

BEFORE



AFTER

VACUUM CHAMBER PM TECHNIQUE VERTICAL DIFFUSION FURNACE DOOR ASSEMBLY

OBJECTIVE:

TO EFFECTIVELY PM THE VERTICAL DIFFUSION FURNACE DOOR ASSEMBLY IN A TIMELY MANNER, WHILE IMPROVING TOOL RECOVERY AND PARTICLE PERFORMANCE

Vacuum Chamber:

KOKUSAI VERTICAL DIFFUSION FURNACE

Vacuum Chamber Residue:

PROCESS INDUCED RESIDUE

Vacuum Chamber Components:

KOKUSAI VDF DOOR ASSEMBLY

Old Procedure:

Infrequent cleaning at outside parts clean shops

Solvent:

DI water, IPA (only)

Vacuum Chamber Products:

- (1) [HT4518D](#)-10 180 Grit Diamond UltraSOLV[®] ScrubPAD
- (1) [HT4536D](#)-10 360 Grit Diamond UltraSOLV[®] ScrubPAD
- (1) [HT4580D](#)-10 800 Grit Diamond UltraSOLV[®] ScrubPAD
- (1) [HT4518DC3](#)-1 180 Grit Diamond UltraSOLV[®] ScrubDISK[®]
- (1) [HT4528DC3](#)-1 280 Grit Diamond UltraSOLV[®] ScrubDISK[®]
- (1) [HT4536DC3](#)-1 360 Grit Diamond UltraSOLV[®] ScrubDISK[®]
- (1) [HT4580DC3](#)-1 800 Grit Diamond UltraSOLV[®] ScrubDISK[®]
- (3) [HT4754](#) UltraSOLV[®] Sponge
- (5) [HT1701](#) UltraSOLV[®] Swab
- (5) [HT1749](#) UltraSOLV[®] Swab
- (5) [HT1750](#) UltraSOLV[®] Swab
- (20) [HT1790](#) UltraSOLV[®] Swab
- (3) [HT179018D](#) 180 Grit Diamond ScrubTIP^{®***}
- (2) [HT179028D](#) 280 Grit Diamond ScrubTIP^{®***}
- (3) [HT173228D](#) Diamond ScrubTIP[®]
- (3) [HT174928D](#) Diamond ScrubTIP[®]
- (2) [HT179080D](#) Diamond ScrubTIP[®]
- (1) [HT5790S](#)-25 MiraWIPE[®] Wipers
- (1) [FT951](#) ErgoSCRUB[®] Ergonomic Handle w/Hook and Loop ScrubDISK[®]

