 An SAE International Group	AEROSPACE STANDARD	SAE AS6081®
		Issued 2012-11
Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition - Distributors		

RATIONALE

This standard was created in response to a significant and increasing volume of fraudulent/counterfeit electronic parts entering the aerospace supply chain, posing significant performance, reliability, and safety risks. This standard was created to provide uniform requirements, practices and methods to mitigate the risks of purchasing and supplying fraudulent/counterfeit electronic parts.

FOREWORD

A growing number of fraudulent/counterfeit electronic parts are entering the supply chain, especially when purchasing parts from other than Original Component Manufacturers (OCMs), or their authorized agents. This standard establishes requirements and practices to mitigate the risk of buying, receiving, and selling fraudulent/counterfeit parts. This document standardizes requirements, practices, and methods related to supplier management, procurement, inspection, test/evaluation, as well as response strategies when suspect or confirmed fraudulent/counterfeit electronic parts are discovered. It should be noted that not one practice, combination of practices, standard or certification to that standard's requirements will prevent fraudulent/counterfeit parts from entering the supply chain. Implementation of the requirements of this document provides a vehicle for specific elements of the supply chain to collaborate and minimize risk.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2012 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
 Tel: +1 724-776-4970 (outside USA)
 Fax: 724-776-0790
 Email: CustomerService@sae.org
 http://www.sae.org

SAE WEB ADDRESS:

**SAE values your input. To provide feedback
 on this Technical Report, please visit
<http://www.sae.org/technical/standards/AS6081>**

TABLE OF CONTENTS

1.	SCOPE.....	3
1.1	Purpose.....	3
1.2	Application.....	3
2.	APPLICABLE DOCUMENTS.....	3
2.1	SAE Publications.....	4
2.2	ANSI Publications.....	4
2.3	Government Publications.....	4
2.4	Commercial Publications.....	4
2.5	ISO Publications.....	5
3.	TERMS AND DEFINITIONS.....	5
3.1	Suspect Part.....	5
3.2	Fraudulent Part.....	5
3.3	Counterfeit Part.....	5
3.4	Related Terms and Definitions.....	6
4.	REQUIREMENTS.....	11
4.1	Quality Management System.....	13
4.1.1	Fraudulent/Counterfeit Parts Mitigation Policy.....	13
4.2	Fraudulent/Counterfeit Electronic Parts Control Plan.....	14
4.2.1	Customer Related Contract Review, Agreement, and Execution.....	14
4.2.2	Supplier Approval and Source Selection.....	14
4.2.3	Purchase Order Requirements.....	15
4.2.4	Supply Chain Traceability.....	15
4.2.5	Preservation of Product.....	16
4.2.6	Verification of Purchased Product.....	16
4.2.7	Control of Nonconforming Product.....	27
4.2.8	Material Control.....	28
4.2.9	Reporting.....	28
4.2.10	Personnel Training.....	28
4.2.11	Internal Audit.....	28
5.	NOTES.....	29
APPENDIX A	SUPPLIER APPROVAL AND SOURCE SELECTION.....	30
APPENDIX B	ORGANIZATION AS CUSTOMER" CONTRACT REQUIREMENTS.....	31
APPENDIX C	ADDITIONAL FRAUDULENT/COUNTERFEIT PART DETECTION TESTS.....	35
APPENDIX D	REPORTING.....	37
APPENDIX E	PERSONNEL TRAINING PROGRAMS.....	45
APPENDIX F	ACRONYMS AND ABBREVIATIONS.....	46
FIGURE 1	INTERRELATIONSHIP BETWEEN SUSPECT, FRAUDULENT AND COUNTERFEIT PARTS.....	6
FIGURE 2	SAMPLE AS6081 REQUIREMENTS PROCESS FLOW.....	12
FIGURE 3	VERIFICATION OF PURCHASED PRODUCT.....	13
TABLE 1	LOT SAMPLING PLAN.....	18

1. SCOPE

1.1 Purpose

This SAE Aerospace Standard standardizes practices to:

- a. identify reliable sources to procure parts,
- b. assess and mitigate risk of distributing fraudulent/counterfeit parts,
- c. control suspect or confirmed fraudulent/counterfeit parts,
- d. and report suspect and confirmed fraudulent/counterfeit parts to other potential users and Authority Having Jurisdiction.

1.2 Application

This standard sets forth practices and requirements for use by distributors of Electrical, Electronic, and Electromechanical (EEE) parts purchased and sold from the Open Market, including purchased excess and purchased returns. This document does not apply to aerospace integrators, their OEMs nor to Authorized (Franchised) Distributors and Aftermarket Manufacturers when supplying parts obtained directly from the OCM or the OCM Authorized (Franchised) Distributor for whom they are authorized. The requirements of this standard are generic and intended to be applied and flowed down through the supply chain to all organizations that procure electronic parts and/or assemblies, regardless of type, size, and product provided. This standard is invoked in accordance with contractual language established between the Customer and the Organization. This standard can be used by internal and external parties, including Certification Bodies accredited by an International Accreditation Forum (IAF) Multilateral Recognition Arrangements (MLA) Signatory Accreditation Body (<http://www.iaf.nu/>), to meet customer, regulatory or the Organization's requirements to mitigate the risk of conducting commerce in suspect, fraudulent or counterfeit parts. **This standard does not “qualify” or “certify” the electronic parts.**

The content of the Appendices is provided as guidance and can be invoked in whole or in part, by the policies, requirements or procedures of the Organization. Information marked “NOTE or NOTES” is for guidance in understanding or clarifying the associated text.

2. 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. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence.

The requirements of this document are intended to supplement the requirements of a comprehensive quality management system standard (e.g., AS9120, ISO 9001, or equivalent) and other applicable quality standards (e.g., ANSI/ESD S20.20, IDEA-STD-1010, or equivalent). They are not intended to stand alone, supersede, or cancel requirements found in other quality standards, requirements imposed by contracting authorities, or applicable laws and regulations unless an authorized exemption/variance has been obtained.

2.1 SAE Publications

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

- AS5553 Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
- ARP6178 Fraudulent/Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors
- AS9100 Quality Management Systems - Requirements for Aviation, Space and Defense Organizations
- AS9120 Quality Management Systems - Requirements for Aviation, Space and Defense Distributors

2.2 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, <http://www.ansi.org/>.

ANSI/ESD S20.20 Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

2.3 Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

- MIL-STD-202 Test Method Standard - Electronic and Electrical Component Parts
- MIL-STD-750 Test Method Standard - Test Methods for Semiconductor Devices
- MIL-STD-883 Test Method Standard - Microcircuits
- OMB Policy Letter 91-3 Reporting Nonconforming Products (not available through the ASSIST database; it may be obtained using the following link: http://whitehouse.gov/omb/procurement_policy_letter_91-3/)

2.4 Commercial Publications

- IDEA-STD-1010 Acceptability of Electronic Components Distributed in the Open Market
- JEDEC JESD31 General Requirements for Distributors of Commercial and Military Semiconductor Devices
- NAS-410 National Aerospace Standard, NAS Certification Qualification of Nondestructive Test Personnel
- ASNT SNT-TC-1A American Society for Nondestructive Testing - Recommended Practice for Personnel Qualification and Certification of Nondestructive Testing
- EN 473 European Standard - Qualification and Certification of NDT Personnel - General Principles
- ASD-STAN EN 4179 AeroSpace and Defence Industries Association of Europe - Qualification and approval of personnel for non-destructive testing
- ASNT CP-189 American Society for Nondestructive Testing Standard for Qualification and Certification of Nondestructive Testing Personnel (2006)

2.5 ISO Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 9000 Quality Management Systems - Fundamentals and Vocabulary

ISO 9001 Quality Management Systems - Requirements

ISO 9712 Non-destructive testing - Qualification and certification of personnel

ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories

3. TERMS AND DEFINITIONS

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

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

“Organization” in the context of this document refers to distributors that supply electronic parts from any source other than directly from Original Component Manufacturers (OCMs) or Authorized (Franchised) Distributors. This includes, but is not limited to, Independent Distributors, Brokers, Service Providers, Third-Party Logistics (3PL) Providers, and Authorized (Franchised) Distributors when sourcing parts from outside the authorized channel.



3.1 SUSPECT PART

A part in which there is an indication that it may have been misrepresented by the supplier or manufacturer and may meet the definition of fraudulent part or counterfeit part provided below.

3.2 FRAUDULENT PART

Any suspect part misrepresented to the Customer as meeting the Customer's requirements.

3.3 COUNTERFEIT PART

A fraudulent part that has been confirmed to be a copy, imitation, or substitute that has been represented, identified, or marked as genuine, and/or altered by a source without legal right with intent to mislead, deceive, or defraud.

NOTE: The following diagram (Figure 1) depicts the above interrelationship between Suspect, Fraudulent and Counterfeit Parts. A Suspect Part may be determined to be, fraudulent or counterfeit through further evaluation and testing. All counterfeit parts are fraudulent, but not all fraudulent parts are counterfeit.

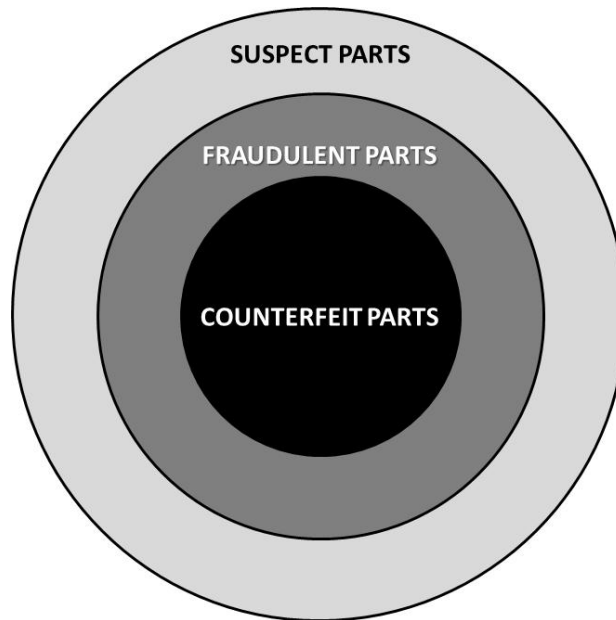


FIGURE 1 - INTERRELATIONSHIP BETWEEN SUSPECT, FRAUDULENT AND COUNTERFEIT PARTS

3.4 Related Terms and Definitions

3.4.1 AFTERMARKET MANUFACTURER

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

- a. 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
 1. transferred from the OCM to the Aftermarket Manufacturer, or
 2. produced by the Aftermarket Manufacturer using OCM tooling and intellectual property (IP).
- b. The manufacturer produces parts using semiconductor dice or wafers, manufactured by and traceable to an OCM, that have been properly stored until use and are subsequently assembled, tested, and qualified using processes that meet technical specifications without violating the OCM's intellectual property and intellectual property rights.
- c. 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 and intellectual property rights.

In any case, the Aftermarket Manufacturer must label or otherwise identify its parts to ensure that the "as shipped" aftermarket manufactured part should not be mistaken for the part made by the OCM.

3.4.2 APPROVED SUPPLIER

Suppliers that are assessed and determined to provide acceptable fraudulent/counterfeit parts risk mitigation processes.

3.4.3 AUTHORITY HAVING JURISDICTION

A statutory authority can differ between countries. The term is used to refer to the governmental organization at the federal, national, state, or local entity having statutory authority to respond to, enforce, or prosecute anti-counterfeiting laws. Examples are Customs, Judicial bodies and Enforcement bodies.

3.4.4 AUTHORIZED DISTRIBUTION

Transactions conducted by an OCM-Authorized Distributor distributing product within the terms of an OCM contractual agreement. Contractual Agreement terms include, but are not limited to, distribution region, distribution products or lines, and warranty flow down from the OCM. Under this distribution, the distributor would be known as an Authorized Distributor. For the purposes in this Standard, Franchised Distribution is considered synonymous with Authorized Distribution.

3.4.5 AUTHORIZED (FRANCHISED) DISTRIBUTOR

Distributor when they perform Authorized Distribution.

3.4.6 AUTHORIZED SUPPLIER

Aftermarket Manufacturers, as defined above, and OCM-authorized sources of supply for a part (i.e., Franchised Distributors, Authorized Distributors).

NOTE: Some Authorized Suppliers will provide other services which are not authorized by an OCM (e.g., independent distribution).

3.4.7 BROKER

In the independent distribution market, Brokers are professionally referred to as Independent Distributors. See definitions for "Broker Distributor" and "Independent Distributor."

3.4.8 BROKER DISTRIBUTOR

A type of Independent Distributor that works in a "Just in Time" (JIT) environment. Customers contact the Broker Distributor with requirements identifying the part number, quantity, target price, and date required. The Broker Distributor searches the industry and locates parts that meet the target price and other Customer requirements. Broker distributors do not have contractual agreements or obligations with OCMs. (For reference only, word or term not used in document)

3.4.9 CERTIFICATE OF CONFORMANCE (C of C, CoC)

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.

