HYDROGEN REFUELLING STATIONS (HRS): RECENT AND CURRENT PERSPECTIVES

HYLAW UK WORKSHOP

CITY HALL 8TH NOVEMBER 2018

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Presentation Contents:

- Legislation / Guidance
  - Historical
  - Current status
- Actions / Gaps
HRS: RELEVANT UK GUIDANCE – 2011

Low pressure stationary applications:
(http://www.hyperproject.eu/)

Refuelling stations:
“HyApproval - Handbook for Approval of Hydrogen Refuelling Stations”
(European Commission) (http://www.hyapproval.org/), 2008

British Compressed Gases Association (BCGA):
Codes of Practice / Industrial guidance

International standards:
ISO TC 197:
Standardization in the field of systems and devices for the production, storage, transport, measurement and use of hydrogen.
Hydrogen (and alternative gaseous fuels)

- Existing codes for use of gas cylinders (CP4), or bulk hydrogen storage (CP33)
- Relevant to hydrogen refuelling stations
- However, further specific guidance required – ISO 20100 preparation stalled
- TSC9 formed 2011 for hydrogen and alternative gaseous fuels
- Development of code of practice (CP) for refuelling stations:
  - To outline major considerations required in design, construction, operation and maintenance
  - Appropriate EU and UK legislation to be addressed
  - Sign-post to relevant documents (NFPA, ISO, etc)
- Institution of Gas Engineers and Managers (IGEM) – IGEM/UP/20 (to replace IGE/UP/5)
- Gather feedback from other UK stakeholders, including:
  - HSE
  - Association for Petroleum and Explosives Administration (APEA)
  - Energy Institute (EI)
  - London Fire Brigade
  - Society of Motor Manufacturers & Traders (SMMT)
BCGA CODE OF PRACTICE 41

The design, construction, maintenance and operation of filling stations dispensing gaseous fuels

Published 2014 / Revised 2016 & 2018

Including

- Layout & Site Selection Criteria
- Design of Filling Station
- Installation & Commissioning
- Operation
- Periodic Examination & Maintenance
- Fuel Quality
- Training
- Personnel Protective Equipment
- Emergency Situations & Procedures

http://www.bcg.co.uk/assets/publications/CP41.pdf
In the UK we have a law that is applicable for anywhere that dispenses, or stores, petroleum:

The Petroleum (Consolidation) Regs 2014

- requires that anyone operating a petrol filling station should have a “petroleum storage certificate” issued by their local Petroleum Enforcement Authority (PEA)
- applies both to retail and non-retail filling stations i.e. those that dispense petrol to the general public and those which only dispense petrol into their own vehicles.
- as part of the PEA assessment of a petrol filling station - the PEA will ensure that the arrangements for any other fuels stored and dispensed on the site are also appropriate, and that the risks associated with the fuels are controlled so as not to impact upon each other.
Forecourt design criteria against which a petrol filling station is assessed can be obtained from the Petroleum Enforcement Liaison Group (PELG):

PELG “The Red Guide”

*Petrol filling stations guidance on managing the risks of fire and explosion*

EI & APEA “The Blue Book”:

Design, construction, modification, maintenance and decommissioning of filling stations.

(APEA = Association for Petroleum and Explosives Administration

EI = Energy Institute)

Compliance with CP41 alone was inadequate to get permit from PEA (ref Air Products experience at Hendon) as, at the time, there was no provision for the use of hydrogen specifically as a vehicle fuel on a petrol filling station in the documents above.
Guidance on hydrogen delivery systems for refuelling of motor vehicles, co-located with petrol fuelling stations (Supplement to the Blue Book)


Developed by:

- Energy Institute (EI)
- Association for Petroleum and Explosives Administration (APEA)
- BCGA
- London Fire Brigade
- HSE
SPECIFIC LEGISLATION RELEVANT TO HRS

European legislation:
- Requirements for electric vehicle charging, hydrogen, CNG and LNG vehicle fuelling;
- Both safety (interoperability) and availability;
- For hydrogen, current Directive includes reference to ISO standards (see Annex II) – changing to EN standards by Delegated Regulation 2017 and 2018 (to come).

UK legislation:
- SI. 2017 No. 897: The Alternative Fuels Infrastructure Regulations 2017
  (Transposes Directive 2014/94/EU in UK law)
- Automated and Electric Vehicles Act 2018
- Primary legislation, to enable new regulations that could require introduction of hydrogen refuelling points (and electric charging points), and other availability related requirements
EXAMPLE: INPUT TO ISO HYDROGEN STANDARDS

<table>
<thead>
<tr>
<th>ISO/TC 197 Group</th>
<th>Standard</th>
<th>Title</th>
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<tr>
<td>WG 5:</td>
<td>ISO 17268</td>
<td>Gaseous hydrogen - land vehicle refuelling connection devices</td>
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<td>WG 24:</td>
<td>ISO 19880-1</td>
<td>Gaseous hydrogen - Fuelling stations: General requirements</td>
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<td>WG 26:</td>
<td>ISO 22734</td>
<td>Hydrogen generators using water electrolysis</td>
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<td>WG 27:</td>
<td>ISO 14687</td>
<td>Hydrogen fuel quality - Product specification</td>
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ISO: HYDROGEN FUELLING STATIONS

ISO TC 197:

2016: ISO TS 19880-1 (informative)
2019: ISO 19880-1

• Outdoor, public stand-alone and integrated fuelling stations;
• Risk assessment requirements;
• Fuelling protocol requirements (e.g. as met by SAE J2601);
• Component requirements;
• Location of equipment in enclosures;
• Station validation requirements (FAT / SAT);
• Additional guidance, including separation distance methodologies (e.g. HyRAM) and other considerations

CEN TC 268 WG5:

EN 17127 – includes interoperability requirements of ISO 19880-1
LEGISLATION RELEVANT TO HYDROGEN VEHICLES

International:

- **Global Technical Regulation No. 13**: Global technical regulation on hydrogen and fuel cell vehicles
- **UNECE Regulation No. 134**: Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen fuelled vehicles (HFCV)
ACTIONS / GAPS TO ADDRESS RELEVANT TO HRS (1)

Near term actions:
• Completion of ISO 19880-1, ISO 19880-8, ISO 14687
• Revision of EN 17127 (& EN 17124)
• Revision of BCGA CP41

Remaining gaps:
• Hydrogen nozzles:
  o Legal requirement for operators for nozzles to meet ISO 17268, however, none exist on market currently
• Hydrogen dispenser testing:
  o Soon to be legal requirement(?) for operators to test against EN 17127, however, no test apparatus exists in UK currently
• Hydrogen quality testing:
  o Soon to be legal requirement(?) for operators to test against EN 17124, however, capability for full testing does not exist in UK currently
• Hydrogen dispenser meter testing:
  o Probable future legal requirement for operators(?) to test against OIML R139, however, no test apparatus exists in UK currently
Remaining gaps (contd):

- **Interoperability:**
  - Mostly addressed where type-approved hydrogen light duty vehicle
  - What if proto-type / small series / one-off / heavy duty? – no clear requirements
  - How to make sure that the vehicle is safe to fill at a dispenser?

- **Vehicle maintenance**
  - MOT currently does not appear to cover hydrogen system
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