



Hamilton Sundstrand
Windsor Locks, CT 06096

Specification: HSM19
Revision: C
Revision Date: 01/24/2023
Effective Date: 03/24/2023
Data Rights: U-2001

Counterfeit Avoidance and Traceability

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DOCUMENT REVISION HISTORY			
REV	PAGE(S) AFFECTED	DESCRIPTION OF REVISION	APPROVAL DATE
-	All	Initial Release	5/14/2012
A	3,4,6,7,8,9,11-39	Added content for Bar Stock/Material. Added Para. 19, Highlighted Requirements for Magnetic Devices. Added Para. 20.0 Contract Assembly House requirements.	8/16/2013
B	ALL	Extensively revised for clarification	05/9/2018
C	ALL	Extensively revised for clarification	1/24/2023

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1.0 Scope

Collins Aerospace is a Raytheon Technologies Corp (RTX) company. This document is applicable to the following Collins Aerospace business units: Power & Controls (P&C) and Global Operations. This specification does not apply to the Windsor Locks Space Systems business entities.

Note: Collins Aerospace Power & Controls and Global Operations, formerly UTAS ES, Electric, Environmental & Engine Systems (heritage Hamilton Sundstrand), will be referred to as Collins in this document.

The intent of this document is to provide supplemental requirements to ASQR-01, COL-ASQR-PRO-0003, AS5553, AS6174, and AS9100 for counterfeit part avoidance and raw material controls.

Suppliers and their supply chain shall follow all applicable requirements within this document unless Collins' Supplier Quality approval is obtained through an SRI (ASQR-01 Form 3) on the Supplier Portal.

2.0 Acronyms

A2LA	American Association of Laboratory Accreditation
ASL	Approved Supplier List
EEE	Electrical, Electronic and Electromechanical
Mil	Military
MPN	Manufacturing Part Number
Nadcap	National Aerospace and Defense Contractors Accreditation Program
OCM	Original Component Manufacturer
OEM	Original Equipment Manufacturer
PCN	Product Change Notification
P/N	Part Number
PPAP	Production Part Approval Process
P.O.	Purchase Order
QML	Qualified Manufacturers List
QPL	Qualified Product List
SQA	Supplier Quality Authority
SRI	Supplier Request for Information
UTAS	United Technologies Aerospace Systems

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3.0 Definitions

- **Aftermarket Manufacturer:**

A manufacturer that meets one or more of the following criteria:

1. The manufacturer is authorized by the OCM to produce and sell replacement parts, usually due to an OCM decision to discontinue production of a part. Parts supplied are produced from materials that have been
 - a. Transferred from the OCM to the Aftermarket Manufacturer, or
 - b. Produced by the Aftermarket Manufacturer using OCM tooling and intellectual property (IP).
2. The manufacturer produces parts through emulation, reverse-engineering, or redesign, that match the OCM's specifications and satisfy customer needs without violating the OCM's Intellectual Property Rights (IPR).

- **Authorized Distributor:**

An organization with a contractual arrangement with, or the express written authority of, the original manufacturer or current design activity to buy, stock, repackage, sell, or distribute the part.

- **Certificate of Conformance (C of C):**

A document provided by a supplier formally declaring that all buyer purchase order requirements have been met. The document may include information such as manufacturer, distributor, quantity, lot and/or date code, inspection date, etc., and is signed by a responsible party for the supplier.

- **Consumables:**

Goods that are consumed through manufacturing or processing of a product and then replaced.

- **COTS:**

In the United States, Commercially available Off-The-Shelf (COTS) is a Federal Acquisition Regulation (FAR) term defining a non-developmental item (NDI) of supply that is both commercial and sold in substantial quantities in the commercial marketplace, and that can be procured or utilized under government contract in the same precise form as available to the general public.

- **Counterfeit Part:**

An unlawful or unauthorized reproduction, substitution, or alteration that has been knowingly mismarked, misidentified, or otherwise misrepresented to be an authentic, unmodified electronic part from the original manufacturer, or a source with the express written authority of the original manufacturer or current design activity, including an authorized aftermarket manufacturer. Unlawful or unauthorized substitution includes used electronic parts represented

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as new, or the false identification of grade, serial number, lot number, date code, or performance characteristics.

- **Original Component Manufacturer (OCM):**

An organization that designs and/or engineers a part and is entitled to any intellectual property rights to that part.

