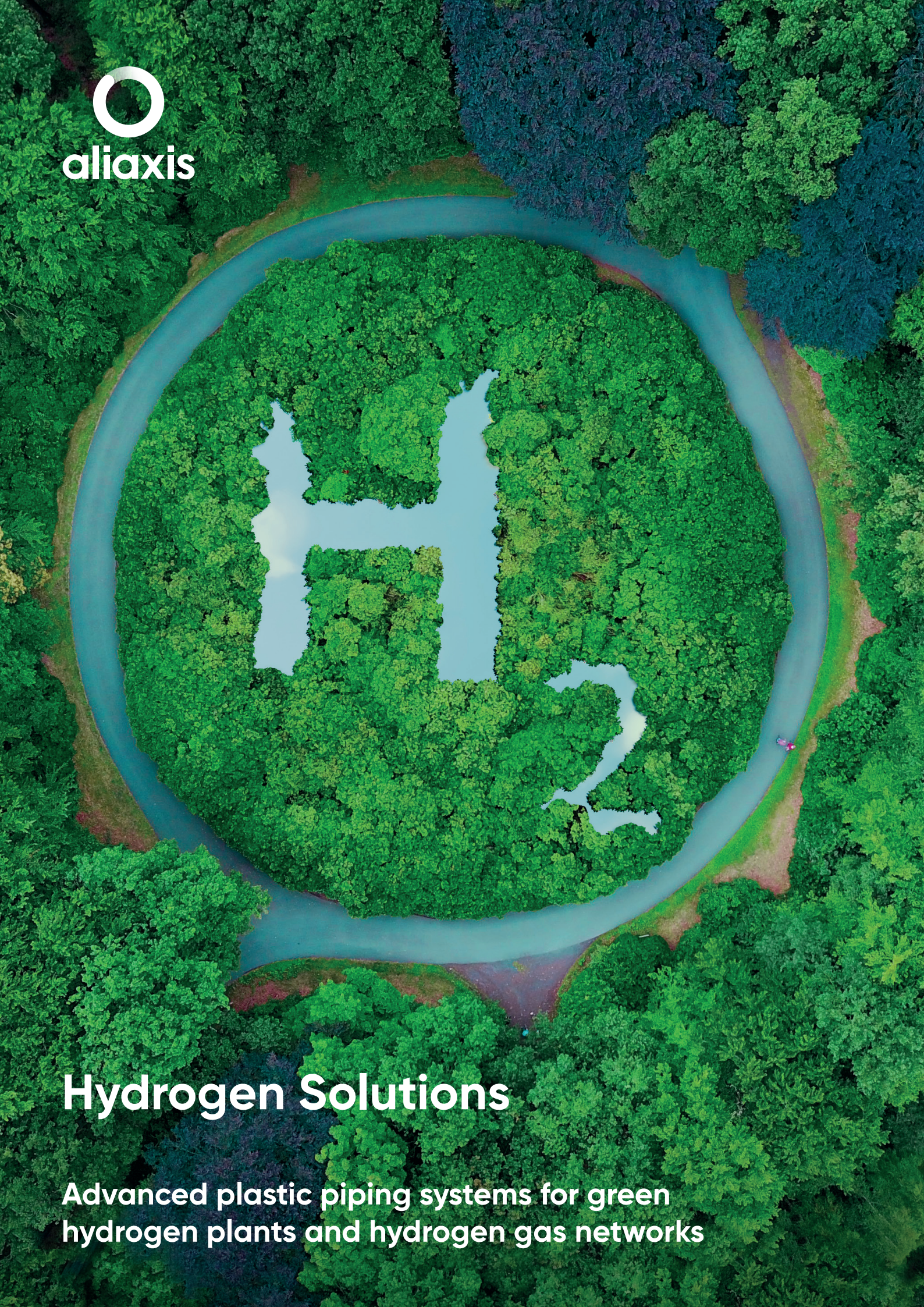
aliaxis



Hydrogen Solutions

Advanced plastic piping systems for green hydrogen plants and hydrogen gas networks

we make life flow

As a pipe and fittings systems manufacturer, we exist to bring solutions to the world's water challenges and accelerate the transition to clean energy.

What we offer

Aliaxis is a global leader in the manufacturing and distribution of advanced plastic piping systems. We provide communities around the world with sustainable innovative solutions for water and energy, leading the industry in a way that anticipates the rapidly evolving needs of our customers and of society.

aliaxis

Contents

MOVING TOWARDS A HYDROGEN-READY FUTURE 2

- Power-to-X Ecosystem

SOLUTIONS FOR GREEN HYDROGEN PLANTS 6

- Water Treatment
- Electrolyte Preparation & Feed
- Water Electrolysis
- Cooling Water

SOLUTIONS FOR HYDROGEN GAS NETWORKS 20

OUR SERVICES 22

Moving towards a **hydrogen-ready future**

As a global community, we need to act urgently to tackle climate change and fight the effects of global warming. To avoid the worst impacts of global warming and maintain a livable planet, greenhouse gas emissions must be reduced by almost 50% by 2030 and reach net-zero by 2050.

Today, we use fossil fuels for 80% of the energy we produce globally, and energy production is the source of about three-quarters of global greenhouse gas emissions annually. As the 2050 net-zero deadline approaches, it's clear we must reduce our dependency on fossil fuels by transforming the way we produce and use energy.

Renewable energy sources, namely wind and solar, provide a pathway toward transforming the global energy sector, and although they make up a small fraction of today's global energy supply, their declining costs and rate of growth forms the base of our net-zero ambitions and creates the conditions for a fully decarbonized future.

The scenario of replacing all fossil fuels with these renewables will essentially mean full electrification of the energy sector. But electricity alone is not suitable for all end-use applications, in what we would call the hard-to-abate sectors, like heavy industry and heavy mobility.

Renewables on their own will not be enough to help us achieve net-zero. They will require a partner - something that can extend their reach and allow them to penetrate the hard-to-abate, energy-intensive sectors.

That partner is hydrogen.

Why hydrogen?

As the most abundant element in the universe, hydrogen holds incredible promise in supporting and enabling a net-zero energy system.

- It can be used to store energy for long time periods.
- It can transport energy over long distances through piping infrastructure networks and via ships.
- It can directly replace fossil fuels as a fuel itself.
- When it burns, it burns clean. The only combustions by product is water.

Another of hydrogen's most promising aspects is that it can be produced from electricity and water using a process called water electrolysis.

- When this electricity is derived from a renewable source, like wind or solar, the result is a versatile clean energy carrier produced with virtually zero greenhouse gas emissions.
- Hydrogen produced from renewable electricity and water is commonly referred to as 'green hydrogen'.

