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HFCV-GTR/SGS-6, Beijing
Vibration Test for Fuel Cell Stack

HFCV-GTR/SGS-6, Beijing
H2 leakage
H2 leakage

HFCV-GTR/SGS-6, Beijing
**FC stack safety**

电堆伺服系统

挤压试验台液压系统

试验仓外观

穿刺挤压试验台

电堆浸泡池
H2 tank

- 火烧
- 枪击
- 水压
- 爆破
- 疲劳
Tank safety

试验井

监控数采

高压压缩机

控制柜

HFCV-GTR/SGS-6，Beijing
Compressed gas

气瓶电堆安装强度试验台

高压燃气附件试验台

高低温箱

工作气瓶间
FC: airtightness
Extrusion and puncture of FC
Tank safety: breakup

- 爆破压力符合要求；
- 但是爆破产生了一块碎片；
Realtime emission

采样间隔0.5s

%LEL

0 30 60 90 120 150 180 210 240 270

t (s)
Static emission

HFCV-GTR/SGS-6, Beijing
Part 2: On GB

- Parts to system to vehicle
- LFL
- Handbook
- Crash requirements

- One word: FCV  CV  EV
Part 3: Comments on SGS-6-02
No.1.4.2  Add “For compressed gaseous hydrogen system, the vent of the overpressure protection device...”

No.1.4.3: Add “For liquid hydrogen system, it must be ...”;

No.1.4.5: This is structure design requirements, moved to part A or deleted?
No. 1.4.9: “The hydrogen gas discharge from other pressure relief systems” should be changed to “The hydrogen gas discharge from any opening(s)”
No. 1.5.2: “Hydrogen releases from the vehicle exhaust system e.g. purge shall be limited locally at the point of discharge throughout normal operation including start-up and shutdown to less than 4% average concentration of hydrogen in air by volume in any moving 3 seconds time interval”:

Why 3 seconds? Please explain it;
Technical Proposal

• No.1.5.5: “...ensure that a joint is bubble free for 3 minutes during leak test at 0.01 MPa with air”.

• The test pressure is too low; What relationship with 2.2.1?
Technical Proposal

- No.1.8: Removable storage system is NOT allowed in many countries for a type-approved vehicle due to immature technology, we wish to delete all related contents. The tech is under developing, so leave rooms for development in the future.
Technical Proposal

- No. 2.1.1: details not needed; Some items should be moved to operating procedure.
- No. 2.2.1: “...gas mixtures shall be converted to an equivalent leakage rate to that for 100 per cent hydrogen”.
- How to convert? Please explain the method in detail.
No. 2.3: Why 100mm? Define warm-up;

Test conditions, e.g. test place, wind speed. Please explain the purpose of the test?
No. 2.4:

- If the main shut off valve is closed, how to deal with?
- Considering the special factor of the H2, the crash test should be carried out in a different way from the conventional ones. Main shut off valve should shut off first, then modify the test procedure. Check the main stop valve just after the crash test.
- 60 min, which takes after a gasoline vehicle crash test, is too long for the measuring the leakage amount of H2. or another timing point.
Proposal (No.2.4)
- carry out the crash test using a relative low pressure;
- check the valves
- air-tightness test of system and parts, e.g. valves, piping, fitting, etc
- take out the tank, and carry out the air tightness test on it
Thank you!

谢谢！