**MRL 1-158 Veeco PSP waferstorm Operation/Power up/Shutdown**

**Chemical fill- carboy removal**

**Feb 19, 2021**

**Authorized personnel: Sid Meshram, Carlos V**

**Operations – Chris G, Lisa A, Jennifer P, Yoonseok C, Sid M**

**Manager – George Totir**

**Chemicals in tool – Solvents only: NF-90, 1165 and IPA.**

**Note:: IPA used for wafer rinse and dry, post NF-90 and 1165. NO DI WATER.**

1. **No solvents are allowed to go down the House chemical drain. Waste chemical is 100% captured inside the tool.**
2. **Daily Morning Start Up – Authorized person :: Chris G, Lisa A, Jennifer P, Sid M.**
3. Confirm power to the tool. This can be checked if the green button on front right area of main tool is lit or not. IF no power to tool, please refer to Start up procedure.
4. Confirm no leaks in tool by opening and checking all chemical cabinet doors for chemical supply and carboy.
5. Confirm tool was left in cool down mode with heaters off. Then turn on the heaters by clicking on heat on title bar. Make sure recirculation to tank 1 and tank 3 come on. Can also turn them on through title bar selection.
6. Takes 45-60mins for temperature to reach and stabilize at 68degC for NF-90 and 75degC for 1165
7. **Daily cooldown procedure – Authorized person :: Chris G, Lisa A, Jennifer P, Sid M.**
8. Confirm no process running in tool by checking all stations in tool bar on computer screen
9. Press Cool on tool bar. Confirm all setpoints change to 15degC on heaters under configuration tab. NCCW will start to run at this point. This will turn on the coolant for 1 hour on all chemical lines before stopping the recirculation pumps.
10. Tanks will cool completely in about 3 to 3.5 hrs.
11. **Start Up procedure –**
12. Confirm no power to the tool. This can be checked if the green button on front right area of main tool is lit or not. If not lit – please check with facilities and or tool engineer for a power dip.
13. Before re-energizing the tool, Make sure tool is not in EMO status. If yes, reset all buttons. Confirm with Tool owner/ sector manager. For any other reason, wait for tool Engineer to confirm status.
14. If confirmed no power to the tool is from power dip, then push the green button ON which will bring the power to the tool.
    1. Wait 5mins for tool to reboot.
    2. Open PSP software. Username and password is Operator.
15. If tool does not auto initialize, click on Initialize, Initialize on software.
16. Computer may have power even if tool does not have power.
    1. Computer is backed up by UPS battery.
17. Tool ready for operations after Initialize.
18. Contact Sid M if any questions.
19. **IPA level check and re-fill for Lot to Lot operations** 
    1. **Authorized persons:** **Chris G, Lisa A, Jennifer P, Sid M.**
    2. Confirm the tool is in idle, no processing state, before removing any supply bottles from the CSU double doors cabinet.
    3. IPA level in the supply container in the chemical supply unit needs to be checked every AM and before any lot operations. Level in supply container can be determined visually. A full 5 gallon IPA supply container will last IPA rinse and dry for 13 wafers.
    4. Two containers of 5 gallon capacity for IPA are available, one in temporary location and other in CSU on IPA supply lin.
       1. Filled 1st container (capped and labelled) can temporarily be stored in the small cabinet by the CSU unit as spare.
       2. This spare container for IPA can be used by 1st and 2nd shift tool operations engineer as and when needed.
       3. 1st shift operations are to confirm in passdown status of filled spare container in temporary storage cabinet in 1-158 lab. 2nd IPA container is within the CSU on IPA supply line.
    5. Don PPE per 5.1.2- list with a backup buddy for chemical operations. **Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy is in the area**
    6. When you open CSU doors the display screen will show a warning message “Door not closed(CSU Right door)”.
    7. When refill of IPA supply container required,
       1. To remove IPA container release the quick disconnect
       2. Move onto a the transport cart.
       3. Bring the cart to 1-150 Laurel hood.
       4. lift and move container inside hood.
       5. Next bring 5- IPA 1 gallon containers to the laurel hood for refill.
       6. Open 5 gallon tank lid cap and Hand Pour from 1 gallon IPA bottles into 5 gallon container.
       7. Close the lid cap and move the full 5 gallon container back to cart to transfer to the CSU.
       8. Open the CSU cabinet door and move into CSU
       9. Connect to the quik disconnect.
       10. Close the CSU door.
