

This instruction covers the set-up and use of the Cascade TEK Vacuum Oven for baking out PMMA prior to any vacuum deposition process. Oven is located in west wall of M-bay. **THIS VACUUM OVEN IS FOR PMMA BAKE ONLY!**



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1. SAFETY REQUIREMENTS

- 1.1 Safety glasses must be worn whenever in the cleanroom, except when using a microscope or when wearing protective goggles.
- 1.2 Information regarding the hazardous materials used in the cleanroom can be found through MSDS documentation located in the gowning room.
- 1.3 When handling hazardous liquids and chemicals, Personal Protective Equipment must be worn.
- 1.4 Please contact the Process & Equipment Engineer for any maintenance, repairs, or problems of the Spinner Systems.

Vacuum Oven specific safety information:

The **Vacuum Oven** is a relatively harmless machine relating to the operator, apart from the obvious hazards of handling of substrate materials when loading and unloading into the hot (75° C) oven.

Safety interlocks will stop the oven from overheating.

2. EQUIPMENT

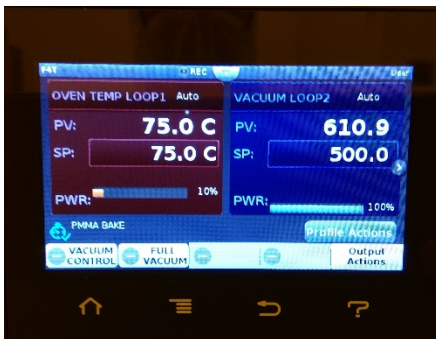
Vacuum Oven	Cascade TEK model TVO-2, custom
Vacuum Pump	Agilent Technologies, model IDP-7, model number X3807-64200

3. FACILITY REQUIREMENTS

- 3.1 Electricity: 110 - 120 V Full load Amps: 10A
- 3.2 Vacuum: Min. of 2 CFM or 57 LPM
- 3.3 Utility Nitrogen: 10 PSI for Backfill, never exceed 15 PSI
- 3.4 CDA: 70 to 80 PSI, never exceed 80 PSI

4. CYCLE OF OPERATIONS

- 4.1 Reserve tool in iLab for the time slot that you require.
- 4.2 Enable your tool in iLab.
- 4.3 Verify the idle conditions on the left controller. The temperature SP should be 75.0° C and the vacuum SP should be 500.0.
 - 4.3.1 If the temperature SP is not 75.0, tap the number area next to SP to bring up the setpoint menu. Changed the value to 75.0.
 - 4.3.2 Wait for the oven temperature, PV, to stabilize within +/- 2°.
 - 4.3.3 The oven vacuum SP can be changed in the same manner as the temperature. The Vacuum PV can be reading from 500 to atmosphere (760 T).



- 4.4 Release the door latch and hold down the BACKFILL button until the vacuum gauge above the button reads over 760 T and the door opens.
- 4.5 Load sample onto one of the shelves, placing sample near center of oven. Do NOT load onto bottom of oven. It is not a shelf.
 - 4.5.1 It is best to keep the door oven open time as little as possible. The recovery of the oven temperature takes much longer if the door is left open for extended time.
- 4.6 Starting the Profile (program).
 - 4.6.1 The currently selected Profile is displayed in the lower left corner of main controller, above the VACUUM CONTROL button. This oven is restricted to baking PMMA only. Thus, the Profile name needs to be PMMA BAKE.
 - 4.6.2 Tap on the Profile Actions button on the Home page.
 - 4.6.3 A menu will come up with the options of Run Last, Run Profile, Go to Profiles and Cancel.
 - 4.6.4 If PMMA BAKE was showing on the Home page, you can start it by choosing Run Last.
 - 4.6.5 If there was any other Profile name showing on the Home page, choose Run Profile and it will bring up the names of all the Profiles in the system. Choosing PMMA BAKE will start the Profile.

- 4.6.6 The first step of the process is a 10 second door seal check. The VACUUM LOOP2 PV should be below 500 at the start of the 2nd step. Please verify this before walking away for the oven.
- 4.6.7 The process will run for approximately 35 minutes after the first step. This will be a 30 minute soak at temperature step, then a 5 minute backfill step.
- 4.6.8 When the process is complete, the timer icon next to the Profile name will turn **Blue**. The last step, the backfill, will leave the oven at between 500 and 600 Torr. To remove your sample, release the door latch and press the BACKFILL button until the gauge reads > 760 T and/or the door releases.
- 4.6.9 Remove the sample and close/latch the door.

5. PROGRAMMING/Writing Profiles

- 5.1 A profile is a recipe programmed in software form. This allows the oven to run the recipe as an automated baking and vacuum process.
- 5.2 Creating or editing profiles will only be done by a member of the staff and are password protected.
- 5.3 The following are brief examples of profiles. Please see the PDF file: Profile_Programming_F4T_CTEK_Shlv on the BNCSHare drive in the Equipment Manuals>Cascade TEK Vacuum Oven folder for a complete guide on programming.

5.3.1 Instant Change Profile

Step Number	Step Type	Step Parameters, part 1	Step Parameters, part 2
1	Instant Change	Target Set Point Loop 1 = 50.0 Time = 8.0 hours	FULL VACUUM: ON
2	End		FULL VACUUM: OFF

5.3.2 Ramp and Soak

Step Number	Step Type	Step Parameters, part 1	Step Parameters, part 2
1	Instant Change	Target Set Point Loop 1 = 50.0 Time = 10.0 seconds	Target Set Point Loop 2 = 500 T VACUUM CONTROL: ON
2	Ramp Time	Target Set Point Loop 1 = 50.0 Time = 30.0 minutes	Target Set Point Loop 2 = 20 T VACUUM CONTROL: ON
3	Soak	Time = 8.0 hours	VACUUM CONTROL: ON
4	Soak	Time = 5.0 hours	FULL VACUUM: ON
5	Ramp Time	Target Set Point Loop 1 = 20.0 Time = 3.0 hours	FULL VACUUM: ON
6	End		VACUUM CONTROL: OFF FULL VACUUM: OFF

6. TROUBLESHOOTING

Unit has 1 interlock that can halt operation. The Oven Limit alarm will prevent the oven chamber from heating. When the oven has an alarm condition, there will be a red alarm mode bar at the top of the main controller screen.

- 6.1 The alarm and interlock are caused by the temperature exceeding both the Oven Limit and Temperature Setpoint.

- 6.2 The power bar will read a percentage of power being called for by the control system, but that power will NOT be going to the heater element.
- 6.3 Possible Oven Limit Activation Causes.
 - 6.3.1 Starting a heating profile with a temperature setpoint near or exceeding the current Oven Limit setting.
 - 6.3.2 The chamber temperature is within 9°C of the Oven Limit setting.
 - 6.3.3 An external temperature source or a heat source in the oven chamber pushes the oven temperature to or above the Oven Limit setting.
 - 6.3.4 The temperature controller circuitry or sensor probe have failed, allowing uncontrolled heating in the chamber to meet or exceed the Oven Limit setting.

7. REVISION RECORD

Reason for Revision	Date of Revision	Person Responsible
Initial Release	November 20, 2019	Matthew Hayes