



Hamilton Sundstrand Corporation Buy Requirements Guide

APPROVALS:

A. Scavotto
PREPARED BY: A. Scavotto

DATE: 8/16/2012

S. Webster
SUPPLIER QUALITY ASSURANCE: S. Webster

DATE: 8/16/2012

R. Murray
SUPPLY CHAIN MANAGEMENT: R. Murra

DATE: 8/16/2012

D. Veilleux
ENGINEERING RECORDS: D. Veilleux

DATE: 2012/08/17

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

COPYRIGHT © HAMILTON SUNDSTRAND CORPORATION. THIS DOCUMENT IS THE PROPERTY OF HAMILTON SUNDSTRAND CORPORATION (HS). YOU MAY NOT POSSESS, USE, COPY OR DISCLOSE THIS DOCUMENT OR ANY INFORMATION IN IT, FOR ANY PURPOSE, INCLUDING WITHOUT LIMITATION, TO DESIGN, MANUFACTURE OR REPAIR PARTS, OR OBTAIN ANY GOVERNMENT APPROVAL TO DO SO, WITHOUT HS'S EXPRESS WRITTEN PERMISSION. NEITHER RECEIPT NOR POSSESSION OF THIS DOCUMENT ALONE, FROM ANY SOURCE, CONSTITUTES SUCH PERMISSION. POSSESSION, USE, COPYING OR DISCLOSURE BY ANYONE WITHOUT HS'S EXPRESS WRITTEN PERMISSION IS NOT AUTHORIZED AND MAY RESULT IN CRIMINAL AND/OR CIVIL LIABILITY. THIS DOCUMENT CONTAINS NO TECHNICAL DATA. ECCN: EAR99



DOCUMENT REVISION HISTORY

| REV | PAGE(S) AFFECTED | DESCRIPTION OF REVISION | APPROVAL DATE |
|-----|-------------------|---|---------------|
| - | All | Initial Release | 5/14/2012 |
| A | 3,4,6,7,8,9,11-39 | Added HSM20 content for Bar Stock/Material. Added Para. 19, Highlighted Requirements for Magnetic Devices. Added Para. 20.0 Contract Assembly House requirements. | |

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



TABLE OF CONTENTS

| Section | Description | Page |
|----------------|---|-------------|
| 1.0 | Scope | 4 |
| 2.0 | Acronyms | 4 |
| 3.0 | Definitions | 5 |
| 4.0 | Applicable Documents | 8 |
| 5.0 | Executive Summary | 9 |
| 6.0 | Test Houses | 10 |
| 7.0 | Statement Regarding the Use of Counterfeit Parts | 10 |
| 8.0 | Un-Broken Traceability | 11 |
| 9.0 | Trusted/Authorized Distributors for Electronic/Mechanical Parts | 12 |
| 10.0 | Source Control – Bar stock/Material | 14 |
| 11.0 | Distributor Responsibilities for Mechanical Parts | 18 |
| 12.0 | Distributor Responsibilities for Electronic Non-Source Controlled Drawings | 20 |
| 13.0 | OEM Responsibilities for Electronic Non-Source Controlled Drawings | 21 |
| 14.0 | Distributor Responsibilities for Electronic Source Controlled Drawings | 22 |
| 15.0 | Distributor Responsibilities for Non-Hamilton Specified Drawings Parts (Purchased to MIL Part Number) | 23 |
| 16.0 | OEM Responsibilities for Electronic Source Controlled Drawings | 23 |
| 17.0 | OEM Responsibilities for Electronic Assemblies with Manufacturer Design Authority | 24 |
| 18.0 | OEM Responsibilities for Electronic Assemblies Made to HS Design to HS Drawing Requirements | 25 |
| 19.0 | Highlighted Requirements for Suppliers of Magnetic Devices Built Per HS16442 | 26 |

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



TABLE OF CONTENTS (Cont.)

| | | |
|--------------|---|----|
| 20.0 | Contract Assembly House | 27 |
| 21.0 | HS Internal actions | 28 |
| Figure 1 | Purchase Method Risk Assessment | 29 |
| Figure 2 | Reference Broker Part Plan Process | 30 |
| Appendix I | AS5553 Compliance for Electronic/Electro-Mechanical Parts | 31 |
| Appendix II | FMEA Process and Example PFMEA and Control Plan. | 33 |
| Appendix III | Electronic/Electro-Mechanical Part Type | 34 |

1.0 Scope

The intent of this document is to provide supplement requirements to ASQR-01 and HSM17 for counterfeit part avoidance.

2.0 Acronyms

| | |
|--------|---|
| AML | Approved Manufacturer List |
| ASL | Approved Supplier List – |
| AQL | Acceptable Quality Level |
| AS | Aerospace Standard |
| C | Centigrade |
| CAD | Conditional Advanced Disposition |
| CAI | Current Article Inspection |
| CEL | Component Evaluation Laboratory |
| C-SCAN | Planar view Image of SAM |
| DPA | Destructive Physical Analysis |
| DQR | Designated Quality Representative |
| ESIR | Electronic Source Inspection Record |
| ESM | Engineering Systems Manuel |
| FAI | First Article Inspection |
| FIT | Failure in Time (1 billion device hours) |
| GIDEP | Government Industry Data Exchange Program |
| HAST | Highly Accelerated Stress Test |
| HRS | Hours |
| HS | Hamilton Sundstrand |
| HSER | Hamilton Sundstrand External Report |
| IPD | Integrated Product Development (Team) |
| LTB | Last Time Buy |
| MAX | Maximum |
| MFG’S | Manufacturers |

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



| | |
|--------|--|
| Mil | Military |
| NADCAP | National Aerospace and Defense Contractors Accreditation Program |
| NCM | Non-Conforming Material |
| OCM | Original Component Manufacturer |
| OEM | Original Equipment Manufacturer |
| PD | Procurement Data |
| P/N | Part Number |
| PPAP | Production Part Approval Process |
| P.O. | Purchase Order |
| QASL | Quality Approved Supplier List |
| QML | Qualified Manufacturers List |
| QPL | Qualifier Product List |
| QUAL | Qualify |
| SAM | Scanning Acoustic Microscopy |
| SCM | Supply Chain Management |
| SDE | Supplier Designated Engineer |
| SPC | Statistical Process Control |
| SPEC | Specification |
| SQA | Supplier Quality Authority |
| SRI | Supplier Request for Information |
| TEMP | Temperature |
| UPPAP | UTC Production Part Approval Process |
| UTC | United Technologies Corporation |
| VP | Vice President |
| XRF | X-Ray Fluorescence |

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

3.0 Definitions

Inspection Lot:

A lot shall consist of devices submitted at one time of one date code submitted to determine compliance with the requirements and acceptance criteria of this specification. Each lot shall consist of devices of a single device type, in a single package style. Devices in each lot shall be manufactured from the same basic raw materials and on the same production line(s) by the same production techniques, and to the same device design rules, and packaged with the same material requirements. Lot identification shall be maintained from the time the lot is received through the time the lot is accepted.

Suspect Part: (as defined in AS5553)

A part in which there is an indication by visual inspection, testing, or other information that it may have been misrepresented by the supplier or manufacturer and may meet the definition of counterfeit part provided below.

Counterfeit Part: (as defined in AS5553)

**HS PROPRIETARY - Subject to the restriction on the title or cover page.
THIS DOCUMENT CONTAINS NO TECHNICAL DATA. ECCN: EAR99**



A suspect part that is a copy or substitute without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented by a supplier in the supply chain. Examples of counterfeit parts include, but are not limited to:

- Parts which do not contain the proper internal construction (die, manufacturer, wire bonding, etc.) consistent with the ordered part.
- Parts which have been used, refurbished or reclaimed, but represented as new product.
- Parts which have different package style or surface plating/finish than the ordered parts.
- Parts which have not successfully completed the Original Component Manufacturer's (OCM)'s full production and test flow, but are represented as completed product.
- Parts sold as up-screened parts, which have not successfully completed up-screening.
- Parts sold with modified labeling or markings intended to misrepresent the part's form, fit, function, or grade. Parts which have been refinished, up-screened, or up-rated and have been identified as such are not considered counterfeit.