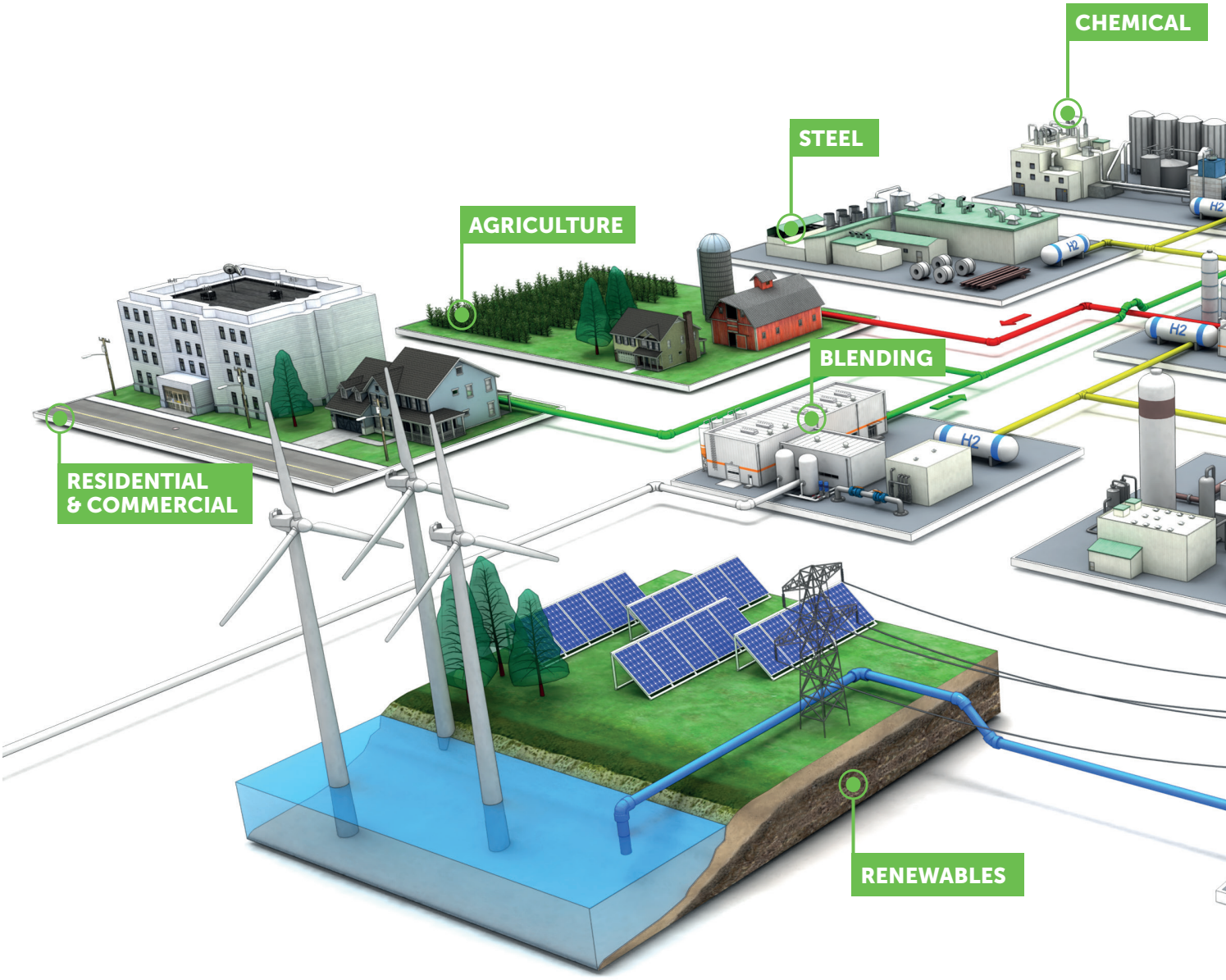
Now, we can benefit from renewable energy sources even when they are not available, by converting them to storable and transportable green hydrogen.

The hydrogen energy transition is in motion, and Aliaxis is ready.

Will you take the journey with us?

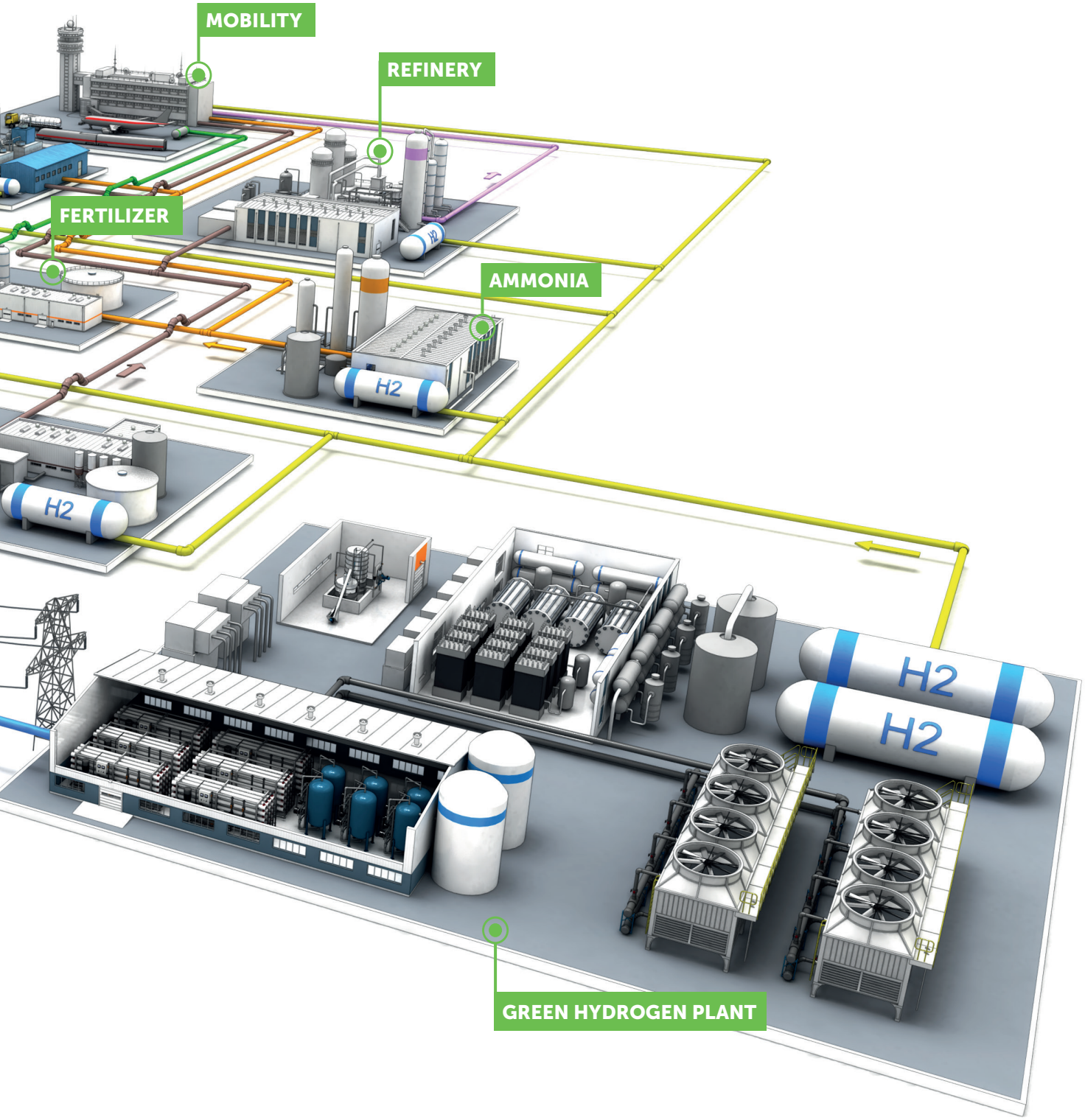
Backed by a 60-year reputation from industry-leading global brands, Aliaxis offers a comprehensive range of integrated piping system solutions to meet the needs of green hydrogen plants, hydrogen gas infrastructure networks, and a variety of applications within the Power-to-X ecosystem.

