SAE INTERNATIONAL STANDARDS-
COUNTERFEIT AVOIDANCE,
DETECTION, MITIGATION AND
DISPOSITION

October 2013

Director, Washington Operations
SAE International
www.sae.org
SAE's main purpose is to collect, develop, and disseminate technical information related to mobility technology.
About SAE: Purpose

Materials

Environmental Standards

Standard Parts

Human Factors

Integrated Vehicle Health Management (IVHM) & Reliability

Counterfeit Parts Avoidance

Deicing

Military Avionics
1. OEMS/Users of Electronics: AS5553
2. OEMS/Users of Materiel (other than electronics): AS6174
3. Independent Distributors/Brokers of Electronics: AS6496
4. Authorized Distributors of Electronics: AS6081
5. Test Laboratories of Electronics: AS6171
SAE Aerospace G-19
Counterfeit Electronic Parts Committee

• Chartered in 2007 to address aspects of preventing, detecting, responding to and counteracting the threat of counterfeit electronic components. Participants included:
  – Government
  – Defense/Aerospace Manufacturers
  – Industry Groups
  – Testing Laboratories

• April 2009 - SAE International released aerospace standard AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

• August 2009 – United States Department of Defense adopted AS5553
SAE G-19 Members

Government and Defense Members

- Defense Logistics Agency (DLA)
- Defense Contract Management Agency (DCMA)
- DOE - National Nuclear Security Administration (NNSA)
- DHS – Department of Homeland Security, Customs and Border Protection (CBP)
- Federal Aviation Administration (FAA)
- Intelligence Advanced Research Projects Activity (IARPA)
- Ministry of Defence (MoD), UK
- National Aeronautics and Space Administration (NASA)
- US Department of Defense (DOD)
- USAF/NRO (National Reconnaissance Office)
- USAF Wright Patterson Air Force Base (AFB)
- US Army - AMCCC Business Operations HQAMC
- US Army Aviation & Missile Command
- US Army Redstone Arsenal
- US Missile Defense Agency (MDA)
- US Navy - Naval Air Warfare Center
- US Navy - Naval Surface Warfare Center (NSWC) Crane
- US Navy - NAVSEA Crane
- US Navy, Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity
- US Department of Transportation

Note: Members function as individuals intending to represent the best interests of the industry, and not as agents or representatives of any organization with which they may be associated.
SAE G-19 Members From Industry Sectors

Participating Industry Associations ...

• ACLASS Accreditation Services
• Aerospace Industries Association (AIA)
• ANSI-ASQ Accreditation Board (ANAB)
• Component Obsolescence Group (COG)
• The Electronic Components Supply Network
• EIA Standards and Technology Electronic Components
• ERAI, Inc.
• Independent Distributors of Electronics Association (IDEA)
• Performance Review Institute (PRI)
• UK Electronics Alliance (UKEA)
<table>
<thead>
<tr>
<th>SAE G-19 Industry Members</th>
</tr>
</thead>
</table>
G-19 Subcommittees Formed Since 2009

- **G-19 CI** - Continuous Improvement Subcommittee
  (AS5553A: Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition)

- **G-19 D** - Independent Distributor Subcommittee
  (AS6081: Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition; Independent Distribution)

- **G-19 AD** - Authorized Distributor Counterfeit Mitigation Subcommittee
  (AS6496: Counterfeit Electronic Parts Counterfeit Mitigation AD’s)

- **G-19 DR** - Distributor Risk Characterization Subcommittee
  (ARP6178: Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors)

- **G-19 A** - Test Laboratory Standards Development Subcommittee
  (AS6171: Test Methods Standard; Counterfeit Electronic Parts)

- **G-19 C** - Standards Compliance Verification Subcommittee
  (AS6462: AS5553, Verification Criteria
  AS6301: AS6081 Verification Criteria)

- **G-19 T** - Definitions Task Group
  (AIR6273: Terms and Definitions - Counterfeit Parts)
AS5553 - Counterfeit Electronic Parts; Avoidance, Detection, Mitigation and Disposition

“… created in response to a significant and increasing volume of counterfeit electronic parts entering the aerospace supply chain, posing significant performance, reliability, and safety risks.”
### SAE AS5553 and AS5553A Aerospace Standards

#### Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Provide uniform requirements, practices and methods to mitigate the risks of purchasing and supplying counterfeit electronic parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Audience</td>
<td>Original Equipment Manufacturers and Users/Integrators that purchase and/or manufacture products with electrical components</td>
</tr>
</tbody>
</table>
| Uses | • Requirements for developing a Counterfeit Parts Control Plan  
• Guidelines in the appendices for Counterfeit Mitigation industry best-practices  
• Compliance standard under development for the Rev. A |
| Status | • AS5553 - Issued - April 2009 through G-19  
• AS5553A – Issued – January 2013 through G-19CI  
• Adopted by NASA in November, 2009  
• Adopted by DoD in August, 2009  
• Under revision by G-19CI Committee to AS5553B  
  ➢ To be aligned with other G-19 Standards |
Main Subjects Covered:

• Fraudulent/Counterfeit EEE Parts Control Plan:
  ➢ Personnel Training
  ➢ Parts Availability - Covered in Annex A
  ➢ Purchasing Process - Appendix B
    - Assessment of Suppliers
    - Supply Chain Traceability - Appendix C
  ➢ Verification of Purchased/Returned Part(s)
  ➢ In-Process Investigation
Subjects covered continued

• Fraudulent/Counterfeit EEE Parts Control Plan:
  ➢ Failure Analysis
  ➢ Material Control - Appendix F
  ➢ Reporting – Appendix G
  ➢ Post Delivery Support
  ➢ Acronyms and Abbreviations-Appendix H
## SAE AS6081 – Aerospace Standard

### Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Independent Distribution

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Standardizes practices to:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>a. procure parts from reliable sources,</td>
</tr>
<tr>
<td></td>
<td>b. assess and mitigate risk of distributing counterfeit parts,</td>
</tr>
<tr>
<td></td>
<td>c. control suspect or confirmed counterfeit parts,</td>
</tr>
<tr>
<td></td>
<td>d. report suspect and confirmed counterfeit parts to other potential users and Authority Having Jurisdiction,</td>
</tr>
<tr>
<td></td>
<td>e. and assess, mitigate, control, and report parts which have been used, refurbished, or reclaimed, but represented as new product.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target Audience</th>
<th>Independent Distributors/Brokers of Electronic Components</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Uses</th>
<th>• Requirements for a Counterfeit Mitigation program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Intended to be used for certification of Distributors (ANAB)</td>
</tr>
</tbody>
</table>

| Status                     | • Published – November 2012. Rev. A in development.                                       |
SAE AS6081 – Aerospace Standard

**Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Independent Distribution**

– Quality Management System
  - Counterfeit Mitigation Policy

– Counterfeit Electronics Parts Control Plan
  - Customer Related Contract Review, Agreement, & Execution
  - Purchasing
  - Purchase Order Requirements
  - Supply Chain Traceability
  - Verification of Purchased Product
  - Material Control
  - Reporting
  - Personnel Training and Certification
SAE AS6081 – Aerospace Standard

**Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Independent Distribution**

- OEMs may specify their independent distributor suppliers comply with AS6081 to support flow-down requirements of AS5553
- AS6081 requirements are intended to be applied/flowed down to Independent Distributor/Broker suppliers
- Independent, third-party certification bodies (CBs) verify of compliance to AS6081
- Accreditation of Certification Bodies (CB) will be through a recognized and respected accreditation body (AB) to ensure the impartiality and competence of each Certification Body
<table>
<thead>
<tr>
<th><strong>Purpose</strong></th>
<th>Delineates practices to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. procure parts from authorized sources,</td>
</tr>
<tr>
<td></td>
<td>b. provide authenticity and traceability of procured parts,</td>
</tr>
<tr>
<td></td>
<td>c. control parts identified as counterfeit,</td>
</tr>
<tr>
<td></td>
<td>d. report counterfeit parts as appropriate, and</td>
</tr>
<tr>
<td></td>
<td>e. minimize the risk of counterfeit() parts entering the supply chain</td>
</tr>
</tbody>
</table>

| **Target Audience** | Authorized/Franchised Distributors of Electronic Components |

| **Uses** | For use by Authorized Distributors purchasing and selling electronic components, supplies and equipment acquired directly from the manufacturer for which they are authorized or from another Authorized Distributor. |

| **Status** | • In development. |
Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Authorized/Franchised Distribution

