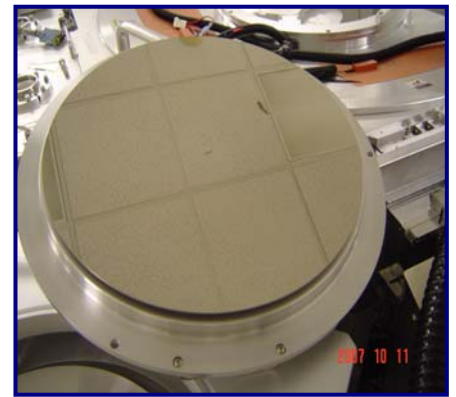




**NOVELLUS INOVA
NeXT DEGAS HEATER**



**NOVELLUS INOVA
NeXT DEGAS REFLECTOR**

VACUUM CHAMBER PM TECHNIQUE NOVELLUS INOVA NeXT DEGAS CHAMBER

OBJECTIVE:

TO EFFECTIVELY PM THE NOVELLUS INOVA NeXT DEGAS CHAMBER IN A TIMELY MANNER, WHILE HELPING TO IMPROVE TOOL PERFORMANCE AND REDUCING PARTICLE PROBLEMS ASSOCIATED WITH JUST WIPING CHAMBER WITH STANDARD FAB WIPERS

Vacuum Chamber:

NOVELLUS INOVA NeXT DEGAS CHAMBER

Vacuum Chamber Process Residue:

PROCESS INDUCED RESIDUE

Vacuum Chamber Components:

CHAMBER HEATER AND REFLECTOR

Old Procedure:

Wipe down with standard fab wipers

Recovery time: Varies with particle issues

Interval: Varies based on process application

New Procedure:

< 1 hour using FWCC *High Performance PM Technique*

ABLE TO BRING CHAMBER BACK TO LIKE NEW CONDITION

Recovery time: IMPROVED RECOVERY TIME WITH PARTICLE REDUCTION

Vacuum Chamber Products:

NOVELLUS INOVA DEGAS PM KIT

PM Kit P/N: TBD

- (1) [HT9423](#) CushionPAD
- (1) [HT4536D](#)-10-1 360 Grit Diamond ScrubPAD
- (1) [HT4580D](#)-10-1 800 Grit Diamond ScrubPAD
- (1) [HT4754](#) UltraSOLV® Sponge
- (1) [HT5291K](#) PolyCHECK® Inspection Wiper
- (2) [HT1511FC](#)-5 MiraSWAB®
- (1) [HT1585FX](#)-5 MiraSWAB®
- (2) [HT5790S](#)-5 MiraWIPES®



NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE:

DEGAS CHAMBER HEATER CLEAN:

Step 1: Lightly dampen the [HT5291K](#) PolyCHECK® Inspection Wiper with IPA and wipe all the surface areas around the top of the INOVA NeXT Degas Chamber to remove any airborne particles that have accumulated around the chamber (See Fig 1, 2 & 3)



Fig 1 & 2: Wiping down surface areas surrounding the Degas Chamber with PolyCHECK® Inspection Wiper

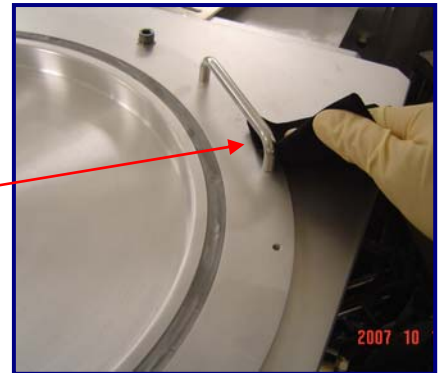
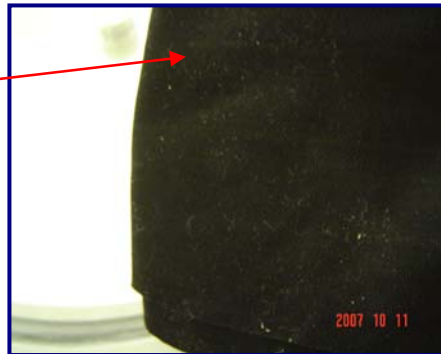


Fig 3: Visible airborne particles accumulated from surrounding areas of Degas Chamber



