Vacuum Chamber PM Technique
Varian VIISta HC Process Chamber

**OBJECTIVE:**

TO EFFECTIVELY PM THE VARIAN HC PROCESS CHAMBER IN A TIMELY MANNER TO HELP MINIMIZE PARTICLE ISSUES AND IMPROVE TOOL PERFORMANCE

**Vacuum Chamber:** Varian VIISta HC

**Vacuum Chamber Process Residue:** Process Induced Residue

**Vacuum Chamber Components:** Process Chamber

**Old Procedure:**

2+ Hours using DI water & IPA with 150+ wipes

**Recovery Time:** 12 hours

**Interval:** PM process chamber every 12 weeks

**New Procedure:**

1.5 hour using Diamond ScrubPAD, ScrubWRIGHT™ Pen, MiraWIFE® and MiraSWABS®

**Recovery time:** 8 hours

**PARTICLE PERFORMANCE:** CHAMBER RECOVERED WITH <3 ADDERS at .16M

**Vacuum Chamber Products:**

**VARIAN VIISta Process Chamber PM Kit**

**PM Kit P/N:** [HT4500-VARPC1](#)

- (1) **HT9423** CushionPAD 24” X 24”
- (1) **HT4528DC3**-1 280 Grit Diamond ScrubDISK®
- (1) **HT4528D**-10-1 280 Grit Diamond ScrubPAD
- (1) **HT4580D**-10-1 800 Grit Diamond ScrubPAD
- (1) **HT4513PD**-10-1 1350 Grit Diamond ScrubPAD
- (1) **HT4536DW**-1 360 Grit Diamond ScrubBELT®
- (1) **FT901** Soft ErgoSCRUB® Handle
- (1) **FTPEN**-1 ScrubWRIGHT™ PEN
- (1) **HT4754** UltraSOLV® Sponge
- (2) **HT1511FC**-5 MiraSWABS® (10 MiraSWABS®)
- (1) **HT5790S**-25 MiraWIPES® (25 MiraWIPES®)
- (1) **HT4790**-5 UltraSOLV® Wipers (5 Wipers)
**VARIAN VIISTA HC PROCESS CHAMBER PM PROCEDURE:**


**Process Chamber Door Assembly Procedure (20 Minutes):**

**Step 1:** Using proper procedures and **safety guidelines** prepare Varian VIISTA HC Process Chamber for wet clean

**Step 2:** Take the HT9423 CushionPAD and place onto a stable working area such as a workbench or clean area on the floor (See Fig 1)

![HT9423 CushionPAD](Fig 1)

**Fig 1:** HT9423 CushionPAD onto stable working area

**Step 3:** Place the chamber door onto the CushionPAD and remove the o-ring in preparation for wet clean
**VARIAN VIISta HC PROCESS CHAMBER PM PROCEDURE (CONT’D):**

**Step 4:** Stage the appropriate parts for wet clean (See Fig 2)

- Container of DI water
- 280D Grit ScrubDISK®
- 280D Grit ScrubPAD
- 800D Grit ScrubPAD
- 360D Grit ScrubBELT® (Not Shown)
- Soft ErgoSCRUB®
- ScrubWRIGHT™ PEN (Not Shown)
- UltraSOLV® Sponge
- MiraSWABS® (Not Shown)
- MiraWIPES®

**Step 5:** Lightly moisten the HT4754 UltraSOLV® Sponge in the container of DI water and perform an initial wipe of the entire chamber door, in order to remove any loose process buildup and flakes (See Fig 3 & 4)

**Step 6:** Attach the HT4528DC3 280 Grit Diamond ScrubDISK® to the FT901 ErgoSCRUB® and moisten with DI water (See Fig 5 & 6)
**Step 7:** Using the 280 Grit Diamond ScrubDISK® attached to the ErgoSCRUB®, scrub the deposition off a small 6” X 6” area on the chamber door (See Fig 7)

**Step 8:** Use the lightly dampened UltraSOLV® Sponge to remove the excess deposition from the chamber door (See Fig 8 & 9)

**Step 9:** Unload the deposition from the Diamond ScrubDISK® by pulling and twisting across the UltraSOLV® Sponge (See Fig 10, 11 & 12)
Step 10: Using the same technique described above, continue to lightly moisten the ScrubDISK® and scrub off the deposition, then use the UltraSOLV® Sponge to remove the excess deposition from the remaining area on the chamber door (See Fig 13 & 14)

Step 11: After using the Diamond ScrubDISK® take the HT4528D 280 Grit Diamond ScrubPAD and using the same technique described above, remove any remaining deposition left on chamber door (See Fig 15)
Step 12: Continue to use the UltraSOLV® Sponge to remove excess deposition from chamber door; remember to rinse out UltraSOLV® Sponge and keep lightly dampened with DI water (See Fig 16 & 17)

