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Massachusetts Institute of Technology
Kavli Institute for Astrophysics and Space
Research (MKI)

Inspection and Documentation

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Preface

This document was taken from LSE Specification QAP-I 201.

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Revision B issued a new format and general editorial update on 07/16/14.

1.0 Scope

This specification describes the procedure used to inspect hardware if required by the sponsor. This applies to Sponsored Research Projects at the Massachusetts Institute of Technology, Kavli Institute for Astrophysics and Space Research (MKI).

1.1 Incoming Inspection

1.1.1 Data and Certifications

Each incoming shipment is examined to ensure that the test reports, test data, certifications, and other required paperwork are included.

1.1.2 Visual

All incoming parts, materials, subassemblies, and assemblies are inspected for count and damage to insure that the shipment is complete and was not harmed during transport. A visual examination is then performed utilizing both the microscope and unaided eye. All items are inspected in accordance with criteria established by the applicable drawing or specification. Additional visual examination or mechanical measurements may be performed to determine compliance with particular aspects of the specification or drawing. See Figure 1-1, Receiving Inspection at MIT, for details.

1.1.3 Electrical

An electrical performance test may be conducted on selected electrical parts to verify functional operation.

1.1.4 Documentation

The result of all inspections, tests, acceptance, or rejection, along with pertinent remarks, are recorded on the Incoming Inspection Report form, Figure 2-1. The completed Incoming Inspection Report is retained in the Incoming/Receiving files.

Figure 1-1 Receiving Inspection at MIT

Receiving Inspection at MIT

ITEM	TEST	NDE	DATA REVIEW	100% VISUAL INSPECT	MEASURE DIMENSIONS	CHEMICAL ANALYSIS
EEE DISCRETES	NO	N/A	YES	YES	NO	N/A
MICROCIRCUITS	<u>NO</u>	N/A	YES	YES	NO	N/A
MECHANICAL PARTS FABRICATED	NO	YES <u>1/</u>	YES	YES	YES <u>8/</u>	YES <u>1/</u>
MECHANICAL PARTS FABRICATED	NO	YES <u>1/</u>	YES	YES	SAMPLE <u>2/</u>	NO <u>3/</u>
ASSEMBLIES FASTENERS (<140,000 psi) <u>4/</u>	NO	NO	YES	YES	NO	NO
METALLIC RAW MATERIALS	NO	N/A	YES	YES	NO	YES <u>1/</u> <u>5/</u> <u>9/</u>
NONMETALLIC RAW MATERIALS	NO	N/A	YES	YES	NO	NO <u>1/</u> <u>9/</u>
ADHESIVES	<u>6/</u>	N/A	YES	N/A	N/A	NO <u>1/</u> <u>9/</u>

- 1/ Testing is performed on fracture critical items only
- 2/ All dimensions are measured and recorded by the Vendor
- 3/ Material is supplied by MIT from bonded stock
- 4/ Fasteners >140,000 psi are not used
- 5/ Done by MIT or an Independent testing laboratory
- 6/ Each adhesive lot (100%), is sample tested for proper cure characteristics
- 7/ PPL and Military devices have 100% GSI. Nonstandards receive 100% MIT S.I.
- 8/ Where applicable
- 9/ This is an exception

1.1.5 Inspection Status Tag

An Inspection Status Tag, Figure 3-1 is attached to the [parts container (or to the material where practical)]. Information contained on the tag indicates the inspections or test to which that particular group of parts or material has been subjected. The Inspection Status Tag also indicates acceptance of the particular group of parts or material when marked "ACCEPTED" in the appropriate information block, by the inspector. The Inspection Status Tag remains attached to the container in which the items are stored until all parts or materials have been expended.

1.1.6 Reject Tag

Parts, materials, subassemblies, and assemblies submitted for inspection, which fail to meet the inspection criteria, in any way, are rejected. A Reject Tag (Figure 4-1) is prepared and affixed to the rejected material. The rejected material is stored separately from all other material to await further action.

1.1.7 Incoming Electrical Performance Test Data

Electrical tests performed per paragraph 1.1.3 above are recorded on appropriate data sheets. Completed Data sheets are maintained in the Incoming/Receiving files.

