

SWALES
AEROSPACE

CONTRACT NO.: N00173-00-C-6011
TASK NO.: 00006.036



**Process Specification for the Handling
and Bake-out (Drying) of Photodiode
Assemblies**

SAI-PROC-1232

**September 9, 2003
Revision -**

**Prepared by:
SWALES AEROSPACE
5050 Powder Mill Md.
Beltsville, MD**

SIGNATURE PAGE

This is a controlled document. Any changes require the approval of the Configuration Control Board.

Prepared by: John I. Haggerty 9/10/03
John I. Haggerty, SAI Date

Reviewed by: Dr. J. Eric Grove 9/9/03
Dr. J. Eric Grove, NRL Date

Quality Assurance: Brian Martini 9/9/03
Brian Martini, SAI Date

Project Manager: Michael Kennedy 9/10/03
Michael Kennedy, SAI Date

DOCUMENT CHANGE RECORD

REVISION	DESCRIPTION	DATE	APPROVAL
-	Initial Release		

1 Scope

This specification establishes the process and requirements for handling Photodiode Assemblies (PDAs).

2 Applicable Documents

The following documents form a part of this specification to the extent specified herein. If no revision is indicated, the latest issue in effect is applicable.

2.1 Government Documents

2.2 Non-Government Documents

SWALES AEROSPACE DRAWINGS OR DOCUMENTS

SAI-PROC-1233	Process Specification for the ESD Handling of CDE Parts and the Assembly
---------------	--

3 Requirements

3.1 General

3.1.1 The PDAs shall be received packaged 5 per package. The package shall be a sealed ESD bag. The bag shall not be opened until the PDA is to be baked-out (dried).

3.1.2 The PDAs are ESD sensitive, only operators trained and certified to SAI-PROC-1233; Process Specification for the ESD Handling of CDE Parts and the Assembly shall handle the PDAs after delivery.

3.2 Receiving and Initial Storage

3.2.1 The delivery person's initial point of contact shall be Swales central receiving personnel located at 5021 Herzel Place. The PDAs shall be supplied to Swales from NRL, with the following forms: DD FORM 1149, GLAST Work Order Authorization, CSP Notification Form (SAI-Form-0046) and Swales Certification Log (SAI-Form-0013).

3.2.2 The PDAs are to remain in the shipping vehicle until they are unloaded at 11313 Fredrick Avenue. The receiving documentation shall be delivered to 5021 Herzel Place. The receiving documentation shall be processed and forwarded to 11313 Fredrick Avenue for Quality Assurance Inspection. The Swales receiving personnel shall have the delivery person escorted to 11313 Fredrick Avenue.

3.2.3 Upon receipt at 11313 Fredrick Avenue, the PDAs shall be moved to the clean room vestibule. There are several plastic containers with covers identified "Place received PDAs in here". The containers contain desiccant and humidity indicators. Place the packaged PDAs in the plastic containers and close the lid.

3.2.4 Certified operators of the "bonding team" shall move the PDAs inside the clean room. The PDAs shall remain stored in plastic containers that contain desiccant and humidity indicators.

3.3 Facilities

3.3.1 Operations herein shall be performed in a class 100,000 or better clean room with temperature control between 68°F to 86°F (20°C to 30°C) – except during bake out –and humidity control between 30% RH and 50% RH. Continuous temperature and humidity monitoring records for the bond work areas shall be maintained and shall be made available for review.

3.3.1.1 If the relative humidity of the work area exceeds 55%, PDAs exposed to the high humidity condition shall be bagged and purged with a constant flow of ultra-pure nitrogen gas until the relative humidity in the work area returns below 50%. If the PDAs are being stored, bagged with desiccant and a humidity indicator, they are to remain bagged and the humidity indicator shall be checked prior to their use.

3.3.1.2 If the relative humidity of the work area is in the range 50% to 55% for more than 3 hours, all PDAs shall be bagged and purged with a constant flow of ultra-pure nitrogen gas until

the relative humidity in the work area returns below 50%. Work may proceed while PDAs are bagged, to the extent that it is physically feasible.

3.3.2 Clothing requirements for the clean room shall be hairnet, ESD smock and shoe covers. Personnel handling hardware, and/or involved in the bonding operation must wear powder-free nitrile gloves and a beard mask.

3.4 Equipment

- ESD approved working benches.
- ESD approved oven.