       11. Rinse the IPA bottles 3x and call RSF x4162 for pick up.
       12. Put away all PPE
    8. After all chemical level and temperature check is complete , wafers can be loaded in cassette for NF-90 or 1165 as defined on MRL track .
    9. Load process recipe mentioned in MRL track and correct handler recipe. Confirm correct soak time. Lot can only then be started.
20. **2nd shift procedure for Chemical supply and carboy swap for 1 container only** 
    1. **2nd shift operations allowed for 1 swap of supply IPA container and 1 swap of carboy waste container.**
    2. Confirm tool in idle no processing state before removing any supply bottles from the CSU double doors cabinet.
    3. For full spare supply container (located inside short flammable cabinet) exchange, Confirm your buddy backup is in the lab, sight and sound and the 2ndshift manager present.
    4. **Don your PPE. Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy is in the area .**
    5. Open temporary flammable cabinet door and keep the door open using the metal bar in door open position. Bring an empty cart to front of cabinet.
    6. Slide and move the IPA 5 gallon spare container from small temporary Flammable chemical cabinet onto the cart. Move cart by Veeco PSP CSU.
       1. Open left doors of CSU for Veeco PSP tool and locate left partial fill IPA source bottle. Bring an empty cart to left partial fill IPA source bottle position
       2. Using stainless steel quick disconnects, detach the container from IPA supply line. Supply line IPA connection should be properly placed for IPA holder only. Move empty container to empty cart.
       3. Empty or partial filled IPA supply container to be filled in 1stshift only.
       4. Slide and Place the capped spare IPA chemistry container from cart into the CSU.
       5. Replace the tool lid cap from empty or partial filled IPA container with one end of quick disconnect to filled spare container carefully.
       6. Move partial filled IPA container on cart into temporary storage flammable cabinet.
       7. Attach the one end of quick disconnect from 5 gallon container back to IPA supply line.
       8. Close the CSU door. Operations can then be resumed.
    7. For waste carboy swap –
       1. Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy backup is in the lab, sight and sound and the 2ndshift manager present.
       2. Confirm tool in idle safe state with no processing. Display screen will show a warning message for Waste Carboy full .
       3. Open the right door of CSU. Bring empty 5 gallon container, kept next to tool and keep it on an empty cart.
       4. Using stainless steel Quick disconnects, detach the waste container from IPA carboy line. Waste line IPA connection should be properly placed in IPA holder only. Remove waste carboy container cap and replace with new cap from empty container. Bring an empty cart next to filled waste container and move waste container from weight scale to empty cart.
       5. Mention in passdown about presence of filled waste container on cart in Veeco PSP lab.
       6. Place an empty 5 gallon container on weight scale for carboy station.
       7. Using stainless steel quick disconnects attach the container to waste carboy IPA line.
       8. Attach correct hazmat label on both full and empty carboy containers.
       9. Close door and Update tool operator as needed.
21. **Chemical source bottle fill in Hood in 1-150 – 1st shift only Authorized person:: Chris G, Lisa A, Sid M**
22. Confirm tool is in idle no processing state before removing any supply bottles from the CSU double doors cabinet.
23. **Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy is in the area .**
24. Pre assemble the chemicals on a cart and the 5gallon empty bottle and wipes in 1-150 Hood area. ( IPA or NF90 or 1165)
25. ONLY fill one 5 gallon chemical bottle at a time in the hood.
26. Fill the empty or partial filled- chemical supply bottle with 4 gallons of new chemical, follow the chemical hand pouring procedure.
27. Wipe droplets and secure the cap on the full bottle.
28. Place on the transport cart
29. Bring the filled supply bottle to the short Flammable cabinet.
30. Open the door and use metal bar to keep it in open position.
31. Carefully lift and place the full bottle on the Flammable cabinet floor.
32. Close the door
33. Return to the rinse hood
34. 3X rinse the empty bottles, place in the location to transport to the RSF.
35. Remove your PPE.
36. Contact Sid M if any operation questions.
37. **IPA Chemical Source bottle change- swap – 1st shift** 
    1. **Authorized person:: Chris G, Lisa A, Sid M**

