SAE INTERNATIONAL

# AEROSPACE RECOMMENDED PRACTICE

ARP6328™ REV. A

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Superseding ARP6328

## (R) Guideline for Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts; Avoidance, Detection, Mitigation, and Disposition Systems

RATIONALE

Revision A of this document reflects the changes made through AS5553 Revision D. This document is a major revision which provides updated effective guidance for personnel training, supplier assessment, purchasing processes, procurement risk assessment, counterfeit risk mitigation, supplier requirements flow down, purchased part verification, investigation, material traceability, suspect counterfeit and counterfeit part control, reporting and auditing. Guidance information from early revisions of AS5553 is retained and updated to be consistent with contemporary good practices.

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**SAE WEB ADDRESS:** http://www.sae.org

**For more information on this standard, visit**
https://www.sae.org/standards/content/ARP6328A/

## 1. SCOPE

The content of ARP6328 contains guidance for implementing processes used for risk identification, mitigation, detection, avoidance, disposition, and reporting of counterfeit electrical, electronic, and electromechanical (EEE) parts and assemblies in accordance with AS5553 Revision D. This document may also be used in conjunction with other revisions of AS5553. This document retains guidance contained in the base document of AS5553, updated as appropriate to reflect current practices. This is not intended to stand alone, supersede, or cancel requirements found in other quality management system documents, requirements imposed by contracting authorities, or applicable laws and regulations unless an authorized exemption/variance has been obtained.

## 2. REFERENCES

### 2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Counterfeiting is not a static process. As industry devises new methods to identify counterfeit EEE parts, counterfeiters develop new methods to disguise their parts. In an effort to keep ahead of the evolution of counterfeiting, the SAE, in addition to other industry organizations, continues to develop new and/or revised standards to mitigate the risk of use of counterfeit EEE parts.

The lists below contain documents offered as additional resources. Not all the documents in the following sections are referenced in the body of this ARP.

#### 2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

| | |
|---|---|
| AIR6273 | Terms, Definitions, and Acronyms, Counterfeit Materiel or Electrical, Electronic, and Electromechanical Parts |
| ARP6178 | Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts: Tools for Risk Assessment of Other than an Authorized Source (e.g., Independent Distributors) |
| ARP9009 | Aerospace Contract Clauses |
| AS5553 | Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts; Avoidance, Detection, Mitigation, and Disposition |
| AS6081 | Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts: Avoidance, Detection, Mitigation, and Disposition - Independent Distribution |
| AS6171 | Test Methods Standard; General Requirements, Suspect/Counterfeit, Electrical, Electronic, and Electromechanical Parts |
| AS6171/2 | Techniques for Suspect/Counterfeit EEE Parts Detection by External Visual Inspection, Remarking and Resurfacing, and Surface Texture Analysis Using SEM Test Methods |
| AS6171/3 | Techniques for Suspect/Counterfeit EEE Parts Detection by X-Ray Fluorescence Test Methods |
| AS6171/4 | Techniques for Suspect/Counterfeit EEE Parts Detection by Delid/Decapsulation Physical Analysis Test Methods |

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|---|---|
| AS6171/5 | Techniques for Suspect/Counterfeit EEE Parts Detection by Radiological Test Methods |
| AS6171/6 | Techniques for Suspect/Counterfeit EEE Parts Detection by Acoustic Microscopy (AM) Test Methods |
| AS6171/7 | Techniques for Suspect/Counterfeit EEE Parts Detection by Electrical Test Methods |
| AS6171/8 | Techniques for Suspect/Counterfeit EEE Parts Detection by Raman Spectroscopy Test Methods |
| AS6171/9 | Techniques for Suspect/Counterfeit EEE Parts Detection by Fourier Transform Infrared Spectroscopy (FTIR) Test Methods |
| AS6171/10 | Techniques for Suspect/Counterfeit EEE Parts Detection by Thermogravimetric Analysis (TGA) Test Methods |
| AS6171/11 | Techniques for Suspect/Counterfeit EEE Parts Detection by Design Recovery Test Methods |
| AS6301 | Compliance Verification Criterion Standard for SAE AS6081, Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition - Distributors |
| AS6462 | AS5553C, Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts; Avoidance, Detection, Mitigation, and Disposition Verification Criteria |
| AS6496 | Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition - Authorized/Franchised Distribution |
| AS9003 | Inspection and Test Quality Systems Requirements for Aviation, Space, and Defense Organizations |
| AS9100 | Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations |
| AS9120 | Quality Management Systems - Requirements for Aviation, Space, and Defense Distributors |
| AS13000 | Problem Solving Requirements for Suppliers |
| EIA-STD-4899 | Requirements for an Electronic Components Management Plan |
| EIA-933 | Requirements for a COTS Assembly Management Plan |
| STD-0016 | Standard for Preparing a DMSMS Management Plan |



2.1.2 ISO/IEC Publications

Available from International Organization for Standardization, ISO/IEC Central Secretariat, 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, Tel: +41 22 749 01 11, www.iso.org.

| | |
|---|---|
| IEC 60748-11-1 | Semiconductor devices - Integrated circuits - Part 11-1: Internal visual examination for semiconductor integrated circuits excluding hybrid circuits |
| IEC 60749-3 | Semiconductor devices - Mechanical and climatic test methods - Part 3: External visual examination |
| IEC 60749-16 | Semiconductor devices - Mechanical and climatic test methods - Part 16: Particle impact noise detection (PIND) |

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| IEC 60749-19 | Semiconductor devices - Mechanical and climatic test methods - Part 19: Die shear strength |
| IEC 60749-22 | Semiconductor devices - Mechanical and climatic test methods - Part 22: Bond strength |
| IEC 62239-1 | Process management for avionics - Management plan - Part 1: Preparation and maintenance of an electronic components management plan |
| IEC TS 62239-2 | Process management for avionics - Management plan - Part 2: Preparation and maintenance of an electronic COTS assembly management plan |
| IEC 62402 | Obsolescence management |
| ISO 9000 | Quality management systems - Fundamentals and vocabulary |
| ISO 9001 | Quality management systems - Requirements |
| ISO/IEC 17025 | General requirements for the competence of testing and calibration laboratories |

2.1.3 ANSI Accredited Publications

Copies of these documents are available online at https://webstore.ansi.org/.

| | |
|---|---|
| ANSI/ASQ E4 | Quality systems for environmental data and technology programs - Requirements with guidance for use |
| ANSI/ESD S20.20 | Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) |

2.1.4 U.S. Government Publications

U.S. Government specifications, standards and information about DoD-adopted specifications and standards is available from the Acquisition Streamlining and Standardization Information System (ASSIST) at https://quicksearch.dla.mil.

| | |
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| DFARS 252.246-7007 | Contractor Counterfeit Electronic Part Detection and Avoidance System |
| DFARS 252.246-7008 | Sources of Electronic Parts |
| DoDI 4245.15 | Diminishing Manufacturing Sources and Material Shortages Management |
| MIL-PRF-19500 | Semiconductor Devices, General Specification For |
| MIL-PRF-38535 | Integrated Circuits (Microcircuits) Manufacturing, General Specification For |
| MIL-STD-3018 | Parts Management |
| SD-19 | Parts Management Guidebook |
| SD-22 | Diminishing Manufacturing Sources and Material Shortages (DMSMS) Guidebook |

2.1.5 United Kingdom Ministry of Defence Publications

Available from www.defencegateway.mod.uk/

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| JSP 886 | Defence Logistics Support Chain Manual |

2.1.6 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications

2.1.7 Components Technology Institute Publications

Available from Components Technology Institute, Inc., 211 Homewood Dr., Huntsville, AL 35801, Tel: +1-256-651-1551, www.cti-us.com

CCAP-101 Counterfeit Components Avoidance Program, Certification for

2.1.8 IDEA Publications

Available from IDEA, 2250 Double Creek Dr #6474, Round Rock, TX 78683-0061, Tel: +1 (714) 670-0200, https://idofea.org/

IDEA-STD-1010 Acceptability of Electronic Components Distributed in the Open Market

2.1.9 JEDEC Publications

Available from JEDEC, 3103 North 10th Street, Suite 240-S, Arlington, VA 22201-2107, www.jedec.org

JEDEC JESD31 General Requirements for Distributors of Commercial and Military Semiconductor Devices

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 U.S. Government Publications

U.S. Government specifications, standards and information about DoD-adopted specifications and standards is available from the Acquisition Streamlining and Standardization Information System (ASSIST) at https://quicksearch.dla.mil.

