Spira Conterfeit Materials Program

"SCMP"

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1 Scope

1.1 Purpose

As a manufacturer of OEM equipment, the finished components of Spira Manufacturing are not subject to counterfeit electronic parts programs. However, this policy ensures the manufacturing process materials meet or exceed the procurement documents to ensure the parts' design requirements are met.

This program ensures the materials meet requirements by purchasing from reliable sources, independently test for compliance, or outsource testing based on a likelihood vs. risk approach established in SAE AS6174.

1.2 Application

This standard documents the processes used to ensure that Spira parts' construction's raw materials meet critical attributes. Requirements for vendors are flowed down in purchase order documentation. Additional requirements may include internal testing, external testing, and physical evaluation.

2 References

2.1 Applicable Documents

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

2.2 External Publications

AS6174	Counterfeit Material; Assuring Acquisition of Authentic and Conforming Material
AS5553	Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
AS9003	Inspection and Test Quality System
AS9009	Aerospace Contract Clauses
AS9100	Quality Management Systems - Requirements for Aviation, Space and Defense Organizations

Government-Industry Data Exchange Program (GIDEP) Operations Manual NAVSEA SO300-BT-PRO-010 (GIDEP Manuals and Guides are available from http://www.gidep.org/)

Government-Industry Data Exchange Program (GIDEP) Requirements Guide - NAVSEA SO300-BU-GYD-010 (April 2008) (http://www.gidep.org/)

ISO 12931	Performance criteria for authentication solutions for anti-counterfeiting in the field of material goods

ISO 9000 Quality Management Systems - Fundamentals and Vocabulary

ISO 9001 Quality Management Systems – Requirements

OMB Policy Letter 91-3 Reporting Nonconforming Products
(http://whitehouse.gov/omb/procurement_policy_letter_91-3)

Y14.100 Engineering Drawing Practices

2.3 Terms and Definitions

The following terms and definitions are taken directly from ISO 9000 and AS6174A and apply to this document:

CRITICAL ATTRIBUTES: Specified mechanical or chemical properties deemed to affect the finished product's intended purpose.

MANUFACTURER: Manufacturer in this standard refers to the point of origin of any material covered by the standard, including factories, mills, foundries, mines, chemical plants, laboratories, etc.

MATERIAL: Material in this standard refers to any parts, assemblies, and other procured items (except for electronic parts covered by AS5553).

SUSPECT MATERIAL: Material, items, or products in which there is an indication by visual inspection, testing, or other information that it may meet the definition of fraudulent material or counterfeit material provided below.

FRAUDULENT MATERIAL: Suspect material misrepresented to the customer as meeting the customer's requirements.

COUNTERFEIT MATERIAL: Fraudulent material 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.

APPROVED SUPPLIER: Suppliers formally assessed by the current design activity or the original manufacturer, determined to be a trusted source that will reliably provide authentic and conforming material, and entered on a register of approved suppliers.

CERTIFICATE OF AUTHENTICITY (C of A): A statement to the effect that all material items listed above furnished on this contract are genuine, new, and unused unless otherwise specified in writing herein; are suitable for the intended purpose; are not defective, suspect, or counterfeit; has not been provided under false pretenses; and have not been materially altered, damaged, deteriorated, or degraded.

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.

DESTRUCTIVE TESTING: A systematic, logical, detailed examination of material during various stages of physical disassembly, conducted on a sample of completed material from a given lot, wherein the material is examined for a wide variety of design, workmanship, and/or processing problems.

GIDEP (GOVERNMENT-INDUSTRY DATA EXCHANGE PROGRAM): A cooperative activity between U.S. and 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.

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. See E.1.3 for further details.

ORIGINAL EQUIPMENT MANUFACTURER: An organization that designs and/or engineers and produces material and is pursuing or has obtained the intellectual property rights to that material.

SUPPLIER: Within the context of this document, a blanket description of all sources of supply for material (e.g., the original manufacturer, franchised distributor, independent distributor, broker distributor, stocking distributor, aftermarket manufacturer) who may or may not have a legally binding relationship with the legally authorized source. This relationship generally includes direct product support, training and marketing support from the legally authorized source and provides direct product support to the customer.

