

VACUUM CHAMBER PM TECHNIQUE Novellus INOVA Cool Station Chamber

OBJECTIVE:

TO EFFECTIVELY PM THE NOVELLUS INOVA COOL STATION CHAMBER IN A TIMELY MANNER, WHILE IMPROVING TOOL RECOVERY AND PARTICLE PERFORMANCE

Vacuum Chamber:

NOVELLUS INOVA COOL STATION

Vacuum Chamber Process Residue:

PROCESS INDUCED RESIDUE

Vacuum Chamber Components:

CHAMBER

Old Procedure:

1 - 2 hours using DI water & IPA with 30+ wipes
(Occasionally use Scotch-Brite®)

Tool Recovery: Extended outgassing and conditioning wafers to pass particle specs

New Procedure:

<1 hour using 360D ScrubPAD, UltraSOLV® Sponge, DI water & IPA w/ MiraWIPES® & MiraSWABS®

Tool Recovery: IMPROVED TOOL RECOVERY WITH LESS OUTGASSING AND CONDITIONING WAFERS TO PASS PARTICLES

Vacuum Chamber Products:

NOVELLUS INOVA PVD CHAMBER PM KIT

- (1) [HT4536D](#)-10-1 800 Grit Diamond ScrubPAD
- (1) [HT4754](#) UltraSOLV® Sponge
- (2) [HT1511FC](#)-5 MiraSWABS® (10 MiraSWABS®)
- (2) [HT5790S](#)-5 MiraWIPES® (10 MiraWIPES®)
- (1) [HT4790](#)-5 UltraSOLV® Foam Wipers (5 Foam Wipers)



NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE:

View "How to" instructional videos on <http://www.foamtecintlwcc.com/flash/>

Step 1: Using proper procedures and **safety guidelines**, shutdown and prepare Novellus INOVA COOL Station chamber for wet clean

Step 2: Take a certified fab vacuum and vacuum out any loose flaking throughout the cool station chamber

SCRUBBING TOP OF COOL STATION CHAMBER:

NOTE: IF IT IS NOT NECESSARY TO SCRUB THE TOP EDGE OF THE COOL STATION CHAMBER, THEN PROCEED TO STEP 11 FOR COOL STATION CHAMBER WIPE PROCEDURE (See Fig 1)

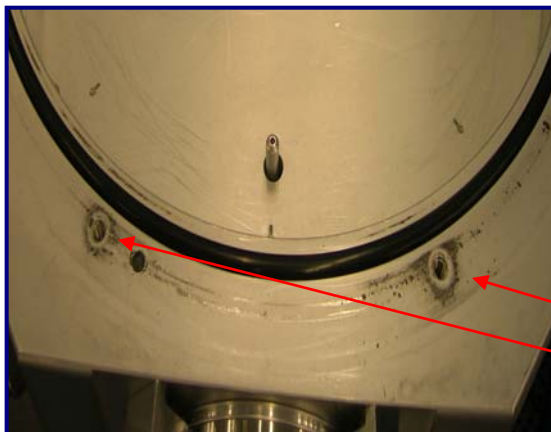


Fig 1: Top edge of cool station chamber; build up may cause vacuum leaks

Step 3: Take the [HT4536D](#) 360 Grit Diamond ScrubPAD and [HT4754](#) UltraSOLV[®] Sponge and dampen with DI water (See Fig 2)

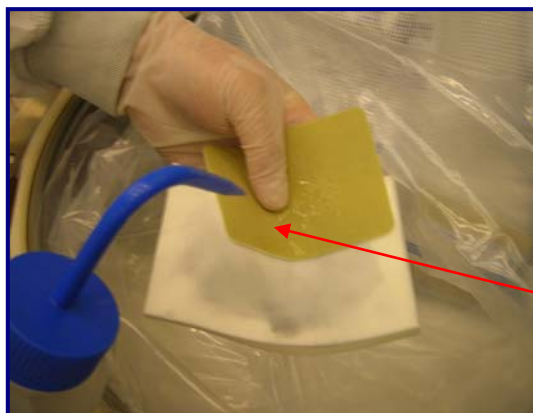
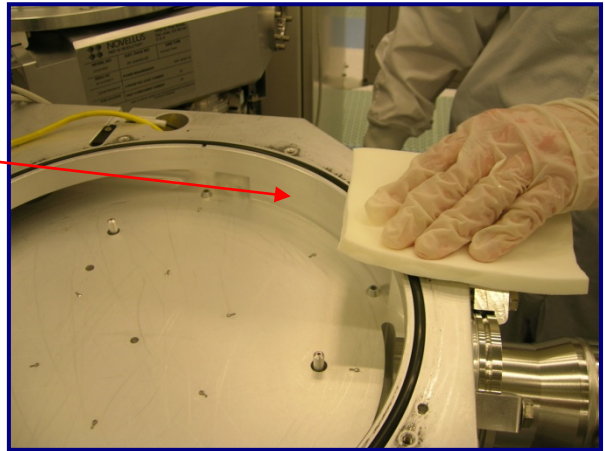


