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**BI Facsimile Cover Sheet**

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**Pages including this  
cover page:** Seven (7)

**Comments:**

Larry, let's try it again. Here is draft #4 of procedure CLCOUPAO. I have incorporated all of your latest comments. I still didn't get the other two procedures done; that is the revised one for Oakite 33 and the next draft of the one for Mirachem 500.

Please look this procedure over and call me Monday the 7th.

A copy of the revised draft #3 of the HMST4N leak testing procedure and a new copy of page 1 of the HMST5N leak test procedure went out two day air. Please replace these six sheets in the leak test package I sent you yesterday. You should have them by Monday the 7th.

Regards,



Chuck Sherlock

cc: Marty Tellalian - Plainfield CBITS - NOE  
Ken Flessas - CBILCH

CLCOUPAO  
Draft 4  
930212

CLEANING OF PLAIN COUPONS  
BY ALTERNATE METHOD #0  
FOR SURFACE ANALYSIS AND OUTGASSING TEST  
CALTECH

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CNS 02-04-94

1.0 SCOPE:

This alternate coupon cleaning procedure covers both the initial hydrocarbon contamination of the plate material and the cleaning of fifty (50) coupons cut from that plate material. One (1) 0.115" x 1" x 18" coupon will be used for post clean EDM cutting into eight (8) or more 0.115" x 1 cm x 1 cm coupons for the surface analysis by XPS, SIMS and Auger methods. Forty eight (48) 0.115" x 1" x 18" coupons will be used for the final outgassing test. The extra one (1) 0.115" x 1" x 18" coupon will have a thermocouple attached for determining the typical maximum coupon temperature during the steam cleaning.

2.0 PERSONNEL:

Experienced personnel shall perform and supervise all cleaning performed in accordance with this alternate procedure.

3.0 REFERENCES:

3.1 California Institute of Technology Technical Specification Number 1100004 for Beam Tube Modules and Number 1100007 for Type 304L Stainless Steel Vacuum Products.

3.2 ASTM Designation A 380 Standard Practice for Cleaning and Descaling Stainless Steel Parts, Equipment and Systems (as a guide).

3.3 Package and ship per Caltech instructions (see step 5.15 of this procedure).

4.0 EQUIPMENT AND MATERIALS:

4.1 Lint free cloths or paper towels.

4.2 100 Watt blacklight with 3650 Angstrom unit wavelength.

4.3 Blacklight meter capable of measuring at least 800  $\mu\text{w}/\text{cm}^2$ .

4.4 Electric hot air dryer.

4.5 Steam cleaner (Jenny) with a heater coil and a dead man type hand held sprayer.

4.6 Two (2) vinyl polyester recovery containment pallet systems for catching and retaining the used cleaning and rinse solutions.

4.7 Clean Nitrilite chemical resistant gloves and neoprene or other chemical resistant apron or coveralls, face shields or goggles with side shields and foot coverings as needed.

4.8 Caltech supplied Ameristat packaging plastic.

4.9 Electrical tie wraps.

4.10 Chevron Delo 400 motor oil SAE 30.

4.11 Paint brush approximately one inch (1") wide.

4.12 Clean metal handling tongs. One medium size and one small size.

4.13 Stainless steel 304L heat treated material supplied by Caltech for the test coupons.

4.14 Clean blunt nose center punch.

#### 5.0 PROCEDURE:

5.1 Before shearing the coupons from the Caltech supplied sheets of heat treated 304L stainless steel, lay out the cut lines for a minimum of fifty (50) 0.115" x 1" x 18" coupons. In the middle between both the long and short direction cut lines of the lay outs for forty nine coupons, center punch mark the surface which is to be contaminated. In the middle near one end of the cut lines of the lay out for the fiftieth coupon, center punch mark the surface which is to be contaminated. Then brush motor oil across the cut lines on the steel sheet surface in a pattern that will ultimately result in a coating of pump oil residue. This residue should cover approximately half of the surface of one side of each of the forty nine (49) 1" x 18" outgassing coupons. It should cover all of the surface of the fiftieth (50th) coupon with the center punch mark near the end and from which the eight (8) 0.115" x 1 cm x 1 cm surface analysis coupons will be EDM cut.

