



BSI Standards Publication

Process management for avionics — Counterfeit prevention

Part 1: Avoiding the use of counterfeit, fraudulent
and recycled electronic components

National foreword

This British Standard is the UK implementation of EN IEC 62668-1:2019+A1:2024. It is identical to IEC 62668-1:2019, incorporating amendment 1:2024. It supersedes BS EN IEC 62668-1:2019, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee GEL/107, Process management for avionics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Process management for avionics - Counterfeit prevention - Part
1: Avoiding the use of counterfeit, fraudulent and recycled
electronic components
(IEC 62668-1:2019)

Gestion des processus pour l'avionique - Prévention de la
contrefaçon - Partie 1: Prévention de l'utilisation de
composants électroniques contrefaits, frauduleux et
recyclés
(IEC 62668-1:2019)

Luftfahrtelektronik-Prozessmanagement - Verhinderung von
Produktfälschung - Teil 1: Vermeidung des Gebrauchs von
gefälschten, betrügerischen und wiederverwerteten
elektronischen Bauelementen
(IEC 62668-1:2019)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 107/335/CDV, future edition 1 of IEC 62668-1, prepared by IEC/TC 107 "Process management for avionics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62668-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-07-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-10-21

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The text of the International Standard IEC 62668-1:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

ISO 14001 NOTE Harmonized as EN ISO 14001

European foreword to Amendment 1

The text of document 107/416/FDIS, future edition 1 of IEC 62668-1/AMD1, prepared by TC 107 "Process management for avionics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62668-1:2019/A1:2024.

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Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62239-1	-	Process management for avionics Management plan - Part 1: Preparation and maintenance of an electronic components management plan	- EN IEC 62239-1	-
IEC 62668-2	-	Process management for avionics Counterfeit prevention - Part 2: Managing electronic components from non-franchised sources	- EN IEC 62668-2	-
ISO 9001	-	Quality management systems Requirements	- EN ISO 9001	-
-	-	Quality Management Systems Requirements for Aviation, Space and Defense Organizations	- AS/EN/JISQ 9100	-
-	-	Quality Maintenance Systems – Aerospace – Requirements for Maintenance Organizations	- AS/EN/JISQ 9110	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PROCESS MANAGEMENT FOR AVIONICS – COUNTERFEIT PREVENTION –

Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62668-1 has been prepared by IEC technical committee 107: Process management for avionics.

This first edition cancels and replaces the third edition of IEC TS 62668-1 published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) added a reference to AS/EN/JISQ 9100 and AS/EN/JISQ 9110 which contain anti-counterfeit requirements which may be used to satisfy the requirements of 4.2;
- b) added reference to USA DFAR rule 252.246.7008 and to UK Defence Standard 05-135;
- c) added reference to more GAO, OECD and ICC reports in 4.5.1;

- d) updated weblinks and other references;
- e) added new Annex E with figures describing how anti-counterfeit documents can be used in supply chains;
- f) added a reference to the new IECQ OD 3702 traceability audit;
- g) added new definition for re-manufactured components with a warning that these are not recommended.

The text of this International Standard is based on the following documents:

CDV	Report on voting
107/335/CDV	107/346A/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62668 series, published under the general title *Process management for avionics – Counterfeit prevention*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

PROCESS MANAGEMENT FOR AVIONICS – COUNTERFEIT PREVENTION –

Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components

1 Scope

This part of IEC 62668 defines requirements for avoiding the use of counterfeit, recycled and fraudulent components used in the aerospace, defence and high performance (ADHP) industries. It also defines requirements for ADHP industries to maintain their intellectual property (IP) for all of their products and services. The risks associated with purchasing components outside of franchised distributor networks are considered in IEC 62668-2. Although developed for the avionics industry, this document can be applied by other high performance and high reliability industries at their discretion.

NOTE IEC 62668 (all parts) does not address the restriction on the re-use of a component in maintenance, repair and overhaul (MRO) operations and only addresses MRO activities when they are under the OEM's responsibility.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62239-1, *Process management for avionics – Management plan – Part 1: Preparation and maintenance of an electronic components management plan*

IEC 62668-2, *Process management for avionics – Counterfeit prevention – Part 2: Managing electronic components from non-franchised sources*

ISO 9001, *Quality management systems – Requirements*

AS/EN/JISQ 9100, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations*

AS/EN/JISQ 9110, *Quality Maintenance Systems – Aerospace – Requirements for Maintenance Organizations*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1**aftermarket source**

reseller which may or may not be under contract with the original component manufacturer (OCM), or is sometimes a component “re-manufacturer”, under contract with the OCM

Note 1 to entry: The reseller accumulates inventories of encapsulated or non-encapsulated (wafer) components whose end of life date has been published by the OCM. These components are then resold at a profit to fill a need within the market for components that have become obsolete.

3.1.2**broker**

individual or corporate organization that serves as an intermediary between buyer and seller

Note 1 to entry: In the electronic component sector a broker specifically seeks to supply obsolete or hard to find components in order to turn a profit. To do so it may accumulate an inventory of components considered to be of strategic value or may rely on inventories accumulated by others. The broker operates within a worldwide component exchange network.

