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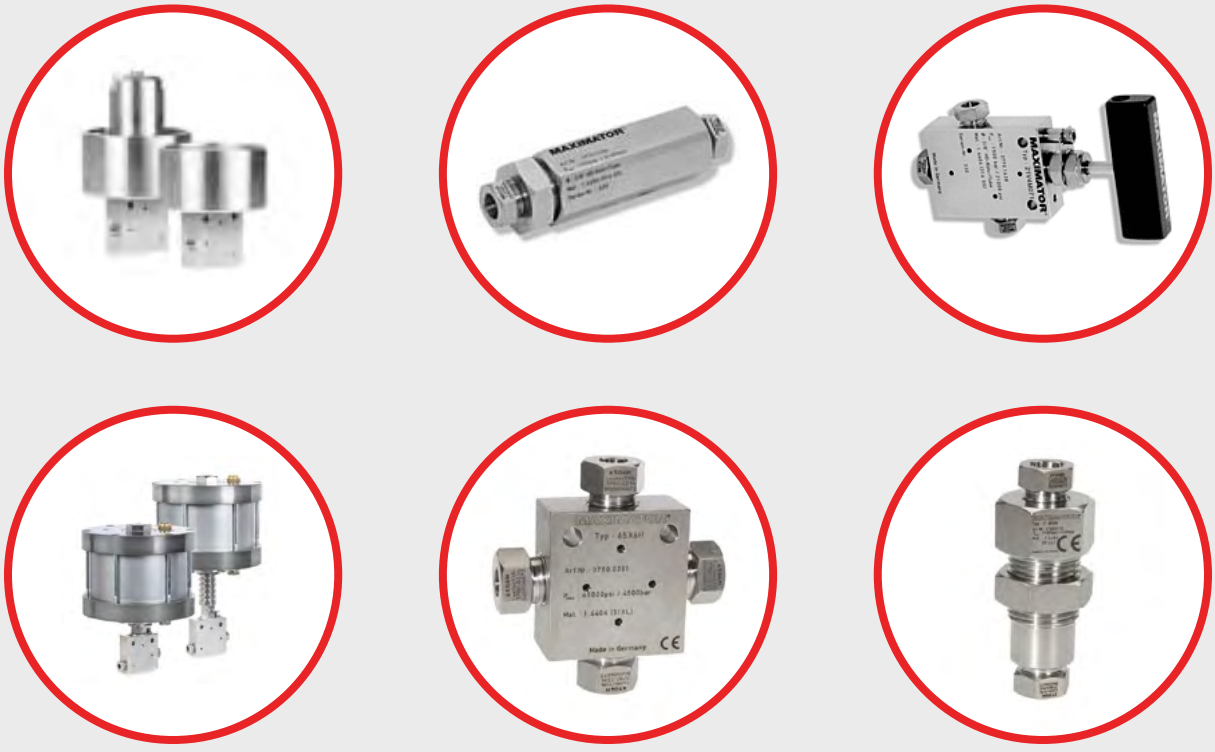
MAXPRO TECHNOLOGIES

Hydrogen Applications

Efforts to develop hydrogen-based solutions in sectors like energy, transportation, and manufacturing have brought hydrogen fuel sources closer to serving the energy needs of businesses and larger portions of the population. This is driving demand for safe, high-quality gas boosters and high-pressure fittings, valves, tubing, and other parts and devices compatible with hydrogen applications.

For over 25 years, MAXPRO® Technologies Inc. has been committed to providing clients throughout North America with quality high-pressure product solutions to handle applications involving hydrogen. Learn more about hydrogen's diverse applications and how our products can support operations in these markets.

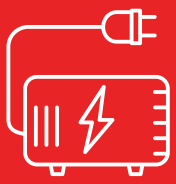


Industry Applications of Hydrogen

Industrial applications for hydrogen are the result of years of research and development. Today, hydrogen technology is involved in some aspect of virtually every major sector. The following are just some examples:

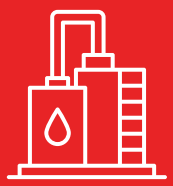
Petroleum. Hydrogen has refining applications in the petroleum industry. This sector creates gasoline, methanol, and related fuels through hydrocracking, eliminating impurities like sulfur from the materials.

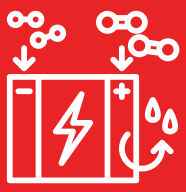
Renewable energy. Renewable energy resources are capable of producing hydrogen, with methods ranging from biomass conversion and wind-powered water electrolysis to various solar and photochemical processes.



Power generation and backup power. These segments of the energy market use hydrogen as a coolant for generators. Hydrogen also helps stabilize the electric grid and can provide backup power to residences and businesses.

