

High Pressure Cylinder Development - Overview

Objectives

- ❖ Develop a light weight C-H₂ vessel at a nominal pressure of 700 bar along with the necessary peripheral equipment, meeting the storage performance, safety requirements and operation conditions specified for H₂ storage in FC vehicles.
- ❖ Develop the enabling technologies that will ensure cylinder suitability over its whole life time (e.g. recycling and on-board monitoring).
- ❖ Address the infrastructure issues related to C-H₂ storage technology investigating two alternatives: on-board system with fast filling and exchangeable solutions.

Achievements

- ❖ Three different C-H₂ technologies investigated: two 700 bar industrial prototypes + one low pressure industrial prototype developed
- ❖ Storage performance higher than 5 wt.% demonstrated for Type IV cylinders
- ❖ New alternative manufacturing processes demonstrated at lab scale
- ❖ Carbon fibre cylinder recyclability demonstrated at lab scale based on a fluidised bed process and microwave pyrolysis
- ❖ Contribution of storage system to total vehicle recyclability as well as design aspects influencing recyclability demonstrated
- ❖ Concept for on-board monitoring proposed based on optical fibre sensor
- ❖ 700 bar filling components developed: commercial available product
- ❖ Fast (3 min.) and complete filling demonstrated with slight cooling
- ❖ Exchangeable rack with integrated components demonstrated for a FC car (170 km autonomy)



Type IV, 700 bar industrial prototype



Type III, 700 bar industrial prototype

Fast filling of a FC vehicle equipped with a 700 bar cylinder



Future Perspectives

- ❖ Improve / optimise reliability of the system (cylinder + components) to meet all existing requirements
- ❖ Re-evaluate design requirements and criteria based on the understanding of real degradation mechanisms occurring in composite cylinders
- ❖ Develop new and innovative materials, vessel concepts and manufacturing processes
- ❖ Optimise recycling concepts, material sorting and recycling technologies applicable to hydrogen vehicles

<p>Partners</p>	<ul style="list-style-type: none"> ❖ Air Liquide France + Deutschland ❖ Comat, Dynetek, Faber, WEH ❖ ADETE, Material, Energie Technologie ❖ Daimler, Ford, PSA ❖ CEA, IVW, CNRS, Nottingham University, Wroclaw University of Technology 	
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