

TITLE:
**UPDATE ON REGULATION REVIEW FOR HRS CONSTRUCTION
AND OPERATIONS IN JAPAN**

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ABSTRACT

In 2005, the Japanese High-pressure Gas Safety Act, the Fire Service Act, and the Building Standards Act were revised to establish the requirements for 35 MPa hydrogen stations. And in 2012-2014, revisions were made to the High-pressure Gas Safety Act and the Fire Service Act to provide the regulatory requirements for 70 MPa hydrogen stations. We conducted a study on materials that may contribute to prepare technical standards concerning the major 4 items, 12 additional items and 13 new items which may affect the costs, from the point of view of promoting the hydrogen infrastructure.

1. The 1st Phase (FY2012-2012) - Major 4 items for the Regulation review

We conducted a study on materials that may contribute to prepare technical standards concerning the following 4 items, which may affect the costs, from the point of view of promoting the hydrogen infrastructure

(1) Increasing steel grade options

→Options for steel grade having high strength other than SUS316L for piping material, etc.
(SUS316Ni \geq 12% · Cold working, SUH660, etc.)

(2) Design factors

→Thin walled pipes by reducing the design factor for piping = 4, etc.
(Application of “Standard for Ultra high pressure gas facility for hydrogen, etc.)

(3) CRPV(Composite Reinforced Pressure Vessels) for HRSs

→Study on new technical standards for CRPV other than steel vessels.

(4) CRPV for hydrogen transport trailer

→Current exemplified standard, and elevation of maximum filling pressure
(35MPa→45MPa)

2. The 1st Phase (FY2012-2013) - Supplemental 12 items for the Regulation review

We conducted a study for the following supplemental 12 item each of which involves many technical issues and changes.

(1) Safety distance between CNG station and HRS

(2) Safety inspection standard for 35MPa HRSs

- (3) Safety valve for CRPV installed in hydrogen transport trailer
- (4) Gasoline stations with hydrogen refueling facilities
- (5) Safety distance between H2 dispenser and public roads
- (6) Self service hydrogen refueling
- (7) Explosion-proof zone around H2 dispenser
- (8) Refueling hydrogen to FCVs on public roads
- (9) Full-filling HRSs
- (10) Hydrogen inventory at HRSs
- (11) Safety distance required for a refrigerating unit of pre-cooling system
- (12) Safety measures required for installation of CRPV at HRSs

3. The 2nd Phase Plan (FY2013 to FY2017)

The following 13 items are the 2nd Phase of the Regulation review which to be conducted during FY 2013 and FY 2017. (* marks are continuous items from FY 2010 or 2011.)

- (1) Safety inspection standard for 70MPa HRSs
- (2) The pressure relief devices (PRD) for composite vessel installed in hydrogen trailer
- (3) * Safety distance between hydrogen dispenser and public road
- (4) * Refueling H2 to FCVs on public roads
- (5) Same as the above (Refueling H2 to FCVs at dealer) ⇒ A work method and legal issues are extracted through the social demonstration using the small equipment for hydrogen refueling
- (6) Mitigation of the maximum temperature for the container on hydrogen transport trailers
- (7) Technical standard for Liquefied HRSs ⇒ The draft of the technical standard which enables installation with a gas station in a city area is drafted.
- (8) Technical standard for small hydrogen supply equipment ⇒ The draft of the technical standard is established, after safety is studied based on the specification of small-scale hydrogen supply equipment (the capacity: less than 30m³).
- (9) Emergency guideline at HRSs
- (10) *Prevention of hydrogen filling exceeding SOC100%
- (11) Increasing options for Metal materials at HRSs
- (12) *Review the technical standards for CRPV (Composite Reinforced Pressure Vessels) at HRSs (added a theme of Type2)
- (13) Self service hydrogen refueling (second action)



Figure 1. (Ex.) CRPV for transportation (35MPa, 205L)



Figure 2. Cylinders at hydrogen station (Shut down inspection is conducted using a fiberscope)



Figure 3. Side-by-side installation of dispensers (US)



Figure 4. Example of installation of touch panel (Germany)

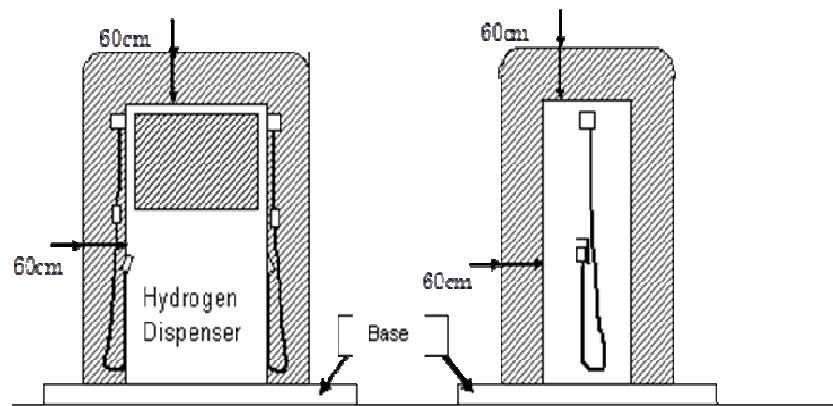


Figure 5. Within 60cm from the surface of hydrogen dispenser casing (Zone 2)

Installation of non-explosion-proof equipment such as POS(Point of sale system) set around hydrogen dispenser has become possible by following JPEC-S 0004.