Step 13: Turn the chamber door onto its side and using the HT4528D 280 Grit Diamond ScrubPAD and UltraSOLV® Sponge remove the deposition from the lip of the viewing window (See Fig 18 & 19)
VARIAN VIISta HC PROCESS CHAMBER PM PROCEDURE (CONT’D):

**Step 14:** Place the HT4536DW 360 Grit Diamond ScrubBELT® onto the FTPEN-1 ScrubWRIGHT™ Pen and use it to reach the tight corners around the viewing window (See Fig 20 & 21)

![Fig 20 & 21: ScrubWRIGHT™ Pen used for more detailed work around viewing window](image1)

**Step 15:** When deposition has been completely removed from chamber door, take the HT4580D 800 Grit Diamond ScrubPAD and using the same technique described above, gently polish over all the areas where the 280 Grit ScrubPAD was used - this will help keep the chamber in a polished state (See Fig 22)

![Fig 22: 800 Grit Diamond ScrubPAD used to polish chamber door after initial scrub](image2)

**Step 16:** Take the HT4513PD 1350 Grit Diamond ScrubPAD and, with plenty of DI water, GENTLY scrub off the deposition from the chamber viewing window (See Fig 23)

![Fig 23: 1350 Grit Diamond ScrubPAD gently removing deposition from window](image3)
NOTE: IT IS IMPORTANT TO USE PLENTY OF DI WATER WHEN USING THE 1350 GRIT ScrubPAD ON THE VIEWING WINDOW TO PREVENT SCRATCHING WINDOW

Step 17: Continue to use UltraSOLV® Sponge as before to remove the excess deposition from viewing window (See Fig 24)

Fig 24: UltraSOLV® Sponge removing excess deposition from viewing window

Step 18: Rinse out the UltraSOLV® Sponge with DI water and wipe the entire chamber door assembly in preparation for the Final Wipe Procedure
VARIAN VIISTa HC PROCESS CHAMBER PM PROCEDURE (CONT’D):

FINAL WIPE PROCEDURE OF CHAMBER DOOR:

VERY IMPORTANT NOTE

THE USE OF HT5790S MiraWIPIES® AND HT1511FC MiraSWABS® DURING THE FINAL WIPE PROCEDURE IS A CRITICAL STEP TO EFFECTIVELY REMOVE PARTICLE DEFECTS FROM PROCESS CHAMBER DOOR

NOTE: BELOW IS AN EXAMPLE OF THE PARTICLES LEFT BEHIND IN A PROCESS CHAMBER AFTER THE FINAL WIPE PORTION OF THE PM WAS PERFORMED USING THE CURRENT FAB WIPE (SEE FIG 25a & 25b)

**Fig 25a:** Current fab wiper after completely wiping chamber

**Fig 25b:** Particles picked up using HT5790S MiraWIPES® after completely wiping with current fab wiper

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

Step 19: Saturate the HT5790S MiraWIPE® with IPA and perform an initial wipe of the chamber door (See Fig 26 & 27)

**Fig 26:** Saturating HT5790S MiraWIPES® with IPA

**Fig 27:** Performing an initial wipe of chamber door
VARIAN VIISta HC PROCESS CHAMBER PM PROCEDURE (cont’d):

**Step 20:** Take the HT1511FC MiraSWAB® and place on a HT5790S MiraWIPE®, and then saturate the MiraSWAB® with IPA (See Fig 28)

![Fig 28: Saturating HT1511FC MiraSWABS® with IPA](image)

**Step 21:** Take the saturated MiraSWAB® and wipe deposition out of all the tight corners and hard to reach areas, such as o-ring grooves (See Fig 29, 30 & 31)

![Fig 29 & 30: MiraSWABS® cleaning out tight areas and grooves along Process Chamber Door](image)

![Fig 31: EXTRA DEPOSITION THE MiraSWABS® ARE ABLE TO REMOVE FROM AREAS ON CHAMBER DOOR](image)
**VARIAN VIISta HC PROCESS CHAMBER PM PROCEDURE (CONT’D):**

MiraWIPE® and MiraSWABS® are the **KEY STEPS for DEFECT REDUCTION and IMPROVED TOOL RECOVERY**

**Step 22:** Continue to saturate the HT5790S MiraWIPE® with IPA and perform a final wipe of the chamber door until no further deposition is removed from door assembly (See Fig 32)

![Completed Process Chamber Door PM](image1)

**VIISta HC Process Chamber PM (1 Hour):**

**Step 23:** Using proper procedures and **safety guidelines** prepare Varian VIISta HC Process Chamber for wet clean

**Step 24:** In preparation for Process Chamber wet clean, carefully cover the electrostatic clamp with a large plastic bag and place a light within the chamber (See Fig 33 & 34)

![Electrostatic clamp carefully covered with large plastic bag](image2)

![Completed Process Chamber Door PM](image3)
**VARIAN VIISTA HC PROCESS CHAMBER PM PROCEDURE (CONT’D):**

