



HYDROGEN STORAGE CATALOGUE

Discover our latest projects around the renewable hydrogen value chain.
Explore innovative solutions for your needs.



WELCOME

Headquartered in Madrid, Asmain is a Spanish engineering and equipment supply company with a significant international presence. We excel in three primary business areas:

- 1. Marine Projects:** We specialize in ports, shipyards, and vessels, providing cutting-edge solutions to enhance maritime infrastructure.
- 2. Energy Solutions:** Our focus is on the liquid natural gas and renewable hydrogen value chains, driving advancements in energy production and optimization.
- 3. Industrial Equipment Supply:** We provide essential equipment for infrastructure projects, including pipelines, structural steel, and modified marine containers.

With over 20 years of experience, Asmain has established multiple offices and expanded into key international markets, including Europe, Asia, the Middle East, and the Americas. This extensive network allows us to serve a diverse client base and adapt to market needs and regulatory environments.

Our products are highly customizable, easy to install, and maintain. We undertake basic and detailed engineering tasks to ensure the optimal functionality of our solutions. Leveraging our international experience, we integrate global best practices and innovative solutions into our projects, delivering high-quality results worldwide.

At Asmain, our core values of integrity, innovation, and customer success are at the heart of everything we do. We strive for continuous improvement and believe in the power of win-win cooperation to achieve remarkable outcomes. Our results-driven approach ensures that every project we undertake not only meets but exceeds expectations. We are committed to embracing new technologies and innovative practices to deliver cutting-edge solutions that create significant value for our clients and the communities we serve.

Join us at Asmain, your reliable ally!

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INTRODUCTION

Welcome to the Renewable Hydrogen Storage and Distribution Section!

In this section, we delve into the exciting world of renewable hydrogen storage and distribution, where innovation meets sustainability to power the future of mobility. As the world shifts towards cleaner energy solutions, renewable hydrogen emerges as a key player in the transition to a low-carbon economy.

Here, we explore cutting-edge technologies and applications for storing and distributing renewable hydrogen, with a particular focus on its role in fueling hydrogen-powered cars and trucks. From advanced storage solutions to efficient distribution networks, we uncover the latest developments shaping the landscape of renewable hydrogen mobility.

Join us as we delve into the possibilities of hydrogen as a clean, versatile, and sustainable energy carrier, driving us towards a greener, more sustainable future. Explore the potential of renewable hydrogen storage and distribution for mobility applications, and witness the transformative power of innovation in action.

Welcome to the future of hydrogen mobility!



HYDROGEN TRANSPORTATION

High-pressure hydrogen tube bundle trailers, designed for optimal gas and liquid storage and seamless distribution. We offer three distinct series to cater to your requirements:

- **Steel Series:** Robust and reliable, with 26 m³ volume.
- **Glass fiber-wound with steel liner Series:** This series blends the resilience of glass fiber with the structural integrity of a steel liner. With 30 m³ volume.
- **Carbon fiber-wound Series:** Exceptional strength-to-weight ratio, offering maximum capacity while maintaining minimal weight. With 37.8 m³ volume.

As well, we offer customizable solutions, to fit the client's needs!



STEEL CYLINDER HYDROGEN BUNDLED CONTAINER

Model	Tube Containers
Empty box mass	33950 kg
Volume filling medium	4600 Nm ³
Number of cylinders	7 pcs
Cylinder	Large volume steel
Nominal working pressure	20MPa
Volume	3.714 m ³

Total volume	26 m ³
Max. filling volume	413 kg
Rated mass	34363 kg
Box size (length x wide x height) mm	12192 x 2438 x 2300
Bottle material	4130X
Cylinder dimensions (OD x wall thickness x length) mm	Φ715 x 21.12 x 10975

*Customized solutions available

GLASS-FIBER-WOUND CYLINDER HYDROGEN BUNDLED CONTAINER

Model	Tube Containers
Empty box mass	32600 kg
Volume filling medium	7515 Nm ³
Number of cylinders	8 pcs
Cylinder	Large volume steel-lined, ring-wound
Nominal working pressure	30MPa

*Customized solutions available

Total volume	30 m ³
Max. filling volume	627 kg
Rated mass	33227 kg
Box size (length x wide x height) mm	12192 x 2438 x 2345
Working temperature	-40°C ~ 60°C
Bottle material	4130X + Carbon fiber
Cylinder dimensions (OD x wall thickness x length) mm	Φ715 x 14.5 x 10715

CARBON FIBER WRAPPED CYLINDER HYDROGEN TUBULAR CONTAINER

Model	Tube Containers
Empty box mass	27500 kg
Volume filling medium	6690 Nm ³
Number of cylinders	9 pcs
Cylinder	Large volume steel-lined, ring-wound
Nominal working pressure	20MPa

Total volume	37.8 m ³
Max. filling volume	560 kg
Rated mass	28060 kg
Box size (length x wide x height) mm	12192 X 2438 X 2525
Working temperature	-40°C ~ 60°C
Bottle material	4130X + Carbon fiber
Cylinder dimensions (OD x wall thickness x length) mm	Φ715 x 9.5 x 11580

*Customized solutions available

HYDROGEN TRANSPORTATION FOR HRS



Our hydrogen storage cylinders are designed for high efficiency and safety. With a designed pressure of 50 MPa and operational use at 45 MPa. Depending on the size of the refueling station, the cylinders can be combined to form groups of different total volumes.

The size is suitable for filling buses and trucks with hydrogen at a storage pressure of 35 MPa.

For 90/ 99MPa bottle container $\Phi 406$ OD (4130X), single length 8200, water volume 0.5 m³/ bottle hydrogen storage and 70MPa filling pressure.

