

REVISIONS

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NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH			
Drawn: M. Smith	10-4-95	Procedure for Installing Optical Witness Sample onto CCD Holding Fixture			
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CCD Handling and Opticle Witness Sample Installation

1.0 Scope

This procedure is written to provide direction on the following; Handling of CCD shipping containers and CCD holding fixture as received from Lincoln Labs; The installation of the Optical Witness Sample Holder and Optical Witness Sample (OWS), and the assembly techniques to minimize particulate contamination onto the CCD surface.

1.1 Introduction

Preventing particulate contamination on the surface of the CCD's is extremely critical to the performance of the ACIS Instruement. This procedure is developed as a practicle method of particulate prevention with a goal to minimize the potential for particulate contamination on the CCD surface during testing at MIT, 37-521.

1.1.1 Material

Bag Material: NYLON 6, Antistatic, cleaned to level 50A.

Alcohol: 2-Propanol, OmniSolve, 99.9%

"Alph 10" Tex-Wipes, Cleanroom Type, Lint Free

Aluminum Holding Bins, Clean Per 36-01320

Cleanroom Totes, Clean Per 36-01320

Optical Witness Sample Holder, Part No 36-02405, Clean Per 36-01320

Optical Witness Sample, 2" Diameter, Silicon (Any Style)

1.1.2 Tools/Hardware

Ensure all tools are clean per 36-01320

Ensure all screws and covers are clean per 36-01320

1.2 Responsibilities

The responsibility lies with each person testing the CCD's. These people are responsible for ensuring that their tools and materials are maintained to cleanroom standards as well as maintaining careful assembly practices so as not to contaminate the CCD's.

Training and monitoring resposibility lies with the Contamination Control Engineer (CCE). The CCE is also responsible for analyzing the OWS data and determining contamination levels upon completion of individual CCD testing at MIT.

2.0 Applicable Documents

36-01316 Cleantent Dressing, Behavior, and Material Handling

36-01320 Cleaning and Inspection Procedure for Material for Class 100 Cleantents

3.0 Procedures

3.1 CCD Shipping Containers As Received From Lincoln Labs

Unbag material per procedure No. 36-01316 then place the shipping container inside the Drybox.

3.2 Installing OWS Holder and OWS

The following is the procedure to be followed while removing the CCD holding fixture from the shipping container for the first time. At this point the OWS holder with the OWS will be installed. See figure 1.

3.2.1 Before the CCD shipping container is removed from the Drybox 1)verify that the humidity in the tent is between 40-55%, 2) Obtain Optical Witness Sample and Holder, part No 36-02405 from the CCE. The OWS and Holder shall be prepared per section 3.5 by the CCE.

3.2.2 Document the serial number of the CCD and the OWS

3.2.3 Wearing ground strap, remove the shipping container from the Drybox. Remove the screws holding the shipping container cover to the base plate. Before lifting the cover off the base plate, wipe the cover and the hole area with 2-Propanol, 99.9% OmniSolve, Alcohol and a clean Alpha 10 Tex-Wipe. USE ONLY THIS SPECIFIC TYPE OF ALCOHOL. (NO SUBSTITUTES)

3.2.4 Remove the cover very slowly and place the cover upside down so that the inner part of the cover is exposed to the downflow of the air in the clean tent. Place all screws inside a clean aluminum bin. If any screw drops to the floor pick it up, place it in a separate bag or container, and send it out to be cleaned. Do not reuse this screw until it is cleaned. Also, you MUST change gloves after you pick up the screw before you continue to work.

3.2.5 Remove two screws on the CCD shield cover and two screws on the CCD cover and place in a clean NYLON 6 bag. Use the above alcohol and apply to a cleanroom Q-tip and gently wipe the area around the two covers, top and sides. Use minimum alcohol so that it does not seep through the edges of CCD cover plates. Install the OWS Holder, with an OWS installed, over the CCD shield cover with two #2-56 cap head screws. See figure 1.

NOTE: This is performed in the vertical position to allow any particulate to fall away from the CCD plane.

3.2.6 Remove CCD holding fixture from the shipping container and mount it to the vacuum fixture, per test assembly procedures.

3.2.7 Before removing the cover plate on the OWS and CCD, change gloves to a new pair of clean gloves (change gloves only in the dressing area).

NOTE: Try not to place fingers on the top or bottom of the cover and try to handle it from the edges at all times. First, remove the cover to the Optical Witness Sample and place screws and cover in separate clean bags.

Remove the last two screws on the CCD cover plate and place screws in a clean bag and place the bag in a covered tote box or dry box. When removing the CCD cover, place it immediately in its own clean bag. Do not place it on the table before you put it in the bag; put it directly into the bag. Put only one cover per bag because two covers will rub against each other and generate particulates.

