LIGO-E940018-01-B

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TELEFAX TRANSMISSION

TO:	Larry Jones	**FROM:**	Paula Morgan
COMPANY:	Caltech	**DATE:**	6/7/94
FAX NO.:	818-304-9834	**# OF PAGES:**	(including cover) 9

Re: Procurement Specs and Procedures

Attached are C-240-0194 Sheet 3 of 3, CLCOUP Rev 1, and BI1N Rev 1. BI1N changes are in Sect 4.1, 4.2, and 5.5. Please review CLCOUP and BI1N as we need to use them for the coil coupons. Please call if you have questions or need revisions called out as we have not identified herein.

Thanks.

Paula Morgan

Paula

CBI

IDENTIFICATION C-240-0194			
TITLE EXPANSION JOINT MATERIAL SPECIFICATION	REFERENCE NO. 930212		SHT 3 OF 3
	OFFICE NOE-C		REVISION 0
PRODUCT LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY RJW	CHKD BY	MADE BY / CHKD BY
	DATE 03/07/94	DATE	DATE / DATE

7.0 IDENTIFICATION

7.1 Identification of the material shall be maintained through all manufacturing processes.

7.2 If material identity is lost, the plate shall be requalified by making all tests that were required for the material or as indicated in this specification

8.0 DOCUMENTATION

8.1 The Certified Material Test Report (MTR) shall be mailed to the purchaser within 48 hours after shipment of the material.

8.2 A record of the material thickness for each coil of material is required. Thickness shall be measured and recorded at both edges and the center of the coil material at 100 foot intervals along the length of the coils.

9.0 PACKAGING, STORING AND SHIPPING

9.1 Package the material for shipment as described in ASTM A700-90, Section 12.4.2.6 or 7 with the additional supplementary requirements as described herein.

9.2 After packaging, the coil material shall be stored for up to four weeks in a clean and dry area until approval is received from the purchaser to ship the material.

9.3 Ship the coils as specified in the purchase order.

	IDENTIFICATION			
	CLCOUP			
TITLE CLEANING OF OUTGAS COUPONS	REFERENCE NO. 930212		SHT 1 OF 5	
	OFFICE RDE		REVISION 1	
PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY CNS	CHKD BY SWP	MADE BY SWP	CHKD BY EEB
	DATE 03/30/94	DATE 05/12/94	DATE 05/22/94	DATE 5/22/94

1.0 SCOPE:

This procedure covers the cleaning of the coupons that will be used for outgas testing.

2.0 PERSONNEL:

The cleaning operation described in this procedure shall be performed by qualified personnel.

3.0 REFERENCES:

3.1 LIGO Specification 1100004, "Beam Tube Module Specification".

3.2 LIGO Specification 1100007, "Process Specification for Low Hydrogen, Type 304L Stainless Steel Vacuum Products".

3.3 The latest revision of Specification C-240-0186, "Coil Material Specification for LIGO Beam Tube Modules".

3.4 ASTM Standard A380, "Standard Practice for Cleaning and Descaling Steel Parts, Equipment, and Systems", (as a guide).

3.5 The latest revision of Specification BI1N, "Blacklight Inspection Technique and Solvent Cleaning Procedure for the LIGO Beam Tube Modules".

4.0 EQUIPMENT AND MATERIAL:

4.1 Outgas Coupons

Coupons for outgas testing and cleaning by this procedure are taken from the A240 Type 304L stainless steel material that will be used for the beam tube. This includes the materials used to make the beam tubes, the beam tube expansion joints, and the beam tube baffles. These materials have been baked per LIGO Specification CMBS1, "Coil Material Bake Specification for LIGO Beam Tube Materials".

	IDENTIFICATION CLCOUP			
TITLE CLEANING OF OUTGAS COUPONS	REFERENCE NO. 930212		SHT 2 OF 5	
	OFFICE RDE		REVISION 1	
PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY CNS	CHKD BY SWP	MADE BY SWP	CHKD BY EEB
	DATE 03/30/94	DATE 05/12/94	DATE 05/22/94	DATE 5/22/94

4.2 Cleaning Equipment and Materials

- Coupons to be cleaned for outgas testing. Each coupon is 1" wide by 18" long.