Fig 2: Moisten ScrubPAD and UltraSOLV[®] Sponge with DI water

NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE (CONT'D):

Step 4: Take **lightly dampened** UltraSOLV® Sponge and wipe the top edge of cool station chamber that is to be scrubbed (See Fig 3)

Fig 3: Moistened UltraSOLV® Sponge wiping top edge of cool station



Step 5: Take **lightly dampened** 360 Grit Diamond ScrubPAD and scrub buildup along the top edge of the cool station chamber (See Fig 4)

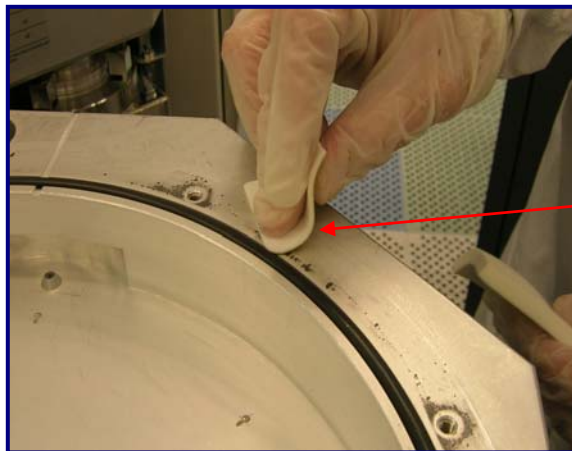


Fig 4: Moist ScrubPAD scrubbing top edge of cool station chamber

NOTE: FOR BEST RESULTS, SCRUB IN ONE DIRECTION ALONG THE OUTER EDGE OF THE O-RING GROOVE. REMOVE AND REPLACE O-RING IF NEW ONE IS AVAILABLE

NOTE: REMEMBER IT IS NOT NECESSARY TO USE A LOT OF DI WATER DURING THIS SCRUB PORTION OF THE PM, ONLY ENOUGH TO KEEP DIAMOND SCRUBPAD MOIST

NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE (CONT'D):

Step 6: After scrubbing a small area with the 360 Grit Diamond ScrubPAD, take the lightly dampened UltraSOLV® Sponge and wipe build up from the scrubbed area

NOTE: THIS STEP WILL ELIMINATE USING EXCESS WIPERS AS THE SPONGE CAN BE REUSED DURING THE SCRUB PORTION OF THE PM

Step 7: As Diamond ScrubPAD loads-up with deposition, pull ScrubPAD across damp UltraSOLV® Sponge to properly unload (See Fig 5, 6 & 7)



Fig 5: ScrubPAD loaded with deposition

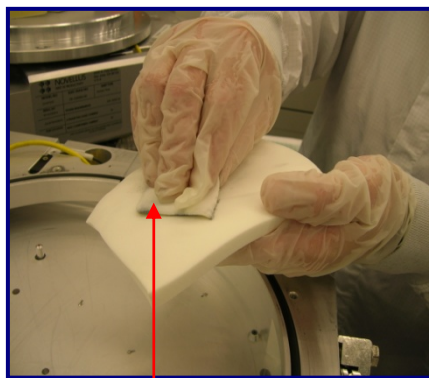


Fig 6: Pull ScrubPAD across UltraSOLV® Sponge



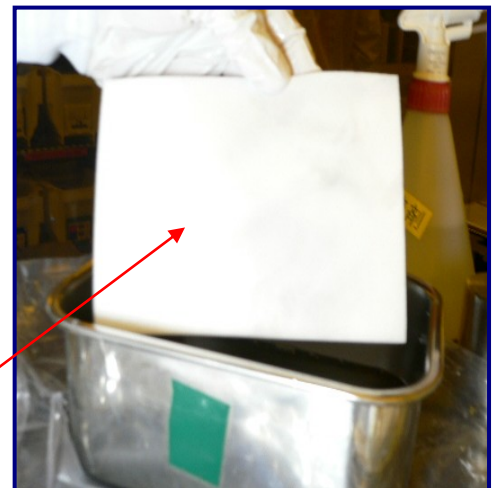
Fig 7: Unloaded ScrubPAD

Step 8: Unload the UltraSOLV® Sponge by rinsing out thoroughly with DI water (See Fig 8 & 9)



Fig 8: UltraSOLV® Sponge loaded with deposition

Fig 9: UltraSOLV® Sponge free of deposition after rinse in DI water



NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE (CONT'D):