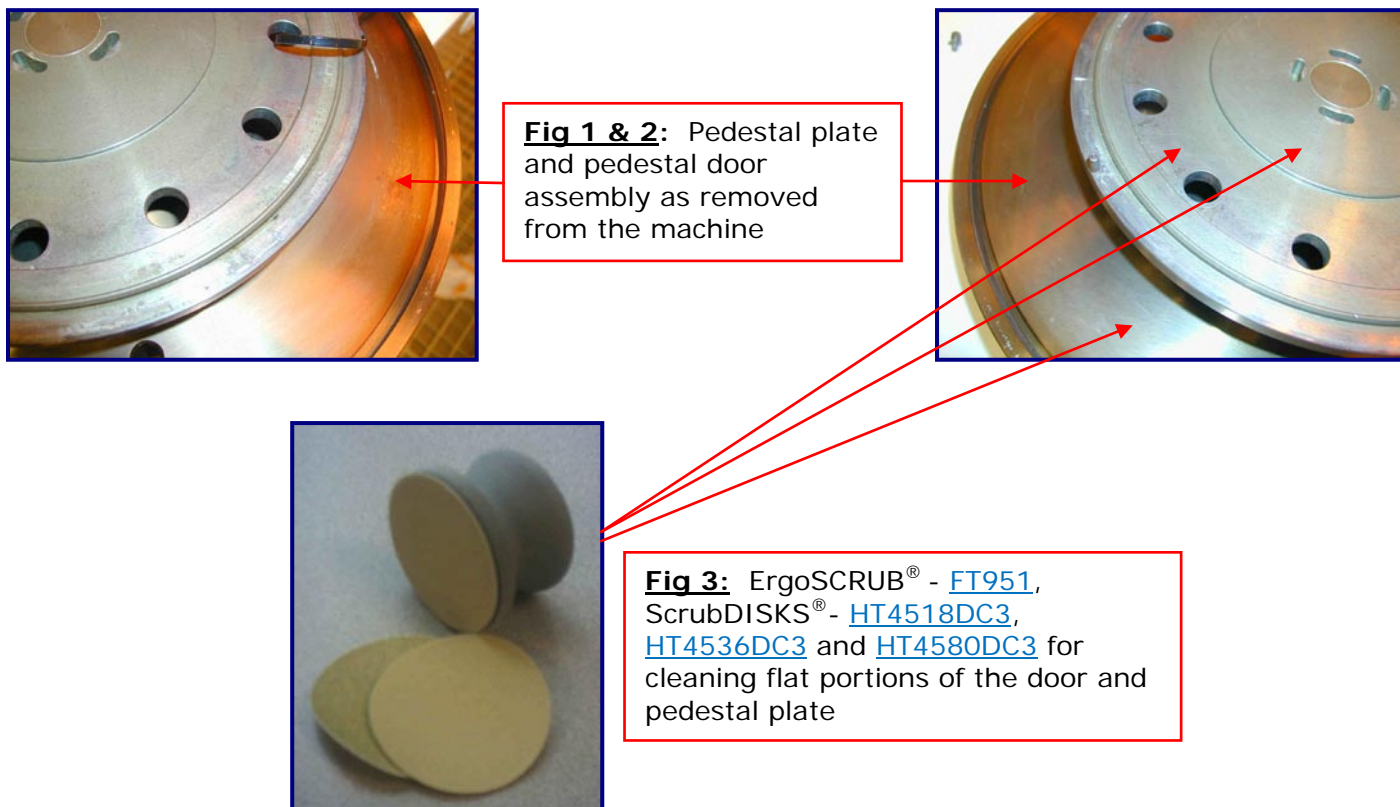
**Various Diamond Grit abrasives can be selected for this process depending on the amount of deposition build-up within the vertical diffusion furnace door assembly – range from 140 to 800 Diamond Grit available. Most PM's can be performed with 280 or 360 Grit ScrubPADs and ScrubTIPS[®] but the use of more aggressive pads may be required for certain high current processes or on the first PM that is accomplished w/o H₂O₂

NOTE: Depending on amount of deposition build-up and if the tool has been PM'd in the past, products may vary and/or additional products may be required

KOKUSAI VERTICAL DIFFUSION FURNACE PM PROCEDURE:

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

Step 1: Remove door assembly from tool and place on approved cleaning surface



Step 2: Using [HT5790S](#) and IPA; thoroughly wipe down the door and pedestal plate paying particular attention to ports, flanges, 90° corners as well as the seal ring and support ring

Step 3: For the flat surfaces on the door and pedestal plate, use [FT951](#) ErgoSCRUB® and [HT4518DC3-1](#) ScrubDISK® to scrub in process deposition using a circular motion, making sure to keep the pad and surface wet with DI water. Be sure to clean both the door and boat side of the pedestal plate

VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):

Step 4: As UltraSOLV[®] ScrubPAD or ScrubDISK[®] begins to load-up with deposition; it can be cleaned off by dragging across UltraSOLV[®] Sponge in one direction (See Fig 4, 5 & 6)



Fig 4: ScrubDISK[®] loaded with deposition



Fig 5: Pull & twist ScrubDISK[®] across UltraSOLV[®] Sponge

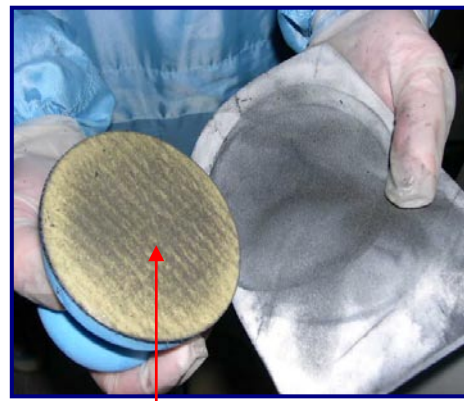


Fig 6: Unloaded ScrubDISK[®]

Step 5: Unload the UltraSOLV[®] [HT4754](#) Sponge by rinsing out with DI water and ringing out into a HazMat container (See Fig 7 & 8)