Unlocking the power of hydrogen through the **Power-to-X ecosystem**



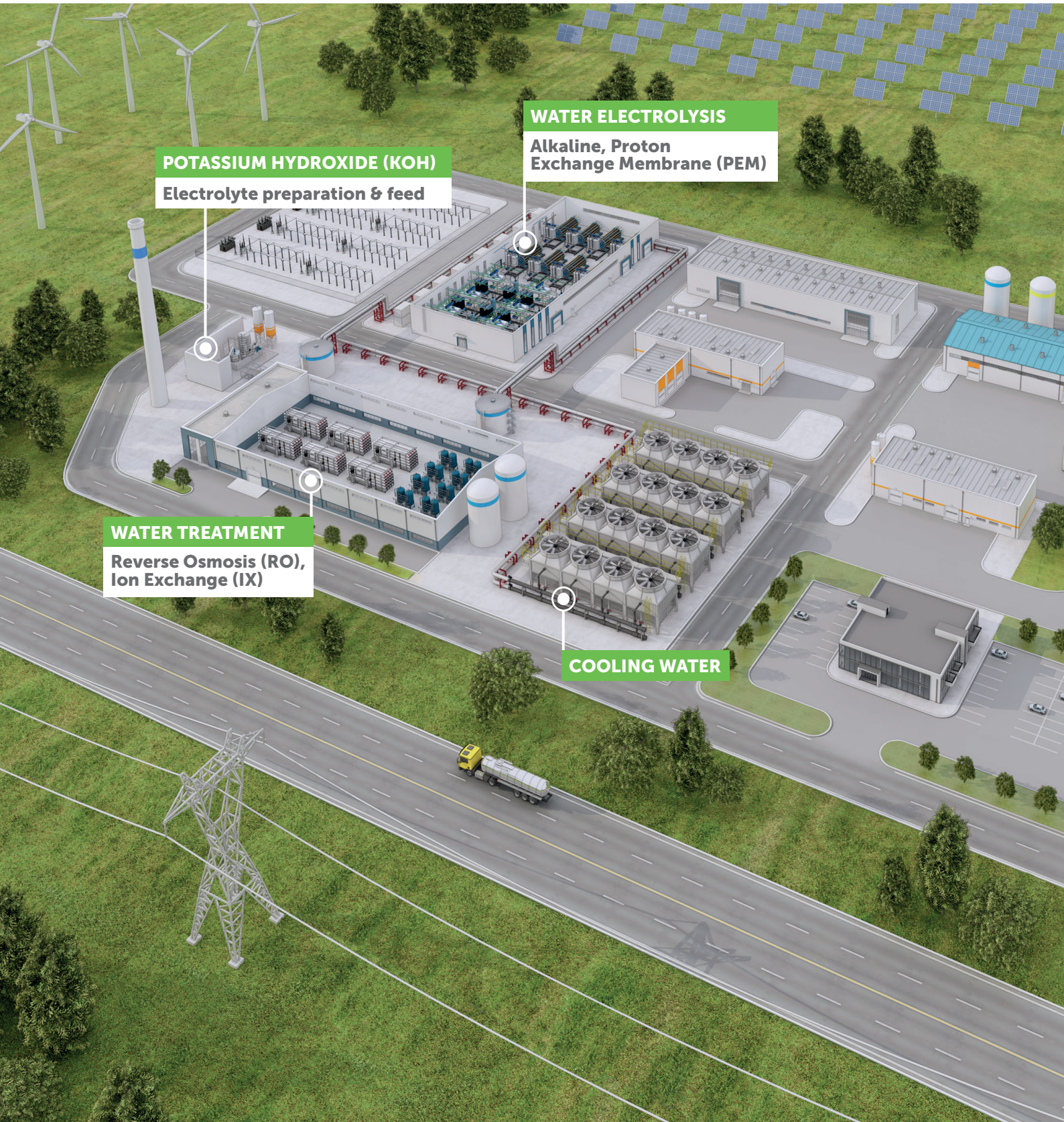
Power-to-X describes the process of converting renewable energy into hydrogen via water electrolysis. The produced green hydrogen can then be used as a fuel or feedstock in a variety of applications, many of which renewables alone have a hard time penetrating. Green hydrogen acts as the bridge between renewables (Power) and a multitude of downstream sectors (X).

The Power-to-X ecosystem is where renewables and hydrogen form their partnership, and it is viewed as a key component on our road to net-zero.



Piping system solutions for **Green Hydrogen Plants**

Aliaxis piping system solutions consist of pipes, fittings, valves, and measurement & instrumentation devices, suitable for a wide range of applications within green hydrogen plants. Whether it be conveyance of demineralized water, potassium hydroxide electrolyte handling, or other balance-of-plant requirements, our piping systems can overcome some of the major challenges associated with traditional metal piping systems.



Features & Benefits of Aliaxis piping systems

Corrosion & Chemical Resistance

The interior and exterior walls of Aliaxis piping systems remain smooth in many service conditions, unlike metals which, over time, can rust, pit, scale, and corrode. Furthermore, our systems provide excellent chemical resistance properties, which allows the safe transportation of a range of industrial fluids and aggressive chemicals.

Lightweight

Aliaxis piping systems are made from strong, lightweight materials, which can reduce transportation and handling costs compared to traditional metal systems. The lightweight nature of our systems can contribute to the safety of installation teams, making pipe and fittings easier to manipulate and reducing the risk of manual handling injuries.

Ease of Installation

Aliaxis piping systems are assembled by fast and reliable jointing techniques, reducing labor and installation costs compared to traditional metal systems. And since no open flame processes are required, installers can realize an improvement to safety on-site, reducing the risk of fire and helping to keep people and buildings safe.

Improved Energy Efficiency

The long-term corrosion resistance benefits of Aliaxis piping systems contribute to low frictional losses throughout the system, which can help maintain pump efficiencies. Furthermore, Aliaxis plastics have a lower rate of thermal conductivity compared to traditional metals, which helps reduce system heat losses. All of this results in improved long-term energy efficiencies over the life of our piping systems.

Extended Life & Performance

Once properly selected for the application and correctly designed & installed, Aliaxis piping systems can provide years of trouble-free, maintenance-free service.

Application

Water Treatment

Water is one of the main inputs for green hydrogen plants. Before water enters the electrolysis stack, it must be treated and demineralized to remove impurities. The water treatment method depends on the raw water source and the water quality requirements of the specific electrolysis technology. Green hydrogen plants will often employ one or a combination of treatment technologies, like reverse osmosis (RO), ion exchange (IX) and electrodeionization (EDI).

Reverse Osmosis (RO)

Reverse Osmosis is a filtration process in which water is forced through a semi-permeable membrane at high pressure to remove contaminant particles, such as aqueous salts and metal ions. Aliaxis offers a variety of piping system solutions designed for reverse osmosis applications, including our wide range flow control valves, measurement & instrumentation devices, and systems for clean-in-place (CIP) processes.

Key Solutions

FIP PVC-U System

The FIP PVC-U System is ideally suited for industrial water treatment applications. Along with its extensive use for transporting water of various qualities, PVC-U is resistant to corrosion and chemical attack by acids, alkalis, salt solutions and many other chemicals, making it extremely versatile in its ability to handle a variety of industrial fluids.

VKD Actuated 2-Way Ball Valve

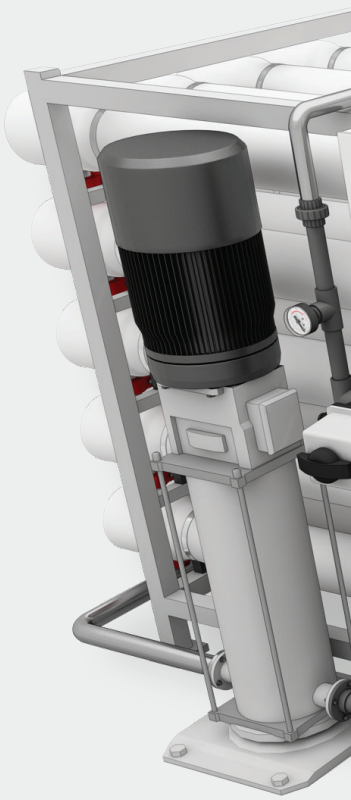
Available in a variety of different valve materials and control options, the VKD Actuated 2-Way Ball Valve provides reliable automated flow control within RO systems. The integrated top mounting flange and easy to install PowerQuick mounting kit combine for simple adaptation for actuation.