1. Confirm tool in idle no processing state before removing any supply bottles from the CSU double doors cabinet.

3. Display screen will show a warning message “Door not closed(CSU Right door)” when you open the CSU door.

4. Don PPE- list with a backup buddy. . **Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy is in the area**

5. Confirm the full bottle is in the Flammable cabinet. (If not go to section 7 Chemical source bottle fill)

* + 1. Open temporary flammable cabinet door and keep the door open using the metal bar in door open position. Bring an empty cart to front of cabinet.
    2. Slide and move the IPA 5 gallon spare container from small temporary Flammable chemical cabinet onto the cart. Move cart by Veeco PSP CSU.
    3. If CSU door locked, get the door key – kept by the parts rack.
    4. Open left doors of CSU for Veeco PSP tool and locate left partial fill IPA source bottle.
    5. Bring an empty cart to left partial fill IPA source bottle position
    6. Using stainless steel quick disconnects, detach the container from IPA supply line.
    7. Supply line IPA connection should be properly placed in the IPA holder only.
    8. Move empty container to empty cart.
    9. Empty or partial filled IPA supply container is to be filled in 1st shift only.
    10. Slide and Place the capped full spare IPA chemistry container from cart into the CSU.
    11. Replace the tool lid cap from empty or partial filled IPA container with one end of quick disconnect to filled spare container carefully.
    12. Attach the one end of quick disconnect from 5 gallon container back to IPA supply line.
    13. Close the CSU door. Reset any door open alarms.
    14. Operations can then be resumed.

6. For refill of partial filled IPA container , refer to section 7 chemical source bottle fill

1. **Chemical change – Authorized person:: Chris G, Lisa A, Sid M**
   1. **Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy is in the area .**
   2. Confirm tool in idle no processing state before removing any supply bottles from the CSU double doors cabinet.
   3. Display screen will show a warning message “Door not closed(CSU Right door)”
   4. Don PPE- list with a backup buddy.
   5. Pre assemble the chemicals…. And wipes in 1-150 hood area.
   6. ONLY fill one chemical bottle at a time.
   7. If CSU door locked,get the door key – kept by the parts rack.
   8. Unlock specific door, for specific chemical.
   9. Confirm the chemical to be refilled. Disconnect the quick disconnect fittings.
   10. Put the empty bottle on a cart and close the door.
   11. Bring the empty supply bottle just disconnected in a cart to the fill hood.
   12. Fill the chemical supply bottle with 4 gallon of new chemical, follow the chemical hand pouring procedure.
   13. Wipe any droplets and secure the cap on the full bottle. Place on the transport cart
   14. Bring the filled supply bottle to the tool using the same cart. Open the door.
   15. Carefully lift and place the full bottle on the cabinet floor.
   16. Connect it with quick disconnect fittings.
   17. Wipe down any wet areas observed.
   18. Repeat if more than one bottle needs to be refilled.
   19. Close the door
   20. Lock the door. Return the key to the storage location.
   21. Return to the rinse hood
   22. 3X rinse the empty bottles, place in the location to transport to the RSF.
   23. Remove your PPE.
   24. Go to the Operator screen and Start the recirculation to tanks using Heat tool bar function on software and wait for tanks to heat up. Set point is 75degC. Operator to Confirm all chemicals present before starting the operations.
   25. Tank ready for operations after process tank reaches 75degC temperature.
   26. This can be checked under configuration and heaters.
   27. End of the day, make sure no wafers in the tool and hit COOL tool bar function on software. This will turn on the coolant for 1 hour on all chemical lines before stopping the recirculation pumps.
   28. Contact Sid M if any operation questions.
2. **Chemical waste carboy bottles change - Authorized person:: Chris G, Yoonseok C, Sid M, Carlos V**
   1. Confirm tool in idle safe state with no processing.
   2. Display screen will show a warning message for Waste Carboy full
   3. **Don full chemical PPE before any chemical operations: Full chemical Apron, chem. Gloves, goggles, faceshield. Confirm your buddy is in the area .**
   4. Open the right door of CSU.
   5. Take the empty 5 gallon container kept next to tool and keep it on an empty cart.
   6. Disconnect the stainless steel Quick disconnects, detach the waste container from IPA carboy line.
   7. Waste line IPA connection should be properly placed in IPA holder only.
   8. Remove the waste carboy container cap and replace with new cap from empty container.
   9. Bring an empty cart next to filled waste container.
   10. Move the full waste container from weight scale to empty transfer cart.
   11. Place an empty 5 gallon container on the weight scale for carboy station.
   12. Install the stainless steel quick disconnects, attach the container to waste carboy IPA line.
   13. Attach correct hazmat label on both full and empty carboy containers.
   14. Close door and Call RSF x4162 for pick up of waste carboy.
   15. Update tool operator as needed.
3. **Heater/Recirculation not turning on**
4. Confirm tool in idle safe state with no processing.
5. Check temperature of chemicals on software under Configuration. If set point is 15degC; click the heat button on software under toolbar functions. This will turn on recirculation and change temp set point to 68degC for NF-90 and 75degC for 1165 chemical.
6. If recirculation does not turn on, open the CSU left doors to visually check the level of all chemicals present in CSU chemical supply containers.
7. Call RSF if more refills are needed
8. Check facilities and control settings and if not in spec , put tool down on MRL track. Any alarms will be displayed by tool software.
9. For any deviation, Notify Facilities, Tool Owner and Sector Engineer.

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