3.1.3**COTS product****commercial off-the-shelf product**

one or more components, assembled and developed for multiple commercial consumers, whose design and/or configuration is controlled by the manufacturer's specification or industry standard

Note 1 to entry: COTS products can include electronic components, subassemblies or assemblies, or top level assemblies. Electronic COTS subassemblies or assemblies include circuit card assemblies, power supplies, hard drives, and memory modules. Top-level COTS assemblies include a fully integrated rack of equipment such as raid arrays, file servers to individual switches, routers, personal computers, or similar equipment.

Note 2 to entry: This note applies to the French language only.

3.1.4**counterfeit, verb**

action of simulating, reproducing or modifying a material good or its packaging without authorization

Note 1 to entry: It is the practice of producing products which are imitations or are fake goods or services. This activity infringes the intellectual property rights of the original manufacturer and is an illegal act. Counterfeiting generally relates to wilful trademark infringement.

3.1.5**counterfeited component**

material good imitating or copying an authentic material good which may be covered by the protection of one or more registered or confidential intellectual property rights

Note 1 to entry: A counterfeited component is one whose identity or pedigree has been altered or misrepresented by its supplier.

Identity = original manufacturer, part number, date code, lot number, testing, inspection, documentation or warranty, etc.

Pedigree = origin, ownership history, storage, handling, physical condition, previous use, etc.

Note 2 to entry: When a material good has no registered or confidential intellectual property rights, then the material good has no intellectual property protection. Examples include situations where the original component manufacturer (OCM) has ceased to trade and has not sold or passed on the intellectual property rights to another entity.

3.1.6**customer device specification**

device specification written by a user and agreed by the supplier

3.1.7 customer user

original equipment manufacturer (OEM) which purchases electronic components, including integrated circuits and/or semiconductor devices compliant with this document, and uses them to design, produce, and maintain systems

3.1.8 data sheet

document prepared by the manufacturer that describes the electrical, mechanical, and environmental characteristics of the component

3.1.9 franchised distributor or agent

individual or corporate organization that is legally independent from the franchiser (in this case the electronic component manufacturer or OCM) and agrees under contract to distribute products using the franchiser's name and sales network

Note 1 to entry: Distribution activities are carried out in accordance with standards set and controlled by the franchiser. Shipments against orders placed can be despatched either directly from the OCM or the franchised distributor or agent. In other words, the franchised distributor enters into contractual agreements with one or more electronic component manufacturers to distribute and sell the said components. Distribution agreements may be stipulated according to the following criteria: geographical area, type of clientele (avionics for example), maximum manufacturing lot size. Components sourced through this route are protected by the OCM's warranty and supplied with full traceability.

3.1.10 fraudulent component

electronic component produced or distributed either in violation of regional or local law or regulation, or with the intent to deceive the customer

Note 1 to entry: This includes but is not limited to the following which are examples of components which are fraudulently sold as new ones to a customer:

- 1) a stolen component;
- 2) a component scrapped by the original component manufacturer (OCM) or by any user;
- 3) a recycled component, that becomes a fraudulent recycled component when it is a disassembled (for example disassembled from a PCB assembly) component resold as a new component (see Figure 1), where typically there is evidence of prior use and rework (e.g. solder, re-plating or lead re-attachment activity) on the component package terminations;
- 4) a counterfeit component, a copy, an imitation, a full or partial substitute of brands;
- 5) fraudulent designs, models, patents, software or copyright sold as being new and authentic. For example: a component whose production and distribution are not controlled by the original manufacturer;
- 6) unlicensed copies of a design;
- 7) a disguised component (re-marking of the original manufacturer's name, reference date/code or other identifiers etc.), which may be a counterfeit component (see Figure 1);
- 8) a component without an internal silicon die or with a substituted silicon die which is not the original manufacturer's silicon die.

3.1.11 intellectual property

creations of the mind such as inventions, literary and artistic works, and symbols, names, images, and designs used in commerce

Note 1 to entry: This is property created through intellectual or creative activity.

Note 2 to entry: It includes patents, trademarks, copyright and designs. It can be owned, rented out, licensed, sold or given away.

3.1.12
microcircuit
component
device

electrical or electronic device that is not subject to disassembly without destruction or impairment of design use and is a small circuit having a high equivalent circuit element density which is considered as a single part composed of interconnected elements on or within a single substrate to perform an electronic circuit function

Note 1 to entry: This excludes printed wiring boards/printed circuit boards, circuit card assemblies and modules composed exclusively of discrete electronic components.

3.1.13
MRO
maintenance, repair and overhaul

operations, such as tests, measurements, replacements, adjustments, and repairs, intended to retain or restore a functional unit in or to a specified state in which the unit can perform its required functions

Note 1 to entry: This activity includes inspection, rebuilding, alteration and the supply of spare parts, accessories, raw materials, adhesives, sealants, coatings and consumables.

Note 2 to entry: This note applies to the French language only.

3.1.14
non-franchised distributor
company which does not fall under a franchised distributor or OCM

Note 1 to entry: These distributors may purchase components from component manufacturers, franchised distributors, or through other supply channels (open markets). These distributors cannot always provide the guarantees and support provided by the franchised distributor network; components sourced through this source are usually protected by the source's warranty only.