Step 9: Repeat steps 3 – 8 for polishing the entire top edge of the cool station chamber. Unload ScrubPAD and UltraSOLV® Sponge as necessary

Step 10: When finished with scrub on top edge of cool station chamber, rinse out UltraSOLV® Sponge with fresh DI water and wipe out the entire chamber using the dampened UltraSOLV® Sponge

NOTE: IF IT WAS NECESSARY TO SCRUB ANY AREA WITHIN THE COOL STATION CHAMBER, REMOVE AND REPLACE YOUR GLOVES WITH A NEW PAIR OF GLOVES PRIOR TO WIPING THE COOL STATION CHAMBER

NOTE: IF IT WAS NECESSARY TO SCRUB ANY AREA WITHIN THE COOL STATION CHAMBER, TAKE CLEAN N₂ OR He TO BLOW OUT THE SMALL AREAS AND TIGHT CORNERS WHERE DI WATER MAY HAVE BEEN CAPTURED

IMPORTANT NOTE

MUST USE HT5790S MiraWIPES® AND HT1511FC MiraSWABS® DURING WIPE PORTION OF PROCEDURE TO EFFECTIVELY REMOVE PARTICLE DEFECTS FROM NOVELLUS INOVA COOL STATION CHAMBER

NOTE: Below is an example of the particles the HT1511FC MiraSWAB® was able to remove from the hard to reach tight areas in the Novellus INOVA COOL STATION Chamber (See Fig 10 & 11)

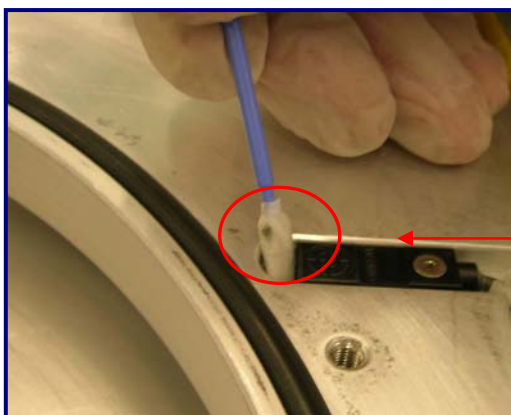
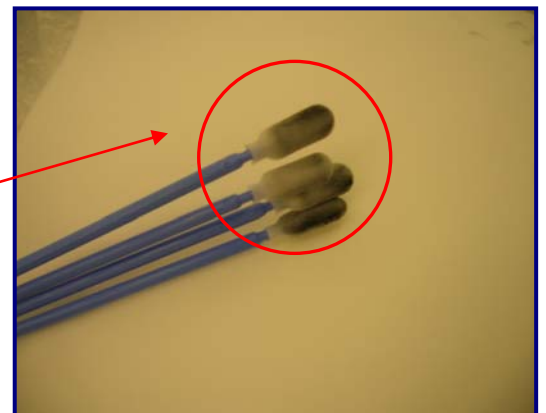


Fig 10 & 11: What the HT1511FC MiraSWAB® was able to effectively removed from COOL STATION chamber



MiraSWABS® are a KEY STEP for DEFECT REDUCTION and IMPROVED TOOL RECOVERY

NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE (CONT'D):

WIPING COOL STATION CHAMBER:

NOTE: Important to use HT1511FC MiraSWABS® before HT5790S MiraWIPES® as the MiraSWABS® will be lifting particles out of the hard to reach areas and will have to follow wiping with the MiraWIPE®

Step 11: Dampen the HT1511FC MiraSWAB® with IPA and wipe out the hard to reach areas, such as o-ring grooves, screw holes and tight corners (See Fig 12 & 13)

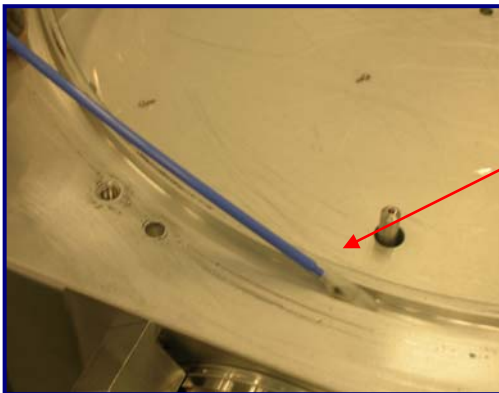
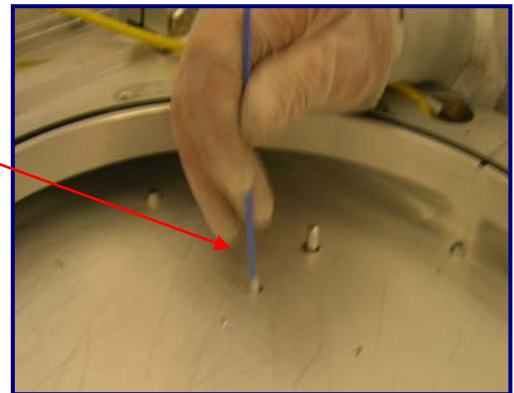