MIL-PRF-38534 Hybrid Microcircuits, General Specification For

MIL-STD-202 Electronic and Electrical Component Parts

MIL-STD-750 Test Methods for Semiconductor Devices

MIL-STD-790 Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts Specification

MIL-STD-883 Test Method Standard - Microcircuits

MIL-STD-1580 Destructive Physical Analysis for Electronic, Electromagnetic, and Electromechanical Parts

DoDI 4140.67 DoD Counterfeit Prevention Policy

2.2.2 United Kingdom Ministry of Defence Publications

Available online from www.defencegateway.mod.uk/.

DEF STAN 05-135 Avoidance of Counterfeit Materiel

2.2.3 JEDEC Publications

Available from www.jedec.org.

JEDEC JESD22-B107 Marking Permanency

2.2.4 RTCA Publications

Available from RTCA, Inc., 1150 18th Street, NW, Suite 910, Washington, DC 20036, Tel: 202-833-9339, www.rtca.org.

DO-254 Design Assurance Guidance for Airborne Electronic Hardware

2.2.5 IEC Publications

Available from IEC Central Office, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland, Tel: +41 22 919 02 11, www.iec.ch.

IEC 62668-1 Process management for avionics - Counterfeit prevention - Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

IEC 62668-2 Process management for avionics - Counterfeit prevention - Part 2: Managing electronic components from non-franchised sources

2.2.6 IAQG Publications

Available from IAQG, Boulevard A. Reyers 80 à, Bruxelles, 1030, Belgium, www.iaqg.org/scmh.

IAQG SCMH 3.5.2 Counterfeit Parts Prevention Guidance

2.3 Terms and Definitions

Throughout the text of this document, wherever the term “product” occurs, it can also mean service.

For the purposes of this document, the terms and definitions listed in ISO 9000, AS5553D, AIR6273, and the following apply:

2.3.1 Related Definitions

2.3.1.1 CERTIFICATION

The certification body action of testifying, guaranteeing, or endorsing organizations that conform with specific management systems standards.

2.3.1.2 OPEN MARKET

The trading market that buys or consigns excess inventories of parts and subsequently utilizes these inventories to ultimately fulfill the supply needs of an end user.

NOTE: The open market may include the purchase and sale of parts where the full supply chain traceability of such parts is unknown.

2.3.1.3 PACKAGE

The body of a component, such as flat-pack or dual-in-line package.

2.3.1.4 PACKAGING

The container or enclosure of parts for distribution, storage, or sale.

NOTE: Packaging selection is determined by product sensitivities such as moisture, physical (lead pitch, co-planarity), electrostatic discharge (ESD), as well as the method (manually, or by use of automated equipment) to be used to place parts on the printed circuit board. Packaging can include various forms of device packaging materials such as corrugated containers (boxes), JEDEC Trays, integrated circuit carriers, tubes/sticks, moisture barrier bags, static shielding bags, tape and reel, conductive carriers, dunnage, and thermoformed vacuum formed or injection molded trays. Packaging accessories include humidity indicator cards, desiccant, antistatic packing material, and proper labels.

## 3. GUIDANCE

### 3.1 Counterfeit EEE Parts Control Plan

This section provides guidance to develop and implement a counterfeit EEE parts control plan for risk identification, mitigation, detection, avoidance, disposition, and reporting of suspect counterfeit or counterfeit EEE parts and/or assemblies containing such EEE parts. These controls are intended to be risk-based and to reduce the likelihood of suspect counterfeit or counterfeit EEE parts being procured and/or installed in products delivered to end customers. The organization should maintain awareness of current counterfeiting information and update its processes based on observed trends. The organization may include EEE anti-counterfeit processes in a comprehensive all commodity plan or its plan may identify separate instructions or procedures provided that it addresses all the requirements in AS5553.

#### 3.1.1 Personnel Training

AS5553 requires personnel to receive training appropriate to their counterfeit prevention role and/or function. The organization should also plan refresher training on an appropriate frequency. This section lists guidance for training contents by job function. Training should cover the awareness, avoidance, detection, mitigation, and disposition of suspect counterfeit or counterfeit EEE parts, as appropriate for the functional role. Periodic updates to training content should address changing trends in counterfeit parts, their avoidance, and new detection methods. Training records should be maintained per company quality management procedures. Some examples of counterfeit prevention training to be considered for applicable functions based on their specific responsibilities are as follows:

a. Management, Program and Project Management and Contracts: Awareness of company policies on counterfeit prevention regulatory and standards requirements, and counterfeit threats.

b. Procurement: Understanding of critical role in procuring EEE parts from authorized sources or exclusive suppliers (see 3.1.3.1), and the process required when parts are not acquired from these sources.

c. Customer Interface: Awareness and job-specific actions relating to counterfeit prevention during auditing, contracting, marketing, and/or field service.

d. Quality Assurance: Understanding of role in preventing, auditing, containment, disposition and reporting of counterfeit part incidents, and assuring customer requirements and company procedures are followed.

e. Inspection and Receiving: How to conduct effective inspection and testing for counterfeit detection, verify proper documentation for purchased and returned parts, physical characteristics for indications of counterfeit EEE parts, test/inspection results; packaging, and paperwork to identify suspect parts.

f. Manufacturing: General counterfeit part awareness and the inventory, kitting, and production controls necessary to assure proper traceability of parts, including any special requirements to control parts in inventory and production.

g. Engineering: Counterfeit parts risk; mitigation test/inspections; verification of test/inspection results; and their role in engineering design for counterfeit avoidance and obsolescence management, minimizing the risk of purchasing parts from unauthorized sources, and securing alternate authorized sources.

3.1.2 EEE Parts Availability

The organization's counterfeit control plan should document processes that maximize the use of available, authentic, originally designed, and qualified EEE parts throughout the product's life cycle.

During design, proposal, and program planning efforts, organizations should assess the long-term availability of authentic parts and part sources for production and support of systems. When assessments indicate availability risks, organizations should implement risk mitigation efforts throughout the product's life cycle to reduce exposure to counterfeit EEE parts, including, for example:

a. planning for adequate procurement lead times;

b. alternate/multiple sources;

c. lifetime or bridge buy from original component manufacturer or its authorized sources;

d. substitutions;

e. system/subsystem/component redesign;

f. EEE parts obsolescence management and mitigation.

Obsolescence can increase the risk of acquiring counterfeit EEE parts. Obsolescence management throughout the product life cycle is a key driver for counterfeit avoidance, and it is essential for minimizing the risk of purchasing EEE parts from unauthorized sources. To reduce the likelihood of purchasing counterfeit EEE parts, equipment manufacturers should proactively manage the life cycle of EEE parts contained within their products through the use of an obsolescence management plan or Diminishing Manufacturing Sources and Material Shortages (DMSMS) management plan. It is recommended that the organization engage customers when obsolescence risks are identified. Jointly consider alternate resolutions to address obsolescence risk.

There are industry-recognized obsolescence part management services that can be used to aid in the mitigation of counterfeit parts.

Appendix B contains examples of government and industry documents which provide guidance about part obsolescence management.

