

# Hydrogen for Mobility

Air Products is one of the world's leading suppliers of hydrogen. One of its' goals is to address the world's need for green, renewable energy whilst reducing overall environmental impacts. Hydrogen is key to achieving this, our Hydrogen for Mobility (H<sub>2</sub>fM) solutions cover the entire value chain for hydrogen fueling.

Generating a cleaner future involves experience, investment and innovation on a worldwide scale. At Air Products we have the technology, expertise, track record, and the ambition to be a first-mover in bringing the hydrogen economy to a commercially realisable scale.

As part of this, we now have a comprehensive range of products and services including Fuel Cell - Mobility (FCM) grade Hydrogen, available in 18 x 50 litre, 300 bar Manifolder Cylinder Packs (MCPs). Each pack contains 19.1Kg of Hydrogen gas, equivalent to around 640 kWh\*1 of energy.



Fuel Cell-Mobility (FCM) grade conforms with the specifications defined in ISO 14687 (Hydrogen Fuel Quality – Product Specification) for the following uses:

- Type 1 Grade D (Gaseous H<sub>2</sub>) - PEM fuel cells for road vehicles.
- Additionally utilised in other transportation fuel cell applications including forklifts, industrial trucks,

and as an alternative to Type 1 grade E (Cat.3) Hydrogen\*2.

\*2 This is Air Products' recently launched, Fuel Cell - Power (FCP) grade.

- Cars, trucks, vans, buses, scooters, forklifts, locomotives, planes, cell towers, material handling equipment, and even submarines are being fuelled with the market leading Air Products' **H<sub>2</sub>fM technologies**.

MCPs are available as part of a much broader range of products and services to support the energy transition, by providing the volumes of hydrogen required.

For additional peace of mind, each MCP is clearly labelled as conforming to **ISO 14687**, with certificates of conformity readily accessible via our **MyAirProducts** customer portal.

## Generating a Cleaner Future with Green Hydrogen

Air Products **Fuel Cell - Mobility (FCM)** grade Hydrogen is also available with CertifHy™ guarantees of green origin, sold separately. CertifHy™ has developed high-quality hydrogen certification schemes across Europe that will support hydrogen's market growth as a reliable tool for consumers to track the origin of Hydrogen and its environmental attributes. CertifHy™ has been initiated at the request of the European Commission and is financed by the Clean Hydrogen Partnership.



\*1 Based on 100% efficiency.

## Gas specifications

Constituents	FCM Fuel Cell - Mobility
Hydrogen (H <sub>2</sub> )	99.97% (3.7)
Max. Impurities	1,000 µmol/mol
Oxygen (O <sub>2</sub> )	5 µmol/mol
Carbon Dioxide (CO <sub>2</sub> )	2 µmol/mol
Carbon Monoxide (CO)	0.2 µmol/mol
Nitrogen (N <sub>2</sub> )	300 µmol/mol
Water (H <sub>2</sub> O)	5 µmol/mol
Total Sulfur (S)	0.004 µmol/mol
Helium (He)	300 µmol/mol
Ammonia (NH <sub>3</sub> )	0.1 µmol/mol
Methane (CH <sub>4</sub> )	100 µmol/mol
Formaldehyde (HCHO)	0.2 µmol/mol
Formic acid (HCOOH)	0.2 µmol/mol
Halogenated compounds	0.05 µmol/mol
Max. Particulate Concentration	1 mg/kg
Sum of N <sub>2</sub> , Ar, He (mole fraction)	1,000 µmol/mol
Max. Particulate Diameter	75 µm

## Technical details and product codes

Product Code	Description	Size	Valve	Pressure (Bar g)	Contents (m <sup>3</sup> )**	Hydrogen Vol (Kg)
TBC	TBC	18x50s	NEVOC	300	224.23	19.1

\*\*Sm<sup>3</sup> @ 15°C, 1013.25 mbar

## Pack dimensions

Size	Height (mm)	Width (mm)	Depth (mm)	Gross Weight (Kg)
18x50S	2,138	1,204	925	2,400

## The Importance of Hydrogen Quality

The effects of impurities on fuel cell performance can be serious. An incorrectly specified grade of Hydrogen can cause deterioration of fuel cell performance, reduced efficiency, and in some situations irreversible damage to the fuel cell. Air Products **Fuel Cell - Mobility (FCM)** grade Hydrogen undergoes a strict quality control regime during which these potentially harmful impurities are measured to ensure they are below the maximum thresholds defined in **ISO 14687**.

Damaging impurities can include sulphur and halogenated compounds, formaldehyde, ammonia, particulates, siloxanes, and mercury. Many fuel cell manufacturers warranties are impacted by these impurities, so choosing the correct grade for mobility applications is critically important.

See table for specification of Air Products Fuel Cell - Mobility (FCM) grade Hydrogen, specifically produced and recommended for vehicle refuelling.

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