Step 2: Stage the [HT9423](#) CushionPAD onto a flat surface that will hold the INOVA Degas Chamber top

Step 3: Using proper procedures and **safety guidelines** remove the chamber top from the INOVA Degas Chamber and place onto [HT9423](#) CushionPAD for protection (See Fig 4)

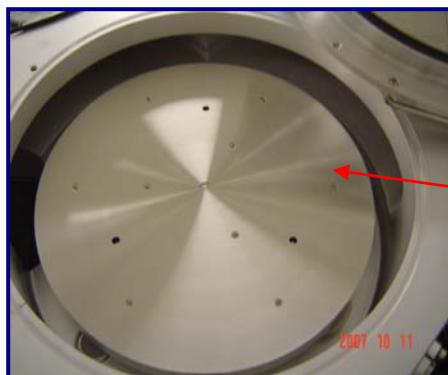


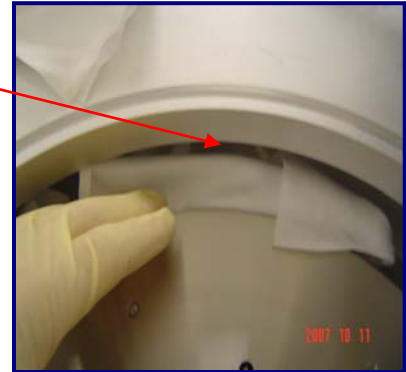
Fig 4: Degas Chamber with top removed

NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 4: In preparation for Degas clean, place a series of standard fab wipers along the outer edge of the Degas Heater for protection (See Fig 5 & 6)



Fig 5 & 6: Placing standard fab wipers along the outer edge of Degas Heater



Step 5: Lightly dampen the [HT4754](#) UltraSOLV® Sponge with DI water (See Fig 7)

Fig 7: Lightly dampening UltraSOLV® Sponge with DI water



Step 6: Take lightly dampened [HT4754](#) UltraSOLV® Sponge and wipe down all areas throughout Degas Chamber (See Fig 8, 9 & 10)

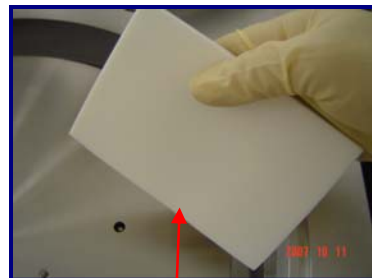
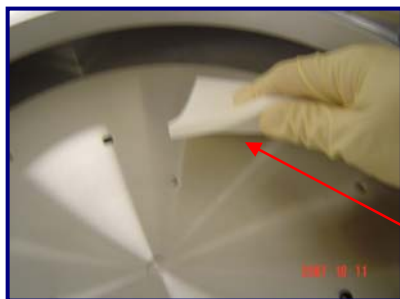


Fig 8, 9 & 10: Lightly dampened UltraSOLV® Sponge wiping Degas Chamber



NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 7: Lightly dampen the [HT4580D](#) ScrubPAD with DI water and proceed to scrub off deposition from the top of the Degas Heater (See Fig 11 &12)

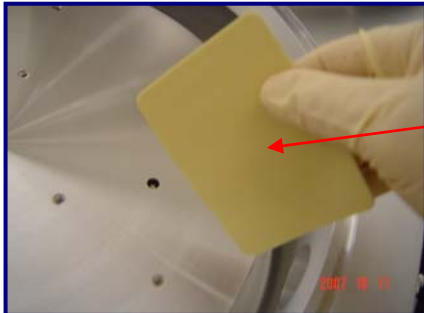
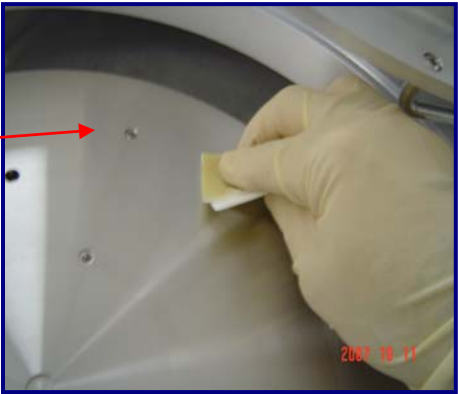


