Update on EU Regulation on type-approval of hydrogen vehicles

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State-of-play

- European Commission adopted the proposal on 10 October 2007
- COM(2007) 593 final
- Full text available at: http://ec.europa.eu/enterprise/automotive/directives/proposals.htm
- Split-level approach: co-decision regulation, comitology regulation
- Co-decision process ongoing
- First reading agreement likely
- Co-decision regulation likely to be adopted by end 2008
- Comitology regulation is under development – planned for first semester 2009
Content of the co-decision Regulation

- Establishes technical requirements for type-approval of:
  - vehicles with regard to hydrogen propulsion
  - hydrogen components (containers and components other than containers)
  - hydrogen systems

- Requirements for installation of such components or systems

- Similar structure to current UNECE Regulations 67 (LPG) and 110 (CNG)

- Based on results of EIHP project
The Regulation applies to:

(a) hydrogen powered vehicles of categories M and N;
(b) hydrogen components designed for motor vehicles of categories M and N;
(c) hydrogen systems designed for motor vehicles of categories M and N.
Test requirements

The proposal specifies test requirements for:

1. Hydrogen containers designed to use liquid hydrogen
2. Other components designed to use liquid hydrogen
3. Hydrogen containers designed to use compressed (gaseous) hydrogen
4. Other components designed to use compressed (gaseous) hydrogen
Content of the Regulation

General requirements (ex.):

• The hydrogen system and the hydrogen components shall function in a correct and safe way.

• They shall reliably withstand the electrical, mechanical, thermal and chemical operating conditions without leaking or visibly deforming.

• Materials of the hydrogen system and components which are in contact with hydrogen shall be compatible with it.

• They shall withstand expected temperatures and pressures.
List of components subject to type approval

components designed to use liquid hydrogen:

- container;
- automatic shut-off valve;
- check valve or non-return valve (if safety device);
- flexible fuel line (if upstream of first automatic shut off valve or other safety devices);
- heat exchanger;
- manual or automatic valve;
- pressure regulator;
- pressure relief valve;
- pressure, temperature and flow sensor (if safety device);
- refuelling connection or receptacle.
List of components subject to type approval

components designed to use compressed (gaseous) hydrogen with a nominal system pressure of over 3.0 MPa:

– container;
– automatic shut-off valve;
– container assembly;
– fittings;
– flexible fuel line;
– heat exchanger;
– hydrogen filter;
– manual or automatic valve;
List of components subject to type approval

Continued:

– non-return valve;
– pressure regulator;
– pressure relief device;
– pressure relief valve;
– refuelling connection or receptacle;
– removable storage system connector;
– sensors (pressure or temperature or hydrogen or flow sensors) if used as a safety device;
– hydrogen leakage detection sensors.
Applicable tests for hydrogen containers (LH$_2$)

- Burst test
- Bonfire test
- Maximum filling level test
- Pressure test
- Leak test
Applicable tests for hydrogen components other than containers (LH$_2$)

<table>
<thead>
<tr>
<th>HYDROGEN COMPONENT</th>
<th>Pressure test</th>
<th>External leakage test</th>
<th>Endurance test</th>
<th>Operational test</th>
<th>Corrosion resistance test</th>
<th>Resistance to dry-heat test</th>
<th>Ozone ageing</th>
<th>Temperature cycle test</th>
<th>Pressure cycle test</th>
<th>Hydrogen compatibility test</th>
<th>Seat leakage test</th>
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<tr>
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Types of hydrogen containers (CGH$_2$)

Classification of containers designed for the use of compressed (gaseous) hydrogen:

- **Type 1** Seamless metallic container
- **Type 2** Hoop wrapped container with a seamless metallic liner
- **Type 3** Fully wrapped container with a seamless or welded metallic liner
- **Type 4** Fully wrapped container with a non-metallic liner.
### Applicable tests for hydrogen containers (CGH$_2$)

<table>
<thead>
<tr>
<th>Test</th>
<th>Applicable To Container Type</th>
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<tbody>
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<td>Burst Test</td>
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<td>Bonfire Test</td>
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<td>Permeation Test</td>
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<td>Hydrogen Gas Cycling Test</td>
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## Applicable tests for hydrogen components other than containers (CGH$_2$)

<table>
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</table>
Content of the comitology Regulation

• The comitology Regulation will contain i.a.:
  – administrative provisions for the EC type-approval of vehicles with regard to the hydrogen propulsion, and of hydrogen components and systems;
  – information to be provided by manufacturers for the purposes of type-approval and periodic inspection;
  – the detailed rules for the test procedures;
  – the detailed rules for the installation of hydrogen components and systems;
THANK YOU for your attention

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