Note 2 to entry: Some non-franchised distributors are able to purchase traceable components from the OCM or their franchised distributors and to provide traceability paperwork and/or are able to return stock for investigation to the OCM. Such non-franchised distributors can satisfy the USA DFARS 252.246.7008 requirements (see A.8.10).

3.1.15
OCM
original component manufacturer
company specifying and manufacturing the electronic component

Note 1 to entry: This note applies to the French language only.

3.1.16
OEM
original equipment manufacturer

manufacturer which defines the electronic subassembly that includes the electronic components or defines the components used in an assembly and/or test specification

Note 1 to entry: This note applies to the French language only.

3.1.17
piracy
willful copyright infringement

3.1.18
re-manufactured component
recycled element

electronic component that includes a recycled silicon die or technology element as documented and disclosed by the electronic component re-manufacturer and that is fully tested before being sold

Note 1 to entry: Examples include a silicon or other die extracted from another electronic component, either new or used, which is externally marked and disclosed using the re-manufacturer's name, logo and different part number.

Note 2 to entry: Re-manufacturing an electronic component can necessitate the original engineering data and schematics of the product. This does not mean that a re-manufactured product is identical to the new product.

Note 3 to entry: Electronic re-manufactured components often come with warranties.

3.1.19 reseller

general supplier which offers a selection of electronic components to order from a catalog

3.1.20 recycled component

electrical component removed from its original product or assembly and available for reuse

Note 1 to entry: The component has authentic logos, trademarks and markings. However, it typically has no output to measure the useful life remaining for its reuse. A recycled component can fail earlier than a new one when re-assembled into another product or assembly. A recycled component may also be physically damaged or damaged through electro static discharge (ESD) during the removal process.

3.1.21 semiconductor

electronic component in which the characteristic distinguishing electronic conduction takes place within a semiconductor

Note 1 to entry: This includes semiconductor diodes which are semiconductor devices having two terminals and exhibiting a nonlinear voltage-current characteristic and transistors which are active semiconductor devices capable of providing power amplification and having three or more terminals.

3.1.22 subcontractor

manufacturer of electronic subassemblies or supplier manufacturing items in compliance with customer design data pack and drawings, and under the authority of the OEM

Note 1 to entry: This supplier can potentially procure all or part of the electronic components required to produce a subassembly and is often referred to as the contract electronic manufacturer (CEM) or electronics manufacturing services (EMS).

3.1.23 supplier

company which provides to another an electronic component which is identified by the logo or name marked on the device

Note 1 to entry: A supplier can be an OCM, a franchised distributor or agent, a non-franchised distributor, broker, reseller, OEM, CEM, and EMS, etc.

3.1.24 suspect component

electronic component which has lost supply chain traceability back to the original manufacturer and which may have been misrepresented by the supplier or manufacturer and may meet the definition of fraudulent or counterfeit component

Note 1 to entry: Suspect components may include but are not limited to:

- 1) counterfeit components;
- 2) recycled components coming from uncontrolled recycling operations carried outside of the OEM, franchised network and OEM business where typically it has been fraudulently sold to the OEM as being in a new unused condition.

3.1.25 traceability

ability to have, for an electronic component, its full trace back to the original component manufacturer

Note 1 to entry: This traceability means that every supplier in the supply chain is prepared to legally declare in writing that they know and can identify their source of supply, which goes back to the original manufacturer and can confirm that the electronic components are brand new and were handled with appropriate ESD and MSL handling precautions. This authenticates that the electronic components being supplied are unused, brand new components with no ESD, MSL or other damage. This ensures that the electronic components are protected by any manufacturer's warranties, have all of their useful life remaining and function according to the manufacturer's published data sheet, exhibiting the expected component life in the application for the OEM's reliability predictions and product warranty.

3.1.26

untraceable

property of electronic components which have lost their traceability (see 3.1.25)

3.2 Abbreviated terms

AAIPT	Alliance Against IP Theft
ACTA	Anti-Counterfeit Trade Agreement
ACTF	Semiconductor Industries Association Anti Counterfeit Task Force
ADHP	aerospace, defence and high performance
ASIC	application specific integrated circuit
ATP	acceptance test procedure
BEAMA	British Electrotechnical Allied Manufacturers' Association
BoM	bill of materials
CAAC	Civil Aviation Administration of China
CATA	China Anti-counterfeit Technology Association
CB	certifying body (third party)
CNIPA	China National Intellectual Property Administration, PRC
COTS	commercial off-the-shelf
CofC	certificate of conformance
CEC	China Electronics Corporation
CECA	China Electronic Components Association
CEEI	China Electrical Equipment Association
CEM	contract electronic manufacturer
CESI	China Electronics Standardization Institute
CMM	component maintenance manuals
CQAE	China Quality Management Association for Electronics Industry
CMOS	complementary metal oxide semiconductor
DFARS	Defense Federal Acquisition Regulation System
DLF	direct line feed
DOD	Department of Defence (US)
DMEA	Defense MicroElectronics Activity
DMSMS	diminishing manufacturing sources and material shortages
DNA	deoxyribonucleic acid
DSCC	Defence Supply Centre Columbus
DLA	Defense Logistics Agency (former DSCC)
EASA	European Aviation Safety Agency
ECIA	Electronic Components Industry Association
ECMP	electronic component management plan
ECSN	electronic component supplier network