NOTE: Before removing this cover from the bag and replacing it on the CCD fixture, change to a new pair of gloves, in the dressing area.

3.2.8 Each time the CCD is exposed the OWS must be exposed. Always expose the OWS *before* exposing the CCD. Each time you replace the CCD cover plate onto the CCD holding fixture, the cover to the OWS must be installed. Always cover the CCD *before* the OWS.

The OWS holding fixture shall stay installed throughout the CCD monitoring at MIT and analyzed after completion. Once a CCD is tested completely and deemed flight acceptable and ready to be sent back to Lincoln Labs, remove the OWS holder per section 3.3.1, 3.3.2, and remove from holding fixture. Replace two 2-56 screws on the CCD shield cover.

3.2.9 Once the OWS is exposed continue with test procedure. (Installing necessary connections and loading the inner vacuum chamber to the tube.)

3.2.10 Reinstall the shipping container cover to the baseplate with two screws. Place the remaining screws inside a clean bag and place in a covered tote box for storage. Put the shipping container back inside the drybox. Do not store the screws on the table in the open.

3.3 Reinstallation of CCD into Shipping Fixture

The following is the procedure for removing the CCD holding fixture from the vacuum fixture and installing into the shipping container;

3.3.1 After the inner vacuum fixture is removed from the vacuum chamber and is placed on the mounting fixture, change your gloves to new clean gloves (change gloves only in dressing area). Wearing a ground strap, remove a CCD coverplate that is inside the bag. Inspect the screws and wipe with alcohol if necessary. Allow to dry and install the CCD cover onto the CCD fixture, using two screws secured diagonally. Try to handle the cover by its edges so that your fingers do not touch the top or bottom flat surfaces of the plate.

3.3.2 Install the cover plate to the OWS in the same manner.

3.3.3 Inspect using blacklight(wear protective goggles).

3.3.3 Remove the CCD holding fixture from the vacuum fixture and secure to the shipping container. Wipe any visible particulates with alcohol and cleanroom Q-tip or vacuum. Secure outer cover and place back into the Drybox.

3.4 Transporting Shipping Containers/Vacuum Chambers To Another Cleanroom

When transporting a CCD shipping container out of the cleanroom it must be placed inside a clean covered tote, portable drybox, or clean bag and not opened until the brought inside a Class 100 cleanroom. Also, the shipping containers must be kept inside the cleanrooms at all times, except during transport. Gloves should be changed after the outer bag, tote or drybox is opened and before the shipping container is removed to prevent cross-contamination.

When transporting the vacuum chamber outside a cleanroom, place cleanroom grade aluminum foil, cleaned with 99.5 % Chromatography grade Acetone followed by 99.5% Chromatography grade Hexane using Alph-10 Tex-wipe, around the open tubes and seal using two tyewraps. The mating end of the X-ray tube should also be covered with foil and secured with tyewraps, or provide a constant flow of nitrogen to purge the lines.

3.5 Optical Witness Sample Evaluation

3.5.1 Initial OWS evaluation will be performed by the CCE in the following manner;

1. Obtain clean OWS holders(part no.36-02405) cleanroom packaged 2" silicone wafers(any type), cleaned bags, and portable drybox.
2. Bring the material inside the MTL cleanroom, building 39 second floor.
3. Perform calibration tests on elipsometer and Wafer Inspection Machine.
4. Install OWS into holder and measure the INITIAL NVR and PARTICLE DEPOSITION on each wafer to be used. Record 5 NVR measurements per wafer and determine the average. Document serial number of the OWS holder, the NVR and print out the particle deposition summary. On the particle deposition summary printout document the OWS serial number, date and the words " initial reading"
5. After measurements are made install the wafer inside the holder and cover. Put each one in a separate bag then put inside portable drybox.

3.5.2 Final OWS evaluation will be performed by the CCE in the following manner;

1. Obtain OWS holders, with the OWS covered inside, that have tracked each CCD, new cleaned bags, and portable drybox.
2. Remove the OWS from the CCD holding fixture by removing the two screws securing it to the holding fixture. Place the OWS holder inside clean bag and place in portable drybox. Bring the drybox inside the MTL cleanroom, building 39 second floor. Measure the FINAL NVR and PARTICLE DEPOSITION on each wafer used. Record 5 NVR measurements per wafer and determine the average. Document serial number of the OWS holder, the NVR and print out the particle deposition summary. On the particle deposition summary printout document the OWS serial number, date and the words " initial reading"
3. After measurements are made cover the OWS and put each one in a separate bag then put inside portable drybox.
4. Determine the difference in NVR and PARTICLE deposition to establish contamination levels.
5. Complete and sign the form in Attachment 1. Maintain on file a record of each applicable CCD.

Figure 1.