  1 set of 50 coupons from each baked coil for outgas testing by Caltech
  1 set of 110 coupons from each baked coil for outgas testing by CBI

- De ionized water with a chlorine content less than 40 ppm.
- Acetone (Electronic Grade).
- Isopropyl Alcohol.
- Lint free cloths.
- Steam Cleaner
- Two clean stands, one for cleaning and the other for drying.
- Clean Nitrilite chemical resistant gloves.
- Neoprene or other chemical resistant apron or coveralls.
- Clean metal pliers.
- Electric heater, hot air dry and/or Infrared heat lamps for drying coupons.
- A 100 Watt blacklight with 3650 Angstrom unit wavelength.
- A blacklight meter capable of measuring at least 800 $\mu w/cm^2$
- Wrapping film - Static Disapative Film Laminate, National Matalizing # N250-707 (distributed by Caltex Plastics as CP STAT 100).
- General purpose nylon cable ties (7 1/2" long with a tensile strength of 50#).

	IDENTIFICATION CLCOUP			
TITLE CLEANING OF OUTGAS COUPONS	REFERENCE NO. 930212		SHT 2 OF 5	
	OFFICE RDE		REVISION 1	
PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY CNS	CHKD BY SWP	MADE BY SWP	CHKD BY EEB
	DATE 03/30/94	DATE 05/12/94	DATE 05/22/94	DATE 5/22/94

5.0 CLEANING PROCEDURE:

5.1 Set up the steam cleaner next to the cleaning and drying stands.

5.2 Thoroughly drain and flush the steam cleaner to remove any previous cleaning solutions in the steam cleaner. Coupons are to be cleaned with steam only, without detergents or cleaners added.

5.3 Use the steam cleaner to thoroughly clean the cleaning and drying stands. Also, clean any other equipment, such as gloves, clamps and racks, that will come in contact with the coupons during the cleaning, drying, inspection, and wrapping operations.

5.4 Steam clean the two pliers that will be used to handle the coupons during the cleaning process.

5.5 Grip the coupon at one end with the clean pliers and steam clean the coupon to within about 1" of the pliers. When spraying with the steam cleaner let the coupon hang down from the pliers over the cleaning stand. With the coupon held only a few inches away from the nozzle of the steam cleaner thoroughly spray all surfaces of the coupon for a minimum of fifteen (15) seconds to a maximum of twenty (20) seconds. When spraying is partially complete, momentarily place the coupon on a clean surface, release the pliers from the unclean end of the coupon and attach the other clean pliers to the clean end of the coupon. Lift the coupon to let it hang down from the pliers and complete the cleaning of the coupon.

5.6 While still holding the cleaned coupon with the clean pliers, place the coupon in a pre-cleaned drying rack.

5.7 Repeat steps 5.4 through 5.6 to clean each of the outgas coupons.

5.8 If time and conditions permit, allow the coupons to air dry. Electric heaters, not air blowers, and/or infrared heat lamps can be used to reduce the drying time.

5.9 Immediately, after the coupons are thoroughly dry, wrap the coupons in the wrapping film and move them to a dark room for blacklight inspection. Always use clean Nitrilite chemical resistant gloves when handling the coupons. Also, keep the coupons covered with the wrapping film to keep them clean and prevent contamination after cleaning.

TITLE	IDENTIFICATION			
CLEANING OF OUTGAS COUPONS	CLCOUP			
	REFERENCE NO. 930212		SHT 4 OF 5	
	OFFICE RDE		REVISION .1	
PRODUCT	MADE BY CNS	CHKD BY SWP	MADE BY SWP	CHKD BY EEB
LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	DATE 03/30/94	DATE 05/12/94	DATE 05/22/94	DATE 5/22/94

6.0 BLACKLIGHT INSPECTION:

6.1 After the coupons are dry, blacklight inspect each outgas coupon per Procedure BI1N, "Blacklight Inspection Technique and Solvent Cleaning Procedure".

6.2 Clean the area where the coupons will be inspected and place a sheet of the wrapping film on the table where the coupons will placed during the blacklight inspection process. Do not allow the coupons to contact any unclean materials during the blacklight inspection.

6.3 The examiner shall put on new clean Nitrilite gloves before handling the clean outgas coupons.

6.4 Cut a piece of the wrapping film and place it alongside the blacklight area for temporarily storing the coupons that pass the blacklight inspection.

6.5 Also, cut a second piece of wrapping film and place it near the blacklight inspection area for temporarily storing the coupons that do not pass the blacklight inspection.

