

October 2, 2008

TEGA_High-Temp_TA7_Day2_v1_r2.doc

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TEGA High-Temp Soil (TA7_plugged) DAY 2

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Reconciled with block: tega sporty ht ramp ta7 2

Objectives:

Power on and perform Day-2 of a full high-temperature ramp on the sample in TA7, which has been previously heated via midday-1 High-temperature ramp. This sample had a plugged frit during the low and mid-T runs, and is assumed to be plugged here. The purpose of this run is to provide a baseline for the enthalpy associated with decomposition of altered minerals found on Day-1 and to provide a baseline for the gases given off by the decompositions. We are flowing no carrier gas, so the calling block will be identical to the Day-1 block except that the TA Sample valve is left closed throughout the run.

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Configuration:

High-temperature Day-1 ramp has been completed previously. The carrier valve is closed and the TA manifold has no gas in it. It was emptied during the Day-1 procedure. The carrier valve will not be operated due to its erratic behavior.

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Deleted: full tank pressure (about 6500 dN).

Software updates were made post Sol 113 to the 386SW and the mode table was changed to V125

Deleted: Changed the EGA Current Limit to 5000dn to accommodate the crosstalk from the short in TA7.¶

Inputs:

Multiplier Voltage: __3300

Calibration Set: 3

Ch 4 Calibration Voltage: 2800

Pump Nudge needed: Yes

Venting Oven #: Will not vent - (none)

Pre-heat duration: 30 secs

Calibrate Channels: 1,4

Oven Close Time: NA

Select TA #: 7

TA# for Check: N/A

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Emission: Low

Cal Tank Temperature: -99C

Constraints:

Gas(es) used: Mars ATM will be collected through the TA Sample valve.

TEGA High-Temp Soil (TA7_plugged) DAY 2**Filaments used:** 1**SW Version (386):** V515**SW Version (EGA):** V321**Sweep and hop mode version(s):** MODE TABLE V125.**Supermodes and Sweep modes used:** Supermodes 1, 2, 3, 4, 6, and 7; Sweeps 37, and 38.**Supermodes used in Ramp: 4, 6, & 7 (and 29, which is a dummy call to not change the supermode)**

Note: TEGA is checked to see if TEGA is safed. If so, abort self to end activity

1. Turn ON TEGA – Call TEGA_power_on – This is controlled by the interop science master
 - 1.1.1. TEGA_MAIN1_PWR "ON"
 - 1.1.2. TEGA_MAIN2_PWR "ON"
 - 1.1.3. TEGA_MAIN3_PWR "ON"
 - 1.1.4. Start the TEGA 386 FSW
2. Pause 3 Minutes (collect engineering data at a high rate before turning down)
3. Call Sequence 30A
4. Pre-heat delay 30 secs
5. Turn on EGA
 - 5.1.1. TEGA/FSW:EGA:Change EGA State
 - 5.1.2. Restore the modes from EEPROM 0
 - 5.1.3. EGA Commands:Restore Mode
6. OPEN GEC Vent Valve
7. Activate Sequence 24 A (Turns up readings for regulating temps)
8. Set Manifold Heater to -30C (execute Sequence 3b)

Deleted: (Increased time between ion pump on and check for pressure from 800ms to 5sec to ensure the emission would come on and not fault out due to high pressure in the EGA)¶

9. Set Emission on delay to 5 sec (allows best chance for emission start if large Ion pump current)

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10. Warm up EGA: CALL tega_ega_emission_warmup

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10.1. (LOW), Calibration Set 3

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10.2. Calls tega_ega_prep, filament-1

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10.2.1.1. Sets JPlate 0 to -107V10.2.1.2. Sets Jplate 1 to -92V10.2.1.3. Pause 5 seconds10.2.1.4. Set MV 3300 (input variable)

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- 10.2.1.5. Ion Pump ON
- 10.2.1.6. Start SM 1, pause 1 sec
- 10.2.1.7. Emission ON
- 10.2.1.8. Pause 2 Minutes
- 10.2.1.9. Stop SM 1
- 10.2.1.10. Emission ON
- 10.2.1.11. Pause 2 Minutes
- 10.2.1.12. Stop SM 1

10.3. Pause 2 minutes (provides time for ion pump to stabilize)

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10.4. Change engineering transmit to 10 secs

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10.4.1. IF pass thru = 1, emission current will change to HIGH

10.5. Call tega_ega_calibration_scans

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- 10.5.1. calibration_set 3
- 10.5.2. hi_emission LOW
- 10.5.3. cal_channels 14
- 10.5.4. cal_voltage 3300V
- 10.5.5. cal_4_voltage 2800V
- 10.5.6. exit_voltage 3300V

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10.6. Wait 1 second

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10.7. Start SM 3

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10.8. Pause 20 minutes

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10.9. Stop SM 3

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10.10. Pause 1 minute

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10.11. Calls tega_ega_gain

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- 10.11.1.1.1. Start SM 2
- 10.11.1.1.2. Pause 1 minute
- 10.11.1.1.3. Set MV 2600 – 3400V (1 minute per voltage)
- 10.11.1.1.4. Exit at 3300_V (input variable)
- 10.11.1.1.5. Stop SM 2
- 10.11.1.1.6. Run Sweep 38

EGA is warmed up and ready to go (54 mins)

11. Reinforce Emission on

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(IF pump nudge is YES Steps 12 to 14 are followed, if NO skip to 15)

12. Change to HIGH Emission

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13. Pause 5 minutes

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14. Change to LOW Emission15. Calibrate EGA: CALL tega_ega_calibration_scans

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15.1.1. calibration_set _____ 3 _____15.1.2. hi_emission _____ LOW _____15.1.3. cal_channels _____ 1,4 _____15.1.4. cal_voltage _____ 3300V _____15.1.5. cal_4_voltage _____ 2800V _____15.1.6. exit_voltage _____ 3300V _____

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16. Set EGA manifold heater to +35 C17. Set TA manifold heater to +65 C18. Set following readings to be taken every 1 second.

