BAUER COMPRESSORS

Quality. Our DNA

BAUER H-SERIES

Hydrogen Compressor and Boosters Solution

INDUSTRY

HYDROGEN

Hydrogen is the most abundant element in the universe, but it rarely occurs in pure form. Its single electron makes it ideal for forming covalent bonds with other elements by filling gaps in their valence electron orbits. To get hydrogen in its pure form, we must separate it from compounds, the most common of which are natural gas, coal, and water. The source of the hydrogen, the process used to isolate it, and the end products created are how we classify hydrogen types. Pure hydrogen gas is invisible, but its classifications are differentiated by color. The four most common are gray, blue, turquoise, and green.

USES

Hydrogen is used extensively in industry to produce chemicals such as methanol and ammonia. Ammonia (NH_3) is often used to create fertilizers, and can also be used as a refrigerant (R-717). Hydrogen is essential for the production of certain metals and is used to process foods such as hydrogenated oils. It is even used to refine petroleum fuels. But hydrogen is not just relegated to refining conventional fuel sources. For decades, NASA has used it for space travel as a rocket propellant in liquid form, and hydrogen can also be used as a gas fuel or in fuel cells. It has the ability to power appliances, vehicles, buildings, and more. 2.2 pounds (1 kilogram) of hydrogen has the same energy as 6.2 pounds (2.8 kilograms) of gasoline. And a benefit of using hydrogen as a fuel is that it does not produce carbon emissions.

TRANSPORT

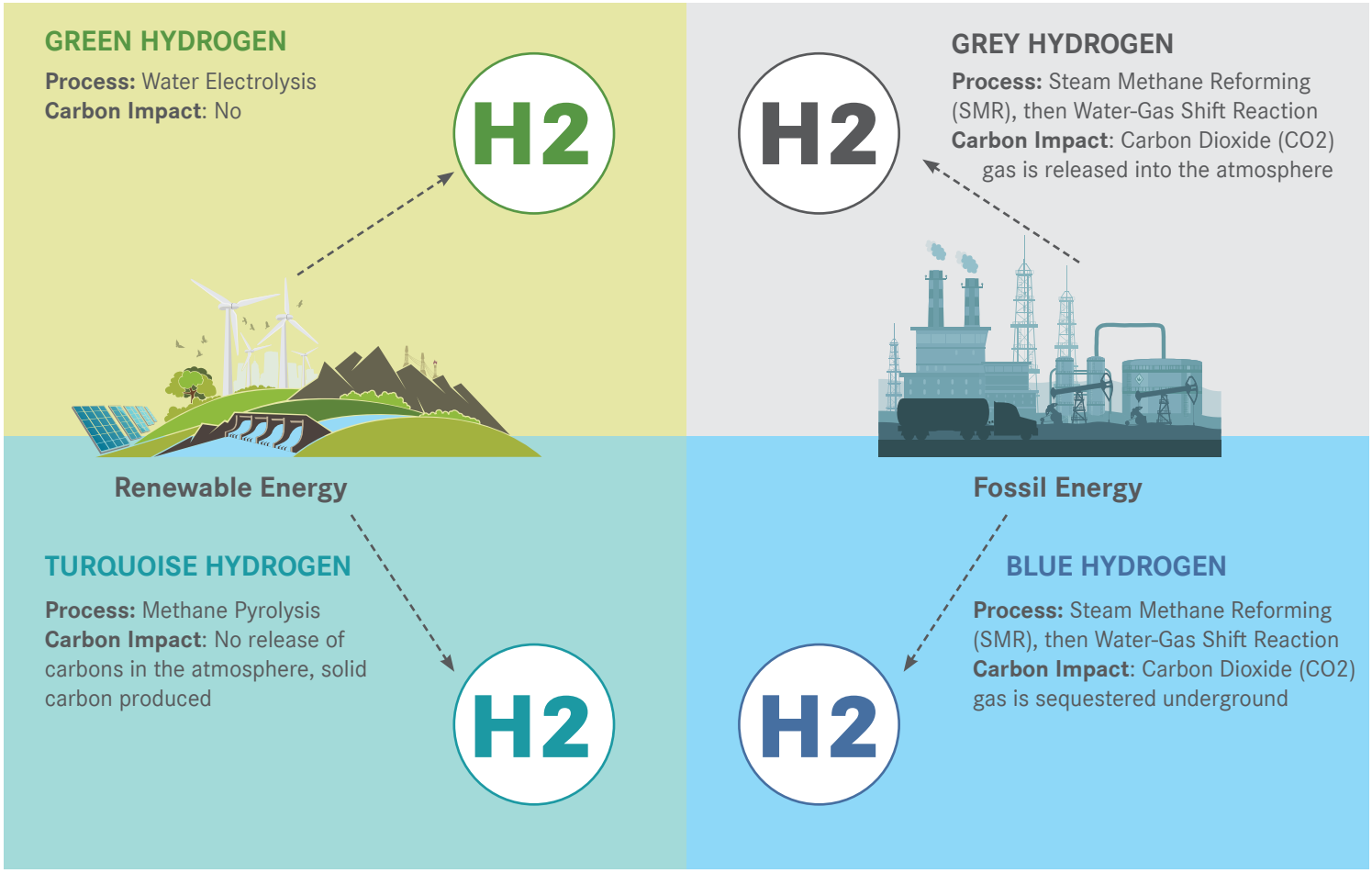
While it is energy-dense, hydrogen gas itself is 93% less dense than air. To ensure efficiency in transporting hydrogen, it must be compressed into a high-pressure gas, or liquified. It can also be compressed and injected through pipelines, just like natural gas. As hydrogen use is anticipated to increase, permanent hydrogen pipelines are proliferating. Alternately, it can be transported over the road via compressed gaseous tube trailers or cryogenic liquid tanker trucks.