1 Requirements

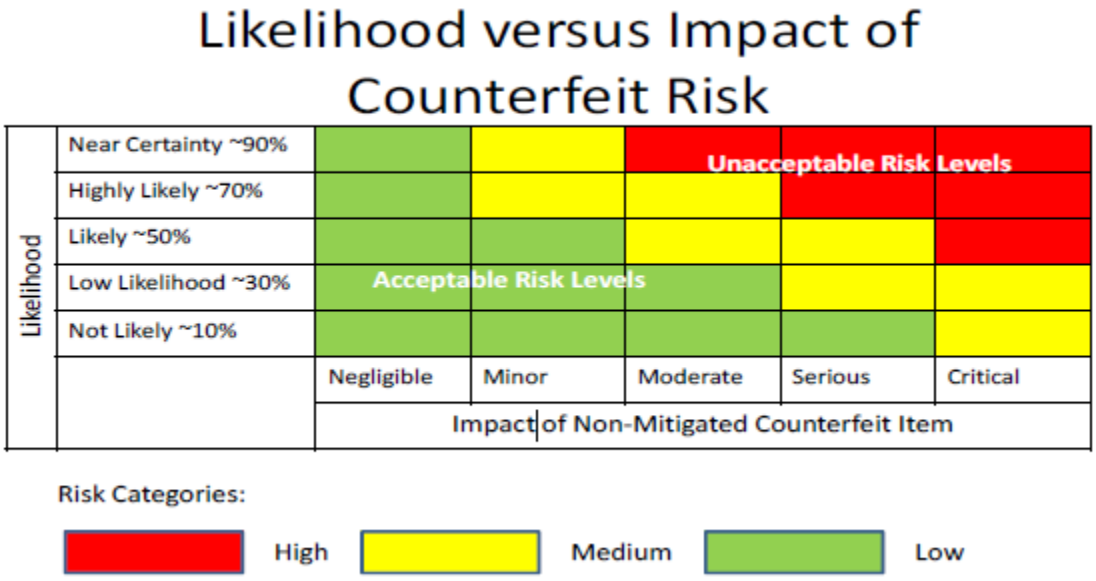
3.1 Material Authenticity Assurance Plan

The plan in sections 3.1.1 through 3.1.7 are enacted to document the processes of ensuring materials meet the critical attributes. The following plans are used to ensure that only authentic and conforming materials are purchased from reliable providers and details plans for risk mitigation, disposition, and reporting in the event counterfeit materials are received.

3.1A Determining Impact Levels

From AS9174A A.1.1 "Determining Counterfeit Risk," Implemented procedures are to based on a likelihood vs. Risk basis of the material. It is understood that different material deficiencies can have different impacts on the system. For example, if a component has a different hue or color, its performance has little effect. On the other hand, if a material outgasses more than it should, or a metal contains more Iron than it should, it could have more significant consequences. Figure 1 (copied from AS6174 Appendix A) breaks down the likelihood vs. risk table.

Figure 1



The critical attributes must be defined into one of the 5 severity groups (negligible, minor, moderate, serious, critical) to utilize the chart above. The following is listing the critical attributes, their severity to projects if compromised, and the determination method.

