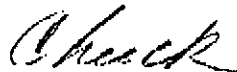


LIGO-EG40007-00-B

CBI Facsimile Cover Sheet**To: Larry K. Jones****Company: Caltech****Phone: 818/395-2970****Fax: 818/304-9834****From: Charles N. Sherlock****Company: CBI****Phone: 713/896 - 3769****Fax: 713/466 - 4259****Date: February 1, 1994****Pages including this
cover page: Ten (10)****Comments:**

Larry, let's try it again. Here is draft #2 of procedure CLCOUPAO and draft #3 of procedure CLCOUPA1. I have incorporated all of your comments except a generic name for the automotive lubricating grease. I still do not have that item. I just didn't want to delay the cleaning procedure review process for the lack of that one item. I will add it and forward as soon as I have it.

Please look these two procedures over and call me with any additional comments.

Regards,

Chuck Sherlock
Houston Corporate Welding

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

CLCOUPAO
Draft 2
930212

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

1 4

CNS 02-01-94

1.0 SCOPE:

This alternate coupon cleaning procedure covers both the Initial hydrocarbon contamination of the plate material and the cleaning of the four (4) 0.115" x 1" x 1" coupons for the surface analysis by XPS, SIMS and Auger methods and the cleaning of the forty eight (48) 0.115" x 1" x 18" coupons for the final outgassing test.

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 Vinyl polyester recovery containment pallet system for catching and retaining the used cleaning and rinse solutions.

4.7 Clean neoprene or other chemical resistant (such as polyethylene) gloves and 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 Tube of automotive lubricating grease.

4.11 Clean metal handling tongs.

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

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 the coupons. Then wipe automotive lubrication grease across the cut lines on the steel sheet surface in a pattern that will result in approximately half of the surface of one side of each coupon being coated with the grease after it has been sheared.

5.2 Wipe the excess grease 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 a vinyl polyester recovery containment pallet system to catch and retain the used condensed steam liquid. 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 grided pallet of the vinyl polyester recovery containment system to remove any dirt or other contaminants from its surface.

5.8 Attach a thermocouple to the surface of one of the coupons approximately in the middle of the 18" length.

5.9 To steam clean the coupons, hold one coupon at a time by the cleaner end with a set of clean tongs. 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 thirty (30) seconds. Also monitor the thermocouple reading during the steam cleaning of that coupon and record the maximum coupon surface temperature noted.

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5.10 While still holding the steam cleaned coupon with the tongs, stand it on end by placing one end of the coupon in the groove between the vinyl polyester grided pallet and the interstices of the vinyl polyester recovery containment system.

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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 of the coupons.

5.13 When the coupons are thoroughly dry, while wearing clean neoprene rubber or chemical resistant gloves, wrap all the coupons in a piece of the Caltech supplied Ameristat plastic for shipping and carry them to a darkened lab room.

5.14 Blacklight inspect all coupons for hydrocarbon contamination as follows:

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

5.14.2 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.

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

5.14.4 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 5.14.3.

5.14.5 If the blacklight inspection reveals no hydrocarbon contamination (no fluorescent glow at 800 μw/cm²) on the surfaces of the coupons, proceed to step 5.15. If the blacklight inspection reveals residual amounts of hydrocarbon contamination, this cleaning method shall be considered inadequate and this procedure shall be voided.

5.15 Package and ship the coupons to Caltech in accordance with the Caltech packaging and shipping instructions given as follows:

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

5.15.2 Handle the coupons and film with clean neoprene rubber or chemical resistant (such as polyethylene) gloves.

5.15.3 Wrap twelve (12) outgassing coupons to a bundle. Wrap the four (4) surface analysis coupons in a separate bundle.

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

5.15.5 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 by rolling the film around the short dimension of the coupons. Then fold the outer edges of the film to the middle.

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

5.15.7 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.

5.15.8 Pack the wrapped coupon bundles in a corrugated box. Add filler material as necessary for protection against possible shipping damage.

5.15.9 Label the box and ship via Airborne, Fedex or UPS to:

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

SNIP →
1" x 18"
COUPONS

SNIP →
1" x 1"
COUPONS

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CLCOUPA1
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930212

**CLEANING OF PLAIN COUPONS
BY ALTERNATE METHOD #1
FOR SURFACE ANALYSIS AND OUTGASSING TEST
CALTECH**

1 5

CNS 02-01-94

1.0 SCOPE:

This alternate coupon cleaning procedure covers both the initial hydrocarbon contamination of the plate material and the cleaning of the four (4) 0.115" x 1 x 1" coupons for the surface analysis by XPS, SIMS and Auger methods and the cleaning of the forty eight (48) 0.115" x 1" x 18" coupons for the final outgassing test.

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 5.24 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 Mirachem 500 Cleaner/Degreaser mixed with water in a proportion of one (1) part by volume of Mirachem 500 to three (3) parts by volume of water.

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

4.7 Vinyl polyester recovery containment pallet system for catching and retaining the used cleaning and rinse solutions.

4.8 Clean neoprene or other chemical resistant (such as polyethylene) gloves and apron or coveralls, face shields or goggles with side shields and foot coverings as needed.

