

FCV PILOT-01 – India's first indigenous hydrogen fuel cell-powered ferry



Shipbuilder:.....**Cochin Shipyard Ltd**
 Designer:.....**Cochin Shipyard Ltd**
 Vessel's name:.....**FCV PILOT- 01**
 Owner/Operator:.....**Cochin Shipyard Ltd**
 Country:.....**India**
 Flag:.....**N/A**
 Total number of sister ships
 already completed:.....**0**
 Total number of sister ships
 still on order:.....**Unspecified**
 Contract date:.....**March 2022**
 Delivery date:.....**February 2024**

Hydrogen fuel cell systems are increasingly being adopted in marine applications as a clean and efficient alternative to traditional fossil fuels, bringing the benefits of reduced greenhouse gas emissions, quieter operation and the potential for extended range without the need to refuel. Their modular design allows for flexibility in installation, making them suitable for various types of vessels, from small boats to large ships. As the maritime industry seeks to reduce its carbon footprint, hydrogen fuel cells are emerging as a key technology for sustainable marine transportation.

In turn, Cochin Shipyard Limited (CSL) has designed, developed and constructed India's first fully indigenous hydrogen fuel cell-powered, battery-operated ferry, running on Low Temperature Proton Exchange Membrane Technology (LT-PEM). "By implementing this technology, the only by-products of the reaction will be water and heat," the shipyard explains.

The ferry seats 50 passengers and operates at 6.5knots. The fuel cell engine is supported by lithium iron phosphate (LFP) batteries. The electrical power produced by the fuel cell engine is used for propulsion load and hotel load requirements, and any excess power produced is used to charge the LFP batteries. CSL adds: "The operation is silent

and, since there are no moving parts, the maintenance is also low as compared to using a typical combustion engine." The ferry is also equipped with CCS2 DC charging and AC shore charging equipment, to charge the batteries at harbour.

The vessel has five onboard hydrogen cylinders, which can carry 40kg of hydrogen, supporting eight hours of operation. Each cylinder is rated for 350-bar pressure. The ferry is also fitted with a solar panel, rated 3kW, and an associated system to feed its auxiliary power supply.

"By successfully implementing hydrogen fuel cell technology, CSL has set a new benchmark in India's maritime industry," the shipbuilder states. "This project aligns with the Government of India's vision for a sustainable and carbon-neutral future, supporting global efforts to reduce dependency on fossil fuels in marine transportation."

TECHNICAL PARTICULARS

Length, oa 24.8m
 Length, bp 24.1m
 Breadth, moulded 6.4m
 Depth, moulded 1.7m
 Gross tonnage 70tonnes
 Displacement 43tonnes
 Design, draught 0.9m at full load
 Design, deadweight 4.1tonnes (approx.)
 Lightweight 39.12tonnes
 Deck space (total) 145m²
 Service speed 6.5knots
 Max speed 6.5knots
 Range 52nm

Propulsion
 Main engine(s):
 Number of engines 2
 Make KPIT Marine Motors
 Model KMM01230002(P),
 KMM01230003(S)

Output of each engine 20kW
 Batteries LFP, 2 x 102.4kW

Propeller(s):
 Number of propellers 2
 Make Madras Marine
 Propulsion System
 Diameter 0.6m
 Material Ni-Al-Bronze
 Number of blades 3
 Speed 600rpm
 Fixed/controllable pitch Fixed
 Open/nozzled Open

Deck machinery/equipment:

- Anchor
- Anchor cables and chains
- Bilge pump

Bridge electronics:

Radar(s) Raymarine
 GPS Raymarine
 Chart plotter Raymarine
 Fire detection system Ampac
 Other communication systems:
 - DTEEx handheld radio transceiver
 - VHF radio
 - Electronic compass
 - Echo Sounder
 - Electric horn

Onboard capacities:

Hydrogen 40kg@350bar

Complement:

Number of crew 4
 Number of passengers 50
 Number of cabins 0

Classification

Classification society Indian Register of
 Shipping
 Notations IRS: 5 IWL,
 ZONE2, FERRY 5 IY,
 BATTERY PROP, FC (main)-Hydrogen

FCV PILOT-01