3.1.3 Purchasing Process

3.1.3.1 The organization can reduce its risk of obtaining counterfeit parts by purchasing EEE parts directly from any of the following.

a. Original component manufacturers (OCM)/original equipment manufacturers (OEM).

b. OCM-authorized sources of supply for a EEE part (i.e., franchised distributors, authorized distributors).

c. Authorized aftermarket manufacturers.

d. Exclusive suppliers (refer to definition in AS5553D).

3.1.3.1.1 The organization should purchase EEE parts from these sources when the parts are still being manufactured or the parts are currently available in stock from these sources.

3.1.3.1.2 According to AS5553, a EEE part that is still being manufactured (by the original manufacturer or an authorized aftermarket manufacturer) must be procured from an authorized source or an exclusive supplier. If a part is in production but not available in stock directly from these sources (e.g., due to lead time), then AS5553 does not allow the part to be obtained from a supplier other than an authorized source or exclusive supplier. If AS5553 compliance is required by a contract, then customer approval would be required to allow the EEE part to be procured from another type of supplier. If AS5553 is not on contract, but the organization's quality management system requires compliance to AS5553, then the organization should address such a procurement within its quality management system, for example, as a discrepancy with corrective action or as a documented exception within its quality management system. To determine whether a EEE part is being manufactured, the organization should perform one or more of the following.

a. Contact the OCM/OEM, Authorized Distributor, or Authorized Aftermarket Manufacturer, or reference their websites.

b. Search for end-of-life (EOL) notifications, product change notifications, or other notifications that announce termination of production.

c. Use a subscription service (i.e., a data provider) to monitor production status.

3.1.3.1.3 If a EEE part is not being manufactured, the organization should maintain objective evidence of the part's production status in the organization's records.

3.1.3.1.4 After production has ceased, a EEE part may remain available in stock from the OCM/OEM, authorized distributor, or authorized aftermarket manufacturer.

3.1.3.1.5 Some customer contracts impose additional constraints to procure EEE parts from sources other than those listed in 3.1.3.1 when the parts are in production (e.g., DFARS 252.246-7008). It is recommended the organization contact the OCM/OEM and authorized aftermarket manufacturer (if any) to confirm whether the parts are still being manufactured. If the parts are still being manufactured, but not available in stock from a source listed in 3.1.3.1, then a good practice for the organization is to engage its customer in the decision whether to purchase from a source other than those listed in 3.1.3.1.

NOTE: Authorized sources are the OCM/OEM and OCM/OEM-authorized sources of supply for an EEE part (i.e., franchised distributors, authorized distributors), and authorized aftermarket manufacturers.

3.1.3.1.6 OCM authorized distribution agreements typically include provisions that protect the user by ensuring product integrity and supply chain traceability, such as:

a. OCM/OEM warranty;

b. proper handling, storage, and shipping procedures;

c. failure analysis and corrective action support;

d. certificates of conformance and acquisition supply chain traceability.

3.1.3.1.6.1 An authorized distributor provides an EEE part acquired through an authorized distribution agreement with the OCM. Contractual agreement terms may include, but are not limited to, distribution region, distribution products or lines, and warranty flow down from the manufacturer.

NOTE: In some parts of the world (such as where IEC 62668-1 is utilized), manufacturers many use the terms "franchise" and "authorize" differently. In those parts of the world, manufacturers franchise distribution of their product and authorize manufacturing by other entities. For the purposes of this document, franchised distribution is considered synonymous with authorized distribution.

3.1.3.1.6.2 When a distributor that typically acts as an authorized distributor provides an EEE part from outside of an authorization distribution agreement, then for the purpose of this document, the distributor is considered a non-authorized source for the part and managed per 3.1.3.5. Counterfeit risk increases when a distributor obtains product through multiple intermediaries (regardless of having traceability to the OCM), if any of the intermediaries are not an authorized distributor.

3.1.3.2 The organization should determine whether its sources are properly categorized for intended purchases. For example, the organization can review reputable information, such as the manufacturer's webpage or part specification, to assure a source is the original manufacturer of parts being purchased. The organization may contact the original manufacturer or reference a list of authorized distributors on the manufacturer's website to assure the intended supplier is an OCM/OEM-authorized source. authorized aftermarket manufacturers should have authorization from the OCM/OEM to produce or distribute the EEE part being purchased.

3.1.3.2.1 To assure an exclusive supplier provides EEE parts obtained exclusively from OCMs/OEMs, OCM/OEM-authorized sources, or authorized aftermarket manufacturers, the organization can review traceability documentation or other objective evidence that the supplier obtains EEE parts directly from such sources.

3.1.3.2.2 In accordance with its documented record retention requirements, the organization should maintain objective evidence of the basis for categorizing all sources of EEE parts. Examples of objective evidence are correspondence from the OCM/OEM; a screen shot (including the date) of an OCM's/OEM's webpage that lists authorized distributors; or an established process that assures accurate categorization of sources.

NOTE: The manufacturer's website may not always reflect recent additions or deletions to the manufacturer's authorized distributor list. Also, some manufacturers may limit what parts their authorized distributor can sell. For example, a manufacturer may allow a distributor to sell parts for use in a commercial application, or for engineering evaluation, but may not allow the same parts to be sold for military or other high reliability applications. Therefore, if the manufacturer's website information is doubtful or lacking, contact the manufacturer directly.

NOTE: Some sources may present themselves as an OCM/OEM, but instead they rebrand, remark, reassemble, repackage, refurbish, or upcycle parts designed/built by other OCMs/OEMs. These sources can be referred to as replacement part sources or replacement part manufacturers. They apply their own part numbers and/or branding to parts. The performance and reliability of these parts may not be well characterized or fully disclosed. The organization should follow a rigorous part substitution, qualification, and supplier evaluation process in accordance with its parts management plan to avoid use of potentially nonconforming parts.

3.1.3.3 Guidance for the Organization to Establish a Process to Review, Audit, and/or Evaluate Exclusive Suppliers

3.1.3.3.1 An exclusive supplier should only deliver EEE parts to customers that the supplier obtained directly from the OCM or its authorized sources. The organization should flow down appropriate requirements to an exclusive supplier.

3.1.3.3.2 The organization should verify:

a. The supplier has a process to identify the OCM and its authorized sources.

b. EEE part purchases are directly from the OCM or authorized sources.

NOTE: Examples of methods to identify the OCM of a part are identification on the part drawing or specification; qualified manufacturer's list; purchasing agreement; or confirmation by the OCM or the organization. OCMs and their authorized sources may change due to acquisitions and other business adjustments, so they should be reverified if the part is re-procured over time. If necessary, contact the current OCM or the authorized source for confirmation or objective evidence that the source was authorized by the OCM at the time of procurement.

c. The supplier has a process to prevent comingling of EEE parts from authorized sources and sources that are not authorized by the OCM, if any. The process may involve lot or batch control, physical barrier(s), physical inventory separation, different physical storage locations, different parts management system, unique marking or labelling combined with other control mechanisms, no purchases from non-authorized sources, and/or electronic inventory control.

d. The supplier maintains objective evidence of 3.1.3.3.2 a., b, and c.

3.1.3.3.3 Verification of 3.1.3.3.2, a., b., c., and d. can be performed by review of supplier procedures, instructions, training, traceability documentation, and/or transactional records. It is preferable to verify practices and inventory controls at the supplier's facility.

NOTE: Exclusive suppliers might not flow down an OCM warranty to the organization. If a supplier does not flow down an OCM warranty, then the organization may take additional steps to verify the EEE parts were obtained directly from the OCM or an authorized source.

