

Korea Regulation on HFCV

Oct. 17-19, 2017
Kwon Sinwook
(KATRI / Korea)

Contents

- 1. Scope**
- 2. Compressed hydrogen storage system**
- 3. Electric safety**
- 4. Vehicle fuel system**
- 5. Summary**

1. Scope

Regulation	Scope	Rule Making
UN GTR 13	Hydrogen-fuelled vehicles of category 1-1 and 1-2 with a gross vehicle mass (GVM) of 4,536 kilograms or less	Jun.27.2013
UN R134	Part I , Part II : Hydrogen-fuelled vehicles Part III: Hydrogen-fuelled vehicles of category M and N	Jun.15.2015
EC/79/2009	Hydrogen-fuelled vehicles of category M and N	Jen.14.2009
Korea	KSRCSS*, KMOVSS**: Hydrogen-fuelled vehicles (Passenger car, Bus, Truck)	Amend: Jun.10.2014 Act: Jul.1.2015

* Korea Safety Regulation for Compressed Storage System

** Korea Motor Vehicle Safety Standard

2. Compressed hydrogen storage system (1/3)

(vs UN GTR13 and UN R134)

Type of test	UN GTR 13	UN R134	KSRCSS
1. Baseline metrics			
Baseline initial burst pressure	O	O	X
Baseline initial pressure cycle life	O	O	X
2. Performance durability			
Proof pressure test	O	O	O
Drop (impact) test	O	O	O
Surface damage	O	O	X
Chemical exposure and ambient temperature pressure cycling tests	O	O	O
High temperature static pressure test	O	O	X
Extreme temperature pressure cycling	O	O	O
Residual proof pressure test	O	O	X
Residual strength burst test	O	O	X

2. Compressed hydrogen storage system (2/3)

(vs UN GTR13 and UN R134)

Type of test	UN GTR 13	UN R134	KSRCSS
3. Sequential pneumatic tests			
Proof pressure test	O	O	X
Ambient and extreme temperature gas pressure cycling test (pneumatic)	O	O	X
Extreme temperature static gas pressure leak/permeation test (pneumatic)	O	O	X
Residual proof pressure test	O	O	X
Residual strength burst test (hydraulic)	O	O	X
4. Service terminating performance in fire	O	O	O
5. Closure durability			
TPRD	O	O	O
Check valve and automatic shut-off valve	O	O	O
Labelling	O	O	X

2. Compressed hydrogen storage system (3/3)

(vs EC/79/2009)

Type of test	EC/79/2009	KSRCSS
Burst test	0	0
Ambt. temp. pressure cycle test	0	0
Leak before break	0	0
Bonfire test	0	0
Penetration test	0	0
Chemical exposure test	0	0
Composite flaw tolerance test	0	0
Accelerated stress rupture test	0	0
Extreme temperature pressure cycling test	0	0
Impact damage test	0	0
Permeation test	0	0
Boss torque test	0	0
Hydrogen gas cycling test	0	0

Remarks: Bonfire test procedure is localized like UN GTR 13

3. Electric safety

Type of test	UN GTR 13	UN R 134	KMVSS
Requirements for protection against electric shock	0	0	0
Concentration limit in enclosed spaces	0	0	0
Protection against electric shock	0	0	0
Electrolyte spillage	0	0	0
REESS retention	0	0	0

4. Vehicle fuel system (In-use)

Type of test	UN GTR 13	UN R 134	KMVSS
Fuelling receptacle requirements	0	0	0
Over-pressure protection for the low pressure system	0	0	0
Hydrogen discharge systems	0	0	0
Protection against flammable conditions single failure conditions	0	0	0
Fuel system leakage	0	0	0
Tell-tale signal warning to driver	0	0	0

4. Vehicle fuel system (Post-crash)

Type of test	UN GTR 13	UN R 134	KMVSS
Fuel leakage limit	O	O	O
Concentration limit in enclosed spaces	O	O	O
Container displacement	O	O	O
Sled test (Acceleration measurement)	X	O	O

- Application vehicle category of sled test
 - UN R 134: M and N
 - KMOVSS: Bus and truck with a GVM of 4,500 kilograms or more
(Similar with N2, 3, M2, 3)

Regulation about sled test are required to improve stability of the fuel storage system

5. Summary

- ❑ Korea regulation scope is applies to all the HFCV

- ❑ KSRCSS on compressed hydrogen storage system is mostly equivalent to EC/79/2009
 - Planning a harmonization with UN GTR 13 after the Phase 2 amendment

- ❑ KMVSS on HFCV is mostly equivalent to UN GTR 13
 - Electric safety: equivalent to UN GTR 13
 - Vehicle fuel system: equivalent to UN GTR 13 except sled test

- ❑ Regulation about sled test are required to improve stability of the fuel storage system