

Comparison of MC Default Protocol and Table Protocol Bench Test Results on 9.8kg Type IV CHSS

Bench Test of 9.8kg Tank @ Powertech

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Purpose: Comparative assessment – compare gas temperature of MC Default vs Table Fill.

Plan and Test Conditions:

Conduct two tests at J2601 Test 11-1A conditions ($P_0 = 5 \text{ MPa}$, $T_{\text{amb}} = 50 \text{ °C}$):

- 1) J2601 L/T fill
- 2) MC Default Fill

Note: Both tests used WEH hardware since JPN spec hardware is not available.

Results:

| | P_{initial} (MPa) | P_{end} (MPa) | SOC_{end} (%) | Fill Time (sec) | * MAT_0 (°C) | ** MAT_{30} (°C) | Peak Gas Temp (°C) |
|--------------|-------------------------------|---------------------------|----------------------------------|--------------------|--------------------------|------------------------------|-----------------------|
| Lookup Table | 5.7 | 81.2 | 96 | 591 | -32.4 | -33.0 | 82.2 |
| MC Default | 5.5 | 83 | 97.4 | 632 | -32.2 | -32.8 | 82.1 |

(Fill graphs are on page 20)

Summary:

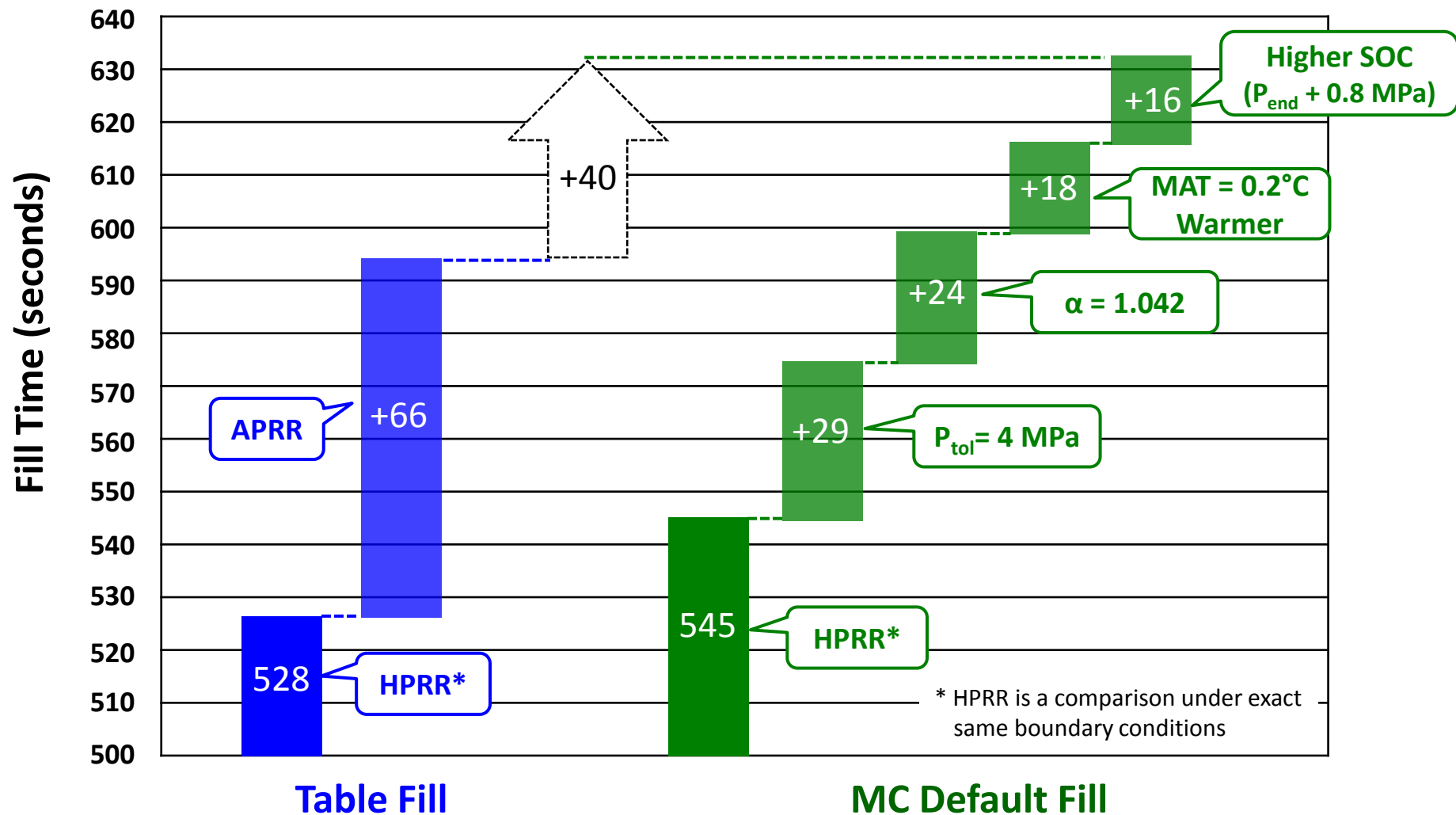
- ☐ Table Fill replicated the T40 boundary conditions almost perfectly
- ☐ MC Default Fill was about 40 seconds longer in duration due to:
 - a) Please see page 19 for a detailed assessment of the fill time differences.
 - b) Also, note that under these conditions, a table fill would have gone into fallback, increasing fill time by 870 sec

☐ Peak Gas Temperatures for both protocols were identical and < 85 °C limit.