EMS	electronic manufacturing services
ERAI	Electronic Reseller Association International (see web-page http://www.eraf.com)
ESD	electrostatic discharge
ESIA	European Semiconductor Industries Association
EOS	electrical overstress
EU	European Union
EUIPO	European Union Intellectual Property Office
FAA	Federal Aviation Administration
FAR	Federal Avionic Regulations
FFF	form, fit and function
FIT	failures in time
FPD	flat panel display
FPGA	field-programmable gate array
FSC	Federal Supply Class
G-19	SAE Counterfeit Electronic Parts Committee
GAMS	Government/Authorities meeting on Semiconductors
GIFAS	French Aerospace Association
HAST	highly accelerated stress test
HIS	hardware intrinsic security
HTOL	high temperature operating life
IAQG	International Aerospace Quality Group – SAE
ICC	International Chamber of Commerce
ID	independent distributors
IDEA	Independent Distributors of Electronics Association
IEC	International Electrotechnical Commission
 IECQ	IEC quality assessment systems for electronic components 
iNEMI	International Electronics Manufacturing Initiative
IP	intellectual property
IPR	intellectual property rights
ISP	internet service provider
ITAR	International Traffic in Arms Regulations
IUID	Item Unique Identification
JEDEC	Joint Electron Device Engineering Council
JIT	just in time
JPO	Japanese Patent Office
LED	light-emitting diode
LDC	lot data code
LTB	last time buy
MEMS	micro-electromechanical systems
MOD	Ministry of Defence, UK
MRO	maintenance, repair and overhaul (related to operations intended to retain or restore a functional unit)
MTBF	mean time between failure

MTTF	mean time to failure
MSL	moisture sensitivity level
NATO	North Atlantic Treaty Organization
NDAA	National Defense Acquisition Act
NEDA	National Electronics Distributors Association
NVRAM	non-volatile random access memory
OCM	original component manufacturer
OECD	Organisation for Economic Co-operation and Development
OEM	original equipment manufacturer
PCB	printed circuit board
PCN	product change notice
PQDR	product quality deficiency report
PRC	People's Republic of China
PV	photovoltaic
QTSL	Qualified Testing Suppliers List
RECS	Reliable Electronic Component Supplier
PUF	physical unclonable function
RFID	radio frequency identity detection
RAM	random access memory
ROM	read only memory
SAE	Society of automotive engineers
SEE	single event effect
SEU	single event upset
SER	soft error rate
SIA	Semiconductor Industry Association
SRAM	static random access memory
TAPO	Trusted Access Program Office
TSO	Trading Standards Officers
UK	United Kingdom
UKEA	UK Electronics Alliance
UNG	unique number generator
USA	United States of America
WIPO	World Intellectual Property Organization
WSC	World Semiconductor Council

4 Technical requirements

4.1 General

This document minimises counterfeiting, recycling and fraudulent activities by maintaining intellectual property and allowing the purchasing of traceable components.

Minimum avionics OEM requirements are defined in 4.2. This, in whole or in part, applies to MRO operations under the OEM's responsibility.

Subclauses 4.3 to 4.14.6 provide supporting information to 4.2.

Informative annexes are provided at the end of this document and their content is subject to change. Users of this document are encouraged to review the latest data available whenever referencing the content of these annexes.

- Annex A provides further cross-reference information for all the institutions and organizations discussed in Clause 4.
- Annex B provides examples of aftermarket sources which shall be considered in obsolescence situations (see 4.12.9).
- Annex C provides an example of a typical Chinese RECS certificate (see 4.7.2).
- Annex D provides a flowchart of IEC 62668-1 requirements and their relationship to external standards.
- Annex E provides typical examples of how to deploy anti-counterfeit standards in the supply chain.

The key elements to control and understand are:

- the definition of intellectual property (see 4.3);
- the limitations of the term counterfeit (see 4.4);
- the better description of “fraudulent components” (see 4.4.3);
- what recycling is and why the avionics industry minimises recycling to in-house activities only (see 4.6);
- the use of original component manufacturers (OCMs) which protect their intellectual property (see 4.7);
- the use of approved franchised distributors or sources (see 4.10);
- the use of risk management and component test processes when buying suspect untraceable components from non-franchised distributors in accordance with IEC 62668-2 (see 4.12.6);
- the protection of the OEM's intellectual property, throughout its product lifecycles including management of all spares;
- the reporting of violations of intellectual property through customer dialogue and local law enforcement (see 4.14, A.7.2, and Clause A.8 for useful contacts);
- the training of relevant employees (see 4.15);
- the use of obsolescence management (see 4.12.1) to mitigate the risk of buying counterfeit components.