Requirements:

- Counterfeit Mitigation Policy
- Counterfeit Electronics Parts Control Plan
- Customer Related Processes
- Purchasing
- Traceability, Record Retention and Retrievability
- Customer Returns
- Scrap Control in Authorized Distribution
- Inventory Control Plan
- Reporting
## Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Tool for the evaluation of a distributor’s processes for the prevention, detection, containment, and reporting of counterfeit electronic components</th>
</tr>
</thead>
</table>
| Target Audience | • Distributors of Electronic Components (self assessment)  
• Customers of Distributors (for assessment and the calculation of a risk score) |
| Uses | • Develop Risk Assessment score for the Counterfeit Mitigation program  
• NOT intended to be used for certification of Distributors |
| Status | • User Guide and Worksheet Published 2011-12-19. |
Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

- Justification for Assessment
- Pre-visit Assessment Survey
- Site Assessment Survey
- Supplier Selection
- Assessment Spreadsheet
  - Survey
  - Tabulates score
Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

– Survey

• General Company Information
• Pre-Assessment Information
• Industry Membership and Reporting
• Quality System and Processes
• Warranty and Insurance
• Supplier Qualification and Purchasing Process
• Handling and Facilities
• Training and Certification
• Inspection and Test
• Non-Conforming Material Control
• Additional Test and Inspection (In-house or Third-Party)
Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

- Intended for use by organizations that procure electronic components from suppliers other than the original component manufacturer (OCM)
- Provides organizations with a tool to assess a supplier’s capability to prevent, detect, contain and report suspect or confirmed counterfeit electronic components
- Not intended to replace certification compliance criteria
# AS6171 – Test Methods Standard

## Test Methods Standard; Counterfeit Electronic Parts

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Standardize practices to detect suspect counterfeit electronic parts and to ensure consistency of test techniques and requirements across the supply chain</th>
</tr>
</thead>
</table>
| **Target Audience** | • Independent Testing Facilities  
• Distributors (in-house testing capability) |
| **Uses** | • Test Methods for counterfeit detection  
• Proficiency for counterfeit test & evaluation  
• Intended to be used for accreditation of Independent Test Laboratories or Distributors (ILAC, through ACLASS, A2LA, etc.) |
| **Status** | • In Development. Expected balloting of main doc. in Q4-2013. |
AS6171 - Each Test Method section will include:

- Processes and a description of procedures
- Apparatus needed for the test technique
- Required qualification and certification of processes and personnel
- Guidelines and requirements for reporting
Current Test Methods Covered Under the First Release

- External Visual Inspection
  - Including Scanning Electron Microscopy (SEM)
- Radiological
- X-Ray Fluorescence (XRF)
- Delid/Decapsulation physical analysis
- Electrical Test
- Acoustic Microscopy
- Fourier Transform Infrared Spectroscopy (FTIR)
- RAMAN Spectroscopy
- Thermogravimetric Analysis (TGA)
- Design Recovery
- Selected Environmental
  - Seal
  - Temp Cycling
  - Thermal Shock
  - Latency Mitigation / Burn-in
- Risk Criteria and sampling plans
- Personnel Certification requirements
Proposed Tests to Be Covered in a Future Rev.

- Secondary Ion Mass Spectroscopy (SIMS)
- X-Ray Photoelectron Spectroscopy (XPS)
- Auger Electron Spectroscopy (AES)
- Ion Exchange Chromatography (IEC)
- Inductively Coupled Plasma/Optical Emission Spectroscopy (ICP/OES)
- Differential Scanning Calorimetry (DSC)
- Thermomechanical Analysis (TMA)
- Surface Profilometry
- Packaging
G-19A Committee Structure

G-19A Main Committee
- Subcommittee Co-Chairs

G-19A Document Coordinator:

External Visual Inspection (incl. SEM)
- Subgroup Co-Leads

Radiological
- Subgroup Co-Leads

XRF
- Subgroup Co-Leads

Delid/Decap Physical Analysis
- Subgroup Co-Lead

Electrical Test
- Subgroup Co-Leads

Acoustic Microscopy

Misc.

