

LIGO-T940032-00-B



1501 North Division Street  
Plainfield, Illinois 60544-8929

## FACSIMILE MESSAGE

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

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November 8, 1994

To: Larry Jones  
LIGO Project Caltech Pasadena, California

Fax No. (818)304-9834

From: M. L. Tellalian Phone (815)439-6517

Plainfield Engineering - PAE

RE: Cleaning Assessment Sampling Procedure  
LIGO Design & Qualification Test - Caltech Contract C146

Larry,

Attached is the cleaning assessment sampling procedure which will be used for both the 8' sections and the QT sections. In the trials conducted yesterday on an 8 foot section, 200 milliliters were applied to the tube at a 20 to 1 slope and approximately 180 milliliters were collected. Approximately 5 milliliters per foot appears to be lost due to surface wetting and evaporation. The collected sample should be at least 200 milliliters as a minimum. As such, the proposed amount of solvent is 200 milliliters plus 5 milliliters per foot of length. Please review the procedure and give me your comments. The 8' tube section is prepared for the initial solvent wash and a sample can be taken to the laboratory today.

Also attached is a sketch showing the details of the end caps and coupon for the solvent wash. Please review the details as well and I will call this afternoon for your comments.

Also attached is the report on the filter paper from Bob Fitzsimmons which has just come in.

Regards,

A handwritten signature in cursive script that reads "Marty Tellalian".

M. L. Tellalian  
Plainfield Engineering

cc by fax: Ray Weiss  
FAX # 617-253-7014

**R. V. FITZSIMMONS AND ASSOC. INC.**

CHEMICAL ANALYSTS AND CONSULTANTS

1860 Arthur Drive

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(708) 231-0680

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ANALYSIS REPORT FOR:

CBI TECHNICAL SERVICES  
1501 N. Division St.  
Plainfield, IL 60544

Attn: Martin L. Tellalian

PURCHASE ORDER NO. 0-31-003 Rev.0  
Item #2

DATE 11/8/94

**REPORT OF MATERIALS ANALYSIS:** Analysis of the filter paper sample containing contaminants.  
Analysis for the propanol extractables (type of extractable materials).

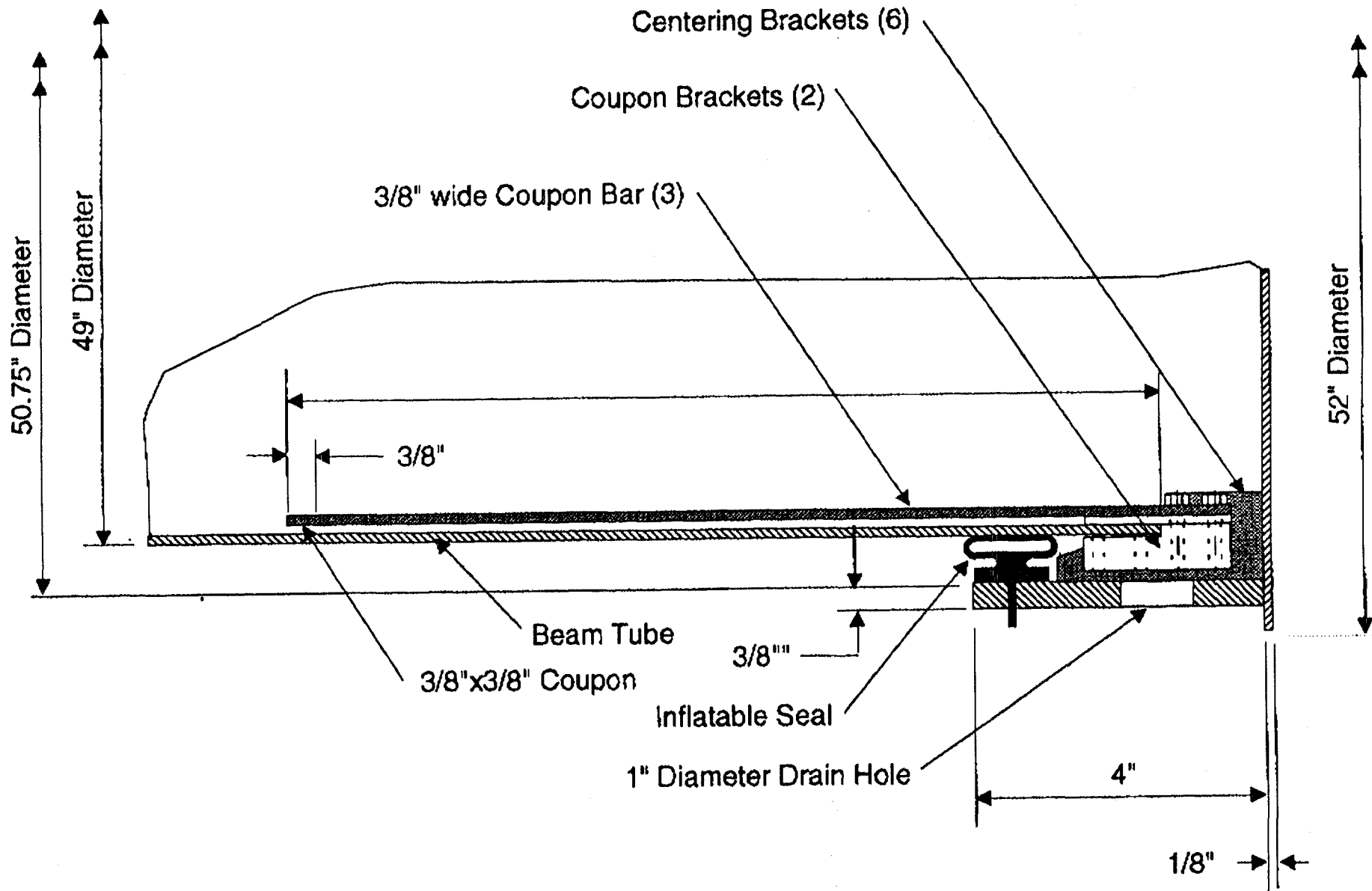
**METHODS:** A portion of the filter paper was extracted with high purity propanol solvent and the extract taken to dryness at 90 C.  
The semi-volatile/non-volatile residue was analyzed by FTIR spectral analysis in a KBr matrix.