Gas boosting for pressure vessels and storage cylinders. Storing hydrogen gas in pressurized storage vessels, types I to IV, is a common practice. Containing the gas in portable or stationary cylinders makes it available for industrial use, refueling stations, and other transportation applications.



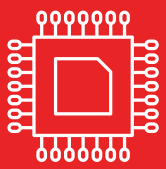


Fuel cell vehicles (FCVs) and hydrogen fueling stations. FCVs are increasingly common in the automotive sector, and hydrogen-powered fuel cell technology will likely support the next generation of cars, buses, trains, aircraft, and marine vessels. Hydrogen, which you can store in cryogenic vessels, takes a liquid state at temperatures of less than -250°C. Liquid hydrogen evaporated to a gas is used directly as fuel, and so hydrogen fueling stations are a growth industry as well.

Gas transfer and scavenging from tube trailers. Tube trailers and other delivery methods support hydrogen transportation infrastructure. Direct gas transfer and scavenging from the atmosphere into hydrogen generators reduces the burden on hydrogen delivery systems.

Heavy equipment manufacturing. Manufacturers of heavy-duty equipment like forklifts use hydrogen as a fuel via fuel cells in place of batteries.

Metalworking. This fabrication technique makes frequent use of hydrogen in processes like welding, annealing, and heat-treating for creating metal components.



Electronic and semiconductor manufacturing. Electronics companies make use of hydrogen for coating applications.

Glass production. When making glass, hydrogen aids in its purification. Adding nitrogen to the hydrogen prevents oxidation.

Agricultural operations and fertilizer production. The agricultural sector requires hydrogen as it's a raw ingredient for making ammonia.

Food production. Companies involved in food production use unsaturated fatty acid hydrogenation to generate vegetable and related oils as well as saturated fats.

Pharmaceuticals. Manufacturers use hydrogen as part of the production process to create pharmaceuticals like vitamins.

Research and test facilities. Facilities like government laboratories and university research centers are working to develop and improve hydrogen production techniques and fuel cell technologies. Much of this work revolves around the assessment and validation of hydrogen infrastructure and fueling systems, as well as hydrogen industry standards and safety regulations.

Equipment for Hydrogen Applications

Piping systems for hydrogen require defect-free components that won't allow the pressurized gas to escape, as even small cracks allow hydrogen leaks and put your system at an increased risk of explosion. Parts for these systems must meet tight tolerance windows and stringent quality controls. MAXPRO's Maximator® hydrogen components with coned and threaded connections are engineered and tested for reliable, bubble-tight operation under high pressures and temperatures, as well as other harsh environmental conditions.

Gas Boosters

Our gas boosters offer superior efficiency and flexibility over stationary high-pressure compressors as they're more compact, lightweight, and eliminate the need for electricity and lubricants. Maximator gas boosters offer hydrogen gas compression up to 22,500 psi (1,050 bar), and 36,000 psig (3,400 bar) for gases like argon and nitrogen and 5,075 psi (350 bar) for oxygen with specialized seals and cleaning methods. Maximator gas booster options include:

- Double-acting, single-stage gas boosters
- Double-acting, single-stage, double-air gas boosters
- Double-acting, two-stage gas boosters
- Double-acting, two-stage, airhead gas boosters
- Single-acting, single-stage gas boosters

Fittings

Maximator fittings for medium-pressure applications use coned and threaded connections. Their large orifice design is compatible with MAXPRO's 21V series of medium-pressure valves and tubing. Options include:

- Connection components
- Crosses
- Elbows
- Tees
- Straight couplings/union couplings
- Bulkhead couplings

Mounting holes come standard on crosses, elbows, and tees.

Air Actuated Valves

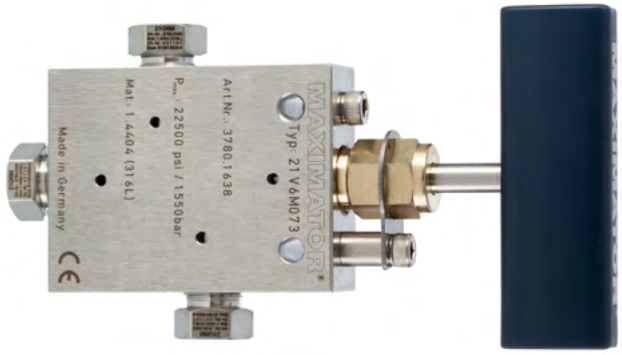
Our innovative, multipurpose valves support hydrogen fueling projects. For applications ranging from compact filling station slow-fill processes to high-flow-rate stations for trucks, buses, or trains, our Maximator air actuated valves are available in:

- Valves for all medium-pressure port sizes
- Normally open and normally closed actuators
- 2-way straight and two way angle body configurations
- Weights between 7 lbs. and 128 lbs.
- Vee and regulating stem options

Medium-Pressure Needle Valves

Maximator needle valves feature stainless steel construction, providing safe and reliable operations under adverse conditions. They surpass the industry standard pressure rating, with a pressure threshold of 20,000 psi. These valves are compatible with both liquids and gases. MAXPRO also maintains accurate valve traceability through extensive documentation of batch numbers, type designations, material numbers, and maximum pressures. Maximator medium-pressure needle valve products include:

- 2-way straight
- 2-way angle
- 3-way/2 on pressure
- 3-way/1 on pressure
- 3-way/2-stem manifold
- 2-way angle/replaceable seat



Tubing

MAXPRO provides medium-pressure solutions using cold-drawn, thick-walled 316SS tubing. This tubing is compatible with the complete Maximator line of medium-pressure hydrogen fittings and valves. We offer:

- Normal tubing sizes between 0.25” and 1.50”
- OD tolerance windows of 0.248/0.243” to 1.495/1.490”

X-Tower

The Flexible gas compressions system

- Maximator X-Tower is a modular gas compression system
- Hydrogen compression up to 900 bar and 20 kg/h (depending on conditions)
- EHB-Series booster technology (Electro-Hydraulic-Booster) with stroke frequency 1-24 strokes/min
- Scalabiliy
- Designed for integration into existing plants
- Covers almost all requirements for efficient gas compression

Hydro Hulc Series

The Flexible gas compressions system

- Modular gas compressor system specifically designed for hydrogen compression
- Up to 1000 bar and 3 kg/h (depending on conditions)
- Scalable volume flow
- The entire series is mounted in 19” rack frame with front connection
- System can be easily installed and adapted to your needs through inter modularity

The Coning & Threading Tool Kits:

Maxpro offers a complete line of coning and threading tool kits for manually coning and threading 1/4" O.D. to 9/16" O.D. tubing. There are three different tool kit versions, Medium Pressure, High Pressure, and the Complete Kit that contains both the Medium and the High Pressure tools. All items are conveniently packaged in a sturdy hand carry tool case with removable top tray. The unique coning and threading tool design allows for interchangeability between components, eliminating multiple tool inventories.

- Coning Tool Assembly
- 1/4, 3/8, 9/16 Collets
- Collet Wrench
- 1/4, 3/8, 9/16 Cutting Blades
- Threading Tool Assembly
- 1/4, 3/8, 9/16 Guide Bushing
- 1/4, 3/8, 9/16 Threading Dies
- Allen Wrenches
- Complete Deburring Tool
- Suflo Cutting Oil
- Laminated Instruction Manual

MAXPRO CONING & THREADING MACHINES

Model #MTCAT – Quickly cones and threads 1/4", 3/8", 9/16", 3/4" and 1" Medium Pressure and 1/4", 3/8", and 9/16" High Pressure Tubing. US Patent #9,015,915, CE Mark

Model #MTCAT-1.5 – The only Coning & Threading Machine on the market that quickly cones and threads all MTCAT tubing sizes plus 1-1/2" Medium Pressure Tubing, Patent Pending, CE Mark Pending.

Additional MAXPRO Products & Services for Hydrogen

MAXPRO also specializes in additional support services and products for hydrogen systems, such as:

Pressure test systems. These systems are applicable for fuel cell recharging, hydrogen gas storage, and other hydrogen vehicle projects.

Gas scavenging systems. For low-flow-rate applications at various pressures, we offer gas scavenging systems.