Fig 12 & 13: MiraSWAB® wiping out hard to reach areas throughout cool station chamber



NOTE: Figure below shows how much more deposition the Foamtec International MiraWIPE® can remove from a critical surface compared to the standard fab wiper, making the MiraWIPE® Final IPA Wipe the most **CRITICAL STEP** of the PM procedure (See Fig 14a & 14b)

Fig 14a: Current fab wiper after completely wiping process chamber



Fig 14b: Particles picked up using HT5790S MiraWIPES® after completely wiping with current fab wiper

MiraWIPES® are another KEY STEP for DEFECT REDUCTION and IMPROVED TOOL RECOVERY

NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE (CONT'D):

Step 12: Fold the [HT5790S](#) MiraWIPE® into quarters and dampen with IPA

NOTE: IMPORTANT TO FULLY SATURATE THE MiraWIPE® WITH IPA; THE MICROFIBER CHARACTERISTICS ARE MORE ABSORBENT AND WILL HOLD MORE IPA THAN ANY STANDARD FAB WIPER HELPING TO PERFORM A MORE EFFECTIVE FINAL WIPE

Step 13: With the IPA dampened MiraWIPE®, wipe down all areas of the cool station chamber, ensuring to refold the MiraWIPE® as necessary to expose a clean side of the MiraWIPE® as you wipe within the chamber

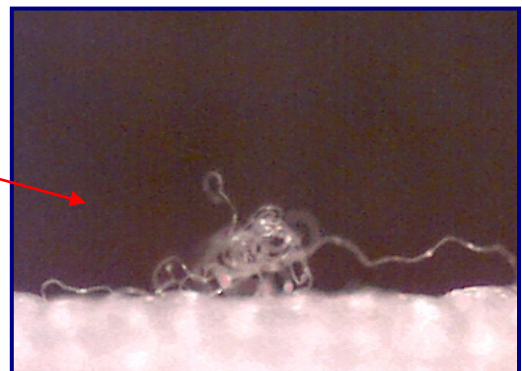
NOTE: IT IS GOOD PRACTICE TO WIPE A CHAMBER FROM THE TOP DOWN AND FRONT TO BACK

NOTE: REPLACE WITH A NEW DAMPENED MiraWIPE® AS NECESSARY

Step 14: Repeat above MiraWIPE® & MiraSWAB® FINAL WIPE PROCEDURE on all remaining areas of Novellus INOVA Cool Station chamber

NOTE: IT IS EXTREMELY CRITICAL TO PERFORM THE FINAL WIPE ON THE COOL STATION CHAMBER PLATEN WITH THE UltraSOLV® FOAM WIPER TO PREVENT GENERATING AND LEAVING FIBERS IN THE COOL STATION CHAMBER (SEE FIG 15)

Fig 15: Fiber generated from wiping cool station chamber platen with standard fab wiper



NOVELLUS INOVA COOL STATION CHAMBER PM PROCEDURE (CONT'D):

Step 15: Take the UltraSOLV[®] foam wiper and fold into quarters (See Fig 16 & 17)

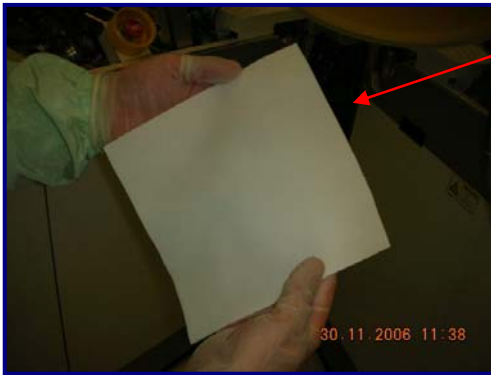


Fig 16: UltraSOLV[®] Foam Wiper



Fig 17: UltraSOLV[®] Foam Wiper folded into quarters

Step 16: Dampen the UltraSOLV[®] foam wiper with IPA and wipe the cool station chamber platen by **PULLING** the foam wiper across the platen

NOTE: IT IS NECESSARY TO PULL THE FOAM WIPER ACROSS THE PLATEN AS THE CHARACTERISTICS OF THE FOAM WIPER WILL NOT ALLOW THE WIPER TO BE PUSHED

NOTE: REFOLD FOAM WIPER AS NECESSARY TO EXPOSE A NEW AREA OF THE WIPER AFTER EACH SECTION HAS BEEN USED

Step 17: Using proper procedures and **safety guidelines** bring cool station chamber back up to production