**RESULTS:**

The extracted material appears to be a mixture of an ester oil (a fatty acid ester of a polyol) and a hydrocarbon oil.

This mixture is different from the oils found in the propanol solvent analyzed and reported to you previously (Nov. 2, 1994).  
The oils found in the propanol appeared to be a mixture of a silicone oil and a phthalate ester oil.

A copy of the FTIR spectra used in this identification will be included with your report.



End Cap Details



<b>TITLE</b> CL1QT SUPPLEMENT CLEANLINESS ASSESSMENT SAMPLING PROCEDURE FOR LIGO		IDENTIFICATION CL1QT-SUP1			
		REFERENCE NO. 930212		SHT 1 OF 1	
<b>PRODUCT</b> LIGO BEAM TUBE MODULES QUALIFICATION TEST CALIFORNIA INSTITUTE OF TECHNOLOGY		OFFICE RCE		REVISION 0	
		MADE BY WLR	CHKD BY	MADE BY	CHKD BY
		DATE 11/8/94	DATE	DATE	DATE

**1.0 SCOPE**

1.1 This procedure describes the sampling procedure used to qualitatively assess the beam tube cleanliness.

**2.0 SUPPLEMENTAL METHODS**

- 2.1 Rotate the beam tube such that the selected test area is along the bottom of the beam tube. the area selected should be representative of the general beam tube condition. For the initial test of a beam tube not cleaned, the beam tube shall be rotated out of the storage, fabrication, or installation positions. Mark the test location on the outside of the beam tube.
- 2.2 Take a clean status sample as follows:
  - 2.2.1 Adjust the slope of the beam tube to 1': 20'. The expansion joint shall be at the upper end.
  - 2.2.2 Place a clean sample collection container at lower end of the beam tube. The container shall be thoroughly cleaned with isopropyl alcohol and dried before use.
  - 2.2.3 Measure length of beam tube. Do not include the expansion joint assembly. The amount of isopropyl alcohol shall be 5 milliliter per foot + 200 milliliter. Measure isopropyl alcohol into a container that is equipped to release isopropyl alcohol at a constant flow rate.
  - 2.2.4 Release the isopropyl alcohol at the upper end below the expansion joint when applicable. The stream shall be kept narrow at the bottom inside of the beam tube. A rate of approximately ten (10) milliliter per second flow will develop a 4" wide channel that should be maintained by stop/start of flow.
  - 2.2.5 Time the flow to determine the amount of time it takes the channel to reach the lower end. Continue the isopropyl alcohol flow until the measured quantity is gone from the container.
  - 2.2.6 Allow the isopropyl alcohol to flow into the sample collection container at the lower end during the emptying of the container and for an additional amount of time equal to the time it took the channel to reach the lower end from the upper end. Continue the collection until the flow is stopped and the droplets are more than ten (10) seconds apart.
  - 2.2.7 Measure the amount of isopropyl alcohol collected in the sample collection container at the lower end and transfer it into a storage container marked with the sample identification code. Record on the assembly checklist and cleaning log book the test area location and the sample identification code and the sample description (QT MOCK UP - After initial spot cleaning, 1' - 6" from 0° to 90°, Sample #1)