T-11 Alternate Fuel Acceptance Criteria

- Single test stand

- Engine rebuild immediately prior to test sequence
  - No rebuilds during test sequence
  - Intent is to conduct all tests without replacement of major internal or external hardware.

- Conduct 1 calibration test using oil 822-2
  - Test must meet all LTMS calibration acceptance requirements
  - Calculate new Zi value

- Conduct 2 tests on the alternate fuel using oil 822-2
  - Calculate Yi and Ei for these two tests. For both Ei values, use the Zi which was calculated immediate following the calibration test on the current fuel
  - Each test must meet the following criteria
    - For each parameter (4 total), Ei < 1.734
    - Average front and rear exhaust manifold temps should be within +/- 15 deg.C of the calibration test
    - Average power within +/- 10 kW of the calibration test
    - Average injection timing within +/- 3 deg of calibration test
    - Tests must be operationally valid with no negative QIs

Note:
The injection timing window of +/- 3 degrees is based on 9.4.1.1 in D 7156.

9.4.1.1 At any time during the test, injection timing may be
changed ± 3.0° BTDC from the initial timing to ensure meeting
the 96 h, 192 h, and 228 h soot windows. See 11.7.

Note:
In the gasoline sequence test approval criteria, it has been helpful to view these requirements as the "free pass" requirements, rather than "pass/fail" requirements. If these requirements are met, the Mack SP is comfortable that no additional review is necessary to approve the fuel. On the other hand, if these criteria are not met, there may be a very good explanation to the reason, unrelated to the fuel. In these cases, the SP may still determine a path forward to approve the fuel, but the requirements will have to be determined on a case by case basis depending on the data.

Additional questions for consideration:
1) Assuming a new fuel is approved, what will the implementation process look like? Will the whole industry choose a single supplier amongst all approved suppliers, or will each lab be able to make its own decision on which approved fuel supplier it wishes to use?
2) If switching to a new fuel, previous Zi values and severity adjustments will be based on calibration data from a different fuel.
   a. Is any additional referencing required?
      i. If not, can switchover happen in the middle of a calibration period?
   b. How will we handle severity adjustments?
3) For a test stand that runs the procedure described in this document, is the stand still calibrated and able to continue candidate testing?

Engine Parameters (Difference from first run after rebuild)

Runs since rebuild

Rebuild
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8