



Workmanship Standards Introduction

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PURPOSE & SCOPE

This document is intended to provide general information regarding workmanship standards (WS). It is authorized for use by Engineering, Operations and Quality. Workmanship standards (WS) establish minimum quality requirements by which product should be, built, inspected and tested. Workmanship standards have been established as separate documents relating to specific tasks, or operations. These workmanship standards, when addressed as a complete set, are commonly referred to as the Workmanship Standards (WS).

DEFINITION

- Workmanship Specifications Manual (WSM) invokes Internal Specifications, Engineering Specifications and Workmanship Standards.
- Workmanship Standards invokes criteria used as a supplement to the drawing, Parts List, CAD model, etc.), or Statement of Work.
 1. Drawing example: Workmanship and Marking per item S01.
 2. Parts list example: Item S01 Part Number WSM.

WORKMANSHIP STANDARD

Workmanship Specifications Manual (WSM) invokes CSW Workmanship Standards (WS), Internal Specifications (IS), and miscellaneous Engineering Specifications as required design, manufacturing, and acceptance criteria when identified on the Purchase Order, Product Definition Data Set (Drawing, Parts List, CAD model, etc.), or Statement of Work. This manual may be identified as the Workmanship and Specifications Manual, WSM, or S01 within a Product Definition Data Set. The WSM is also applicable to all CSW procurements unless otherwise specified in the Purchase Order, Drawing, or Subcontractor Statement of Work (SSOW). The only exception to this requirement are Commercial Off the Shelf (COTS) parts purchased on a CSW Vendor Item Control drawing, or other parts with a CSW approved Assertion of Commerciality.

This document is to be used for deliverable product at L3 Communication Systems – West (CSW), Salt Lake City Facility, and is applicable to product delivered to CSW when identified in Purchase Order documentation. This includes demonstration equipment that is deliverable. Workmanship standards are a level I document and considered policy. The WS follows the established Order of Precedence as documented in Y-001, “Quality Management Systems”

NOTE: The drawing takes precedence over the CSW Workmanship Standards Manual, except in regards to customer hardware inducted into the Maintenance, Repair, and Overhaul (MRO) process. For MRO, WS-023 takes precedence over the drawing in determining the scope of repair for as-received conditions resulting from customer use.

There are several Internal Specifications and Quality Bulletins which directly affect workmanship issues. These documents shall be utilized, as applicable documents, when determining workmanship requirements and making product acceptance.

Example: IS-003 provides direction on class criteria for acceptability to IPC-A-610, IPC/WHMA-620, and J-STD-001 standards.

1. INSTRUCTIONS/CRITERIA

Compliance to the workmanship standards is mandatory on in-house, off-load or outsource deliverable product. Any exceptions must be authorized and approved by: the Vice Presidents of Engineering, Operations, and Quality. These exceptions shall be documented in the specific Quality Assurance Program Plan(s).

The graphic illustrations and dimensions shown may not be exact, but general acceptance criteria are provided. In case of conflict between the workmanship standard written text criteria and graphic illustrations, the written text criteria shall take precedence over the graphic illustrations.

The acceptability criteria of IPC-A-610, IPC/WHMA-620, and J-STD-001 standards shall govern all workmanship standards, where written text and/or graphic illustrations refer to, or depict soldering, unless otherwise specified. It is recommended that all solder defects be referred to the area Manufacturing Process Engineer (MPE) in order to ensure proper corrective and preventive action.

Where workmanship criteria is provided, depicting a particular solder joint, connector, etc., that criteria is also to be applied to other similar product applications.

If a workmanship standard does not provide any accept/reject criteria and no direction is specified in the build documentation -, a supplier's specification sheet may be used. However, this decision should be forwarded to the cognizant Engineer and Quality Engineer for authorization to proceed.

Deliverable Commercial off the Shelf (COTS) product (non-custom, catalog items – defined on a Vendor Item Control Drawing) shall meet the requirements specified by the supplier, or as specified by the purchasing requirements. In addition, COTS products must meet the general quality requirements expected by the commercial industry. i.e. no obvious quality deficiencies (examples include: damaged, loose or missing hardware, cosmetic paint aberrations, and inconsistencies between units).

Deliverable COTS products that have been altered from their original catalog configuration (Modified COTS – defined on a Procurement Control Drawing) require that only the modified portions meet the requirements of the drawing, purchase order and CSW Workmanship Standards, as a minimum. The non-modified portion is to be evaluated as described in the above paragraph.

COTS Commercial Off-The-Shelf (COTS) means any item of supply material that is customarily used by the general public. COTS items shall meet their intended use. WS-025 defines the minimum acceptance criteria for COTS.

Note: Product that is built, per CSW defined Envelope, Source Control or Procurement drawings or any other type of (e.g. Software) that does not fall under the definition of Vendor Item Control, COTS. Shall meet the requirements of the drawing, purchase order and CSW Workmanship Standards, as noted in [Table 1](#).