4.2 Minimum avionics OEM requirements

The avionics OEMs shall:

- a) Protect their intellectual property rights (see 4.3, 4.4, 4.5, 4.12 and 4.13).
- b) Select components from original component manufacturers (OCMs) which control their intellectual property rights (see 4.3, 4.7) and which include unique configuration controlled part numbers and physical part markings (see 4.7.6), avoiding the use of re-manufactured components (see 3.1.18) wherever possible.
- c) Have an anti-counterfeit, fraudulent and recycled component process, in compliance with the requirements herein, which may include an anti-counterfeit management plan in **A1** accordance with this document and which can be based on plans such as SAE AS5553D or others similar (see 4.12.13). The OEMs shall flow this requirement down to lower level suppliers (see 4.12.13.3). **A1**

NOTE 1 Figures E.1, E.2, E.3, E.4 and E.5 can assist in the deployment of anti-counterfeit standards.

NOTE 2 AS/EN/JISQ 9100 and/or AS/EN/JISQ 9110 contain high level requirements for anti-counterfeit management for all types of electrical and mechanical components and materials and can be used to satisfy this need (see 4.7.3 and 4.12.1). Some documents such as IEC TS 62239-2 and SAE AS6174 (see 4.12.13) can also aid for anti-counterfeit management.

- d) Have a process (see 4.12) to audit all sources of supply of components.

NOTE 3 AS/EN/JISQ 9100 and/or AS/EN/JISQ 9110 can satisfy this requirement.

- e) Have a process only allowing the purchase of traceable components (see 4.4.4), as follows:

- 1) from the original component manufacturer (OCM) (see 4.7) with any appropriate traceability measures such as the use of Semiconductor Industries Association Anti Counterfeit Task Force (ACTF) measures (see 4.7.7) or physical unclonable function (PUF) features (see 4.7.10);
- 2) direct from the USA Trusted Foundry Program (see 4.7.8) and/or from the USA Trusted IC Supplier Accreditation Program (see 4.7.9) where required by customer contract or considered appropriate;
- 3) in situations where the component is obsolete, by purchasing directly from the franchised aftermarket manufacturer (see 4.12.9 and Annex B);
- 4) from franchised distributors (see 4.10)
 - which are preferably AS/EN/JISQ 9120 approved (see 4.9);
 - which are also ISO 9001 approved as a minimum requirement (see 4.8); or
 - which comply with SAE AS 6496 requirements (see Clause A.16);
 - from non-franchised distributors (see 4.11) using IEC 62668-2.

NOTE 4 SAE AS6171 can assist with the use of IEC 62668-2.

NOTE 5 Some tracking schemes (see 4.10.3) or tamper-proof initiatives can assist with traceability and authentication.

NOTE 6 AS/EN/JISQ 9100 and/or AS/EN/JISQ 9110 can satisfy the traceability requirements.

- f) Have a process which avoids the use of unapproved brokers (see 4.11.5).

NOTE 7 AS/EN/JISQ 9100 and/or AS/EN/JISQ 9110 can satisfy this requirement.

- g) In the rare event an avionics OEM considers it is necessary to purchase untraceable components:

- 1) conduct and document an exhaustive search for traceable alternatives, including the review of possible design changes to accommodate traceable alternatives and aftermarket sources (see 4.12, in particular 4.12.9, 4.12.10, 4.12.11, and Annex B);
- 2) use and document a risk management process to assess the additional requirements needed to determine that the components are not counterfeited, recycled or fraudulent components, using the requirements of IEC 62668-2. This risk management process will include conformity, quality, reliability and maintenance performances aspects.

NOTE 8 SAE AS6171 can satisfy the requirements of IEC 62668-2.

- h) Have a process for repair and rework operations (see 4.13.9) which shall include AS/EN/JISQ 9110 certification for all maintenance operation.
- i) Report incidents of counterfeit and fraudulent activities in accordance with local law (see 4.14) and customer requirements.
- j) Establish an anti-counterfeit awareness training for relevant personnel based on Table 1 which is provided for guidance and which identifies the relevant personnel and training records (see 4.15). In the case of newly hired personnel, initiate immediate training for the specific discipline or department.
- k) Have a process to verify that any components are not counterfeit or fraudulently recycled and meet the requirements as defined in the contract.

NOTE 9 AS/EN/JISQ 9100 and/or AS/EN/JISQ 9110 can satisfy this requirement.

NOTE 10 This also applies to returned components and surplus components purchased as a “buy back” scheme, for example when buying back surplus stock from a subcontractor or internal transfers.

- l) Have an obsolescence process to mitigate the instances of buying obsolete components.

NOTE 10 IEC 62239-1, IEC TS 62239-2, IEC 62402 or SAE STD016 can be used to satisfy this requirement.

- m) Apply in whole or in part, according to the application, the requirements listed in items a) to l) for their MRO operations, and/or have a process to cascade the applicable requirements and control their implementations if MRO operations are subcontracted to MRO organizations.