Table 1

Critical Attribute	Use	Test Method	Impact	Impact Rating
Tensile strength	Spiral Base Materials	Tensile Testing & Manufacturing Process	Gasket compression too hard - brittle gasket Gasket compression too soft - Reduction in shielding effectiveness (~5 dB) Evidence of counterfeit gasket would be very evident in the production process. Materials that do not meet the requirements enough to affect the product would not complete the manufacturing process.	Minor
Base Material Purity	Spiral Base Materials	Chemical Composition Destructive Testing	Premature corrosion due to plating voids or galvanic corrosion. Reduction in shielding performance would only be seen after long periods of exposure to corrosive environments.	Moderate
Platings	Plating of base materials and components for corrosion protection	Chemical Composition Destructive Testing	Premature corrosion due to plating voids or galvanic corrosion. Effects would only be evident after many hours in contact with harsh environments.	Moderate
Rubbers (and Adhesives)	Environmental gaskets components & Bonding elastomers to spirals	Chemical Composition Destructive Testing	Materials may be more adversely affected by chemicals and show signs of failing prematurely. Results would be seen in the manufacturing of the products, reduction in holding strength would be evident in any cleaning processes.	Minor
Rubber Outgassing Performance	bonding parts and as support material	ASTM-E-595	Very little. Adhesives and non-outgassing cords have a minimal mass contribution to the system and would have little impact on outgassing totals.	Minor
Aluminum Composition and Temper	Support materials for gaskets	Manufacturing Process	Very little. Aluminum components are incorporated to support gaskets assemblies. Materials that do not meet the requirements would only pose a problem in the manufacturing process.	Minor

3.1B Determining Likelihood Levels

In conjunction with determining the impact levels of counterfeit materials on the system, the likelihood of receiving such materials has to be evaluated. The likelihood is based on the provider and contributing factors such as certifications, reputation, historical evidence, Location in the supply chain, and testing capabilities. Table 2 outlines the requirements that are required to classify a specific supplier into a likelihood level.

Table 2

Classification	Chances of being counterfeit	Vendor requirements
Not Likely	~10%	The vendor is on the Approved Vendor List Has a documented history of quality Performs internal testing with audit records available AS9100 or ISO9001 qualified + additional certs Is the material **Manufacturer** The vendor provides material certs with test data
Low Likelihood	~30%	The vendor is on the Approved Vendor List Has a documented history of quality Performs internal testing with audit records available AS9100 or ISO9001 qualified Is **Authorized Reseller** The vendor provides material certs with test data
Likely	~50%	The vendor is on the Approved Vendor List Performs internal testing with audit records available Is **Authorized Reseller** The vendor provides material certs with test data
Highly Likely	~70%	The vendor is on the Approved Vendor List Is **Non-Authorized Reseller**
Near Certain	~90%	Is **Non-Authorized Reseller**

Per Spira's AS9100 policy, requirements for vendors who can provide materials for finished goods have been set with defined requirements. The vendors that supply materials used in standard parts must be on The Approved Vendor list, provide C of Cs, and are the manufacturers or authorized resellers. The majority of vendors are AS9100 certified and the ones who are not complete Spira quality surveys. All shipments of material require C of C and material certs to inspect the material. Based on the requirements of the AS9100 program, the highest chances of materials being counterfeit is 50% and giving a "Likely" rating. The high majority of Spira vendors are in the "low Likelihood" or "Not Likely" category.

3.1C Requirements based on Likelihood and Impact

After establishing the impact and likelihood of counterfeit material, the resulting requirements are determined by AS6174 Appendix A (Figure 3). Based on the table's resulting requirements, Minimum requirements are: visually inspect material upon receiving, inspect the mandatory Certificate of Authenticity, and used Authorized Suppliers. As standard practice, Spira requires more than the minimum requirements of its vendors. To ensure quality products are being supplied and used to fabricate parts. Sections 3.1.1 through 3.1.7 include the requirements enacted within the quality system.

Figure 2

Traceability Requirements Mapped to Counterfeit Risk Assessments

Likelihood						
	Near Certainty ~90%	Certificate of Authenticity	Process Audit/Review	Auditable Part History	OEM or OCM	OEM or OCM
	Highly Likely ~70%	Receipt Visual Inspection	Certificate of Authenticity	Verification Testing	OEM or OCM	OEM or OCM
	Likely ~50%		Receipt Visual Inspection	Authorized Supplier	Auditable Part History	Auditable Part History
	Low Likelihood ~30%			Certificate of Authenticity	Verification Testing	Verification Testing
	Not Likely ~10%			Receipt Visual Inspection	Certificate of Authenticity	Certificate of Authenticity
		Negligible	Minor	Moderate	Serious	Critical
		Impact of Non-Mitigated Counterfeit Item				

3.1.1 Authentic and Conforming Material Availability

The authentication process aims to ensure that the material required for production is not so obscure as to require non-qualified sources. Spira's Engineering department's responsibility is to review the materials required and ensure that quality sources are available for the materials. Some requirements may include a specification for outdated materials or specialty materials, which would require review and additional evaluation upon receipt. For standard materials used in most production components, multiple vendors should be sourced to supply quality articles and have available backups.