3.1.3.4 To avoid the purchase or use of suspect counterfeit or counterfeit EEE parts, the organization should evaluate, select, and monitor suppliers utilizing methods, or a combination of methods, such as:

a. Surveys (e.g., utilizing assessment criteria from ARP6178).

b. Audits (e.g., utilizing criteria from AS6462).

c. Verification that the supplier's documented processes adhere or are certified to industry standards, such as:

1. assembly/equipment/system providers - AS9100, ANSI/ASQ E4, ASME NQA-1

2. OCMs, aftermarket manufacturers - AS9100, ISO 9001, AS9003, ANSI/ASQ E4, ASME NQA-1

3. distributors - AS9120, AS6081, AS6496

4. test facilities - ISO 9001, ISO/IEC 17025, AS6081, AS6171

d. Review of evidence the organization assesses its suppliers' processes to avoid the purchase or use of suspect counterfeit or counterfeit EEE parts, including their supplier assessment, selection, and management. A supplier's EEE counterfeit prevention process may include measurement of the number of procurements from independent distributors.

e. Review of previously documented suspect counterfeit and counterfeit reports noted by the Organization and/or external sources of information, such as (e.g., GIDEP, ERAI, criminal investigative agency reports or press-releases, Anti-Counterfeiting Forum, Parts and Materials Management Conference (PMMC) (formerly known as the Diminishing Manufacturing Sources and Material Shortages (DMSMS) Conference), Counterfeit Microelectronics Working Group, and other meetings on counterfeit parts). If the data identifies the supplier being evaluated as the source of suspect counterfeit or counterfeit material, then the Organization should consider the supplier as a higher risk. A supplier's EEE counterfeit prevention process may include measurement of suspect counterfeit incidents. See Figure 1A for additional information about utilizing data from these reports.

f. Review of historical experience with the source of supply (e.g., quality performance, delivery performance, supplier corrective action requests); compliance to counterfeit avoidance and detection industry standards.

g. Review other measures of supplier health such as:

1. Dunn & Bradstreet rating - Adverse financial ratings could indicate higher risk of nonconforming products, which may include counterfeit material.

2. United States Government System for Award Management (SAM) - Suspension or proposed debarment for fraudulent, suspect counterfeit or counterfeit activity may indicate higher risk of potential counterfeit.

3. Other financial or government supplier rating system which indicates an adverse trend.

h. Evaluation of the warranty, return policy and/or product liability terms offered by the source of supply.

i. Verification that the supplier has physical business facilities appropriate for the materials being provided (e.g., avoid suppliers with fake addresses such as an empty lot or building, supplier co-located or sharing staff with another entity that was identified as a source of suspect counterfeit or counterfeit parts. The organization should perform additional assessments regarding suppliers that lack a physical business address (e.g., using a residential address, eCommerce, commercial mailbox, post office box, flea market).

j. Other methods deemed appropriate for the intended types of procurement.

3.1.3.4.1 The organization should determine whether to perform its assessment remotely or at the supplier's facilities. Some assessments may be performed by the organization, or their designated third-party assessor. Risk mitigation action should be taken whenever the assessment of a source of supply indicates elevated risk. Examples of risk mitigation actions include supplier corrective action requests, assessments, audits, or supplier disapproval.

3.1.3.4.2 The organization should periodically monitor the performance of its sources of supply to assure that the sources are maintaining effective processes for mitigating counterfeits. The scope and frequency of supplier evaluation should be commensurate with the assessed risk of the source.

3.1.3.5 Procurement of EEE parts from suppliers other than those listed in 3.1.3.1 should be used as an exception and requires a documented risk assessment and risk mitigation.

3.1.3.5.1 Risk Assessment

The organization with technical responsibility should assess risk, considering:

a. The likelihood of receiving this type of part as a suspect counterfeit part or counterfeit part from the intended source.

b. The potential consequences of a suspect counterfeit part or counterfeit part in the product application as known by the organization, such as safety, product performance, cost impact, maintainability, reliability, life expectancy, serviceability, equipment loss, data loss, cybersecurity, customer dissatisfaction, loss of the organization's reputation.

3.1.3.5.2 Risk Mitigation

The organization should:

a. document inspections and/or tests to mitigate counterfeit risk;

b. specify acceptance and rejection criteria;

c. select inspections and/or tests commensurate with the level of risk associated with the source of supply and part application.

3.1.3.5.3 As guidance, Figures 1A and 1B provide typical sequences of risk levels related to the source of supply and product/application criticality, respectively. Due diligence related to critical applications (including additional inspection/test) and customer requirements should be performed when establishing procurement requirements. Examples of factors for assessing and mitigating supplier risk are contained in Table 1. Figure 2 contains a summary of a procurement risk mitigation process.

3.1.3.5.3.1 An organization with technical responsibility of an OEM product is an entity with formal authority for the design, validation of performance and/or reliability, service, or repair support of the OEM product. If the organization has technical responsibility for the product being manufactured, it should engage its own subject matter experts to assess and mitigate counterfeit risk. An organization with technical responsibility may also engage its customer about product application, or if customer engagement is required by contract. If the organization lacks technical responsibility for the product (examples are contract manufacturers or build-to-print manufacturers), the organization should request the customer or entity with technical responsibility of the product being produced to assess risk and provide mitigation instructions.

3.1.3.5.3.2 To help detect and avoid suspect counterfeit and counterfeit EEE parts, tests, inspections, and other risk mitigation methods should be performed in accordance with accepted customer and industry-recognized standards (e.g., AS6171, CCAP-101, IDEA-STD-1010, IEC 60749-series), unless otherwise specified by the customer. Examples of risk mitigation inspection and test methods can be found in Appendix C. New inspections and tests continue to be developed to detect suspect counterfeit and counterfeit EEE parts. Refer to the source documents referenced in the appendix for additional inspections or tests developed since the release of this document.

3.1.3.5.3.3 If Government regulations are invoked in the contract (e.g., DFARS 252.246-7007, DFARS 252.246-7008), some level of inspection and testing is required for electronic parts that are purchased from a source other than those listed in 3.1.3.1.

3.1.3.5.3.4 Additional specifications, standards and test methods can be useful in detecting potential counterfeit parts, such as military standards, IEC, and JEDEC.

3.1.3.5.3.5 Inspections and tests may be performed internally by the organization, or externally by a supplier or service provider. It is recommended that the supplier or service provider be evaluated by the organization or through third-party accreditation (e.g., ISO 17025 accreditation or DLA's Qualified Test Suppliers List) to assure that the inspections and tests are performed adequately.

3.1.3.5.4 Additional Guidance

3.1.3.5.4.1 Documentation provided by a source other than those listed in 3.1.3.1 (e.g., Certificate of Conformance, Certificate of Quality Compliance, traceability records) is typically not sufficient to mitigate the risk of receiving counterfeit EEE parts. Documentation may be counterfeited, modified, or improperly used to misrepresent authenticity. If a source other than those listed in 3.1.3.1 obtains EEE parts from sources other than the original manufacturer and its authorized sources, then the organization should require inspection and test, in addition to documentation review. See Appendix D for additional documentation review guidance.

3.1.3.5.4.2 EEE parts purchased from customers, assembly manufacturers with surplus EEE parts, or government entities may be considered acquired from other than those referenced in 3.1.3.1. The organization should consult with these entities to determine if the parts are traceable to an authorized source, or if the parts should be subjected to risk mitigation by the customer, organization, and/or a third party to assure the parts are authentic.

3.1.3.5.4.3 Customer-furnished EEE parts are provided, managed, and utilized in accordance with the organization's contract with its customer. If the organization has evidence customer-furnished parts could be counterfeit, the organization should engage the customer to adjudicate the parts.

NOTE: EEE parts procured from authorized sources are typically considered low risk that the parts would be counterfeit. Based on this low risk, the organization uses their quality management system (QMS) processes to verify the acceptability of the EEE parts upon receipt. The organization may be required by contract to perform inspection and test of parts from authorized sources. If authorized sources have parts that are not traceable to the original manufacturer or inadequately managed returned parts, the organization may also require inspection and test of at least a sample of parts.