Certificate of Conformance (C of C):

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

Franchised Distributor:

A distributor with which the OCM has a contractual agreement to buy, stock, re-package, sell and distribute its product lines. When a distributor does not provide products in this manner, it is considered an independent distributor for those products. Franchised distributors normally offer the product for sale with full manufacturer flow-through warranty.

Government Industry Data Exchange Program (GIDEP):

A cooperative activity between 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.

Trusted Independent Distributor:

An industry definition of an Independent distributor is as follows: A distributor that purchases new 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 independent distributors. Re-sale of the purchased parts (re-distribution) may be to OEMs, contract manufacturers, or other independent distributors. Independent distributors do not have

This document does not contain any export controlled technical data. This Watermark Supersedes All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



contractual agreements or obligations with OCMs. A Trusted Independent Distributor, as determined by Hamilton Sundstrand, shall be defined by Paragraph 9.0 within this document.

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 may have broken traceability back to the OEM.

Broker:

In the independent distribution market, brokers are professionally referred to as independent distributors.

Approved Supplier:

Suppliers that are formally assessed, determined to be at low risk of providing counterfeit parts, and entered into JDE.

Original Component Manufacturer (OCM):

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

Aftermarket Manufacturer:

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.

First Article Inspection (FAI):

A complete, documented physical and functional inspection process to verify that prescribed production methods have produced an acceptable item as specified by engineering drawings, planning, purchase order, engineering specifications, and/or other applicable design documents. First Article Inspection (FAI) Reports are to be performed as required by ASQR-01 and as indicated in ASQR-01 to AS9102.

Raw Materials:

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

Consumables:

Goods that are intended to be used in manufacture or processing of a product and consumed fairly quickly and then replaced (Oxford). Consumable type defined in Paragraph 10.2 bullet 5.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings.
9/23/2014 11:30:17 AM



COTS:

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

COTS Verses HS Drawing Part Number Distinction:

The HS part number gathers a complete data set on the COTS device, using established methods to measure the assembly, materials, design, performance, and reliability attributes. It also provides detailed evaluation of up-screening steps and their added value or lack thereof. It assesses robustness of parts evaluated by drawing any correlations between any failures (or lack thereof) and the inherent manufacturer’s advertised quality and reliability.

4.0 Applicable Documents

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

- AS5553 Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
- AS6081 Counterfeit Electronic Parts, Avoidance Protocol Distributors
- HSM17 Hamilton Sundstrand Supplier Product-Release Programs
- ASQR-01 Aerospace Supplier Quality Requirements
- SP1228 Processing of Nonconforming Material
- HT0990 Manufacturing Process Review
- HSC16199 Management & Classification of Critical to Quality Characteristics
- AS9102 Aerospace First Article Inspection Requirement
- AS9100 Quality Management Systems – Requirements for Aviation, Space and Defense
- AS9120 Quality Management Systems – Requirements for Aviation, Space and Defense Distributors
- AC 21-29C Detecting and Reporting Suspect Unapproved Parts – U.S. Department of Transportation
- SAE-J1739 Potential Failure Mode and Effects Analysis in Manufacturing and Assembly Processes
- HS48 Acceptance Testing of Steel, major Forgings
- HS424 Acceptance of Castings
- HS16442 Procurement Specification for Magnetic Devices Used in Electronic Applications.
- CEP-100 Hamilton Sundstrand Supplier Configuration Management Requirements.
- SP-1249 HS defined broker part process.
- HS14722 Materials of Concern

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



5.0 Executive Summary

The intent of this paragraph is to provide a general summary of subject matter that is covered in greater detail within this document. Key Items include but not limited to the following:

- Under no circumstance is Hamilton Sundstrand to be provided counterfeit parts.
- Distributors must be AS9120, ASQR-01, HSM17, HS14722 and HSM19 compliant.
- HS purchasing shall maintain a supplier rating for quality and delivery to be found on the HS supplier portal.
- This document establishes requirements for Source Control of raw materials and consumables to ensure traceability and prevent material acquisitions from disreputable sources. With regards to raw materials and consumables, it does not pertain to Industry/Military standard parts of Commercial-Off-the Shelf (COTS) items.
- Distributors must provide full warranty back to the OEM.
- Hamilton Sundstrand will not accept parts from distribution that have broken traceability (defined in Paragraph 8.0) to the OEM.
- In the case where a distributor procures a part from another distributor, the secondary distributor must be an approved distributor of the OEM and AS9120 certified. Full warranty back to the OEM must be maintained. Exceptions will require the part to go through a HS approved broker part plan (Refer to Figure 2).
- Non-Franchised Distributors must have a trusted non-franchised distributor audit performed prior to the execution purchase orders. Purchases from non-franchised distribution must be reviewed by Hamilton Sundstrand for direct traceability to the OEM. If parts are not bought direct from the OEM, an approved HS counterfeit detection test plan must be performed.
- Distributors of electronic and electro-mechanical parts (Refer to Appendix III) are required to implement and enforce a written counterfeit part prevention and control plan, in accordance to AS5553(reference Appendix A), which is designed to preclude, detect, and remove any counterfeit components or non-compliant material from being delivered to HS.
- The distributor's counterfeit parts prevention and control plan shall enforce the same prevention requirements onto all sub-tier providers.
- All OEM suppliers of electronic and electro mechanical parts must have a counterfeit avoidance methodology (reference Appendix I). This methodology must be flowed down to their sub-tier subcontractors.
- Communication between suppliers and Hamilton Sundstrand shall be done through the SRI system.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Markings. 08/17/2014 11:10:17 AM



- Purchase orders for production type hardware must be placed with suppliers on the Quality Approved Supplier List (QASL).
- If an EASL exist against an individual part number, the part must be bought from the manufacturer listed.
- Parts on a Source Control drawing must be provided using the ASL. If an ASL does not exist, the supplier is to issue a SRI for disposition prior to shipment of any said material.
- Suppliers shall provide PCN notifications.
- Part substitution shall not be made unless approved by HS.
- Purchase requirements pertaining to counterfeit avoidance shall be flowed down to all contract assembly houses and their sub-tier providers.
- For the preference and risk assessment of the source of electronic and mechanical part purchases, refer to Figure 1.

6.0 Test Houses

Evaluation and or testing shall be performed by either Hamilton Sundstrand CEL or a qualified testing facility. A qualified test house is one that has been surveyed and approved by Supplier Quality and Component Engineering. This may include the OEM or a third party test site. Test to be performed may include datasheet verification, infant mortality, reliability requirements such as burn-in, or up-screening.

This document does not contain any export controlled technical data. This document is classified as UNCLASSIFIED//FOR OFFICIAL USE ONLY. Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

7.0 General Statement Regarding the Use of Counterfeit Parts

Supplier shall represent that it will not furnish “counterfeit goods”. This includes Purchase Order Agreements defined but not limited to LTA, LTB, Spot buys, Non-Product, Government Buys, and Transition Buys. Counterfeit or suspect counterfeit parts are defined within HS to the following in addition to that of which is defined in AS5553:

- Parts that are an unauthorized copy or substitute of an original equipment manufacturer or original component manufacturer (collectively, “OEM”) item
- Parts not traceable to an OEM sufficiently to ensure authenticity in OEM design and manufacture.
- Parts that do not contain proper external or internal materials or components required by the OEM or are not constructed in accordance with OEM design.
- Parts that have been re-worked, re-marked, re-labeled, repaired, refurbished, or otherwise modified from OEM design but are represented as OEM authentic or as new
- Parts that have not passed successfully all OEM required testing, verification, screening, and quality control processes
- Parts that fail to meet the requirements of an “Approved Part” as defined in FAA Advisory Circular 21-29C, and any updated version thereof.



Counterfeit goods will be deemed non-conforming and in addition to any other rights Buyer may have at law or pursuant to this Agreement, Supplier will disclose the source of the counterfeit good to Buyer and otherwise cooperate with Buyer with respect to any investigations or remedial actions undertaken by Buyer.