3.1.2 Purchasing

To identify potential risks for counterfeit materials, the Spira purchasing department shall maintain the following requirements for the providers of materials using in the fabrication of its parts:

A. All approved vendors must be evaluated and given a likelihood rating based on Table 2. The rating should be listed in the Approved vendor's table.
B. Per AS9100 requirements, a register of approved suppliers shall be maintained and include the scope of approval.
    a. Valid and current AS9100 certification numbers are kept on file for vendors that are certified.
    b. Any vendor that is not certified must complete Spira's vendor qualification survey.
C. Whenever possible, procure directly from the Original Equipment Manufacturer or an authorized reseller. When purchasing directly or from a registered reseller is not available, additional risk management provisions should be incorporated.
D. Assure that approved sources are continuing to maintain effective processing. Updated AS9100 certs must be collected, testing data should show up to date calibration audits, and a review of supplier quality should determine past performance.
E. Additional suppliers should be assessed and verified whenever possible if the primary supplier can not meet product demands.

F. Establish additional Risk Management Provisions for material from questionable sources. These may include more stringent risk assessment scores, Internal testing of mechanical properties, outside testing of critical attributes, GIDEP lookup, and site audits.
G. Flow down requirements to vendors based on the best practices of AS6174 (SQC21 clause).
H. All materials used in the product are sourced from domestic vendors from domestic materials. Metals may be mined from foreign countries. However, processing and smelting should be conducted with the United States. Any material not conforming to this policy must be noted on the material cert.

3.1.3 Purchasing information

The documented process shall specify contract/purchase order quality requirements to maximize the likelihood of being provided authentic and conforming material. Procurement of material shall be subject to the applicable contract requirements pertaining to Counterfeit Avoidance/Mitigation (SQC21).

Specialty metals procured for the use in Spira gaskets are subject to DFARS 252.225-7014 Alternate I: Preference for Domestic Materials. Specialty metal incorporated in articles delivered in fulfillment of contracts to Spira Mfg. shall be melted in the United States.

3.1.4 Verification of Purchased Product

The goal of verification is to rule out with certainty equivalent to the risk of materials being counterfeit. For customers on the approved vendor list with a long history of delivering non-counterfeit parts, the burden of inspecting for evidence would be less compared to a new vendor. Inspection methods used for inspecting material should, at a minimum, be the requirements of AS6174 based on the likelihood vs. impact tables. Any additional testing is at the discretion of the QC department, MRB, or management.

For cases where there is reason to doubt the authenticity of material or compliance with manufacturing specifications, additional tests and inspections should be performed, as necessary, to detect counterfeits. The following mitigation methods can be applied to reduce the risk of receiving counterfeit material. These methods may not definitively distinguish authentic material from counterfeit material, but they minimize the risk of counterfeit material entering the production system when properly used. Questionable test results may require the performance of comprehensive failure analysis.

A. Visual Inspection

Visual examinations should be performed at a magnification appropriate to the attribute under examination with appropriate lighting. For material with product identification and/or other identifying/traceability markings, a representative sample based on a determination of product risk should be examined from each Lot (date code or other identification code) for evidence of remarking and/or salvaged, reclaimed, or other indications of re-use. Examples of suspect counterfeiting include, but are not limited to:

A. Altered or unexplained markings, stampings, moldings, and engravings.
B. Signs of refurbishment without being identified as refurbished material.
C. Altered labels and tags
D. Signs of re-painting or re-coating
E. Other signs of re-used material include oil stains, overheated areas, signs of disassembly and reassembly, erosion, wear, dents, and scrapes, etc.