3.4.10 CERTIFICATE OF CONFORMANCE AND SUPPLY CHAIN TRACEABILITY (CoCT)

A Certificate of Conformance required by certain military specifications which requires documented supply chain traceability from the Qualified Parts List/Qualified Manufacturers List (QPL/QML) manufacturer through delivery to a government agency if the material is not procured directly from the approved manufacturer.

3.4.11 DESTRUCTIVE PHYSICAL ANALYSIS (DPA)

A systematic, logical, detailed examination of parts during various stages of physical disassembly, conducted on a sample of completed parts from a given lot, wherein parts are examined for a wide variety of design, workmanship, and/or processing problems. Information derived from DPA may be used to:

- a. preclude installation of inauthentic parts or parts having patent or latent defects
- b. aid in disposition of parts that exhibit anomalies
- c. aid in defining improvements or changes in design, materials, or processes
- d. evaluate Supplier production trends

(For reference only, word or term not used in document)

3.4.12 DISPOSITION

Decisions made by authorized representatives within an Organization concerning future treatment of nonconforming material. Examples of dispositions are to scrap, use-as-is (normally accompanied by an approved variance/waiver), retest, rework, repair, or return-to-supplier.

3.4.13 ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL (EEE) PART

Electrical, electronic, and electromechanical parts are components designed and built to perform specific functions, and are not subject to disassembly without destruction or impairment of design use. Examples of electrical parts include resistors, capacitors, inductors, transformers, and connectors. Electronic parts include active devices, such as monolithic microcircuits, hybrid microcircuits, diodes, and transistors. Electromechanical parts are devices that have electrical inputs with mechanical outputs, or mechanical inputs with electrical outputs, or combinations of each. Examples of electromechanical parts are motors, synchros, servos, and some relays.

3.4.14 FRANCHISED DISTRIBUTION

For the purposes in this Standard, Franchised Distribution is considered synonymous with Authorized Distribution (see "Authorized Distribution" definition above).

3.4.15 FRANCHISED DISTRIBUTOR

Also known as Authorized Distributor (see "Authorized (Franchised) Distributor" definition above).

3.4.16 HOMOGENEOUS LOT

A group of parts that:

- a. is received in a single shipment (whether in single or multiple packages),
- b. is marked or otherwise identified with identical lot, batch, run, and identification information (e.g., dates codes, lot codes),
- c. is identical in appearance to the unaided eye (parts and packaging),
- d. appear to have been subjected to the same handling, packaging, and/or storage conditions, and
- e. has maintained their physical placement relative to each other (i.e., have never been separated based on evidence such as source, packaging, labeling).

3.4.17 INDEPENDENT DISTRIBUTOR

A distributor that purchases parts with the intention to sell and redistribute them back into the market. Purchased parts may be obtained from Original Equipment Manufacturers (OEMs) or Contract Manufacturers (typically from excess inventories), or from other Distributors (Franchised, Authorized, or Independent). Resale of the purchased parts (redistribution) may be to OEMs, Contract Manufacturers, or other Distributors. Independent Distributors do not normally have contractual agreements or obligations with OCMs. See definition of "Authorized (Franchised) Distributor."

3.4.18 KNOWN AUTHENTIC PART

A part which has either been purchased directly from the manufacturer, their authorized distributors, or authenticated by the manufacturer with supporting documentation.

3.4.19 NONDESTRUCTIVE TESTING (NDT)

Can also be described as Nondestructive Inspection (NDI) or Nondestructive Evaluation (NDE). NDT encompasses a wide variety of analytical techniques used in science and industry to evaluate the properties of materials, components, subcomponents, or systems without damaging or permanently altering them.

3.4.20 OPEN MARKET

The trading market that supplies parts that are not exclusively from or directly traceable to the OCM or authorized (franchised) distributors.

NOTE: The Open Market often includes the purchase and sale of parts where the full supply chain traceability of such parts is unknown, e.g., parts salvaged from electronic waste.

3.4.21 ORGANIZATION

In the context of this document, it refers to distributors that supply electronic parts from any source other than directly from OCMs or Authorized (Franchised) Distributors. This includes, but is not limited to, Independent Distributors, Brokers, Service Providers, 3PL Providers, and Authorized (Franchised) Distributors when sourcing parts from outside the OCM's authorized channel.

3.4.22 ORIGINAL COMPONENT MANUFACTURER (OCM)

An entity that designs and/or engineers a part and is pursuing or has obtained the intellectual property rights to that part.

NOTES:

- a. The part and/or its packaging are typically identified with the OCM's trademark.
- b. OCMs may contract out manufacturing and/or distribution of their product.
- c. Different OCMs may supply product for the same application or to a common specification.

3.4.23 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.

3.4.24 PACKAGING (COMPONENT)

Component packaging refers to the manner in which electronic parts are packaged in preparation for use by electronic assemblers. The determination of packaging types 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. There are four main types of packaging: bulk, trays, tubes, and tape and reel.

3.4.25 PART(S)

One or more pieces joined together, which are not normally subject to disassembly without destruction or impairment of intended design use. For the purposes in this document, "part" is synonymous with "component".

3.4.26 POPULATION

A collection of Homogeneous Lots from which to draw statistical inferences.

3.4.27 REFINISHED

Using post-manufacture plating methods (such as solder dipping) to alter the plating composition on a part's leads. (For reference only, word or term not used in document)

3.4.28 REFURBISHED

Parts that have been renovated in an effort to restore them to a "like new" condition, e.g., leaded parts may have had their leads realigned and re-tinned and subjected to cleaning agents and chemical processing.

3.4.29 STOCKING DISTRIBUTOR

A Distributor that stocks inventory.

3.4.30 SUPPLIER

Within the context of this document, a blanket description of all sources of supply for a part. Types of Suppliers include OCM, OEM, Authorized (Franchised) Distributor, Independent Distributor, Broker Distributor, Stocking Distributor, Aftermarket Manufacturer, Government Supply Depot, and 3PL Provider.

3.4.31 SUPPLY CHAIN TRACEABILITY

Documented evidence of a part's supply chain history. This refers to documentation of all supply chain intermediaries and significant handling transactions, such as from OCM to distributor, or from excess inventory to broker to distributor.

3.4.32 SUPPLY CHANNEL

The general category of Supplier, such as Open Market, OCM, Aftermarket Manufacturers, Authorized (Franchised) Distributor, 3PL Provider, Independent Distributor, Broker Distributor, OEM Surplus, etc.

3.4.33 THIRD-PARTY LOGISTICS (3PL) PROVIDERS

Firms that provide outsourced or "third party" logistics services to companies for supply chain management functions. 3PL Providers typically specialize in integrated operation, warehousing, and transportation services that can be scaled and customized to Customer's needs based on market conditions and the demands and delivery service requirements for their products and materials.

3.4.34 UNUSED

Electronic parts that have not been previously used (i.e., attached to a board or powered up since leaving the supply chain). A shipment of unused material can contain mixed date codes, lot codes, or countries of origin, and should be received in original factory or third party packaging. The material may have minor scratches or other physical defects as a result of handling, but the leads should be in good condition and should not be refurbished. The material should be guaranteed to meet the manufacturer's full specifications. Unused programmable parts should be received without having been previously programmed.

3.4.35 UPRATED

Assessment that results in the extension of a part's ratings to meet the performance requirements of an application in which the part is used outside the manufacturer's specification range. (For reference only, word or term not used in document)

3.4.36 UPSCREENED

Additional part testing performed to produce parts verified to specifications beyond the part manufacturer's operating parameters. Examples are Particle Impact Noise Detection (PIND) testing, temperature screening, Radiation Hardness Assurance testing, etc.

3.4.37 USED (REFURBISHED OR PULLED)

Product that has been electrically charged and subsequently pulled or removed from a socket or other electronic application, excluding electrical testing for acceptance. Used product may be received in non-standard packaging (i.e., bulk), and may contain mixed lots, date codes, be from different facilities, etc. Parts may have physical defects such as scratches, slightly bent leads, test dots, faded markings, chemical residue or other signs of use, but the leads should be intact. Used product may be sold with a limited warranty, and programmable parts may still contain partial or complete programming which could impact the part's functionality. Used parts marketed as refurbished shall be declared as such.

4. REQUIREMENTS

All requirements of "Section 4. REQUIREMENTS" shall apply when this standard is invoked in contractual language between the Customer and Organization.

For the purposes of this document, the handling of both fraudulent and counterfeit electronic parts shall be identical.

Figures 2 and 3 depict a sample process flow of the Section 4. REQUIREMENTS. The step sequence can be modified to accommodate the risk mitigation process or Customer requirements.