Under no circumstances shall counterfeit parts from distribution, OEM's, Sub-tier providers, 3rd Party build houses, or Test houses be allowed in Hamilton Sundstrand product. Part type definition includes but is not limited to the following material types:

- Bar stock
- Raw materials
- Consumables
- Electronic components
- Connectors/contacts
- Wire
- Mechanical components
- Hardware
- Sub-assemblies
- Board assemblies
- Unit assemblies
- Casting
- Forgings

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

8.0 Un-Broken Traceability:

For procurement of product for commercial or industrial use, product delivered by the manufacturer to the HS approved AS 9120 franchised distributor is not normally required to contain a formal certificate of conformance. In such cases, the accompanying documentation is a commercially acceptable packing list. If the HS approved AS9120 distributor is not franchised, a letter of proof from the OEM must also accompany the packing list. This documentation normally identifies the manufacturer, distributor to whom the parts were supplied, distributor purchase order number, part number, and quantity. Additional information, such as date code or statement of compliance, may be provided. If part is provided through distribution, the distributor must provide a C of C confirming that there is un-broken traceability from all intermediaries back to the OEM.

For procurement of product for military or US Government use, a manufacturer certification to a specified military or aerospace specification or standard is required. This documentation shall contain at a minimum the manufacturer, distributor, distributor purchase order number, part number, quantity, and date code of each quantity supplied. If bought direct form the OEM, the OEM shall provide a C of C. If bought through distribution, the distributor must provide a C of C confirming there is un-broken traceability back to the OEM.



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

If a part is bought direct from an OEM to a Hamilton Sundstrand drawing, the OEM must provide a C of C.

In the Case of Bar Stock and Raw material, a C of C can be substituted with compliant documentation as stated in the following scenarios:

9.0 Trusted/Authorized Distributors for Electronic/Electro-Mechanical Parts
(Refer to Appendix III for Part Type)

A Trusted Distributor shall ensure that only new and authentic devices are delivered to HS as piece parts, assemblies and/or subassemblies by use of established test and inspection activities necessary to assure authenticity. The distributor shall only purchase parts directly from the OEM, an OEM HS approved franchised distributor with AS9120 certification, or an authorized aftermarket manufacturer approved by HS. The distributor must provide full warranty back to the OEM.

Additional requirements are as follows:

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HS14722 and HSM17.
- The distributor must demonstrate adherence and/or certification to quality levels of AS9120.
- Distributor is required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed (reference Appendix A) to preclude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries.
- The Distributor is required to submit written confirmation to HS for compliance to this requirement.
- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.

HS PROPRIETARY - Subject to the restriction on the title or cover page.
THIS DOCUMENT CONTAINS NO TECHNICAL DATA. ECCN: EAR99



- In the event that an OEM does not have a franchised distribution base, a HS approved distributor may form what is called a Site or Approved Franchise title with the OEM. This is a legal agreement with the OEM to provide product to HS as a distributor under the franchised distribution title as defined in this document.
- Purchase of electronic parts from non trusted sources shall be classified as broker parts and be considered suspect. Such parts shall be subject to HS risk mitigation counterfeit detection processes (Refer to Figure 2).
- Distributors that are allowed to make such a purchase with HS approval as stated on a purchase order are not allowed to have DQR authority unless written approval is received from a Supplier Quality Counterfeit Avoidance Engineer. This is on a per P.O. request bases.
- Approval of Non-Franchised Distributors to become Trusted shall be based on a site audit performed by SCM and Supplier Quality. Site audit shall include compliance to AS5553, AS9120, ASQR-01, HSM17 and DQR authorization Assistance in the evaluation shall be provided by Component Engineering. Counterfeit detection techniques, test capabilities, buying practices, material handling, and quality controls shall also be reviewed as a minimum. In the event the non-franchised distributor has not been utilized for a two year period or greater, the audit will need to be repeated prior to the delivery of product for HS use. Non-franchised distributors shall not be utilized without written permission from HS.
- Distributors are not allowed to issue their C of C for broker parts until a HS delegated representative examination of the traceability documentation has been performed for counterfeit detection methodologies.
- Parts found to be nonconforming or otherwise unsuitable for use must be physically identified and segregated from conforming material. Nonconforming material is not permitted to be shipped to HS.
- All parts provided by non-franchised distributors must contain the same OEM warranties as provided by a franchised distributor.

9.1 **Trusted Broker for Electronic/Electro-Mechanical Parts**

(Refer to Appendix III for Part Type)

A trusted Broker is a distributor that may not have compliance to ASQR-01, HSM17, or AS9120 but does add value to the Hamilton Sundstrand Broker Part Process. Prior to use, a broker must go through a trusted broker approval process performed by HS Supplier Quality. A Trusted Broker is to be used through the use of a Trusted Distributor. Purchasing shall request a preliminary assessment of all material to be performed by the trusted broker as part of the HS broker part plan (Refer to Figure 2). Broker shall perform and provide the following:

- Purchase only from reliable sources
- Review of industry alerts such as ERAI and GIDEP
- Have a counterfeit avoidance and detection plan that meets Appendix A and the following:



- Review of all date codes, does date code match that of OEM
- Pictures of material
- Samples upon availability
- Marking Permanency - Black Topping & Overspray examination
- Alterations / Re-Marking
- Lead / Terminal Quality
- Re-worked or Tampered Parts
- Physical Dimension & Package Outline
- Basic functional test
- Material Analysis (when applicable)
- Review of all C of C's for un-broken traceability

10.0 Bar Stock/Material

Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17, HSM19, HS14722,AS9100 (for OEM) , and AS9120 (Distribution). Requests for any exceptions to this procedure must be submitted through the SRI process prior to production. (See:ASQR-01).

10.1 Scope

This document establishes requirements for Source Control of raw materials and consumables. The purpose is to mitigate the risk of material substitution, ensure traceability throughout all levels of the supply chain, and prevent material acquisition from disreputable sources.

10.2 Applicability:

This specification is applicable when HSM17 is a Purchase Order requirement. It is not applicable to Industry / Military standard parts or Commercial-Off-the-Shelf (COTS) items. This procedure applied to:

- Bulk purchased metals and any related alloys.
- Products fabricated from forming of metals using various processes including but not limited to stamping, machining, welding, casting, forging, sintered metals, cold and hot forming, and heat treating. As an example this includes metallic raw materials used in manufacture of bearing.
- Metallic raw materials used in manufacture of bearings.
- Bulk purchased raw materials such as resins used in the manufacture of plastic parts.
- Consumable materials which are used 'as required' per design/engineering requirements. Could include items such as adhesives, coatings, epoxies, brazing alloys, welding alloys, soldering alloys, fluxes, lubricants, inks, tapes, thread lock compound, paint, resins, primers, silicones, sealants, etc.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



10.3 Requirements:

The supplier shall implement a raw material and consumables source control strategy to ensure:

- All customer requirements are implemented as part of the contract review process.
- Change management processes are in place to prevent unapproved procurement sources.
- Material validation strategies beyond reliance on the certifications (i.e. C of A, C of C).
- Traceability and identification of raw material and applicable consumables (per engineering requirements) to the end product.
- Robust material storage controls to mitigate risk of degradation and control shelf life.
- Availability of records within 48 hours of request by HS.
- Control and validation of sub-tiers to these requirements.

As part of sourcing strategy, the supplier shall establish a risk assessment process such as the use of FMEAs and control plans. When potential risks for sources of raw materials is determined to be high in meeting the requirements a 100% inspection plan shall be implemented. Alternatively, the supplier shall establish and define a method to ensure 100% compliance to the design requirements. (For details on FMEA see Appendix-II)

This document does not contain any export controlled technical data. This watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

10.4 Validation Requirements for Certifications (C of A, C of C's):

- The compliance of certification to the design requirements for all raw materials and consumables shall be validated and documented on an annual basis. Exceptions to this requirement shall be communicated to HS via the SRI process. The validation documents must be maintained according to HS record retention requirements as defined in ASQR-01.
- The validation documents must certify that the chemical composition, element analysis, maximum impurity levels, microstructure, and physical properties of the material conform to the design specification.