3.1.3.5.4.4 In addition, the organization should evaluate sources for microcircuits or semiconductors that obtain die (e.g., from previously packaged parts or unpackaged die/wafers) from non-authorized sources to confirm such sources have counterfeit risk management processes in place to detect, avoid, and prevent incorporation of counterfeits in their products.

3.1.3.5.4.5 Counterfeit risk assessment and mitigation planning should begin prior to the tendering of a purchase contract for EEE parts. The extent of the risk assessment and mitigation processes should be commensurate with the risks related to the source of supply and criticality of the product application. Figures 1A and 1B provide guidance about the hierarchy of source and product application risk.


***Figure 1A - Typical source of supply risk stack chart***

3.1.3.5.4.6 To reduce risk from a supplier that is identified as a source of suspect counterfeit or counterfeit parts, the organization should perform additional due diligence (e.g., additional inspections and tests, more frequent evaluations, utilization of multiple methods to evaluate the supplier). The extent of supplier evaluation and monitoring should be determined by the level of risk involved in the procurement, the nature of the product, and the supplier. Similarly, additional inspections and tests should be considered as risk mitigation if the specific manufacturer's part number being procured has been reported to be suspect counterfeit or counterfeit.

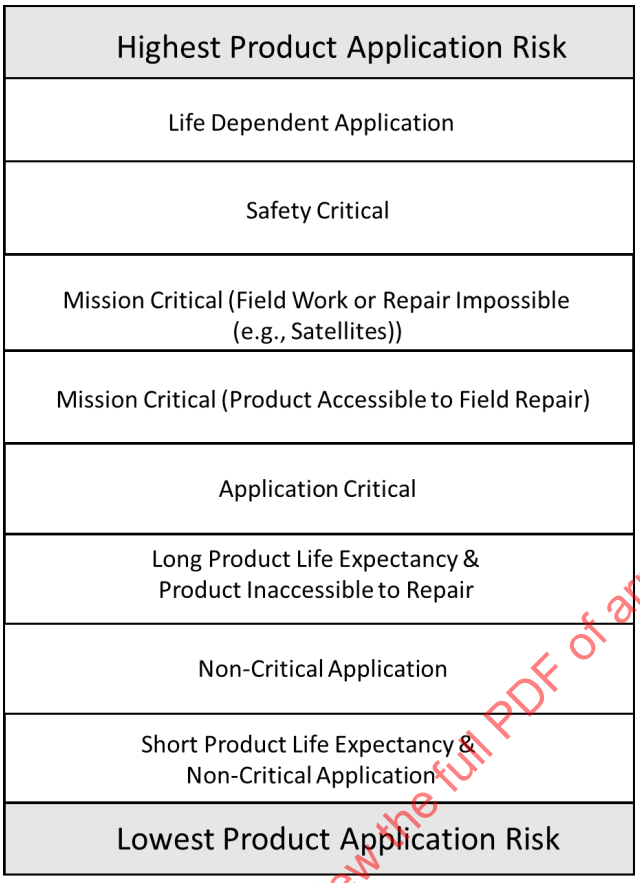


***Figure 1B - Typical product application risk stack chart***

3.1.3.5.4.7 During supplier assessment and approval, supplier risk may be reduced when attributes in Table 1 are addressed. Typically, lower risk suppliers address more of these attributes. Table 1 should be used in conjunction with Figure 1A to assess supplier risk. The organization should consider its supplier risk tolerance when determining minimum approval criteria.

***Table 1 - Supplier risk attributes***

| |
|---|
| Customer audited and approved with site visit |
| Audited and confirmed compliant to an appropriate counterfeit avoidance standard (e.g., AS5553, AS6081, IEC 62668-1) |
| Self-assessment to an appropriate counterfeit avoidance compliance verification standard to checklist (e.g., AS6462, AS6301) |
| AS9100/AS9120 Certification |
| ISO 9001 Certification |
| ANSI ESD S20.20 Certification |
| Documented and implemented quality management system |
| Established track record and quality recognition |
| Sustained level of business maturity |

3.1.3.5.4.8 Figure 2 provides guidance for implementation of a procurement risk mitigation process.

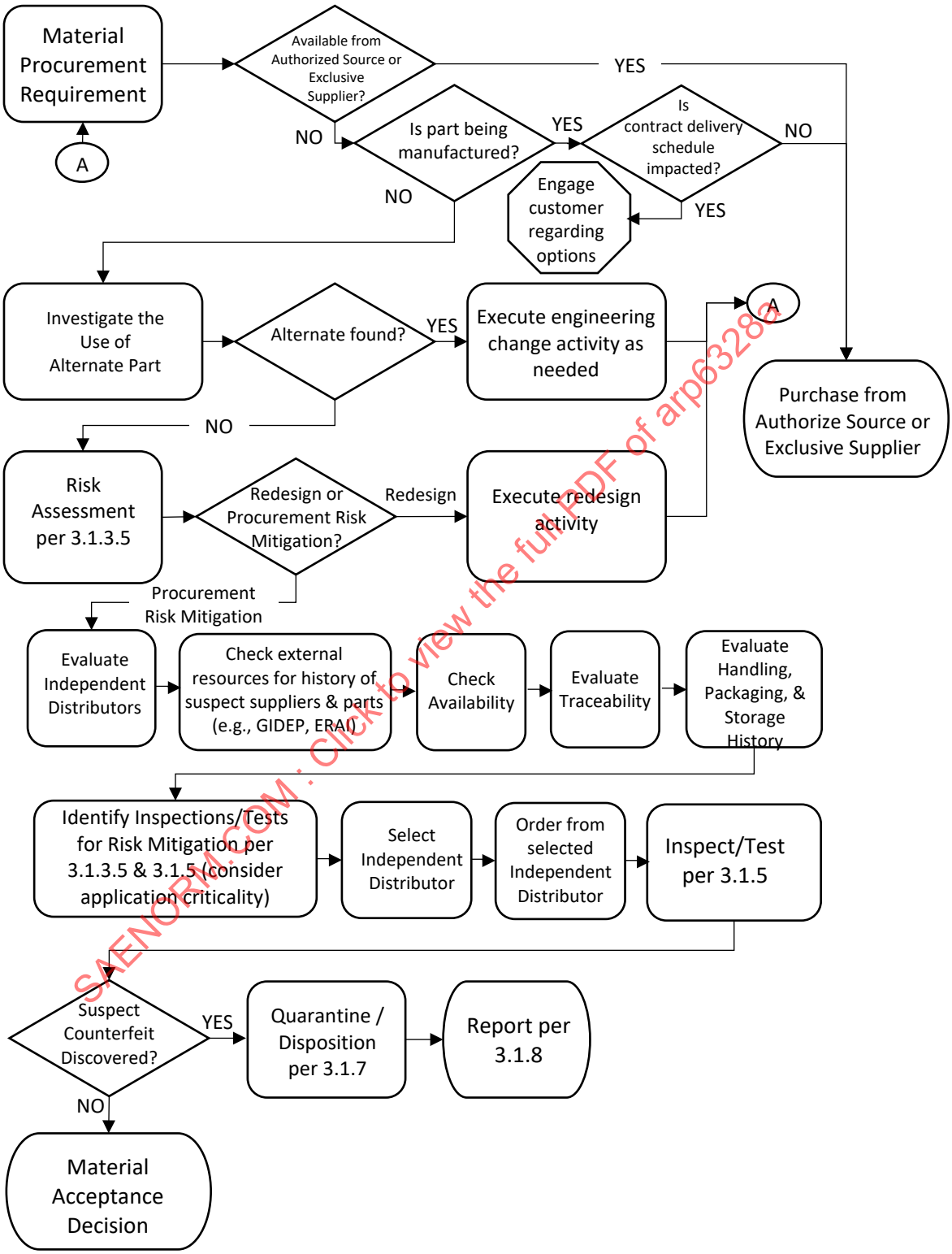




***Figure 2 - Procurement risk mitigation***

3.1.4 Purchasing Information

The organization should specify contract language and purchase order requirements to minimize the risk of being provided suspect counterfeit or counterfeit EEE parts. Such language examples can be found in Appendix E.