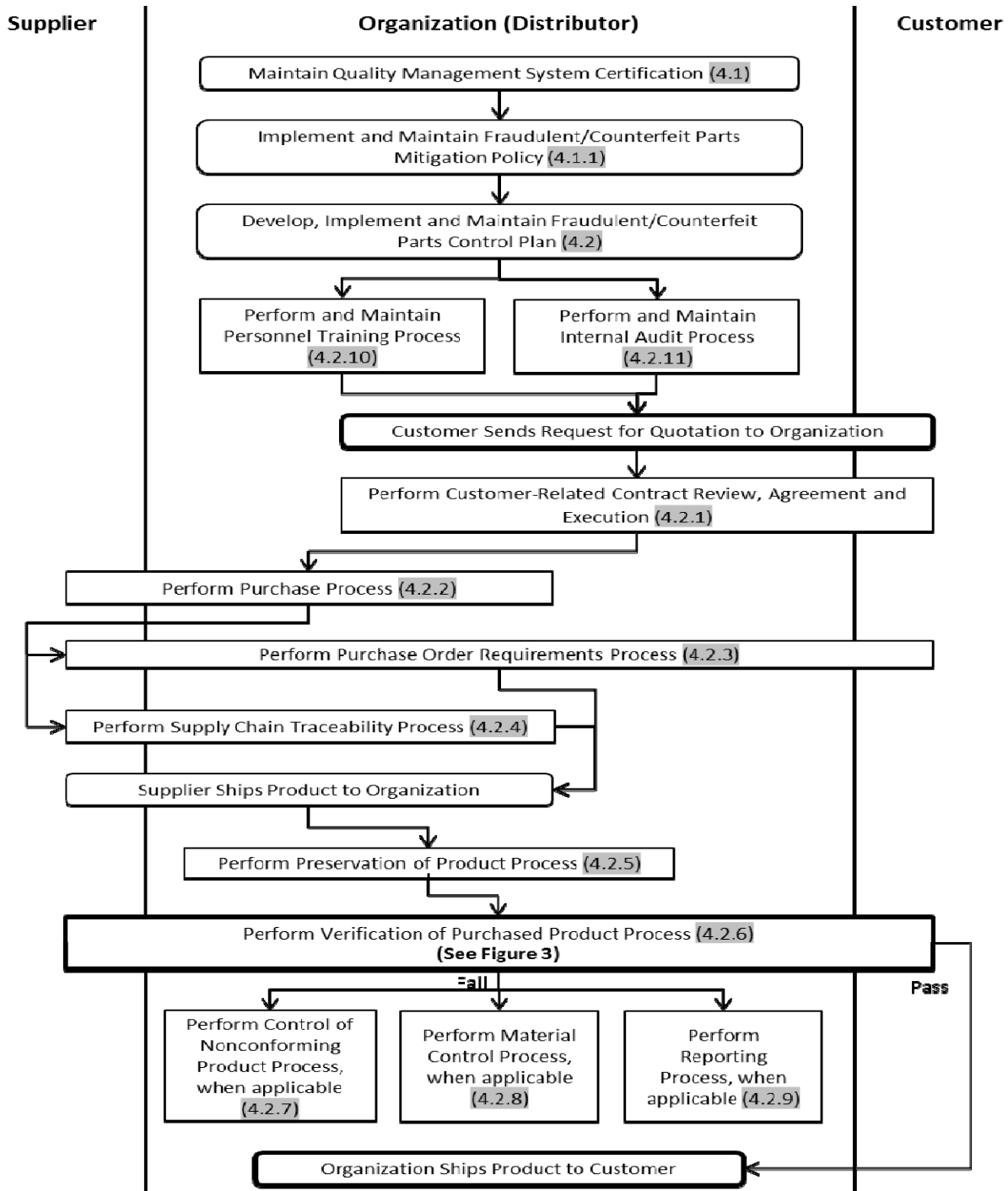


FIGURE 2 - SAMPLE AS6081 REQUIREMENTS PROCESS FLOW

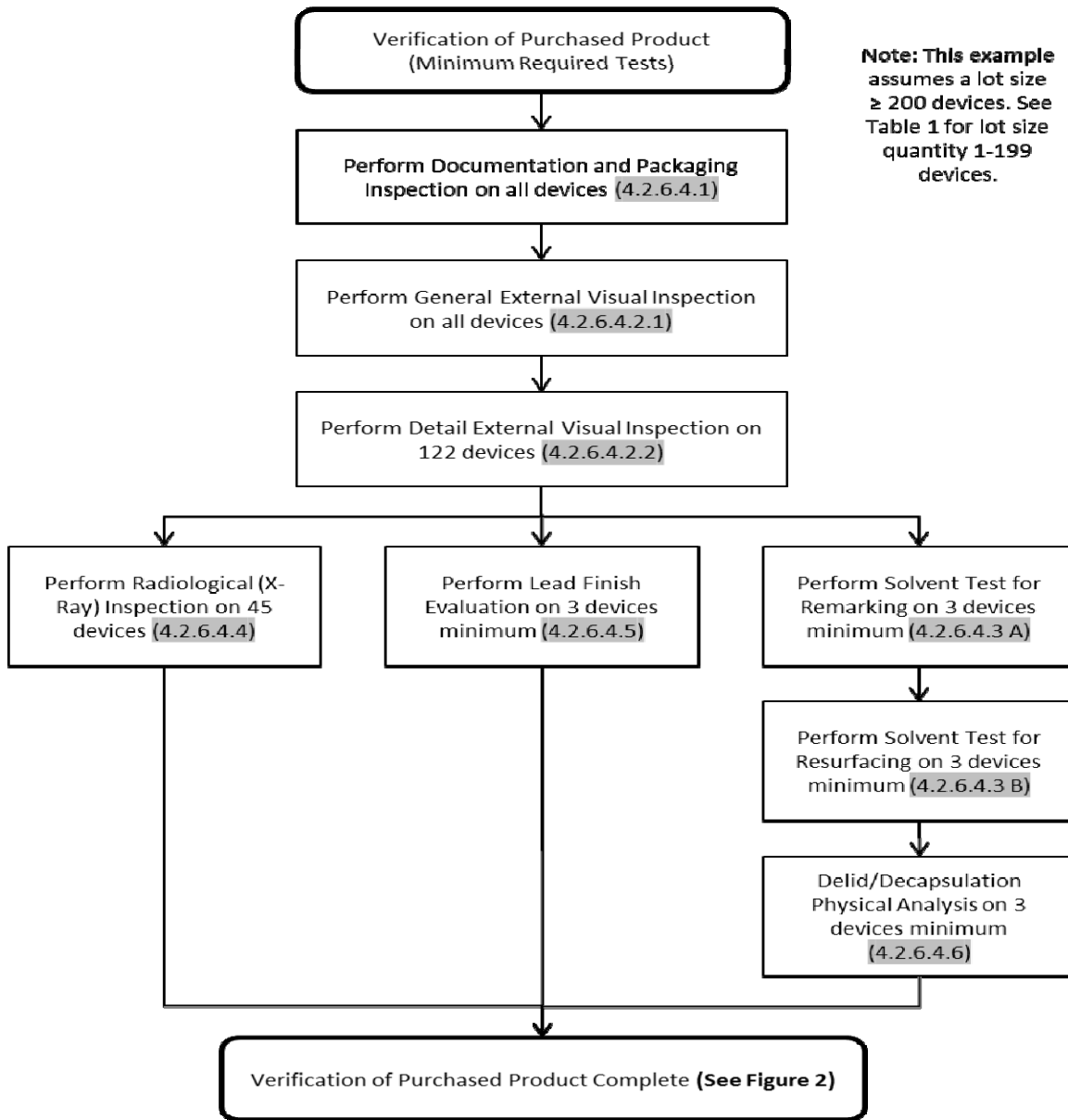


FIGURE 3 - VERIFICATION OF PURCHASED PRODUCT

4.1 Quality Management System

The Organization shall be certified to a quality management system standard, ISO 9001, SAE AS9120 or equivalent by a Certification Body accredited for the specific standard by an International Accreditation Forum (IAF) Multilateral Recognition Arrangements (MLA) Signatory Accreditation Body (<http://www.iaf.nu/>). Such certification and certification to this standard shall be accomplished by combined or integrated audit criteria, as determined by the Organization's Quality Management System and 4.2 Fraudulent/Counterfeit Electronic Parts Control Plan herein.

4.1.1 Fraudulent/Counterfeit Parts Mitigation Policy

The Organization's executive management shall define and document its policy to prevent the purchase, acceptance, and distribution of fraudulent/counterfeit parts. The Organization shall also state its policy regarding the disposition and reporting of parts determined to be suspect, fraudulent, and/or confirmed counterfeit. The Organization's executive management shall ensure that its policy is communicated, understood, implemented, and maintained at all levels of the Organization and accessible with a written request by the customer.

4.2 Fraudulent/Counterfeit Electronic Parts Control Plan

The Organization shall develop and implement a fraudulent/counterfeit electronic parts control plan that documents its processes used for risk mitigation, disposition, and reporting of fraudulent/counterfeit parts. The control plan shall specify flow down of applicable requirements of this document to the Organization's suppliers, contractors, and their sub-contractors. The control plan may be provided as a stand-alone plan against this standard or otherwise may be integrated into the Organization's existing Quality Management System. The control plan shall be applied to all purchases or returns of electronic parts and shall include the minimum processes described in 4.2.1 through 4.2.11.

4.2.1 Customer Related Contract Review, Agreement, and Execution

4.2.1.1 The documented processes shall specify the review, agreement, and execution of contractual requirements to minimize the risk of fraudulent/counterfeit parts trade.

4.2.1.2 In the event that Customer commitments cannot be satisfied, the Organization shall, in no more than 5 days, notify Customer in writing and mutually agree to suitable contract modifications.

4.2.1.3 The Organization shall disclose in writing at the time of each individual quotation, the source of supply (by company name and location), if the Organization is or is not authorized (franchised) for the item(s) being quoted and is or is not providing full manufacturer's warranty on the quoted material. If the Organization considers that the name of the source of supply is proprietary to the Organization, the Organization and Customer shall negotiate an appropriate non-disclosure agreement.

4.2.1.4 The Organization shall provide a product warranty for a minimum of one (1) year, stating that the product is reliable and free from known defects and that the Organization will replace defective parts or refund original cost of product.

4.2.1.5 When quoting material to Customers, Organization shall provide the Customer a quote based on the best results and practices as documented in 4.2.1.6 or allow Customer choice(s) based on other available information.

4.2.1.6 The Organization shall issue a revised written quotation to the Customer, if at any time the source of supply changes (i.e., at the time of initial quote, parts were being procured from an authorized source, but said parts subsequently became unavailable and as a result, the Organization had to procure the material from an alternate source).

4.2.2 Supplier Approval and Source Selection

The documented processes shall:

- a. Assess potential sources of supply to determine the risk of receiving fraudulent/counterfeit parts. Assessment actions may include surveys, audits, review of product alerts (e.g., GIDEP or equivalent; see Appendix D, Reporting), and review of Supplier quality data to determine past performance. Appendix A provides guidelines related to Supplier approval and source selection.
- b. Maintain a register of approved Suppliers, including the scope and criteria for the approval. Supplier approval and source selection criteria shall include: historical experience with procuring product from the particular source, a listing or reference to any unresolved documented problems noted by external sources (e.g., ERAI, GIDEP, IDEA, customer referrals or equivalent), documented evidence that the supplier has acceptable terms for product warranty, returns and liability, financial means to support contractual guarantees, product liability insurance and third party professional insurance. Maintenance of the approved supplier register shall also incorporate weighted criteria or a supplier ranking process in accordance with ARP6178 or an equivalent system for supplier selection, utilizing weighted supplier quality data. Supplier approval and source selection criteria shall be documented, maintained, and available to the Customer upon request. Documentation shall include a process for assessment, corrective action, or removal of approved Suppliers. Appendix A provides guidelines related to Supplier approval and source selection.

- c. Preclude purchasing from sources of supply who have repeatedly failed to detect and avoid fraudulent/counterfeit parts or otherwise failed to exercise due diligence in the detection and avoidance of such parts. For guidance see Appendix D. Reporting.
- d. Procure only new and authentic parts directly from OCMs or Authorized Suppliers or from Suppliers who obtain such parts exclusively from the OCM or their Authorized Suppliers with Supply Chain Traceability when the parts are available from those sources and can meet Customer delivery requirements.

When the Organization has quoted parts to the Customer as having been sourced from Authorized Distribution, Organization shall require Suppliers to disclose at the time of each individual quotation, objective evidence (either proof from the OCM's website or letter from the OCM) that the Supplier is authorized (franchised) for the item(s) being quoted and is or is not providing full manufacturer's warranty on the quoted material. This disclosure shall be based on objective evidence which may include proof from the OCM's website, or letter from the OCM (on OCM letterhead), or other form of evidence acceptable to the customer.

NOTE: The OCM's website may not always reflect recent additions or deletions to the OCM's authorized (franchised) distributor list. Also, some OCMs may limit what parts their authorized (franchised) distributor can sell. For example, an OCM 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 OCM website information is doubtful or lacking, contact the OCM directly.

- e. Require Suppliers to issue a revised written quotation and risk assessment, if at any time the source of supply changes (i.e., at the time of initial quote, parts were being procured from an authorized source, but said parts subsequently became unavailable and as a result, the Supplier had to procure the material from an alternate source).

4.2.3 Purchase Order Requirements

- 4.2.3.1 The Organization shall communicate and document contract provisions that establish purchasing controls for fraudulent/counterfeit part avoidance. Requirements to manage risk shall be determined prior to entering into a contractual agreement. Examples of contractual requirements and clauses are provided in Appendix B.
- 4.2.3.2 The purchase contract shall include flow-through requirements, as specified by the Customer and requirements to manage risk determined in 4.2.3.1.
- 4.2.3.3 The purchase contract shall define the product as quoted and require the Supplier to meet the requirements exactly. Changes relative to the source of supply or traceability shall be approved by the Customer and made in advance of the Supplier shipping parts. Exceptions require approval by the Customer prior to the Organization shipping the parts.

4.2.4 Supply Chain Traceability

The documented processes shall require the retention of records providing supply chain traceability wherever such traceability exists. The records shall provide traceability to the OCM, Aftermarket Manufacturer or their Authorized Distributors that identify the name and location of all of the supply chain intermediaries for all procurement lots, and the date of all intermediate purchases, from the part manufacturer to the direct source of the product for the seller. Supply chain traceability records shall be provided with each shipment and shall be retained for a minimum of five (5) years or maintained in accordance with Customer statutory and regulatory requirements. If this traceability is incomplete or unavailable, Customer approval is required in advance of shipment. This traceability requirement applies to new purchases of material, material in inventory, material returned (with material paper work and material denoting it has previously been returned) and material transferred from other businesses within the Organization. The Organization shall also provide, with the delivery of each consignment, copies of the original manufacturer's or their Authorized Distributor's certificate of conformity/compliance together with the test results, etc., where applicable.

4.2.5 Preservation of Product

The Organization shall preserve the product during internal processing and delivery to the intended destination in order to maintain conformity to requirements. As applicable, preservation shall include identification, handling, packaging, storage, and protection. Preservation shall also apply to the constituent parts of a product.

Preservation of product shall also include, where applicable in accordance with product specifications and applicable statutory and regulatory requirements, provisions for:

- a. cleaning,
- b. prevention, detection, and removal of foreign objects,
- c. special handling for sensitive products (e.g., electrostatic discharge, moisture and temperature controls),
- d. marking and labeling including safety warnings,
- e. shelf life control and stock rotation, and
- f. special handling for hazardous materials.

4.2.6 Verification of Purchased Product

Verification of Purchased Product shall be conducted in accordance with 4.2.6.1 through 4.2.6.8.

Verification tasks may be discontinued at any point where failures or indication of fraudulent/counterfeit parts are found. However, the test results are "indicators" only and not to be construed as conclusive one way or the other. Proper parts risk mitigation by the Customer may include the full suite of required and additional tests of Table 1 herein and beyond, resulting in contracted test scope increase. In addition, OCM-input may be required to draw full conclusion of the test results. Product failing verification inspection/testing shall be controlled in accordance with 4.2.7 Control of Nonconforming Product.

The OCM should be contacted to assist in authenticating product in conjunction with conducting verification testing. In many cases, the Organization may not succeed in obtaining OCM cooperation or be able to obtain "OCM-supplied data". However, the OCM may provide insight into the authenticity of a device when provided documentation, photographs and other artifacts without providing the proprietary data serving as the basis for this insight. In cases where the OCM does not furnish data, but provides feedback questioning the authenticity of the device, the Organization should consider the product as "Suspect Part". The sections below should include this approach.

4.2.6.1 Contracted Product Verification Process

In the event the Organization sub-contracts any of the inspections and testing specified herein, or otherwise as may be specified by the customer, to an independent third party test laboratory, the Organization shall:

- a. if requested by the test facility, make available a copy of the summary report (requirement 4.2.6.8) of any previously completed inspections and tests.
- b. require the test facility to report to the Organization any discovery of a suspect/fraudulent/counterfeit part discovered in conjunction with the contracted inspections and/or tests. However, the reporting of any discovery of a suspect/fraudulent/counterfeit part detected by inspections and/or testing that was not contractually required shall be for information only, and as such, the Organization rather than the subcontract test facility, is responsible for evaluating and reporting on the information in their consolidated summary report in accordance with requirement 4.2.6.8.