Fig 7: UltraSOLV[®] Sponge loaded with deposition

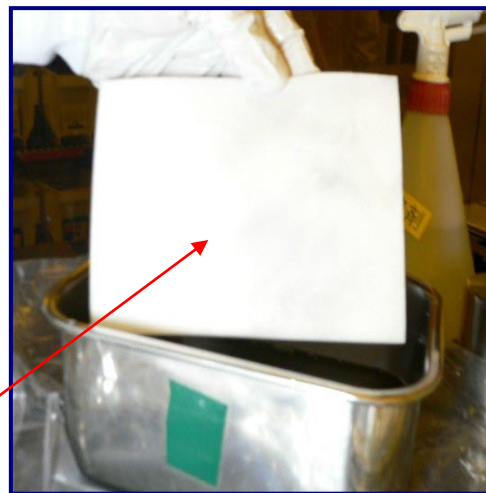


Fig 8: UltraSOLV[®] Sponge free of deposition after rinse in DI water

NOTE: AFTER THE INITIAL PM IT IS LIKELY THAT THE 280 GRIT DIAMOND ScrubDISK[®] CAN BE SUBSTITUTED FOR THE 180 GRIT DIAMOND ScrubDISK[®]

VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):

Step 6: For areas of the plate and door not accessible with the ErgoSCRUB[®], use the [HT4518D](#) 180 Grit Diamond ScrubPAD to scrub the deposition. Use the same circular motion being sure to keep the pad and surface wetted with DI water

Step 7: To clean the pedestal mount and the mounting slot, the ScrubPAD may be cut into strips (See Fig 9a)

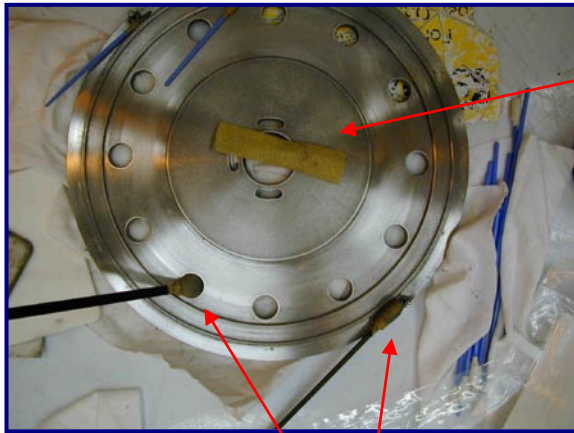


Fig 9a: UltraSOLV[®] ScrubPADs [HT4518D](#)-10, [HT4536D](#)-10 and [HT4580D](#)-10 are cut in 1" strips, folded and inserted in the ID to clean the mounting slots of the pedestal plate. Begin with larger grit and finish with the finer grit

Fig 9b: ScrubTIPS[®] [HT179018D](#)-1, [HT179036D](#)-1 and [HT179080D](#)-1 were used to clean the ports, cutouts and 90° articulated surfaces on the pedestal plate

Step 8: For ports, cutouts, 90° corners and other articulated portions of the pedestal plate, the initial scrubbing should be done with the ScrubTIPS[®] [HT179018D](#), [HT173218D](#) and the [HT174918D](#) (See Fig 9b, 10a and 10b)

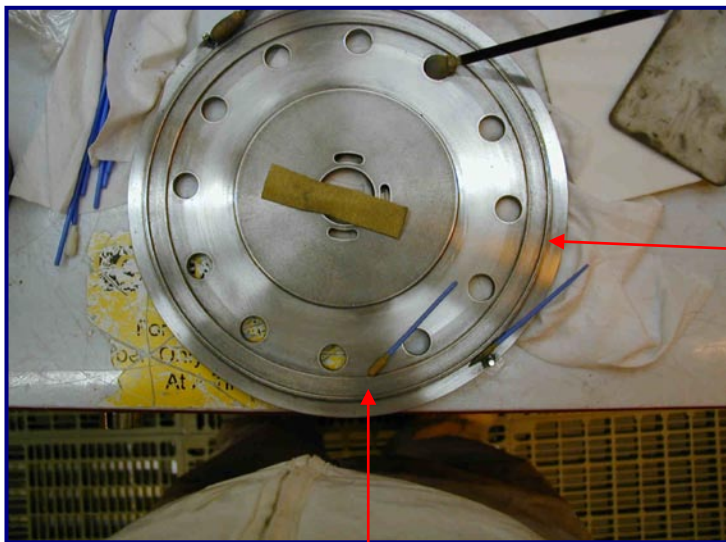


Fig 10a: The 90° corner of the articulated surface on the pedestal plate and the heavy build-up in the section of the plate between the mounting pin and the edge of the pedestal plate were cleaned with ScrubTIPS[®] [HT174918D](#), [HT174936D](#) and [HT174980D](#)

