VACUUM CHAMBER PM TECHNIQUE
LAM 9400 POLY ETCH
WET SCRUB

OBJECTIVE:
TO EFFECTIVELY PM THE LAM 9400 POLY ETCH CHAMBER, AND THE
ASSOCIATED PARTS, IN A TIMELY MANNER TO IMPROVE PARTICLE
PERFORMANCE, REDUCE PM RECOVERY TIME AND MAXIMIZE TOOL UP-TIME

Vacuum Chamber: LAM 9400
Vacuum Chamber Process Residue: POLY ETCH RESIDUE
Vacuum Chamber Components: CHAMBER BODY AND ASSOCIATED PARTS

Old Procedure: Wipe chamber body using standard fab wipers with DI water,
Final wipe with IPA
Recovery time: 4 to 6 hours
PROBLEMS: “PARTICLE PERFORMANCE VERY POOR”

New Procedure: Foamtec International designed cleaning technique
Recovery time: 2 To 4 hours
RESULTS: REDUCED PARTICLES - IMPROVED PERFORMANCE

Vacuum Chamber Products:
LAM POLY ETCH PM Kit
PM Kit P/N: HT4500-VARP1
• (2) HT4580D-10-1  800 Grit Diamond ScrubPAD
• (1) FTPEN-1 ScrubWRIGHT™ Pen
• (1) HT4580DW-1  800 Grit Diamond ScrubBELT®
• (1) HT4754 UltraSOLV® Sponge
• (2) HT1511FC-5 4” MiraSWAB® (10pc)
• (1) HT5790S-25 MiraWIPE® (25pc)
**LAM 9400 POLY ETCH CHAMBER PM PROCEDURE:**


**Step 1:** Using proper procedures and safety guidelines, properly prepare LAM 9400 POLY ETCH Chamber and Foamtec International products for wet scrub PM (See Fig 1)

![Fig 1: LAM POLY ETCH Chamber with PM parts](image1)

**Step 2:** Fill a plastic container with approximately 2” to 3” of DI water and place HT4754 UltraSOLV® Sponge and HT4580D-1 800 Grit Diamond ScrubPAD in container of DI water to moisten (See Fig 2)

![Fig 2: HT4754 UltraSOLV® Sponge and Diamond ScrubPAD in container of DI water](image2)

**Step 3:** Take damp UltraSOLV® Sponge and perform an initial wipe of the entire LAM POLY ETCH Chamber. Rinse out sponge in container of DI water as necessary
**LAM 9400 Poly ETCH CHAMBER PM PROCEDURE (cont’d):**

**Step 4:** Take damp UltraSOLV® Sponge and wipe a small area within the LAM POLY ETCH Chamber that is to be scrubbed. Ensure to keep area moist with DI water during scrub.

**NOTE:** MAY WANT TO REDUCE CHAMBER BODY TEMPERATURE TO HELP KEEP DI WATER FROM EVAPORATING QUICKLY (See Fig 3)

**Fig 3:** Wiping a small area within LAM ETCH Chamber

**Step 5:** With HT4580D ScrubPAD lightly dampened with DI water begin to SCRUB the moistened area within LAM ETCH Chamber to remove deposition buildup (See Fig 4)

**Fig 4:** Scrubbing a small area within LAM ETCH Chamber
LAM 9400 POLY ETCH CHAMBER PM PROCEDURE (CONT’D):

Step 6: Ensure to WIPE the scrubbed area with the UltraSOLV® Sponge to keep area moist and to remove deposition buildup from chamber body. Do not allow deposition to dry out before wiping with UltraSOLV® Sponge (See Fig 5)

**Fig 5:** UltraSOLV® Sponge wiping deposition from chamber

NOTE: THE POLYMER ON THE LAM POLY ETCH CHAMBER SHOULD NOT BE VERY THICK. SCRUBBING TECHNIQUE SHOULD BE WITH GENTLE PRESSURE AND FOR A SHORT PERIOD OF TIME

Step 7: Return UltraSOLV® Sponge and Diamond ScrubPAD to container of DI water periodically to help keep products moist

**NOTE:** ENSURE NOT TO PUT EXCESSIVE DI WATER ON CHAMBER BODY, JUST ENOUGH TO KEEP SCRUBBED AREA MOIST

Step 8: As Diamond ScrubPAD begins to load up with deposition, pull across UltraSOLV® Sponge to unload ScrubPAD (See Fig 6, 7 & 8)

**Fig 6:** ScrubPAD loaded with deposition

**Fig 7:** Pull ScrubPAD across UltraSOLV® Sponge

**Fig 8:** Unloaded ScrubPAD
LAM 9400 Poly Etch Chamber PM Procedure (cont’d):

Step 9: When placing UltraSOLV® Sponge in DI water, ensure to **Rinse-Out** as much deposition as possible from sponge (See Fig 9 & 10)

![Fig 9: Loaded UltraSOLV® Sponge](image)

![Fig 10: UltraSOLV® Sponge After Rinse](image)

