



**GUIDELINES FOR FINAL CUSTOMER SOURCE
INSPECTION (BUY-OFF) OF EEE COMPONENTS**

ESCC Basic Specification No. 21003

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1 **PURPOSE**

This guideline document defines the minimum requirements applicable to the performance of Final Customer Source Inspection (Buy-off) of electrical, electronic and electro-mechanical components suitable for some space applications.

2 **SCOPE**

When stipulated in the Customer's Purchase Order, the guidelines of this specification may be applied.

Final Customer Source Inspection (Buy-off) shall be performed at the Manufacturer's facility under the responsibility of the Customer or other appropriate authority, at a defined stage during testing prior to delivery, as agreed with the component Manufacturer.

The Buy-off Inspector shall respect the Manufacturer's approved rules and procedures, as applicable, in the Buy-off inspection area when handling and manipulating the components under inspection, with regards to cleanliness, contamination control and ESD controls.

Application shall be on an inspection lot basis.

Sampling shall be as specified herein.

3 **APPLICABLE DOCUMENTS**

The following documents form part of this specification. The relevant issue shall be that in effect on the date of placing the Purchase Order.

- The applicable procurement specification(s) (Generic, Detail, etc.).
- ESCC Basic Specification No. [20500](#), External Visual Inspection.
- ESCC Basic Specification No. [21300](#), Terms, Definitions, Abbreviations, Symbols And Units.
- ESCC Basic Specification No. [21500](#), Calibration System Requirements.
- IEC 60410, International Standard, Sampling Plans and Procedures for Inspection by Attributes.
- [ECSS-Q-ST-60](#), Space Product Assurance: Electrical, Electronic and Electromechanical (EEE) Components.
- [ECSS-Q-ST-60-14](#), Space Product Assurance: Relifing Procedure - EEE Components.

4 **TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS**

The terms, definitions, abbreviations, symbols and units as specified in ESCC Basic Specification No. [21300](#) shall apply.

5 **INTRODUCTION**

Final Customer Source Inspection (Buy-off) comprises a series of inspections (and test witnessing), performed by the Customer's or other appropriate authority's designated Buy-off Inspector, at the component Manufacturer's facility, prior to delivery, on the inspection lot of components being processed to meet the Customer's Purchase Order.

Buy-off is performed in order to independently check that the inspection lot of components meets the Customer's Purchase Order and the applicable requirements of the relevant specifications.

6 GENERAL

The minimum inspection requirements applicable to Buy-off are defined in Chart 1.

CHART 1 – MINIMUM BUY-OFF INSPECTION REQUIREMENTS

| Inspection | Requirements |
|--|--|
| Documentation Review (see Para. 6.3.1) | <ul style="list-style-type: none"> • Verify and record identity and traceability information of the inspection lot presented to Buy-off Inspection. • Documentation package shall be checked for completeness against the Customer's Purchase Order. • Certificate of Conformance Review. • Any other documentation items required by the Customer's Purchase Order shall be reviewed. |
| External Visual Inspection (see Para. 6.3.2) | Sample external visual inspection in accordance with the relevant specifications. Sampling: General Inspection Level II, AQL 0.65% per IEC 60410. |

Buy-off may include additional inspections or test witnessing when required by Customer or other appropriate authority; see Para. 6.3.3.

The full details and relevant specifications for all the inspections and test witnessing to be performed, together with the required period of notification to be provided by the Manufacturer to the Customer, and at what point during testing the Buy-off shall be performed, shall be as stipulated in the Customer's Purchase Order.

Unless otherwise specified, all inspections or test witnessing required to be performed during Buy-off shall be performed by the Customer's or other appropriate authority's designated Buy-off Inspector at the Manufacturer's manufacturing facility.

The Buy-off Inspector shall be completely independent from the component Manufacturer and shall act under the responsibility of the Customer or other appropriate authority.

6.1 BUY-OFF INSPECTION TEST FACILITIES

The following minimum requirements shall apply to the Manufacturer's facility where the Buy-off takes place and shall be verified during the Buy-off by the Buy-off Inspector:

- Inspection and test equipment used during the Buy-off shall be appropriate and suitable to the required inspections and tests.
- The facility shall have a quality assurance system which ensures:
 - the inspections and tests performed during the Buy-off are controlled, including recording of results (when required).
 - inspection and test equipment used during Buy-off is calibrated in accordance with ESCC Basic Specification No. 21500 or an equivalent system, and the calibration period for each equipment is defined and is valid.
 - traceability of individual components submitted to each inspection or test during Buy-off is managed.
- The facility shall maintain environmental conditions, protection against electrostatic discharge, cleanliness and handling controls appropriate to the components, the inspection and test equipment, and to the inspections and tests performed or witnessed.