Fig 10b: ScrubTIPS[®] [HT173218D](#), [HT173236D](#) and [HT173280D](#) were used to clean the side and the area around the pedestal plate

VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):

NOTE: AS WITH THE ScrubPADS AND ScrubDISKS[®], THE [HT4754](#) SPONGE CAN BE USED TO CLEAR THE BUILD-UP SLUDGE FROM THE ScrubTIP[®]

Step 9: Polish all surfaces scrubbed with the 180 Grit Diamond ScrubDISK[®], ScrubPADS and ScrubTIPS[®] by using the same DISK, PAD or TIP in the 360 grit and then the 800 grit. For example, all the flat surfaces previously scrubbed with the 180Grit Diamond ScrubDISK[®] should be polished successively with the 360 grit and 800 grit (See Fig 11a)

Step 10: The door of the pedestal mount should be cleaned according to Fig 11a. The flat portions should be scrubbed with the [HT179036D](#) ScrubTIP[®] and polished with the [HT179080D](#) ScrubTIP[®]. The recessed channel and orifice should be scrubbed with the [HT174936D](#) and the [HT173236D](#) and polished with the [HT174980D](#)

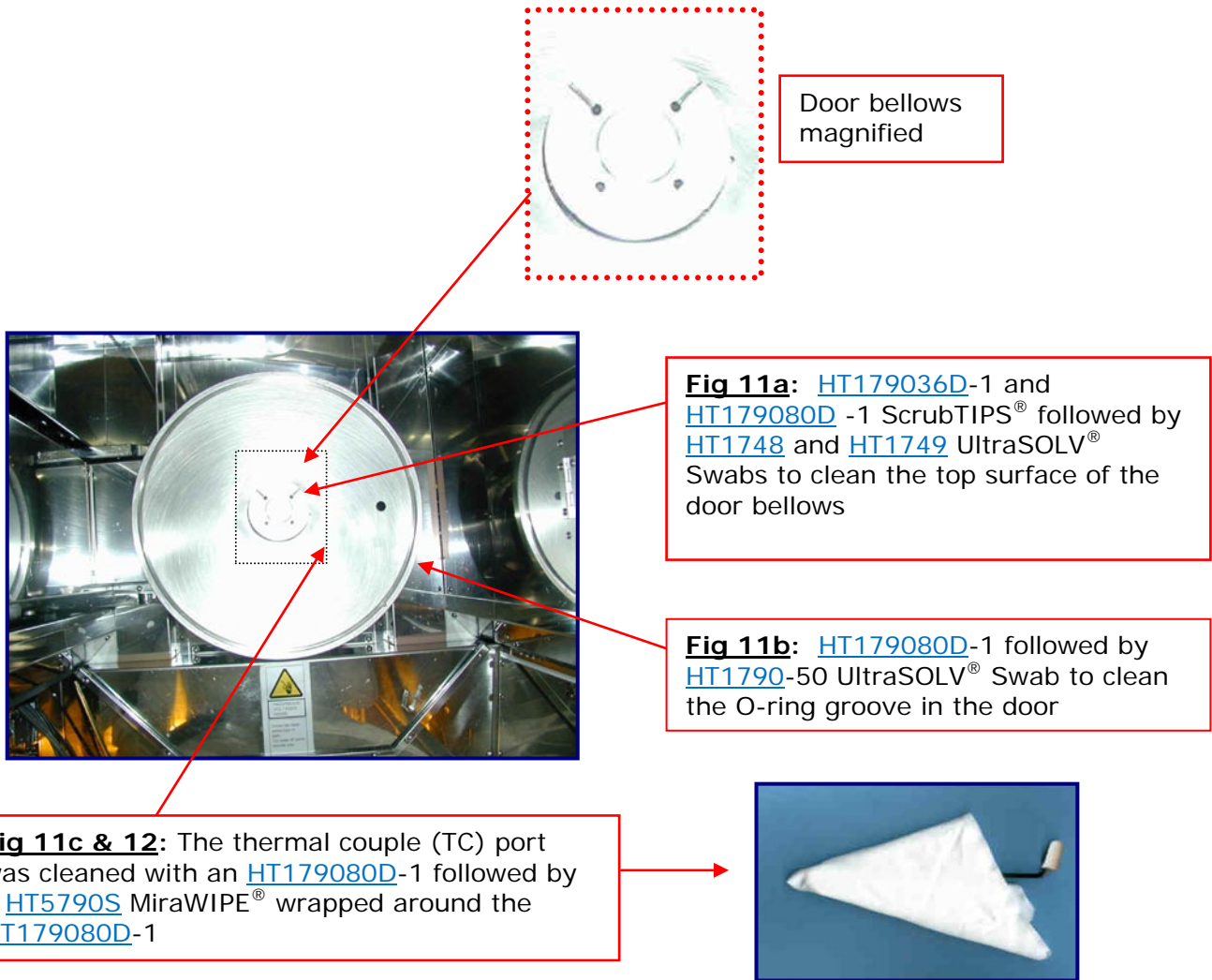
It is recommended to pre-clean the scrubbed areas with the [HT4754](#) sponge prior to moving to the higher grit PAD, DISK OR TIP. For corners, ports and other areas not easily accessed with the sponge a MiraWIPE[®] wrapped around an appropriately sized swab will expedite this pre-cleaning process