3.1.4.1 The organization should flow down applicable counterfeit avoidance and detection requirements to applicable contractors and their sub-contractors. The organization may flow down: (i) counterfeit prevention industry standards (e.g., AS5553, AS6496, AS6081, AS6171); (ii) other requirements documents (e.g., DEF STAN 05-135, DFARS 252.246-7007); (iii) portions of standards; or (iv) the organization's language developed to satisfy its counterfeit avoidance needs. The organization may specify requirements based on customer contract requirements, the product being procured, the type of supplier, and the organization's assessment of the supplier's counterfeit prevention processes. Some suggested requirements to flow down to suppliers include quality management system, sourcing restrictions, traceability, inspection/test, delivery documentation, reporting and quarantine of suspect counterfeit and counterfeit parts to preclude their return to the supply chain.

3.1.4.2 AS5553 requires the organization to mandate authorized distributors disclose when they are not, or no longer, an authorized source for the EEE parts they are supplying. It is also recommended that the purchase order should specify that the authorized distributor only acquire the parts from within an authorized distribution network, as permitted by its authorized distribution agreement with the original manufacturer. If a distributor adheres to AS6496, then the distributor is also required to disclose in writing at the time of quotation if it is not authorized for the item(s) being quoted. If the distributor's authorization is terminated prior to the performance of the organization's contract, AS6496 also requires the distributor to notify the organization.

3.1.4.3 AS5553 also requires the organization to mandate exclusive suppliers disclose if they cannot supply EEE parts they acquire directly from authorized sources. Exclusive suppliers should notify the organization promptly, to allow the organization to consider other procurement options with lower counterfeit risk.

3.1.4.4 Examples of methods for flowing down the requirements of 3.1.4.1 and 3.1.4.2 may include:

a. text in the body of the purchase agreement;

b. a clause in terms and conditions applicable to the purchase agreement;

c. an overriding agreement or general terms agreement between the organization and its supplier;

d. a statement of work, specification, or other requirements document invoked by the purchase agreement.

3.1.5 Verification of Purchased Part(s)

3.1.5.1 The organization should verify the risk mitigations prescribed in 3.1.3.5 have been performed and documented. Verification of purchased parts is intended to assure that these inspections and tests have been performed to detect suspect counterfeit and counterfeit EEE parts and that the parts were dispositioned per applicable acceptance criteria. If EEE parts pass the inspections and tests specified by the risk mitigations prescribed in 3.1.3.5, the organization may continue to perform its QMS acceptance process. If EEE parts fail these inspections and tests, the organization should investigate (see 3.1.6), control (see 3.1.7), and report (see 3.1.8) the parts if they satisfy the definition of a suspect counterfeit EEE part or counterfeit EEE part.

3.1.5.2 Personnel performing verifications should be technically competent (see 3.1.1). Some test services provide results without clearly stating a conclusion about the authenticity of the parts, so the organization is often responsible for this determination. In its acceptance decision, the organization should consider all inspection and test results, the application criticality, and whether sufficient mitigation of the assessed counterfeit risk has been achieved.

3.1.6 Investigation

3.1.6.1 The organization should investigate incidents of suspect counterfeit and counterfeit EEE parts discovered by the organization or a customer. The organization's supplier may be asked to support the investigation, as appropriate. The organization's inventory, work-in-process, or product may be impacted by a suspect counterfeit part or counterfeit part identified by suppliers, government agencies or industry sources, such as GIDEP, ERAI, or Anti-Counterfeiting Forum. The organization's investigation process should be documented and should address observed attributes that raised questions about the authenticity of a part; objective and credible evidence to identify the part as suspect counterfeit; and/or method(s) to confirm the part is counterfeit.

3.1.6.2 Method(s) of detection. Inspection/testing performed by the supplier or a test service per the risk mitigation plan is often the method suspect counterfeit and counterfeit parts are detected for parts not yet received by the organization. After the organization receives parts, if the parts exhibit indications they may potentially be counterfeit, the organization should identify and implement inspection, test, and/or documentary methods to evaluate the authenticity of the parts.

3.1.6.3 Verification process to determine if a part meets the definition of a suspect counterfeit part or counterfeit part. This may include a review by the organization's subject matter expert(s), the original manufacturer, or a test service.

3.1.6.4 Containment/control process. Identify the current location(s) of suspect counterfeit parts or counterfeit parts and affected products (e.g., in-process, post acceptance, or in-service). Suspect counterfeit parts or counterfeit parts and affected products should be controlled in accordance with 3.1.7.3 and the organization's nonconforming material control processes.

3.1.6.5 Resolution of suspect counterfeit parts and counterfeit parts in the organization's inventory, work-in-process, pre-delivery operations, or in-service by a customer. Resolution should address the disposition of (1) suspect counterfeit parts and counterfeit parts and (2) any product or assemblies containing suspect counterfeit parts or counterfeit parts. If product containing such parts has been delivered to a customer or will impact future delivery, the organization should identify and notify customer(s) of impacted product and jointly develop resolution plans to disposition the affected product (e.g., rework, repair, quarantine, use-as-is, or redesign). Resolution plans should be based on risk and other factors such as application, product location, product condition, accessibility, customer continued use, and contractual requirements. As part of its investigation, the organization should identify root cause(s) and implement appropriate corrective and preventive actions.

NOTE: AS13000 delineates a formal problem-solving process that organizations may follow to conduct investigations.

3.1.7 Material Traceability and Control

The organization's EEE parts traceability and control process(es) should be documented. Appendix F contains additional guidance and information about traceability.

3.1.7.1 The organization should have a process for tracking procured EEE parts from the organization to an authorized source and to the original manufacturer. If a EEE part cannot be tracked to its original manufacturer, the organization should require documented risk mitigation per 3.1.3.5 prior to part acceptance and maintain a process for tracking the EEE part to the documented risk mitigation results (see 3.1.5). Tracking of EEE parts is not limited to a specific technology or method. Emerging tracking technologies may be considered. Tracking processes may rely on activities performed by multiple companies.

The organization should comply with contract requirements for traceability, tracking records, and record retention or, in the absence of contract requirements, the organization should establish requirements in its quality management system.

The following is guidance and not a requirement of AS5553.

Should the organization utilize records to help track EEE parts, some examples of tracking records may be packing lists, receiving records, procurement records, source selection records, and certificates of conformance and traceability. Such records normally identify the part number, manufacturer, supplier, receiving organization, purchase order number, and quantity. Additional information, such as lot code, date code, serialization, or statement of compliance, may be provided but is not normally required. Records may be electronic, hardcopy or other form that is accessible to the organization.

a. If the organization's source is the original manufacturer, then the organization's purchase order, receiving record or the packing list may be adequate tracking evidence. Note that while original manufacturers of military qualified parts (e.g., Qualified Manufacturers List/Qualified Parts List (QML/QPL)) are usually required to provide a compliance certificate with each shipment (general military specifications often contain requirements for a compliance certificate and its contents), commercial part manufacturers frequently do not provide a compliance certificate, so another form of traceability record (e.g., a packing list) is commonly used.

b. If the organization obtains EEE parts from an authorized distributor, then the organization's records should be sufficient evidence to track the parts to the authorized distributor and the authorized distributor should be able to track the parts to the original manufacturer. Authorized distributor record requirements may be found in AS6496.

c. If the organization obtains EEE parts from an exclusive supplier, the supplier should be able to provide evidence that it obtained the parts from an authorized source. The organization's records should track the parts to its supplier and that supplier should be able to demonstrate that it obtained the parts directly from an authorized source. The authorized source should be able to track the parts back to the original manufacturer.

d. If the organization obtains EEE parts from an independent distributor that acquires EEE parts from other than an authorized source, the distributor may not have traceability documentation. Note that traceability documentation could be falsified. The organization should require risk mitigation actions per 3.1.3.5, regardless of the existence of traceability evidence from an independent distributor.

e. It is recommended that the organization flow down appropriate requirements to suppliers to enable tracking of EEE parts back to the original manufacturer. If suppliers will be required to maintain tracking records, then the organization should flow down record retention requirements commensurate with the application risk. Tracking records should be available to the organization and its customer upon request. Examples of procurement clauses requiring evidence of traceability are provided in Appendix E.

