GTR#13 TF#4

Verification Test for Service Terminating Performance in Fire

January 2022

Objectives

- **Improve reproducibility of the fire test for Compressed Hydrogen Storage Systems (CHSSs).**
- **Expand the test method to include heavy-duty vehicles in addition to light-duty vehicles.**
- **Accommodate various types and sizes of CHSS containers in a performance-based manner.**
  - Cylinders (regardless of type)
  - Conformable containers

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STATUS

Changes to the 2-stage localized/engulfing fire test (5.1.4, 6.2.5.1, and rationale) drafted and merged into the GTR#13 Phase 2 draft.

- Includes the burner definition and pre-test checkout to verify set-up prior to the CHSS fire test for range of anticipated CHSS sizes and shapes.
- After burner checkout, the CHSS fire test is conducted by simply setting fuel flows (i.e., the specific heat release rates) for the localized fire stage and then the engulfing fire stage.
- The CHSS fire test is conducted with the container filled with compressed hydrogen.
  - Use of compressed air as an alternative has been deleted.
- The separate engulfing fire test (in 6.2.5.2) was deleted as it is no longer needed.
- Round-robin verification testing of 6.2.5.1 is in progress.

ROUND-ROBIN TESTING

Round-robin testing complete:

1. JARI (Japan) -- Indoor test
2. Southwest Research Institute (NHTSA US) -- Indoor test
3. Powertech (Canada) -- Outdoor enclosure test
4. KGS (South Korea) – *Waiting for test report*
5. TesTnet (Canada) -- Outdoor test at temporary site with walls for wind protection except for walk-in entrance

Testing planned in 2022 for Phase 3:

5. TesTnet (Canada) – Repeat test at standard test site
    a) Standard (50mm) nozzle spacing
    b) 75mm nozzle spacing
6. BAM (Germany)

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Open Items

- Proposal to allow CHSS containers to withstand the fire test without vent-down of contents has been deferred to Phase 3.

- China has performed testing of Type 3 and 4 containers at 35 and 70 MPa and is satisfied that testing with only compressed hydrogen gas is acceptable.

- Waiting for test report from Korea (with data in requested digital format) to finalize required adjustments to the test methods in 6.2.5.1 and prepare figures for the *Rationale* for proposed changes to GTR#13.