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APPROVALS

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Warnings, Cautions and Notes

Information contained within this specification that is especially important to note is identified by one of the following labels:

Warnings

The paragraphs listed within this specification having descriptions or practices that could cause harm to personnel and/or hardware are identified with the following symbol:



Cautions

The paragraphs listed within this specification having descriptions or practices that could result in an adverse result or compromise personnel safety are identified with the following symbol:



Notes

The paragraphs listed within this specification having descriptions or practices that are important to the successful completion of that operation, without compromising personnel safety, are identified with the following symbol:



1. SCOPE

This document establishes the requirements for packaging and preserving of parts cleaned for Ultra High Vacuum (UHV) service for the AdLIGO Seismic Isolation System In-Vacuum Mechanical components.

1.1. Purpose

This specification is intended to provide the necessary controls to preserve the cleanliness of components that have undergone UHV cleaning. The requirements specified herein are intended to support the Vacuum Compatibility requirements of the AdLIGO Seismic Isolation System In-Vacuum Mechanical components contract.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue used shall be the one in effect on the date of contract negotiation. Conflicts between the documents referred herein and the contents of this specification shall be brought to the attention of the cognizant ASI *Contract Technical Manager* for resolution.

| Document # | Document Title |
|-----------------------|---|
| Specifications | |
| <i>ASI</i> | |
| 20008228 | Environmentally Controlled Facilities |
| ASID-3-1 | Quality Systems Procedures |
| 20006638 | General Packaging Requirements |
| | |
| Standards | |
| <i>Non-ASI</i> | |
| ANSI Z540-1 | Calibration Laboratories and Measuring and Test Equipment, General Requirements for |
| ANSI/ASQC Z1.4 | Sampling Procedures and Tables for Inspection by Attributes |
| ASTM B 479 | Annealed Aluminum and Aluminum-Alloy Foil for Flexible Barrier, Food Contact and Other Applications |
| FED-STD-209 | Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones |
| MIL-STD-1246 | Product Cleanliness Levels and Contamination Control Program |
| MIL-DTL-117 | Bags, Heat-Sealable |
| ASTM B 3 | Specification for Soft or Annealed Copper Wire |
| MIL-PRF-81705 | Heat Sealable, Electrostatic Protective, Flexible Barrier Materials |

3. REQUIREMENTS

3.1. End Product Requirements

3.1.1. Workmanship

The packaged component shall be completely covered by three (3) individual layers of clean barriers, with its outer-most layer heat-sealed. The protected package shall clearly identify the item enclosed, date packaged and its status for final integration. The package shall be free from rips, tears, holes or other defects that would inhibit the barrier film from protecting the packaged component.

3.2. Materials

3.2.1. Certification of Material

All materials used in the packaging applications identified herein shall be certified by the manufacturer as meeting the requirements of this specification.

3.2.2. Barrier Films

Barrier films used in the precision cleaned components packaging application identified herein, shall be manufactured in accordance to MIL-PRF-81705 Type III, Class 1 or 2.



The procedures specified herein are not approved for ESD sensitive hardware.

3.2.2.1. Form

Barrier films converted to standard size bags shall be manufactured in accordance to MIL-DTL-117.

3.2.2.2. Cleanliness

Barrier films used in the packaging applications identified herein shall be cleaned in accordance to MIL-STD-1246, Level 100.

3.2.3. Barrier Foil

Barrier foil used in the precision cleaned components packaging application identified herein, shall be manufactured in accordance with ASTM B-479, paragraphs 3.1.4 & 10.3.1 (Dry Annealed, A - having a test dryness 100/0, free from residual rolling oil as determined by the water test). UHV Flexible Barrier Foil shall have a thickness of 0.0015".

3.3. Equipment

3.3.1. Tools

Tools used in the packaging of precision cleaned components, which are not specified herein, shall be designated and approved by the cognizant Engineering activity.

3.3.2. Equipment

The following equipment is required to support the procedures specified herein. Equipment with project specific heritage is listed in Section 7 of this specification.

3.3.2.1. Consumables

3.3.2.1.1. Polyimide Pressure Sensitive Tape

Polyimide Pressure sensitive tape shall be manufactured from 1.0 mil thick polyimide backing material with 1.5 mils of clear electrical grade acrylic pressure sensitive adhesive.

3.3.2.1.2. Latex Gloves (Class 100 Compatible)

Latex gloves shall be in accordance with the Ad-LIGO Seismic Isolation System In-Vacuum Mechanical Elements Contamination Control plan ASI 20008228.



Workers exposed to latex gloves and other products containing natural rubber latex may develop allergic reactions such as skin rashes; hives; nasal, eye, or sinus symptoms; asthma; and (rarely) shock.

Ref: National Institute for Occupational Safety and Health (NIOSH) Publication N. 97-135.