10.5 Raw Materials and Consumables Specific Requirements:

10.5.1 RFQ Process:

- The supplier shall establish a process to evaluate raw materials for traceability, stop gap measures, shipping, and manufacturing and to ensure that the requirements of this specification are flowed to sub-tiers.



- The supplier shall have traceability for all raw materials throughout their manufacturing process, inventory/storage points, and within all levels of the supply chain back to the original source.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM



10.5.2 Contract Review

- The supplier shall establish a process to ensure all the applicable raw material and consumable specifications are current to the purchase order and design specifications.
- The supplier shall establish a process to ensure that raw material and consumables requirements, as defined on the print, being followed and documented.

10.5.3 PO Processing:

- The supplier shall establish, research, and document the reputation and quality performance history for the sources of raw materials and consumables.
- The supplier shall establish a documented process to prevent PO placement to unapproved sources of raw materials and consumables and ensure flow down throughout all applicable levels of the supply chain.

10.6 Receipt and use of Raw Materials and Consumables:

- The supplier shall establish documented criteria for acceptance and/or rejection of raw material and consumables. The records of accepted or rejected raw materials shall be maintained and available for review
- Suppliers shall not accept any converted billet / ingot material by material distributors. Certifications accompanying metallic raw materials shall only be accepted and considered valid when issued by the original manufacturing source (Original Mill).

10.7 Traceability and Identification:

- The supplier shall establish a method of error-proofing to ensure the correct part, material, or consumable being selected and used prior to and throughout the manufacturing process.
- For heat treated materials, the supplier shall ensure that there is a documented and verified traceability to heat treat / lot.
- The supplier shall ensure that all raw materials and consumables used are clearly identified on the production documents such as traveler, router, work instruction, BOM, etc. by traceable identification such as lot or batch number.



10.8 Test and Validation:

- The supplier shall establish and implement the inspection activities necessary to ensure that purchased raw material and consumables meet specified requirements.
- When raw materials and consumables key characteristics have been identified, the supplier shall ensure that these characteristics are monitored, maintained, controlled, and documented using established statistical methods. In the event statistical method is not feasible or the Cpk is less than 1.33, the supplier shall establish and define a method to ensure 100% compliance to the design requirements.
- The supplier shall establish a documented procedure to ensure that raw materials critical parameters and key characteristics are validated by a Nadcap accredited or A2LA approved, independent laboratory on first receipt from each supplier or distributor of raw materials and once a year thereafter.
- The supplier shall establish a documented procedure to ensure that raw materials critical parameters and key characteristics are validated by laboratory analysis prior to use and records are maintained and available for review.

10.9 Inventory:

- The supplier shall ensure that there is a procedure in place to control and document the temperature storage conditions and shelf life requirements for applicable raw material and consumables.
- The supplier shall ensure that FIFO system is utilized for raw material and consumables.
- Where similar or like materials are stored or staged, the supplier shall have a process in place to ensure that there is no chance for mixing or errantly selecting due to proximity.

10.10 Quality Management System:

- The supplier shall ensure the applicable raw materials and consumables used in HS products are directly purchased from the original manufacturing sources or procured from franchised distributors.
- The supplier shall have an established policy for length of record retention which is in compliance with HS record retention requirements as defined in



ASQR-01. This requirement shall be flowed down through all levels of the supply chain to the OEM and/or material source.

- The supplier shall define an internal audit process and schedule to ensure internal compliance to this procedure.
- The supplier shall define a sub-tier audit process and schedule to ensure sub-tier compliance to this procedure.
- The supplier shall establish and use control plans where raw material and consumables critical parameters and key characteristics have been identified.

10.11 Change Control:

- The supplier shall establish a change control policy to ensure all changes affecting raw material and consumables are documented and communicated to HS and to ensure compliance with applicable HS configuration management requirements in CEP-100.
- If alternative sourcing is used or planned, the supplier’s quality authority shall actively be involved in the transition and approvals of raw material and consumables sources.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

11.0 Distributor Responsibilities for Mechanical Parts

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17, and HS14722. Distributor must be AS9120 certified.
- For flight safety parts, the distributor is required to purchase parts from an HS approved Original Components Manufacturers (OCM) or from another AS 9120 trusted franchised disturber that has un-broken traceability. Approved OCM is located on the drawing and/or ASL (ASL). An ASL compliance review must be performed. If an ASL exists, purchase of product must be made only to the manufacturer listed. If there is no ASL written, HS is to be informed through the SRI and the SRI must be disposition prior to the shipment of said material.
- For non flight safety parts, the distributor is required to purchase parts from an HS approved Original Components Manufacturers (OCM) or from another AS9120 franchised disturber that has un-broken traceability. Approved OCM are located on the drawing or ASL.
- When specified on the Hamilton Sundstrand Purchase order, any product produced for Hamilton Sundstrand (Aerospace Division) requiring product and/or materials testing shall be performed by a Materials Testing Laboratory listed in Hamilton



Sundstrand Report #80, "Approved Process/Material Supplier Report". In the event that traceability is broken, HS is to be informed through the SRI and the SRI must be disposition prior to the shipment of said material.

- Other testing required by an engineering drawing and associated technical specification(s) necessary to complete a part shall be performed by supplier's internal lab or any testing source holding a current A2LA, Nadcap, or HS approval.
- If any special processes are specified on the drawing, these are required to be performed by suppliers approved on the Hamilton Sundstrand 80/85 report.
- If a specification is listed in either HS Report #80 or #85, and no HS approved process provider is listed, the supplier of the material shall submit an electronic SRI (ASQR-01 Form 3) from the HS Supplier Portal to request an approved process supplier to be identified.
- Distributor must provide C of C indicating proof of un-broken traceability (as defined above).
- Un-broken traceability requirement shall be flowed down to all sub-tier providers.
- The distributor shall maintain a record of un-broken traceability.
- Distributors are not allowed to provide substitute part (better than) unless specified on the drawing or ASL or approved through the SRI system. Distributors are however allowed to use drawing 69100 -1, -2, or -3 for alternate parts, materials, and processes if the items of concern are listed.
- Distributors of Electro-mechanical parts are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan in accordance to Appendix I, designed to prelude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries.
 - The Distributor's Counterfeit Parts Prevention and Control Plan shall enforce the same prevention requirements onto the OEM and all sub-tier providers.
 - The Distributor is required to submit written confirmation to HS for compliance to this requirement. Compliance shall be achieved through semi-annual self audits per Appendix I and 2 year audits performed by a HS representative.
 - The cost of counterfeit electronic parts and suspect counterfeit electro-mechanical parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.
- In the event that there is a request of exceptions to the criteria's defined in the drawing or to the requirements stated in this document, the distributor shall provide an SRI indicating the discrepancies. The distributor cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.

This document does not
contain any export
control technical data.
Classification Supersedes
Any and All Other Export
Classifications or
Classification Markings.
Classification as of:
9/23/2014 11:30:17 AM



12.0 Distributor Responsibilities for Electronic Non-Source Controlled Drawings

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- Distributor must have franchised status with the OEM and be AS9120 certified. If agreements are not in place, the distributor shall be considered non-franchised and must adhere to Paragraph 8.0 of this document.
- Flow down ASQR09.2 UPPAP requirement to OEM as required per the Purchase Order.
- Flow down UPPAP training requirement to OEM if UPPAP is required on purchase order.
- The distributor is required to purchase parts from an HS approved Original Components Manufacturers (OCM) or from another AS9120 franchised distributor that has un-broken traceability. Approved OCM is based on the drawing and/or ASL. An ASL compliance review must be performed. If an ASL is written, purchase of product must be made to it. If there is no ASL written, HS is to be informed through the SRI and the SRI must be disposition prior to the shipment of said material.
- Un-broken traceability requirement shall be flowed down to all sub-tier providers.
- In no instance is the distributor allowed to provide a part procured from a broker unless directed by HS through a HS defined broker part process.
- The distributor shall maintain a record of un-broken traceability.
- The distributor must notify HS buyer and provide a listing of parts that cannot be acquired directly from the HS approved OEM or another AS9120 franchised distributor
- In the event that there is a request of exceptions to the criteria's defined in the drawing or to the requirements stated in this document, the distributor shall provide an SRI indicating the discrepancies. The distributor cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.
- Distributors are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan in accordance to Appendix I, designed to prelude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries.
- The Distributor's Counterfeit Parts Prevention and Control Plan shall enforce the same prevention requirements onto the OEM and all sub-tier providers.
- The Distributor is required to submit written confirmation to HS for compliance to this requirement. Compliance shall be achieved through semi-annual self audits per Appendix I and 2 year audits performed by a HS representative.
- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.



