



Hydrogen roll-out

Deploying an automotive and fuelling infrastructure

by Randy Dey

ISO plays an important role in the development of International Standards for hydrogen technologies through ISO technical committee ISO/TC 197, *Hydrogen technologies*, in which 20 countries participate, with another 15 as observers. Its comprehensive work programme covers standards for infrastructure, automotive, transportable and portable hydrogen applications. This article focuses on the ISO/TC 197 activities, which are aimed at facilitating the deployment of a safe and efficient infrastructure for hydrogen-powered road vehicles and their fuelling by 2015.

ISO and world trade

ISO International Standards are developed using the core principles of the World Trade Organization's Agreement on Technical Barriers to Trade (WTO TBT): transparency, openness, impartiality and consensus, effectiveness and

relevance, coherence, and addressing the concerns of developing countries.

ISO together with the International Electrotechnical Commission (IEC) and the International Telecommunication Union (ITU) have built a strategic partnership with the WTO. This partnership aims to avoid technical barriers to trade, which

can result from a proliferation of differing regional and national standards, and regulations that reference them, instead of international standards of the type developed by ISO and its partners.

ISO standards can make a significant difference.

In the field of hydrogen technologies, the availability of ISO standards can make a significant difference for a large number of stakeholders, namely the manufacturers who will be able to compete on many more markets around the world, the governments, who will benefit from the technological and scientific bases underpinning health, safety and environmental legislation, developing countries, which will have access to an important source of technological know-how and the consumers that will be given the assurance of the quality, safety and reliability of these new technologies.

Hydrogen fuel cell vehicles

In terms of market entry, some hydrogen technologies are getting close to commercialization with the roll-out of

hydrogen fuel cell vehicles expected to gain momentum around 2015. To ensure the smooth operation of the hundreds of thousands vehicles forecast, ISO/TC 197 is developing the standards described below.

- **Hydrogen fuel quality specification** is covered by ISO technical specification ISO/TS 14687:2008. Work continues to define contaminants, including their measurement and monitoring using practical sampling and test methods
- **Fuelling connectors** – ISO 17268:2006 defines 25 MPa (Megapascal) and 35 MPa refuelling connectors. It is being revised to define the 70 MPa refuelling connectors
- **On-board hydrogen storage tanks** for both gaseous and liquid hydrogen are addressed, respectively, in ISO/TS 15869:2009 and ISO 13985:2006.

ISO plays an important role for hydrogen technologies.

- **Hydrogen refuelling stations (HRS)**
 - To support the development of the hydrogen refuelling infrastructure, a number of major companies signed the hydrogen mobility initiative in September 2009. ISO/TC 197 is working to support this infrastructure through the development of ISO 20100, *Gaseous hydrogen – Fuelling stations*
 - Working group WG 11 is looking specifically at separation distances and



hazardous locations. It is also working to define the requirements applicable to the compressor and dispensing system, including the preparation of a dispenser protection table which identifies the safeguards necessary for possible equipment malfunction. Through these measures, the standard will address the safety of users and protection of the downstream equipment on the vehicles

- **Hydrogen sensors** – ISO 16142:2010 covers the performance requirements of hydrogen detection apparatus used in stationary applications
- **Hydrogen generators** – Two standards are already available to support onsite hydrogen production at refuelling facilities. They are ISO 22734:2008 for hydrogen generators using water electrolysis and



ISO 16110:2010 for hydrogen generators using fuel processing technologies

- **Stationary storage** – Work has been launched to define requirements of composite and metal hydrogen storage containers that will be used in stationary applications (ISO 15399).

Road to the future

Through the work of ISO/TC 197, ISO is preparing the way for the upcoming international deployment of hydrogen fuel cell vehicles and the fuelling infrastructure anticipated in 2015. The input and participation of all stakeholders – including manufacturers, regulators and users – to this work will ensure that innovation in the sector is translated into safe and efficient products and services which are available in time to serve the market. ■

About the author



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