



ISO/TC 197  
Hydrogen technologies

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Secretariat: SCC (Canada)

**N673 Rationale by France for the revision of ISO 16111-2008 2015 01 29**

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Expected action: INFO

Background: This is the rationale document that will be included with the CIB for the revision of ISO 16111:2008.

Committee URL: <http://isotc.iso.org/livelink/livelink/open/tc197>

## Rationale for proposed revision of ISO 16111: 2008

**Title of the proposed deliverable.**

(in the case of an amendment, revision or a new part of an existing document, show the reference number and current title)

English title	<b>ISO 16111: 2008 Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride</b>
French title (if available)	<b>ISO 16111:2008 Appareils de stockage de gaz transportables – Hydrogène absorbé dans un hydrure métallique réversible</b>

**Scope of the proposed deliverable.**

Same as ISO 16111:2008, which is copied here.

*“This International Standard defines the requirements applicable to the material, design, construction, and testing of transportable hydrogen gas storage systems, referred to as “metal hydride assemblies” (MH assemblies) which utilize shells not exceeding 150 l internal volume and having a maximum developed pressure (MDP) not exceeding 25 MPa (250 bar). This International Standard only applies to refillable storage MH assemblies where hydrogen is the only transferred media. Storage MH assemblies intended to be used as fixed fuel-storage onboard hydrogen fuelled vehicles are excluded. This International Standard is intended to be used for certification purposes.”*

**Purpose and justification of the proposal.**

Reversible metal hydride technology has significantly evolved since 2008; hence some parts of the standard require an update in order to be aligned with the technology evolution.

In light of this, and the acquired practical experience, the 2008 version of the document needs both the resolution of identified inconsistencies as well as enhancement of its contents. Specifically, the following aspects should be considered for revision:

	Uncertainties	Impacts
Unclear coverage of the scope	Does a storage system take into account several volumes?	
Unclear definition of "MH assembly"	What is a MH assembly: a set of tanks?  If there are several tanks, is this a MH assembly of a set of MH assemblies?  In this last case, is the possible use of one valve, one PRV, one TPRD, etc.?	High costs in case of one TPRD or one PRV per Tank.  Feasibility of the tests: - very complex in case a test of the set of tanks is required, - problem with the vibration test during cycling, - etc.
Unclear definition of "Batch"	Does a batch apply to the hydride itself or to the MH Assembly?	Testing leads to the destruction of the material (to perform the approval tests, about 20 samples are used).  For small size batch, the test cost can even be higher than the product sales.  Transportation authorization issue for material whose tests can't be carried out on site.
Restricted definition of "MDP"		Not applicable to high temperature hydride.

Unclear definition of "Temperature range"	Possible confusion between process temperature and environmental temperature.	
Shell design	<p>Contradictions between the document and some references to standards:</p> <ul style="list-style-type: none"> <li>- 5.3.1: tensile strength &lt;950MPa whereas ISO 9809-1 &lt;1100MPa.</li> </ul> <p>Contradictions within the document:</p> <ul style="list-style-type: none"> <li>- 3.21 (any shape) vs 5.3.1(shell designed according to...); the use of ISO 16528 excludes "gas cylinder"; is MH Assembly a gas cylinder or not?</li> </ul>	

The current standard sections that are proposed for revision as well as additional sections are identified in the attached Table of Contents. In summary, the objective of this revision is to better define the requirements applicable to the material, design, construction, and testing of transportable hydrogen gas storage systems, referred to as "metal hydride assemblies" (MH assemblies).

Note: a solution needs to be found how best to address systems with volumes exceeding 150 L. Possibly, a note may be added within the revised standard stating that it could be used as a guideline.

<b>Proposed Project Leader / Convenor</b> (name and e-mail address)	<b>Name of the Proposer</b> (include contact information)
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