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Facsimile Cover Sheet

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Comments:

Larry, let's try it again. Here is draft #5 of procedure CLCOUPAO. I have incorporated all of your latest comments. Please look this procedure over and call me with an okay or additional comments.

The sooner we can get this resolved, the quicker I can get going on getting it done.

Regards,

Chuck

Chuck Sherlock

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

CLCOUPA0
Draft 5
930212

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

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CNS 02-14-94

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 in areas that contain no old or new marker dye marks. One (1) 0.115" x 1" x 18" coupon, cut from the clean end of the plate material will be used for post clean laser cutting by others into ten (10) or more 0.115" x 1 cm x 1 cm coupons for surface analysis by the XPS, SIMS and Auger methods. Eight (8) of these will be hydrocarbon contaminated and two (2) will be uncontaminated. Forty eight (48) 0.115" x 1" x 18" coupons will be used for the hydrogen 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 steam cleaning. This same coupon with the thermocouple attached will be used in each of the alternate coupon cleaning procedures investigated.

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 5.17 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 $\mu w/cm^2$.

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 Dust/mist respirators with exhalation valve that are NIOSH/MSHA approved such as Zee #2304.

4.9 Caltech supplied Ameristat packaging plastic.

4.10 Electrical tie wraps.

4.11 Chevron Delo 400 motor oil SAE 30. ← I still have to confirm

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

4.13 Clean metal handling tongs.

4.14 Stainless steel 304L heat treated material supplied by Caltech for the test coupons. Use material from an area or areas that contain no old or new marker dye marks.

4.15 Clean blunt nose center punch.

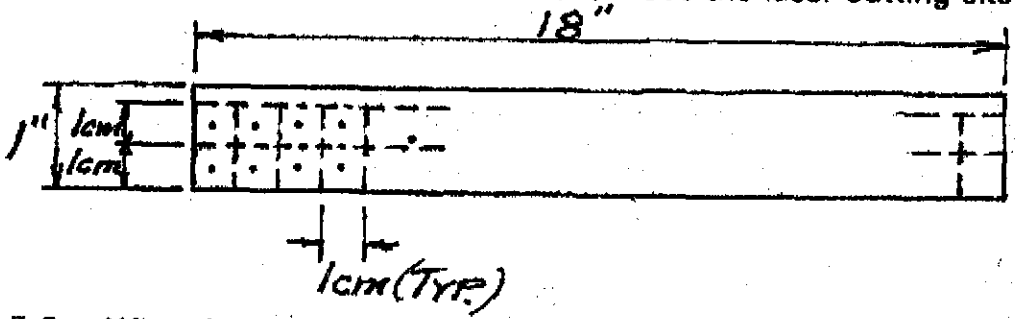
4.16 J Type thermocouple.

4.17 Digital thermocouple readout unit.

5.0 PROCEDURE:

5.1 Before shearing the coupons from the Caltech supplied sheets of heat treated 304L stainless steel, center punch mark the surface which is to be hydrocarbon contaminated at a minimum of fifty (50) locations. For forty nine (49) coupons, these locations shall be in the approximate center of the anticipated

sheared position of each of these coupons. For the fiftieth coupon, the location shall be in the center of one half of the anticipated sheared position of that coupon. Brush motor oil across the anticipated shear lines on the steel sheet surface in a pattern that will ultimately result in a coating of pump oil residue. This residue shall cover all of the center punched surface of one side of each of the forty nine (49) 1" x 18" hydrogen outgassing coupons. It should cover half of the surface of the fiftieth (50th) coupon on the end with the center punch mark from which eight (8) contaminated 0.115" x 1 cm x 1 cm surface analysis coupons will be laser cut. Two (2) 0.115" x 1 cm x 1 cm coupons will be laser cut from the other uncontaminated end. See the laser cutting sketch below.



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 areas of the steel sheet having no old or new marker dye marks following the layout instructions.

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" hydrogen outgassing coupons approximately in the middle of the 18" length on the side opposite from the center punch mark.

5.9 Steam clean the tongs to be used in the next step.

5.10 To steam clean the coupons, hold one coupon at a time with the set of tongs cleaned in the previous step. Hold each coupon by its edges or by the end with the center punch mark for the one from which the surface analysis samples are to be laser 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 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. Also steam clean the center punch to be used in marking the coupon from which the surface analysis coupns are to be laser cut.

5.12 Allow the coupons and center punch 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 a dust/mist respirator and 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. Fold the plastic over the coupons for protection and 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 and the center punch 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 μw/cm² on the examination surface using the blacklight meter.

5.15.4 In a darkened area, blacklight inspect all surfaces of all coupons and the center punch to be used in step 5.16. 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 μw/cm²) on the surfaces of the coupons, proceed to step 5.16. If the blacklight inspection reveals residual amounts of hydrocarbon contamination, void this cleaning method procedure as inadequate.

5.16 Center punch mark the anticipated location of the 1 cm x 1 cm surface analysis coupons in the 1" x 18" coupon being shipped to MIT.

5.17 Package and ship forty eight (48) hydrogen outgassing coupons to Larry Jones at Caltech. Package and ship the forty nineth coupon 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 only when wearing dust/mist respirators and clean Nitrilite chemical resistant gloves.

5.17.3 Wrap twelve (12) hydrogen outgassing coupons to a bundle. In a separate bundle wrap the single coupon from which the surface analysis coupons will be laser cut by MIT

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 In a second corrugated box pack the single coupon for laser cutting into surface analysis coupons. Add filler packing material as necessary for protection against possible shipping damage.

5.17.11 Label this box and ship this coupon via Airborne, Fedex or UPS to:

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