6.2 LOT DISPOSITION AND REPORTING

6.2.1 During Buy-off

Immediately on conclusion of each inspection or test during the Buy-off, the Buy-off Inspector shall be responsible for recording the results and for notifying the Manufacturer's liaison QA/QC representative of the findings.

The Buy-off Inspector shall discuss any rejects or problems identified during any inspection or test with the Manufacturer's liaison QA/QC representative. It is jointly the responsibility of the Manufacturer and the Buy-off Inspector to ensure that any rejects are permanently removed from the inspection lot and quarantined.

For any rejects or problems identified during any sample inspection or test, or any rejects or problems that are considered by the Buy-off Inspector to impact the acceptability of the complete inspection lot, unless otherwise specified, the Buy-off Inspector, having first discussed the rejects with the Manufacturer's liaison QA/QC representative, shall immediately notify the Customer and/or other appropriate authority, with the full details of the findings for resolution on how to proceed. At the same time, the Buy-off Inspector and the Manufacturer's QA/QC shall ensure that the rejects are permanently removed from the inspection lot and quarantined, and that the remainder of the inspection lot is placed on hold in a suitable quarantine location at the Manufacturer's facility pending resolution by the Customer or other appropriate authority, and definition of a final disposition and/or corrective actions.

6.2.2 On Completion of Buy-off

The Buy-off Inspector is responsible for the acceptance/rejection of the inspection lot and would be expected to provide a disposition on the release of the inspection lot for delivery against the Customer's Purchase Order.

On completion of the Buy-off Inspection, the Buy-off Inspector shall report the results and disposition to the Manufacturer's liaison QA/QC representative and to the Customer.

The Buy-off Inspector can provide four dispositions as follows:

1. **Accepted:** The inspection lot is considered acceptable and all the components accepted during the Buy-off are available for delivery.
2. **Conditional Acceptance:** The inspection lot is considered acceptable subject to specific condition or conditions being satisfied. The Buy-off Inspector shall provide the Customer and the Manufacturer's liaison QA/QC representative with full details for the reason for the conditional acceptance. e.g. when a required activity, process or test has not yet been performed or results are not available.
3. **On Hold:** The acceptance of the inspection lot is in question. The lot shall be held in quarantine at the Manufacturer's facility pending resolution by the Customer or other appropriate authority. The Buy-off Inspector shall provide the Customer or other appropriate authority, and the Manufacturer's liaison QA/QC representative with full details of the reason(s) for the lot being quarantined and initiate a non-conformance action to facilitate resolution by the Customer or other appropriate authority.
4. **Reject:** The inspection lot is considered as not acceptable.

6.2.2.1 *Buy-off Report*

On completion of the Buy-off Inspection, the Buy-off Inspector shall collate all the results and findings into a Buy-off Inspection report using a suitable format which shall be provided to the Customer or other appropriate authority.

Unless otherwise specified, the report shall include as a minimum:

- A unique Buy-off Inspection report reference number.
- The component type number/part number.
- The component procurement specifications numbers and issues (as applicable).
- The Customer's Purchase Order number, references and quantities.
- The Buy-off Inspector's name and affiliation.
- The Manufacturer's name and the location of the Manufacturer's inspection facility.
- The date of the Buy-off.
- Full traceability information for the inspection lot including all relevant lot identification information e.g.: piece part lot, wafer lot, package lot, serial number list, radiation test lot, etc. (as applicable).
- The particulars of each inspection and/or test performed during Buy-off, including:
 - the inspection/test method, conditions and applicable specification.
 - results attributes and variables data (where applicable) for the inspection lot inspected, including the quantity of components inspected and the quantity (and serial numbers, if applicable) of components accepted.
- Full details (including serial numbers, if applicable) of any rejects or problems identified during the Buy-off Inspection including the reason for rejection.