- **Manufacturer Part Number (MPN):**

An MPN is a record that associates the Collins part number with the approved manufacturer and manufacturer's part number. This restricts the source(s) that parts can be procured from. Previously known as Approved Supplier List (ASL).

- **Original Equipment Manufacturer (OEM):**

A company that manufactures products that it has designed from purchased components and sells those products under the company's brand name.

- **Raw Materials:**

Crude or processed material that can be converted by manufacture, processing, or combination into a new and useful product. (Merriam Webster)

- **Suspect Part:**

A part for which there is objective and credible evidence indicating that the part is likely a Counterfeit Part.

- **Contractor Approved Supplier:**

A supplier that does not have a contractual agreement with the original component manufacturer but has been identified as trustworthy by Collins. This pertains to an Independent Distributor that has gone through a rigorous approval process that is designed to reduce the risk of receiving a counterfeit part.

4.0 Applicable Documents

Unless otherwise specified, the following specifications and standards, of the latest issue in effect, form part of this specification to the extent specified herein.

AS5553	Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
AS6081	Counterfeit Electronic Parts, Avoidance Protocol Distributors
AS6174	Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel
AS6462	AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition Verification Criteria

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AS9100	Quality Management Systems – Requirements for Aviation, Space and Defense
AS9120	Quality Management Systems – Requirements for Aviation, Space and Defense Distributors
ASQR-01	Aerospace Supplier Quality Requirements
COL-ASQR-PRO-0003	Supplier Quality Requirements
HSM13	Electrical Component Parameter Listing
HSM17	Collins Supplier Product-Release Programs
PN02.01-06	Alternate Specification List
69100-1,2,3,4	Listing, Parts, Materials, Processes – Alternate

5.0 EEE Part Test House

Evaluation and/or testing shall be performed by Collins or a Collins approved test facility. Listing of approved EEE test houses can be found on the Supplier Portal Report 80 under HS APPROVED ELECTRONICS TEST HOUSE.

6.0 Un-Broken Traceability

6.1 EEE Parts

Full traceability shall be provided with unbroken chain of ownership from the manufacturer to the P.O. supplier (including any intermediary distributors). To ensure traceability from the manufacturer, a formal C of C can be used. However, if this is not available, a commercially acceptable packing list can be used to provide traceability. If a part is bought direct from the OCM/OEM, the OCM/OEM shall provide a C of C.

In addition, for procurement of product for military or US Government use, a manufacturer certification to a specified military or aerospace specification or standard is required. This documentation shall contain at a minimum the manufacturer, distributor, distributor purchase order number, part number, quantity, and date code of each quantity supplied.

If a Mil STD part is purchased without a Collins drawing (i.e., the part number on P.O. is that of the Mil part), the following traceability applies: QPL or QML integrated circuits or hybrid semiconductor devices are to be procured in accordance with MIL-PRF-38534 or MIL-PRF-38535. Semiconductor devices are to be procured in accordance with MIL-PRF-19500. To ensure conformance, the distributor must provide a Certificate of Conformance and Traceability (CoC/T) with the information and documentation required by the applicable military specification. This documentation must reference the contract number and include a certification signed by the approved QPL/QML manufacturer. The CoC/T is required to determine acceptability of the supplies. If the CoC/T is not provided, is

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incomplete or otherwise unacceptable, the parts will not be suitable for Collins use and will be rejected.

6.2 Material other than EEE

In the case of Bar Stock and Metallic Raw material, an original Mill-Certification is required **along with** unbroken chain of ownership from the mill to the P.O. supplier (i.e., packing slips/CoC from each intermediary distributor).

6.3 Approved Alternates

For obsolete, superseded, and canceled references on Collins' drawings, the following documents can be used to identify an approved alternate. If an acceptable alternate is not listed, the supplier shall submit an SRI through the Supplier Portal.

Windsor Locks (WLOX) Designs with 73030 cage code:

69100-1: Alternate Parts Listing

69100-2: Alternate Materials Listing

69100-3: Alternate Processes Listing

69100-4: Vendor/Name Substitutions

Rockford Designs with 99167 cage code:

PN02.01-06: Alternate Specification List

These documents can be found on the Supplier Portal at the following location:

Supplier Portal > Help & Training > Forms & Documents > Power & Controls and Global Operations > Quality > Quality Specifications & Forms > Quality Forms and Documents > Alternate Specific References.