5.2 Wipe the excess motor oil from the surface of the sheet steel with clean clothes or paper towels until it feels dry to the touch.

- 5.3 Shear the coupons from the steel sheet following the cut lines.
- 5.4 Adjacent to the steam jenny, place two (2) vinyl polyester recovery containment pallet systems. One to catch and retain the used condensed steam liquid and the other to serve as a draining and drying rack for the coupons. This is in a protected area.
- 5.5 Turn on the steam cleaner heating coils.
- 5.6 Spray water from the steam cleaner spray nozzle into the sanitary sewer drain until it reaches the boiling point (turns to steam).
- 5.7 With the steam cleaner sprayer held only a few inches away, thoroughly spray the four pallet grids of the two vinyl polyester recovery containment system to remove any dirt or other contaminants from its surface. Remove the two pallet grids from one of the recovery containment systems. This will prevent the pallet grids from becoming contaminated with the condensed steam run-off and, in turn, possibly contaminating the cleaned coupons.
- 5.8 Attach a thermocouple to the surface of one of the 1" x 18" outgassing coupons approximately in the middle of the 18" length.
- 5.9 To steam clean the coupons, hold one coupon at a time with a set of clean tongs. Hold them by the cleaner end or by the end with the center punch mark for the one from which the surface analysis samples are to be cut. When spraying with the steam cleaner, hold the coupon over the recovery containment system from which the pallet grids were removed. With the steam cleaner sprayer held only a few inches away, thoroughly spray all the surfaces of the coupon being held with the tongs for a minimum of fifteen (15) seconds to a maximum of twenty (20) seconds. Also monitor the thermocouple reading during the steam cleaning of that coupon and record the maximum coupon surface temperature noted.
- 5.10 While still holding the steam cleaned coupon with the tongs, stand it on end by placing one end of the coupon in one of the grooves between a vinyl polyester pallet grid and the interstices of the vinyl polyester recovery containment system that has the grids in place.
- 5.11 Repeat steps 5.9 and 5.10 for each coupon. When standing them on end to dry, set them 2" to 3" inches apart.
- 5.12 Allow the coupons to air dry. Only use the electric hot air dryer if the humidity is so high as to prevent rapid drying.
- 5.13 After the coupons are thoroughly dry, while wearing clean Nitrilite chemical resistant gloves, wrap all of them in a piece of the Ameristat plastic laid on a cart

with the inside surface of the roll turned upward and carry them to a darkened lab room.

**5.14** Dispose of the cleaning/rinse condensed steam liquid by flushing it into the sanitary sewer.

**5.15** Excluding the coupon with the thermocouple attached, blacklight inspect all the other cleaned coupons for hydrocarbon contamination as follows:

**5.15.1** Turn on and warm up the blacklight for a minimum of five (5) minutes.

**5.15.2** The examiner shall be in the darkened area for at least five (5) minutes to allow time for eye adaptation to the darkness prior to viewing the coupon surfaces. If the examiner wears glasses or lenses, they shall not be photosensitive.

**5.15.3** Confirm the maximum distance at which the blacklight produces  $800 \mu\text{w}/\text{cm}^2$  on the examination surface using the blacklight meter.

**5.15.4** In a darkened area, blacklight inspect all surfaces of all coupons. During the inspection, hold the blacklight no further or no closer from the examination surface than the distance established in step 5.15.3.

**5.15.5** If the blacklight inspection reveals no hydrocarbon contamination (no fluorescent glow at  $800 \mu\text{w}/\text{cm}^2$ ) on the surfaces of the coupons, proceed to step 5.16. If the blacklight inspection reveals residual amounts of hydrocarbon contamination, this cleaning method shall be considered inadequate and this procedure shall be voided.

**5.16** The 1" x 18" coupon with the center punch mark near the end shall be EDM cut into surface analysis coupons as follows:

**5.16.1** Place a piece of Ameristat film on a bench with the inside surface of the roll turned upward to provide a clean surface.

