

**ISO Round Table
10 January 2007, Geneva**

4.1 Hydrogen User Perspectives and Feed-back

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Survey

- CCS conducted a survey in preparation for this ISO Round Table. Although the response rate (20%) was excellent, this was not a scientific exercise.
- This presentation is a general overview of highlights of the survey results.

Respondent Profile

- Type of organization
 - Government, Industry; NGOs
- Field of operations
 - Automotive; energy; infrastructure
- Target Market
 - Majority of respondents are aiming at the global market

Market projection

- a) Is the world in danger of running out of affordable fossil fuels?
- Majority of respondents believe this will happen between 2030-2050
- b) What kind of alternate fuel approach will be commonly used in 2030 for vehicles? (top 3 of 9)
- Fuel Cell engine with compressed gas hydrogen
 - ICE with compressed gas hydrogen
 - ICE with mixture (natural gas & compressed gas hydrogen)
- c) What are the main challenges for building infrastructure for alternate fuels? (top 2 of 5)
- Availability of natural resources
 - Government policy

RCS activities

- Familiarity with RCS Yes 89%
- Familiarity with ISO Yes 95%
- Active in RCS development Yes 77%

- Is there a need to wait until technology is further advanced before developing regulations, codes and standards are developed?
 - No - 75%

- *Standardization needs: What international standards are missing that need to be developed as soon as possible?*

RCS Activities - Standardization needs

Standards published by ISO/TC 197 <i>Hydrogen technologies</i>	Standardization needs	In cooperation with
ISO 13984: 1999 Liquid hydrogen – Land vehicle fuelling system interface	√	
ISO 13985:2006 Liquid hydrogen — Land vehicle fuel tanks	√	ISO/TC 22
ISO 14687:1999/Cor. 2001 Hydrogen fuel – Product specification	√	
ISO/PAS 15594:2004 Airport hydrogen fuelling facility		
ISO/TR 15916:2004 Basic considerations for the safety of hydrogen systems		
ISO/TS 16111:2006 Transportable gas storage devices — Hydrogen absorbed in reversible metal hydrides	√	ISO/TC 58/SC3
ISO 17268:2006 Compressed hydrogen surface vehicle refuelling connection devices	√	ISO/TC 22

RCS Activities - Standardization needs

ISO/TC 197 Work programme	Standardization needs	In cooperation with
ISO/DTS 14687-2 Hydrogen Fuel — Product Specification — Part 2: Proton exchange membrane (PEM) fuel cell applications for road vehicles	√	
ISO/DIS 15869 Gaseous hydrogen and hydrogen blends — Land vehicle fuel tanks	√	ISO/TC 22 ISO/TC 58/SC3
ISO/FDIS 16110-1 Hydrogen generators using fuel processing technologies — Part 1: Safety		
ISO/CD 16110-2 Hydrogen generators using fuel processing technologies — Part 2: Test methods for performance		
ISO/CD 16111 Transportable gas storage devices — Hydrogen absorbed in reversible metal hydrides	√	ISO/TC 58/SC3
ISO/WD 17268 Compressed hydrogen surface vehicle refuelling connection devices	√	ISO/TC 22
ISO/DTS 20012 Gaseous hydrogen — Fuelling stations	√	
ISO/DIS 22734-1 Hydrogen generators using water electrolysis process — Part 1: Industrial and commercial applications		
ISO/CD 22734-2 Hydrogen generators using water electrolysis process — Part 2: Residential applications		
ISO/WD 26142 Hydrogen detectors		IEC/TC 31

RCS activities - Standardization needs

ISO/TC 197 Ad hoc group on H ₂ components	Standardization needs	In cooperation with
Stationary hydrogen storage tanks including 70 MPa technologies	√	ISO/TC 11
Stationary metal hydride storage tanks	√	ISO/TC 11
Interface between the filling station and vehicles and refuelling protocol	√	ISO/TC 22
Dispensers/Break away devices	√	ISO/TC 22
Pumps/Compressors/Heat exchangers/Vaporizers		
Pressure relief devices		ISO/TC 22
Valves and fittings	√	ISO/TC 22
Measurement devices (hydrogen metering, sensors, etc)	√	ISO/TC 22

RCS activities - Standardization needs

New standards that would need to be developed	Standardization needs	In cooperation with
Classification of hazardous areas	√	IEC/TC 31
Clearance distances	√	
Material compatibility	√	ISO/TC 58/SC 3
Crash tests	√	ISO/TC 22
CO ₂ capture and storage	√	

General recommendation:

Develop performance based ISO standards to avoid hindering innovation

Harmonization of regulations, codes and standards

- Is the concept of "one product, one standard, one test" important?
 - Yes - 96%
- What are the major harmonization issues? (top 3 of 7)
 - Vehicle safety/crash test
 - Clearance distance
 - Fuel Quality
- Is it important to develop a Global Technical Regulation for hydrogen fuel cell vehicles now?
 - Yes - 95%
- Is there a need to harmonize vehicle approval methods (type v/s self certification)?
 - Yes - 68%

Harmonization of regulations, codes and standards

- Is it important to have the UN develop a regulation for hydrogen infrastructure?
 - Yes - 88%
- Would you support the formation of an “Independent Global Harmonization Body” to facilitate regulations, codes and standards ?
 - Yes - 87%
- Would you support a global gap and conflict analysis of regulations, codes and standards for hydrogen infrastructure and vehicles?
 - Yes - 88%

Key Conclusions

- Respondents are very familiar with RCS and ISO. They support:
 - Harmonization – "One product, one standard, one test"
 - Development of GTR for HFCV
 - Formation of Independent Global Harmonization Body
 - Thank you