

LIGO - E930002-00-B



1501 North Division Street
Plainfield, Illinois 60544-8929

FACSIMILE MESSAGE

Fax No. is: 815 439 6010
Verify No. is: 815 439 6000

Page 1 of 5

December 9, 1993

To: Larry Jones
LIGO Project Caltech Pasadena, California

Fax No. (818)304-9834

From: M. L. Tellalian Phone (815)439-8517
Plainfield Engineering - NOE-C

RE: Cleaning Procedure for Outgas Test Coupons
LIGO Design & Qualification Test - Caltech Contract C146

Larry,

Attached is the procedure for the cleaning the outgas test coupons prepared by Chuck Sherlock which we briefly discussed yesterday.

Per our discussion yesterday, I have notified Rick Prior in our Houston weld lab not to start any work on the virgin material without your approval. Our tentative plan is to shear (40) 4 1/2" x 20" samples from one 40" x 90" sheet. This will provide us with (20) welded samples. The edges of the 9" wide welded samples will then be sheared off to provide cleaning samples. Although we prefer to work with 4" or 4.5" samples for welding, the minimum width we can work with is approximately 3". Assuming the 20 welded samples are sufficient, (2) 40" x 90" sheets will still be available for cleaning coupons if cleaning and welding need to be totally independent.

Regards,


M. L. Tellalian
Plainfield Engineering

cc:MLT/SWP/ LIGO File 4.6.3
C. Sherlock - MWG Houston
B. Grimsley/R. Prior - MWG Houston



DOC. ID CLCOUP
 REV. NO. 0
 CONTRACT 930212

TITLE CLEANING OF WELDED AND PLAIN COUPONS
 FOR OUTGASSING TESTS
 CALTECH

PAGE NO. 1 OF 4

APPROVED	Engr	Corp	Corp	Const	Mfg	BY	DATE
		Weld	QA			PREPARED	CNS
						REVISED	
						AUTHORIZED	
						REFERENCED	
						STANDARD	REV. NO.

1.0 SCOPE:

This procedure covers both the initial solvent cleaning of the plate material after it is ready for welding and the final Oakite 33 cleaning of the 0.115" x 1" x 18" coupons for the outgassing tests.

2.0 PERSONNEL:

Experienced personnel shall perform and supervise all cleaning performed in accordance with this 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 Larry K. Jones facsimile of December 2, 1993 to Ken Flessas on Sequence of Preparing Outgassing Test Coupons.

3.4 Packaging per Caltech instructions.

4.0 EQUIPMENT AND MATERIALS:

4.1 Stainless steel power brushes used only for stainless steel.

4.2 Industrial grade 99% mol isopropyl alcohol.

4.3 Lint free cloths or paper towels.

4.4 100 Watt blacklight with 3650 Angstrom unit wavelength.



DOC. ID CLCOUP
 REV. NO. 0
 CONTRACT 930212

TITLE CLEANING OF WELDED AND PLAIN COUPONS
 FOR OUTGASSING TESTS
 CALTECH

PAGE NO. 2 OF 4

APPROVED

Engr Corp Weld Corp OA Const Mfg

BY DATE

PREPARED
 REVISED
 AUTHORIZED
 REFERENCED
 STANDARD REV. NO.

- 4.5 Blacklight meter capable of measuring at least 800 $\mu\text{w}/\text{cm}^2$.
- 4.6 Four (4) or more fifty five (55) gallon drums of de-ionized water.
- 4.7 Oakite 33 mixed with the de-ionized water in a proportion of 2:3 by weight.
- 4.8 Oakite Enprox 714 for neutralizing the used Oakite 33 cleaning solution.
- 4.9 Steam cleaner (Jenny) with a heater coil and a dead man type hand held sprayer.
- 4.10 Recovery system for catching and retaining the used cleaning and rinse solutions.
- 4.11 Neoprene or other chemical resistant gloves and apron or coveralls and/or foot coverings as needed.
- 4.12 A minimum of four (4) chemical resistant plastic fifty five (55) gallon drums. Two (2) for mixing the Oakite 33 cleaning mixture and two (2) for holding the de-ionized rinse water.