As well, we offer customizable solutions, to fit the client's needs!

HYDROGEN STORAGE CYLINDERS FOR HYDROGEN REFUELING STATIONS

Design Pressure	50MPa	Working pressure	45MPa
Design temperature	-40°C ~ 60°C	Working temperature	-40°C ~ 60°C
Design thickness	28.9/ 36 mm	Test pressure	56.3MPa
Corrosion allowance	0.5 mm	Single bottle volume	1/ 1.5 m ³
Bottle container size (diameter x length x wall thickness) mm	Φ406 x 10975 x 28.9 Φ508 x 10975 x 36	Number of cylinders	9 pcs

*Customized solutions available



ON-VEHICLE HYDROGEN STORAGE SUPPLY



On-vehicle hydrogen storage supply refers to the system used in hydrogen fuel cell vehicles (FCVs) to store and supply hydrogen gas to the fuel cell stack for electricity generation. This system is crucial for the operation of FCVs, as it provides the necessary fuel to power the vehicle's electric motor.

The on-vehicle hydrogen storage supply system also includes components such as valves, regulators, and safety devices to control the flow of hydrogen and ensure safe operation. Additionally, hydrogen fueling ports are integrated into the vehicle to facilitate refueling at hydrogen refueling stations.

TYPE IV STORAGE SYSTEM

Type IV hydrogen storage cylinders are advanced storage solutions designed specifically for safely storing and transporting hydrogen gas. These cylinders are constructed using a composite material, typically consisting of a lightweight structural liner (such as aluminum) wrapped with high-strength carbon fiber or fiberglass-reinforced polymer.

Type IV cylinders offer several advantages over traditional metal cylinders, including reduced weight, improved corrosion resistance, and enhanced safety. They are commonly used in hydrogen fuel cell vehicles, where lightweight, high-pressure storage solutions are essential for maximizing vehicle range and efficiency.

PRODUCT DESCRIPTION



- Application: Passenger car
- Maximum working pressure: 87.5MPa
- Working temperature: -40 ~ 85°C
- Minimum working pressure: 1.5MPa
- Interface size: 1.5-12 UNF-2B
- Fixed form: Cylindrical part (23L&57L), Boss + Cylindrical part (50L)
- Permeation rate: $\leq 0.5 \text{ Nml}/(\text{h} \cdot \text{l})$
- Coefficient of variance: $< 5\%$
- Fuel: GB/T 37244-2018 (compatible with ISO 14687, SAEJ 2719)
- Standard: UN-R134 & GB/T 42612

PERFORMANCE FEATURES



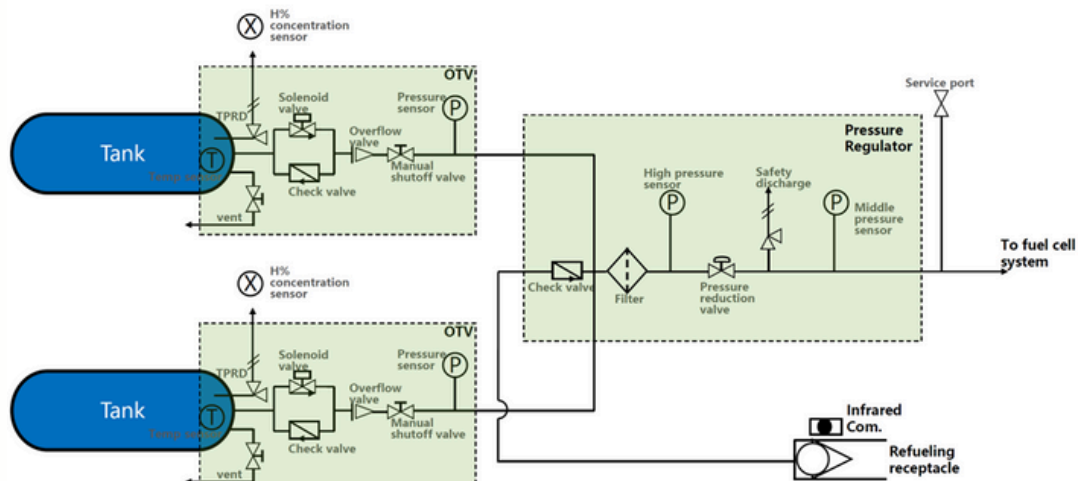
- Lightweight design of composite layer
- Innovative molding process of the plastic liner, which can effectively avoid defects of buckling and craft sand hole on tank liner.
- Advanced carbon fiber lay-up and the winding process, to achieve the T700 grade CF application.
- Can be customized according to customer demand size development.

TECHNICAL SPECIFICATIONS

Type	Type IV		
Water volume	23 L	57 L	210 L
Nominal working pressure	70 MPa	70 MPa	35 MPa
Weight	20 kg	38 kg	81 kg
Design cycles	1100		
Service lifetime	15 years		
Size (diameter x length)	245 917	373 913	420 2180
Size specific	Design lead time: 1 month. Sample delivery lead time: 5 months		

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HYDROGEN STORAGE SYSTEM LAYOUT



THANK YOU

Thank you for exploring our Hydrogen Transportation & Storage section!

We hope this journey has provided valuable insights into the potential of hydrogen as a clean and sustainable fuel for transportation. As we continue to innovate and drive forward the transition to a greener future, your interest and support are invaluable.

Stay connected with us for the latest updates and developments in renewable energy and sustainable transportation. Together, we can create a brighter, cleaner, and more sustainable tomorrow. Thank you once again for joining us on this journey towards a hydrogen-powered future.

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