

Coater Standard Operating Procedure

April 24, 2008

The ideal and simplest condition for starting would be one where the unit had been unloaded and cleaned, and had set overnight to reach room temperature. If the coater does not need cleaning or venting or cooling, etc., skip the unnecessary step(s).

Check with Technician/Lab Manager to ensure cleanroom exhaust running, no maintenance going on in cleanroom, coater is ready to go, etc ...

Check that the coater is plugged into the wall outlet.

(The "MAIN POWER" button will be illuminated when coater is plugged into the wall).

Pull out the red "EMO" button.

Power on the PDS 2010 coater by pressing the "MAIN POWER" button.

(The process controllers will light up when "MAIN POWER" is button is pressed.)

Make sure that all temperature, pressure and alarm setpoints are correct.

Furnace setpoint 690C Chamber gauge setpoint 135 C Vaporizer setpoint 175 C
Vacuum setpoint 35 mBar

Fill out the "Log Sheet" Date, Name, Time

If the vacuum reading is not about 1000, vent the system by moving the "VACUUM" selector to "VENT".

When the "VACUUM" controller reads approximately '1000', the chamber is at atmosphere.

Put "VACUUM" selector to "HOLD".

Remove the chamber lid and sides.

Careful: lid is heavy, chamber is heavy. Do not drop on toes/foot.

A good method for removing the chamber is to twist it before lifting. This is easy and creates a nice clean break if it is stuck down with Parylene coating.

If Parylene coating build-up from previous coating runs is blistering or separating from the machine surfaces, the Parylene film must be removed at this time. See Cleaning section at end of procedure.

If required, clean the COLD TRAP PROBE.

(If cold trap probe head is cold, wear protective gloves when working with a Cold Trap. Avoid Freeze Burns !)

If needed, apply Micro Soap (spray bottle) to the COLD TRAP PROBE. Wait to dry. While drying, continue with the following steps

If cold trap probe head is clean and coated with soap and **** DRY **** , insert into trap housing.

Turn on the “FLEXI-Cool” mechanical chiller by making sure the wall power bar outlet is turned on and then pressing the green button on the front left hand side.

Listen for humming noise to verify cold trap is on.

Depress “PROCESS START/STOP” (button should turn green colored).

Switch “FURNACE“ selector to ENABLE.

(Furnace and Chamber gauge temperatures will take about 60 minutes to get to their set temperatures).

Do not wait for heater to reach set point, but continue with the next steps. The **coater** will eventually get to the proper temperatures before beginning coating.



If Vaporizer door is hot, allow Door and dimer boat to cool before handling them and wear protective gloves when removing the Dimer Boat.

“ Aluminum Boat”

Cut a piece of aluminum foil about 11 inches by 5 inches.

Form the aluminum foil along the outside diameter of the aluminum tube that is kept on the rack beside the coater.

Face the shiny side of the foil toward the metal tube.

Fold the ends of the foil so there are no holes or any leaks where the dimer could spill out.

Measure than amount of dimer into the boat using a metal spatula and digital balance. Do this near the sink (not in the yellow cleanroom). Careful of spilling dimer powder particles onto surfaces.

(10 grams of dimer will deposit about 6 microns of Parylene-C film

2 grams of dimmer will deposit about 1 micron Parylene.)

Do not exceed 50 grams

Carefully load boat into vaporizer chamber.

Check door O-ring for hair, dirt, powder.

Close the load door and turn lock tab.

If cold trap probe was sprayed with Micro Soap and is now dry, inset into housing.

If cold trap probe is clean and **** dry ****, turn on the “FLEXI-Cool” mechanical chiller by making sure the wall power bar outlet is turned on and then pressing the green button on the front left hand side.

Listen for humming noise to verify cold trap is on.

Load samples (silicon, glass, metal, cards, etc) onto fixture .

Make sure fixture is centered on turn table.

Switch “Vaporizer” selector to “ENABLE”. The turntable we begin to rotate the fixture. Insure that the fixture does not hit the baffle or the fixture could become stuck during the run.

Switch “Vaporizer” selector to DISABLE.

Check all O-rings on the chamber, cold trap and vaporizer door for loose Parylene film, hair and dust. If required, clean with a wipe ** slightly ** dampened with alcohol .

Carefully place chamber on chamber base and carefully put the lid on. **These parts are heavy. Do not drop on toes or foot.**

Switch “Vaporizer” selector to “ENABLE”.

If 15 minutes have elapsed since the mechanical chiller has been turned on, make sure cold head is centered inside housing (hold down with your hand until the vacuum is applied in the next step).