**Step 25:** Stage the appropriate parts needed for Process Chamber PM, most of the parts will be the same parts used for the Chamber Door PM

- Container of DI Water
- 280D Grit ScrubDISK®
- 280D Grit ScrubPAD
- 800D Grit ScrubPAD
- Soft ErgoSCRUB®
- UltraSOLV® Sponge
- MiraSWABS® (Not Shown)
- MiraWIPES®

**NOTE:** THE PROCESS CHAMBER PM WILL FOLLOW THE SAME TECHNIQUE DESCRIBED ABOVE FOR THE PROCESS CHAMBER DOOR PM

**Step 26:** Lightly moisten the UltraSOLV® Sponge in the container of DI water and perform an initial wipe of the area that will be cleaned inside the Process Chamber, in order to remove any loose process buildup and flakes

**Step 27:** Attach the HT4528DC3 280 Grit Diamond ScrubDISK® to the FT901 ErgoSCRUB® and moisten with DI water (See Fig 35)

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**Fig 35:** 280 Grit Diamond ScrubDISK® attached to ErgoSCRUB®
VARIAN VIISta HC PROCESS CHAMBER PM PROCEDURE (CONT’D):

Step 28: Using the 280 Grit Diamond ScrubDISK® attached to the ErgoSCRUB®, scrub the deposition off a small 6” X 6” area within the process chamber (See Fig 36)

Step 29: Use the lightly dampened UltraSOLV® Sponge and proceed to remove the excess deposition from the scrubbed area within the process chamber

Step 30: Unload the deposition from the Diamond ScrubDISK® by pulling and twisting across the UltraSOLV® Sponge (See step 9 of Chamber Door Procedure)

Step 31: Using the same technique described above, continue to lightly moisten the ScrubDISK®, scrub off the deposition, and use the UltraSOLV® Sponge to wipe the excess deposition from the remaining areas in the process chamber

Step 32: After using the Diamond ScrubDISK® take the HT4528D 280 Grit Diamond ScrubPAD and using the same technique described above, remove any remaining deposition left in the area to be scrubbed in the process chamber (See Fig 37)
VARIAN VIISta HC PROCESS CHAMBER PM PROCEDURE (CONT’D):

Step 33: When deposition has been completely removed from the area to be cleaned in the chamber, take the HT4580D 800 Grit Diamond ScrubPAD and, using the same technique described above, gently polish over all the areas where the 280 Grit Diamond ScrubPAD was used - this will help keep the process chamber in a polished state (See Fig 38)

FINAL WIPE PROCEDURE OF PROCESS CHAMBER:

VERY IMPORTANT NOTE

THE USE OF HT5790S MiraWIPE® AND HT1511FC MiraSWABS® DURING THE FINAL WIPE PROCEDURE IS A CRITICAL STEP TO EFFECTIVELY REMOVE PARTICLE DEFECTS FROM PROCESS CHAMBER

NOTE: BELOW IS AN EXAMPLE OF THE PARTICLES LEFT BEHIND IN A PROCESS CHAMBER AFTER THE FINAL WIPE PORTION OF THE PM WAS PERFORMED USING THE CURRENT FAB WIPE (SEE FIG 39A & 39b)

MiraWIPE® are the KEY STEP for DEFECT REDUCTION and IMPROVED TOOL RECOVERY.
VARIAN VIISTA HC PROCESS CHAMBER PM PROCEDURE (CONT’D):

Step 34: Carefully remove the plastic bag over the electrostatic clamp

Step 35: Saturate the HT5790S MiraWIPE® with IPA and perform a final wipe of the process chamber (See Fig 40)

Step 36: Take the HT1511FC MiraSWAB® and place into a MiraWIPE®, and then proceed to saturate the MiraSWAB® with IPA (See Fig 41)

Step 37: Continue to saturate the remaining MiraWIPES® with IPA and wipe out the process chamber until no further visible deposition is being removed by the MiraWIPE®

Step 38: In order to help minimize back side particle problems it is important to use the HT4790 UltraSOLV® Foam Wiper to wipe the face of the electrostatic clamp - this will be the last step just prior to closing up the Process Chamber
**VARIAN VISTA HC PROCESS CHAMBER PM PROCEDURE (CONT’D):**

**Step 39:** Take a **dry HT4790** UltraSOLV® Foam Wiper and fold into quarters, then wipe the face of the electrostatic clamp by pulling the foam wiper from the back to the front of the face (See Fig 42)

**Fig 42:** Using the **HT4790** UltraSOLV® Foam Wiper to wipe the face of the ESC from BACK to FRONT

**Step 40:** Refold the UltraSOLV® Foam Wiper exposing a clean side of the wiper and continue to wipe the remaining areas of the electrostatic clamp

**Step 41:** Using the approved **safety procedures and guidelines** close the process chamber and return the tool back to production