B. Non-Destructive Testing (NDT)

Non-Destructive Testing 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. The following NDT Techniques can be used to validate the materials, processes, and markings of material:

A. Visual, weight, optical, and infrared (if applicable), and dimensional inspections. Can be used on all items.
B. Functional tests: Install part to see if it works, fit tests, compression test, transfer impedance test, etc.
C. XRF or X-ray testing of plating composition

C. Destructive Testing

Destructive testing can include:

A. Deformation tests (bend, shock, tensile, shear, fatigue, hardness, adhesion, impact, etc.)
B. Metallurgical tests (cut material, polish, and evaluate under magnification)
C. Exposure tests (salt spray, corrosion, etc.)
D. Analytical tests (gas chromatography, spectral analysis, electron microscopic inspections, wet chemistry composition analysis, etc.)
E. Functional tests (run it until it breaks), etc.

3.1.5 In-Process Investigation

This section lists the checkpoints for materials within the manufacturing process that detect or validate materials' mechanical properties. These processes help identify any counterfeit materials that may not have been noticed in receiving inspection.

A. Slitting procedures: outside processing that during processing would find material that is excessively soft or stained uncharacteristically
B. Winding process: During the formation of the spiral shape, The equipment uses a defined set system of blocks. This setup is sensitive to the material properties, and if the material varies from previous batches, the setups would need to be modified in a fashion that is not typical. Also, brittle materials or excessively soft materials would not take the required shapes for the processing. The in-process testing would eliminate all but minor inconsistencies of the materials. Only slight discrepancies in material properties would make it through the forming process, and they would have little effect on the gasket's performance.
C. Adhesion of components in assembly: Spiral gaskets are often adhered to elastomeric gaskets during assembly. Joining processes and the subsequent cleaning is conducted by hand and have strict guidelines on acceptability per Spira Workmanship Standards (SWS-9000). Issues with the adhesion properties of the material are evident in a few ways. The first indicator of incorrect material properties would be the material format as it comes out of the applicator; this would be evidence of improper storage or shelf life information. After applying the adhesive cure, time is a significant indicator of the material composition. The adhesive's cure time, too short or too long, would indicate an adhesive issue. Finally, once the adhesive is cured, the bond to the materials must conform to SWS-9000. The adhering and cleaning process roots out the majority of material issues. Any bonds passing the requirements only pose minor issues over long lifetime parts.

3.1.6 Material Control

A. Material suspected of being counterfeit may be subject to the following processes as deemed necessary by the MRB.
   I. The Specific Lot of material must be secured in the material holding enclosures to ensure it does not reenter the supply chain (Mandatory)
   II. Any additional materials provided by the vendor must be frozen until tested to ensure it does not have the same defects (mandatory)
   III. The material is tested internally for compliance with material specifications and controls, if possible.
   IV. The material may be sent for third party testing and reporting at a qualified lab.
   V. A Sample of the material may be sent back to the vendor for their verification.
   VI. Any additional processes that may lend insight to the materials conditions, as deemed necessary by the MRB.
B. Any material found to be counterfeit must be destroyed per AS9100. The material must be destroyed and disposed of off-site and rendered useless in a manner that prevents its use in Spira's supply chain. Under no circumstances can the full Lot be returned to the vendor.
C. When products are returned from a customer, receiving inspection should ensure the materials are not counterfeit. All return materials must be evaluated upon receipt. Receiving inspection of return materials should look for: accurate and unmodified labels, sealed packages, correct documentation, correct quantities, and investigate material attributes (platings, compression force, shielding performance, etc.).

3.1.7 Reporting

If counterfeit material is discovered in Spira's Supply chain, the following reporting actions should be taken:

A. Alert the vendor to the discrepancies, including the testing reports and evidence.
B. Inform the MRB and the board of the material and the potential risk as well as corporate details. Disclose the information regarding what risk is created by the counterfeit material, orders that received the defective product, corrective action to ensure proper material is sourced subsequently (new vendor, additional testing, etc.), cost, and time for replacing the material and affected orders.
C. Notify any customers who may have received defective parts.
D. Reporting to GIDEP is filed to alert any additional customers of the vendor.
E. Follow up with the vendor regarding NCR, corrective actions, and verification.
F. If warranted, notify criminal investigative authorities