6.4 Manufacturer Part Number (MPN)

6.4.1 MPNs are required for the below drawing and part types:

- Collins Drawings identified as Vendor Item Control, Specification Control, Source Control, Customer/Supplier (control drawings) and Source Approval drawings, reference HSM19.
- Safety Parts (or flight safety)
- All detail drawings of Printed Wiring Boards (PWBs).
- All items detailed on Altered Item drawings
- All items detailed on Selected Item drawings

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- Part numbers procured to Military, Government or Industrial standards when a lot date code restriction is added for a quality issue.

6.4.2 If an MPN exists (this will be listed on the Collins PO), the parts shall be provided per the MPN. MPN information shall contain date code restriction information. Supplier shall review restrictions and provide product accordingly. Note: When no restriction is applied, the note will state so.

6.4.3 When the manufacturer does not have an assigned part number for the item being procured, the Collins part number is used for the MPN record. The MPN includes all characters that define the technical characteristics of the part. For parts that are procured that have suffixes (orderable information) associated with how the parts are packaged for delivery (i.e., tape and reel, or tape and reel size for electronic components), those suffixes do not have to be included in the MPN, as they can be specified by procurement in purchase order requirements. This is also true if the orderable information is not the last character in the manufacturer part number, however a wild card(s) (*) shall be used in place of that character(s) in the MPN.

6.4.4 In the event of a conflict with the MPN, an SRI shall be submitted and include a summary of the issue or why the update is required, manufacturer name, address, cage code (if applicable), manufacturer part number, and applicable ISO/AS certifications. Examples of conflict:

- MPN manufacturer part number does not match that on the Collins drawing.
- MPN supplier does not match the source on the Collins drawing or as defined in Collins supplier cross reference document, 69100-4.
- Part listed on the MPN is not available due to obsolescence
- Supplier/manufacturer part number appears to be in error.
- Missing MPN for the above drawing types.

7.0 Control of Raw Materials and Consumables

This section applies to raw materials and consumables procured in accordance with Collins engineering drawing requirement, specification, procurement specification and purchase order requirements. The purpose is to mitigate the risk of material substitution, ensure traceability, and prevent material acquisition from disreputable sources.

Examples include but are not limited to: adhesives, brazing alloys, epoxies, fluxes, inks, lubricants, metallic raw material (bar stock, extrusions, plate, sheet), paints, plastics, primers, resins, sealants, soldering alloys, tapes, welding filler alloys, etc.

7.1 Receipt of Raw Materials and Consumables

- 7.1.1 All raw material and consumables called out on the **Collins** engineering drawing, specification, procurement specification or purchase order shall be certified in accordance with the material specification.
- 7.1.2 The supplier shall establish a documented process with criteria for acceptance and/or rejection of raw material and consumables. The records of accepted or rejected raw materials shall be maintained and available for review.
- 7.1.3 Applicable document revisions requirements are defined in HSM17.

7.2 **Additional Requirements** for Metallic Raw Materials:

- 7.2.1 Original mill certification is required and shall be traceable to raw material lot, **heat**, or batch numbers.
- 7.2.2 Material procured to a military, federal or industrial specification revision prior to that imposed by the **Collins** purchase order shall be considered acceptable provided the supplier validates the material certification meets all requirements of the latest specification revision **and obtains Collins Material Engineering approval via an SRI.**
- 7.2.3 Suppliers shall not accept any converted billet / ingot material by material distributors. Certifications accompanying metallic raw materials shall only be accepted and considered valid when issued by the original manufacturing source (Original Mill).
- 7.2.4 All bar, rod, tubing, extrusion, raw forgings, raw castings, plate, sheet, or strip material, that has been heat treated in accordance with the applicable material specification (e.g., AMS-H-6875, AMS2761, AMS2771 or AMS2772), at the primary producer's facility (mill, forging facility, or foundry) to the condition specified by the engineering drawing shall be considered as having been heat treated in accordance with the material specification on the engineering drawing.

All subsequent special processing of raw materials shall be performed by approved special processes suppliers listed on Report 80/85. (e.g., chemical processes, heat treatment, non-destructive testing, etc.).

