



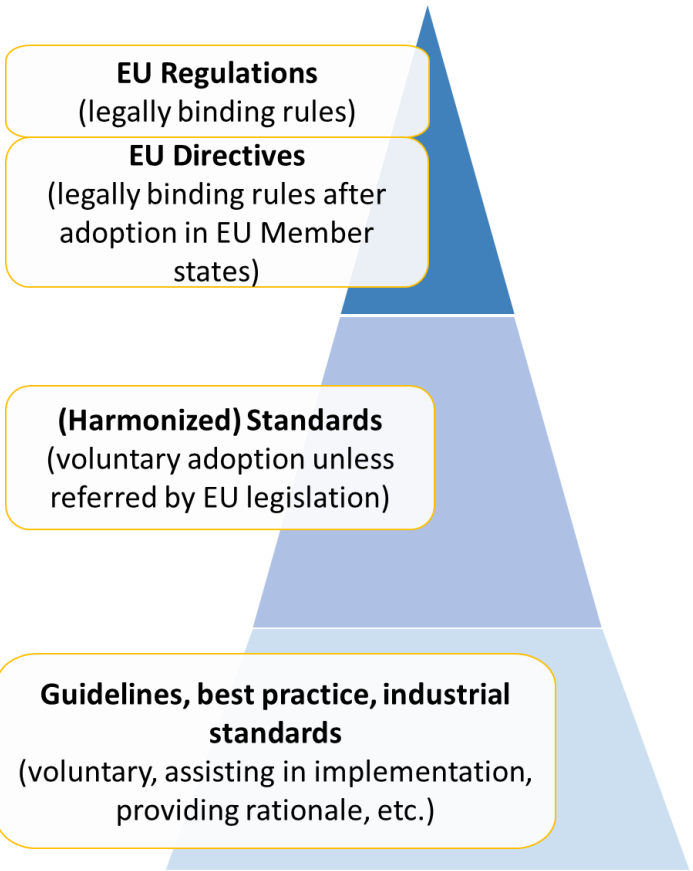
FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Regulatory & Standardisation Framework

Online workshop on
Safe Storage of Compressed Gas Hydrogen
in road transport applications
and related infrastructure

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<p>ATEX-products: Directive 2014/34/EU on explosive atmospheres ATEX- workplace: Directive 1999/92/EC on safety and health protection of workers potentially at risk from explosive atmospheres</p>	<p>PED: Pressure Equipment Directive 2014/68/EU TPED: Transportable Equipment Directive 2014/68/EU</p>
<p>For example: EN 1127-1:2019 Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology IEC EN 60079 series on Explosive atmospheres</p>	<p>For example: EN 15001 series on Gas Infrastructure - Gas installation pipework EN 13458 series on Cryogenic vessels - Static vacuum insulated vessels</p>
<p>For example the Guidelines of the European Industrial Gas Association: EIGA IGC 100/11/E Hydrogen Cylinders and Transport Vessels EIGA IGC 121/14 Hydrogen Pipeline Systems. EIGA IGC 06/19 Safety in Storage, Handling and Distribution of Liquid Hydrogen</p>	



Safety requirements and process (safety distances internal / external)

Hydrogen as a fuel and refueling infras...

HRS and Hydrogen delivered to stator...

Safety requirements and process (safet...

[Database](#) | [Compare LAPs](#) | [Legislation](#)

France

[Hide National legislation](#)