Fig 11 & 12: Lightly dampened ScrubPAD scrubbing top of Degas Heater



NOTE: DURING SCRUB OF DEGAS HEATER, ENSURE TO SCRUB ONLY THE AREAS BETWEEN SAPPHIRE BALLS (GROUNDING PINS) AND LIFT PINS (See Fig 13)

Fig 13: Scrubbing between Degas Heater sapphire balls and lift pins



Step 8: Use lightly dampened UltraSOLV[®] Sponge to remove the deposition from the scrubbed areas on the Degas Heater (See Fig 14)

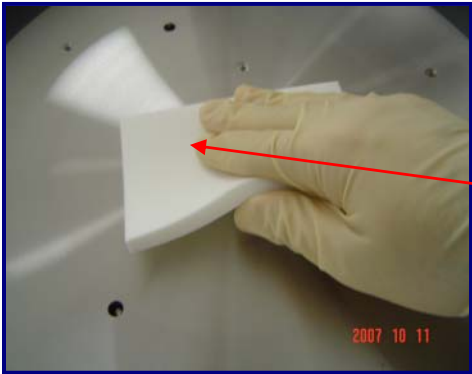


Fig 14: UltraSOLV[®] Sponge removing deposition from scrubbed areas on Degas Heater

NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 9: As Diamond ScrubPAD becomes filled with deposition, pull the ScrubPAD across the dampened UltraSOLV[®] Sponge to unload the ScrubPAD of deposition (See Fig 15, 16 & 17)

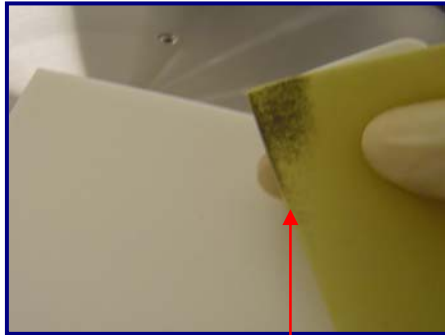


Fig 15: Diamond ScrubPAD loaded up with deposition

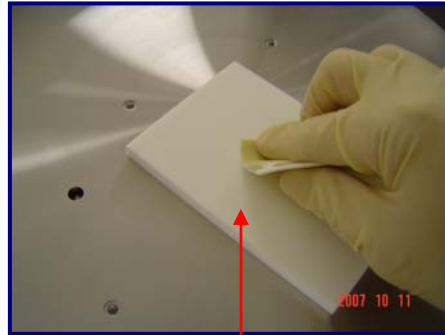


Fig 16: Pull ScrubPAD across UltraSOLV[®] Sponge

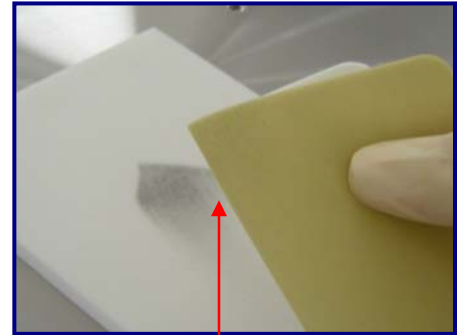


Fig 17: Diamond ScrubPAD unloaded

Step 10: Unload UltraSOLV[®] Sponge of deposition by rinsing with DI water (See Fig 18 & 19)



Fig 18: UltraSOLV[®] Sponge loaded with deposition



Fig 19: UltraSOLV[®] Sponge free of deposition after rinse in DI water

NOTE: ENSURE TO KEEP UltraSOLV[®] SPONGE ONLY SLIGHTLY DAMPENED WITH DI WATER

Step 11: Continue to scrub the remaining areas of the Degas Heater ensuring to unload the Diamond ScrubPAD and UltraSOLV[®] Sponge as necessary

Step 12: When scrub is complete, dampen a single [HT5790S](#) MiraWIPE[®] with IPA and wipe off the entire Degas Heater

NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 13: Closely inspect the Degas Heater and, using the technique described above, re-scrub any areas where deposition was missed

NOTE: ENSURE TO CONCENTRATE ALONG THE TOP EDGE OF THE DEGAS HEATER, AS THAT IS AN AREA MOST LIKELY FILLED WITH DEPOSITION (See Fig 20 & 21)