5.0 PROCEDURE:

- 5.1 Turn on and warm up the blacklight for a minimum of five (5) minutes.
- 5.2 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 surface. If the examiner wears glasses or lenses, they shall not be photosensitive.
- 5.3 Confirm the maximum distance at which the blacklight produces 800 $\mu\text{w}/\text{cm}^2$ on the examination surface using the blacklight meter.



DOC. ID CLCOUP
 REV. NO. 0
 CONTRACT 930212

TITLE CLEANING OF WELDED AND PLAIN COUPONS
 FOR OUTGASSING TESTS
 CALTECH

PAGE NO. 3 OF 4

APPROVED	Engr	Corp Weld	Corp OA	Const	Mfg	BY DATE	
						PREPARED	REV. NO.
						REVISOR	
						AUTHORIZED	
						REFERENCED	
						STANDARD	REV. NO.

- 5.4 ~~In a darkened area, blacklight inspect the plate material that has been power brushed for welding. During the inspection, hold the blacklight no further from the examination surface than the distance established in step 5.3.~~
- 5.5 Remove any hydrocarbon contamination from the power brushed plate material by flushing with isopropyl alcohol and wiping with lint free clothes or paper towels. Repeat this operation as necessary until no visible traces of hydrocarbon remain on the surface when viewed under the blacklight.
- 5.6 After all welding and shearing of coupons is complete, view all coupons, both welded and plain, in a darkened area with the blacklight. Repeat step 5.5
- 5.7 Mix a 2% by weight solution of Oakite 33 and de-ionized water in two (2) of the drums.
- 5.8 Insert the screened suction line of the steam cleaner into the drum containing the de-ionized water. Turn on the cleaner heating coils.
- 5.9 Arrange the coupons together in a rack in a cleaning area that can be drained to a catch basin where the used Oakite 33 cleaning solution can be retained. The cleaning area shall be covered and be protected from the wind so as to prevent contamination during and after cleaning.
- 5.10 Spray the de-ionized water from the spray nozzle directly back into the drum from which it is being pumped until it reaches the boiling point. When the temperature of the de-ionized water in the steam cleaner reaches the boiling point, thoroughly spray the exposed surfaces of all coupons. While wearing neoprene rubber or chemical resistant gloves, turn over the coupons so that the opposite surface of the coupons is exposed. Then thoroughly spray those surfaces. Allow the used de-ionized water to run off into the sewer drain.



DOC. ID CLCOUP
REV. NO. 0
CONTRACT 930212

TITLE CLEANING OF WELDED AND PLAIN COUPONS
FOR OUTGASSING TESTS
CALTECH

PAGE NO. 4 OF 4

APPROVED

Engr Corp Weld Corp OA Const Mfg

BY DATE

PREPARED
REVISED
AUTHORIZED
REFERENCED
STANDARD

REV. NO.

- ~~5.11 Switch the screened suction line of the steam cleaner from the drum of de-ionized water to the drum containing the Oakite 33 cleaning solution.~~
- 5.12 Spray the Oakite cleaning solution from the spray nozzle directly back into the drum from which it is being pumped until it reaches the boiling point. When the temperature of the Oakite 33 cleaning solution reaches the boiling point, thoroughly spray the exposed surfaces of all coupons. While wearing neoprene rubber or chemical resistant gloves, turn over the coupons so that the opposite surface of the coupons is exposed. Then thoroughly spray those surfaces.
- 5.13 Wait for five (5) minutes and repeat step 5.12. Any time the catch basin becomes nearly full of used Oakite 33 solution, pump the used cleaning solution from the basin into an empty labeled drum.
- 5.14 Switch the screened suction line of the steam cleaner from the drum of Oakite 33 cleaning solution to the drum of de-ionized water.
- 5.15 Repeat step 5.10.
- 5.16 While wearing neoprene rubber or chemical resistant gloves the operator shall turn the coupons to ensure that all surfaces are dry.
- 5.17 When the coupons are thoroughly dry, package the coupons in accordance with Caltech packaging instructions.
- 5.18 Add Oakite Enprox 714 to the drum(s) of used Oakite 33 cleaning solution until the solution is neutralized to a ph of 7 as indicated by the litmus paper remaining gray when dipped in the solution.
- 5.19 When the used Oakite 33 cleaning solution is neutralized, drain it into the sewer.