**5.16.2** Handle this cleaned piece of plate material and the film with clean Nitrillite chemical resistant gloves. Wrap this piece of plate material with several layers of the film. Then fold the outer edges of the film to the middle and secure with two or more tie wraps.

**5.16.3** Carry this wrapped clean piece of plate material to a company called Reliable EDM. Provide them with clean Nitrile chemical resistant gloves to use in handling the cleaned piece of plate material.

5.16.4 Instruct them on the need for all the precautions to maintain the cleanliness of the material. Personally ensure that the work surface they will be using is clean. If necessary, lay a piece of the Ameristat film on that surface with the inside surface of the roll turned upward. Observe that they use the Nitrile gloves when they handle and fixture the piece of cleaned plate material on the end with the center punch mark facing upward. Ensure that the fluid used is only clean tap water or de-ionized (distilled) water.

5.16.5 As the material is being cut, make sure it does not get turned over. That is, the side that is facing upward must stay on top. Center punch mark the top surface of each surface analysis coupon as soon as the EDM cuts are completed. Hold each 0.115" x 1 cm x 1 cm analysis coupon by the edges with a clean set of small clean tongs and dry them with the hair dryer while being careful to minimize heating the metal.

5.16.6 After each one is dried, place them on a fresh piece of Ameristat film with the inside surface of the roll turned upward. Wrap these surface analysis coupons with several layers of the film. Then fold the outer edges of the film to the middle and secure with two or more tie wraps.

5.16.7 Return to CBI with this wrapped bundle of cleaned surface analysis coupons. In the laboratory while wearing clean Nitrilite gloves cut the tie wraps and remove the surface analysis coupons from the Ameristat film. Recheck them with the blacklight in accordance with step 5.15 to ensure that no hydrocarbon contamination occurred as a result of the EDM cutting. If hydrocarbon contamination exists, the cleaning process will be repeated for the surface analysis coupons.

5.17 Package and ship the outgassing coupons to Larry Jones at Caltech and package and ship the surface analysis coupons to Rainer Weiss at MIT in accordance with the Caltech packaging and shipping instructions given as follows:

5.17.1 Place a piece of Ameristat film on a bench with the inside surface of the roll turned upward to provide a clean work surface.

5.17.2 Handle all coupons and film with clean Nitrilite chemical resistant gloves.

5.17.3 Wrap twelve (12) outgassing coupons to a bundle. Wrap the eight (8) surface analysis coupons in a separate bundle.

5.17.4 Keep the inside surface of the film roll toward the inside surface of the package being wrapped. Limit film handling to outside edges only.

5.17.5 Wrap coupons with at least two (2) layers of film so that the outside edges do not come in direct contact with the coupons. Accomplish this

for the outgassing coupons by rolling the film around the short dimension of the coupons. For the surface analysis coupons, lay them side by side in a line and roll the film around the short dimension. Then fold the outer edges of the film to the middle.

5.17.6 Secure the film around the bundle with two (2) or more electrical tie wraps.

5.17.7 Label each bundle with the date wrapped, the identification of the cleaning procedure used to clean the coupons and the maximum coupon surface temperature noted during cleaning.

5.17.8 Pack the wrapped 0.115" x 1" x 18" outgassing coupon bundles in a separate corrugated box. Add filler packing material as necessary for protection against possible shipping damage.

5.17.9 Label this box and ship these outgassing coupons via Airborne, Fedex or UPS to:

California Institute of Technology  
Attention: Larry K. Jones 102 - 33  
Pasadena, CA 91125

5.17.10 Pack the wrapped 0.115" x 1 cm x 1 cm surface analysis coupons in a second corrugated box. Add filler packing material as necessary for protection against possible shipping damage.

5.17.11 Label this box and ship these surface analysis coupons via Airborne, Fedex or UPS to:

Attention: Rainer Weiss  
Room 20B145  
Massachusetts Institute of Technology  
18 Vassar Street  
Cambridge, MA 02139