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Cleaning procedure for INGRID Vacuum components.

Peter Moore 18th March 1999.

Basically this procedure outlines the minimum procedure for cleaning metallic assemblies that are within the cryostat cold vacuum environment.

Preparation of required materials

Deep detergent bath. Mix twenty litres of distilled / de-ionized water with between 150 to 200 ml of 'NEUTRACON' detergent from DECON LABS into long plastic bath. Thoroughly mix (should show slight spume on surface and lower surface tension).

Deep water bath. Fill a long plastic bath with fifteen litres of distilled / de-ionized water. Put top on bath to avoid dust / drip contamination.

Shallow water bath. Fill a long plastic bath with five litres of distilled / deionized water. Put top on bath to avoid dust / drip contamination.

Propanol bath. Wipe clean the large stainless steel cooking pot. Fill with four litres of Propanol. Put lid back on to avoid excessive evaporation and contamination.

Ultrasonic bath. If bath is not excessively dirty, add Propanol to level mark in bath (detent line inside bath); Else dispose of current contents (re-bottle into marked containers), Wipe clean and fill to indicated level. Clean sieve by wiping.

Clean towelling. Provide roll of blue paper absorbent towelling. One bag of white synthetic clean room wipes.

Materials. Disposable Latex gloves, blue freezer bags, aluminium foil.

Tools. Tweezers, clean nail brushes, tooth brushes, clean Allen keys, screwdrivers, etc.

Procedure.

1. All assemblies must be stripped down to their basic components and inspected for gross contamination of dirt, swarf, grease, dust, etc. Remove localised area of heavy contamination with Propanol and scrubbing. Use low cost blue absorbent paper towel and dirty brushes to achieve this. Dispose of all residues, cleaning fluids, dirty brushes afterwards.
2. Put Latex gloves on !
3. Immerse items completely (where possible) in the detergent bath. Slosh agitate the water every thirty minutes for a total soak time of five hours. If items are too big to be totally immersed, scoop detergent mixture and pour over components every 15 minutes while brushing down the liquid flow. After five hours soak, scrub all surfaces with a nail brush and / or toothbrush to remove scale and sludge from surface (particularly in blind holes, etc. Remove items from the bath and let excess detergent mixture drain off back into detergent bath.
4. Place items in the first (deep) water bath, completely covering if possible. Agitate the bath for fifteen minutes. If it is not possible to completely cover the items, turn the items over enough times and repeat the agitation to ensure that all surfaces have been thoroughly rinsed. Remove the items from the bath and let excess water drain back into the bath.
5. Place items in the second (shallow) water bath. Agitate fiercely to provide a slosh / splash bath to all surfaces for three minutes. Remove from the bath, drain and place on clean blue absorbent towels and air dry. Do not use heatgun as you are in an atmosphere with volatile flammable material in suspension ! Dry nitrogen can be used to speed up this process.
6. Take your gloves off !
7. Large items to be bathed in Propanol by pouring Propanol over them from the large round tank. Small items that can be fully immersed (and not damaged by) the ultrasonic bath should be cleaned with five minutes ultrasonic immersion. Beware that the temperature of the ultrasonic bath does not climb too high to avoid rapid boil off of the Propanol. Always agitate with the tank lid on. Large items should be pour bathed and brushed with the camel hair brushes. Do not wear latex gloves while handling Propanol ! Thoroughly bath and brush items, especially in blind holes and corners, etc. until no residue is seen to run off the parts. Should take about ten minutes or so. Pick out items with tools and place on clean white sorbing towels. Dry items with dry nitrogen.
8. Put your latex gloves on !
9. Items to be baked should be placed in the oven on clean aluminium foil. Screws, bolts, spacers and small items should be transferred to a clean blue plastic bags and stored in the clean store area (not just left on the bench). Write on the outside label area of the bag the identity of the contents. Mechanical subassemblies can be assembled and stored in the clean glass containers and capped with the lids. Large items can be left in the clean storage area sitting on and wrapped up in aluminium foil.

10. Load the vacuum oven so as to allow space between the items (i.e. they do not touch) and make sure the items will not fall over. When loaded close the door and gently lock with the wedge, close the bleed valve on the door and open the two vacuum valves and begin to pump. The current pump will trip out several times until the amount of gas in the oven is reduced to a low level. Gauge should read better than $10E-3$ before switching on the oven. Set the temperature of the thermostat to 120 degrees, switch on the main power switch and check that the orange light comes on (takes about 30 seconds to respond). Once temperature is reached (orange light cycling), bake for at least 24 hours.
11. Switch off oven. Keep pump running for another eight hours. Shut vacuum valve on oven and pump, shutdown the pump and unlock door. Wait until temperature of inspection window is comfortable to touch then bleed air into chamber via bleed port. Put your latex gloves on! Remove items from oven only when completely cool. Store items as per section 9.