National Legislation

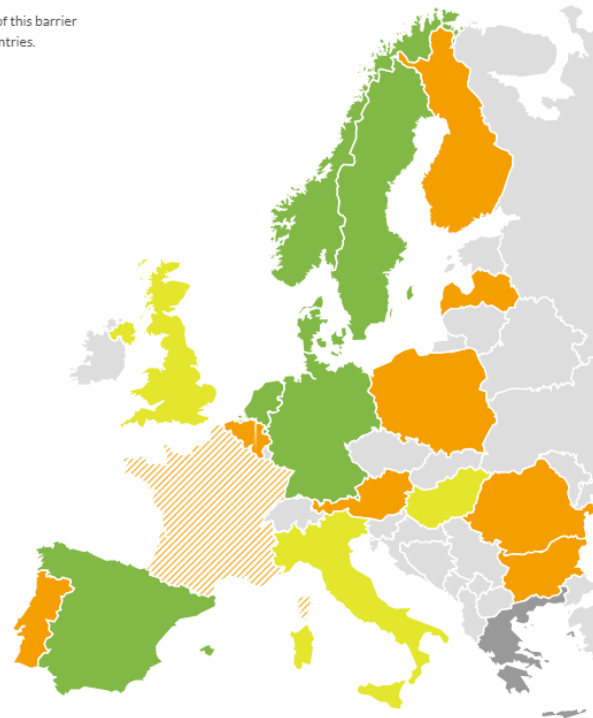
[Arrêté du 12 février 1998 relatif aux prescriptions générales applicables aux installations classées pour la protection de l'environnement soumises à déclaration sous la rubrique n° 4715 - "Regulation for the general prescription for installations / units falling under the "declaration procedure" for installations having between 100 kg and 1 T H2 on the site"](#)

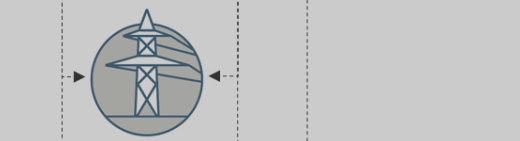
The regulation is fixing the safety distances and general safety recommendations for installations / units having between 100 kg and 1 T hydrogen on the site (see above for the details). For installations having less than 100 kg on the site (storage and use), there is no regulation applicable. For installations having more than 1 T H2 on the site, a specific environmental procedure with risk analysis and environmental impact analysis has to be performed.

[Décret n° 2013-375 du 2 mai 2013 modifiant la nomenclature des installations classées - « french transposition of the Directive 2010/75/EU on Industrial Emissions Decree No. 2013-375 of May 2, 2013 amending the nomenclature of classified installations - French transposition of the Directive 2010/75 / EU on Industrial Emissions](#)

This map depicts the severity of this barrier across the HyLaw Partner countries.

- No barrier
- Low
- Medium
- High
- Data not available
- Selected countries





Production

ISO 22734 Electrolyzers safety

ISO 16110-1 H2 generators safety

ISO 19883 PSA safety

Storage/Transport

Compressed hydrogen
For gas cylinders in general:
ISO 11114, 11119, 9809

Liquid hydrogen
ISO 15930

Underground storage
For gas storage in general:
European EN 1918

STILL MISSING
ISO/AWI 19884 Gaseous hydrogen — Cylinders and tubes for stationary storage

FCEV

Generic Vehicles safety
ISO 6469-2 Vehicle operational safety
ISO 23273 whole vehicle safety
SAE J3578 general Fuel Cell Vehicle Safety
SAE J2579 on the fuel systems

Onboard storage safety
ISO 19881 Land vehicle fuel containers
ISO 19882 TPRD

HFS

Safety of HRS and components
ISO 19880-1 HFS general requirements
ISO 19980-3 Valves
ISO 19980-5 Hoses

Safety of HRS – vehicle interface
ISO 17268/SAE J2600 connectors
SAE J2601 refueling protocol
SAE J2799 communication
Future 19885 Fueling protocols

Power

IEC 62282-3-100 Stationary FC safety
IEC 62282-5-100 Portable FC Safety
IEC 62282-6-100 Micro FC Safety

ISO/CD 19880-6 Fittings
ISO/WD 19880-7 O-rings
ISO/AWI 19885-x Fuelling protocols for hydrogen-fuelled vehicles

Gas end-users

H2 for domestic applications

H2 turbines

H2 industrial applications

For gas in general:
ISO 21789 Safety of gas turbine applications
ISO 13577 Safety of Industrial furnaces
European EN 15150 Safety for appliances
EN 15151 Safety for 2NG gas blends fuel

