OUTSTANDING COMMENTS ON THE GRPE DRAFT ECE COMPRESSED GASEOUS HYDROGEN (CGH_2) REGULATION Version 10 Dated 06.11.02 RESULTS OF THE CGH_2 EXPERTS MEETING IN MUNICH 05 MARCH 2003 (NON GRPE/ISO HARMONIZATION)	GRPE - **020** 05-03-2003

Table 1: GENERAL COMMENTS

Paragraph/ Annex	Organisation	Comments/Proposed Modification	Agreed	Final Modification Or Reason For Rejection
14.3.3	RA/ VTEC	It says that the isolating valves in 14.3.1 and 14.3.2 shall not be separated from the container. This wording incorrectly includes the non-return valve of the receptacle.	Y	Make new final sentence of Para. 14.3.2 into a new Para. 14.3.3. Wording of the old 14.3.3 would remain unchanged.
General/ 14.1.17	UTC	The current draft requires a minimum factor of 1.3between the nominal working pressure (NWP) and the maximum allowable working pressure (MAWP) with regard to components down-stream of the first regulator. This margin is necessary for thermal expansion only if the system can "trap" pressurized hydrogen between shut-offs as part of normal operation including start/stops (as we do not want the Safety Relief Valve to actuate as part of normal operation). A 1.3 factor is not required if the system has features to prevent the "trapping" and/or heating during all normal operating modes. My proposal is as follows: The MAWP shall be at least 1.3 times the NWP unless the system is configured and controlled to normally prevent the "trapping" of pressurized fuel without activation of safety relief devices. If the system is properly configured and controlled to normally prevent the "trapping" of pressurized	Y	14.1.17 The *Hydrogen System* downstream of a *Pressure Regulator* shall be protected against overpressure due to the possible failure of the *Pressure Regulator*. The set pressure of a *Pressure Relief Valve* shall be a) lower than or equal to the MAWP for the appropriate section of the *Hydrogen System.* b) higher than or equal to 1.3 times the NWP for the appropriate section of the *Hydrogen System.* Delete last sentence of Annex 8, No. B 5.2.6

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		fuel then the MAWP may be selected by the vehicle manufacturer to a value as low as 1.1 times the NWP. I recommended a value of 1.1 because typical safety relief systems require at least a 10% margin above normal operating levels so it shouldn't be overly prescriptive.		
General Annex 8	TUV	Add a burst pressure test for all components TUV proposal to have a hydrostatic burst test to 3 x NWP or 3xMAWP as appropriate On new components?	Y	Apply pressure cycling test according to Annex 8, B4 for all components (change table 8A1, B4). Delete hydrostatic test B8
Ann. 8: B2.2	TUV	The amount of acceleration during the ageing test should be discussed . If necessary change values for pressure, duration or temperature	Y	Change Annex 8, B2 to include thermal ageing: Second paragraph of B2.2 reads: The test shall be undertaken in accordance with ASTM D572. The sample shall be exposed to oxygen at the maximum material temperature in accordance with paragraph 2.4.5.1 of this regulation at 2 MPa for a period of 96 hours. Either the tensile strength and elongation or the microhardness shall comply with the specifications given by the *manufacturer*. No

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Paragraph/ Annex	Organisation	Comments/Proposed Modification	Agreed	Final Modification Or Reason For Rejection
				visible cracking of the test samples is allowed. Include ozone compatibility test (see BX below)
General	-	Component marking	Y	Change wording in ANNEX 3 to read: Where: a ≥ 4 mm Rationale: Approval mark for EC Directives ≥ 4 mm

BX OZONE COMPATIBILITY TEST

BX.1 Sampling

The test applies to elastomer materials
- where a sealing surface is exposed directly to air (e.g. facing seal of receptacle)
- used as a flexible fuel line cover.

Number of material samples to be tested: 3

BX.2 Procedure and Requirements

The test shall be undertaken in accordance with ISO 1431/1.
The test samples shall be stressed to 20 percent elongation and exposed to air at 40°C with an ozone concentration of 0.5 parts per million for a period of 120 hours.

No visible cracking of the test samples is allowed.

BX.3 Results

The results of the tests shall be presented in a test summary.

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