Table 1 – Anti-counterfeit awareness training guidelines

Discipline or department	Type of awareness training	Frequency	Comments
Sourcing, buying or procurement	Traceability in the supply chain, differences between brokers, the different types of distributor (franchised, non-franchised), the OCM etc. When to raise issues.	Every 2 years	Change frequency to annual if there is a new major change or development to be flowed down or if the department has a poor anti-counterfeit management record.
Subcontract procurement	How the subcontractors should control their supply chain for an avionics product, how changes are to be managed and approved by the OEM before implantation.	Every 2 years	
Hardware design	Why sourcing cannot be done directly off the internet; why approved suppliers are necessary; why franchised distributors are necessary, etc.	Every 2 years	
Program management	Why sourcing cannot be done directly off the internet, why approved suppliers are necessary, etc. How obsolescence management mitigates the risk to supply counterfeit components.	Every 2 years	
Component engineering	Type of testing which can be used to minimise the use of counterfeit components; how part numbers and non-conformances should be managed, etc. How obsolescence management mitigates risk to supply counterfeit components.	Every 2 years	
Goods receiving. Goods inwards Stock room Kitting, material kitting department	Why visual inspection is necessary and why attention to detail regarding part numbers, labelling, certificates of conformance and paperwork is necessary. How to raise concerns.	Every 2 years	
Supplier quality	How to audit for anti-counterfeit. Checklists, etc. Whom to discuss issues with and how to manage corrective actions.	Every 2 years	

Discipline or department	Type of awareness training	Frequency	Comments
Production assembly department	General awareness; how to report any concerns if part marking looks suspicious, etc. Review production test failure trends and investigate low yields which may be caused by counterfeit or fraudulent components.	Every 2 years	
Test department	General awareness for consideration of counterfeit to be included in fault analyses or fault findings.	Every 2 years	

4.3 Intellectual property

4.3.1 General

Anti-counterfeit activities start with the definition and knowledge of what intellectual property (IP) is. Counterfeit occurs when the original manufacturer's IP is fraudulently infringed. Therefore, anti-counterfeit activities are concerned about the maintenance of intellectual property.

The World Intellectual Property Organization (WIPO) is a specialized agency of the United Nations. It is dedicated to developing a balanced and accessible international IP system, which rewards creativity, stimulates innovation and contributes to economic development while safeguarding the public interest.

WIPO was established by the WIPO Convention in 1967 with a mandate from its Member States to promote the protection of IP throughout the world through cooperation among states and in collaboration with other international organizations. Its headquarters are in Geneva, Switzerland. For further information about WIPO see Clause A.1. The following are regional Intellectual Property offices:

- a) USA: The United States Patent and Trademark Office (see A.8.1).
- b) UK: The Intellectual Property Office (see A.6.1), which provides further information and details of the on-line IP Health check diagnostic tool.
- c) Europe: The Europa webpage contains summaries of EU legislation for intellectual property (see A.7.1).
- d) China: The State Intellectual Property office of the P.R.C (see A.9.1).

The following are additional resources for intellectual property information:

- 1) WIPO webpage (see A.1.3) has links to the treaties administered by WIPO, with details of legislations from a wide range of countries and other related information (see A.1.4) and includes the present members of the Global Network on Intellectual Property (IP) Academies.
- 2) The International Intellectual Property Alliance is a private sector coalition, formed in 1984, of trade associations representing the US copyright based industries in bilateral and multilateral efforts working to improve international protection and enforcement of copyrighted materials and open up foreign markets closed by piracy and other market access barriers (see A.8.4).
- 3) The International Trade Administration, U.S. Department of Commerce Stopfakes webpage (see A.8.2) has links to Intellectual Property Toolkits for other countries.
- 4) The USA Embassy in China webpage (see A.8.3) has very useful data for IP control when importing goods into China.

4.3.2 Definition of intellectual property

4.3.2.1 General

Intellectual property (IP) is defined in 3.1.11 and can be controlled by the use of:

- patents
- trademarks
- copyright protection
- design registration

4.3.2.2 Patents

Patents are territorial rights. Therefore, they apply in one country, in the European Union (EU), or through the Patent Cooperation Treaty. A granted patent becomes property and can be sold or licensed out. A patent can last up to 20 years. For further information see:

- WIPO (see A.1.3);
- the European Patent Office (see A.7.3.);
- the Chinese Patent and Trademark Office (see A.9.2); or
- the Japanese Patent Office (see Clause A.10).

4.3.2.3 Trademarks

These are signs, for example words, logos, pictures, or any combination thereof. Trademarks are territorial and must be filed in each country where protection is sought.

Trademarks should be registered at:

- WIPO for the Madrid System for the International Registration of Trademarks which offers a route to trademark protection in multiple countries by filing a single application (see A.1.3); or
- EUIPO in Europe (see A.7.4) for a "Community Trade Mark" applicable to all EU member states; or
- the Chinese Patent and Trademark Office in China (see A.9.2); or
- the United States Patent and Trademark Office in the USA (see A.8.1).

4.3.2.4 Copyright

This is an automatic right which can be licensed or sold. Use © after your name.

4.3.2.5 Design

A design relates to the physical appearance of an item or part of it. Designs should be registered in your country or with the EU at EUIPO (see A.7.4) or with WIPO (see A.1.3).