The channel and orifice should be cleaned with the [HT1749](#) UltraSOLV[®] Swab with IPA. It is also recommended to wrap a [HT5790S](#) MiraWIPE[®] around the end of the swab to final clean the 4 channels on the top of the pedestal mount (See Fig 11c)

The o-ring grove should be thoroughly polished with the [HT179080D](#) ScrubTIP[®] and then cleaned with the [HT1790](#) UltraSOLV[®] Swab. Final cleaning should be accomplished by wrapping the MiraWIPE[®] around the end of the [HT1790](#) Swab and wetting it with IPA (See Fig 11c)

The thermal couple (TC) port should not be scrubbed. To clean the TC port use the [HT1790](#) UltraSOLV[®] Swab followed by a MiraWIPE[®] wrapped round the swab as described above (See Fig 11c & 12)

VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):



Step 11: Final cleaning should be accomplished using MiraWIPE® dampened with IPA and the appropriately shaped swabs as denoted in the various pictures. Make sure to use fresh wipers until visible contamination ceases to transfer from the part to the wiper

Special attention should be given to articulated areas and especially the 90° corners. Wrapping the MiraWIPE® round the appropriately shaped swabs will ensure the part is as clean as possible

The TC port in the door is especially dirty and should be cleaned with 2-3 [HT1790](#) swabs and then finished with a MiraWIPE® wrapped round a [HT1701](#) Swab

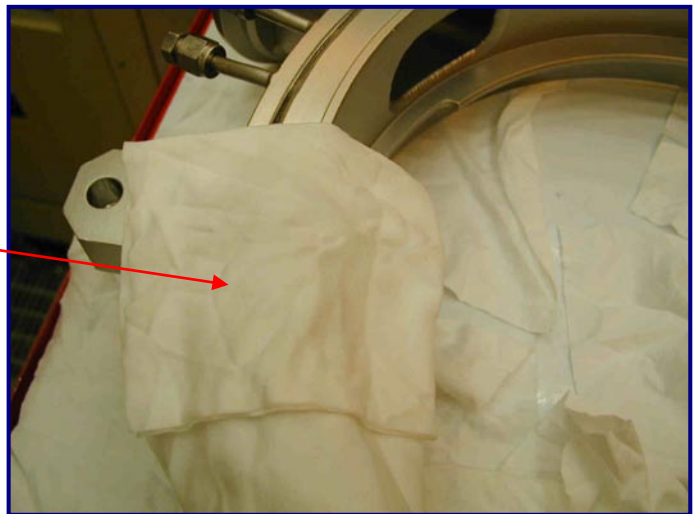
VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):

IMPORTANT NOTE

THE USE OF HT5790S MiraWIPES® DURING FINAL WIPE PORTION OF PROCEDURE IS A CRITICAL STEP TO EFFECTIVELY REMOVING PARTICLE DEFECTS

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 13, 14, 15 & 16)

Fig 13: Post Clean Flange Assembly: Current wiper was used to verify cleanliness of the flange assembly as received from parts clean vendor. Assembly was declared **clean**, as no contamination was transferred from the flange to the wiper



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

Fig 14: HT5790S MiraWIPE® was used to further clean the flange assembly. Note contamination transferred to Mirawipe® after part was first cleaned with a POR Wiper.



VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):

Fig 15: Post Clean Flange Ring:

Current wiper was used for a final wipe to verify cleanliness of flange ring as received from parts clean vendor. There is no additional contamination removed from the flange ring

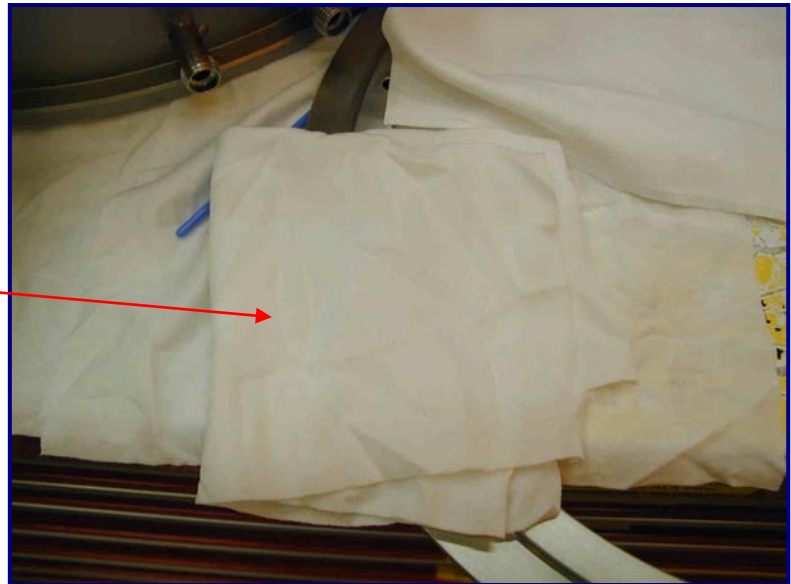


Fig 16: An [HT5790S](#)

MiraWIPE[®] was used for one last wipe of the flange ring when it was declared to be clean after a final wipe with POR wiper. Additional contamination was picked up by the MiraWIPE[®]

VERTICAL DIFFUSION FURNACE PM PROCEDURE (CONT'D):

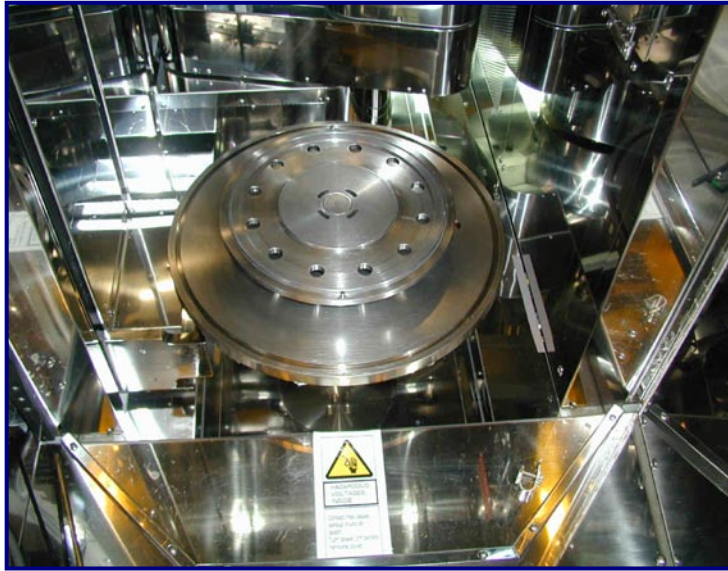


Fig 17 & 18:
Door assembly, post PM



Fig 19: Began PM with both bottles filled. Approximately 30ml IPA and 50ml DI water consumed during PM

VERTICAL DIFFUSION FURNACE PM (CONT'D):

Parts Used During PM