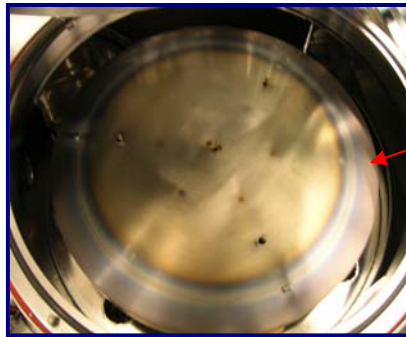
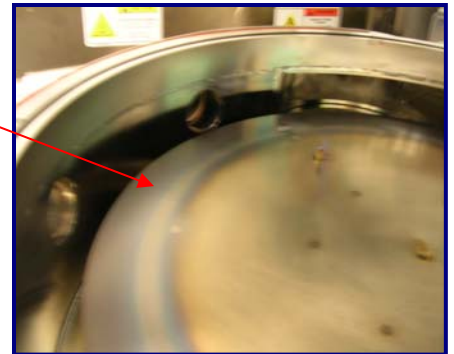


Fig 20 & 21: Outer edge of Degas Heater filled with deposition

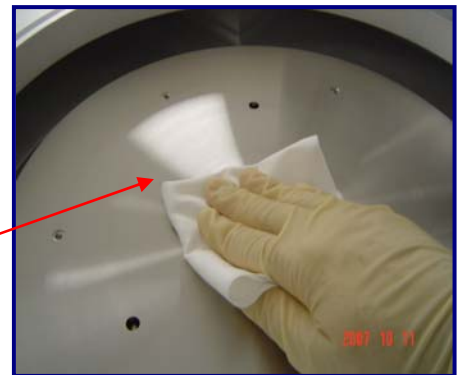


Step 14: When the entire surface of the Degas Heater has been completely cleaned of deposition, dampen an [HT5790S](#) MiraWIPE[®] with IPA and wipe down the entire Degas Heater (See Fig 22 & 23)



Fig 22: Dampen the [HT5790S](#) MiraWIPE[®] with IPA

Fig 23: Wipe down entire Degas Heater with MiraWIPE[®]



IMPORTANT NOTE

THE USE OF [HT5790S](#) MiraWIPES[®] AND [HT1511FC](#) MiraSWAB[®] DURING THE FINAL WIPE PORTION OF THE PROCEDURE IS A CRITICAL STEP TO EFFECTIVELY REMOVE PARTICLE DEFECTS FROM DEGAS CHAMBER

NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

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 Wipe the most **CRITICAL STEP** of the PM procedure (See Fig 24a & 24b)

Fig 24a: Current fab wiper after completely wiping Degas Chamber



Fig 24b: Particles picked up using HT5790S MiraWIPES® after completely wiping with current fab wiper

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

Step 15: Take the HT1511FC MiraSWABS® and dampen with IPA, wipe out all the hard to reach areas and tight corners. Concentrate on the sapphire balls and lift pins on top of the Degas Heater (See Fig 25, 26 & 27)

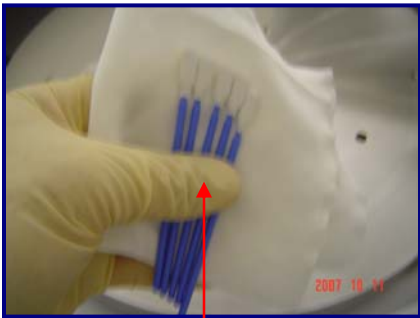
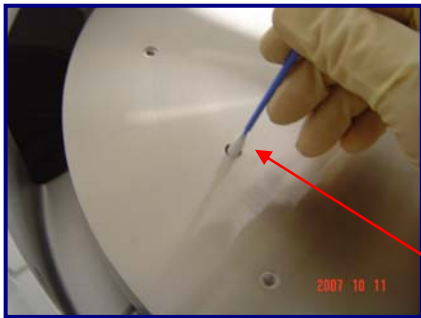