1.1.8 Parts Screening Data

Data supplied as part of the purchase requisition for parts and materials, as well as evidence of compliance with screening specifications, are reviewed by the inspector and are kept on file in the Incoming/Receiving files. Critical test data will be reviewed by the appropriate design engineer.

1.1.9 Limited Life

Age sensitive products which have a limited shelf life shall be recorded on the shelf life tag. The shelf life tag shall be attached to the limited life item. The date of manufacture and the expiration date are also recorded on the product unit package. See Figure 5-1. Data which is recorded on the shelf life tag is as follows:

- Product name
- Purchase order number
- Manufacturer
- Manufacturer's part number
- Manufacturer's lot code or number
- Date of manufacture
- Shelf life and storage condition
- Expiration date

1.2 Kit Inspection

Parts and materials which have successfully passed incoming inspection are stored in flight bonded stock awaiting use. When needed for assembly, they are drawn from bonded stock and placed in kits by Quality Assurance. The kits are assembled and inspected before issuance for fabrication, utilizing the latest released parts list. Kit tags are attached to the containers.

Kit tags provide next assembly identification as well as the necessary information for the configuration traceability list.

1.3 In-process Inspection

1.3.1 Visual

A visual examination, using both microscope and unaided eye is performed on all fabricated components, assemblies, subassemblies, cable harness, and sensors. Criteria for accepting the articles submitted for inspection is established by the “Workmanship Requirements: Inspection Criteria for Electronic Equipment” and the appropriate assembly drawings. The steps in the manufacturing process, at which inspections shall be performed, are shown on the applicable approved Assembly Work Order. These inspections are performed to ensure that unacceptable workmanship, not easily detectable at a later stage of manufacture, is clearly identified so that action to correct the deficiency may be taken in a timely manner.

1.3.2 Electrical

Electrical performance tests are conducted at various stages in the manufacturing process to verify performance of subassemblies or assemblies. These tests shall be performed in accordance with applicable released test procedures.

1.3.3 Documentation

At the subassembly and assembly level, the results of all in-process inspections, tests, acceptance, or rejection, along with amplifying remarks, are recorded in the AWO. Discrepancies are recorded in the fault log. The completed Fault Log is attached to the applicable assembly work order. Inspection sign off on the Assembly Work Order is made only after acceptance. Those measurements required by the applicable test procedure are recorded on appropriate data sheets are maintained in the equipment documentation file.

1.3.4 Component In-process Inspection and Tests

As the functionally grouped major subassemblies begin to take on the form of a complete experiment, a Flight Assembly/History Log is started. The log book shall contain a record, in chronological form, of all inspections, tests, operating time, problems, failures, repairs, serial numbers, weights and any other information useful in compiling a history on the particular experiment. The Flight Assembly/History Log shall be maintained by the Individual responsible for the hardware, and will remain with the experiment. The Log shall be reviewed from time to time by the Quality Assurance Group to verify that entries are complete, and up to date.

2.0 Incoming Inspection Report

2.1 Instructions for Completing the Incoming Inspection Report (Figures 2-1a, 2-1b)

2.1.1 Project

Abbreviated form of the project name; i.e. XTE, Astro-D, AXAF, TESS, etc.

2.1.2 Part Name

Noun Name of part; i.e. Diode, transistor, I.C., bracket, housing, connector, power supply, detector, etc.

2.1.3 Part No.

Part number which is assigned by MIT/MKI.

- 2.1.4 **Distr/MFR**
Distributor and Manufacturer from whom the item is procured.
- 2.1.5 **Lot Code**
The lot code/lot date code shall be as it appears on the manufacturer's documentation (if applicable).
- 2.1.6 **P.O. Number**
The purchase order number by which the parts were procured.
- 2.1.7 **Date Rec**
The date on which MIT/MKI receives the part or shipment.
- 2.1.8 **Quantity**
The total of parts in a particular shipment, except where more than one lot code/lot date code is received. A separate inspection report will be initiated for each lot.
- 2.1.9 **Test Procedure No.**
The number assigned to the written electrical test procedure by which the part is to be tested (if applicable).
- 2.1.10 **Manufacturer's P/N**
Part number which I assigned by the part manufacturer.
- 2.1.11 **Documentation**
Screening data, test data, or other data required by the purchase order will be reviewed by the inspector. If complete and satisfactory, the inspector shall stamp or initial the space provided.
- 2.1.12 **Serial Number**
The serial number marked on the part, material, subassembly, or assembly, which clearly denotes its individual identity when compared with parts of the same type, lot, and part number.
- 2.1.13 **Visual**
Mark "accepted" or "rejected" as determined by the requirements.
- 2.1.14 **Electrical**
Mark "accepted" or "rejected" as determined by the requirements.
- 2.1.15 **Comments**
Self explanatory.