4.2.6.2 Test Level

Acceptance and reject criteria are defined herein for all inspections and tests in Level A tests of Table 1. Results of each inspection and test performed shall be documented, retained, and traceable to product identification information (e.g., date/lot codes, applicable serial number), purchase order, invoice, and inspection and testing personnel. Marking on the individual part that reflects the level of inspection and testing performed (e.g., MIL-STD-202, MIL-STD-750, MIL-STD-883 or equivalent) by itself is insufficient evidence that the required testing and inspection was performed. Documentation shall be made available to the Customer upon request. Retention of test data shall be five (5) years minimum.

When the Customer has contractually specified an AS6081-certified supplier, the minimum level of inspection and testing for each active part or assemblies that contain active elements shall include the AS6081 Level A requirements of Table 1. For passive parts, the minimum level of inspection/testing shall include the following for the characteristics applicable to the type of passive part:

- a. Documentation and Packaging Inspection (Level A1 of Table 1)
- b. External Visual Inspection (Level A2 of Table 1)
- c. Solvent Test for Remarking (Level A3 of Table 1 – Solvent Test for Remarking only)
- d. Lead Finish Evaluation (Level A5 of Table 1)

The Organization, in consultation with the Customer, may impose additional inspection and testing requirements based on the perceived risk due to source prior performance, prior reported incidents, etc. The Customer may also specify additional inspection and tests prior to receipt of goods based on source information (e.g., test results) provided by the Organization or other product application risk assessment criteria. In either case, the Customer shall identify in writing, the specific additional inspections and tests via contract(s) between Customer and Organization (Distributor).

4.2.6.3 Test/Inspection Sampling Plan

A standard lot is a homogeneous lot (see Section 3. TERMS AND DEFINITIONS herein) and is defined in this sampling plan as the total number of devices that are received in a given shipment (procurement lot) at Incoming/Receiving Inspection and have the same lot or date code. A future shipment of devices of the same date code shall be considered a new lot. This should prevent a shipment of good devices being accepted and being followed by a suspect shipment of devices of the same date code being accepted without inspection. A lot is also a quantity of devices removed from storage and submitted for inspection. Generally, a procurement lot is of the same lot or date code, while a lot from stores may have mixed date or lot codes. Test samples shall be selected at random; however, for lots with mixed date codes, the devices must be separated into separate sublots (minimum sample size applies to each individual subplot). When selecting the sample, ensure that the parts are randomly selected from the total population. Parts exhibiting potential anomalies shall be included in the sampling group. If the parts are received in tape and reel and/or multiple packages, parts shall be randomly pulled from the entire length of the reel and from multiple reels and/or packages. The same samples can be used for multiple test steps. For example, the samples used for External Visual Inspection can be used for X-ray, followed by Lead Finish Evaluation (X-ray Spectroscopy-XRF or Energy Dispersive Spectroscopy-EDS/EDX) testing. The same sample population can be used for additional testing. Table 1 reflects minimum sample sizes. Larger sample sizes may be used for improved test confidence or to support an improved test flow sequence.

Minimum test/inspection sample size shall be in accordance with Level A, Table 1.

TABLE 1 - LOT SAMPLING PLAN

Test/Inspection	Minimum Sample Size		Level
	Lot Size 200 or greater Devices	Lot Size 1-199 Devices (See NOTE 1)	
Minimum Required Tests			Level A
Documentation and Packaging			A1
Documentation and Packaging Inspection (4.2.6.4.1) (non-destructive)	All devices	All devices	
External Visual Inspection			A2
a. General (4.2.6.4.2.1) (non-destructive)	All devices	All devices	
b. Detailed (4.2.6.4.2.2) (non-destructive)	122 devices	122 or all devices, whichever is less	
Remarking & Resurfacing (destructive)	See NOTE 2	See NOTE 2	A3
Solvent Test for Remarking (4.2.6.4.3 A) (destructive)	3 devices	3 devices	
Solvent Test for Resurfacing (4.2.6.4.3 B) (destructive)	3 devices	3 devices	
Radiological (X-Ray) Inspection			A4
X-Ray Inspection (4.2.6.4.4) (non-destructive)	45 devices	45 devices or all devices, whichever is less	
Lead Finish Evaluation (XRF or EDS/EDX)	See NOTE 3	See NOTE 3	A5
XRF (non-destructive) or EDS/EDX (destructive) (4.2.6.4.5) (Appendix C.1)	3 devices	3 devices	
Delid/Decapsulation Internal Analysis (destructive)	See NOTE 4	See NOTE 4	A6
Delid/Decapsulation (4.2.6.4.6) (destructive)	3 devices	3 devices	
Additional Tests (as agreed between Customer and Organization)			
Remarking & Resurfacing (destructive)	See NOTE 2	See NOTE 2	A3 Option
Scanning Electron Microscope (4.2.6.4.3 C) (destructive)	3 devices	3 devices	
Quantitative Surface Analysis (4.2.6.4.3 D) (non-destructive)	5 devices	5 devices	
Thermal Testing			Level B
Thermal Cycling Test (Appendix C.2)	All devices	All devices	
Electrical Testing			Level C
Electrical Testing (Appendix C.3)	116 devices	All devices	
Burn-In			Level D
Burn-In (Pre & Post) (Appendix C.4)	45 Devices	45 devices or all devices, whichever is less	
Hermeticity Verification (Fine and Gross Leak)			Level E
Hermeticity Verification (Fine and Gross Leak) (Appendix C.5)	All devices	All devices	
Scanning Acoustic Microscopy (SAM)			Level F
Scanning Acoustic Microscopy (SAM) (Appendix C.6)	As specified	As specified	
Other			Level G
Other test/inspections	As specified	As specified	

NOTES:

- For very small lot sizes, less than ten (10) devices, this "destruct" test sample size may be reduced to one (1) device at the discretion of the Cognizant Engineer with Quality Assurance concurrence and Customer approval.
- Devices for the Remarking & Resurfacing Inspection shall be selected from the Detailed External Visual Inspection lot.
- Devices with possible lead finish anomalies shall be selected from the Detailed External Visual Inspection lot.
- Devices for the Delid/Decapsulation Internal Analysis shall be selected from the Remarking & Resurfacing Inspection lot.

4.2.6.4 Minimum Fraudulent/Counterfeit Part Detection Methods

For cases where procurements are made from sources other than OCMs or Authorized (Franchised) Suppliers, or there is a reason to doubt a part's authenticity, tests and inspections shall be performed to detect fraudulent/counterfeit parts. The following mitigation methods shall be performed as a minimum.

4.2.6.4.1 Documentation and Packaging Inspection

The Organization shall verify receipt of contractual documentation. CoCs, supply chain traceability information, manufacturer's datasheet, internal part specification, or other documentation shall be examined for originality and applicability to the delivered material, including, but not limited to:

- a. Lot and/or date codes on the packaging do not match the lot and/or date codes on the parts or is inconsistent with OCM Product Discontinuation Notices (PDNs).
- b. Manufacturer's logo or label is absent, or does not match that shown on their website or on previous shipments.
- c. Poor syntax, misspelled words, alterations, or changes to the documentation.
- d. Barcode symbols do not match the human-readable printed part data.
- e. Package materials are inconsistent with the description on the datasheet or otherwise indicate that the parts may not be new and authentic.

If there is an elevated concern for product integrity, contact the OCM or Authorized (Franchised) Supplier to attempt to verify that date/lot codes, reel sizes, and quantities listed on the documentation are valid.

4.2.6.4.2 External Visual Inspection

External Visual Inspection is considered to be non-destructive. External Visual Inspection, if properly performed, can lead to a high capture rate of suspect or fraudulent/counterfeit parts. A good deal of fraudulent/counterfeits are parts that have been recycled; i.e., taken off boards or assemblies and reworked in the form of straightening and retinning the leads, remarking by sanding off the original marking, and/or blacktopping to hide the sanding marks and then remarking.

The External Visual Inspection consists of the following two examinations. The first is to ensure that all parts in the lot meet the General Criteria (requirement 4.2.6.4.2.1) and appear in good condition to the unaided eye. The second examination is when the samples are selected from the lot to undergo the Detailed Criteria (requirement 4.2.6.4.2.2). Whenever possible, compare the sample being inspected to a part received from the OCM or OCM-approved Authorized (Franchised) Distributor.

4.2.6.4.2.1 General Criteria

Verify the following:

1. Parts are received in a single shipment.
2. Parts are marked or otherwise identified with identical lot, batch, run, and identification information (e.g., date codes, lot codes, and serial numbers). If multiple date codes are observed, follow the criteria defined in 4.2.6.3 Test/Inspection Sampling Plan for the handling of multiple date codes.
3. All parts are identical in appearance to the unaided eye (parts and packaging).
4. Parts appear to have been subjected to the same handling, packaging, and/or storage conditions.
5. Parts have maintained their physical placement relative to each other (i.e., have never been separated based on evidence such as source, packaging, labeling.)

4.2.6.4.2.2 Detailed Criteria

The samples shall be optically examined at magnification and lighting sufficient to detect the particular feature being examined. Anomalies may be an indication of suspect counterfeit parts. The accept/reject criteria used should include relevant versus non-relevant conditions of distinguishing between a true suspect counterfeit part versus a false positive indication. This information shall be documented in the final test report. Verify the following against the applicable device specification or manufacturer's datasheet, when available:

1. Number of terminations per part
 2. Package type
 3. Part dimensions
 4. Verify pin 1 placement (or orientation consistency) in tray, stick or tape and reel
- A. Lead Condition:
1. Non-uniform color
 2. Tool marks other than forming tool marks
 3. Lack of exposed base metal at the lead tip
 4. Bent or non-planar leads
 5. Excessive or uneven plating
 6. Missing pins
 7. Discoloration, dirt, or residues on the leads
 8. Scratches (or insertion marks) on the inside and outside faces of the leads
 9. Gross oxidation
 10. Excessive solder on the leads
 11. Non-uniform thickness
 12. Solder dipped outside of specification, part number or data sheet description
- B. CGA Columns and BGA Ball Interconnects:
1. Discoloration, dirt, or residues on solder spheres or columns
 2. Crushed or flattened BGA solder spheres
 3. Misaligned columns
 4. Discolored solder spheres or columns
 5. Non-uniform size and shape of solder spheres

C. Discrepant Markings may be signs of counterfeiting. Look for:

1. Different marking styles for parts with the same date/lot code
2. Different country of origin for parts with the same date/lot code
3. Different body molds for parts with the same date/lot code
4. Different backside markings for parts with the same date/lot code
5. Previous marking partially visible on the surface
6. If available, compare part logo(s) to a part received from the OCM or OCM-approved Authorized (Franchised) Distributor.

D. Device Package Irregularities:

1. Uneven thickness of the packages
2. Dimples with uneven depth
3. Visible scratch marks or unidirectional abrasions
4. Significant package variation for parts with the same date/lot code
5. Differences in the corner radius between the top and bottom surfaces
6. Cracks or visible damage such as burn marks
7. Color discrepancy between the top and bottom of the part
8. Glue, adhesives, or other residues on the surface of the package
9. Evidence of color fade on the body of the part
10. Signs of corrosion on body of part or exposed areas of the leadframe

E. BGA Packages Condition:

1. Solder mask damage
2. Solder on exposed plating away from the solder spheres
3. Scratches in the mask that run underneath a solder sphere
4. Debris or residue between the solder spheres
5. Solder dross on the solder mask
6. Solder mask touchup or repair

4.2.6.4.3 Inspection for Remarking and Resurfacing

Inspection for Remarking and Resurfacing is considered to be destructive.

NOTES:

1. Rework performed by the device manufacturer or by one of its Authorized Distributors with expressed permission of the manufacturer (e.g., Category B and C distributor per MIL-STD-790) for the purpose of remarking a device can be a manufacturer-authorized process. When such services are performed, records of such rework will be maintained and such devices supplied with manufacturer warranty. Authorized rework on devices will be permitted to the extent allowed by applicable governing specifications.
2. If the testing herein results in removal of the part marking or alteration of the surface, it does not necessarily mean that the part is counterfeit. Additional testing or evaluation may be required to further resolve the issue. Mechanical scraping of the surface is sometimes successful at revealing remarking or resurfacing, but this technique is operator-dependent, can be inconsistent and for the purposes of this document, is not an acceptable alternative to the tests herein.

A. Solvent Test for Remarking

External visual inspection may reveal evidence of remarking where the original marking was removed by chemical or mechanical means, and the marking area was resurfaced or masked with a material that may or may not match the original surface. Any removal of the original surface finish, laser markings, or ink markings is an indication the part may be fraudulent or counterfeit. This first test focuses on ink part markings and is a modified resistance-to-solvents test. To perform this test, mix a solution of three (3) parts mineral spirits (CAS Registry Number 9072-35-9) with one (1) part isopropyl alcohol (CAS Registry Number: 67-63-0). Dip a cotton swab into the solution, and wipe the swab across the markings on the part. The markings should not smear or be removed by the solution. However, more aggressive test methods that will also test for resurfacing reveal other indications that the original device marking has been removed.