Fig 25: Dampen HT1511FC MiraSWABS® with IPA

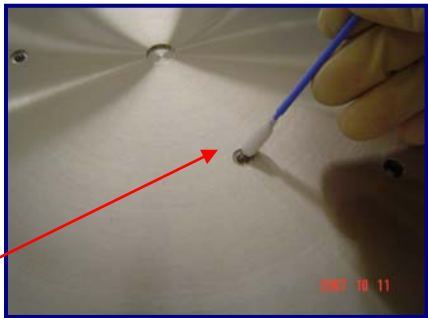


Fig 26 & 27: MiraSWABS® cleaning out lift pins and sapphire balls

NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

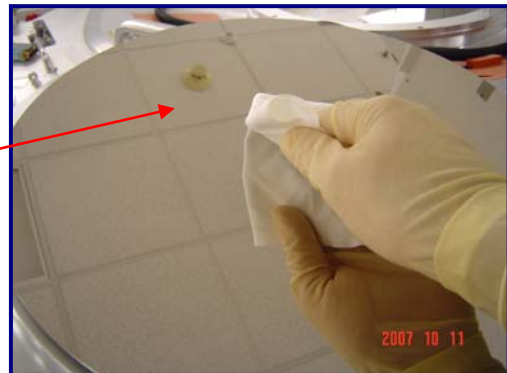
Step 16: After using MiraSWABS[®] to clean out the hard to reach areas along the Degas Heater, take another HT5790S MiraWIPE[®] dampened with IPA and wipe off Degas Heater to remove any particles that were lifted by the MiraSWABS[®]

DEGAS CHAMBER REFLECTOR CLEAN:

Step 17: Fold the HT5790S MiraWIPES[®] into ¼'s and dampen with IPA

Step 18: Using gentle pressure, wipe off the Degas Reflector in a back-to-front motion (See Fig 28)

Fig 28: MiraWIPES[®] wiping Degas Reflector in a back to front motion



Step 19: Turn the MiraWIPE[®] over and refold as necessary to continue exposing a fresh area of the MiraWIPE[®] during the wiping of the reflector

WARNING

ENSURE NOT TO USE THE SEALED EDGE OF THE WIPER ON THE MIRROR SURFACE OF THE REFLECTOR AS THIS MIGHT CAUSE SCRATCHES ON THE REFLECTOR

NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 20: Continue wiping the Degas Reflector using fresh [HT5790S](#) MiraWIPES[®] dampened with IPA until no more deposition is removed by the MiraWIPES[®] (See Fig 29)

Fig 29: Deposition removed by [HT5790S](#) MiraWIPES[®] on Degas Reflector



NOTE: DUE TO THE MICROFIBER CHARACTERISTICS OF THE MIRAWIPE[®], MORE DEPOSITION WILL BE REMOVED FROM THE REFLECTOR THAN BY A STANDARD FAB WIPER (SEE FIG 30A & 30B)

Fig 30a: Deposition removed by MiraWIPES[®] after completely wiping with standard fab wiper

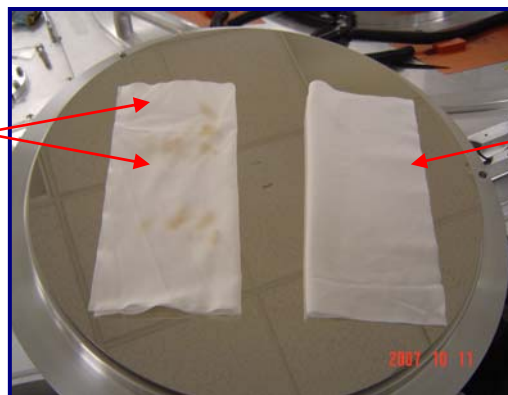


Fig 30b: Current fab wiper after completely wiping Degas Reflector

Step 21: Using additional MiraWIPES[®] continue wiping all areas of the Degas Chamber top (See Fig 31)

Fig 31: Additional MiraWIPES[®] wiping remaining areas of Degas Chamber top



NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 22: Dampen the [HT1585FX](#) MiraSWAB® with IPA and reach under the Degas Reflector to wipe the surface behind the reflector (See Fig 32 & 33)