Switch the “VACUUM” selector to “VACUUM”. This will apply vacuum to chamber and cold trap.

****** Wait for chamber to pump down to less than 20 mBar (about 10 minutes).**

If it does not drop below 20 mBar , there may be a leak somewhere (chamber o-rings, cold trap o-ring or vaporizer door o-ring) .

If you suspect a leak, switch vaporizer to “Disable”,

Switch Vacuum to “Vent” for 20 seconds.

Then switch Vacuum to “Hold”.

Look for loose pieces of Parylene film on all o-rings and any sealing surface (chamber lid, chamber base, cold trap, vaporizer door, etc.) .

The furnace will reach 690C after about 60 minutes. The Vaporizer will gradually get hot. Once the dimer starts to vaporize, the vacuum will increase to 30 mBar or so and remain fairly constant.

Once the dimer is all vaporized, the Vaporizer temperature will increase up to 180C and the vacuum will start to drop.

The “PROCESS START/STOP” button will start blinking.

Anytime up to several hours you can press the “PROCESS STOP/START” to disable all the heaters.

Set “VAPORIZER” to DISABLE to stop the holder rotation.

Turn the “VACUUM” selector to “VENT” to vent the chamber until it reads about 1000.

Turn the VACUUM selector to “HOLD”.

If there are no more coating runs, turn off Flexi-cool Chiller (green switch on chiller). Wait 15 minutes before removing the cold head. While waiting continue with steps below.

Remove chamber lid and side. **Careful. Heavy. Do not drop on toes.**

Unload the coated parts.

Peel off any thick layers of Parylene from the lid, sides, viewport window, rotating base, opening on the base to the cold trap, etc. and spray the just peeled areas with Microsoap from the spray bottle.

If Microsoap has been sprayed on, wait for Microsoap to dry.

Put chamber sides and lid back on. Careful. Do not drop on toes.

*** When the chiller has been off for 15 minutes (do not exceed 25 minutes), use cleanroom wipes to wipe deposits, remove Parylene deposit on the cold head.

Apply Micro soap (spray bottle) solution to cleanroom wipe and wipe the cold head.

If there are no more coating runs, turn “FURNACE” selector to “DISABLE”.

If there are no more coating runs, turn “CHAMBER GAUGE” selector to “DISABLE”.

If there are no more coating runs, ensure “VAPORIZER” is on “DISABLE”.

If there are no more coating runs, ensure “VACUUM” selector is on “HOLD”.

Press the red “EMO” button in to remove the live voltage to the coater electronics.

Fill the “Log Sheet” with the base pressure, Parylene depositing pressure, amount of dimer used, number and type of samples, etc.

Report any problems to the Technician.

HOW SOON TO REMOVE THE COLD TRAP PROBE

There are two opposing needs to consider.

- 1) The flex line to the probe, and its junction, need time to warm somewhat so they are not damaged by the flexing.
- 2) However, the probe needs to be removed promptly so the frozen material on the probe does not drip or fall into the bottom of the Cold Trap housing and eventually cause damage.

Try to allow enough time for the flex line (and its junction to the probe) to warm before moving, but do not wait so long that the frozen material on the probe begins to melt.

Then use special care to minimize stress on the line and junction when moving the probe out of the housing and onto its holding fixture.

When the probe has warmed up more (less frosty) use a wipe wrapped around the probe to twist and remove the deposits. Use some isopropyl alcohol on a wipe remove all deposits. If necessary, use Scotch Brite abrasive pad to remove the rest of the deposits.

Spray probe with Microsoap.

If cleaning of the chamber is necessary:

- * The rotating base should be removed for cleaning.
- * Strip all the film from the Chamber, Viewport, Furnace Port, port to the cold trap and any other surfaces of the coater that has parylene film.
- * With a spray bottle and a cleanroom wipe, apply the pre-mixed 2% solution of Micro Soap release agent to all the bare stainless steel surfaces from where the Parylene coating needs to be stripped in subsequent coating runs.

Apply Microsoap to :

- the baffle tube that has holes for the vapor to enter the chamber.
- the interior walls of the coating chamber;
- the interior side of the chamber lid and viewport glass;
- the inlet and outlet ports of the chamber;
- the turntable and fixture that holds samples

Do not apply Microsoap over deposited Parylene coating from previous runs. The sequential runs make the Parylene thicker and easier to remove as sheets, rather than in small pieces.

Allow one hour for the soap to dry before assembling the coater chamber.

The coater internal surfaces must be clean. All O-rings and seals must be in good condition and all sealing surfaces must be clean. Even small strips of Parylene film on the O-rings will cause vacuum leaks that will impair the coating process.