All mechanical and physical testing requirements specified on the engineering drawing and/or material specification (e.g., hardness, tensile, grain size, decarburization, etc.) after special processes shall be performed by an approved inspection laboratory listed on Report 80/85 or Nadcap, A2LA, ILAC accredited laboratories.

Note: Drawings that are designated as Source Controlled, with no Collins restricted Special Process specification (e.g., PN, HS, MS) would not require the use of a Report 80/85 Special Processes source.

7.3 Traceability and Identification

- 7.3.1 The supplier shall ensure that all raw materials and consumables used are clearly identified physically.
- 7.3.2 The supplier shall ensure traceability of raw material and applicable consumables (by lot or batch number) to the end product, including on the production documents such as traveler, router, work instructions, BOM, etc.

7.4 Testing Requirements – Metallic Raw Material

- 7.4.1 The supplier shall develop, document, and implement a raw material testing program that will ensure that material received from the supplier's sub-tier sources meets the applicable technical and quality requirements.
- 7.4.2 This section does not apply to:
- COTS parts
 - Castings and Forgings procured per Collins engineering drawings directly from sources listed on Report 80/85.
 - Approved casting facilities are listed in HS Report 80/85 under 'CASTING FACILITY, HS APPROVED'.
 - Approved forging facilities are listed in HS Report 80/85 under 'FORGE FACILITY, HS APPROVED'
 - Metallic raw material obtained directly from Collins approved sources defined by Collins material specifications (via specification, addendum, Report 80/85).
 - Part manufacturers that buy material direct from a A2LA or Nadcap accredited mill.
- 7.4.3 Suppliers shall use handheld spectrometry devices, XRF analyzer, or equivalent, to verify chemical properties on 100% of metallic raw material bought from:
- Distributors (including QDL distributors)
 - A non-A2LA mill
 - A non-Nadcap accredited mill

7.4.4 When using handheld spectrometry devices, XRF analyzer, or equivalent, the supplier shall have an established method and documented process to validate and meet the proficiency requirements below:

- Demonstrate that the required training is obtained by the personnel and is periodically refreshed
- Process for acceptance, rejection, or rework of material
- Calibration/Verification of the Equipment

7.4.5 Alternatively to using handheld spectrometry devices or XRF analyzer, the supplier can send the material out for third party testing. Supplier shall validate physical and chemical properties of metallic raw materials at a minimum frequency of one test per material per supplier within a twelve-month period using a laboratory holding A2LA or Nadcap accreditation, or by a Collins approved supplier.

- Material is defined by the material specification as called out on the Collins engineering drawing or procedure including grade, type, and class as applicable.
- The physical property testing requirements shall be as specified by the applicable material specification (acceptance tests, lot acceptance tests).
- “Per Supplier” requires the testing to be performed for each material and supplier combination at the specified interval.

7.4.6 Alternate plans, including sampling plans for high volume purchases, shall be submitted and approved through a SRI.

7.5 Storage and Handling

7.5.1 The supplier shall have a procedure in place to control and document the temperature storage conditions and shelf-life requirements for applicable raw material and consumables.

7.5.2 Age sensitive material may be updated to extend the shelf life when Collins specifies or approves the required testing and extension limits.

7.5.3 The supplier shall ensure that a FIFO (First In - First Out) system is utilized for raw material and consumables that have an expiration date.

7.5.4 Where similar or like materials are stored or staged, the supplier shall have a process in place to ensure that there is no chance for mixing or errantly selecting due to proximity.

7.6 Records

Upon request, records shall be available to Collins within 48 hours.



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8.0 Supplier Types and Additional Requirements

Suppliers are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan per ASQR-01, AS5553 (**electronic parts**) and AS6174 (**non-electronic material**). The plan shall flow down requirements as applicable throughout the supply chain. **For parts related to a government contract, DFAR 252.246-7007 and DFAR 252.246-7008 shall apply.**

In no instance shall broker parts be used (parts procured from an unauthorized source) unless approved by Collins through the Collins defined Broker Part Process. **Approval shall be requested and obtained through an SRI on the Supplier Portal.**

Suppliers shall comply with HSM13 when procuring or supplying part numbers listed within HSM13 or if HSM13 is being flowed within the quality notes on the Collins PO. HSM13 defines the requirements for incoming inspection above and beyond the normal incoming inspection procedures for procured electronic components.

In addition to sections 1.0 – 7.0, the below requirements are applicable by supplier type.