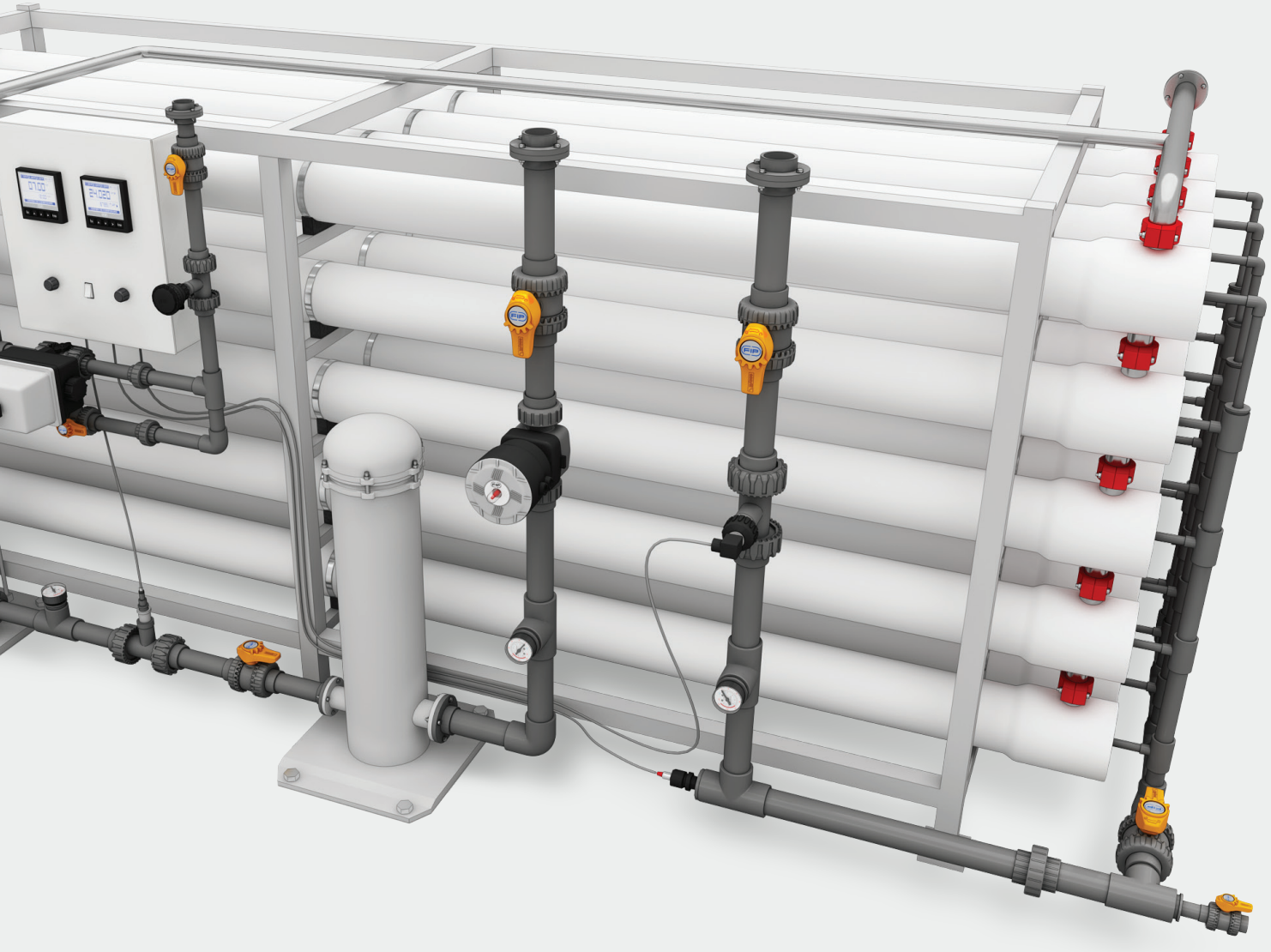
FLS M9.07 Flow & Conductivity Monitor

The FLS M9.07 is a dual monitor and transmitter which combines flow and conductivity measurements. It ideally utilized when these measurements are required in proximity. A 4" full graphic display can show up to 3 parameters at one time or a single parameter in full screen.

FLS F3.00 Paddlewheel Flow Sensor

The FLS F3.00 paddlewheel flow sensor is designed for use with a variety of solid-free liquids. The sensor is ideal for measuring non-conductive liquids and can measure flow as low as 0.15 m/s while maintaining a highly accurate output signal. A specially designed family of fittings ensures an easy and quick installation into all pipe materials, in sizes from DN15 to DN600.





Application

Water Treatment

Water is one of the main inputs for green hydrogen plants. Before water enters the electrolysis stack, it must be treated and demineralized to remove impurities. The water treatment method depends on the raw water source and the water quality requirements of the specific electrolysis technology. Green hydrogen plants will often employ one or a combination of treatment technologies, like reverse osmosis (RO), ion exchange (IX) and electrodeionization (EDI).

Ion Exchange (IX)

Ion Exchange treatment is used to demineralize water before it enters the electrolysis stack. Charged ion exchange resins remove unwanted ions in the water. The resins must be periodically regenerated by washing with an acid or basic solution to restore their original ionic form. Aliaxis piping system solutions for ion exchange applications include manual and pneumatically actuated flow control valves, flow meters, conductivity sensors, and systems used to safely transport regeneration chemicals.

Key Solutions

FIP PVC-C System

The FIP PVC-C System, like PVC-U, is resistant to corrosion and chemical attack by acids, alkalis, salt solutions and many other chemicals. The ability of PVC-C systems to handle corrosive fluids up to 95°C is particularly beneficial with processes operating at elevated temperatures, which is common when anion exchange resins are regenerated with caustic solutions.

