2024/04/26 - Li Oven Turn on Procedure

Goal of this procedure: Enter oven mode and reach desired oven profile

Instructions: To keep track of changes to the procedure - copy this page, date it, and add execution notes in red. Remember to save changes.

Table of Contents:

- Procedure
 - Checkout and setup Perform these steps several hours before opening the oven valves
 - Procedure for oven turn on
 - Procedure for oven shut down
 - Emergency shut down procedure
- Figures:
 - Useful material
 - ° Li oven sketch with TC locations
 - Li density profiles

Link to elog summary:

Oven startup: http://physics-elog.slac.stanford.edu/facetelog/show.jsp?dir=/2024/17/26.04&pos=2024-04-26T17:01:17

Oven shutdown: http://physics-elog.slac.stanford.edu/facetelog/show.jsp?dir=/2024/18/29.04&pos=2024-04-29T01:10:33

He bottle pressure: http://physics-elog.slac.stanford.edu/facetelog/show.jsp?dir=/2024/18/29.04&pos=2024-04-29T11:33:37

Procedure

Update 4/8/2024 for simplified

Checkout and setup - Perform these steps several hours before opening the oven valves

		Procedure	Execution notes
	1	Record goal density and helium buffer pressure	8 Torr He, 650W oven power
	2	Set 10 Torr gauge set points to plus and minus 1 Torr of desired pressure ^o Note: the hysteresis value is where the trip occurs, the lower value is where the fault will clear	8.20 Set SP, 9.02 Hyst SP 7.80 Set SP, 7.02 Hyst SP
	3	Set the 1000 Torr gauge setpoint to 30 Torr	30 Torr Set SP, 33 Torr Hyst SP
	4	If using DPS, confirm it is operating nominally and record the starting IP pressure (VGCC 3259)	Done VGCC3259 = 2.2e-8
	4	Confirm helium gas bottle is connected to fill line #1, regulator set to 5-10 psig. <i>Record</i> gas type, starting bottle pressure, and regulator pressure	He, new gas bottle bottle at ~2250psi regulator: 10psi
	5	Confirm that the fill line #2 is closed, and that the IOTA controller in rack FKG20-22 is turned off.	done
	6	Zero the 10 and 1000 Torr gauges	done

Figures:

Useful material

E300 Google Drive folder

How to perform a static fill with DPS

TDK-Lamdba GEN100-15 oven heater power supply manual

Li oven sketch with TC locations



Li density profiles

From: Summary of FACET II lithium oven measurements - June 3, 2021

More profiles available in doc (3 Torr, 4 Torr, 6 Torr, 8 Torr









Procedure for oven shut down

	Procedure	Execution notes
1	Turn off heater supply slowly to reduce thermal stress to the oven tube and wick.	13:11 - 71.75V, 7.95A=570.2W, TC4=871.8C 14:11 - 65.12V, 7.22A=470.2W, TC4=837.0C 15:11 - 57.69V, 6.41A=369.7W, TC4=770.2C 16:11 - 49.16V, 5.48A=269.5W, TC4=681.1C 17:11 - 38.91V, 4.37A=170.1W, TC4=574.3C 18:11 - 24.90V, 2.85A= 70.8W, TC4=444.5C 19:11 - 0.40V, 0.04A= 0.0W, TC4=285.3C
	Do this either by hand, or using the automated tool (~ 100 Watts per hour)	

9 hours turning down by hand- 11 hours until valves can be closed

2	After the heater power is turned down to 0, wait until oven thermocoupl es indicate the oven is near room temperature (less than 50°C). Lithium is liquid at 180° C. Takes about 11 hours to reduce to 50C	
3	Write down the buffer pressure for the record in the facet elog	5 Torr
4	Close oven gate valves 3183 and 3187. Turn the key to "CLOSE VALVE" in the PLC valve controller in rack FKG20- 22 and remove the key. This will disable the valves from opening. Set the Be window valve 3208 back to CAMAC.	Closed 4/29/2024 10:30
5	Drain all helium gas and open valves to restore pumping. If using DPS then follow: How to perform a static fill with DPS	Fill valve closed at 10:35. MFC still on DPS procedure completed 4/29/2024 11:21
6	Open the Be window valve, remove bypasses, and reset gas types on the gauges to nitrogen.	Beam on TD11, valve opened

Emergency shut down procedure

If possible the oven should be cooled slowly using the above procedure to reduce thermal stresses on the oven. But in an emergency situation the oven may be put into a safe-mode to prevent loss of lithium using the following procedure. Note that depending on the situation, some of these steps are automatically taken by the EPS.

	Procedure	Execution notes
1	Close oven gate valves 3183 and 3187.	
	If there is an EPS fault then this happens automatically.	
2	Turn off the oven heater power.	
	If there is an EPS fault then this happens automatically.	
3	Secure the helium gas source – either drain the IP or ensure DPS is operating in the nominal static fill state: How to perform a static fill with DPS	
4	Log the details of the fault and shutdown: type of fault, reason if known, IP pressure, oven temp, and any other relevant information.	
5	Turn the key to "CLOSE VALVE" in the PLC valve controller in rack FKG20-22 and remove the key. This will disable the oven gate valves from opening.	
6	Do not attempt to restart the oven until you investigate, find, and fix the source of the failure.	