If parts cannot be tracked back to an authorized source, the organization should be able to access documentation indicating the parts satisfactorily completed risk mitigation per 3.1.3.5.

EEE parts provided by the organization's customer are typically customer-owned and it is the customer's responsibility to be able to track the provided parts to their source or risk mitigation documentation.

The organization's inventory control process should ensure EEE parts are sufficiently traceable to identify them to a authorized source or documented risk mitigation.

3.1.7.2 When the organization discovers that its inventory, work-in-process, or its products contain suspect counterfeit or counterfeit EEE parts, AS5553 requires the organization to be able to determine which item(s) are or contain those suspect counterfeit or counterfeit parts. As a minimum, the organization should be able to identify the boundaries of the population that potentially could be impacted. The organization should assess its inventory, work-in-process, higher level assemblies, and delivered products for impact. Some customers may expect the organization to be able to trace such parts to specific assemblies and products in the organization's possession or in deliveries to customer(s).

3.1.7.3 The organization should establish processes to physically identify, segregate, quarantine, and disposition suspect counterfeit and counterfeit EEE parts. The purposes of these processes are to prevent inadvertent use of the parts and their return to the marketplace where the parts could be distributed to other organizations. Parts should remain in quarantine in a controlled area as long as needed for investigation by the organization, customers, and/or government authorities. The organization's documented processes should also define the responsibility and authority for the review and disposition of suspect counterfeit or counterfeit parts, and the process for approving personnel making these decisions.

The organization's control processes should include the following.

a. Physically identify the parts as suspect/counterfeit product (e.g., tag, label, mark).

b. Physically segregate the parts from acceptable non-suspect parts and place in quarantine. Quarantine should consist of physical barriers and controlled access.

c. Per 3.1.8, ensure suspect counterfeit and counterfeit EEE parts are reported to affected customers and other organizations.

d. Do not return the parts to the supplier for refund, replacement, etc., to preclude resale of the suspect counterfeit or counterfeit EEE parts into the supply chain. Under controlled conditions, a sample of parts may be returned to the supplier to allow the supplier to conduct internal investigation.

e. The organization may perform additional analysis to determine if the parts are authentic, or to assess impact on the organization's product. This may be accomplished via further part-level testing, communications with the OCM of the part number, review of reporting data bases, engineering analysis, third-party analysis, etc.

f. After confirmation that a part is suspect counterfeit or counterfeit, the organization should screen its inventory and work-in-process for parts from the same source or with the same identification (e.g., part number, lot code, date code). Until they are found satisfactory, these parts should be segregated and controlled.

g. If additional information is identified that is not contained in the original notification, the organization should update its reporting to affected customers and other organizations.

h. After appropriate authorities complete their investigation and possible litigation, the authorities should disposition the parts for scrap.

3.1.7.4 After the organization, its customer, and/or government authority has completed its investigation of suspect counterfeit or counterfeit parts, the organization may disposition the parts. If EEE parts are dispositioned for scrap disposal, they should be rendered physically unusable prior to disposal to prevent their reuse or re-entry into the supply chain. Part destruction may include methods such as grinding, breaking, or crushing and should also destroy the internal elements of the parts.

If the organization uses a scrap EEE part disposal service, the organization should evaluate the service's processes to ensure the parts are actually destroyed. Discarded packaging has been re-used by counterfeiters to deceive organizations about the authenticity of its contents. The organization is encouraged to disposition packaging materials, such as shipping containers, ESD bags, trays, and reels, to prevent their improper reuse.

3.1.7.5 Counterfeit and suspect counterfeit parts are considered nonconforming material. Nonconforming material is controlled by the organization's quality management system and/or inventory management system. The organization should screen inventory and work-in-process to identify and quarantine all items that may contain the suspect counterfeit or counterfeit parts. These items should be contained under quarantine until they are dispositioned.

3.1.7.6 To mitigate the risk of suspect counterfeit and counterfeit EEE parts infiltrating the organization's inventory or products, the organization should have a returns acceptance process for piece parts (i.e., excluding assemblies). EEE parts returned to the organization should be segregated from new and unused EEE parts until they are verified to be acceptable, i.e., new and unused.

The organization's returns acceptance process may use the following methods and criteria to inspect returned EEE parts and compare them to applicable documentation and packaging marking for:

a. returned part number;

b. name of the manufacturer;

c. quantity to be returned;

d. date/lot code of parts to be returned;

e. confirm that the organization delivered the part number, quantity, and date/lot code to the entity returning the parts;

f. packaging appears to be sealed and undamaged;

g. physical evidence that the parts are unused and are in original condition as shipped;

h. if available, validate the returned parts with electronic tracking/trace technologies or with traceability documents such as shipping documents, certificates of conformance, purchase orders, etc.

The organization may perform additional risk-based inspection and testing. If the organization decides, for economic reasons, that returns should not be validated, then the returned EEE parts should continue to be segregated from new and unused parts. The objective of this segregation is to preclude their use as production inventory.

In addition to the returns acceptance process described above, the organization is encouraged to require returns to have a return material authorization (RMA). The RMA should require that the parts returned by the customer are the same parts purchased directly from the organization.

3.1.8 Reporting

3.1.8.1 The content of this section is provided as guidance and can be invoked in whole or in part, by the policies, requirements, or procedures of the organization.

3.1.8.2 The organization should provide timely notification of identified suspect counterfeit or counterfeit parts to its customer(s), reporting organizations (as applicable), and to the authority having jurisdiction (as applicable), in accordance with the organization's policy and/or legal/contract requirements. The organization's supplier may provide this notification. Notifying customers and reporting organizations about suspect counterfeit and counterfeit parts potentially in delivered product enables customers and other parties to assess the impact to them. If a shorter period is not otherwise specified by the organization's policy and/or legal/contract requirements, recommended notification to reporting organization(s) should be within 60 days.

3.1.8.3 In addition to contract, legal, and regulatory requirements, the organization may voluntarily report information about suspect counterfeits to potential reporting contacts in Appendix G. Voluntary reporting can help reduce the proliferation of counterfeits. Reporting formats, content, and/or methods vary, depending on customer and reporting contact requirements. It is recommended that the organization's legal counsel is engaged prior to reporting to these contacts.

3.2 Auditing

The organization's quality management system (QMS) internal audit program or self-assessment activity should identify the AS5553 requirements that the organization assesses for compliance. Appendix A of AS5553D contains AS5553D verification criteria and can be used in part or in its entirety to assess for compliance to AS5553. AS6462 contains verification criteria for previous versions of AS5553 and is no longer being updated.