DK Actuated 2-Way Diaphragm Valve

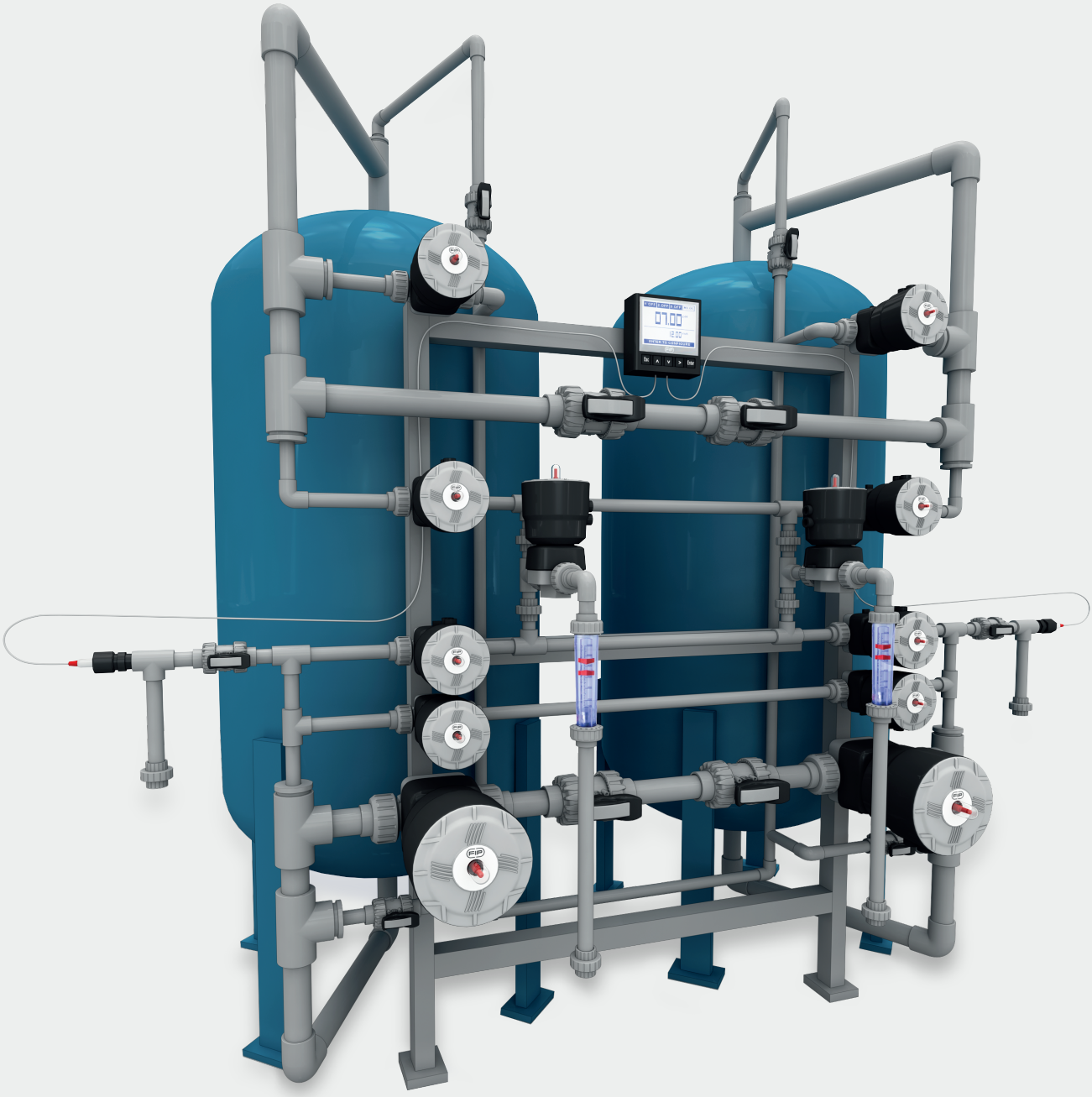
The DK Pneumatic Actuated 2-Way Diaphragm Valve allows for precise flow regulation while providing a high number of actuation cycles. The modular nature of this valve results in many material, body style, diaphragm, and control options. The high-strength, compact, and lightweight actuator comes with a standard optical position indicator protected by a transparent cap.

FLS C300 Conductivity Sensor

The FLS C300 Conductivity Sensor is designed for the monitoring of high purity water. The integrated temperature sensor with an automatic temperature compensation function allows for precise measurement of conductivity, down to 0.055 µs/cm.

FLS M9.05 Conductivity Monitor

The FLS M9.05 conductivity monitor is suitable for a broad range of applications, including high purity water processes like ion exchange. Two 4-20mA analog outputs allow transmission of conductivity and temperature measurements to an external device.



Application

Potassium Hydroxide (KOH) Electrolyte Preparation & Feed

Potassium Hydroxide (KOH), at concentrations between 25-30% in solution, is normally used in alkaline water electrolysis because it provides enhanced conductivity when compared to other alkaline electrolytes. A common way of preparing the KOH feed solution is by supplying pre-treated water into a mixing tank, where the KOH is dissolved in water, and then the 25-30% solution is sent to the electrolysis stage.

Aliaxis offers piping system solutions in a variety of materials suitable for the safe handling of KOH. Our wide range of flow control valves and measurement & instrumentation devices ensure precise control for batch mixing processes.

Key Solutions

FIP PVC-U System

The FIP PVC-U System is ideally suited for industrial water treatment applications. Along with its extensive use for transporting water of various qualities, PVC-U is resistant to corrosion and chemical attack by acids, alkalis, salt solutions and many other chemicals, making it extremely versatile in its ability to handle a variety of industrial fluids.

FIP PVC-C System

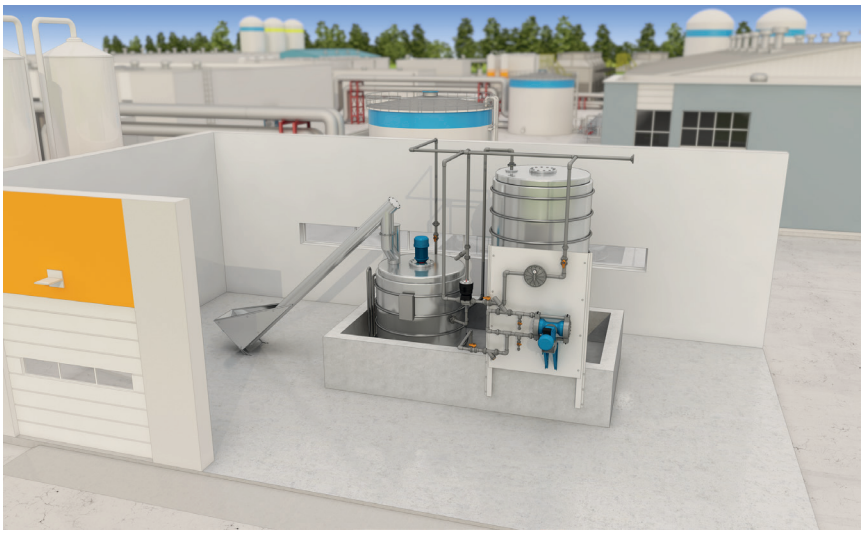
The FIP PVC-C System, like PVC-U, is resistant to corrosion and chemical attack by acids, alkalis, salt solutions and many other chemicals. The ability of PVC-C systems to handle corrosive fluids up to 95°C is particularly beneficial with processes operating at elevated temperatures, which is common when anion exchange resins are regenerated with caustic solutions.

VXE 2-Way Ball Valve

The VXE 2-Way Ball Valve features an ultra-compact double block design and full port operation. The true union ends allow the valve to be easily removed from the piping system and fully serviced. The Easyfit handle doubles as a tool for ball seat adjustment and for the safe tightening of union nuts. A labelling system built into the handle allows labelling or tagging to mark, protect, or identify the valve.

FLS HF6 Hydrostatic Level & Pressure Transmitter

The FLS HF6 Hydrostatic Level & Pressure Transmitter is designed to measure the fluid level in a tank using a gauge pressure sensor that measures fluid column weight. The transmitter can be installed from the top of the tank or mounted through the wall of the tank. A capillary tube inside the sensor body is used for proper compensation of atmospheric pressure.



Application

Alkaline Water Electrolysis

Alkaline water electrolysis uses an aqueous alkaline electrolyte solution, like KOH, in a cell consisting of an anode and cathode separated by a membrane. Cells are arranged in a stack and when an electrical current is applied, water is split on the cathode side where hydrogen gas is formed. Hydroxide ions (OH^-) move through the membrane from the cathode to the anode side, where oxygen gas is formed.

Alkaline water electrolysis solutions from Aliaxis include piping systems for electrolyte feed and recirculation, gas collection, electrolyte and gas cooling, instrument air, and process drainage.

Key Solutions

FIP PVC-C System

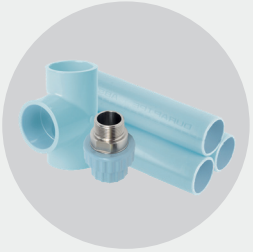
The FIP PVC-C System, like PVC-U, is resistant to corrosion and chemical attack by acids, alkalis, salt solutions and many other chemicals. The ability of PVC-C systems to handle corrosive fluids up to 95°C is particularly beneficial with processes operating at elevated temperatures, which is common when anion exchange resins are regenerated with caustic solutions.