- Distributors are not allowed to provide substitute part (better than) unless specified on the drawing or ASL. Exceptions are packaging variations such as tape and reel verses tube verses individually bagged.
- Examples of **not** allowed:
 1. A memory device made by Manufacturer “A” with a speed of 15nS cannot be substituted with Manufacturers “A” 10nS part without approval from HS.
 2. Distributor is not allowed to substitute a lead-free part for a lead finished part unless specified on the drawing or ASL.
- Mil-Spec type devices can be substituted by a better than grade. Example: JANTX diode to JANS is acceptable.
- Distributors are however allowed to use drawing 69100 -1, -2, or -3 for alternate parts, materials, and processes if the items of concern are listed.

13.0 OEM Responsibilities for Electronic Non-Source Controlled Drawings

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- OEM must provide C of C indicating proof of un-broken traceability (as defined above).
- Un-broken traceability requirement shall be flowed down to all sub-tier providers.
- The OEM shall maintain a record of un-broken traceability.
- OEM is required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed to prelude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries. This requirement shall be flowed down to all sub-tier providers.
- ASQR09.2 UPPAP to be performed by OEM as dictated by HS IPD team.
- OEM to receive UPPAP training provided by HS Supplier Quality as required.
- Changes that may affect quality must be documented and communicated to the applicable Quality Assurance and/or Purchasing Representative prior to affectivity of the change. Example of changes:
 - Ownership
 - Manufacturing location
 - Process – form, fit, function
 - Product Inspection/Testing Techniques
- OEM’s are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed to prelude, detect, and remove any counterfeit components from all deliveries to HS (Refer to Appendix I).
- Counterfeit Parts prevention and Control Plan requirement must be flowed down to all Sub-tier providers.
- In the event that there is a request of exceptions to the criteria’s defined in the drawing or to the requirements stated in this document, the OEM shall provide an SRI indicating the discrepancies. The OEM cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.



14.0 Distributor Responsibilities for Electronic Source Controlled Drawings

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- Distributor must have franchised status with the OEM and be AS9120 certified. If agreements are not in place, the distributor shall be considered non-franchised and must adhere to Paragraph 8.0 of this document.
- ASQR09.2 UPPAP to be performed by the OEM as required per the Purchase Order.
- OEM to receive UPPAP if ASQR09.2 UPPAP is required on purchase order.
- The distributor is required to purchase parts from the Original Component Manufacturer (OCM) as indicated on the drawing and/or ASL.
- The distributor must notify HS and provide listing of parts that cannot be acquired directly from the HS source approved OEM. Distributor must notify HS through an SRI. If communication is made via an e-mail, HS will request a SRI to be submitted.
- Distributor must provide C of C indicating proof of un-broken traceability (as defined above).
- Un-broken traceability requirement shall be flowed down to all sub-tier providers.
- The distributor shall maintain a record of un-broken traceability.
- In the event that there is a request of exceptions to the criteria's defined in the drawing or to the requirements stated in this document, the distributor shall provide an SRI indicating the discrepancies. The distributor cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.
- Drawing revisions shall require a FAI as required by SQA. A PPAP may also be required at HS SQA discretion.
- Distributors are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan in accordance to Appendix I, designed to prelude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries.
- The Distributor's Counterfeit Parts Prevention and Control Plan shall enforce the same prevention requirements onto the OEM and all sub-tier providers.
- The Distributor is required to submit written confirmation to HS for compliance to this requirement. Compliance shall be achieved through semi-annual self audits per Appendix I and 2 year audits performed by a HS representative.
- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.
- If the drawing contains sub-assemblies, the electronic components within the assemblies shall have traceability requirements back to selected OEM. In no instance shall broker parts be used unless approved by HS. In the case of bar stock/material, the above Bar Stock/Material guidelines apply.

HS PROPRIETARY - Subject to the restriction on the title or cover page.
THIS DOCUMENT CONTAINS NO TECHNICAL DATA. ECCN: EAR99



- Distributor is required to submit written confirmation to HS of compliance to requirements called out.
- Distributor shall provide PCN notifications pertaining to HS product. Example of changes:
 - Ownership
 - Manufacturing location
 - Process – form, fit, function,
 - Sub-assembly changes
 - Product Inspection/Testing Techniques

15.0 Distributor Responsibilities for Non-Hamilton Specified Drawings Parts (Purchased to MIL Part Number)

Distributor must provide a C of C as defined in un-Broken Traceability for Mil Part numbers.

16.0 OEM Responsibilities for Electronic Source Controlled Drawings

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- OEM must be listed on drawing. If discrepancy exist, OEM to issue SRI to HS for disposition.
- ASQR-09.2 UPPAP to be performed by OEM as dictated by HS IPD team.
- OEM to receive UPPAP training provided by HS Supplier Quality as required per ASQR-09.2 UPPAP.
- OEM must provide C of C indicating proof of un-broken traceability (as defined above).
- Un-broken traceability requirement shall be flowed down to all sub-tier providers.
- The OEM shall maintain a record of un-broken traceability.
- OEM cannot provide production parts to HS unless the OEM is listed on the drawing.
- OEM's are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed to prelude, detect, and remove any counterfeit components from all deliveries to HS (Refer to Appendix I).
- Counterfeit Parts prevention and Control Plan requirement must be flowed down to all Sub-tier providers.
- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.
- In the event that there is a request of exceptions to the criteria's defined in the drawing or to the requirements stated in this document, the OEM shall provide an SRI indicating the discrepancies. The OEM cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.

This document does not
in any export
controlled technical data.
mark
Supersedes
Any and All Other Export
Classifications or
Classification Markings.
Classification as of:
3/2014 11:30:17 AM



- Changes that may affect quality must be documented and communicated to the applicable Quality Assurance and/or Purchasing Representative prior to affectivity of the change. Example of changes:
 - Ownership
 - Manufacturing location
 - Process – form, fit, function
 - Product Inspection/Testing Techniques

17.0 OEM Responsibilities for Electronic/Electro-Mechanical Assemblies with Manufacturer Design Authority

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- OEM must be listed on drawing or ASL. If discrepancy exist, OEM to issue SRI to HS for disposition.
- ASQR-09.2 UPPAP to be performed by OEM as dictated by HS IPD team.
- OEM to receive UPPAP training provided by HS Supplier Quality as required per ASQR-09.2 UPPAP.
- C of C from OEM is mandatory.
- The OEM, subcontractor, and sub-tiers assume responsibility for the authenticity and un-broken traceability of all parts.
- Changes that may affect quality must be documented and communicated to the applicable Quality Assurance and/or Purchasing Representative prior to affectivity of the change. Example of changes:
 - Ownership
 - Manufacturing location
 - Process – form, fit, function
 - Product Inspection/Testing Techniques
 - Use of alternate components from the original deliverable product
- OEM's are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed to prelude, detect, and remove any counterfeit components from all deliveries to HS (Refer to Appendix I).
- Counterfeit Parts prevention and Control Plan requirement must be flowed down to all Sub-tier providers.
- In the event that there is a request of exceptions to the criteria's defined in the drawing or to the requirements stated in this document, the OEM shall provide an SRI indicating the discrepancies. The OEM cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.
- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.