B. Solvent Test for Resurfacing

Caution: For all solvents specified in these tests, ensure proper safety precautions are used, including proper Personal Protective Equipment, a ventilated fume hood, and eliminate any ignition sources.

This test focuses on the part's surfaces and is a sequence of three separate tests: (1) an Acetone (CAS Registry Number 67-64-1) Test, (2) a 1-Methyl 2-Pyrrolidinone (CAS Registry Number: 872-50-4) Test, and (3) a Dynasolve 750 (www.dynaloy.com), or equivalent test.

1. Acetone (CAS Registry Number 67-64-1) Test - The first test in the series is the Acetone test. To perform this test, dip a cotton swab into Acetone. Then wipe the swab across the surface of the part (avoid markings if possible). If the swab turns black or if the section you wiped has a permanent color change, the part may be coated, and therefore considered suspect counterfeit. Refer to IDEA-STD-1010 for additional options on conducting this test.
2. 1-Methyl 2-Pyrrolidinone (CAS Registry Number: 872-50-4) Test - If the part passes the Acetone test, move on to the 1-Methyl 2-Pyrrolidinone test. When using 1-Methyl 2-Pyrrolidinone, completely immerse the part in the solution and heat it to 115 to 120 °C for 2 to 5 min (the time and temperature may be adjusted to compensate for your sample). Once the part is removed from the solution, use a cotton swab to wipe the coating off (avoid markings if possible). The removed coating will show on the cotton swab as black in color, and indicative of a suspect counterfeit part.

3. Dynasolve 750 (or equivalent) Test - If the part passes the Acetone and the 1-Methyl 2-Pyrrolidinone tests (both are destructive tests), move on to the Dynasolve 750 test. Using a preheated solution of Dynasolve 750 at 105 °C, completely immerse the part in the solution for 45 min. Once the part is removed from the solution, use a cotton swab to wipe the coating off. The removed coating will show on the cotton swab as black in color. Also look for scratch marks on the surface of the removed coating. Either condition is indicative of a suspect counterfeit part.

C. Scanning Electron Microscope (SEM) for Microblast Resurfacing (Additional Test as agreed between Customer and Organization)

A SEM can produce very high-resolution images of a sample surface, revealing details less than 1 nm in size or about 250 times the magnification limit of the best optical microscopes. The test that shall be performed here is a form of visual test that compares the surfaces of a part within the lot being inspected and from the test lot against the virgin surface of a known authentic part of the same or proximate date and lot code, as available. The purpose is to reveal evidence of package resurfacing or marking removal, performed by microblasting. Microblasting is a micro abrasive jet machining technology that uses various types of fine (3 to 100 microns) abrasive particles to remove part marking and/or to resurface the package exterior. The inspection shall be conducted at minimum 5000X to (1) compare surface characteristics to the virgin surface of a known authentic part of the same or proximate date and lot code, as available, and (2) to detect the presence of abrasive particle media that randomly and invariably embeds itself into the softer surfaces of plastic encapsulated microcircuits (PEMs). Please note that the surface of ceramic and metallic packages is always changed with a microblasting process, but the inspection of embedded particles in ceramic or metallic package surfaces may be less definitive for these harder surfaces. Also note that the inspection for the presence of embedded abrasive particle media can be augmented with EDS/EDX element analysis. EDS/EDX testing is currently an alternate test for Lead Finish Evaluation herein.

D. Quantitative Surface Analysis (QSA) (Additional Test as agreed between Customer and Organization)

QSA is the use of unambiguous, quantitative information about component packaging through comparative surface feature analysis. Changes to the external packaging of electronic components due to resurfacing techniques (i.e., altering the original surface by sanding, lapping, micro-blasting and/or recoating and remarking) produce subtle changes to surface patterns on the sub-millimeter scale. These patterns may be measured quantitatively with nondestructive optical and/or spectroscopic techniques with resolution and sampling rates sufficient to identify resurfaced components with a high degree of statistical confidence. QSA techniques and systems provide evidence of resurfacing through comparative analysis in homogeneous lots and can identify heterogeneity within a sample as a test for "peppering" of counterfeit parts within authentic components. Evidence of resurfacing obtained through QSA is considered grounds for failing this test. If these results conflict with the other solvent tests for remarking or resurfacing, Additional Test Methods (4.2.6.5 herein) may then be required.

4.2.6.4.4 Radiological (X-ray) Inspection

X-ray inspection is considered to be non-destructive if the radiation exposure to the parts does not exceed the manufacturer's specification. Consult the Customer if the manufacturer's radiation effects data for the parts are not available, as the Customer may be able to assist in obtaining this information. Verify in writing that the Customer had previously conducted independent radiation effects testing on the parts and/or determined that the radiological (X-ray inspection) level is acceptable for the particular device or device technology. This is particularly important for manually operated radiological (X-ray) inspection or automated radiological (X-ray) inspection of the entire lot. In the event that manufacturer's data are not available and the Customer is not able to provide verification of radiation effects data, then sampling only shall be conducted and then the radiological (X-ray) testing shall be considered destructive, unless otherwise specified by the Customer. Parts that are exposed to radiation levels that exceed the manufacturer's specification shall not be returned to the lot after testing and may be used for subsequent destructive tests.

Radiological inspection of electronics includes film radiography, digital radiography, and real time radiography. The penetrating radiation used for electronic inspection would be X-rays. Radiographic analysis by use of X-rays shall be performed to verify that the internal package or die construction is consistent within the lot being inspected and versus OCM-supplied data and/or with a known authentic part of the same or proximate date and lot code, as available. Analysis should compare die size, general shape, lead frame construction, wire bond gauge and routing.

Parts shall be inspected for homogeneity, consistency, and uniformity. It is normal for there to be some variation across different date and lot codes, but not normally in parts with the same date and lot code. Radiographic films (or digital images) shall be retained. If any anomalies are noted in the sample of the lot, 100% of the lot should be inspected with X-ray. Whenever possible, compare the sample being inspected to a part received from the OCM or OCM-approved Authorized (Franchised) Distributor.

4.2.6.4.5 Lead Finish Evaluation (X-ray Spectroscopy - XRF or Energy Dispersive Spectroscopy - EDS/EDX)

The Lead Finish Evaluation with XRF is non-destructive whereas the Lead Finish Evaluation with EDS/EDX is destructive.

Lead Finish Evaluation shall be performed by XRF or EDS/EDX (see Appendix C.1) to determine lot consistency compared to the manufacturer's datasheet and/or to confirm the presence or absence of lead (Pb) or other constituent elements. Individual scan data shall be retained. The initial method of detecting replated leads is the External Visual Inspection, not the Lead Finish Evaluation. Lead Finish Evaluation is not considered a stand-alone test. It augments the findings of External Visual Inspection. During the External Visual Inspection, leads shall be inspected for any finish abnormalities per 4.2.6.4.2.2 Detailed Criteria. This could include color variations, lack of exposed base metal at the lead tip, damaged leads, plating thickness variations, scratches and/or insertion marks, oxidation, corrosion, presence of solder and/or flux, etc. This evaluation shall always be performed prior to XRF/EDS/EDX Lead Finish Evaluation. The subset of parts selected for the Lead Finish Evaluation shall not be randomly selected. They shall be specifically chosen based on the visual inspection results and the sublots created based on that inspection and shall include a representative sample from each variation observed during detailed External Visual Inspection. The sample size shall be determined by the observed lead finish variations in the lot. The Lead Finish Evaluation sample size shall be three (3) or 100% of a subplot, if less than three (3) parts constitute a subplot for each finish variation observed during detailed External Visual Inspection.

4.2.6.4.6 Delid/Decapsulation Internal Analysis

Delid/Decapsulation Internal Analysis is considered to be destructive.

A representative sample of three (3) parts minimum from each homogeneous lot shall be delidded/decapsulated and examined, when the part is sealed in a hermetic package or is plastic-encapsulated, to verify that the die markings and internal package or die construction is consistent with a known authentic part, as available. Any discrepancies in die markings may be indicative of a fraudulent/counterfeit part and should be resolved through communication with the OCM if possible. All die photos shall be stored to the data retention requirements of the applicable quality management system and be easily accessible for future reference.

Each die shall be optically examined at a suitable magnification (30X to 200X, typical). The required magnification will depend on die feature size and the process technology used. Die marking verification - All die markings shall be documented (date, manufacturer, logos, mask set ID). When present, the die marking shall be consistent with the manufacturer's data in the form of (1) data obtained directly from a known authentic part, (2) the Mask ID data found on the inspected chip uniquely matching the intended part (e.g., the examined Mask ID = the manufacturer's part number), or (3) OCM-supplied data. When this information is not available or die markings are not present, die layout and features shall be compared between multiple samples from the same "population" (see 3.4 Related Terms and Definitions). The presence of contamination, damage, defects, and double (security) wire bonds are possible indicators of a fraudulent/counterfeit device and shall be documented.

4.2.6.5 Additional Test Methods

Additional fraudulent/counterfeit part detection tests can be found in Appendix C Additional Fraudulent/Counterfeit Part Detection Tests. Test results are "indicators" only and not to be construed as conclusive one way or the other. Proper parts risk mitigation by the Customer may include the full suite of both required and additional tests of Table 1 herein, resulting in contracted test scope increase. In addition, OCM-input may be required to draw full conclusion of the test results.

NOTE: Counterfeiting is not a static process. As new methods are devised to discriminate counterfeit parts, new methods are introduced by the counterfeiters to disguise their parts. Several new subtle anomalies may be observed before the device or lot is placed into a suspect category, where further evaluation may then be required beyond the tests noted herein. As a result, new detection techniques and methods, along with a solid supporting knowledge base, may need to be applied.

4.2.6.6 Control of Suspect, Fraudulent, or Confirmed Counterfeit Parts

The following steps shall be implemented for suspect, fraudulent, or confirmed counterfeit parts:

- a. Physically identify the parts as suspect/fraudulent/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. Identify all additional suspect/fraudulent/counterfeit parts on hand or in storage. See 4.2.7 Control of Nonconforming Product.
- c. Notify the Supplier of findings and provide the Supplier with the opportunity to verify said findings. If the Supplier requests the parts be returned, Organization and Supplier shall establish a mutually agreeable sample of the suspect parts and send to one or more mutually agreeable independent, third party test laboratories for the purpose of evaluation and testing. In the event that a mutually agreeable sample size cannot be established, the default return sample size shall be the lesser of ten (10) parts or 50%, of each suspect lot/date code.
- d. The results of the evaluation may produce a variety of situations and results. The contractual agreement between the parties will dictate the outcome, however, in any case, suspect counterfeit parts shall not be returned to the Supplier for refund, credit, or replacement. Refer to Appendix B.1.6 Product Impoundment and Financial Responsibility for guidance.

4.2.6.7 Returned Product

The following applies to product not found to be suspect, fraudulent, counterfeit, non-conforming or otherwise defective. Steps shall be taken by the Organization to ensure that product substitution has not occurred in the return process. The parts should be returned with:

- a. Part number to be returned
- b. Name of manufacturer
- c. Purchase order number under which parts were supplied
- d. Quantity to be returned
- e. Date/lot code of parts to be returned
- f. Reason for return

Returns should not be made to Suppliers without proper return material authorization. After receipt of return material authorization, the returned parts should include copies of the original paperwork.

4.2.6.8 Records/Summary Reports of Inspection and Test Results

4.2.6.8.1 The Organization shall supply a summary report of all inspection and test results for each lot (1) in advance of product shipment or (2) with each shipment of product, as specified by the customer (or Organization when testing is conducted by more than one independent, third party test laboratory). Unless otherwise specified by the customer, include detailed results/records of inspections and tests (e.g., X-ray film/digital images, XRF results (e.g., copy of the XRF plot), delid/DPA photographs, etc.). The Organization shall retain all records/summary reports, images, and data of inspections and testing results for the minimum retention period of five (5) years. These records/summary reports shall be stored in a manner to protect against damage from fire, flood, etc. The records/summary reports shall be readily (within 72 h) retrievable upon request by the Customer. The summary report shall include the following information, as a minimum:

- a. The manufacturer and part number
- b. The lot size being shipped
- c. The manufacturer date code(s) or lot code comprising the shipment lot
- d. The sample size (or 100%) used for each inspection and test
- e. The date the inspections and tests were performed
- f. An indication of whether each individual inspection and test passed, failed or was inconclusive (or questionable). Product that failed any of the inspections and tests or exhibited inconclusive (or questionable) results, shall not be shipped without prior authorization by the Customer.
- g. The specific inspections and tests that were performed and the test conditions (e.g., General Visual, Detailed Visual, Marking/Surface Exam, X-ray, etc.)
- h. The accept/reject criteria that applies for each of the inspections and tests (e.g., Documentation and Packaging Inspection per 4.2.6.4.1, Detailed Visual Inspection per 4.2.6.4.2.2, etc.)
- i. The signature and/or stamp of the individuals that performed the inspections and tests, and the authorized individual that accepted the inspection and test results. These signatures/stamps shall represent that the individual understands the penalties associated with fraud under Authority Having Jurisdiction.
- j. The level of magnification used for the Detailed Visual Inspection.
- k. The name and address of any applicable subcontracted third party inspection or test facility.
- l. Description of whether testing: used a known authentic part as a comparison or used absolute measurements and compared the results to a Customer-supplied Source Control Drawing or OCM data or a combination of the two methods was employed or used a comparison against average lot data when OCM-data or a known authentic part was not available.