FIP PP-H System

The FIP PP-H System provides excellent performance at elevated operating temperatures. The system consists of a comprehensive range of pipes, fittings, valves, and measurement & instrumentation devices for conveying pressurized and non-pressurized industrial fluids.

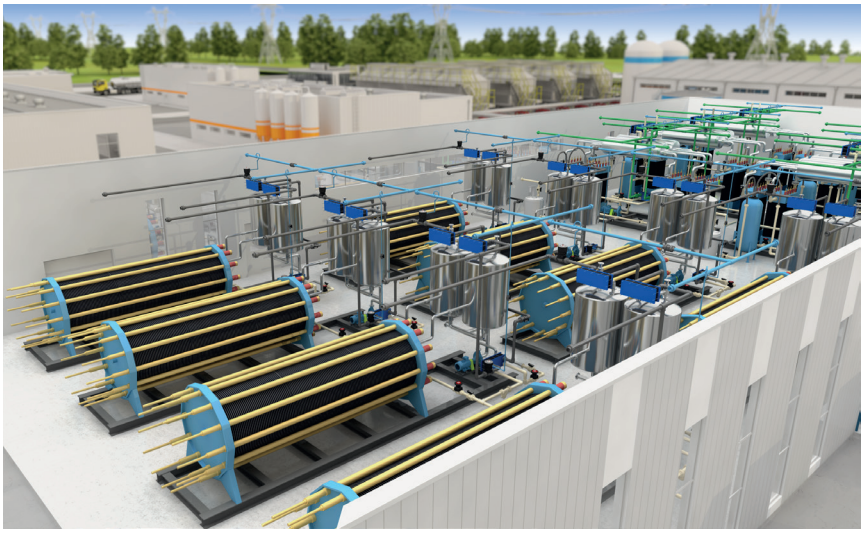
SuperFLO ABS System

The SuperFLO ABS System is ideal for transporting cooling water or water-glycol mixtures. SuperFLO ABS has a smooth bore, greatly reducing or even eliminating the build-up of biofilms which can harbour harmful bacteria. The system is corrosion resistant, meaning lower maintenance costs and optimum pump efficiencies, and can operate over a wide range of temperatures, as low of -40°C.



Air-Line Xtra Compressed Air System

Air-Line Xtra is a system specifically designed for compressed air distribution. It is the ideal solution for ensuring that air is kept clean and uncontaminated. This lightweight, non-corroding system is suitable for continuous operation at 12.5 bar and is an excellent alternative to traditional metal piping systems.



Application

PEM Water Electrolysis

Proton exchange membrane (PEM) water electrolysis uses demineralized water in a cell consisting of an anode and cathode separated by a solid polymer electrolyte membrane. Cells are arranged in a stack, with water fed to anode. When an electrical current is applied, water is split on the anode side where oxygen gas is formed. Hydrogen ions (H^+) move through the membrane from the anode to the cathode side, where hydrogen gas is formed.

PEM water electrolysis solutions from Aliaxis include piping systems for demineralized water feed and recirculation, gas collection, water and gas cooling, instrument air, and process drainage.

Key Solutions

FIP PP-H System

The FIP PP-H System provides excellent performance at elevated operating temperatures. The system consists of a comprehensive range of pipes, fittings, valves, and measurement & instrumentation devices for conveying pressurized and non-pressurized industrial fluids.

STRAUB Pipe Couplings

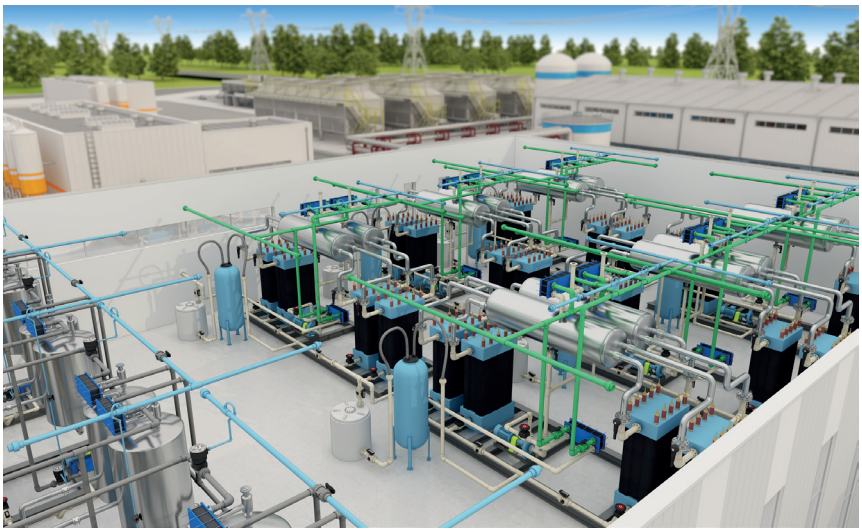
STRAUB Pipe Couplings are capable of joining pipes of the same or dissimilar materials, replacing traditional welded and flanged jointing methods. This universal connection solution can be made on smooth-ended pipes without any pipe end machining, resulting in quick, safe, and reliable installations.