HYDROGEN AS A CLEAN TRANSPORTATION FUEL

Hydrogen fuel cell electric vehicles (FCEVs) solve the dilemma presented by the long charge times required by electric vehicles, but still enjoy the same lack of harmful emissions. They can be refueled from pumps like traditional vehicles, but instead of gasoline or diesel, FCEV fueling stations supply highly-compressed hydrogen gas. FCEVs utilize fuel stacks that pass hydrogen through a membrane where it is safely combined with oxygen from the air to produce electricity for powering the vehicle's motor, and the only emissions generated are water vapor. For larger vehicles, fuel cell motors can be scaled up by adding additional fuel cells for increased power. When it comes to driving range, FCEVs are comparable to traditional engines, owing to the fact that only about 20-30% of the energy created in combustion gets harnessed for propulsion, whereas vehicles using compressed hydrogen gas utilize 60%.

HIGH-PRESSURE SOLUTIONS

Its low density and small molecular size make hydrogen incredibly prone to leaking, and hydrogen molecules have the potential to react violently with oxygen. Additionally, hydrogen can be corrosive to certain materials, causing a condition called hydrogen embrittlement. As a result, storage containers, tubing, fittings, and other system components designed for use with hydrogen have to be manufactured with high-quality materials to the tightest tolerances to ensure the product is contained, and BAUER's purpose-built hydrogen compressors are made to accommodate these conditions.



Gray hydrogen is produced from natural gas, the chief ingredient of which is methane, a compound composed of carbon and hydrogen. In a process called steam methane reforming, methane and steam are combined under intense pressure and heat to produce pure hydrogen and carbon monoxide gases. The carbon monoxide is then added to more steam to produce carbon dioxide and additional hydrogen in a process called water-gas shift reaction. The resulting carbon dioxide is emitted into the atmosphere.

Blue hydrogen is produced the same as gray, but the carbon dioxide created in the process is sequestered underground to keep it from entering the atmosphere, making this a more climate-friendly option than gray hydrogen.

Turquoise hydrogen uses a method called methane pyrolysis. This process involves adding extreme heat to methane to cause it to thermally degrade into hydrogen gas and solid carbon. The solid carbon can then be utilized in a number of ways such as tire production or soil supplementing. Even if the solid carbon is not reused, it does not impact the atmosphere, and it is cheaper to store than carbon in gas form.

Green hydrogen is produced by splitting water into its component elements hydrogen and oxygen using an electric current powered by a renewable, zero-emission source such as solar, hydroelectric, or wind energy.

LESS COMMON HYDROGEN TYPES:

Black and brown hydrogen come from coal gasification, a process that uses steam to convert coal into syngas. This results in the creation of carbon monoxide and dioxide, as well as methane gas and pure hydrogen. Black hydrogen comes from bituminous coal, whereas brown comes from lignite coal.

Pink hydrogen uses nuclear energy to facilitate water electrolysis, purple hydrogen uses a combination of nuclear energy and chemicals to thermochemically induce water electrolysis, and red hydrogen uses nuclear power to create high temperatures to force the catalytic splitting of water molecules.

White hydrogen is naturally occurring, and very rare.

HYDROGEN COMPRESSORS & BOOSTERS

RELIABLE AND MODULAR

For efficient compression and high-reliability thanks to the H2 compatible lubrication system. A quality achieved for fuel cells according to ISO14687.