**NOTE:** BECAUSE POLYMER IN LAM POLY ETCH CHAMBER IS NOT VERY THICK, DO NOT EXPECT SCRUBPAD AND SPONGE TO APPEAR LOADED WITH DEPOSITION, BUT IT IS STILL IMPORTANT TO UNLOAD SCRUBPAD AND SPONGE ACCORDINGLY

Step 10: Using the same technique described above, use the FTPEN-1 ScrubWRIGHT™ Pen to scrub the deposition off of all the hard to reach areas and tight corners throughout LAM POLY ETCH Chamber (See Fig 11)

![Fig 11: FTPEN-1 Scrubbing Hard to Reach Areas and Tight Corners](image)

Step 11: Repeat steps 4 - 10, scrubbing the remaining areas of the LAM POLY ETCH Chamber, rinsing UltraSOLV® Sponge and unloading 800 Grit Diamond ScrubPAD & ScrubBELT® as necessary
LAM 9400 POLY ETCH CHAMBER PM PROCEDURE (cont’d):

Step 12: Using the same procedure as outlined above, continue wet scrub on the other side of process chamber above turbo pump

Step 13: LAM POLY ETCH wet scrub portion of PM should take < 1hr to complete

Step 14: When finished with scrub portion of PM, replace DI water with fresh DI water and rinse-out UltraSOLV® Sponge in fresh DI water

Step 15: Take freshly rinsed UltraSOLV® Sponge and perform an entire LAM POLY ETCH Chamber wipe in preparation to perform FINAL WIPE PROCEDURE

FINAL WIPE PROCEDURE:

IMPORTANT NOTE

THE USE OF HT5790S MiraWIPE® DURING FINAL WIPE PROCEDURE IS A CRITICAL STEP TO EFFECTIVELY REMOVING PARTICLE DEFECTS FROM THE LAM 9400

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 PROCEDURE the most CRITICAL STEP of the PM procedure (See Fig 12a & 12b)

Fig 12a: Current fab wiper after completely wiping LAM 9400

Fig 12b: 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 16: Fold the HT5790S MiraWIPES® into quarters and apply IPA to the MiraWIPES®, then wipe entire LAM POLY ETCH CHAMBER (See Fig 14)

Step 17: If available, recommend using clean dry air or N₂ to blow out moisture from tight corners and edges that you are not able to effectively reach with MiraWIPES® (See Fig 15)
LAM 9400 POLY ETCH CHAMBER PM PROCEDURE (CONT’D):

Step 18: In addition to using the MiraWIPES®, apply IPA to the HT1511FC-5 MiraSWABS® and wipe all of the hard to reach areas and o-ring grooves (See Fig 16)

![Fig 16: HT1511FC-5 MiraSWAB® wiping corners and o-ring grooves w/IPA](image)

Step 19: When finished with turbo pump chamber, wipe down with HT5790S MiraWIPE® and IPA, using same technique. Return to other end of process chamber to perform FINAL WIPE PROCEDURE

Step 20: During FINAL WIPE PROCEDURE, ensure to remove isolation valve from within slit-valve area and wipe with MiraWIPE® and IPA. This area is very susceptible to accumulating loose particles (See Fig 17)

![Fig 17: Loose particles on isolation valve](image)
LAM 9400 POLY ETCH CHAMBER PM PROCEDURE (CONT’D):

Step 21: While isolation valve is removed take HT1511FC MiraSWAB® and dampen with IPA and effectively wipe out the isolation valve o-ring groove (See Fig 18 & 19)

Step 22: Using HT5790S MiraWIPE® with IPA wipe out entire isolation valve area while valve is removed

Step 23: During FINAL WIPE PROCEDURE recommend opening top portion of process chamber to wipe with MiraWIPE® and IPA. This area is also very susceptible to accumulating loose particles (See Fig 20, 21 & 22)

Fig 18 & 19: HT1511FC MiraSWAB® wiping isolation valve o-ring

Fig 20: Removing hardware to open top portion of process chamber

Fig 21: Top portion of chamber removed

Fig 22: Loose particles accumulate along edges of POLY ETCH Process Chamber
LAM 9400 POLY ETCH CHAMBER PM PROCEDURE (cont’d):

Step 24: Dampen the remaining HT1511FC MiraSWABS® with IPA and proceed to wipe out all remaining o-rings grooves

Step 25: Recommend removing and replacing all o-rings throughout LAM POLY ETCH Chamber

Step 26: When finished with complete chamber wipe down, use the remaining HT5790S MiraWIPES® and wipe down ALL parts being placed back into chamber

Step 27: Take all the LAM POLY ETCH parts that are to be cleaned into Parts Clean Shop and, using the same technique as described above, proceed to take second HT4580D 800 Grit Diamond ScrubPAD and perform a wet scrub on all parts to be placed back into chamber (See Fig 23, 24 & 25)

Step 28: Ensure to use additional MiraWIPES® with IPA and WIPE DOWN ALL PARTS being placed back into LAM POLY ETCH Chamber. Using LAM’s safety guidelines and procedures bring LAM Poly Etch Chamber back up to production