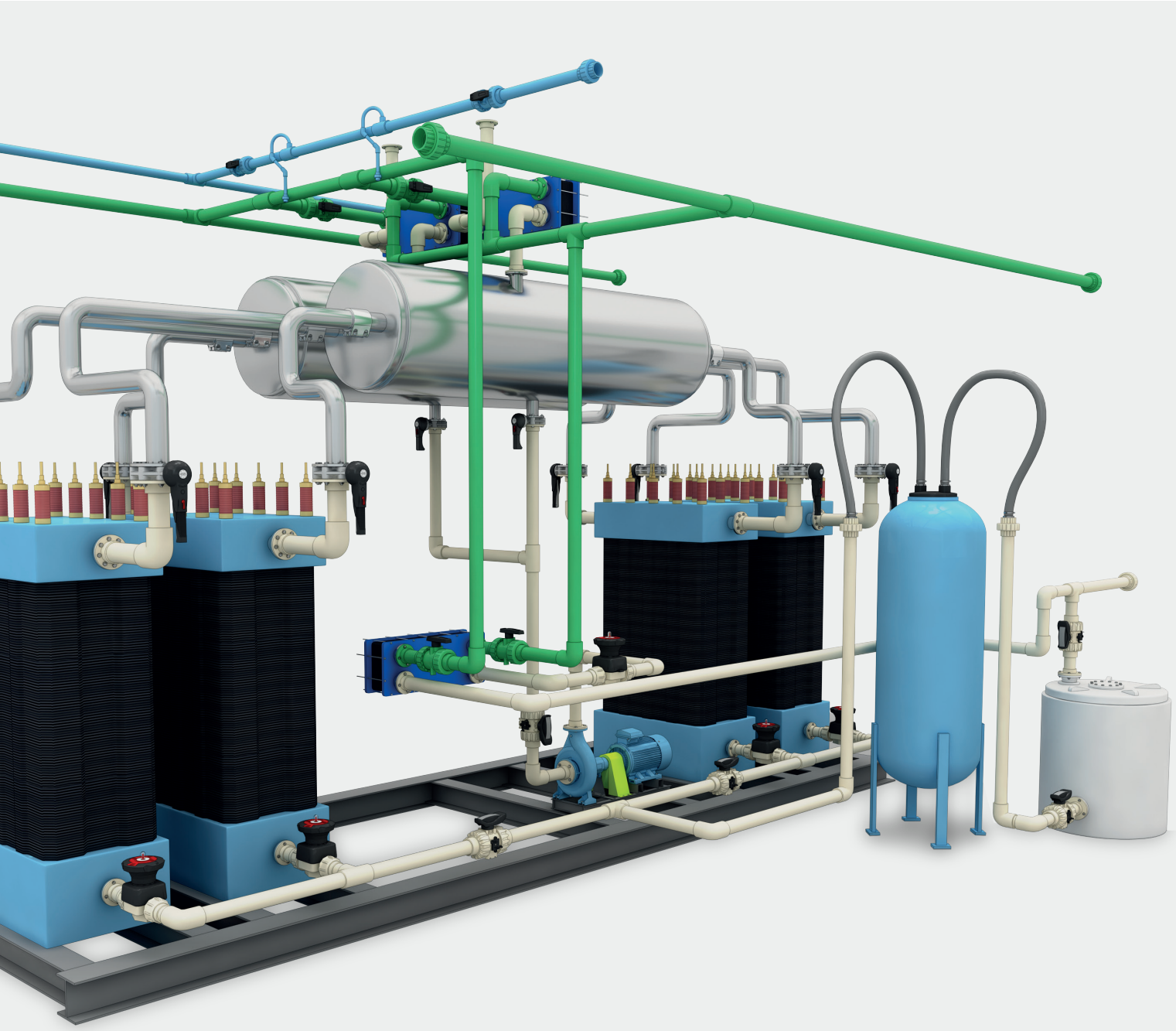
KRYOCLIM® System

The KRYOCLIM System is especially fit for industrial cooling applications. The system is made from HPF®, a state-of-the-art synthetic material which offers excellent physical and chemical properties at very low temperatures, The system can operate over a wide range of pressures and temperatures while remaining extremely ductile, even at its lowest permissible temperature of -30°C.

GIRAIR® Compressed Air System

GIRAIR is a system specifically designed for compressed air distribution. It is the ideal solution for ensuring that air is kept clean and uncontaminated. This lightweight, non-corroding system is suitable for continuous operation at 12.5 bar and is an excellent alternative to traditional metal piping systems.





Application

Cooling Water

Green hydrogen plants require cooling systems for several processes, including rectifier cooling, water and electrolyte recirculation cooling, and cooling the produced hydrogen gas and oxygen gas. Evaporative cooling is a common choice for these systems, where cooling water absorbs heat from the processes and is sent to one or more cooling towers to reduce the water's temperature. The cooled water is pumped back into the processes, where it absorbs heat again, and is then sent back to the cooling towers in a continuous cycle.

Aliaxis piping solutions for cooling are highlighted by our SuperFLO ABS, PE, and KRYOCLIM® systems, which can operate over a wide span of pressures and temperatures, contributing to trouble-free performance over the life of the cooling system. We also offer piping solutions for chemical dosing systems, used to prevent corrosion, scaling, fouling and microbial growth in cooling applications.

Key Solutions

SuperFLO ABS System

The SuperFLO ABS System is ideal for transporting cooling water or water-glycol mixtures. SuperFLO ABS has a smooth bore, greatly reducing or even eliminating the build-up of biofilms which can harbour harmful bacteria. The system is corrosion resistant, meaning lower maintenance costs and optimum pump efficiencies, and can operate over a wide range of temperatures, as low of -40°C.

PE100 System

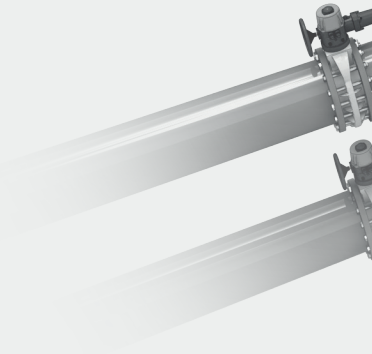
The PE100 System, consisting of pipes, fittings, valves, and installation tools & equipment is an ideal solution for cooling water applications. PE pipe is flexible, lightweight and corrosion resistant, and can be used to create robust, fully-welded systems with butt-fusion or electrofusion jointing for maximum joint integrity and an extensive service life.

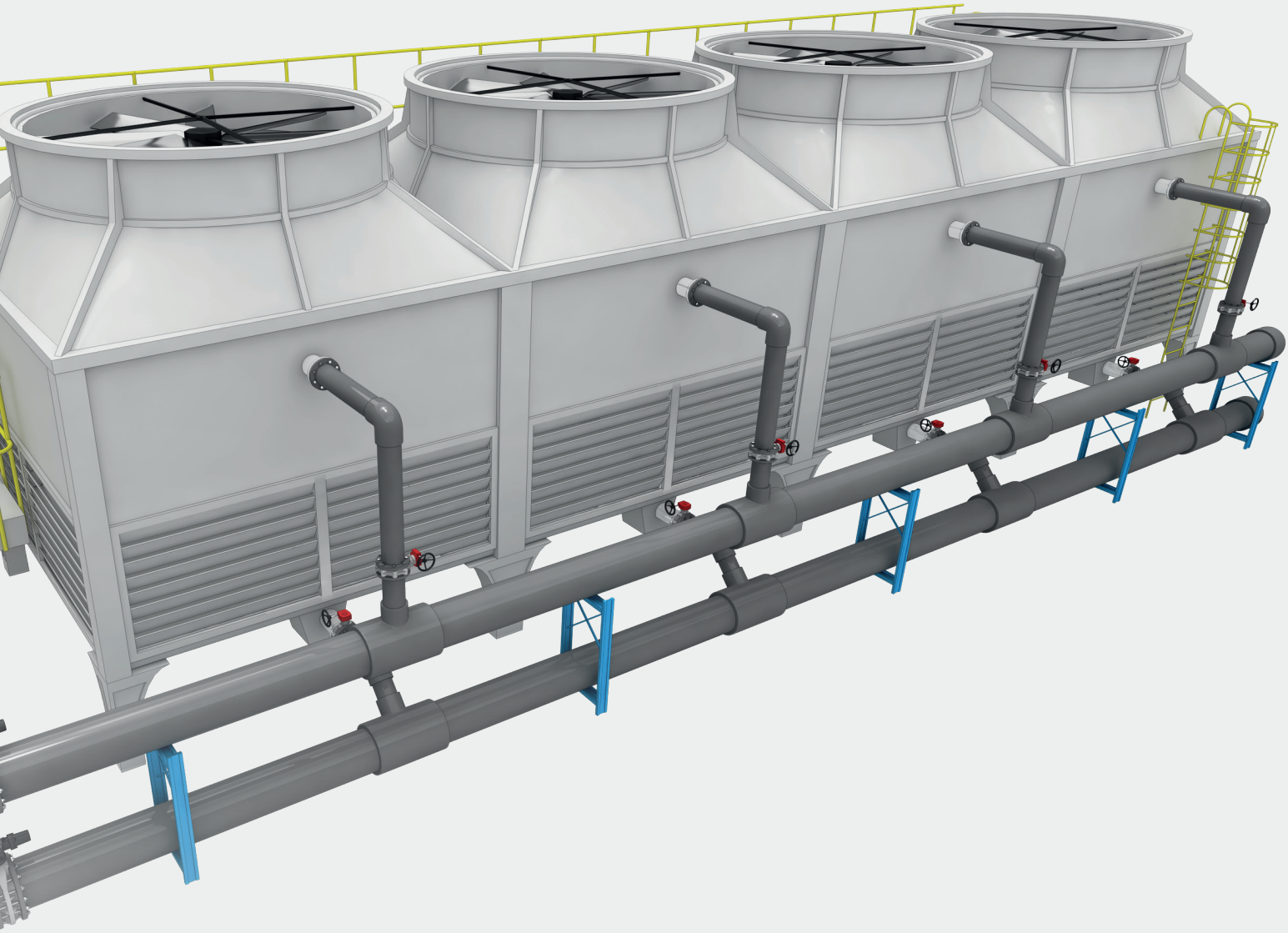
KRYOCLIM® System

The KRYOCLIM System is especially fit for industrial cooling applications. The system is made from HPF®, a state-of-the-art synthetic material which offers excellent physical and chemical properties at very low temperatures, The system can operate over a wide range of pressures and temperatures while remaining extremely ductile, even at its lowest permissible temperature of -30°C.

