



PARTNERING FOR HYDROGEN

Scalable solutions for every step of the value chain

FIVES: YOUR PARTNER FOR A MORE SUSTAINABLE INDUSTRY

FROM THE FIRST RAILWAY LINES TO THE EIFFEL TOWER LIFTS AND FACTORY 4.0, FOR OVER 200 YEARS FIVES HAS BEEN DESIGNING THE DISRUPTIVE SOLUTIONS AND TECHNOLOGIES THAT MAKE UP INDUSTRY. AS A PIONEER OF DECARBONIZATION AND DIGITALIZATION, FIVES IS ALWAYS ONE INNOVATION AHEAD THANKS TO ITS ABILITY TO ANTICIPATE CUSTOMER NEEDS.

More than
200
years of history



35 R&D
centers



100
Locations

Fives: a pivotal player in the hydrogen ecosystem

A **worldwide leader** in industrial engineering, Fives has been at the forefront of hydrogen for **over 50 years**.

Our renowned experts are continuously optimizing equipment to meet the challenges of this growing market in terms of performance, cost and lead-time reduction.

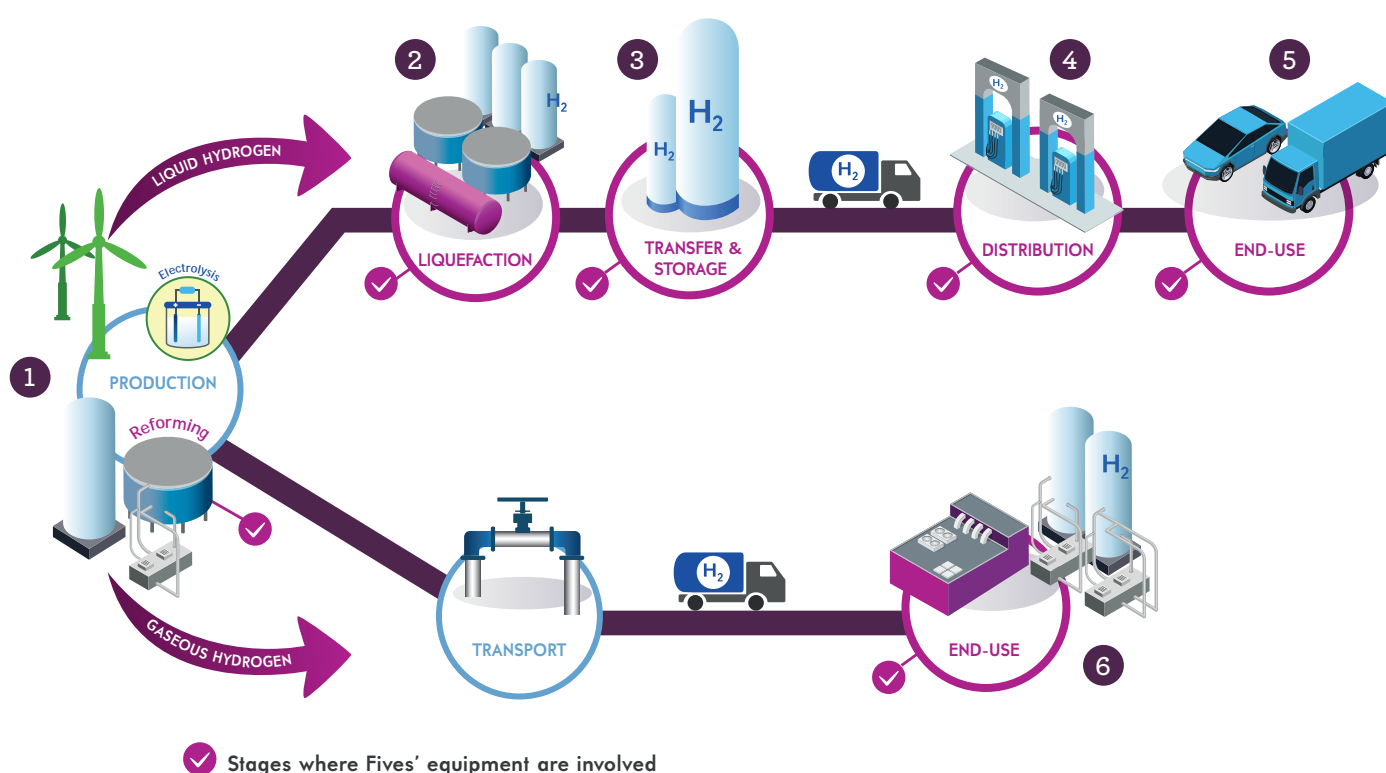
Through our extensive range of solutions for the complete hydrogen value chain, **we support manufacturers**, who are keen to **reduce their environmental impact, all around the world**.