4.2.6.8.2 Summary Report for Subcontracted Inspection and Test Results

In the event that the Organization subcontracted any of the inspections and testing to a third party test laboratory, the Organization shall compile all subcontracted inspection and test reports/data into a single consolidated report/data package. The consolidated report/data package shall be structured as follows:

- a. The report/data provided by the subcontractor shall be the original report/data, or a copy of the original report/data with no modification or transcribing of the inspection and test data.
- b. Include Organization's high level summary of all subcontracted inspection and test results, including an assessment of any discovery of a suspect/fraudulent/counterfeit part reported by the subcontracted test facility, regardless of whether or not the subcontracted test facility was contracted to perform the inspection and testing that detected the suspect/fraudulent/counterfeit part. The Organization shall also state if any re-inspection and/or re-test of previously performed inspection and testing is recommended, based on the information provided by the subcontracted inspection and test facility.

4.2.7 Control of Nonconforming Product

The Organization shall ensure that product which does not conform to product requirements is identified, segregated and controlled to prevent its unintended use or delivery. A documented procedure shall be established to define the controls and related responsibilities and authorities for dealing with nonconforming product.

The Organization shall act upon any reported information of nonconforming product with respect to product previously shipped, or not yet shipped. If the assessment of this information indicates that suspect, fraudulent or confirmed counterfeit product was shipped, the Organization shall report the information in accordance with 4.2.9. Parties requiring notification of nonconforming product can include suppliers, internal organizations, customers, distributors, and regulatory authorities, by taking actions necessary to contain the effect of the nonconformity on other processes or products.

The Organization shall deal with nonconforming product by one or more of the following ways:

- a. by taking action to eliminate the detected nonconformity, however, the Organization shall not rework, repair or alter the product;
- b. by authorizing its use, release, or acceptance under concession by the Customer or an applicable, relevant design authority;
- c. by taking action to preclude its original intended use or application (e.g., scrap and/or destruction);
- d. by taking action appropriate to the effects, or potential effects, of the nonconformity when nonconforming product is detected after delivery or use has started. The organization's nonconforming product control process shall provide for timely reporting of delivered nonconforming product;

NOTE: Parties requiring notification of nonconforming product can include suppliers, internal organizations, customers, distributors and regulatory authorities.

- e. by rejection for return to the Supplier or manufacturer; however, suspect, fraudulent or confirmed counterfeit parts shall not be returned except for independent verification testing herein and in accordance with 4.2.6.6 Control of Suspect, Fraudulent, or Confirmed Counterfeit Parts and 4.2.6.7 Returned Product.

Product dispositioned for scrap shall be conspicuously and permanently marked, or positively controlled, until physically rendered unusable.

When nonconforming product (e.g., delivery of incorrect quantity versus the quantity ordered, shipping product that is not in packaging specified by the Customer, etc.) is corrected, it shall be subject to re-verification to demonstrate conformity to the requirements. Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, shall be maintained.

4.2.8 Material Control

The documented processes shall:

- a. not alter, obliterate or redact any information from the OCM's labeling or part marking relevant to supply chain traceability. Adhesive labels may cover the OCM marking provided that the OCM marking is clearly legible after label removal.
- b. control excess and nonconforming parts to prevent them from entering the supply chain under fraudulent circumstances.
- c. control suspect or confirmed fraudulent/counterfeit parts to preclude their use or reentry into the supply chain by physically segregating the parts from acceptable non-suspect parts and placing in quarantine. Quarantine should consist of physical barriers and controlled access for a minimum of five (5) years or maintained in accordance with Customer statutory and regulatory requirements.

4.2.9 Reporting

The documented processes shall require that all occurrences of suspect, fraudulent and confirmed counterfeit parts be reported, within 60 days of identification, to internal organizations, and to customers, applicable Government authorities, Government reporting organizations (e.g., GIDEP or equivalent), industry supported reporting programs (e.g., ERAI or equivalent), and Authority Having Jurisdiction. Information and guidelines for reporting fraudulent/counterfeit parts are provided in Appendix D Reporting.

4.2.10 Personnel Training

- a. Relevant personnel, including management of programs, projects, procurement, quality assurance, inspection, receiving, manufacturing and engineering activities shall be trained as appropriate to their function, in the avoidance, detection, mitigation and disposition of suspect/fraudulent/counterfeit parts. Examples of training are included in Appendix E Personnel Training Programs.
- b. Personnel involved with direct handling (e.g., inspectors, assemblers, test technicians) of electronic parts shall be trained in techniques for detecting suspect/fraudulent/counterfeit parts. Examples of training are included in Appendix E Personnel Training Programs.
- c. Personnel with responsibility for the detection of suspect/fraudulent/counterfeit indicators through use of specialized technologies and methods such as Acoustic Microscopy, shall be trained to ensure competence in their use, e.g., training by equipment manufacturer, or by technology specialists in the specific equipment and test method, or equivalent. Personnel with responsibility for the detection of suspect/fraudulent/counterfeit indicators through use of Radiographic Inspection (e.g., X-ray and XRF) shall be trained and certified to NAS-410 National Aerospace Standard, NAS Certification Qualification of Nondestructive Test Personnel or equivalent. Organizations using outside agencies shall be responsible for assuring that the appropriate requirements of training and certification are met. Examples of training and certification programs and standards are included in Appendix E Personnel Training Programs.

4.2.11 Internal Audit

The Organization shall conduct internal audits at planned intervals to determine whether the quality management system

- a. conforms to the requirements of this standard and to the quality management system requirements established by the Organization, and
- b. is effectively implemented and maintained.

An audit program shall be planned, taking into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits. The audit criteria, scope, frequency, and methods shall be defined. The selection of auditors and conduct of audits shall ensure objectivity and impartiality of the audit process. Auditors shall not audit their own work.

A documented procedure shall be established to define the responsibilities and requirements for planning and conducting audits, establishing records, and reporting results.

Records of audits and their results shall be maintained.

The management responsible for the area being audited shall ensure that any necessary corrections and corrective actions are taken without undue delay to eliminate detected nonconformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of verification results.

5. NOTES

- 5.1 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.

PREPARED BY SAE SUBCOMMITTEE G-19D, DISTRIBUTOR OF
COMMITTEE G-19, COUNTERFEIT ELECTRONIC PARTS

APPENDIX A - SUPPLIER APPROVAL AND SOURCE SELECTION

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

- A.1 Supplier approval and source selection criteria should consider the following factors when such information is available:
- a. historical experience with procuring product from the source.
 - b. unresolved documented problems noted by external sources (e.g., ERAI, GIDEP, IDEA, customer referrals, or equivalent).
 - c. trading history, including references, from known reputable organizations.
 - d. demonstrated adherence and certification to quality standards such as AS9100, ISO 9001, AS9120, ANSI/ESD-S20.20, ANSI Z540.3, IDEA-STD-1010, JEDEC JESD31, IPC/JEDEC J-STD-033, ISO 17025 (test facilities), or equivalent.
 - e. demonstrated adherence to applicable provisions of this Aerospace Standard.
 - f. results of audits/surveys.
 - g. acceptable documented purchasing and product acceptance processes for verifying the authenticity of parts supplied.
 - h. use of qualified laboratory testing facilities (third party or in-house), such as those certified to ISO 17025.
 - i. use of quality inspectors that have been trained on the product verification techniques that they perform and are formally trained based on demonstrated competency.
 - j. acceptable terms for product warranty, returns and liability; financial means to support contractual guarantees; and Product Liability insurance as well as third party professional insurance.
 - k. factors indicating greater potential for supply of fraudulent/counterfeit parts, such as:
 1. High risk geographic location of source and/or product
 2. Multiple company names
 3. Inaccurate or misleading representation of product stock and availability
 4. Inaccurate or misleading representation of facilities or in-house capabilities
 5. Inaccurate or misleading representation of industry qualifications and/or affiliation
- A.2 When authorized suppliers provide services which are not authorized by an OCM (e.g., independent distribution), it is recommended the Organization clearly identifies the role in the transaction (by line item exception when they are not authorized) that the supplier provides (i.e., Authorized Supplier, Independent Distributor).

APPENDIX B - ORGANIZATION AS CUSTOMER" CONTRACT REQUIREMENTS

The content of this Appendix is provided as guidance and can be invoked in whole or in part, by the policies, requirements or procedures of the Organization. Legal counsel should be consulted prior to invoking in whole or in part any of the proposed contract requirements set forth in this Appendix.

NOTE: Purchase and Sales contract language typically uses the terms "Seller" and "Buyer." To avoid confusion, those terms were not used in this document. In this section of the document, the "Organization" should be interpreted to be the "Customer (Buyer)."

B.1 CONTRACT/PURCHASE ORDER CONTRACT CLAUSES

The clauses provided in B.1.1 below, or substantially equivalent language, should be included in all contracts/purchase orders for electronic parts entered into by the Organization. They are intended to supplement, not duplicate or replace, requirements contained in other quality standards invoked upon the Supplier (e.g., ISO 9001, AS9120) or purchase contracts with the Organization.

B.1.1 Guarantee of Product Source(s)

- a. "<SUPPLIER> shall ensure that only new and authentic products are delivered to <ORGANIZATION>. <SUPPLIER> shall endeavor to first purchase parts directly from Original Component Manufacturers (OCMs), OCM Authorized (Franchised) Distributors, or authorized Aftermarket Manufacturers or from Suppliers who obtain such parts exclusively from the OCM or their Authorized Suppliers with OCM traceability. Supply of product that was not provided by these sources is not authorized unless first approved in writing by <ORGANIZATION>."
- b. "Authorized (Franchised) Distributor <SUPPLIER> covenants, warrants, and represents that it has effective contractual agreements in place with each manufacturer whose product(s) it is procuring to sell to <ORGANIZATION>."

Authorized (Franchised) Distributor <SUPPLIER> shall:

1. Only ship products to <ORGANIZATION> that have been procured directly from the manufacturer.
2. Not ship products to <ORGANIZATION> that has been procured from any other source without prior written consent from <ORGANIZATION>.
3. Be considered an unapproved Independent Distributor for Products procured from other sources.

Failure to obtain <ORGANIZATION'S> prior written approval constitutes a material breach under the terms of this agreement.

Authorized (Franchised) Distributor <SUPPLIER> will fully indemnify <ORGANIZATION> from any and all claims, losses, and damages that result from said breach. <ORGANIZATION> reserves the right to reject any and all requests for approval, and require additional verification and testing of products."

B.1.2 Supply Chain Traceability

"<SUPPLIER> shall maintain a method of item traceability that ensures tracking of the supply chain back to the manufacturer of all Electrical, Electronic, and Electromechanical (EEE) parts being delivered per this order. This traceability method shall clearly identify the name and location of all supply chain intermediaries from the manufacturer to the direct source of the product for <ORGANIZATION> and shall include the manufacturer's batch identification for the item(s) such as date codes, lot codes, serializations, or other batch identifications. This traceability requirement applies to new purchases of material, material in inventory and material transferred from <SUPPLIER'S> other business units. If this traceability is unavailable or cannot be provided, <ORGANIZATION> shall approve this exception in writing at the time of purchase order."

B.1.3 Test and Inspection Requirements

"<SUPPLIER> shall establish and implement test and inspection activities necessary to assure the verification of purchased product. See 4.2.6 of this document.

<SUPPLIER> shall document and provide upon request all available tests and inspections results which were performed to assess and mitigate the risk of distributing fraudulent/counterfeit parts. Accept/reject criteria and sampling criteria shall be clearly defined or approved by <ORGANIZATION>.

Tests and inspections shall be performed by persons that have been trained in the product verification techniques that they perform and are formally trained based on demonstrated competency. <SUPPLIER> shall maintain records of training and methods used to demonstrate competency. <ORGANIZATION> shall inquire as to <SUPPLIER'S> inspection qualifications prior to placing an order."

B.1.4 Certificate of Conformance (CoC)

"<SUPPLIER> shall approve, retain, and provide copies of Electrical, Electronic, and Electromechanical (EEE) Manufacturer Certificates of Conformance (CoC) when available. In no case shall the manufacturer's certificate be altered or show signs of alteration.