3.5 Materials

- Clean-room swabs, Texwipes TX 761
- 100% Ethyl Alcohol (200 proof)
- Gloves, Nitrile, powder-free and static dissipative, "Ansell Brand TNT® Blue"

3.6 Personnel

3.6.1 All personnel working to this document shall be trained and certified to this document.

3.7 Handling

3.7.1 PDA handling

- a) All PDAs shall be traceable from procurement through receiving, processing, inspection, shipping, and delivery. When personnel action impacts traceability and identification, methods must be implemented to ensure traceability.
- b) The PDA is ESD sensitive. The ESD bag containing the PDA shall only be opened on an ESD grounded surface. Assembly of the PDA shall be confined to an ESD grounded surface.
- c) The PDA is to be handled by the ceramic carrier only. Do not touch the clear optical window, even with gloves.
- d) The PDA shall be bonded within 4 hours from the time it was removed from its' sealed storage bag.
- e) Only powder-free nitrile gloves shall be used while contacting or PDAs. PDAs shall never be handled using bare hands.
- f) All materials shall be handled in such a manner as to minimize exposure to humidity, skin oils, and contamination.
- g) All work surfaces shall be kept free of noticeable dust and debris. Worktables shall be cleansed with 100% ethanol before use and covered with protective film, as appropriate.

3.7.2 Prior to use, verify that the humidity indicator stored with the PDA has not exceeded 50% RH.

3.8 Bake-Out (Drying) and Cleaning

3.8.1 The PDAs shall be dried prior to use. The purpose of the drying is to remove moisture from the silicone material, which could potentially inhibit the cure of the bonding material.

3.8.2 Visually verify the cleanliness of each PDA prior to placing into the oven for drying. Any visible contamination NOT on the optical window shall be cleaned as follows, prior to drying:

- a) Moisten a clean-room swab with ethanol and wipe the surface of the PDA (NOT the optical window) clean. Do not touch the optical window at this time.
- b) Visually verify cleanliness of the PDA surfaces other than the optical window. Repeat solvent wiping as required.

3.8.3 Visually verify the cleanliness of the optical window of each PDA prior to placing into the oven for drying. Any visible contamination of the window, prior to drying, shall be cleaned as follows:

- a) Blow-dry the window surface with ultra-pure nitrogen gas.
- b) If contamination is still present, moisten a clean-room swab with ethanol and wipe the surface of the window clean. The intent is to apply minimal pressure with the swab so no abrasion to the window occurs.
- c) Visually verify cleanliness of the window surface. Repeat solvent wiping as required.
- d) Place in clean oven on a flat shelf.

3.8.4 After oven drying, verify cleanliness of the window surface. Any visible contamination of the window, after drying, shall be cleaned as follows:

- a) Moisten a clean-room swab with ethanol and wipe the surface of the window clean. The intent is to apply minimal pressure with the swab so no abrasion to the window occurs.
- b) Visually verify cleanliness of the window surface. Repeat solvent wiping as required.
- c) Blow-dry the window surface with ultra-pure nitrogen gas.
- d) Place in clean oven on a flat shelf.

3.8.5 The bake-out temperature and duration shall be either of the following two options:

- 100° C ± 5° C for 2 hours + 30 minutes/-0 minutes

Or

- 65° C ± 5° C for 12 hours +5 hours/- 2 hours

3.8.6 After drying the PDAs shall be bonded within 4 hours. If the PDAs are not to be bonded within 4 hours, re-package the PDAs as received and store in a container with desiccant and a humidity indicator.

3.8.7 The oven air temperature shall be monitored and recorded. Because of the small mass of the PDAs, they will rapidly reach temperature equilibrium with the gas, and therefore their temperature will not be monitored.

4 Quality Assurance Provisions

4.1 Material Control

4.1.1 All materials used shall have been received, inspected and issued a Lot Control Number (LCN) prior to use.

4.2 Receiving Inspection

4.2.1 Receiving and inspection of the crystals shall be as performed as described in the requirements section of this document.

4.2.2 If materials are received without the necessary documentation, the material shall be forwarded to the 11313 Fredrick Avenue clean room vestibule, "red tagged" and placed on hold. QA will obtain the necessary documentation prior to the release of the material.

4.3 Personnel Certification

Trained and competent technicians as determined shall perform processing in accordance with this specification.

4.4 Facility Approval Inspection

Facility approval inspection is performed with procedures normally used in production. Facility approval inspection consists of all the requirements in this specification. .

4.5 Surveillance

The cognizant Quality Assurance activity shall provide the surveillance necessary to verify conformance to this specification and processes.

4.6 Equipment Calibration

4.6.1 The cognizant Quality Assurance activity shall assure that the calibration system is in accordance with MIL-STD-45662. Requirements