Paragraph/figure/table	Recommendation	Comment/Justification
Part A 4.2 Storage system P.13	Here is the list of ISO standards. They should be under the heading: International standards instead of Industry standards ISO 13985:2006 Liquid hydrogen — Land vehicle fuel tanks ISO/TS 15869:2009 Gaseous hydrogen and hydrogen blends —Land vehicle fuel tanks	As presented by ISO in Budapest.
Part A 5.1.2.2.2 Item vi. P. 16	Remove this item from the draft GTR. This is a misleading statement.	The Powertech report does not provide any evidence in support of the statement that tanks that have passed the ISO TS(NGV2) tests have failed the tests proposed by OICA.
Part A 5.1.3 Storage system production requirement P.19	The need for the container manufacturer to perform and keep record for the batch and routine production test should be moved to Part B. The proposed batch and routine tests were provided by ISO in SGS-6-11 Revised (see attached)	Batch and routine production test are essential to guarantee the safety of the containers that are produced in series. The manufacturing of container is a special process (i.e. the quality of the container cannot be fully assessed by non destructive testing at the end of the manufacturing process). It is therefore essential that the manufacturing process is kept under control and it is the purpose of the batch and routine test to demonstrate that the tanks that are produced on a daily basis have not deviated from the tanks that were initially qualified. Also the comment on page 32 of the draft GTR indicated that there is need to limit the variability due to manufacturing, which is assured by the batch tests.

Part B 5.1 Types of tanks Page 29	Keep the 4 types of tanks as follows: Type 1 – Metal containers; Type 2 – Hoop wrapped composite containers with a metal liner; Type 3 – Fully wrapped composite containers with a metal liner; Type 4 – Fully wrapped composite containers with no metal liner.	It is impossible to fully replicate the applicable on-road stress factors in a test. As a result, tests are designed to replicate those service conditions that are known to affect the integrity of the tanks based on the known failure modes. A new technology may have failure mode that are linked to service conditions that have not been planned in the testing. A re-evaluation of the test program should be done before allowing new types of tanks. Also, by keeping the types of tanks, the testing program can be adjusted based on the known failure mode. For example, only Type IV tanks have to be subjected to the permeation test.
Part B 5.1 Table 5.1.1 P. 29 and 30	Table 5.1.1 is very confusing. It does not provide a clear indication of the tests that have to be performed as part of the qualification testing.	The Table and the requirements of 5.1.2.3 are still under discussion. Further work is required during the task force meeting.
Part B 5.1 Batch and routine tests P.30 and 36	The need for the container manufacturer to perform and keep record for the batch and routine production test should remain in Part B. The proposed batch and routine tests were provided by ISO in SGS-6-11 Revised (see Clauses 5.1.8 and 5.1.9 of the attached document)	Batch and routine production test are essential to guarantee the safety of the containers that are produced in series. The manufacturing of container is a special process (i.e. the quality of the container cannot be fully assessed by non destructive testing at the end of the manufacturing process). It is therefore essential that the manufacturing process is kept under control and it is the purpose of the batch and routine test to demonstrate that the tanks that are produced on a daily basis have not deviated from the tanks that were initially qualified. The new testing approach is also based on the fact that there is a need to limit the variability due to manufacturing, which is assured by the batch tests (see the comment on page 32 of the draft GTR).

Part B 5.1.2.1 Material requirements P. 31	Material properties are essential requirements for the safety of containers. They should be kept in Part B of the GTR. The proposed material requirements were provided by ISO in SGS-6-11 Revised (see Clause 5.1.6 of the attached document)	The overall based performance-based qualification does not address the suitability for use of the materials. Specific material tests are needed.
Part B 5.1.2 Storage system performance test requirements First paragraph p.31	A note should be kept to identify that this is still very much under discussion within the SGS.	There is still no agreement on the proposed sequence of tests. Further discussion is required during the task force meeting.
Part B 5.1.2 Storage system performance test requirements Second paragraph p.31	Change the second paragraph to the following: The storage system shall ~~does not have to~~ be re-qualified if any of the subsystem components are exchanged ~~for components with comparable function, fittings, and dimensions, and meet comparable component performance qualification specifications~~. A change in the TPRD hardware, its position of installation and/or venting lines requires re-qualification with a bonfire test.	There is no requirement that defines how subsystem components can be deemed of comparable functions, fitting, dimensions, and meet comparable performance qualification specifications as those that were initially qualified as part of the qualification of the storage system. As a result, it is not acceptable to allow that these subsystem components be exchanged without a new qualification of the storage system.
Part B 5.1.2.1.1 Baseline Initial Burst Pressure Test p.32	The initial burst pressure test should retain the commonly used burst ratio that are based on the type of fiber as follows: • Metal: 2,25 X working pressure (WP) • Glass: 2,4 WP for type 2, 3,4 WP for type 3 and 3,5 WP for type 4 • Aramid: 2,25 WP for type 2, 3,0 WP for type 3 and 3,0 WP for type 4 • Carbon: 2,25 WP for WP greater than 35 MPa • Carbon: 2,0 x WP for WP of 35 MPa and higher • Also stress ratio should be considered (see SGS-6-11 Revised, clause 5.1.5).	These burst and stress ratios have a long history and should not be discarded just for the sake of using a more performance-based approach that use the same burst pressure ratio for all types of tanks. The Powertech validation testing program does not provide the confidence that the new testing approach will detect all tanks that would fail in service. The number of samples that were tested to prove this concept was limited to one tank. Further, according to the report, this tank has had numerous failures in vehicle service and routine testing and would have probably failed any test.