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18.1. Manifold Pressure18.2. Outlet Pressure18.3. Bus A Current18.4. Bus B Current

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19. Start Supermode 7: Soil volatiles

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20. Select Oven TA_7__ (TWEAKABLE)

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21. Set Ramp so it has no control over any of the valves(6 total)

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**Remember to turn on current monitoring to shut down manifold heater
(Do not turn manifold heat back on after turning it off in the ramp.)**

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22. Start Ramp (TWEAKABLE)

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22.1. Ramp Segments File: _____

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23. Run Heater Init (tega_init_heater_control)

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Execute Sequence 24 B to increase readings on temperature regulation.

23.1.1. TA Manifold +65C23.1.2. Plumbing 1 +65C23.1.3. Plumbing 2 +35C23.1.4. Transfer Tube +75C23.1.5. EGA Plumbing +45C23.1.6. EGA manifold to +35 C23.1.7. Wedge Heater @ 10% duty cycle

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24. Pause for Delay_2 (467 sec;) – TWEAKABLE

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Measure Atmosphere

25. Pause for Delay_3 (879 sec;) – TWEAKABLE TA Manifold = 4000 dN = 66 mbar

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Flush atmosphere from oven and plumbing (assumes oven is not plugged at low T)

26. Open oven inlet valve

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27. Pause 2 minutes (to measure leak rate of oven) TA Manifold = 18 mbar

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28. Open oven outlet valve (to flush oven)

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29. Pause 10 seconds (to get an idea on flow rate)

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30. Open bypass valve (to flush atmosphere out of EGA manifold)

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31. Pause 2 seconds

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32. Close bypass valve

Deleted: (TBD for gas to flush out.)

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33. Close outlet valve (inlet remains open so TA manifold can record any pressure rise)

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34. Pause for Delay_4 (2031 sec for 650 deg C) - TWEAKABLE

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Take gas sample at 650 C temperature.

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Deleted: (about 600 C?)

35. Open oven outlet valve (to flush oven)

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36. Pause 10 seconds (to give gas a chance to escape in case it is not plugged)

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37. Open bypass valve (to let evolved gases get to EGA outlet manifold)

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38. Pause 2 seconds

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39. Close bypass valve

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40. Close outlet valve

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41. Pause 2 minutes (for concentration wave to reach EGA inlet)

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42. Pause 1 min (to measure transition with high time resolution SM 6)

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43. Stop SM

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44. Start SM 7

45. Pause for Delay_5 (774 sec) - TWEAKABLE

Take gas sample at end of 5-min hold at 1000 deg C.

46. Stop SM

47. Start SM 6 (for high time resolution data)

48. Pause 1 min

49. Pause 1 min (to watch gas drain out of CML)

50. Open oven outlet valve (to flush oven)

51. Pause 10 seconds (to give gas a chance to escape in case it is not plugged)

52. Open bypass valve (to let evolved gases get to EGA outlet manifold)

53. Pause 2 minutes (for concentration wave to reach EGA inlet)

54. Pause 1 minute (to monitor change in gas at high resolution)

55. Stop SM

56. Start SM 7

57. Wait for ramp to complete (timeout = 3370.9 sec) - **TWEAKABLE**

57.1. Ramp Ends as Follows:

57.1.1. SM 7 running

57.1.2. Carrier and Calibration Closed

57.1.3. Inlet & Outlet Open

57.1.4. TA Sample Closed

57.1.5. Bypass Open

58. Close outlet valve

59. Close inlet valve

Shut down

60. Run tega_disable_heater_control (Turn all remaining heaters off)

61. Close bypass valve

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Deleted: <#>Close outlet valve (inlet remains open so TA manifold can record any pressure rise)¶

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Open TA Sample valve (to empty out old gas)¶

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Deleted: <#>Pause

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Deleted: <#>1 minute

Deleted: <#>2 seconds

Deleted: <#>(TBD; for concentration wave to get to EGA.)

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¶
Close TA Sample valve (to capture gas for analysis)

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Deleted: <#>Open TA sample valve (to reduce pressure to ambient in CML volume)¶
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62. CLOSE GEC Vent Valve

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63. Turn off EGA: CALL tega_ega_off

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63.1. EGA Shutdown:

63.1.1. Multiplier Voltage OFF

63.1.2. Wait 5 secs

63.1.3. Emission Off

63.1.4. Wait 5 secs

63.1.5. Ion Pump Control OFF

63.1.6. Activate Sequence 7A to turn the EGA OFF

64. Turn off TEGA: CALL tega_power_off

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64.1. Turn off the third TEGA switch

64.2. Turn off the second TEGA switch

64.3. Turn off the first TEGA switch

64.4. FPGA Dump – Aker Valve state

Open TA sample valve (to reduce pressure to ambient in CML volume)

Close TA sample valve