6.3 BUY-OFF INSPECTIONS AND TESTS

Unless otherwise specified, as a minimum, Buy-off shall include a documentation review and an External Visual Inspection, as specified in Chart 1.

Buy-off may also offer the opportunity to perform or witness other tests or inspections as described in Para. 6.3.3.

The accept/reject criteria for the various tests and inspections to be included in the Buy-off should be documented and agreed by the Manufacturer, and the Customer or other appropriate authority before any test or inspection is performed.

6.3.1 Documentation Review

The Buy-off Inspector shall establish that the Manufacturer has produced a documentation pack that is consistent with the requirements of the Customer's Purchase Order and the applicable procurement specification. This documentation pack may be a hard copy, in an electronic format or a mixture of both. The Buy-off Inspector shall review the documentation pack to confirm the identity, and traceability of the data to the inspection lot and to verify that all required documentation items are included. All documentation items required by the Customer's Purchase Order shall be reviewed by the Buy-off Inspector; as a minimum, a review of the Certificate of Conformance and cover sheet(s) (if applicable) shall be performed.

The documentation review may include one or more of the following:

- (a) Verification that the Certificate of Conformance and cover sheet(s) are available and are correct.
- (b) Verification that the list of equipment used, list of test references are available, when required.
- (c) Confirmation that the components presented are from the same lot inspected at Precap Inspection.
- (d) Verification that the inspection lot's percent defective allowable (PDA) conforms to the specified limit.
- (e) Verification that all specified test summaries are available and are correct and that the delivery lot meets all specified lot acceptance criteria, i.e. the Manufacturer has performed all tests and inspections required in the applicable procurement specifications and that they are in accordance with the required test methods and conditions (including, where applicable, Lot Acceptance Testing or Lot Validation Testing results).
- (f) Verification that all specified 'read and record' data is available and the recorded parametric data meets the limits specified.
- (g) Verification that any failures are identified, recorded in a failed components list and have been removed from the inspection lot.
- (h) Verification that any non-conformance report (NCR), request for waiver (RFW) or similar document issued on the inspection lot is available and, if necessary, approved by the Customer (approval to be obtained in advance in order to avoid Buy-off with Conditional Acceptance).
- (i) Check the date code validity of the inspection lot. If the lot is older than the specified life time (in accordance with [ECSS-Q-ST-60](#), [ECSS-Q-ST-60-14](#) or as specified in the Purchase Order), check that the required relife testing has been performed (if done by the Manufacturer).
- (j) Verification that the lot radiation test data is available, when applicable, that the testing is in accordance with the required test methods and conditions, and that the recorded parametric data meets the limits specified.

6.3.2 External Visual Inspection

The implementation of external visual inspection during Buy-off may follow the guidelines expressed in Chart 1 and this paragraph with regards to sampling and recommended technique(s).

Regarding the criteria for acceptability during the external visual inspection, the use of the applicable procurement specification together with ESCC Basic Specification No. [20500](#) and the applicable ESCC ancillary specifications, or equivalent MIL test methods, is recommended.

Upon request, the Manufacturer should provide the Buy-off Inspector with drawings and/or schematics, or other details that allow him to understand and verify the design of the components under inspection and the desired position and type of its constituents.

6.3.3 Additional Tests/Inspections during Buy-off

Subject to agreement between the Customer and the Manufacturer, additional activities may be performed by the Buy-off Inspector during Buy-off.

Additional tests and/or inspections may include one or more of the following:

- (a) Dimension check: performed or witnessed by the Buy-off Inspector; in accordance with the applicable procurement specification; on a sample basis e.g. 1 component.
- (b) Electrical measurements: witnessed by the Buy-off Inspector; in accordance with the applicable procurement specification at the agreed test temperature(s) (usually only at room temperature); usually on a sample basis e.g. 20 components (or 100% if lot < 20).
- (c) Verification of Lead Finish: For component with leads or terminals that are not gold plated, evidence of lead/terminal finish control for the components in the inspection lot in accordance with ESCC Basic Specification No. [25500](#) shall be obtained from the Manufacturer.
- (d) Check of delivery packaging.
- (e) Other specific tests or inspections: performed or witnessed by the Buy-off Inspector; in accordance with the applicable specification and defined sampling (e.g. specific Lot Acceptance Tests or Lot Validation Tests in accordance with the applicable procurement specification).