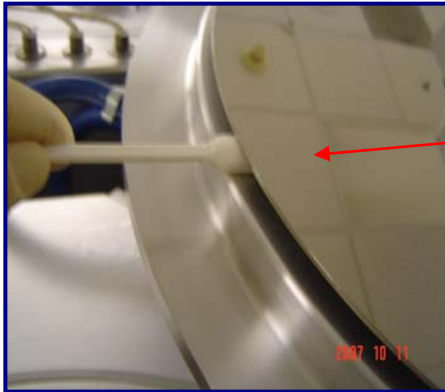
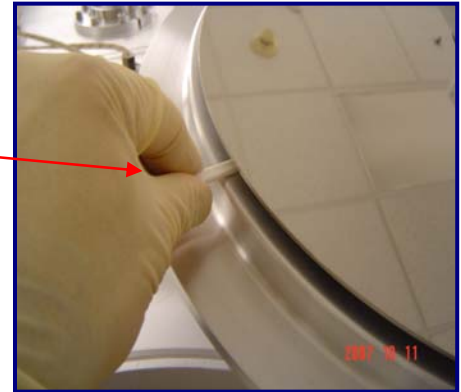


Fig 32 & 33:
[HT1585FX](#) MiraSWAB® dampened with IPA wiping behind Degas reflector



Step 23: Use the remaining MiraSWABS® to wipe out all the hard to reach areas, such as: o-ring grooves, view ports (See Fig 34 & 35)

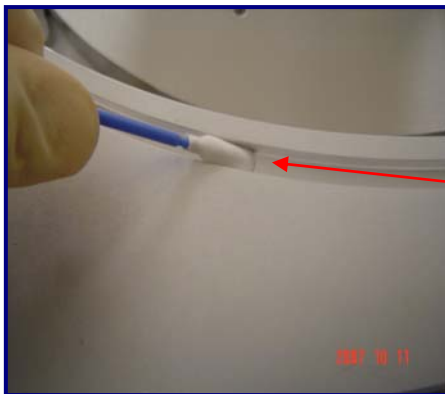
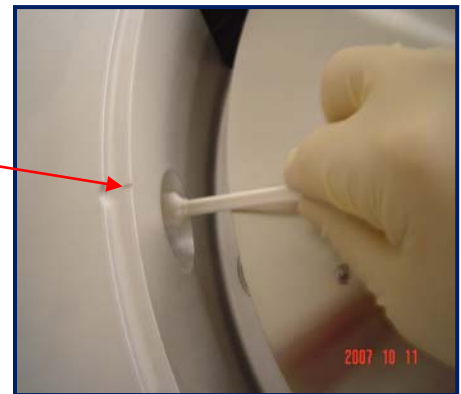
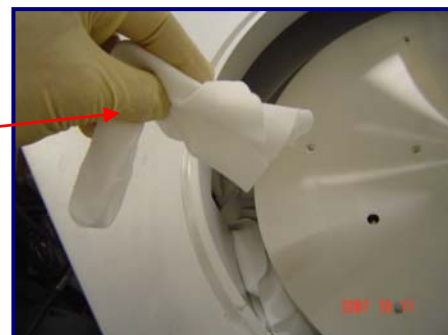


Fig 34 & 35:
Remaining MiraSWABS® wiping out o-ring grooves and chamber view ports



Step 24: Remove all standard wipers that were placed around Degas Heater (See Fig 36)

Fig 36: Removing fab wipes from around Degas Heater

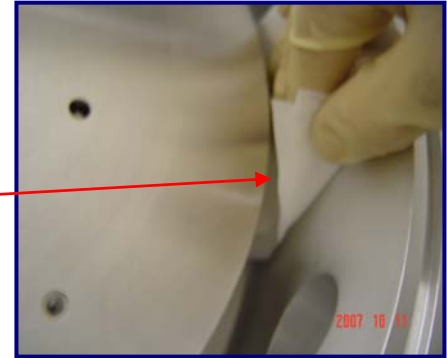


NOVELLUS INOVA NEXT DEGAS CHAMBER PM PROCEDURE (CONT'D):

Step 25: Using all remaining MiraWIPES[®] dampened with IPA and wipe out the entire Degas Chamber one final time, ensuring to reach back into the slit valve areas and underneath the Degas Heater as much as possible (See Fig 37, 38 & 39)



Fig 37, 38 & 39: Using MiraWIPES[®] to wipe out all remaining areas of Degas Chamber



Step 26: Using the proper Novellus procedures and **safety guidelines** return Novellus INOVA NeXT DEGAS CHAMBER back to production