This document does not contain any export technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 08/17 AM



- The OEM shall maintain a list of approved sub-tier suppliers, including the scope and duration of the approval and the frequency of supplier audits/assessments.
- In no instance shall broker parts be used unless approved by HS. In the case of bar stock/material, the above Bar Stock/Material guidelines apply.
- All material used shall be verified to have a maximum and minimum operating/performance temperature range that is with-in the HS specified requirement. In the case of deficiencies, an SRI must be written requesting permission for use from HS Engineering.
- When applicable, 100% up-rate screening shall be performed at a HS approved test house.
- Use of materials shall meet the reliability and FAI requirements as dictated in the statement of work and drawing.
- If lead-free solder is used when material type is not stated on the drawing, HS shall be notified if material is not compliant to TechAmerica GIEA-STD-0005-1. HS shall provide disposition prior to the release of product to HS.

18.0

OEM Responsibilities for Electronic/Electro-Mechanical Assemblies Made to HS Design to HS Drawing Requirements.

- Suppliers and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- OEM must be listed on drawing. If discrepancy exist, OEM to issue SRI to HS for disposition.
- ASQR09.2 UPPAP to be performed as dictated by HS IPD team.
- UPPAP training provided by HS Supplier Quality as required per ASQR09.2 UPPAP.
- C of C from OEM is mandatory.
- The OEM, subcontractor, and sub-tiers assume responsibility for the authenticity and un-broken traceability of all parts.
- Changes that may affect quality must be documented and communicated to the applicable Quality Assurance and/or Purchasing Representative prior to affectivity of the change. Example of changes:
 - Ownership
 - Manufacturing location
 - Process – form, fit, function
 - Product Inspection/Testing Techniques
 - Use of alternate components from the original deliverable product
- OEM is required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed to prelude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries (Refer to Appendix I).
- Counterfeit Parts prevention and Control Plan requirement must be flowed down to all Sub-tier providers.

This document does not
export
controlled technical data.
This Watermark
Classification Supersedes
All Other Export
Classifications or
Classification Markings.
Classification as of:
9/23/2014 11:30:17 AM



- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.
- The OEM shall maintain a list of approved sub-tier suppliers, including the scope and duration of the approval and the frequency of supplier audits/assessments.
- In no instance shall broker parts be used unless approved in writing by HS. In the case of bar stock/material, the above Bar Stock/Material guidelines apply.
- If lead-free material is used when material type is not stated on the drawing, HS shall be notified if material is not compliant to TechAmerica GIEA-STD-0005-1. HS shall provide disposition prior to the release of product to HS.

19.0 Highlighted Requirements for Suppliers of Magnetic Devices Built Per HS16442

- Magnet Wire. Unless otherwise specified, magnet wire shall be solid copper wire that is in accordance with ANSI/NEMA-MW1000, J-W-1177 or MIL-W-583. Wire shall be insulated with Polyimide, Polyamide, Polyurethane, and a derivative or any combination of those materials. The specific wire chosen for a given winding shall be at the discretion of the manufacturer unless specified on the procurement documentation. The minimum service temperature rating of the wire shall be greater than the maximum service temperature of the magnetic device plus rise above ambient temperature and shall comply with the requirements of this specification.
- Suppliers are required to implement and enforce a written Counterfeit Parts Prevention and Control Plan designed to preclude, detect, and remove any counterfeit components from all deliveries to HS (Refer to Appendix I).
- Counterfeit Parts prevention and Control Plan requirement must be flowed down to all Sub-tier providers with emphaties on magnetic wire suppliers.
- All changes to the part design, materials, or processes following initial design approval by HS shall be submitted as a product change notice (PCN) to and approved in writing by HS prior to the commencement of requalification testing and prior to the delivery of the production lot of devices with the proposed change.
- Supplier must demonstrate compliance with the requirements of RTCA/DO-254 for simple hardware items. The supplier shall establish and maintain a configuration control system to track all changes to the magnetic device and components thereof.
- The supplier shall provide HS with copies of all nonproprietary PCNs created against magnetic devices supplied.
- Changes to the acceptance test procedure (ATP) for a given magnetic device, including a change in test equipment shall also be submitted to and approved by HS.



20.0 Contract Assembly House

When a contract assembly house is to provide material for a HS defined assembly, the purchase of said material must follow the same guidelines as stated in this document. The following apply:

- The contract assembly house and all members of their supply chain that provide product to HS shall be compliant to all applicable Quality Management System Requirements, ASQR-01, HSM17 and HS14722.
- The contract assembly house must be listed on drawing or ASL. If discrepancy exist, they are to issue an SRI to HS for disposition.
- ASQR-09.2 UPPAP to be performed by as dictated by HS IPD team.
- The contract assembly house is to receive UPPAP training provided by HS Supplier Quality as required per ASQR-09.2 UPPAP.
- The assembly house is required to implement and enforce a written Counterfeit Parts Prevention and Control Plan, in accordance to Appendix I that is designed to preclude, detect, and remove any counterfeit components or non-compliant material from all HS deliveries.
- The assembly house is required to submit written confirmation to HS for compliance to this requirement. Compliance shall be achieved through semi-annual self audits per Appendix I and 2 year audits performed by a HS representative.
- The cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs.
- The assembly house is required to purchase parts from an HS approved Original Components Manufacturers (OCM) or from another AS9120 franchised disturber that has un-broken traceability. Approved OCM is based on the drawing and/or ASL. An ASL compliance review must be performed. If an ASL is written, purchase of product must be made to it. If there is no ASL written, HS is to be informed through the SRI and the SRI must be disposition prior to the shipment of said material.
- Un-broken traceability requirement shall be flowed down to all sub-tier providers.
- In no instance is the assembly house allowed to provide a part procured from a broker unless directed by HS through a HS defined broker part process.
- The assembly house shall maintain a record of un-broken traceability.
- The assembly house must notify HS buyer and provide a listing of parts that cannot be acquired directly from the HS approved OEM or another AS9120 franchised distributor
- In the event that there is a request of exceptions to the criteria's defined in the drawing or to the requirements stated in this document, the assembly house shall provide an SRI indicating the discrepancies. The assembly house cannot provide any such material without HS written approval through an SRI. SRI shall include a CAD and/or deviation.
- Changes that may affect quality must be documented and communicated to the applicable Quality Assurance and/or Purchasing Representative prior to affectivity of the change. Example of changes:
 - Ownership



- Manufacturing location
- Process – form, fit, function
- Product Inspection/Testing Techniques
- Use of alternate components from the original deliverable product
- If lead-free material is used when material type is not stated on the drawing, HS must be notified if material is not compliant to TechAmerica GIEA-STD-0005-1. HS must provide disposition prior to the release of product to HS.