Complete and modular systems compatible with electrolysis and storage rack for decanting station. The hydrogen

- **Outlet pressure :** 90 to 350 bar max
- **Volume Flow-rate (acc.to ISO1217) :** 3.1 - 41.2 SCFM
- **Intake pressure :** 0.29 - 60 PSIG
- **With or without cabinet enclosure**

- **BAUER MICRO SERIES H120**

- **BAUER COMPACT SERIES®** Simplex

Hydrogen Systems for Small Fleets

- 5 -7.5 HP (4-5.5KW)
- 3.1 - 6.0 SCFM
- 5000 PSIG (350 Bar)

SYSTEM FOOTPRINT

DIMENSIONS LxWxH inches(mm) approx.

- 55” x 57” x 52” (1397mm x 1448mm x 1321mm)

WEIGHT pounds (kg) approx.

- 1430-1515lbs (649-687 kgs)

Depending upon model and options

*Dimensions exclude vent stack

BAUER H-SERIES 2

Hydrogen Systems for Small to Medium Fleets

- 20 HP (16 KW)
- 14.1 - 20.6 SCFM
- 5000 PSIG (350 Bar)

SYSTEM FOOTPRINT

DIMENSIONS LxWxH inches (mm) approx.

- 97” x 58” x 85” (2464mm x 1473mm x 2159mm)

WEIGHT pounds (kg) approx.

- 3200-4000 lbs (1066-1814 kgs)

Depending upon model and options

*Dimensions exclude vent stack

› **BAUER COMPACT SERIES®** Duplex

BAUER H-SERIES 3

- 20(x2) HP (16(x2) kW)
- 28.2 - 41.2 SCFM
- 5000 PSIG (350 bar)

SYSTEM FOOTPRINT

DIMENSIONS L X W X H inches (mm) approx.

- 139” x 57” x 84” (3531mm x 1448mm x 2134mm)

WEIGHT pounds (kg) approx.

- 5500 - 8000 lb (2495 - 3629 kg)

* Dimensions exclude vent stack **Approximate dimensions and weight

* The Duplex includes a locally mounted NEMA 4 PLC panel and a locally mounted

› **BAUER H-SERIES**

BAUER H-SERIES 4

- 60 HP (45 kW)
- 41-75 SCFM
- 5300 PSIG (365 bar)

SYSTEM FOOTPRINT

DIMENSIONS LxWxH inches(mm) approx

- 133” x 104” x 115” (3378mm x 2642mm x 2921mm)

WEIGHT pounds (kg) approx.

- 10000 lbs (4535 kgs)

TECHNICAL DATA

Model	Number of Stages	Running Speed	Motor Power		Inlet Pressure Range		Final Pressure[1]		Flow Capacity at Min/Max Inlet Pressure		
		RPM	hp	kW	PSIG	BARG	PSIG	BARG	SCFM	m3/h	kg/hr
H-SERIES 1											
H120-5	4	960	5	4	0.29 - 4.35	0.02 - 0.3	5000	350	3.1 - 4.2	5.4 - 7.1	0.48 - 0.63
H120-7.5	4	1380	7.5	5.5	0.29 - 4.35	0.02 - 0.3	5000	350	4.4 - 6.0	7.5 - 10.1	0.67 - 0.90
H-SERIES 2											
H15.2-20	4	1450	20	16	0.29 - 4.35	0.02 - 0.3	5000	350	14.1 - 17.7	24 - 30	2.14 - 2.67
H15.4-20	3	1450	20	16	30 - 60	2.0 - 4.0	5000	350	12.4 - 20.6	21 - 35	1.89 - 3.12
H-SERIES 3											
H15.2-20	4	1450	20(x2)	16(x2)	0.29 - 4.35	0.02 - 0.3	5000	350	28.2 - 35.4	48 - 60	4.28 - 5.34
H15.4-20	3	1450	20(x2)	16(x2)	30 - 60	2.0 - 4.0	5000	350	24.8 - 41.2	42 - 70	3.94 - 6.24
H-SERIES 4											
H23.10[(2)]	4	1500	60	45	30-65	2.0 - 4.5	5300	365	41-75	69.6-127.6	6.3-11.5

Note: All capacities are referenced minimum and maximum inlet pressure shown. Performance tolerance +/- 5%. *H120-6=230 V, 1 Phase, 60 Hz; H120-9= 230-460 V, 3 Phase, 60 Hz

[1]Maximum allowable working pressure = max. setting safety valve; final pressure (shutdown pressure) lower.

