

GTR #13 (Phase 2)

FIRE TEST DEFINITION

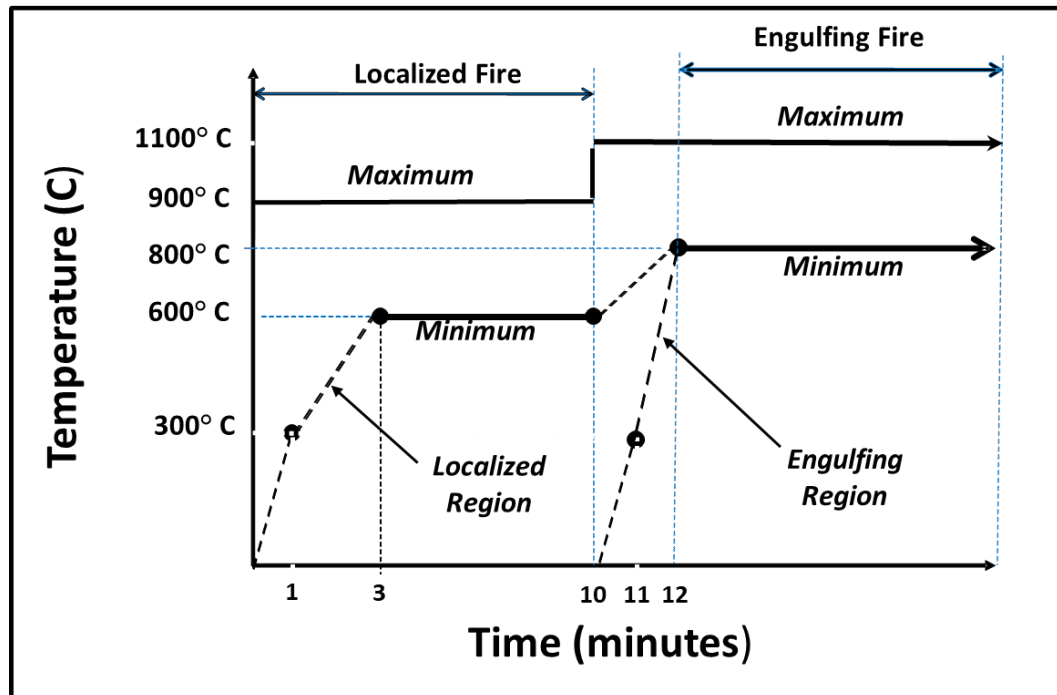
Task Force 4 Status

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Background

FIRE EXPOSURE TEST IN CURRENT GTR #13

- Builds on excellent CNG experience
- Inserts localized fire stage and limits flame length during the test to challenge the ability of TPRD(s) sense fire and to activate.



GTR #13 PHASE 2

TASK FORCE 4 OBJECTIVES

- Address Variability in Fire Test Results
- Expand to Larger Vehicles
- Consider Other Situations and Alternatives

ADDRESSING VARIABILITY OF TEST RESULTS

Sources of Variability

- 1) Width of fire (relative to tank diameter)
- 2) Uniformity of fire within the test area
- 3) Height (length) of flame
- 4) Wind

ADDRESSING VARIABILITY OF TEST RESULTS

Status

Methodology to Qualify Burner for test (Method 1b)

- Original JARI fire test data reviewed and used to establish criteria for qualification of the burner.
- Test method used by JARI for evaluation of candidate burners for fire testing.

Definition of Burner for Fire Testing

- Two types of burners evaluated by JARI meet performance criteria when tested without wind effects.
- Reasonable agreement in test results was noted between tests at CSA in Canada and JARI in Japan during a “mini” round robin.
- A partial premix burner configuration with a width of 600mm has been preliminarily selected as the prescribed burner (Method 1a).

Definition of the test method

- JARI has demonstrated the ability to detect when wind is adversely effecting the fire test (and therefore testing is not appropriate), but additional work is required to define wind shielding for outdoor testing.
- Sufficient information is now available for initial drafting of proposed revisions.
- Additional laboratories are desired for further round-robin testing.

Extension of Fire Test to Heavy Duty Vehicles **Adjustments to the Test Method**

- Increase time of thermal exposures?
- Increase temperature levels of localized and/or engulfing stages?

CONSIDERATION OF OTHER SITUATIONS AND ALTERNATIVES

- Modification to criteria for passing the fire test.
 - Allow an alternative to venting through the TPRD(s)?
 - Time out for successful completion after long fire exposure without burst?
- Require ignition of vent gas to prevent secondary ignition outside vehicle?
- Additional requirements for complex situations and/or use of Method 2 to demonstrate safety,
 - REESS faults (example: LiO battery fires)
 - Non-uniform indirect heating of containers due to cargo/load fires.