



IDENTIFICATION			
<b>CLCOUP</b>			
LIGO-F950C61-04-B			
TITLE CLEANING OF OUTGAS COUPONS	REFERENCE NO. 930212		SHT <u>1</u> OF <u>5</u>
	OFFICE RDE		REVISION 4
PRODUCT LIGO BEAM TUBE MODULES CALIFORNIA INSTITUTE OF TECHNOLOGY	MADE BY CNS	CHKD BY SWP	MADE BY SWP
	DATE 03/30/94	DATE 05/12/94	DATE 10/18/95
			DATE 10/19/95

**1.0 SCOPE:**

This procedure covers the sizing, cleaning, packaging and shipping of the coupons that will be used for hydrogen outgas testing.

**2.0 PERSONNEL:**

Experienced personnel shall perform and supervise the operations described in this procedure.

**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).

**4.0 EQUIPMENT AND MATERIAL:**

**4.1 Material for Outgas Coupons**

The coupon material for use in this procedure will be taken from the A240 Type 304L stainless steel material that will be used for the beam tube. The material has been baked per LIGO Specification CMBS1, "Coil Material Bake Specification for LIGO Beam Tube Materials". The material size will be sufficient to provide at least 160 coupons ( 50 coupons for testing at Caltech 110 coupons for testing at CBI ). Each coupon will 1" wide by 18" long.

APPROVED	
CBI	DATE
<i>[Signature]</i>	11/10/95
CALTECH	DATE



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#### 4.2 Cleaning Equipment and Materials

- De ionized water with a chlorine content less than 40 ppm.
- Reagent Grade Acetone.
- Reagent Grade 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.
- Wrapping film - Static Disapative Film Laminate, National Metalizing # 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#).

#### 5.0 COUPON CUTTING:

- 5.1 From each piece of coupon material shear 160 coupons for hydrogen outgas testing. Each coupon shall be 1" wide by 18" long.
- 5.2 Take care not to contaminate the coupon material and coupons. The coupons shall be cut to size without using lubricants or heat. A shearing process shall be used to cut the coupons.



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5.3 Traceability of the coupon material shall be maintained throughout all processes. An identification marking shall be steel stamped on the end of each coupon to identify the coil from which the coupon was removed. No other markings are permitted on the coupons. Each set of coupons shall be kept separated and processed separately.

**6.0 COUPON CLEANING PROCEDURE:**

- 6.1 Set up an area to clean the coupons. The coupon cleaning area should be separated from shop work areas that create air born contaminants, such as welding, grinding and painting areas. If necessary, use curtains to protect the coupon cleaning area from other work areas.
- 6.2 Set up the steam cleaner next to the cleaning and drying stands.
- 6.3 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.
- 6.4 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.
- 6.5 Steam clean the two pliers that will be used to handle the coupons during the cleaning process.
- 6.6 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.
- 6.7 While still holding the cleaned coupon with the clean pliers, place the coupon in a pre-cleaned drying rack.
- 6.8 Repeat steps 5.4 through 5.6 to clean each of the outgas coupons.
- 6.9 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.



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6.10 Immediately, after the coupons are thoroughly dry, wrap the coupons in the wrapping film and move them to a dark room for blacklight inspection and packaging. 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.

**7.0 COUPON PACKAGING:**

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.
- 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.



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**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 to:

California Institute of Technology  
Attention: Larry Jones 51 - 33  
391 South Holliston  
Pasadena, CA (91125)