4.9 Two (2) chemical resistant plastic two (2) gallon containers for pump type sprayers.

4.10 Caltech supplied Ameristat packaging plastic.

4.11 Electrical tie wraps.

4.12 Tube of automotive lubricating grease.

4.13 Clean metal handling tongs.

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

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 the coupons. Then wipe automotive lubrication grease across the cut lines on the steel sheet surface in a pattern that will result in approximately half of the surface of on side of each coupon being coated with the grease after it has been sheared.

5.2 Wipe the excess grease 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 a vinyl polyester recovery containment pallet system to catch and retain the used Mirachem 500 cleaning solution and rinse water. 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 grided pallet of the vinyl polyester recovery containment system to remove any dirt or other contaminants from its surface.
- 5.8 Attach a thermocouple to the surface of one of the coupons approximately in the middle of the 18" length.
- 5.9 Nearly fill both pump type sprayer plastic containers with water.
- 5.10 Mix one (1) part by volume of Mirachem 500 cleaner/degreaser with three (3) parts of water in both of the plastic spray containers.
- 5.11 Insert the screened suction line of the steam cleaner into one of the plastic containers of Mirachem 500 cleaning solution. Spray the water (as steam) from the steam cleaner spray nozzle into the sanitary sewer until the Mirachem 500 cleaning solution starts coming through.
- 5.12 Spray the Mirachem 500 cleaning solution from the steam cleaner spray nozzle back into its plastic container until the Mirachem 500 cleaning solution reaches the boiling point (turns to steam). Do this for both containers of solution.
- 5.13 To steam clean the coupons with the Mirachem 500 cleaning solution, hold one coupon at a time by the cleaner end with a set of clean tongs. With the steam cleaner sprayer held only a few inches away, thoroughly spray all the surfaces of the coupon being held with the Mirachem 500 cleaning solution for a minimum of fifteen (15) seconds to a maximum of thirty (30) seconds. Also Monitor the thermocouple reading during the Mirachem 500 steam cleaning of that coupon and record the maximum surface temperature noted.
- 5.14 While still holding the Mirachem 500 cleaned coupon with the tongs, stand it on end by placing one end of the coupon in the groove between the vinyl polyester grided pallet and the interstices of the vinyl polyester recovery containment system.
- 5.15 Repeat steps 5.13 and 5.14 for each coupon. When standing them on end to await the rinse phase, set them 2" to 3" inches apart.
- 5.16 After completing step 5.15, remove the screened suction line of the steam cleaner from the Mirachem 500 cleaning solution container. Connect the suction line of the steam cleaner to the water supply. Spray the existing Mirachem 500 cleaning solution from the steam cleaner into the vinyl polyester containment pallet until all the Mirachem 500 cleaning solution has been pumped through. Then

spray water from the steam cleaner spray nozzle into the sanitary drain until it reaches the boiling point (turns to steam).

5.17 To steam rinse the coupons, remove them one at a time with the clean tongs from the groove of the grided pallet of the vinyl polyester recovery containment system. 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 thirty (30) seconds. Also monitor the thermocouple reading during the steam rinsing of that coupon and record the maximum coupon surface temperature noted.

5.18 While still holding the steam rinsed coupon with the tongs, stand it back on end in the groove between the vinyl polyester grided pallet and the interstices of the vinyl polyester recovery containment system. When standing them on end to dry, set them 2" to 3" apart.

5.19 Repeat steps 5.17 and 5.18 for each coupon.

5.20 Dispose of the Mirachem 500 cleaning/rinse water solution by flushing into the sanitary sewer as allowed by the MSDS for this product.

5.21 Allow the coupons to air dry. Only use the electric hot air dryer if the humidity is so high as to prevent rapid drying of the coupons.

5.22 When the coupons are thoroughly dry, while wearing clean neoprene rubber or chemical resistant gloves, wrap all the coupons in a piece of the Caltech supplied Ameristat plastic for shipping and carry them to a darkened lab room.

5.23 Blacklight inspect all coupons for hydrocarbon contamination as follows:

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

5.23.2 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.

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

5.23.4 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 5.23.3.

5.23.5 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 5.24. If the blacklight inspection reveals residual amounts of hydrocarbon contamination, this cleaning method shall be considered inadequate and this procedure shall be voided.

5.24 Package and ship the coupons to Caltech in accordance with the Caltech packaging and shipping instructions given as follows:

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

5.24.2 Handle the coupons and film with clean neoprene rubber or chemical resistant (such as polyethylene) gloves.

5.24.3 Wrap twelve (12) outgassing coupons to a bundle. Wrap the four(4) surface analysis coupons in a separate bundle.

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

5.24.5 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 by rolling the film around the short dimension of the coupons. Then fold the outer edges of the film to the middle.

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

5.24.7 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 either the cleaning or the rinsing phase.

5.24.8 Pack the wrapped coupon bundles in a corrugated box. Add filler material as necessary for protection against possible shipping damage.

5.24.9 Label the box and ship via Airborne, Fedex or UPS to:

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