6.6 Pick up the outgas coupons one at a time and blacklight inspect all surfaces of the coupon per Procedure BI1N.

6.7 All outgas coupons that pass the blacklight inspection shall be packaged immediately or placed on the sheet of clean wrapping film located near the blacklight inspection area for packaging at a later time.

6.8 Any coupons that do not pass the blacklight inspection shall be placed on a second sheet of clean wrapping film located near the blacklight inspection area. See Procedure BI1N for procedure to remove Hydrocarbon contamination on the surfaces of the coupons. After re-cleaning the coupons will be blacklight inspected per this procedure.

7.0 PACKAGING OF THE COUPONS:

All of the coupons that pass the blacklight inspection shall be packaged immediately following the blacklight inspection operation. The following steps shall be followed in packaging the coupons for storage and/or shipping:

7.1 Place a piece of the wrapping film on a clean surface with the inside surface of the roll turned upward to provide a clean work surface.

7.2 Handle all coupons and wrapping film only when wearing a dust/mist respirator, a clean room hair cap, and clean Nitrilite chemical resistant gloves.

	IDENTIFICATION			
	CLCOUP			
TITLE CLEANING OF OUTGAS COUPONS	REFERENCE NO. 930212		SHT 5 OF 5	
	OFFICE RDE		REVISION 1	
PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY CNS	CHKD BY SWP	MADE BY SWP	CHKD BY EEB
	DATE 03/30/94	DATE 05/12/94	DATE 05/22/94	DATE 5/22/94

7.3 Wrap ten (10) outgas coupons to a bundle.

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

7.5 Wrap the coupons with at least two (2) layers of wrapping film so that the outside edges of the wrapping film do not come in direct contact with the coupons. Accomplish this by rolling the film around the short dimension of the coupons.

7.6 Secure the film around the bundle with two (2) or more nylon cable ties.

7.7 Label each bundle with the date wrapped and the materials identification.

7.8 Store the wrapped bundles of coupons to be tested by CBI in a clean and dry storage area until they are outgas tested.

8.0 SHIPPING OF COUPONS TO CALTECH:

8.1 Pack the wrapped bundles of coupons to be shipped to Caltech in a corrugated box. Add filler packing material as necessary for protection against possible shipping damage.

8.2 Label the box and ship the outgas coupons via Airborne, Fedex or UPS to:

California Institute of Technology
Attention: Larry Jones 102 - 33
Pasadena, CA (91125)

CBI

IDENTIFICATION			
BI1N			
TITLE BLACKLIGHT INSPECTION TECHNIQUE AND SOLVENT CLEANING PROCEDURE PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	REFERENCE NO. 930212		SHT _1_ OF _2_
	OFFICE		REVISION 1
	MADE BY RWP	CHKD BY CNS	MADE BY EEB	CHKD BY
	DATE 4/18/94	DATE 4/18/94	DATE 5/22/94	DATE

1.0 SCOPE:

This procedure covers blacklight inspection and solvent cleaning for LIGO materials. This procedure is not intended to be used when blacklight inspection is an integral part of the applicable cleaning procedure.

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).

4.0 EQUIPMENT AND MATERIALS:

4.1 Technical grade 99% isopropyl alcohol and technical grade acetone.

4.2 Lint free cloths.

4.3 100 Watt blacklight with 3650 Angstrom unit wavelength.

4.4 Blacklight meter capable of measuring at least 800 $\mu w/cm^2$.

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 $\mu w/cm^2$ on the examination surface using the blacklight meter.

5.4 In the darkened area, blacklight inspect the surfaces. During the inspection, hold the blacklight no further from the examination surface than the distance established in step 5.3.

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IDENTIFICATION			
BI1N			
TITLE BLACKLIGHT INSPECTION TECHNIQUE AND SOLVENT CLEANING PROCEDURE	REFERENCE NO. 930212		SHT _2_ OF _2_
	OFFICE		REVISION 1
PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY RWP	CHKD BY CNS	MADE BY EEB	CHKD BY
	DATE 4/18/94	DATE 4/18/94	DATE 5/22/94	DATE

5.5 If the blacklight inspection reveals residual amounts of hydrocarbon contamination (fluorescent glow at 800 $\mu w/cm^2$) on the surfaces, remove the hydrocarbon contamination by flushing with isopropyl alcohol and wiping with lint free cloths.

5.6 Repeat steps 5.4 and 5.5 until no indications of hydrocarbon contamination are revealed by the blacklight inspection.