Manufacturer CoCs shall, at a minimum, include the following:

- a. Manufacturer name and address
- b. Manufacturer and/or Customer's part number and dash number
- c. Batch identification for the item(s) such as date codes, lot codes, serializations, or other batch identifications
- d. Signature or stamp with title of <SUPPLIER'S> authorized personnel signing the certificate

Where manufacturer CoCs are not available, <ORGANIZATION> shall require <SUPPLIER> to provide the following signed and dated CoC:

'<SUPPLIER> hereby attests that the parts provided under this purchase order are unused, unaltered and authentic and have not been salvaged, reclaimed, otherwise used, or previously rejected for any reason. This statement is based on rigorous supplier selection practices, supplier assurance practices, and tests and inspections of the specific parts supplied that are designed to prevent the supply of fraudulent/counterfeit parts.'

'<SUPPLIER'S> certificates shall state that the products have been handled in accordance with the requirements of this document and include as a minimum the following:

- a. Manufacturer's name
- b. Part number and product assurance level
- c. <ORGANIZATION'S> name and address
- d. Name and address of the Customer
- e. Quantity of the parts in the shipment
- f. Lot date code, as applicable

- g. Latest re-inspection date, if applicable
- h. Certification that the shipment is part of the shipment covered by the Manufacturer's documentation
- i. Signature and date of transaction. An authorized signatory assigned by a corporate officer with responsibility for the product quality and reliability or their documented designee.'

<SUPPLIER> shall maintain copies of certificates with lot records until the lot is completely shipped. <SUPPLIER> shall maintain the product and shipment traceability for a minimum of five (5) years after the date of the last shipment from each lot."

B.1.5 Quality Management System

"<SUPPLIER> shall maintain a quality management system that complies with SAE International, AS9120 Quality Management Systems - Requirements for Aviation, Space and Defense Distributors, or ISO 9001, Quality Management System Requirements. Independent certification/registration is required unless specified by the Customer.

Suppliers that obtain certification/registration and subsequently change certification bodies (CBs), lose registration status, or are put on notice of losing registration status, shall notify <ORGANIZATION> within three (3) days of receiving such notice from its CB."

B.1.6 Product Impoundment and Financial Responsibility

- a. Fraudulent/counterfeit parts have no value. For example, any Limitation of Warranties provision contained in the Supplier's Terms and Conditions will be declared null and void if it is later determined that fraudulent/counterfeit parts or suspect fraudulent/counterfeit parts were received by the Organization from the Supplier.

"<SUPPLIER> and <ORGANIZATION> hereby agree that fraudulent/counterfeit parts have no value and any contract documents establishing a transaction involving fraudulent/counterfeit parts shall be declared null and void."

- b. Supplier has the right to agree with or verify the Organization's findings.

"<SUPPLIER> and <ORGANIZATION> hereby agree that if the OCM determines the suspect parts are authentic, then the decision is "final" and <SUPPLIER> and <ORGANIZATION> hereby agree that if <ORGANIZATION> or a testing laboratory chosen by <ORGANIZATION> determines that the electronic parts supplied are suspect/fraudulent/counterfeit, then <SUPPLIER> has the right to: (1) Agree with <ORGANIZATION'S> findings and the transaction will be voided; or (2) Verify <ORGANIZATION'S> findings by contracting with an <ORGANIZATION> approved and <SUPPLIER> recognized test laboratory (hereafter referred to as "lab") for further verification."

- c. Organization's burden of proof.

"Since any dispute between <ORGANIZATION> and <SUPPLIER> may be resolved in a civil proceeding whether in a court of law or in an arbitration, the appropriate burden of proof required for <ORGANIZATION> to establish that the suspect parts are fraudulent/counterfeit shall be preponderance of the evidence, which means that <ORGANIZATION> must establish that it is more likely than not that the suspect parts are fraudulent/counterfeit unless <ORGANIZATION> is trying to establish fraud, which would then raise <ORGANIZATION'S> burden of proof to a clear and convincing evidence standard. However, if for whatever reason, the issue of the authenticity of the suspect parts is raised during a criminal proceeding, then the burden of proof that the suspect parts are fraudulent/counterfeit shall be that the suspect parts are fraudulent/counterfeit beyond a reasonable doubt."

d. Product confiscation/destruction.

"If <SUPPLIER> accepts <ORGANIZATION'S> findings and chooses to immediately void the transaction, the suspect electronic parts will not be returned to <SUPPLIER> unless and/or until an independent lab agreed to by both <SUPPLIER> and <ORGANIZATION> determines that the electronic parts are not suspect fraudulent/counterfeit or fraudulent/counterfeit. Under these circumstances, <ORGANIZATION> shall retain possession of the suspect electronic parts for a time period at least as long as the applicable statute of limitations under the appropriate Authority(ies) Having Jurisdiction following the date upon which <SUPPLIER> received notification from <ORGANIZATION> that it was choosing to immediately void the transaction between them. Once this period has expired, then <ORGANIZATION> shall have the absolute right to destroy the suspect electronic parts. If <SUPPLIER> exercises its right to have an independent lab determine whether the suspect electronic parts are fraudulent/counterfeit and the lab verifies the findings that the subject electronic parts are either suspect fraudulent/counterfeit or fraudulent/counterfeit, then <SUPPLIER> must issue an immediate refund of all monies paid by <ORGANIZATION>. If the suspect parts are determined to be suspect counterfeit, fraudulent or counterfeit by the independent test lab, then the <Supplier> of those parts shall be required to pay for all charges issued by the testing lab. If, however, the suspect parts are determined not to be suspect counterfeit, fraudulent or counterfeit then the <Organizations> of those parts shall be required to pay all of the charges issued by the testing lab. <ORGANIZATION> and <SUPPLIER> agree that whether or not <SUPPLIER> refunds all monies paid by <ORGANIZATION>, <ORGANIZATION> shall have the absolute right to reacquire possession of the subject electronic parts from the lab in order to prevent the subject electronic parts from being offered for sale through any channels of distribution. In the event that <SUPPLIER> pursues its Supplier, either in civil or criminal proceedings, <SUPPLIER> shall have the right upon request to receive and use a mutually agreeable sample quantity of the parts sold for the purpose of pursuing its remedies. Upon completion of testing, samples will be returned to <SUPPLIER> who will then return them to <ORGANIZATION>. <ORGANIZATION> and <SUPPLIER> agree that <ORGANIZATION> shall have the right to destroy the suspect electronic parts after expiration of the applicable statute of limitations under the appropriate Authority(ies) Having Jurisdiction. Notwithstanding the above, if <ORGANIZATION> and <SUPPLIER> agree in writing that the parts can be immediately destroyed, the parts will be destroyed per their agreement so long as all civil or criminal actions, in which the suspect electronic parts are the subject of the action, have been completed."

APPENDIX C - ADDITIONAL FRAUDULENT/COUNTERFEIT PART DETECTION TESTS

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

Additional tests should be performed where specified by the Customer or where deemed necessary, based on risk assessment. In either case, additional product and inspection tests should be performed as agreed in writing between the Customer and the Organization. These additional tests may include one or more of the following:

C.1 ENERGY-DISPERSIVE X-RAY SPECTROSCOPY (EDS OR EDX)

Energy-dispersive X-ray spectroscopy (EDS or EDX) is an analytical technique used for the elemental analysis or chemical characterization of a sample. It is one of the variants of X-ray Fluorescence (XRF) spectroscopy which relies on the investigation of a sample by analyzing X-rays emitted by the matter in response to being hit with charged particles. The number and energy of the X-rays emitted from a specimen can be measured by an energy-dispersive spectrometer and allows the elemental composition of the specimen to be measured.

C.2 THERMAL CYCLE TESTING

Thermal Cycling should be performed on 100% of the parts. Upon completion of the required thermal cycles and a basic visual examination of the parts for evidence of marking deterioration or other physical damage, the parts should be electrically tested.

C.3 ELECTRICAL TESTING

Comprehensive electrical testing should be performed on all parts in a facility with test equipment and test engineering expertise suitable for the specific part type. The Customer should approve all test facilities and test methodologies.

C.4 BURN-IN

Pre Burn-In and Post Burn-In electrical testing should be performed on all parts. The steps involved in performing burn-in test are described below.

- a. Pre Burn-In Electrical Performance Testing - Parts should undergo comprehensive electrical testing to the applicable performance data sheet.
- b. Burn-In - Parts (100%) should undergo a powered burn-in at the part's maximum rated temperature.
- c. Post Burn-In Electrical Performance Testing - Parts should undergo comprehensive electrical testing to the applicable performance data sheet.

C.5 HERMETICITY VERIFICATION (FINE AND GROSS LEAK)

Parts that are intended to be hermetic, such as metal cans and ceramic packaged parts, should undergo 100% fine and gross leak testing, as applicable.

C.6 SCANNING ACOUSTIC MICROSCOPY (SAM) INSPECTION

SAM inspection should be performed on a representative sample from each homogeneous lot. SAM testing, including accept/reject criteria, should include the following as a minimum:

- a. Surface scans of both the top and bottom component package surfaces to detect evidence of resurfacing or remarking. Evidence of resurfacing or remarking should require total lot rejection.
- b. Interior top scans of the die, paddle, bond wires and lead frames to detect evidence of delamination, lead stress, and contamination. Presence of lot sampling defects should require either total lot rejection or 100% testing of all parts in lot.
- c. Overall calculations showing percentage of any die-voiding present. Presence of die-voiding should require overall percentage be calculated on each sampled component and reported to Customer for acceptance/rejection.

APPENDIX D - REPORTING

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

Upon identification of suspect or confirmed fraudulent/counterfeit parts, the Organization shall provide timely (within 60 days) notification to the reporting service organizations (as applicable) listed herein and to Authority Having Jurisdiction (as applicable).

Authority Having Jurisdiction, such as the agency Office of Inspector General (OIG), conducts independent criminal, civil and administrative investigations or audits that affect the servicing Governmental entity. Depending on the matter, Authority Having Jurisdiction coordinates with law enforcement agencies such as the U.S. Federal Bureau of Investigation (FBI) and U.S. Immigration and Customs Enforcement (ICE). Reports can be provided directly to Authority Having Jurisdiction points of contact, or via independent hotline reporting systems of the servicing Governmental entity. Table D1 provides reporting contact sources.

TABLE D1 - REPORTING CONTACT SOURCES

European Union (EU)	
	<p>The European Commission has developed a Manual for Lodging of Applications for Customs Action, available at: http://ec.europa.eu/taxation_customs/resources/documents/customs_controls/counterfeit_piracy/right_holders/manual.en.pdf</p> <p>The manual includes a listing of national customs website for EU countries:</p> <p>Austria: http://www.bmf.gv.at/ Belgium: http://fiscus.fgov.be/interfdan/ Bulgaria: http://www.customs.bg/ Cyprus: http://www.mof.gov.cy/ce Czech Republic: http://www.cs.mfcr.cz/ Denmark: http://www.skat.dk/ Estonia: http://www.customs.ee/ Finland: http://www.tulli.fi/ France: http://www.douane.gouv.fr/ Germany: http://www.ipr.zoll.de/ Greece: http://www.gsis.gov.gr/ Hungary: http://www.vam.hu/ Ireland: http://www.revenue.ie/ Italy: http://www.agenziadogane.it/ Latvia: http://www.vid.gov.lv/ Lithuania: http://www.cust.lt/ Luxembourg: http://www.etat.lu/DO/ Malta: http://mfin.gov.mt/ Netherlands: http://www.belastingdienst.nl/ Poland: http://www.clo.gov.pl/ Portugal: http://www.dgaiec.min-financas.pt/ Romania: http://www.customs.ro/ Slovak Republic: http://www.colnasprava.sk/ Slovenia: http://carina.gov.si/ Spain: http://www.agenciatributaria.es/ Sweden: http://www.tullverket.se/ United Kingdom: http://www.hmrc.gov.uk/</p>

Russia	
	<p>Department of Economic Security Department of the Interior of the Russian Federation (DEB Interior Ministry of Russia)</p> <p>The Department of Economic Security Department of the Interior of the Russian Federation is an independent structural unit of the central apparatus of <u>the Interior Ministry</u>, providing and performing the functions of the Ministry to develop and implement public policy and legal regulation of economic security, as well as performing other functions in accordance with the Regulations of the Department, regulations Affairs of Russia.</p> <p>A rights holder in Russia should report incidences of product counterfeiting to the Department of Economic Security, Russian Federation Ministry of the Interior. The Department is a specialized unit that also investigates financial fraud, financial support for terrorism, scams, currency counterfeiting, etc. The contact information is:</p> <p>By mail: 119049, Moscow, Zheetnaya Street 16</p> <p>By telephone: 7(495)-667-68-67</p> <p>Website: http://guebmvd.ru/</p> <p>Product counterfeiting activities often involve cross border trade. The rights holder should also report crimes to the Russian Customs Service. Customs will then watch for suspicious goods at the border, but not on an unlimited time basis. The rights holder should also consider registering their TMs on the Custom's TM registry for customs, which then becomes part of the computerized database available at all customs posts. Customs officials will then be in a better position to intercept shipments of fake goods. The contact information is:</p> <p>By telephone: 7(495)-204-57-28</p> <p>By fax: 7(495)-204-57-12</p> <p>By email: umts_panfilova@mail.customs.ru or umts_kontakt@mail.customs.ru</p> <p>Website: http://www.russian-customs.org/</p>

