

# STORHY FINAL EVENT

## HYDROGEN STORAGE SYSTEMS FOR AUTOMOTIVE APPLICATION

PSA POISSY, JUNE 3-4, 2008



### Subproject Cryogenic Storage: Light Weight Inner Tank

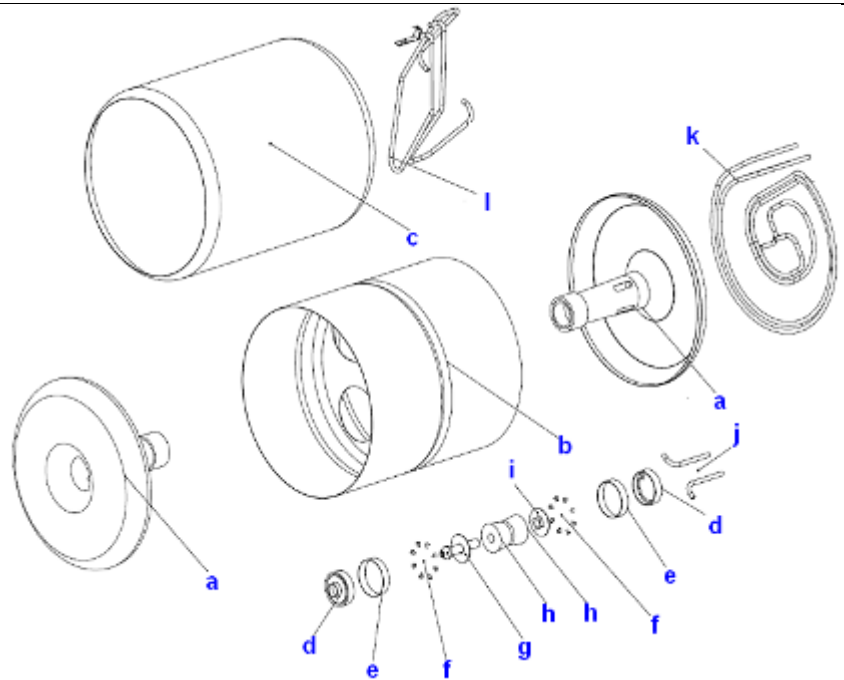
#### Objectives

- ❖ Demonstration of the principle feasibility of a cryogenic hydrogen inner tank made from light weight composite materials (carbon fibre reinforced plastic - CFRP) by using a cylindrical functional model

#### Description

##### Part description:

- ❖ Mass = 23.6 kg (excl. vacuum pipes)
- ❖ Length = 701 mm
- ❖ Diameter = 554 mm
- ❖ Number of parts = 17 (excl. pipes)
- ❖ Materials:
  - Tank shell made of carbon fibre reinforced plastic,
  - Permeation liner (inside & outside) made of copper,
  - Inserts made of stainless steel,
  - Pipes made of stainless steel,
  - Centre bolt, screw nut & washer made of Marinel.



##### Abstract of the specification:

- ❖ Stored hydrogen mass = 10 kg at 6 bar
- ❖ Hydrogen storage capacity (mass fraction) = > 12 wt%
- ❖ Operating temperature = -253 to +85 °C
- ❖ Operating pressure = 0 to 6 bar
- ❖ Test pressure = 10.4 bar
- ❖ Re-fuelling time = 3 min (cold)
- ❖ Life cycle (cold - cold) = 15,000 filling / release cycles
- ❖ Filling cycles (warm - cold) = > 50
- ❖ Vacuum quality = 10<sup>-8</sup> bar
- ❖ Leak rate = > 10<sup>-6</sup> mbar l/s

##### List of parts:

- a = dome end cap (knitted)
- b = cylinder part & stiffening plane
- c = over wrapping
- d = insert
- e = reinforcement insert
- f = rivets (steel)
- g = centre bolt & washer
- h = cone
- i = screw nut
- j = connection pipes
- k = vacuum pipes
- l = inner tank pipes

#### Future Perspectives

- ❖ Validation tests, crash / destructive tests & safety tests at cryogenic temperatures
- ❖ Advanced engineering of free-form shaped tank systems to industrialise manufacturing process

<b>Partners</b>	<ul style="list-style-type: none"> <li>❖ Air Liquide</li> <li>❖ Austrian Aerospace GmbH</li> <li>❖ BMW Forschung und Technik GmbH</li> <li>❖ Institut für Verbundwerkstoffe GmbH</li> <li>❖ Linde AG</li> <li>❖ MAGNA STEYR Fahrzeugtechnik AG &amp; Co KG</li> <li>❖ MT Aerospace AG</li> <li>❖ Oerlikon Space AG</li> <li>❖ Prochain e.V.</li> <li>❖ Volvo Technology Corporation</li> </ul>	
-----------------	--	--

**Website** [www.storhy.net](http://www.storhy.net)



The project partners wish to thank the European Commission for financial support of the Integrated Project StorHy- Hydrogen Storage Systems for Automotive Application (Contract No.: SES6-CT-2004-502667) within the 6<sup>th</sup> RTD Framework Programme.