

## **TRIUMF UHV Cleaning and Assembling Procedures**

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### **Introduction:**

Due to the detrimental effects of oils and contaminants on an Ultra High Vacuum (UHV) system, the following cleaning and assembly procedures have been developed to help minimize the contamination of components used in an UHV system. This is a living document; its purpose is to document the procedures as they are developed and fine tuned and to convey the procedures to individuals who may not be familiar with UHV practice.

### **Cleaning:**

- 1.) Inspect the components first to ensure that all required venting holes and slots are in place. If components are excessively greasy or dirty, use a solvent bath to remove the grease. Pay special attention to any holes and tapped threads. Air guns can also be used to ensure that machining chips are removed from any holes or tapped threads.
- 2.) Wash all components with soapy water (20% simple green/water mix). Again pay special attention to any holes and tapped threads. Rinse with hot city water. The purpose of this step is to ensure that all the grease, light oils and machining chips are completely removed from the part.
- 3.) Put the component in a clean container and submerge with soapy water mix (same mix ratio as in step #2 above). Immerse container into an ultrasonic cleaner and agitate for 30 min. Ensure that the transfer medium in the Ultrasonic Cleaner does not contaminate the cleaning solution used.
- 4.) Transfer the component to another clean container and rinse with hot city water.
- 5.) Leaving the component in the same container, rinse with distilled or de-ionized water.
- 6.) After rinsing, fill container to a level sufficient to submerge the part. Immerse the container into an ultrasonic cleaner and agitate for 30 min.
- 7.) Do a final rinse of the component in the container with distilled or de-ionized water.
- 8.) Transfer the component to a clean container and allow it to air dry in a dust free environment. The part can be left in the container for clean storage.
- 9.) Use clean gloves onward from Step #2 and post process.

### **For best results the following things should be kept in mind;**

- 1.) Do NOT mix different materials in the same wash, corrosion reactions can occur in the alkaline soapy solution causing oxide coatings to form on some metals and corrosive reactions on others.
- 2.) Use different soapy mixes for different materials. Do not use the same soapy water mix for Aluminium and then for Copper. The same oxide and corrosive reactions can occur due to the ions being dissolved in the mix.
- 3.) If the part looks dirty, then it probably is and further cleaning is necessary.
- 4.) If oxide coatings become problematic, especially with aluminium and copper, then shorten the duration of Steps # 3 & 6 and try to shorten the time required to air dry the part.
- 5.) Clean gloves must be used during the complete cleaning process and especially Steps 3 to 9. When placing gloves on one's hands, care must be exercised so that the working

- surfaces of the gloves are not contaminated with hand oils. Gloves cannot be considered clean once they have been used on tools or doorknobs.
- 6.) Immediately replace a glove once it has been perforated.

### **Assembly:**

It is a requirement that two people work together when assembling or disassembling UHV components. All components used in a UHV system MUST first be cleaned to the UHV Standards described in the procedure listed above.

- 1.) Person #1 is to wear clean gloves. Care must be taken when placing gloves on one's hands. It is vital to keep the working surfaces of the gloves free from contaminants such as dirt, grease or skin oils. Person #1's role is to handle and assemble the various UHV cleaned components used in the UHV system.
- 2.) Person #2 is not required to wear gloves as their role is as a "dirty" helper for person #1. Person #2's major responsibility is to ensure that person #1 remains clean. If a component requires tightening, then person #2 gets the tool required, cleans the working end of the tool with acetone and a clean tissue and then tightens the component while person #1 holds the clean assembly. Under no circumstance does person #1 handle tools and person #2 handle clean components.
- 3.) For components are contained in clean bags or storage containers; the outside surfaces of the bags or storage containers MUST be considered contaminated. In this instance person #2 opens the storage container or bag and places the bag or container in such a way that person #1 can remove the item from the container or bag without touching anything but the component.

### **For best results the following things should be kept in mind;**

- 1.) When placing gloves on one's hands, care must be exercised so that the working surfaces of the gloves are not contaminated with hand oils. Only handle the gloves by the cuffs when placing a glove on one's hand. If your hand does not completely fit into a glove; DO NOT use an ungloved hand to complete the fit. Put a glove on the other hand and then try to work the glove or gloves onto your hands.
- 2.) Gloves cannot be considered clean once they have been used to handle tools, bags, containers or doorknobs. Put another clean pair of gloves onto your hands.
- 3.) Immediately replace a glove once it has been contaminated or perforated.