United Kingdom (UK)	
Crimestoppers	<p>Contact Crimestoppers anonymously by calling +44 (0) 800 55 5111. Talking to one of our advisors helps you provide the full picture and makes sure the best use can be made of your information.</p> <p>By telephone: +44 (0) 800 55 5111</p> <p>Website: http://www.fakesfundcrime.org.uk</p>
HM Revenue and Customs	<p>HM Revenue and Customs http://www.hmrc.gov.uk/index.htm</p> <p>Customs Hotline by telephone: +44 (0)800 59 5000</p>
Intellectual Property Office Intel Hub	<p>By mail: Intelligence Hub, Concept House, Cardiff Road, Newport, South Wales, NP10 8QQ</p> <p>By telephone: + 44 (0) 1633 814535</p> <p>By email: ipintel@ipo.gsi.gov.uk</p> <p>Website: http://www.ipo.gov.uk</p>
Ministry of Defence Police Fraud Squad	<p>For issues relating to UK Defence.</p> <p>By mail: Head of Fraud Squad, MDPGA Wethersfield, Braintree, Essex. CM7 4AZ</p> <p>By telephone: + 44 (0) 1371 854203</p>
Trading Standards Institute	<p>To alert trading standards officers to the sale, purchase or production of counterfeit goods in the UK, the Trading Standards Institute disseminates any information received through its secure website TS Interlink.</p> <p>By email: information@tsi.org.uk</p> <p>By mail:</p> <p>Information centre, TSI 1 Sylvan Court, Sylvan Way Southfields Business Park Basildon Essex SS15 6TH</p> <p>Website: http://www.tradingstandards.gov.uk/</p>
Anti-Counterfeiting Forum	<p>The UK Electronics Alliance (UKEA) maintains a database of fraudulent/counterfeit items primarily for U.K. organizations. Data can be submitted by anyone on the public domain of their website (http://www.anticounterfeitingforum.org.uk/). Companies need to register on the website, which they may do free of charge, to report, view and comment online on fraudulent/counterfeit items. Submitting companies remain anonymous in the reporting of fraudulent/counterfeit items. All electronics-related companies/organizations are able to register. Registered users, and information uploaded to the database, are monitored on a regular basis to ensure correct use of this facility.</p>

U.S.A.	
Air Force Office of Special Investigations (AFOSI)	<p>AFOSI units are located at most Air Force bases worldwide. The AFOSI contact should be indicated in the installation's telephone directory.</p> <p>Or AFOSI can be contacted at 877-246-1453 for the phone number of the nearest AFOSI unit.</p> <p>AFOSI's email is hqafosi.watch@ogn.af.mil</p>
Department of Commerce (DOC), Office of Inspector General (OIG)	<p>By mail:</p> <p>U.S. Department of Commerce Office of Inspector General 1401 Constitution Avenue, NW Washington, DC 20230</p> <p>Tel: (202) 482-4661</p> <p>By telephone: HQ hotline 1-800-424-5197.</p> <p>By email: hotline@oig.doc.gov</p> <p>Online complaint form: http://www.oig.doc.gov/Pages/Hotline.aspx</p>
Department of Energy (DOE), Office of Inspector General (OIG)	<p>By mail:</p> <p>U.S. Department of Energy Office of Inspector General ATTN: IG Hotline 1000 Independence Avenue, SW Mail Stop 5D-031 Washington, DC 20585</p> <p>By telephone: Inspector's General Fraud Hotline: 1-800- 541-1625 (toll free) or (202) 586-4073 (toll)</p> <p>By email: ighotline@hq.doe.gov</p>
Department of Transportation (DOT), Office of Inspector General (OIG)	<p>By mail:</p> <p>OIG Fraud Hotline 1200 New Jersey Avenue, SE West Bldg., 7th Floor Washington, DC 20590</p> <p>By telephone: 1-800 424-9071 (toll free)</p> <p>By email: hotline@oig.dot.gov</p> <p>Online complaint form: https://www.oig.dot.gov/dot-oig-hotline-complaint-form</p>

ERAI	<p>ERAI is a privately held global trade association that monitors, investigates, reports, and mediates issues affecting the global supply chain of electronics, including supply of fraudulent/counterfeit and substandard parts.</p> <p>ERAI maintains a database of fraudulent/counterfeit and high-risk items. Data can be submitted by anyone on the public domain of their website (http://www.eraf.com/). Companies do not need to be members to report fraudulent/counterfeit and high-risk items. Submitting companies remain anonymous in the reporting of fraudulent/counterfeit/high-risk items. Companies must be ERAI members to view this database. However, virtually all electronics-related companies/organizations, not just resellers, are candidates for membership.</p> <p>For further guidance, contact ERAI at (239-261-6268) or http://www.eraf.com/</p>
Excluded Parties List System (EPLS)	<p>The Excluded Parties List System (EPLS) includes information regarding entities debarred, suspended, proposed for debarment, excluded or disqualified under the nonprocurement common rule, or otherwise declared ineligible from receiving Federal contracts, certain subcontracts, and certain Federal assistance and benefits.</p> <p>NOTE: EPLS and other systems is migrating to the System for Award Management (SAM). SAM is a free web site that consolidates the capabilities found in CCR/FedReg, ORCA, and EPLS. Registering with SAM will allow access to the full functionality of the system.</p> <p>See https://www.sam.gov/portal/public/SAM/ for additional information.</p>
Federal Aviation Administration (FAA)	<p>By mail: FAA Form 8120-11, "Suspected Unapproved Parts Report"</p> <p>Federal Aviation Administration Aviation Safety Hotline Office AAI-3, Room 840 800 Independence Avenue, SW Washington, DC 20591</p> <p>By telephone: 1-800-255-1111</p> <p>By email: FAA Form 8120-11 to: 9-awa-avs-aa1-safetyhotline@faa.gov</p> <p>Online: FAA Form 8120-11 is available at: http://www.faa.gov/documentLibrary/media/form/faa8120-11.pdf</p>

<p>Government-Industry Data Exchange Program (GIDEP)</p>	<p>GIDEP (Government-Industry Data Exchange Program) is a cooperative activity between the U.S. Government, the Canadian Government, and Industry participants seeking to reduce or eliminate expenditures of resources by sharing technical information essential during research, design, development, production and operational phases of the life cycle of systems, facilities and equipment.</p> <p>GIDEP is the vehicle by which Industry and Government organizations alert each other of defective/nonconforming product, including fraudulent/counterfeit parts. GIDEP documents should be used by Government organizations and contractors to share information on counterfeiting issues. OMB Policy Letter 91-3 directs Executive Agencies and Establishments to participate in GIDEP. Contractors and suppliers should be members of GIDEP and have processes for monitoring GIDEP documents, responding to GIDEP documents, and reporting fraudulent/counterfeit parts issues to GIDEP.</p> <p>GIDEP participants should consult the GIDEP Operations Manual for guidance concerning participation in the program, reporting requirements, and procedures for the exchange of reports, data, and information.</p> <p>For additional guidance, go to the GIDEP member's website (http://www.gidep.org).</p> <p>Non-participants may contact the GIDEP Help Desk (951-898-3207) for guidance.</p>
<p>IDEA</p>	<p>IDEA (Independent Distributors of Electronics Association) is a non-profit trade association representing Independent Distributors that have formally committed to adhere to prescribed quality and ethical standards. The stated purpose of IDEA is to promote the independent distribution industry through media advocacy; to improve the quality of products and services through a quality certification program, educational seminars and conferences; and to promote the study, development, and implementation of techniques and methods to improve the business of Independent Distributors.</p> <p>IDEA maintains a database of fraudulent/counterfeit and high-risk items. Data can be submitted by OCMs and members.</p> <p>For additional guidance, go to (http://www.idofea.org).</p>
<p>NASA Office of Inspector General (NASA OIG)</p>	<p>By mail:</p> <p>NASA Office of Inspector General P.O. Box 23089 L'Enfant Plaza Station Washington, DC 20026</p> <p>By telephone: 1-800-424-9183</p> <p>By email: http://oig.nasa.gov/cyberhotline.html</p>

National Intellectual Property Rights Coordination Center	<p>The National Intellectual Property Rights Coordination Center (IPR Center) is the U.S. Government's clearing house for investigations into counterfeiting and piracy - crimes that threaten public health, public safety and fair competition.</p> <p>IPR Center Participants:</p> <ul style="list-style-type: none">• U.S. Immigration and Customs Enforcement• U.S. Customs and Border Protection• Federal Bureau of Investigation• Food and Drug Administration, Office of Criminal Investigations• U.S. Postal Inspection Service• Department of Commerce, International Trade Administration• U.S. Patent and Trademark Office• Naval Criminal Investigative Service• Defense Criminal Investigative Service• U.S. Army Criminal Investigative Command, Major Procurement Fraud Unit• U.S. General Services Administration Office of the Inspector General• Consumer Product Safety Commission• Defense Logistics Agency• U.S. Department of State, Office of International Intellectual Property Enforcement• INTERPOL• Government of Mexico Tax Administration Service• Royal Canadian Mounted Police <p>In addition, the IPR Center works closely with the Department of Justice Computer Crime and Intellectual Property Section.</p> <p>By mail:</p> <p>Homeland Security Investigations National IPR Coordination Center 2451 Crystal Drive, STOP 5105 Arlington, VA 20598-5105</p> <p>By telephone: 1-866-IPR-2060</p> <p>By email: IPRCenter@dhs.gov</p> <p>Online: http://www.iprcenter.gov/</p>
---	--

APPENDIX E- PERSONNEL TRAINING PROGRAMS

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

E.1 PERSONNEL TRAINING PROGRAMS

- a. Defense Acquisition University - Course CLL 032 (<http://www.dau.mil/default.aspx>)
- b. IDEA - IDEA-TRN-1000 Avoidance and Visual Indicators of Counterfeit Parts for Management (<http://www.idofea.org/>)
- c. IDEA - IDEA-TRN-2000 Inspection for Visual Indicators of Counterfeit Parts (<http://www.idofea.org/>)
- d. SAE International - Implementation of AS6081 – Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors (<http://www.sae.org/pdevent/C1135>)
- e. NAS-410 - National Aerospace Standard, NAS Certification Qualification of Nondestructive Test Personnel
- f. ASNT SNT-TC-1A - American Society for Nondestructive Testing - Recommended Practice for Personnel Qualification and Certification of Nondestructive Testing
- g. EN 473 - European Standard - Qualification and Certification of NDT Personnel - General Principles
- h. ASD-STAN EN 4179 - AeroSpace and Defence Industries Association of Europe - Qualification and approval of personnel for non-destructive testing
- i. ISO 9712 - Non-destructive testing - Qualification and certification of personnel
- j. ASNT CP-189 - American Society for Nondestructive Testing Standard for Qualification and Certification of Nondestructive Testing Personnel (2006)

APPENDIX F- ACRONYMS AND ABBREVIATIONS

3PL	Third-Party Logistics
AFOSI	Air Force Office of Special Investigations
ANSI	American National Standards Institute
AS	SAE designation prefix for Aerospace Standard
ASQ	American Society for Quality
BGA	Ball Grid Array
CAS	Chemical Abstracts Service
CGA	Column Grid Array
CoC	Certificate of Conformance
CoC/T	Certificate of Conformance and Supply Chain Traceability
C of C	Certificate of Conformance
CRB	Certification/Registration Body
DAPS	Document Automation and Production Service
DIP	Dual In-Line Package
DoC	Department of Commerce
DoE	Department of Energy
DoT	Department of Transportation
DPA	Destructive Physical Analysis
EDS/EDX	Energy-dispersive X-ray Spectroscopy
EEE	Electrical, Electronic and Electromechanical
EPLS	Excluded Parties List System
ERAI	ERAI, Inc
ESD	Electrostatic Sensitive Device or ElectroStatic Discharge
EU	European Union
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
GIDEP	Government-Industry Data Exchange Program
HQ	Headquarters
IAF MLA	International Accreditation Forum Multilateral Recognition Arrangements
ICE	U.S. Immigration and Customs Enforcement
IDEA	Independent Distributors of Electronics Association
IEC	International Electrotechnical Commission
ILAC	International Laboratory Accreditation Cooperation
IP	Intellectual Property
IPR	Intellectual Property Rights
ISO	International Organization for Standardization
JEDEC	Joint Electronic Device Engineering Council
JESD	JEDEC Standard Document
JIT	Just In Time
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
OMB	Office of Management and Budget
PDN	Product Discontinuation Notice
PEM	Plastic Encapsulated Microcircuit
PIND	Particle Impact Noise Detection
QML	Qualified Manufacturers List
QPL	Qualified Products List
SAM	Scanning Acoustic Microscopy
SEM	Scanning Electron Microscope
SOIC	Small-Outline Integrated Circuit
STD	Standard
TM	Trademark
TSOP	Thin Small-Outline Package
UK	United Kingdom
UKEA	UK Electronics Alliance
XRF	X-ray Fluorescence