8.1 Contractor Approved Supplier

A Contractor Approved Supplier (**commonly referred to as a Broker**) is a distributor that adds value to the **Collins** Counterfeit Material Prevention and Control Plan process. Added value includes, but not limited to, methodologies of AS6081, AS6171 and IDEA-STD-1010-B.

8.2 Authorized Distributor

8.2.1 Distributors shall confirm that EEE parts are new and that they have not been comingled with used, refurbished, reclaimed, or returned parts.

8.2.2 Distributors are not allowed to provide substitute parts (better than) unless specified by prior approval of **Collins, or as listed in section 6.3.**

Exceptions are:

- Packaging variations such as tape and reel verses tube verses individually bagged.
- Mil-Spec type devices can be substituted by a better than grade. Example: JANTX diodes to JANS are acceptable.

Examples of not allowed:

- A memory device made by Manufacturer “A” with a speed of 15nS cannot be substituted with Manufacturers “A” 10nS part without approval from **Collins.**

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- Substitute a lead-free part for a lead finished part.
- 8.2.3** Distributors shall establish, research, and document the reputation and quality performance history for sources of raw materials and consumables.
- 8.2.4** If a part contains sub-assemblies or electronic parts not manufactured by the OEM, the components within the assemblies shall have traceability requirements back to the OCM.
- 8.2.5** Distributors shall submit PCNs (Product Change Notifications) pertaining to Collins product on an SRI using ASQR-01 Form 2. Example of changes:
- Manufacturing location
 - Sub-assembly changes
 - Product Inspection/Testing Techniques

8.3 Distributor

- 8.3.1** Distributors providing parts to “Build to Print, Detailed or Assembly Drawings” shall have a process in place:
- To assure that restricted raw material and detail products are procured from sources approved by Collins. Note: Special Processes and NDT Requirement are defined in HSM17 and Report 80 and 85.
 - To monitor sub-tier performance and counterfeit avoidance.
- 8.3.2** Distributors providing Mil Part Numbers must provide a C of C as defined in section 6.0, Un-Broken Traceability.

8.4 OCM and OEM

- 8.4.1** The OCM, OEM, subcontractor, and sub-tiers assume responsibility for the authenticity and un-broken traceability of all parts. Documentation of un-broken traceability shall be maintained throughout the supply chain.
- 8.4.2** In the case of bar stock/material, the above Bar Stock/Material guidelines apply (reference paragraph 6.2).
- 8.4.3** Changes that may affect quality shall be documented and communicated via SRI prior to effectivity of the change. Example of changes:
- Manufacturing location
 - Product Inspection/Testing Techniques
 - Obsolescence Notification: Obsolescence notifications to be made 24 months prior to end of life through a SRI or PCN.

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8.5 Contract Assembly House for Collins Build to Print

- 8.5.1** If a Contract Assembly Houses receives a PO from Collins for assemblies which contain component part numbers listed within HSM13, HSM13 shall apply. Contract Assembly Houses are responsible for identifying applicable part numbers during the contract review process and ensure sub-tier POs are flowing the requirements of HSM13 to sub-tiers providing these parts. Suppliers are responsible to ensure all applicable product fully complies with HSM13 prior to delivery to Collins.
- 8.5.2** When a contract assembly house is to provide material for a Collins defined assembly, the purchase of said material must follow the same guidelines as stated in this document.
- 8.5.3** The assembly house is required to implement and enforce a written Counterfeit Parts Prevention and Control Plan per ASQR-01.
- 8.5.4** Counterfeit Parts Prevention and Control Plan shall enforce preventions onto the OCM/OEM and sub-tier providers to ensure counterfeit materials are not used.
- 8.5.5** When parts are not supplied by Collins, the assembly house is required to purchase parts from a Collins approved Original Manufacturer, or from a distributor on the RTX QDL with un-broken traceability.
- 8.5.6** Un-broken traceability requirement shall be flowed down to all sub-tiers.
- 8.5.7** The contract assembly house shall at no time use broker parts unless authorized by Collins through a deviation/waiver and authorization per the purchase order. Broker parts shall have a broker part process plan performed and approved per the Collins Counterfeit Material Prevention and Control Plan.
- 8.5.8** The assembly house shall provide any PCN they receive that pertains to Collins product on ASQR-01 Form 2, submitted via SRI.
- 8.5.9** Changes that may affect quality must be submitted for approval prior to effectivity of the change via SRI. Example of changes:
- Manufacturing location
 - Product Inspection/Testing Techniques
 - Use of alternate components from the original deliverable product

9.0 Compliance Assessment for Counterfeit Avoidance Program

The following may be used as reference documents regarding counterfeit avoidance methodologies: AS9100, AS5553, ARP6328, AS6174, AS6171, AS6496, AS6081, DFAR 252.246-7007 and DFAR 252.246-7008 as applicable.