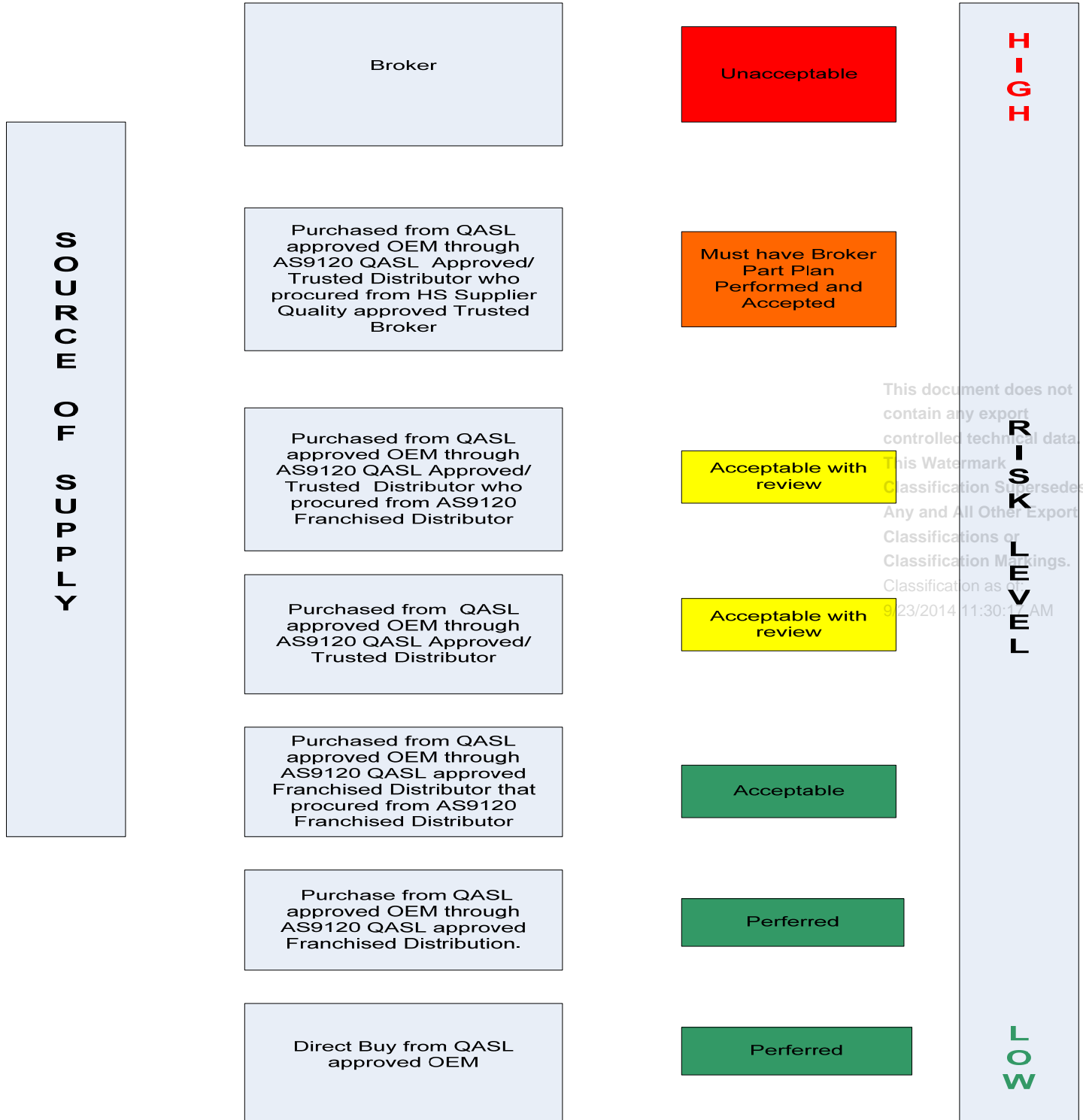
21.0 HS Internal actions

- For non MIL parts, assure OEM or Distributor is on QASL
- Assure distributors comply with HS contract terms and conditions with regards to supply chain controls.
- SCM is required to obtain parts that are in production or currently available in stock from the original manufacturers of the parts or their authorized dealers, or from trusted suppliers who obtain such parts exclusively from the original manufacturers of the parts or their authorized dealers per HS drawings or the ASL.
- In the case of Mil-parts, the SCM is required to buy parts from the QPL. If an ASL exists against a part, the part must be bought per the ASL.
- Request for C of C to ensure traceability.
- Issue counterfeit part controls and restrictions pertaining to the use of broker parts.
- Issue FAI and PPAP requirements.
- Issue SRI Communication requirements.
- In the event that an SRI or e-mail is issued for no inventory availability, the Buyer is required to have the SRI reviewed by SRC for disposition.
- Perform periodic audits which include compliance to Counterfeit Control Plans when applicable.
- Monitor GIDEP and Industry alerts as part of the Supplier and QASL rating.

controlled technical data.
This Workmark
Classification Superse-
Any and All Other Export
Classifications or
Markings.
Classification as of:
9/23/2014 11:30:17 AM

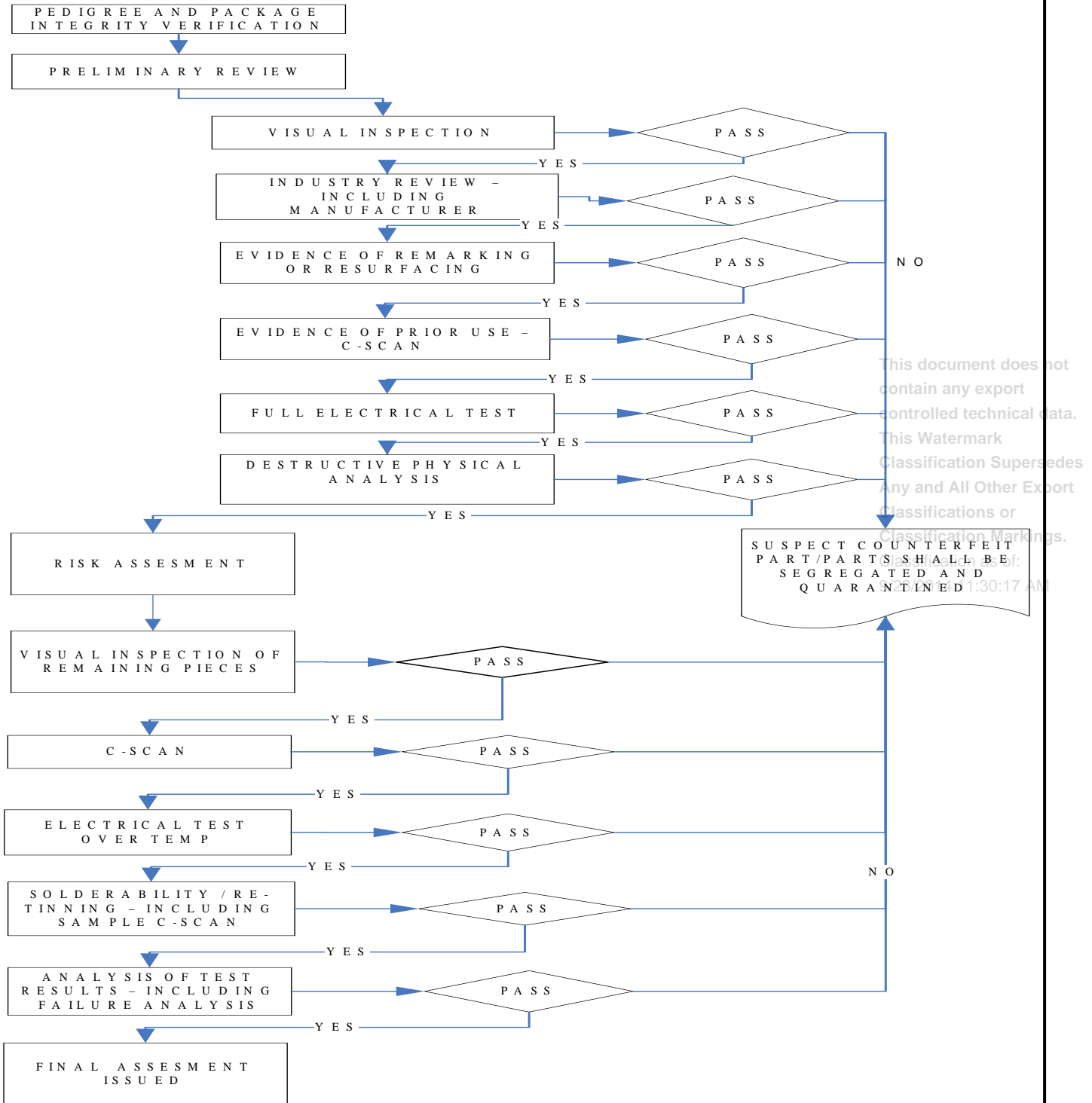


FIGURE 1 - PURCHASE METHOD RISK ASSESSMENT



This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of 9/23/2014 11:30: AM

FIGURE 2 - REFERENCE BROKER PART PLAN PROCESS



APPENDIX I

AS5553 COMPLIANCE for ELECTRONIC/ELECTRO-MECHANICAL PARTS

SCOPE:

Appendix I is designed as a guideline to achieve compliance to AS5553 within the supply chain that is satisfactory to HS. Compliance shall be achieved through semi-annual self audits per Appendix I and 2 year audits performed by a HS representative. Audit frequency shall be per the discretion of HS. It is not intended to act as a substitute for AS5553.