3.3.2.1.3. Tie Wire

Tie wire shall be manufactured from annealed copper in accordance with ASTM B3.

3.3.2.2. Heat Sealer

Heat sealer shall be a hand-held model with an adjustable heater control.

3.3.3. Protective Garments

Protective garments shall be in accordance with the Ad-LIGO Seismic Isolation System In-Vacuum Mechanical Elements Contamination Control plan ASI 20008228.

3.4. Procedure

3.4.1. Environment

Unless otherwise specified, all activities associated with the packaging of precision cleaned components shall be performed in a clean room or clean zone (e.g., laminar flow bench) in accordance with the Ad-LIGO Seismic Isolation System In-Vacuum Mechanical Elements Contamination Control plan ASI 20008228.

3.4.2. Application

The packaging of precision cleaned components shall be in accordance with one of the following methods specified in the following sub-paragraphs:

3.4.2.1. Type I Packaging

3.4.2.1.1. Intimate Barrier

- a) Wrap components in a single layer of UHV barrier foil, ensuring that the foil covers the entire component and overlaps onto itself a minimum of four (4) inches (100 mm).
- b) All overlaps shall be folded to create lap seams.

3.4.2.1.2. Intermediate Barrier

- a) Components that have been encapsulated with UHV barrier foil shall be covered in a single layer of clean barrier film, ensuring that the film covers the entire component and overlaps onto itself a minimum of four (4) inches (100 mm).

- b) Following the complete coverage of barrier film, tie wire shall be used to keep the barrier film secure to the component.



Do not heat seal the seams of intermediate barrier films

- c) Free ends of the tie wire shall be adjusted so they are parallel to the adjacent surface.

3.4.2.1.3. Outer Barrier

- a) Components that have received their intermediate barrier shall be covered in a second layer of clean barrier film, ensuring that the film covers the entire component and overlaps onto itself a minimum of four (4) inches (100 mm).



Where applicable, barrier films shall be converted into bags in advance of installation to minimize insitu heat seal operations and reduce local volatile contamination

- b) Secure all open seams using heat seals.



Where heat sealing is impractical, outer barrier film seams may be sealed using polyimide (Kapton®) film tape with acrylic adhesive.



The application of tapes using silicone adhesives is strictly prohibited.

3.4.3. Identification

Components that have been subjected to the packaging processes specified herein shall be clearly identified as follows:

3.4.3.1. Labels

Labels shall be located in two locations 180 degrees from each other and positioned so that they are readily visible to personnel when the component or sub-assembly is. The marking medium and label adhesive shall be compatible with the film it will be attached to.

3.4.3.1.1. General Markings

All packaged components shall be labeled with the following information securely attached to the outer-most barrier:

1. Part Number
2. Serial Number (if applicable)
3. Traveler Number
4. Date of Packaging

3.4.3.1.2. Special Marking

All packaged components shall be labeled with the following special information securely attached to the outer-most barrier:

“CLEANED AND BAKED FOR ULTRA HIGH VACUUM SERVICE”

4. QUALITY ASSURANCE PROVISIONS

4.1. Quality Conformance Inspection

Unless otherwise instructed, quality conformance inspections shall be performed by the manufacturing contractor to verify that the requirements of this specification have been met.

4.1.1. Sampling for Quality Conformance Inspection

Unless otherwise instructed, a sampling plan in accordance with ANSI/ASQC Z1.4 shall be used to determine inspected quantities of packaged parts.

5. PREPARATION FOR DELIVERY

This section is not applicable to this specification

6. NOTES

6.1. Intended use

This specification is intended for use in establishing procedures for packaging UHV cleaned hardware using qualified materials through operational control.

6.2. Definitions

6.2.1. Cleanroom

A closed room meeting specified airborne particulate and environmental requirements specified in FED-STD-209.

7. APPROVED PRODUCTS

The following products are approved for the use in the processes specified herein: maybe facilitated by the following companies:

7.1. Barrier Films

Product Nomenclature

Manufactures Address

Metalized Static Shielding Film
Clean Shield

Aero Packaging
523 Veneto Ct.
Tracy, CA 95377
209.839.1647

Stat Zap 2102

SECO Industries
6909 E. Washington Blvd.
Montebello, CA 90640
323.726.9721

7.2. Barrier Foil

Product Nomenclature

Manufactures Address

Ultra High Vacuum (UHV) Foil

All-Foils, Inc.
4597 Van Epps Road
Brooklyn Heights, OH 44131
216.661.0211

7.3. Equipment

Product Nomenclature

Manufactures Address

Polyimide Pressure Sensitive Tape

Temp-R-Tape K102/Acrylic

Saint-Gobain Performance Plastics
14 McCaffrey Street
Hoosick Falls, NY 12090
Phone: 800.962.2666 (518.686.7301)