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Collins preferred method of validation to AS5553 regarding counterfeit avoidance and detection for EEE parts is to use a 3rd party certification body such as Performance Review Institute (PRI) Counterfeit Avoidance Accreditation program (CAAP).

In the event that a 3rd party certification to AS5553 is not available, **Collins** reserves the right to perform an audit utilizing the **Collins** Checklist Form # QC-0019 1 which is modeled from AS6462 and AC7401 (CAAP) Requirements.

When 3rd party accreditation becomes available for non-EEE parts (AS6174), **Collins** will assess for acceptance. Until that point, material controls shall be modeled from AS6174 and **Collins** Procedure HSM19. Validation shall be per **Collins** Checklist Form # QC-0019 3 - Raw Materials and Consumables.

For Trusted Independent Distributors, AS6081 3rd party accreditation per AS6178 or PRI CAAP is recognized as a minimum requirement and shall be used in conjunction with **Collins** Checklist Form # QC-0019 2.

DFAR 252.246-7007 and DFAR 252.246-7008 are to the MDA Contractor Compliance Audit Checklist (Counterfeit Parts and Materials). Non-compliant suppliers must provide a request for waiver with reasoning for non-compliance.

Occurrence of Compliance Assessments shall be based on Supplier Risk.

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Cage Code 73030

Specification: HSM19
Revision: C
Revision Date: **01/24/2023**
Effective Date: **03/24/2023**
Data Rights: U-2001

APPENDIX I: Lead-Free

All Suppliers delivering products containing Electrical, Electronic, or Electromagnetic (EEE) components shall manage those components in accordance with TechAmerica GEIA-STD-0005-1. Appendix I highlights the critical requirements of that document, and the additional Collins requirements.

Electronic Component Termination Finish

Per **Collins** requirements, electronic component termination finish shall conform to one of the approved materials specified in the following table. Any finish not listed in the following table shall be subject to approval by **Collins** Components Engineering. Request for approval shall be made through the SRI system. Once a component termination finish has been approved, the approval may be used for future purchases of said component providing the finish does not change. A change in finish shall require an additional review **and approval**.

Finish	Description
SnPb	Tin Lead – minimum 3% lead content
Au	Gold: ≤ 2.5 microns (98 micro-inches) plating thickness
Annealed Matte Sn	Annealed Matte Tin, nominal thickness 10 microns (394 micro-inches); demonstrated compliance to JESD 201 Table 5B Class 2 or equivalent
Matte Sn over Ni	Demonstrated compliance to JESD 201 Table 5B Class 2 or equivalent
NiPdAu	Nickel – Gold: Layered metals – Ni/Pd co-deposited, Au Immersion
NiAu	Nickel – Gold: Layered metals – ENIG: Electroless Nickel/Immersion Gold
NiPd	Nickel – Palladium: Layered Metals or Co-deposited

Whenever any pure tin (>97%) component termination finishes are used, tin whisker mitigation as defined in GEIA-STD-0005-2 “Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronic Systems” is required. Non-compliance shall result in notification through the SRI system. **Collins** Engineering shall provide disposition.

Assemblies/Sub-Assemblies

Product containing components with pure tin finishes require a minimum of one level of tin whisker mitigation as defined in GEIA-STD-0005-2. Request for exception shall be made through the SRI system.

Ball Grid Array (BGA) components soldered to a printed wiring board shall contain tin/lead solder balls only. Lead free solder balls are not allowed in a tin/lead assembly.

Tin/Lead (63Sn/37Pb or 60Sn/40Pb) solder shall be used in the assembly of soldered connections. If necessary for high temperature applications, Sn96 alloys and high temperature Tin/lead alloys are allowed as long as tin content is less than or equal to 97%. Use of Lead Free Solder requires the approval of **Collins**. Request for approval shall be made through the SRI system.

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