* MAT_0 represents the mass average of the dispenser outlet temperature measured from the beginning of the fill

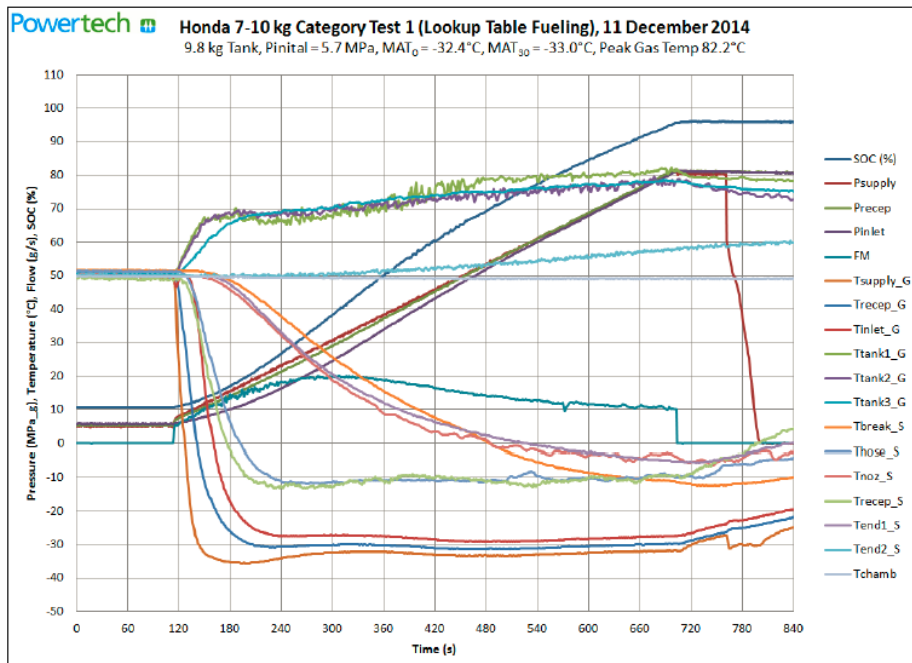
** MAT_{30} represents the mass average of the dispenser outlet temperature measured from 30 seconds into the fill

Contribution of Factors to Differences in Fill Times

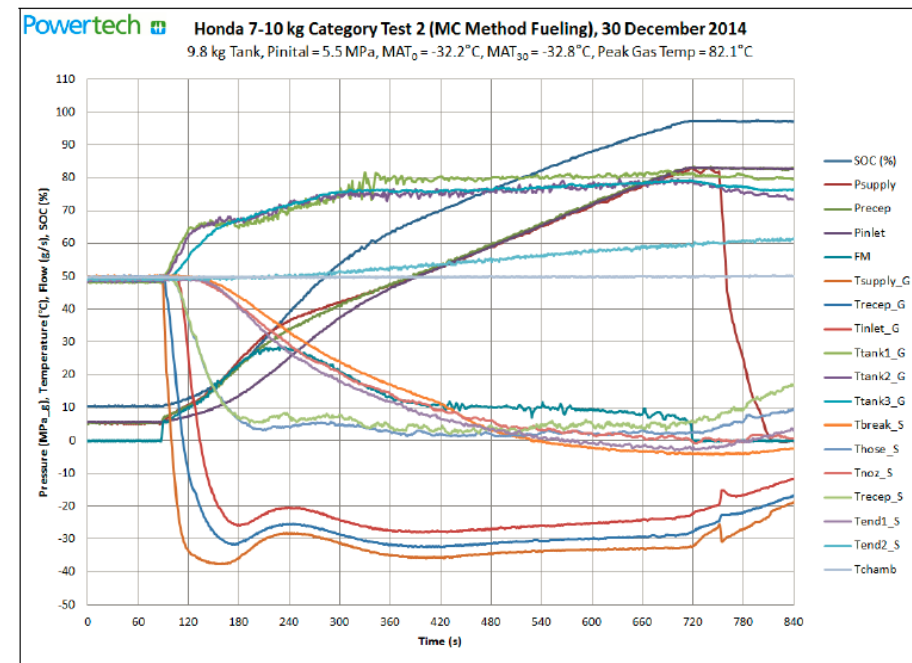


- Note that MC Default Fill HPRR is slightly more conservative than Table HPRR under same boundary conditions
- Table Fill is discounted by APRR, whereas MC Default Fill has multiple discount factors

Lookup Table Fill



MC Default Fill



- Tests of Table Fill & MC Default Fill were conducted at 50°C T_{amb} & T40 boundary conditions to compare results
- Peak Gas Temperature for both protocols were identical and < 85 °C limit.