FK 2-Way Butterfly Valve

Available in a variety of disc materials and control options, the FK 2-Way Butterfly Valve provides reliable flow control within cooling water systems, up to DN400 sizes. The FK's fiberglass reinforced polypropylene (PPGR) body provides optimal UV resistance and high mechanical strength, making it suitable for use in demanding outdoor applications.





PE piping system solutions for

Hydrogen Gas Networks

As the hydrogen energy transition evolves, there will be an increasing need to deliver green hydrogen to various sectors and end-use applications. In some cases, up to 100% hydrogen will be required, while in other cases, hydrogen admixtures into natural gas networks will be employed. These scenarios will require either completely new hydrogen gas distribution networks or upgrading of existing natural gas distribution networks to make them hydrogen-ready. There may be parts of existing natural gas networks that can accept various percentages of hydrogen without the need for upgrading. Whatever the case, Aliaxis is ready.

The Aliaxis FRIALEN® line of products is H2ready® and suitable for use in gas distribution networks with up to 100% hydrogen fuel gases. Combined with the new innovative FRIAMAT® Fusion Unit, FRIALEN safety fittings have been engineered to deliver the highest quality joints for PE pipes, creating a fully homogenous system that utilities and end-users can depend on for their hydrogen gas distribution needs.

Key Solutions

FRIALEN® Safety Fittings

FRIALEN Safety Fittings provide an unrivalled electrofusion jointing solution for PE gas piping systems. The scope of application for FRIALEN fittings and valves has been extended to hydrogen. This means that our products can be used with up to 100% hydrogen fuel gas up to a maximum operating pressure of 10 bar. This is confirmed by test certificates from the DBI – Gastechnisches Institut GmbH. Suitable components are marked with an H2ready icon in the product range.

FRIALEN H2ready products:

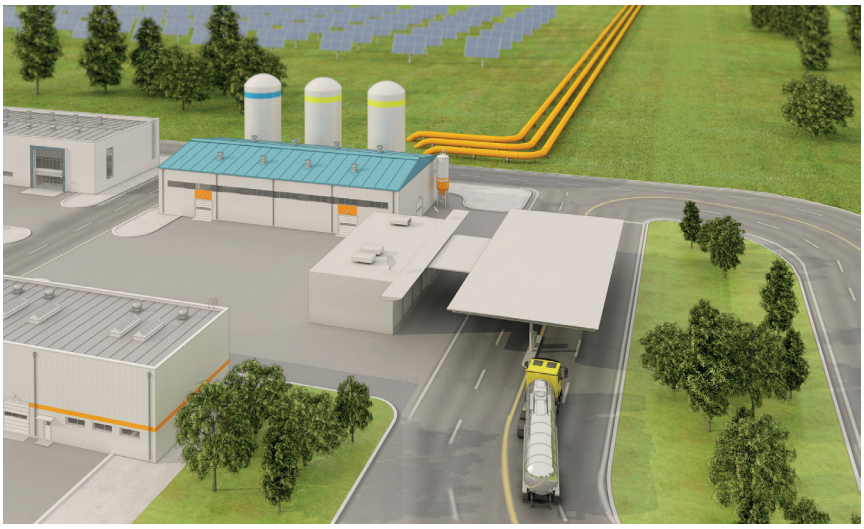
- Molded electrofusion fittings made of PE-HD for gas pipe systems
- Electrofusion tapping tees for PE-HD gas and water pipe systems
- Electrofusion gas and water tapping valves with service shut-off for PE-HD pipes
- Ball valves made of PE100

FRIAMAT® Fusion Unit

The new FRIAMAT Fusion Unit is a robust, lightweight and innovative solution to meet all electrofusion jointing needs. The FRIAMAT basic model features flow-optimized active cooling, robust housing, a high-quality graphic display, and intuitive user interface. The FRIAMAT prime model opens up a wealth of digital functions for documentation and extended traceability, made possible by the new Bluetooth interface in combination with the FRIAMAT app.

PE100 System

The PE100 System, consisting of pipes, fittings, valves, and installation tools & equipment is an ideal solution for gas inftrastructure networks. PE pipe is flexible, lightweight and corrosion resistant, and can be used to create robust, fully-welded systems with butt-fusion or electrofusion jointing for maximum joint integrity and an extensive service life.



H2ready
GEPRÜFT / TESTED

Value Added Services & Solutions

Supporting you and your project. Every step of the way.

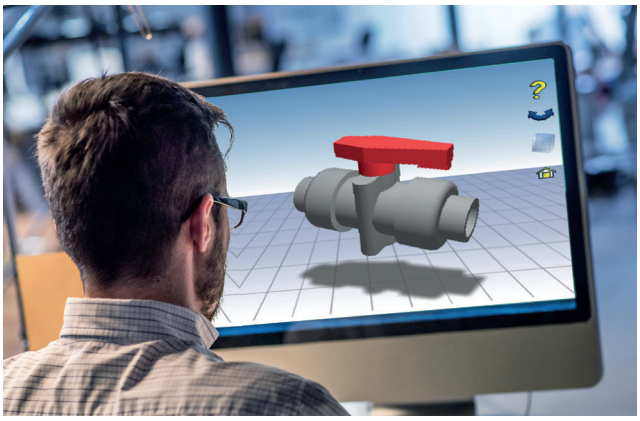
Research & Technology

As a company driven by innovation and the ambition to be the clear global leader in plastic piping solutions, our three Research & Technology hubs, located in Canada, France and India, work together with our regional and local businesses to create valued-added solutions that have a positive impact on our customers and on society.

Design & Specification Support

We know that getting the design and specification of piping systems right at the beginning of a project can save a significant amount of time further down the line. That's why our product specialists and technical support team engage with you to provide a range of services to make even the most challenging projects run smoothly. You can be sure we have the right tools and expertise to meet your needs.

- Specification review & advice
- Chemical resistance guidance
- System design support
- Design calculation tools



Digital Libraries

Effective design relies upon good quality information for all components in a system, being managed in a holistic way. To support this, we provide online CAD libraries, with drawings available in 2D and 3D file formats. We also provide Building Information Modelling (BIM) libraries for many of our product lines.

Custom Prefabrication Solutions

Whether you're looking to save time, save space, or overcome a complicated technical challenge, we provide a complete service for custom prefabrication solutions including the design, manufacture and testing of unique products engineered for your specific needs.

- Custom pipe lengths, diameters and thicknesses
- Fabricated fittings with unique angles and connection combinations
- Pipe and fitting sub-assemblies
- Manifolds
- Custom valve, actuation and seal combinations

Installation Support

Once the correct piping system is specified for an application, proper installation is critical to ensure the system will perform effectively throughout its operating life. We provide a wide range of installation resources and support to give installers the tools they need to get it right every time.

- Installation guides & videos
- Product training sessions
- E-learning platforms
- On-site support

Aliaxis SA
Avenue Arnaud Fraiteur 15-23
1050 Brussels, Belgium
T: +32 2 775 50 50
info@aliaxis.com
aliaxis.com