4.4 Counterfeit consideration

4.4.1 General

There are various definitions of "counterfeit" being used in the avionics industry at present, which is essentially infringement of intellectual property rights. However counterfeit definitions need to use the legal definition to ensure law enforcement can proceed with managing counterfeit issues through the judiciary. The definition of counterfeit should not be confused with recycling (see 4.6).

4.4.2 Legal definition of counterfeit

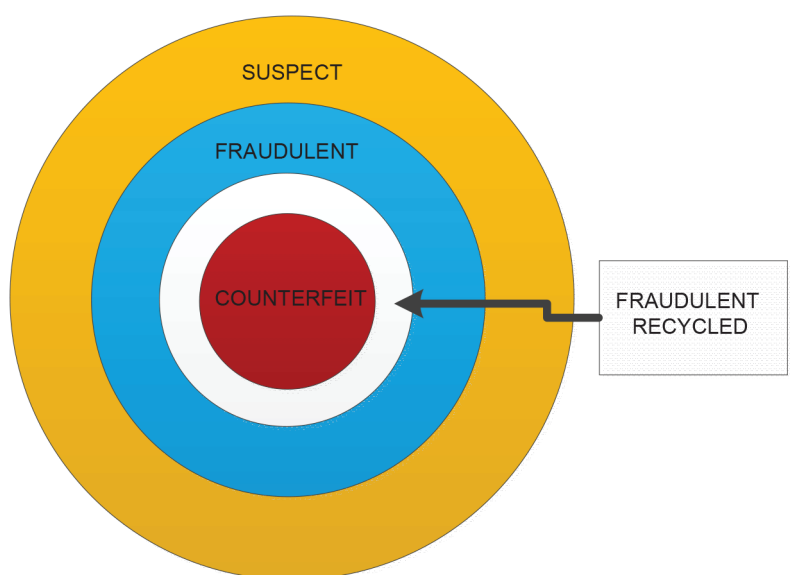
See 3.1.4 for the definition of "counterfeit" and 3.1.5 for the definition of "counterfeited component". These definitions are based on ISO 16678.

Each country typically has a slightly differently worded legal definition but generally all are based on trademark infringement.

4.4.3 Fraudulent components

See 3.1.10 for the definition of "fraudulent component". Fraudulent components are considered to be a subset within the suspect components perimeter; see 3.1.24 for the definition of "suspect component" and Figure 1. Suspect components require further investigation to determine if they are fraudulent, fraudulent recycled or counterfeit components.

NOTE It is relatively easy for law enforcement to follow the trail of money derived from fraudulent activities through the banking system and therefore there are many more successful legal convictions for fraud than for counterfeit activities. Also, as the electronic component recycling market expands, there is a huge temptation for unscrupulous brokers to trade hard to find recycled components as being in a new 'unused' condition in order to realize a greater profit. The sale of fraudulent recycled components as being in a new 'unused' condition is therefore increasing as the electronics recycling industry expands.



IEC

Figure 1 – Suspect components perimeter

4.4.4 How to establish traceability

See 3.1.24 for the definition of "traceability". Traceability is typically demonstrated by certificates of conformance (CofC) or packing slips (see 4.12.4) or other means of tracking components back to the OCM.

Where this is not available, the necessary information may be obtained from the supplier's business systems or through other databases [\[A1\]](#) (see Figure 2). [\[A1\]](#)

Indeed, the distributor or franchised aftermarket manufacturer may not always be in possession of an original certificate of conformance or packing slip from the OCM, but can have business system database entries confirming the date of receipt from the supplier (which should be the OCM or one of their franchised distributors), the quantity and lot date code. This business system information together with a copy of the franchised agreement should provide sufficient information to satisfy traceability requirements back to the OCM.

NOTE 1 IECQ OD 3702 traceability audit can be used as a second party or third party audit process for verification purposes at any part of the supply chain (see Figure E.3 and E.4).

NOTE 2 IPC-1782 can also assist with the traceability of critical items based on risk.