Part B 5.1.2.1.2 Baseline Pressure Cycle Life (Leak before Break) Test P. 33	The LBB test should be retained in the GTR.	The LBB test has been traditionally used in composite container standards. This can be further discussed at the task force meeting.
Part B 5.1.2.2.1 Verification test for Performance Durability	A boss torque test should be included for composite tanks with non load sharing liners.	The boss torque test has historically been used for composite tanks both used for the transport of gases (ISO 11119) and onboard applications. This can be further discussed at the task force meeting.
Part B Part B 5.1.2.2.1.4 Extreme fuelling usage: Ambient temperature pressure cycling p.34	The SGS still need to determine if taxis should be considered as commercial applications. If this is the case, commercial applications should be subjected to 11500 cycles as opposed to the 5500 cycles.	Fuel cell may have a life that does not correspond to the current ICE model. As a result, the SGS should consider the possibility that the FC be replaced during the life of the vehicle, leading to a longer use of the car with the same storage container.
Part B 5.1.2.2.2 Verification test for expected on-road performance P. 35-39	We propose to change the proposed series of pneumatic tests to the combination of hydraulic and pneumatic tests that ISO provided in the SGS-6-11 Revised (see Clauses 5.1.7.3 to 5.1.7.6 of the attached document). These tests included the Extreme temperature pressure cycling test (see 5.1.7.3), the hydrogen gas cycling test (see 5.1.7.4), the Accelerated stress rupture test (see 5.1.7.5) and the Permeation test (see 5.1.7.5).	The series of tests proposed in the draft GTR are new and have not been fully validated. The Powertech validation testing program included just a few samples. Much more testing would be required before such tests are properly validated. As a result, this validation program does not provide the confidence that the 500 pneumatic cycles of the extreme temperature pressure cycling are equivalent to the 5500 hydraulic cycles of the ISO extreme temperature pressure cycling test.
Part B 5.1.2.2.2 SGS-6 Discussion P. 37	Remove item 1 from the draft GTR. This is a misleading statement.	The Powertech report does not provide any evidence in support of the statement that tanks that have passed the ISO TS tests have failed the tests proposed by OICA.
Part B 5.1.2.2.2.4 Leak/permeation test P. 38	Before a permeation rate is specified, the SGS should be provided with more data (worldwide back-up studies, testing results) in addition to the HySafe work.	The HySafe proposed permeation rate has varied from time to time. It seems that more work is required to validate what should be the permissible permeation rate.

Part B 5.1.2.4. Verification test for fail-safe conditions P. 41	The penetration test should be included as part of these tests.	The penetration test has historically been used for composite tanks both used for the transport of gases (ISO 11119) and onboard applications. This can be further discussed at the task force meeting.
Part B 5.1.4 Marking p. 41	ISO suggested a series in markings on the container as follows: a) "H_2 ONLY"; b) "DO NOT USE AFTER XXXX-XX", where XXXX-XX identifies the year and the month of expiry; c) manufacturer's identification; d) container identification (a serial number unique for every container); e) water capacity (l); f) "USE ONLY MANUFACTURER-APPROVED NON-RECLOSING THERMALLY ACTIVATED PRESSURE RELIEF DEVICE"; g) date of manufacture (year in four digits and month in two digits); h) NWP (MPa) at temperature (℃); i) if labels are used, there is an additional requirement for a unique identification number and the manufacturer's identification to be permanently marked on an exposed metal surface in order to permit tracing in the event that the label is destroyed;	Suggestions for markings were requested at the September 2009 Meeting.