SAE INTERNATIONAL

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



Counterfeit Parts Avoidance

Human Factors





Deicing



Military Avionics

Integrated Vehicle Health Management (IVHM) & Reliability





SAE Aerospace Council Organization Chart





SAE Organizational Structure





G-19 & G-21 Counterfeit Prevention & Detection Standards





SAE G-19 & G-21 Document Proposed Roadmap, September 2013

			AE Counterfeit Avoid	osed Roadmap, Septem		
	G-19 Counterfeit Electronic Co Phil Zulueta, SAF					eriel Committee Oversight on, SAE G-21 Co-Chairman
			Auditor Compet	ency (Asxxxx)		
Proficiency Test Provider (ISO/IEC 17043 Accredited)				Certification Body (IAF & ISO/IEC 17021 Accredited)		
Test Provider (Accredited to ISO/IEC 17025 & Certified to AS9100 and/or ISO 9001)	Original Component Manufacturer (Certified to AS9100 and/or ISO 9001)	(Certified to AS	ibutor 9120 and/or ISO 01)	Original Equipment Manufacturer/User/MROTest Pro(Certified to AS9100 and/or AS9110 and/or ISO 9001)(Certified to AS9		Test Provider (Certified to AS9100 and/or ISO 9001)
Operator(s) Certified to PT Scheme or Identified AS6171 Test Methods		Authorized/ Franchised	Broker/ Independent			
AS6171, Test Methods Standard; Counterfeit Electronic Parts Document in progress. Dan DiMase & Sultan Lilani, Subcommittee Co-Chairman, Mike Megrdichian, Document Coordinator, SAE G-19A Asxxxx, Compliance Standard or Guide (Includes Audit Checklist) Bill Scofield, Brian Worden - Subcommittee Co-Chairmen, SAE G-19C		Document in progre	Risk Assessmen User Gu Dan DiMase & Ch: AS6081, Counterfeit Electronic Parts Avoidance, ID's. Published 2012-11-7. Rev. A in progress Phil Zulueta Chairman, SAE G-19D AS6301, Compliance Standard or Guide (includes Audit Checklist) Bill Scofield, Brian Worden, Sub-com. Chairmen, SAE G-19C and Definitions – Frau ess. Kirsten Koepsel, S	AS5553A, Fraudulent/ Counterfeit Electronic Parts; Tool for t of Distributors. Worksheet and ide Published 2011-12-19 Fred Schipp, Subcommittee Co- airmen, SAE G-19DR AS5553A, Fraudulent/ Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition. Issued 2009-04-02. Rev. A published 2013-01-21. Sarah Skinner, Subcommittee Chairperson, SAE G-19Cl AS6462, AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition Verification Criteria Includes Audit Checklist. Published 2012-11-01. Rev. A in progress. Bill Scofield, Brian Worden - Subcommittee Co-Chairmen, SAE G-19C dullent/Counterfeit Electronic Parts Subcommittee Chairperson, SAE G-19C	(Includes A Bill Scofield, Brian Worden - Sub IST	AS6174, Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel Commodity Slash Sheets in Rev. A document. Wayne Moss, Bob Tipton – Subcommittee Co-Chairmen. Materiel Subcommittee, SAE G-21
	Publish	ed	In Develo	pment	Gap	

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)



SAE G-19 Industry Members

Adaptive Management Solutions Aero Engine Controls Aerojet Rocketdyne **Airbus Americas** American Electronic Resource Analytical Alternatives **Analytical Solutions** Applied DNA Sciences Arcadia Components Ares Corp Arrow Electronics Astute Electronics **BAE Systems (Operations) BAE Systems** Ball Aerospace & Technologies Barnes Group Inc **Bechtel Plant Machinerv** Beckman Coulter Inc Bell Helicopter Textron Boeina **Boeing Advanced Systems Boston Scientific Corp Business Quality Process Management** Business Trend LLC **CALCE University Of Maryland** Camcode Celestica Corp. Technology & Engineering China Aero-Polytechnology Establishment **Creative Electron Inc. Crestwood Technology Group Curtiss-Wright Controls** DA-Tech **Derf Electronics** Det NortskeVeritas (DNV) **DPA Components International Dynamic Research & Testing Labs** ECC Corp **Electronic Supply Chain Solutions** Eltek Semiconductors European Aeronautic Defence and Space Co

Focal Spot Inc. **General Dynamics General Dynamics UK GE** Aviation Glenbrook Technology **Goodrich Aerospace Goodrich Control Systems Greenberg & Bass** Harris Corp **Hi-Reliability Microelectronics Hi-Rel Laboratories** Honevwell Aerospace Honeywell Aerospace Electronic Systems Honevwell Int'l Honeywell Technology Solutions Howard University IEC Electronics Corp Infineon Technologies AG **Integra Technologies** Intel Jabil **Jacobs Engineering** Jet Propulsion Laboratory L-3 Communications - CSW Left Coast Technical Solutions Lockheed Martin Aeronautics **Lockheed Martin Missiles & Fire Control** 3M **Orbital Sciences** Plexus Corp Process Sciences Raytheon **Renesas Electronics Corp Rochester Electronics** Rockwell Collins Inc **Rolls-Royce Corp** Sandia National Laboratories Schlumberger HPS Microram Electronics Motronics Circuits International