Table 1

DRAWING TYPE:	APPLICATION:
Vendor Item Control	Commercial Off the Shelf (COTS) parts --- The vendor is directed to ship parts as identified by the vendor(s) Cage Code and part number. *(CSW Workmanship Standards not applicable)
Procurement Control	Modified COTS parts --- The vendor is directed to ship parts as identified by the vendor(s) Cage Code and part number. *(CSW Workmanship Standards applicable to the modified section ONLY)
Source Control	L3 defined parts, produced by a source(s) of supply selected for their expertise. Part shall have the vendor(s) Cage Code and Part Number and L3 Cage Code and Part Number. *(CSW Workmanship Standards are applicable unless otherwise noted on the drawing)
Envelope	Critical Item Development Specification (CIDS) part drawings controlled by redline process using a numerical revision scheme. An Envelope Drawing discloses the basic technical data and performance. *(CSW Workmanship Standards are applicable to Envelope Drawings)

*WS-023 is applicable for all hardware inducted into the Maintenance, Repair, and Overhaul process, regardless of material drawing type.

It is the responsibility of Engineering and Quality Engineering to resolve any workmanship standards interpretation issues.

Internally developed portions of the workmanship standards are considered company proprietary and are not to be copied, loaned, or transferred without written authorization through the Quality organization. Standards, such as IPC-A-610, that make up part of our workmanship standards are covered under their own copyright. Specific workmanship standards can be made available to suppliers, without written authorization by Quality, in order to accomplish the requirements of the applicable purchase agreement.

END OF DOCUMENT

DOCUMENT INFORMATION

Responsible Organization: Operations

Function/Sub-function: Workmanship Standards

Governing Document(s): Y-001, Quality Management System
IS-003, Workmanship Acceptability of Electronic Assemblies

Subordinate Document(s): N/A

Related Document(s): IS-001, Use of Non-Specified Hardware/Material and Drawing Notes
IS-002, Alternate Piece Marking Method
IS-004, Base Materials for Rigid and Multilayer Printed Wiring Boards
IS-005, Printed Circuit Board Workmanship & Design Criteria
IS-006, Drawing Standards
IS-008, Material Number/Suffix Configuration
IS-009, Immersion Gold – Electroless Nickel Specification
IS-010, Unique Identification Number (UID)

IS-011, Elimination and Replacement of Primer and Paint Part Numbers
 IS-012, Minimizing the Use of Hexavalent Chromium Conversion Coatings
 IS-013, Substitution of Alternate Size and Shape Material
 IS-014, Contract Number Required on Identification Plate
 WS-002, IPC-A-610 Acceptability of Electronic Assemblies
 WS-003, Cable Harness Assembly
 WS-004, Metal Fabricated Parts and Assemblies
 WS-005, Electromechanical Assemblies
 WS-006, Micromechanical Assemblies
 WS-007, Coil Wound Products
 WS-010, Protective Finishes
 WS-011, General Cleaning
 WS-012, Marking, Engraving, and Labeling
 WS-015, Gaskets
 WS-017, Thermal Compound
 WS-019, Printed Circuit Board Workmanship Criteria
 WS-020, Circuit Card Assembly
 WS-022, Cosmetic Surface Conditions
 WS-023, Special Repair Activity (SAR)
 WS-024, Composite Materials
 WS-025, COTS Items- Condition and Appearance Acceptability
 WS-026, Product Line and Commercial Assemblies
 J STD-001, Requirements for Soldered Electrical and Electronic Assemblies
 1000154383, Specification of Part Marking Requirements
 60083155, Specification of Torque and Retention Requirements for Threaded Hardware

Related Training: N/A

Approval Requirements: Principal, Quality Engineering
Director, Manufacturing Engineering

Review Requirements: Manager(s), Engineering Management
Manager, Quality Management (Product Inspection)
Lead, Manufacturing Engineering (Metal Fabrication)

Revision History Summary

Revision #	Description of Change	Date
00-11	Initial Release through Revision 11	Various
12	Added MRO exception in note on page 2. Added * throughout Table 1. WS-023 is applicable for all hardware inducted into the Maintenance, Repair, and Overhaul process, regardless of material drawing type.	02/21/2018
NA	Replaced reference to P-318 with WS-025 in section 1. No revision upgrade necessary.	4/4/2018
NA	Added 1000154383, Specification of Part Marking Requirements to the list of related documents. No revision upgrade necessary.	8/6/2018
NA	Removed WS-018 from list of related documents. No revision upgrade necessary.	2/13/2019
NA	Added WS-024, WS-025 and WS-026 to list of related documents. No revision upgrade necessary.	5/19/2020
13	Updated logo and proprietary in footer. Updated review and approval requirements.	6/18/2021