

SOP 1—Initiation of primary chamber pumping system.

1. Confirm primary chamber gate valve (GV1), load-lock gate valve (GV2), Ar vent valve into primary turbo pump (VV1) and load-lock turbo pump (VV2), foreline valve to primary turbo pump (FV1), and foreline valve to the load-lock turbo pump (FV2) are all closed.
2. Confirm process gas Ar1 and O₂ mass flow valves are closed.
3. Confirm that the GV1 adaptive pressure control box is on. Confirm that the TP1 frequency controller is on and not faulted.
4. Confirm that the convectron gauge connected to the primary chamber (CG1) is on and recording pressure.
5. Start foreline pump and wait 1-2 minutes for pump to warm.
6. Open FV1 and wait until “gurgling” sound in foreline pump stops. If gurgling sound does not stop within 1 minute, close FV1 and turn off foreline pump. Abort attempt.
7. Immediate after gurgling sound stops, push Set Point 1 button on the GV1 control box and then push “Position Mode” button. This opens GV1 to the 10% open position. Foreline pump should gurgle again, assuming the primary chamber was backfilled with Ar. If not, foreline pump may not gurgle. CG1 should exhibit rapid reduction in primary chamber pressure. If not, immediately close GV1 by pushing the “Close” button on the control box and abort attempt. Once rapid pressure reduction is confirmed, fully open GV1 by pushing the “Open” button on the control box.
8. Immediately after the CG1 pressure falls below 2×10^{-1} Torr, start the TP1 coolant (confirm coolant flow) by pushing the “Start” button on the TP1 frequency controller. Confirm that the load on TP1 increases and then decrease to one (1) light on the frequency controller. This should take at most a few minutes. If the load on TP1 increases but then does not begin to decrease, immediately close GV1 by pushing the “Close” button on the control box. Monitor load on TP1—if it does not fall to 1 light, turn off TP1 and follow SOP 3.
9. After a few minutes attempt to start the ion gauge connected to the primary chamber (IG1). Depending on the recent activity in the primary chamber, the pressure reading should be in the 10^{-5} - 10^{-6} Torr range and falling.

SOP 2—Termination of primary chamber pumping system.

1. Confirm that the 1000-Torr Baratron gauge (CM3) is on and recording approximately zero pressure. If CM3 is not working properly, close the primary chamber gate valve (GV1) and follow SOP 3.
2. If CM3 is working properly and reading zero pressure, confirm GV1 is open. If GV1 is closed and cannot be opened (for example, because of high primary chamber pressure), follow SOP 3.
3. Close the window shutter on the primary chamber. Confirm VV1 & VV2 closed.
4. Confirm that the foreline valve to the load-lock turbo pump (FV2) is closed and that TP2 is off. IF TP2 IS RUNNING, SKIP STEP 8 BELOW AND PERFORM STEP 7A.
5. Open low purity or vent Ar2 bottle and set low pressure side of the regulator to a maximum of 5 psig (5 psi above 1 atm.). Note that the “zero” reading of the low pressure side of the Ar2 regulator is 1 atmosphere. Open the small valve from the regulator to the Ar2 vent line. DO NOT open vent line to TP1 (VV1).
6. Push the “Stop” button on the TP1 frequency controller and turn off the TP1 coolant.
- 7A. SKIP THIS STEP if FV2 is closed and TP2 is off. Close TP1 foreline valve (FV1).
7. Open VV1.
8. SKIP THIS STEP if FV2 is open and TP2 is running. Turn off the foreline pump immediately after opening VV1.
9. Confirm Ar flow into the primary chamber by monitoring the chamber pressure with CM3. NOTE: The CG1 reading is gas specific and calibrated for air. It will not record 760 Torr (1 atm.) for Ar and should be ignored during venting.
10. When CM3 reaches approximately 100 Torr close the primary gate valve (GV1) by pushing the “Close” button on the control box. Do not go above 100 Torr on CM3 without permission from Prof. Heuser. It may be necessary to readjust regulator to 5 psig if CM3 does not reach 100 Torr.
11. Close FV1 (unless already closed in step 7A).
12. In the following order; close VV1, close small valve from the regulator to the Ar2 vent line, close the Ar2 regulator, and close the Ar2 bottle.

SOP 3—Termination of primary chamber pumping system with primary gate valve (GV1) closed.

NOTE: THIS SOP FOLLOWED ONLY IF PRIMARY CHAMBER GATE VALVE GV1 IS CLOSED AND CANNOT BE OPENED.

1. Confirm that the foreline valve to TP2 (FV2) is closed and that TP2 is off. IF TP2 IS RUNNING, SKIP STEP 5 AND PERFORM STEP 3A.
2. Open low purity or vent Ar2 bottle and set low pressure side of the regulator to a maximum of 5 psig (5 psi above 1 atm.). Note that the “zero” reading of the low pressure side of the Ar2 regulator is 1 atmosphere. Open the small valve from the regulator to the Ar2 vent line. DO NOT open vent line to the TP1 (VV1).
- 3A. SKIP THIS STEP if FV2 is closed and TP2 is off. Close the TP1 foreline valve (FV1).
3. Push the “Stop” button on the TP1 frequency controller and turn off the TP1 coolant.
4. Open VV1.
5. SKIP THIS STEP if FV2 is open and TP2 is running. Turn off the foreline pump immediately after opening VV1.
6. If TP2 is off, monitor the foreline pressure with the TC pressure gauge. Move to step 7 when the pressure reaches at least 100 Torr. If TP2 is running, confirm that the TP1 has stop rotating by listening for termination of whinnying sound. At most, wait 2 minutes before performing Step 7.
7. Close FV1 (unless already closed in step 3A).
8. Immediately in the following order; close VV1, close small valve from the regulator to the Ar2 vent line, close the Ar2 regulator, and close the Ar2 bottle.