Today, **Fives is building its technological leadership on key process equipment**, from liquefaction, distribution, to combustion, as well as on solutions for laser welding, leak testing and gigafactory automation.



FIVES SUPPORTS YOU EVERY STEP OF THE WAY IN YOUR TRANSITION TO HYDROGEN

A full range of solutions to meet your industrial challenges



- 1 PRODUCTION**
 - ✓ Industrial piping
 - ✓ Assembly
 - ✓ Flares
 - ✓ Regenerative thermal oxidizers
 - ✓ Burners
- 2 LIQUEFACTION**
 - ✓ Heat exchangers
 - ✓ Cold boxes
- 3 TRANSFER AND STORAGE**
 - ✓ Cryogenic pumps

- 4 DISTRIBUTION**
 - ✓ Cryogenic pumps
- 5 END USE (liquid)**
 - ✓ Testing
 - ✓ Laser welding
 - ✓ Gigafactory automation
- 6 END USE (gaseous)**
 - ✓ Burners

HYDROGEN AS A NEW ENERGY

Today, hydrogen has become one of the main solutions to decarbonize industry and mobility.

To meet the growing demand for hydrogen worldwide, Fives designs and manufactures the key equipment required to **produce, liquefy, transfer and burn** hydrogen on an industrial scale.

PRODUCTION

Industrial piping and assembly

With over 120 years of expertise, Fives is a renowned player for nuclear and highly complex industrial piping. The Group also provides assembly of electrolyser skids and hydrogen piping infrastructures.



LIQUEFACTION

Heat exchangers and cold boxes

A technological leader in cryogenics for over 65 years, Fives is the largest manufacturer of heat exchangers worldwide and supplies the largest industrial gases players. The Group is the 1st supplier of equipment for hydrogen liquefaction.



TRANSFER AND DISTRIBUTION

Cryogenic pumps

Cryomec Hy-Transfer™: new range of centrifugal pumps for high pumping efficiency, minimized heat exchange and improved flow rate.

Cryomec Hy-Filling™: high-performance and cost-effective high-pressure pumps for road and off-road vehicles, heavy mobility, trains, and captive mobility (forklifts).