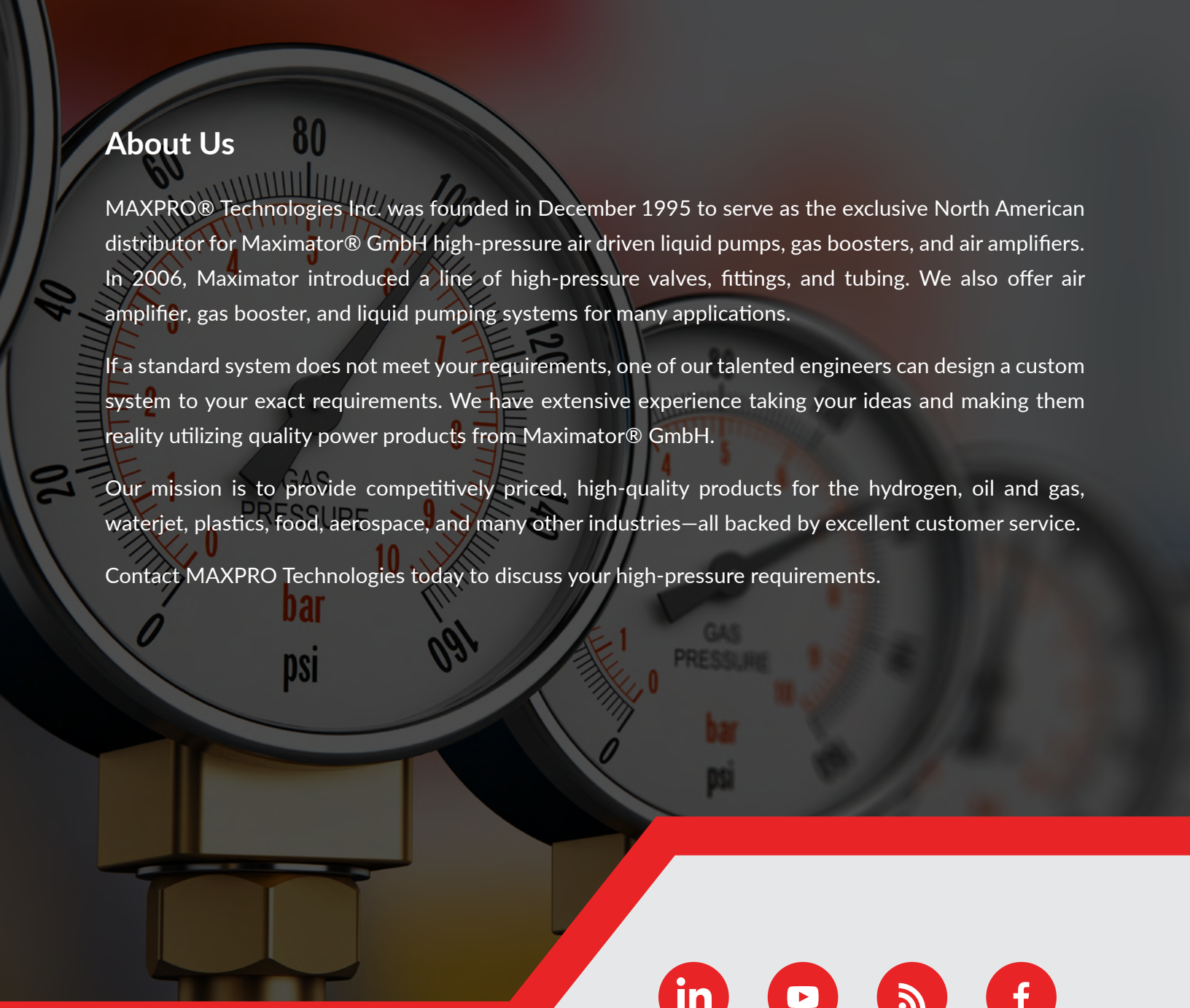
Gas fueling systems. These fueling systems include the X-Tower Compressor System with flexible, interchangeable electrically driven gas booster modules. The modules allow for quick changing, providing up to 90% uptime. The water-cooled systems operate at pressures of up to 13,000 psig (900 barg).

Hydrogen Industry Solutions From MAXPRO

Hydrogen technology has already changed the face of numerous global industries. With advancements in hydrogen fuel technology and pressurized containment systems, we move closer to hydrogen power use on a broader scale.

For safe, high-performance valves, fittings, and tubing as well as gas booster, air amplifier, and liquid pumping systems, the MAXPRO team is here to help. Additionally, our partner Maximator Test LLC provides additional support for equipment evaluations such as hydrostatic testing, leak testing, proof testing, burst testing, pressure fatigue, and impulse testing (up to 15Hz).

To learn more about MAXPRO products and services supporting breakthrough hydrogen technologies, contact us today using our online form or by email at sales@maxprotech.com.



About Us

MAXPRO® Technologies Inc. was founded in December 1995 to serve as the exclusive North American distributor for Maximator® GmbH high-pressure air driven liquid pumps, gas boosters, and air amplifiers. In 2006, Maximator introduced a line of high-pressure valves, fittings, and tubing. We also offer air amplifier, gas booster, and liquid pumping systems for many applications.

If a standard system does not meet your requirements, one of our talented engineers can design a custom system to your exact requirements. We have extensive experience taking your ideas and making them reality utilizing quality power products from Maximator® GmbH.

Our mission is to provide competitively priced, high-quality products for the hydrogen, oil and gas, waterjet, plastics, food, aerospace, and many other industries—all backed by excellent customer service.

Contact MAXPRO Technologies today to discuss your high-pressure requirements.

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