4. NOTES

4.1 Revision Indicator

A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

## APPENDIX A - ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AC | Alternating Current |
| AFOSI | Air Force Office of Special Investigations |
| AM | Acoustic Microscopy |
| ANSI | American National Standards Institute |
| ARP | Aerospace Recommended Practice |
| AS | SAE designation prefix for Aerospace Standard |
| ASSIST | Acquisition Streamlining and Standardization Information System |
| CoC | Certificate of Conformance (aka C of C) |
| CoC/T | Certificate of Conformance and Supply Chain Traceability |
| COTS | Commercial off the Shelf |
| DC | Direct Current |
| DLA | Defense Logistics Agency |
| DMSMS | Diminishing Manufacturing Sources and Material Shortages |
| DOC | Department of Commerce |
| DoD | Department of Defense |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| DDPA | Delid/Decapsulation Physical Analysis |
| DFARS | Defense Acquisition Regulation Supplement |
| EEE | Electrical, Electronic and Electro-Mechanical |
| EIA | Electronic Industries Alliance |
| ERAI | ERAI, Inc. |
| ESD | Electrostatic Sensitive Device or ElectroStatic Discharge |
| EVI | External Visual Inspection |
| FAA | Federal Aviation Administration |
| FAR | Federal Acquisition Regulation |
| FTIR | Fourier Transform Infrared Spectroscopy |
| GEB | GEIA Engineering Bulletin |

| | |
|---|---|
| GEIA | Government Electronics and Information Technology Association |
| GIDEP | Government-Industry Data Exchange Program |
| IDEA | Independent Distributors of Electronics Association |
| IEC | International Electrotechnical Commission |
| IPR | Intellectual Property Rights |
| ISO | International Organization for Standardization |
| JEDEC | Joint Electronic Device Engineering Council |
| JESD | JEDEC Standard Document |
| MIL-PRF | Military Performance Specification |
| MIL-STD | Military Standard |
| NASA | National Aeronautics and Space Administration |
| OCM | Original Component Manufacturer |
| OEM | Original Equipment Manufacturer |
| OIG | Office of Inspector General |
| PEMS | Plastic Encapsulated Microcircuits |
| PIND | Particle Impact Noise Detection |
| QML | Qualified Manufacturers List |
| QPL | Qualified Products List |
| SD | DoD Defense Standardization Program Office prefix designation for Standard Document |
| SEM | Scanning Electron Microscopy |
| STD | Standard |
| TGA | Thermogravimetric Analysis |
| XRF | X-ray Fluorescence |

## APPENDIX B - PART OBSOLESCENCE MANAGEMENT REFERENCE EXAMPLES

DoD Instruction 4245.15: Diminishing Manufacturing Sources and Material Shortages Management

EIA-933: Requirements for a COTS Assembly Management Plan

EIA-STD-4899: Requirements for an Electronic Components Management Plan

IEC 62239-1: Process Management for Avionics - Preparation and maintenance of an Electronic Components Management Plan

IEC 62402: Obsolescence Management

IEC TS 62239-2: Process Management for Avionics - Management Plan - Part 2: Preparation and Maintenance of an Electronic COTS Assembly Management plan

MIL-STD-3018: Parts Management

MoD JSP886 The Defense Logistics Supply Chain Manual Volume 7 Integrated Logistics Support Part 8.13 Obsolescence Management

STD-0016, Standard for Preparing a DMSMS Management Plan

SD-19: Parts Management Guidebook

SD-22: Diminishing Manufacturing Sources and Material Shortages (DMSMS) Guidebook

## APPENDIX C - INSPECTION AND TEST METHODS FOR DETECTION OF COUNTERFEIT EEE PARTS

***Table C1 - Inspection and test methods for detection of counterfeit EEE parts (see Notes 1 and 2)***

| Item | Test or Inspection Method | Source Document |
|---|---|---|
| 1 | External Visual Inspection (EVI), General (Full Lot) | AS6171/2<br>IDEA-STD-1010, 10.1, 10.2,16<br>IEC 60749-3 |
| 2 | EVI Detailed (Sample) | AS6171/2<br>IDEA-STD-1010, 10.3.1,16 |
| 2a | Solderability Testing | IDEA-STD-1010, 11.1 |
| 2b | Fluorescent Dye Penetrant | IDEA-STD-1010, 11.2 |
| 3 | EVI, Remarking | AS6171/2<br>IDEA-STD-1010, 10.3.2.1 |
| 4 | EVI, Resurfacing | AS6171/2<br>IDEA-STD-1010, 10.3.2.2, 11.6 |
| 4a | Scrape test | AS6171/2<br>IDEA-STD-1010, 10.3.2.3 |
| 5 | EVI, Part Dimensions | AS6171/2<br>IDEA-STD-1010, 10.3.3 |
| 6 | EVI, Scanning Electron Microscopy (SEM) | AS6171/2 |
| 7 | X-ray Fluorescence (XRF), Lead Finish Analysis | AS6171/3<br>IDEA-STD-1010, 11.3 |
| 8 | XRF, Lead Finish Thickness | AS6171/3<br>IDEA-STD-1010, 11.3 |
| 9 | XRF, Material Composition | AS6171/3<br>IDEA-STD-1010, 11.3 |
| 10 | Delid/Decapsulation Physical Analysis (DDPA), Internal Inspection | AS6171/4<br>IDEA-STD-1010, 11.7<br>IEC 60748-11-1 |
| 11 | DDPA, Bond Pull | AS6171/4<br>IEC 60749-22 |
| 12 | DDPA, Die Attach | AS6171/4<br>IEC 60749-19 |
| 13 | Radiological, 2D | AS6171/5<br>IDEA-STD-1010, 11.4 |
| 14 | Radiological, 3D, Incremental | AS6171/5<br>IDEA-STD-1010, 11.4 |
| 15 | Radiological, 3D, Independent | AS6171/5<br>IDEA-STD-1010, 11.4 |
| 16 | Acoustic Microscopy (AM), Plastic Encapsulated Microcircuits (PEMS) - External Only | AS6171/6<br>IDEA-STD-1010, 11.5<br>IEC 60749-16 PIND |
| 17 | AM PEMS - External, Internal, and Material (Incremental) | AS6171/6<br>IDEA-STD-1010, 11.5 |
| 18 | Electrical, Curve Trace, at Ambient Temperature | AS6171/7<br>Standards invoked by the part specification, data sheet, or design application |
| 19 | Electrical, Direct Current (DC) Test at Ambient Temperature | AS6171/7<br>Standards invoked by the part specification, data sheet, or design application |
| 20 | Electrical Key Parameters (Alternating Current (AC), Switching, Functional) at Ambient Temperature | AS6171/7<br>Standards invoked by the part specification, data sheet, or design application |
| 21 | Electrical, DC Test and Key Parameters (AC, Switching, Functional) Over Temperature | AS6171/7<br>Standards invoked by the part specification, data sheet, or design application |
| 22 | Electrical, Burn-in With Pre and Post Electrical Tests | AS6171/7<br>Standards invoked by the part specification, data sheet, or design application |

| | | |
|---|---|---|
| 23 | Electrical, Temperature Cycling With Pre and Post Electrical Tests | AS6171/7<br>Standards invoked by the part specification, data sheet, or design application |
| 24 | Seal Test (for Hermetically Sealed Devices) | AS6171/7 |
| 25 | Raman Spectroscopy | AS6171/8 |
| 26 | Fourier Transform Infrared (FTIR) Spectroscopy | AS6171/9 |
| 27 | Thermogravimetric Analysis (TGA) | AS6171/10 |
| 28 | Design Recovery, Level 1: Simple Manual Comparison | AS6171/11 |
| 29 | Design Recovery, Level 2: Layout Comparison | AS6171/11 |
| 30 | Design Recovery: Level 3: Selective Functional Comparison | AS6171/11 |
| 31 | Design Recovery: Level 4: Full Microcircuit Comparison | AS6171/11 |
| 32 | User Requested Inspections and Testing as Specified in the Contractual Language | As specified by the User |

NOTE 1: The listing of inspections and tests contained in this table are examples only. Depending on the product risk level involved, combinations of inspections and tests from Table C1 and other sources may be performed to mitigate the risk of use of counterfeit EEE parts.

NOTE 2: Industry continues to develop new technologies and techniques to detect counterfeits. The organization should monitor new developments and consider implementation as part of their risk mitigation efforts.