COMBUSTION

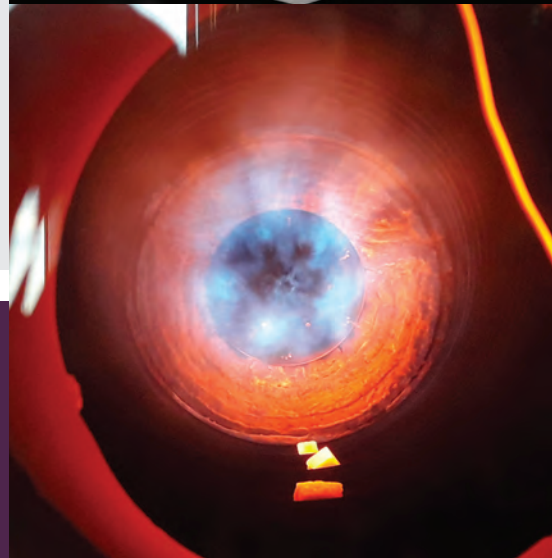
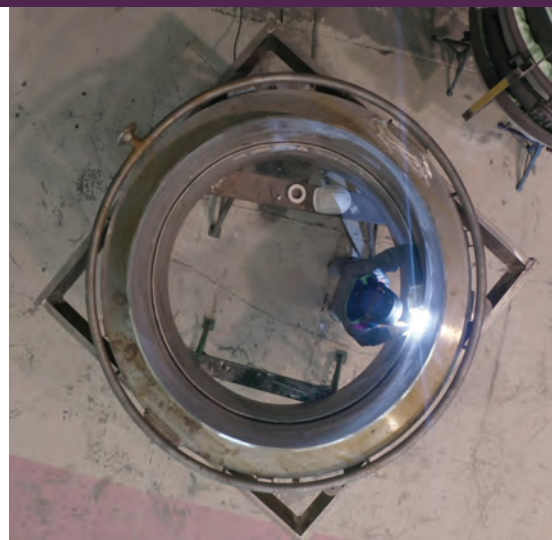
Hybrid and hydrogen proven burners

Fives has more than 50 years of experience in burning high hydrogen content fuels.

Under the names ITAS, North American and Pillard®, Fives offers the largest range of hybrid and hydrogen proven burners on the market for all industries and applications.



+50 References for
hydrogen liquefaction



HYDROGEN FOR A SUSTAINABLE MOBILITY

With its long-standing leading expertise in the automotive sector, Fives offers **automated solutions for vehicle electrification and for hydrogen applications.**

The Group supports major market players in their transition to more environmentally friendly vehicles: from battery electric vehicles, fuel cell electric vehicles, hybrid electric vehicles and plug-in hybrid electric vehicles to hydrogen fuel cell applications including electrolyzers, tanks and storage solutions.

TESTING

Fives designs and supplies testing solutions for hydrogen tanks, electrolyzers and fuel cells.

- Hydrogen tank testing: proof tests, drying process, leak tests, system leak tests, cycling and burst tests.
- Electrolyzer and fuel cell testing: pressure tests and leak tests.



LASER WELDING

Fives designs and manufactures laser technologies for welding, cutting, and cleaning applications, as well as pre and post processes.

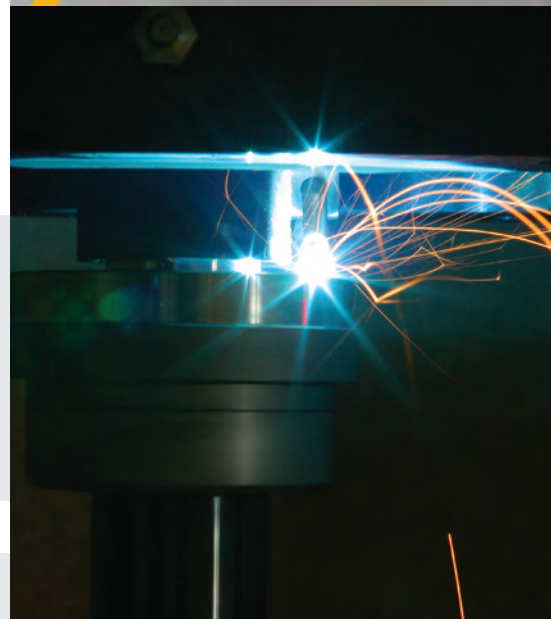
These high precision machines apply to electrolyzers (i.e. bipolar plates), fuel cells and batteries.



GIGAFACTORY AUTOMATION

Fives supplies precision robotic systems and automation solutions for complex production flows.

These assembly and material handling solutions, which implement conveyors, AGVs, cranes, etc., are designed for flexible and scalable hydrogen assembly and production lines (i.e. fuel cells).



CONTACTS

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Burners and combustion systems

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Industry can do it