STORHY FINAL EVENT
HYDROGEN STORAGE SYSTEMS FOR AUTOMOTIVE APPLICATION
PSA POISSY, JUNE 3-4, 2008

Prototypes & Tests of Cryogenic Storage Systems

Objectives

- **Specification of functional tests** and adaptation of test benches
- **Manufacturing of lightweight prototypes** of the outer jacket and the inner tank
- **Proof of feasibility** using cylindrical composite prototypes

Achievements

- **Preparation of set-up for validation tests**
  Adapted functional test procedures and test benches have been created and established.

- **Manufacturing of an outer jacket** made of CFRP (Carbon Fibre Reinforced Plastic) lay-up of about 2 mm wall thickness around a structural aluminium liner with 1 mm wall thickness

- **Manufacturing of an inner tank** made of CFRP and a glass fibre reinforced epoxy resin system as leak barrier. The finished tank was coated with 50 µm copper, as permeation barrier, by means of a combination of electro less plating and electroplating.

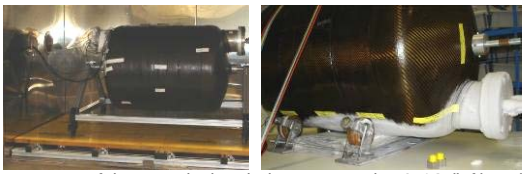
- **Validation of the selected manufacturing process**
  (VARI – Vacuum Assisted Resin Infusion) by developing and manufacturing a specific tooling for the CFRP application

- **Proof of feasibility** by validating critical functions and performing essential tests with samples and prototypes

  Vacuum tests of the outer jacket confirmed the validity of the structural integrity and the gas tightness at ambient and cryogenic temperature

  Validation of the inner tank prototype by **pressure tests** up to 1.04 MPa, **helium leak tests** at room temperature and filling **tests with gaseous and liquid hydrogen**

Prototype of the outer jacket



Prototype of the outer jacket during tests at plus 85°C (left) and cryogenic tests with liquid nitrogen at minus 196°C (right)

Prototype of the inner tank with hydrogen permeation barrier made of coated copper on the composite outer surface

Prototype inner tank with thermal insulation after integration in a cryostat for liquid hydrogen tests at minus 253 °C

Future Perspectives

- Confirming the validity of the system by **durability tests**
- Performing **destructive tests**
- **Design adaptation** of the geometric envelope according to new vehicle architecture

Partners

- Air Liquide
- Austrian Aerospace GmbH
- BMW Forschung und Technik GmbH
- Institut für Verbundwerkstoffe GmbH
- Linde AG
- MAGNA STEYR Fahrzeugtechnik AG & Co KG
- MT Aerospace AG
- Oerlikon Space AG
- Prochain e.V.
- Volvo Technology Corporation

Website

www.storhy.net

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