3.0 Incoming Inspection Status Tag

3.1 Instructions for Completing Inspection Status Tag (Figure 3-1)

3.1.1 Project

Abbreviated form of the project name; i.e. XTE, Astro-D, AXAF, TESS, etc.

3.1.2 Manufacturer

Manufacturer from whom the item is procured.

3.1.3 MIT No.

A part or drawing number which is assigned by MIT/MKI.

3.1.4 Mfg No.

The part, item, or assembly number assigned by the manufacturer.

3.1.5 Lot

The lot code shall be as it appears on the manufacturer's documentation (if applicable).

3.1.6 P.O. Number

The purchase order number by which the item was procured.

3.1.7 Date Received

The date on which MIT/MKI receive the part, or shipment of parts.

3.1.8 Quantity

The total number of parts in a particular shipment, except where more than one lot code is received. A separate inspection report will be initiated for each lot code when practical.

3.1.9 Part Name

Noun name of part, i.e. Diode, transistor, I.C., bracket, housing, connector, power supply, detector, etc.

3.1.10 Date

Enter the date the visual inspection was performed.

3.1.11 By

Inspector's stamp or signature.

3.1.12 Date

Enter the date the electrical testing was performed.

3.1.13 By

Inspector's stamp or signature.

3.1.14 Date

Enter the date the screening was completed.

3.1.15 By

Inspector's stamp or signature.

3.1.16 Remarks

Special instructions; i.e. Electrostatic sensitive, refrigerate, store flat, radioactive, do not freeze, use before date, etc.

Figure 3-1 Incoming Inspection Status Tag

Incoming Inspection Status Tag MASSACHUSETTS INSTITUTE OF TECHNOLOGY KAVLI Institute for Astrophysics and Space Research (MKI)	
Project	MFG.
MIT No.	MFG No.
Lot	P.O. No.
Date Rec'd.	QTY.
Part Name	
Visual Inspection	
Date	By
Electrical Test	
Date	By
Screening Completed	
Date	By
Remarks:	

4.0 Reject Tag

4.1 Instructions for Completing the Reject Tag (Figure 4-1)

4.1.1 Project

Abbreviated name of the project, i.e. XTE, AXAF, Astro-D, TESS, etc.

4.1.2 Date

Date material was rejected.

4.1.3 Part Name

Diode, resistor, transistor, etc.

4.1.4 Part No.

The part or drawing number assigned by MKI.

4.1.5 Inspection Report Date

The “date received” as recorded on the inspection report which the material was rejected.

4.1.6 Reason for Rejection

Brief summary; broken lead, improper marking, void in seal, etc.

4.1.7 Disposition

Awaiting engineering review, MRB action, Return to Vendor (RTV), scrap, etc.

4.1.8 Inspector

The inspector’s stamp or signature rejecting the material.

Figure 4-1 Reject Tag

REJECT TAG	
Massachusetts Institute of Technology Kavli Institute for Astrophysics and Space Research (MKI)	
Project _____	Date _____
Part Name _____	Part Number _____
Inspection Report Date _____	
Reason for Rejection _____	
Disposition _____	
Signature _____	

Figure 5-1 Shelf Life Tag

Shelf Life Tag	
Massachusetts Institute of Technology Kavli Institute for Astrophysics and Space Research(MKI)	
Product Name	_____
Purchase Order No.	_____
Manufacturer	_____
MFGR'S P/N	_____
MFGR's Lot Code	_____
Date of Manufacture	_____
Shelf Life	_____
Storage Conditions	_____
Expiration Date	_____
Signature	_____
Date RCV'D @ MIT	_____