- Supplier has a Counterfeit Electronic Parts Control Plan?
- Supplier has developed and implemented a counterfeit electronic parts control plan that documents its processes used for risk mitigation, disposition, and reporting of counterfeit parts?
- Supplier evaluates potential sources of supply (including electronic parts, assembly, and equipment suppliers) to determine the risk of receiving counterfeit parts. Assessment actions may include surveys, audits, review of product alerts (e.g., GIDEP, ERAI), and review of supplier quality data to determine past performance?
- Supplier maintains a register of approved suppliers, including the scope of the approval, to minimize the risk of counterfeit parts supply?
- Supplier specifies a preference to procure directly from OCMs or authorized suppliers who are on the approved supplier register?
- Supplier assures that approved/ongoing sources of supply are maintaining effective processes for mitigating the risks of supplying counterfeit electronic parts. Assurance actions may include surveys, audits, review of product alerts, and review of supplier quality data to determine past performance?
- Supplier assesses and mitigates risk of procuring counterfeit parts from sources other than OCMs or authorized suppliers. This shall be accomplished and documented for every application when it is necessary to procure from other than the OCM or an authorized supplier?
- Supplier specifies supply chain traceability to the OCM or aftermarket manufacturer that identifies the name and location of all of the supply chain intermediaries from the part manufacturer to the direct source of the product for the seller. If this traceability is unavailable or the documentation is suspected of being falsified, does the supplier have a documented risk assessment process?
- Supplier specifies a flow down of applicable requirements to AS5553 to applicable contractors and their sub-contractors. In the event that one or more supply chain intermediaries do not have a counterfeit part control plan compliant to this document, is a risk analysis and assessment performed?
- Supplier has a documented process that specifies the following methods:
 - Control excess and nonconforming parts to prevent them from entering the supply chain under fraudulent circumstances.



APPENDIX I - AS5553 COMPLIANCE (CONTINUED)

- Control suspect or confirmed counterfeit parts to preclude their use or reentry into the supply chain.
- Supplier has a documented process to assure that all occurrences of counterfeit parts are reported, as appropriate, to internal organizations, customers, government reporting organizations (e.g., GIDEP), industry supported reporting programs (e.g., ERAI), and criminal investigative authorities?
- Supplier has approval and source selection considerations which include:
 - The buyer’s historical experience with the source.
 - Previously documented problems noted by external sources (e.g., GIDEP, ERAI, IDEA, customer referrals).
 - How long the source has been in business.
 - The source’s demonstrated adherence and/or certification to higher-level quality standards such as the following:
 - Assembly/equipment/system providers: AS9100
 - OCMs, aftermarket manufacturers: AS9100, ISO 9001, AS9003
 - Distributors: AS9120
 - Test facilities: ISO 9001
- Acceptable documented purchasing and product acceptance processes and practices for verifying the authenticity of parts supplied.
- Use of outsourced or in-house laboratory testing.
- Use of quality inspectors that have been trained and qualified concerning types and means of electronic parts counterfeiting and how to conduct effective product authentication.
- Membership in associations with rigorous business, ethical, and quality standards intended to avoid acquiring and reselling counterfeit goods (e.g., IDEA).
- Terms of the supplier warranty, return policy and product liability.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 7 AM



APPENDIX II
FMEA PROCESS AND EXAMPLE PFMEA AND CONTROL PLAN

FMEA is a team-based problem solving and risk mitigation tool to help identify and eliminate, or reduce the effects of potential failures before they occur. FMEA development includes activities that are intended to:

- Recognize and evaluate the potential failure of a product/process and the effect of that failure.
- Identify the causes of the failure and how often they could occur.
- Identify Process Controls and Action Items that will reduce or eliminate the chance of the potential failure occurring.
- Identify what needs to be closely monitored and controlled thru the use of control plan.
- Document the entire process, process improvements, and lessons learned.

Cases for performing a FMEA include:

- A new design/technology, new process, or new source.
- Modifying or changing an existing design or process.
- Using an existing FMEA for a different application or environment.
- Continuous Improvement Activities.
- Corrective action activities.

This document does not contain any export controlled technical data. This Watermark Classification Supersedes Any and All Other Export Classifications or Classification Markings. Classification as of: 9/23/2014 11:30:17 AM

FMEA publications and Standards can be obtained from the following sources:

SAE publication: 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), www.sae.org.

SAE-J1739 Potential Failure Mode and Effects Analysis in Design (Design FMEA), Potential Failure Mode and Effects Analysis in Manufacturing and Assembly Processes (Process FMEA)

SAE-ARP5880 Recommended Failure Modes and Effects Analysis (FMEA) Practices for Non-Automobile Applications. (Replaces MIL-STD-1629a)



APPENDIX III ELECTRONIC/ELECTRO-MECHANICAL PART TYPE

Electronic Component Type (Reference)

- Semiconductors (Discrete)
 - Diodes: Zener Diode, Transient Voltage Suppression, Light Emitting, Laser Diode, Photodiode....
 - Transistors: Bipolar, Field Effect, Thyristors, Insulated Gate Bipolar....
- Integrated Circuits
 - Digital
 - Analog
- Optoelectronics
 - Opto-Isolator, Opto-Coupler, Photo-Coupler, Solid State Relay, Opto Switch, LED Display, Photodiode
- Passive
 - Resistors: fixed value, Power, Variable, heater, thermistor...
 - Capacitors: Fixed, ceramic, Film, Electrolytic, Mica, Vacuum, Variable, Filter, network....
- Magnetic
 - Inductor, coil, choke
 - Transformer
 - Toroid
 - Ferrite, bead
 - Motor
 - Solenoid....
- Transducers, Sensors, Detectors
 - Audio
 - Linear variable differential transformer
 - Rotary encoder
 - Motion sensor
 - Flow Meter
 - Force Torque
 - Thermal: Thermocouple, Thermistor, Resistance Temperature Detector, Bolometer
 - Magnetic Field; Magnetometer, Gauss meter

This document does not
control technical data.
This Watermark
Classification Supersedes
Any and All Other Export
Classifications or
Markings.
Classification as of:
9/23/2014 11:30:17 AM

APPENDIX III ELECTRONIC/ELECTRO-MECHANICAL PART TYPE

Electronic Component Type (Reference) Cont.

- Assemblies, modules
 - Oscillator
 - Display devices: Liquid crystal display
 - Filters

Electro-Mechanical Component Type (Reference)

- Piezoelectric devices, crystals, resonators
 - Crystal
 - Ceramic resonator
 - Ceramic Filter
 - Surface acoustic wave
 - Ultrasonic motor
 - Piezo buzzers
- Terminals and Connectors
 - Socket
 - Screw terminal, terminal blocks
 - Pin header
- Cable Assemblies
- Switches
 - Manual: Toggle, rocker, slide, rotary, pushbutton...
 - DIP
 - Footswitch
 - Micro
 - Relay
 - Reed
 - Thermostat
 - Humidistat
 - Circuit Breaker
- Protection Devices
 - Fuse, one time use
 - Circuit Breaker
 - PolySwitch

This document does not
contain any export
controlled technical data.
This Watermark
Classification Supersedes
Any and All Other Export
Classifications or
Classification Markings.
Classification as of:
9/23/2014 11:30:17 AM



APPENDIX III
ELECTRONIC/ELECTRO-MECHANICAL PART TYPE

Electro-Mechanical Component Type (Reference) Cont.

- Protection Devices (Cont.)
 - Ground-fault
 - Metal oxide varistor
 - Inrush current limiter
 - Gas discharge tube
 - Spark gap

- Printed Circuit boards

This document does not
contain any export
controlled technical data.
This Watermark
Classification Supersedes
Any and All Other Export
Classifications or
Classification Markings.
Classification as of:
9/23/2014 11:30:17 AM