

**OUTSTANDING COMMENTS ON THE  
GRPE DRAFT ECE COMPRESSED GASEOUS HYDROGEN (CGH<sub>2</sub>) REGULATION  
Version 10 Dated 06.11.02  
AFTER THE GRPE CGH<sub>2</sub> EXPERTS MEETING IN MUNICH 23-24 JANUARY 2003  
(NON GRPE/ISO HARMONIZATION)**

**GRPE - 012**

10-02-2003

Replaces GRPE-010

Yellow highlighting indicates new sections

**Table 1: GENERAL COMMENTS**

Paragraph/ Annex	Organisation	Comments/Proposed Modification	Agreed	Final Modification Or Reason For Rejection
General	RDW	Consider implications of container assemblies. 1.	-	<p style="background-color: yellow;">Also see changes proposed by VTEC at the end of the document</p> <p>Reword 14.3.1 by deleting “or Container Assembly”</p> <p>The following issues must be resolved before shut-off valves can be removed:</p> <ol style="list-style-type: none"> <li>1. Limit no. of containers per container assembly</li> <li>2. Clarify 6.2.3 regarding how an assembly is type approved.</li> <li>3. Change Annex 7 to containers or container assemblies</li> <li>4. What if there are 3 different types of containers in each assembly?</li> <li>5. Consider max no of containers and the total volume</li> <li>6. Flexible fuel lines shall be prohibited within Container Assemblies (6.2.3 + a new paragraph). Indicate that the manufacturer of the container is the manufacturer of the container assembly.</li> <li>7. Containers within an assembly must be of the same “design”.</li> <li>8. Consider fuel line burst pressure (6.4) relative to the</li> </ol>

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				<p style="color: red;">container</p> <p style="color: red;">9. Vibration between containers and fuel lines</p>
General	-	Agree detail of the PSA removable container proposal: See original proposal at the end of this document	-	<p style="color: red;">See GRPE Doc. No. 008</p> <p style="color: red;">RDW wish to discuss major points</p>
General/ 14.1.17	UTC	<p>The current draft requires a minimum factor of 1.3 between 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.</p> <p>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</p>		

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		<p>controlled to normally prevent the "trapping" of pressurized fuel then the MAWP may be selected by the vehicle manufacturer to a value as low as 1.1 times the NWP.</p> <p>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.</p>		
General & 2.1.26	EIHP2	<p>If the TUV proposal to restrict Type Approval to Class 0 components + safety related components is accepted the following changes to the scope of the document should be considered: Reword: 2.1.26: "<u>Hydrogen System</u>": An assembly of <i>Hydrogen Components</i> and connecting parts fitted on motor vehicles using hydrogen, excluding <i>the Hydrogen Conversion System(s)</i>.</p> <p>2.1.23: "<u>Hydrogen Conversion Unit</u>": Any unit designed for the conversion of hydrogen into electrical, mechanical or thermal energy including internal combustion engines and fuel cell stacks.</p> <p>Modify references to <i>Hydrogen Conversion Unit</i>, "Propulsion</p>	-	To be addressed by the Ad-hoc Working Group

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		Systems” and APU’s		
2.1.32	Powertech	Confirm normal conditions are at 0 or 15 degC		??? RA/PT to check
2.2	GRPE Ad-hoc WG	<i>“In view of the common view expressed by all the national administrations against type 5, the Chairman suggests to put this subject between square brackets (type 5 and § 6.2.2.) to be reported to GRPE. The members agree to look for a reworded text that can be accepted as compromise. The Chairman commits himself to contact relevant parties to find out what compromise can be reached prior to the next GRPE session.”</i>		???
14.1.11	VTEC/RA	<p>“Hydrogen components (...) shall be enclosed by a gas tight housing in accordance with paragraph 14.9.”            But par. 14.9 only applies to gas tight housings for containers.            (According to par. 14.2.6, par. 14.9 is even limited to Type 4 containers.)</p> <p>14.9 Delete “on the container(s)” from the title</p> <p>14.1.11 Split into 2 paras (14.1.11 &amp; 14.1.12) 1<sup>st</sup> para.            Existing 1<sup>st</sup> sentence, 2<sup>nd</sup> para. Remainder of the existing</p>		

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		para with the following. (rewording not necessary as title to 14.9 changed)		
14.3.2	VTEC/RA	<p>The present requirement is OK if separate refuelling and fuel supply lines are used. For a single line to be used the following changes are required:</p> <p>Add a new final sentence: "If a single line is used into the <i>Container</i> or <i>Container Assembly</i> for both refilling and fuel supply, it shall be secured as described above on the refilling line at the junction between the refilling line and the <i>Fuel Supply Line</i>."</p> <p>14.8.3 Add "...or at the junction of the refilling line and the <i>Fuel Supply Line</i>..." after <i>Container Assembly</i></p>		
14.3.3	VTEC/RA	Delete Para. 14.3.3 as it only restates the requirements given in Para. 14.3.1 & 2		
14.4.4	VTEC/RA	How can the internal dimensions of a PRD impede the PRD-function?		

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		Delete "PRD and the" and "both before and after the PRD"?		
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?		Add a hydrostatic burst test to 3 x NWP or 3xMAWP as appropriate on new components. (4x based on infinite life, these components are based on 15/20 year life and then discarded. Higher BPRs for some types of containers are intended to give 2.35 at end of life.)  See document GRPE-013 for details of the TUV proposal, and GRPE-014 for a modified proposal
Ann. 8: B1.1 & 2.1	TUV	No. of samples for plastic should be 5 for better statistics		???
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		???
Ann.8, Tab.B5.1	TUV	Increase no. of test cycles for manual valves to 100		???

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Ann.8, B5.2.1 iii)	Powertech	Add "...and at 1.25 NWP" after max. material temp.		???

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**Table 2: EDITORIAL COMMENTS**

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Annex 7: B13.2 & 3	VTEC	Change "...given in..." to "...stated in..."		



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**PROPOSED CHANGES TO CONTAINER ASSEMBLY CONCEPT**

Retain existing definitions for "Container" & "Container Assembly"

Change 6.2.3 to:

6.2.3 At the request of the *Manufacturer*, a *Container Assembly* shall be type approved as one *Container* if the *Container Assembly* including integral interconnecting fuel lines fulfils the provisions laid down in Annex 7 to this Regulation. Welded or similar permanent connections shall be used within the *Container Assembly*. Flexible Fuel Lines shall not be used as integral interconnecting fuel lines in a *Container Assembly*.

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