Electricity end-users

Micro-CHP

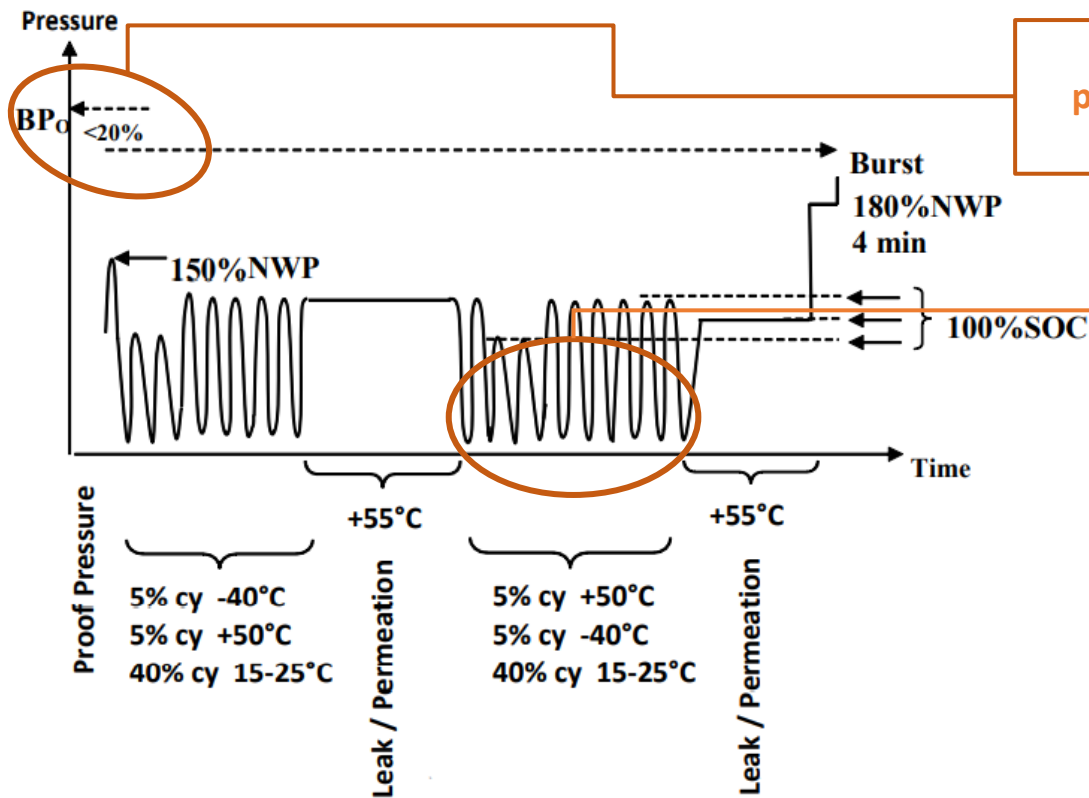
Power-to-power

IEC 62282-3-400:2016 Small fuel cell power system with combined heat and power output
IEC 62282-8-101/2/3 Reversible fuel cells
Future IEC 62282-8-202 safety of power-to-power systems

EN ISO 17268 Connection devices
EN ISO 17127 Outdoor refuelling points
Both under revision

UNECE GTR 13 - Phase 2

Extension to HDV and different type and geometry of on-board CHSS



Changes to the burst pressure if specific test criteria are met

New lifetime to address heavy duty cycles

Plus

- improved test performance in fire
- drop (impact), flaw and chemical attack to take into account conformable tanks.
- Specific storage crash tests

Are there still gaps?

...for the scope of this workshop.



- Permitting processes for HRS or similar depend on local/national rules and authorities (see HyLaw).
- Similarly, the use of public transport infrastructure, such as tunnels, bridges, underpasses, public (multistore) parking places depend on local/national rules.
- However, TEN-T corridors are part of a common EU strategy and its 'interoperability' requirements may assist a EU wide approach to tunnels.
- Other aspects of European interoperability, such as connectors and refuelling are already partially covered, but will need more attention in the future.
 - Are there example of HRS in Europe, with a storage falling under the Seveso directive?
 - Which is the return of experience from incident and near miss at European HRS?





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