands
Energy	Power-to-X	225	20-35	Germany



What you can expect from working with us

We accompany you from your first inquiry to a reliable maintenance service

Your inquiry

You provide us with information about your project by completing our questionnaire.



Budget offer for standard system

We send you a budget offer for a comparable standard system.



Custom commercial and technical quotations after basic engineering

You order a basic engineering service from ReiCat and provide your specifications. In return, we provide you a commercial and technical quotation. See FAQ #10.



Presentation of our solution including Q&A session

We present you our solution and guide you through our quotations. This is the time to discuss and clarify all technical questions from your side.



Detailed engineering, manufacturing & commissioning

During detailed engineering we conduct calculations of strength, flow, and beam statics. We manufacture your unit and supervise the installation and start-up.



Maintenance and spare parts services

We offer custom maintenance and spare parts services fit for your needs.

FAQ

Gas quality and technical specifications

1. Which impurities can be removed from hydrogen from electrolysis?

The main impurities of H₂ from electrolysis are residual oxygen and moisture. In case of alkaline electrolysis there might also be traces of liquid alkaline. Oxygen, moisture and aerosols can be removed by standard ReiCat hydrogen purification units producing hydrogen of quality 5.0 / grade 99.999 %. Further impurities might be removed by enhancing our standard systems.

2. Can you also purify to quality 6.0 / grade 99.9999 %?

Yes, under the condition that there are only oxygen and moisture as impurities and that the gas can be dried up to - 60 °C and at > 20 bar, our systems can purify hydrogen to grade 99.9999 %. This requires a bigger reactor and a bigger chiller.

3. What are your inlet requirements regarding temperature and pressure?

Our systems are flexible in terms of temperature. The standard pressure range is 1 - 40 bar(g). However, a special design allows pressures up 400 bar(g).

4. Which Closed Loop design standard is best for my application?

The choice depends on your requirements and needs. See page 2 for details on each design.

Catalyst & process efficiency

5. What are the standard adsorption and regeneration times of your systems?

8 h - 24 h adsorption cycles (depending on the size of the unit), 8 h regeneration.

6. What are the standard H₂ losses in a system without ReiCat Closed Loop Technology?

A standard systems loses around 3 % of H₂. ReiCat Closed Loop Technology can reduce this to zero.

7. What is the energy consumption of a standard system?

Approximately 10 Wh per Nm³.

Scope of supply

8. What is ReiCat's scope of supply?

Gas purification unit, packaging, transportation (upon request), supervision of commissioning & startup service, spare parts package, custom maintenance package (upon request).

9. What is included in the budget offer of a standard system?

Engineering, all components within the skid incl. HighFlex H₂® and Closed Loop Technology (pressure vessels, piping, fittings, catalyst, molecular sieve), O₂ & H₂O analysis, design according to EN code, manufacturing.

FAQ

Scope of supply

10. What is included in the commercial and technical quotation after basic engineering?

- Commercial quotation: unit price, price of requested add-ons and delivery time.
- Technical quotation: basic PFD diagram, basic layout plan, utility requirements, utility consumption, basic overall dimensions, basic overall weight, scope of supply / list of materials, process description; in our “Basic Engineering Plus” package the following additional deliverables are included: preliminary P&ID, information about noise emissions, HAZOP on-site study, general arrangement drawing (incl. dimensions).

Engineering standards & delivery times

11. Is construction according to ASME or other engineering standards/codes possible?

Yes, it is possible. We generally follow EN standards. Upon request we are happy to follow other engineering standards like ASME, China Stamp, etc. We have delivered systems for every common international standard in the past.

12. What is the standard delivery time?

Delivery time highly depends on your specifications and our capacity at time of order.

Installation & setup

13. Is outdoor installation possible?

Yes, outdoor installation is possible with accompanying heating and insulation elements.

14. How long does installation and commissioning take?

This heavily depends on the system size and scope. For a system size of 15,000 Nm³/h, commissioning and startup typically take around 2 – 3 weeks.

Why should I choose ReiCat?

- Experience matters! ReiCat builds on 40 years of experience in gas purification.
- More than 60 hydrogen treatment systems worldwide proof the longevity of our systems beyond the industry standard of 20 - 25 years.
- Our modular systems allows for tailored engineering according to your needs.
- Our systems are designed for highest energy efficiency to ensure lowest OPEX.
- Our proprietary Closed Loop Technology and HighFlex H₂® Technology guarantee minimum to zero H₂ loss and optimal adaptation to fluctuating volume flows in PtX systems.