[2] All capacities are referenced to sea level, 15°C (59° F) gas inlet temperature and 20°C (68°F) ambient temperature, dry gas. Flow measured at compressor inlet according to ISO 1217. Tolerance +/- 5%. Motor power is referenced to maximum inlet pressure and discharge pressure. Consult BAUER for performance at other conditions.

› BAUER H26 X-FILL

› BAUER H52 X-FILL

BAUER H-SERIES 5

› 175 HP (132 kW)
› 126.5-232.5 SCFM
› 5300 PSIG (365 bar)

SYSTEM FOOTPRINT

DIMENSIONS L X W X H inches (mm) approx.

› 216” L X 87.6” W X 117” H
(5486.4mm x 2225.04mm x 2971.8mm)

WEIGHT pounds (kg) approx.

› 18000 lbs (8165 kgs)

BAUER H-SERIES 6

› 350 HP (261 kW)
› 253-465 SCFM
› 5300 PSIG (365 bar)

SYSTEM FOOTPRINT

DIMENSIONS LxWxH inches(mm)

› 297.6” L X 99.6” W X 117” H
(7559mm x 2529.84mm x 2971.8mm)

WEIGHT pounds (kg) approx.

› 22700 lbs (10297 kgs)

TECHNICAL DATA

Model	Number of Stages	Running Speed	Motor Power		Inlet Pressure Range		Final Pressure[1]		Flow Capacity at Min/Max Inlet Pressure		
		RPM	hp	kW	PSIG	BARG	PSIG	BARG	SCFM	m3/h	kg/hr
H-SERIES 5											
H26.10[(2)]	4	1500	175	132	30-65	2.0 - 4.5	5300	365	126.5 -232.5	215 - 395	19.3 - 35.5
H-SERIES 6											
H52.10	4	1450	350	261	30-65	2.0-4.5	5300	365	253 - 465	430 - 790	38.6 - 71

Note: All capacities are referenced minimum and maximum inlet pressure shown. Performance tolerance +/- 5%. *H120-6=230 V, 1 Phase, 60 Hz; H120-9= 230-460 V, 3 Phase, 60 Hz
[1]Maximum allowable working pressure = max. setting safety valve; final pressure (shutdown pressure) lower.
[2] All capacities are referenced to sea level, 15°C (59° F) gas inlet temperature and 20°C (68°F) ambient temperature, dry gas. Flow measured at compressor inlet according to ISO 1217. Tolerance +/- 5%. Motor power is referenced to maximum inlet pressure and discharge pressure. Consult BAUER for performance at other conditions.

BAUER CONNECT®

IOT REMOTE TELEMETRY AND CONTROL

BAUER CONNECT® is an app and internet-based IoT solution that allows BAUER customers to remotely monitor - and control - the performance of the entire BAUER system through any wireless mobile device or computer; anytime, anywhere.

Key Features: allow customers to increase efficiency and productivity, save time, do more with fewer resources, enjoy lower operational costs, and have total flexibility with a solution tailored specifically for the end-user.

BAUER CONNECT® - Connection that matters.

The BAUER Remote HMI function allows factory-trained technical personnel to remotely control the BAUER system via the BAUER CONNECT® App with the same functionality as if one were standing

MOBILE DASHBOARDS

BAUER CONNECT® App will also display a real-time graphical display of the entire system (SCADA view). The Mobile Dashboard feature provides information such as compressor system status, error log, critical pressures and temperatures, and volume of air dispensed

NOTIFICATIONS

The BAUER CONNECT® Mobile App will send push notifications if certain critical parameters of the BAUER system fall outside of normal operating range, or if triggered by a system alert. This ensures that essential personnel is notified immediately, thus allowing for pro-active intervention in a situation that could potentially be detrimental to the BAUER system as well as the customer's operation.

BAUER REPORTS

The BAUER Reports feature is a function that generates custom reports tailored to the specific needs of the customer. Customers can have access to historical data via a multitude of standard and customized reports.

BAUER PREDICTIVE ANALYTICS

This feature of BAUER CONNECT® provides a new pro-active dimension to perpetually maintaining customers' compressor systems at peak conditions with minimum downtime. BAUER's predictive analytics algorithm uses artificial intelligence to analyze the collected system information on the BAUER Cloud to predict upcoming maintenance requirements and preventative actions to

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BAUER COMPRESSORS, INC.
1328 Azalea Garden Road
Norfolk, VA 23502
Tel. +1 (757) 855-6006
Fax +1 (757) 857-1041
Hydrogen@BauerComp.com
www.BauerComp.com

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