Mouser Electronics Plexus Northrop Grumman **Premier Semiconductor Services** Niisu **Nisene Technology Group** Northrop Grumman Electronic Systems N.F. Smith & Associates NQA Selex Galileo Silicon Cert Laboratories SMT Corp Snell & Wilmer SolTec Electronics Sonix Sonoscan Star Associates International **Texas Instruments** Thales Group The Aerospace Corp The Electronic Components Supply Network Trace Laboratories TTI **TWI NDT Validation Center UL DQS Inc Underwriters Laboratories, UL DQS** UTC Aerospace Vladimir SC Respect Westland Helicopters White Horse Laboratories World Data Products World Micro Wyle Laboratories Xilinx



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 Committee 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

An SAE International	rospace	AEROSPACE	SAE AS5553	
		0171127112	Issued 2009-04	
	Counterfeit Electron	ic Parts; Avoidance, Detection	, Mitigation, and Disposition	
		RATIONALE		
aerospace supply cl	hain, posing significa reated to provide ur	int performance, reliability, and s	volume of counterfeit electronic parts enteri afety risks. and methods to mitigate the risks of receiv	
		FOREWORD		
To assure customer sa products that meet or and the resulting dive organizations face the the world and at all le product to multiple cust	" created i increasing ve	nd regulatory authority require	electronic partse the challenge	ice industry
This document standard procurement, inspection, discovered.	significant pe	erformance, reliability	y, and safety risks." supplier	management, rfeit parts are



SAE AS5553 and AS5553A Aerospace Standards

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

Purpose	Provide uniform requirements, practices and methods to mitigate the risks of purchasing and supplying counterfeit electronic parts
Target Audience	Original Equipment Manufacturers and Users/Integrators that purchase and/or manufacture products with electrical components
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			
Purpose	 Standardizes practices to: a. procure parts from reliable sources, b. assess and mitigate risk of distributing counterfeit parts, c. control suspect or confirmed counterfeit parts, d. report suspect and confirmed counterfeit parts to other potential users and Authority Having Jurisdiction, e. and assess, mitigate, control, and report parts which have been used, refurbished, or reclaimed, but represented as new product. 		
Target Audience	Independent Distributors/Brokers of Electronic Components		
Uses	 Requirements for a Counterfeit Mitigation program Intended to be used for certification of Distributors (ANAB) 		
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



SAE AS6496 – Aerospace Standard

Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Authorized/Franchised Distribution			
Purpose	 Delineates practices to: a. procure parts from authorized sources, b. provide authenticity and traceability of procured parts, c. control parts identified as counterfeit, d. report counterfeit parts as appropriate, and e. minimize the risk of counterfeit() parts entering the supply chain 		
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



ARP6178 – (Aerospace Recommended Practice)

Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors

Purpose	Tool for the evaluation of a distributor's processes for the prevention, detection, containment, and reporting of counterfeit electronic components
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



SAE ARP6178

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)



SAE ARP6178

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

Purpose	Standardize practices to detect suspect counterfeit electronic parts and to ensure consistency of test techniques and requirements across the supply chain
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





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 – Test Methods Standard

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



AS6174 – Counterfeit Materiel

Counterfeit Materiel Other than Electronic Parts; Assuring Acquisition of Authentic and Conforming Materiel

Purpose and Uses	 This SAE Standard standardizes practices to: a. maximize availability of authentic materiel (made from the proper materials using the proper processes with required testing,) b. procure materiel from reliable sources c. assure authenticity and conformance of procured materiel d. control materiel identified as counterfeit, and e. report counterfeit materiel to other potential users and government investigative authorities 	
Target Audience	 Organization that purchase and/or manufacture products other than electrical components 	
Rationale	Created in response to a significant and increasing volume of counterfeit material entering the supply chain	
Status	 Published May 2012. Rev. A in development. 	



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



AS6174 - Counterfeit Materiel

- 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.



AS6174 - Counterfeit Materiel

- New Areas of Work:
 - Source Requirements need revision
 - Refrigerants
 - Packaging
 - Raw Materials
 - Bearings
 - Fasteners
 - Others?



Summary of SAE G-19/G-21 Aerospace Standards

Standard	Title	Status
SAE AS5553A (G19-CI)	Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition	Issued January 2013 and available at <u>www.sae.org</u>
SAE AS6462 (G19-C)	Verification Criteria for Certification against AS5553	AS5553 verification criteria for first release published – 2011-11. Discussions underway for certification programs/schemes. Rev. A verification criteria under development
SAE AS6171 (G19-A)	Test Methods Standard; Counterfeit Electronic Parts	In draft; Individual test methods balloted. Main document balloting expected in 4Q-2013
SAE AIR6273 (G19-T)	Terms and Definitions:	In draft. Expected balloting in 1Q- 2014.



Summary of SAE G-19/G-21 Aerospace Standards

Standard	Title	Status
SAE AS6081A (G19-D)	Counterfeit Electronic Parts Avoidance – Independent Distributors	Published 2012-11. Rev. A in development.
SAE AS6301 (G19-C)	Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Independent Distributors Verification Criteria	In draft.
SAE ARP6178 (G19-DR)	Counterfeit Electronic Parts; Tool for Risk Assessment of Distributors	Published 2011-12.
SAE AS6496 (G19-AD)	Authorized Distributor Counterfeit Mitigation	In draft.
SAE AS6174 (G-21)	Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel	Published May 2012. Rev. A in development.



SAE INTERNATIONAL

QUESTIONS?

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