

CMB
.TECH

HYDROVILLE



POWERED BY HYDROGEN

H₂ DUAL FUEL TECHNOLOGY

Hydroville was launched in 2017 and is the world's first passenger vessel powered by hydrogen through dual fuel combustion engines. The vessel can accommodate 13 passengers and 2 crew members.

The Hydroville is a sea going catamaran and is class approved by Lloyd's Register. The project started as a pilot to test hydrogen technology for applications in large seagoing ships. The advantage of hydrogen is that no CO₂, particulate matter or sulphur oxides are emitted during its combustion.



STILLAGE SPECIFICATION

CYLINDER

Type	-	Type III
Weight	-	66 kg
Cylinder life	-	20 years
Water volume	-	205L

PRESSURE

Service pressure	-	200 bar
Maximum pressure	-	260 bar
Test pressure	-	300 bar
Capacity per tank	-	3 kg
Amount of tanks	-	12
Working temperature	-	- 40°C - +82°C
Supported Frame Accelerations	-	Forward 12g Rear 2g Transverse 2g Vertical 2g



H₂ REFUELLING

- Standard H₂ high-flow receptacle
- < 20 mins refuelling time
- No cooling required
- Refuelling from industrial tube trailer is possible



H₂ INJECTION SYSTEMS

- Custom H₂ injector ring assembly
- Minimal changes to the base engine
- Injects H₂ based on engine load
- Integrated safety features



CMB.TECH'S 3 LAYERS OF SAFETY

The H₂ dual fuel system is designed supervisory, allowing the switch back to diesel if needed, ensuring operational reliability of the machine. On top of that, the hydrogen system itself has 3 different layers of safety to ensure redundant safety:

- 1 - The first layer is provided by using high integrity components as used on other CMB.TECH projects that exceed normal safety requirements as well as conforming to all the relevant class and safety requirements. All hydrogen components are carefully selected to be the industry's most reliable of its class and are EC79 (2009) approved and UN/ECE-R134 ready.
- 2 - The second layer is provided by leak detection software and a control system that is developed from the ground up at CMB.TECH. The H₂ control strategy allows for safe and efficient operation of the system and comprises of two parts:
 - **Dynamic Leak Detection** – The H₂ control system will constantly perform a dynamic leak test when the engines are running in dual fuel mode. The test isolates one bank of cylinders within the H₂ storage container at a time and monitor it over a calibrated time period. If there is any pressure decay, the system shuts down, a fault flagged and a static leakage test is performed. This test is performed continuously throughout operation.
 - **Static Leak Detection** – In safe mode, engine key on/off and wheelhouse request, integrity of the storage cylinders and gas lines are checked in static condition under pressure. Any decay in pressure results in an alarm, causing the cylinder valves to close, shutting down the system to safe mode and declares a fault.
- 3 - The third layer of safety is provided by H₂ gas detectors, strategically positioned to monitor any leaking H₂ gas. During the detailed design phase, the optimal positioning was determined within areas like the bunkering panel, storage control valve panel and within the vessel's engine room. Any detection of H₂ gas will shut the H₂ system down and will report a fault. The gas detectors and alarm panel are kept as a separate system to the existing fire detection system.





VESSEL SPECIFICATION

VESSEL

Construction year	-	2017
Length	-	14.1m
Width	-	4.2m
Draft (incl. stern drives)	-	1.23m
Draft (excl. stern drives)	-	0.75m
Max. displacement	-	17.5 ton
Light weight	-	14.8 ton
Propulsion	-	2x dual fuel Hypenta D4 combustion engines with total capacity of 441kW

FUEL

Hydrogen	-	36kg
Diesel	-	2x260L

PERFORMANCE

Max. speed	-	27 kn
Cruising speed	-	18 - 22 kn
Passengers	-	13 + 2 crew
Emission	-	CO ₂ 58%
Reduction at	-	NO _x 65%
19 knots (@2800rpm)	-	PM 57%







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TO THE INDUSTRY**

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