Packaging
- Subgroup Co-Leads

Risk Criteria
- Subgroup Co-Leads

G-19 & G-21 Counterfeit Avoidance, Detection, Mitigation & Disposition Committee Update
AS6171 – Test Methods Standard

- Standardize practices to detect suspect counterfeit electronic parts and to ensure consistency of test techniques and requirements across the supply-chain
- Level of testing is risk-based and includes sampling plans
- Accreditation of the Test Laboratory will be through International Laboratory Accreditation Cooperation (ILAC) (AClass, A2LA or other laboratory accreditation bodies) to ensure the impartiality and competence of the Test Laboratory
- A third party proficiency scheme is recommended to reduce variability among operators
AS6171 will include guidance for:

- Evaluating risk and recommended tier level of testing based on:
  - Risk of the supplier,
  - Risk of the part,
  - Risk of application, and
  - Other risk factors.

- Recommended sampling plans
### Counterfeit Materiel Other than Electronic Parts; Assuring Acquisition of Authentic and Conforming Materiel

<table>
<thead>
<tr>
<th>Purpose and Uses</th>
<th>This SAE Standard standardizes practices to:</th>
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<tbody>
<tr>
<td></td>
<td>a. maximize availability of authentic materiel (made from the proper materials using the proper processes with required testing,)</td>
</tr>
<tr>
<td></td>
<td>b. procure materiel from reliable sources</td>
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<tr>
<td></td>
<td>c. assure authenticity and conformance of procured materiel</td>
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<tr>
<td></td>
<td>d. control materiel identified as counterfeit, and</td>
</tr>
<tr>
<td></td>
<td>e. report counterfeit materiel to other potential users and government investigative authorities</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Target Audience</th>
<th>Organization that purchase and/or manufacture products other than electrical components</th>
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</thead>
</table>

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<tr>
<th>Rationale</th>
<th>Created in response to a significant and increasing volume of counterfeit material entering the supply chain</th>
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<tr>
<th>Status</th>
<th>Published May 2012. Rev. A in development.</th>
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</thead>
</table>
Committee G-21 - Counterfeit Materiel (AS6174)

- April 20, 2010 – DoD PSMC (Part Standardization and Management Committee) requested SAE to address counterfeit NON-electronic parts
- May 14, 2010 – First telecom of new group
- October 4, 2010 – AS6174 based on major rewrite of AS5553 to address all materiel, nearly complete
- Jan-May 2011 – revised to consider Office of the Secretary of Defense (OSD) and WH Intellectual Property Enforcement Coordinator(IPEC) input
- Published May 2012
• For all applications
  – Preference for purchase from original manufacturer or licensed/franchised dist.
  – Extra documentation/testing for other distributors/brokers

• Tracks closely with draft Office of the Secretary of Defense (OSD) and White House (WH) policy for avoiding counterfeits with all materiel, including medicine, tourniquets, etc.
• New Areas of Work:
  – Source Requirements – need revision
  – Refrigerants
  – Packaging
  – Raw Materials
  – Bearings
  – Fasteners
  – Others?
<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE AS5553A (G19-CI)</td>
<td>Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition</td>
<td>Issued January 2013 and available at <a href="http://www.sae.org">www.sae.org</a></td>
</tr>
<tr>
<td>SAE AS6171 (G19-A)</td>
<td>Test Methods Standard; Counterfeit Electronic Parts</td>
<td>In draft; Individual test methods balloted. Main document balloting expected in 4Q-2013</td>
</tr>
<tr>
<td>SAE AIR6273 (G19-T)</td>
<td>Terms and Definitions:</td>
<td>In draft. Expected balloting in 1Q-2014.</td>
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<tr>
<td>Standard</td>
<td>Title</td>
<td>Status</td>
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<td>(G19-D)</td>
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<tr>
<td>SAE AS6301</td>
<td>Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Independent Distributors Verification Criteria</td>
<td>In draft.</td>
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<tr>
<td>(G19-C)</td>
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<td>SAE ARP6178</td>
<td>Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors</td>
<td>Published 2011-12.</td>
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<tr>
<td>SAE AS6496</td>
<td>Authorized Distributor Counterfeit Mitigation</td>
<td>In draft.</td>
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<td>(G19-AD)</td>
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<td>SAE AS6174</td>
<td>Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel</td>
<td>Published May 2012. Rev. A in development.</td>
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<td>(G-21)</td>
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QUESTIONS?

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