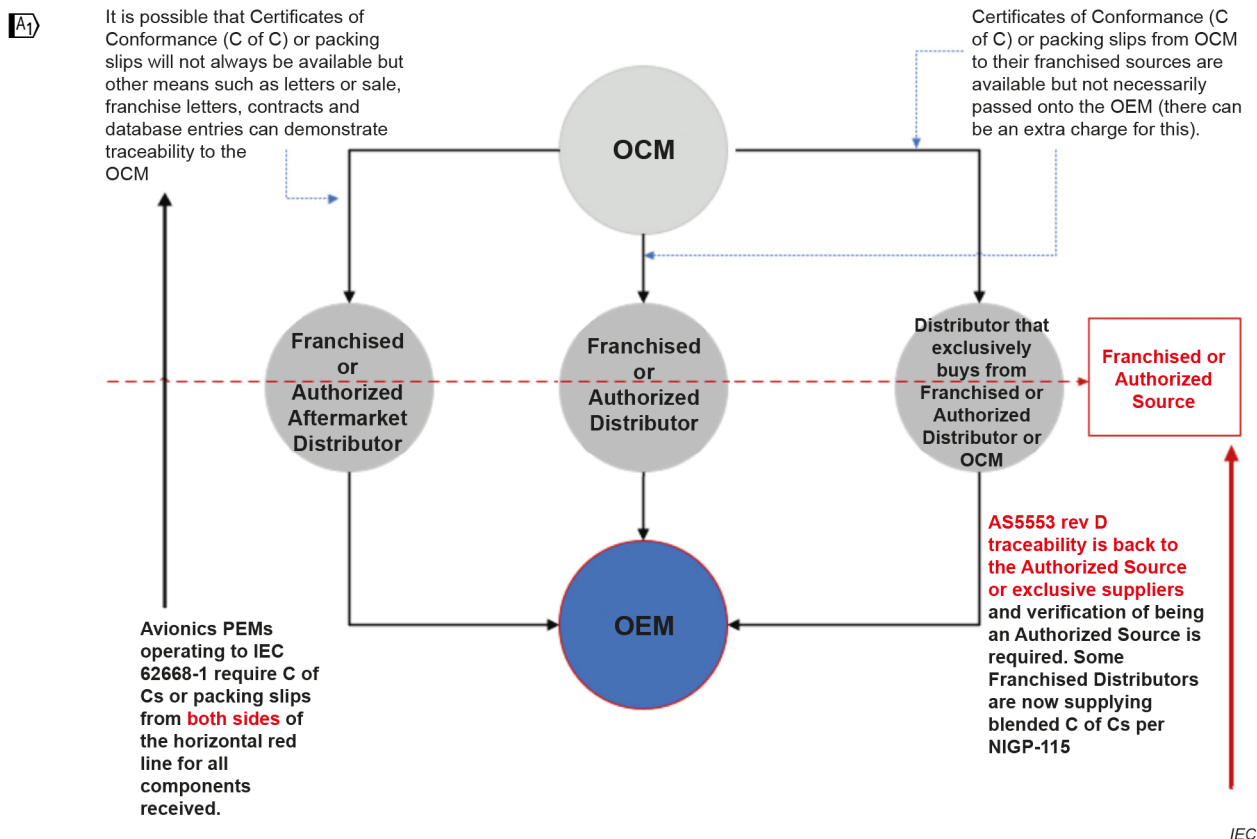


Figure 2 – Typical IEC 62668-1 and SAE AS5553 traceability requirements approach **A1**

4.4.5 Reasons for the loss of component traceability

Many components lose their traceability (see 3.1.26 for the definition of "untraceable") back to the original manufacturer. This can be caused by:

- Poor housekeeping and record retention either by distributors or OEMs. Many OEMs move stock from one location to another and in the process lose the traceability paperwork.
- Often OEMs sell off surplus stock back into the supply chain, without the traceability paperwork and then attempt to buy it back in. Such components are then identified as 'suspect'. As there is no traceability, this stock becomes known as possible 'counterfeit' stock.
- Distributors not checking back through the supply chain as to whether the components have traceability back to the original manufacturer. Many non-franchised distributors will not be able to manage this traceability. The supply chain may be very long and after a certain point down the supply chain, information may not be obtainable. This lack of knowledge makes the components 'suspect' and hence considered as possible counterfeit stock.
- Using inappropriate distributors for the avionics market, which are not AS/EN/JISQ 9120 certified. Although they may typically supply direct from manufacturers, they cannot prove that this is the case as their warehouse operations and traceability processes are not able to track individual lots of components and where they originate from.
- Commercial grade components which are not supplied with full traceability back to the OEM.

4.5 The counterfeit problem

4.5.1 General

Recent reports, published by the US Government Accountability Office, detail the extent to which counterfeiting activity affects the US economy:

- GAO-10-423;
- GAO-12-375;
- GAO-12-213T;
- GAO-13-762T;
- GAO-03-713T;
- GAO-16-236;
- USA Homeland Security report 'Supporting Innovation, Creativity and enterprise, charting the path ahead FY2017-2019' (see A.8.12).

Europol also reports on the impact of counterfeiting activity (see A.7.2).

The Japanese Patent Office also includes a 'FY2004 Survey Reports on Losses Caused by Counterfeiting' (see Clause A.10).

The OECD (Organisation for Economic Co-operation and Development) has published several reports concerning the impact of the counterfeit trade (see Clause A.18).

The International Chamber of Commerce (ICC) also tracks the impact of counterfeiting and piracy providing projections up to 2016 (see Clause A.19).

There are also several on-line videos highlighting the link between organised crime and counterfeiting (see Clause A.27).

NOTE Counterfeiting is a growing trade as there are usually minimal penalties in the criminal justice systems when caught. Typical punishments are a low value financial fine with no incarceration. Weak criminal justice system penalties allow the accused to walk out of the court room and recommence their counterfeiting operations on the same day.

4.5.2 General worldwide activities combating counterfeit issues

4.5.2.1 General

There are currently several ongoing anti-counterfeit activities which will assist law enforcement activities, as follows.

4.5.2.2 Anti-Counterfeiting Trade Agreement (ACTA)

The Anti-Counterfeiting Trade Agreement (ACTA) is a multinational treaty for the purpose of establishing international standards for intellectual property rights enforcement, see A.2.1. Unfortunately, it has failed to obtain worldwide acceptance.

4.5.2.3 Government/Authorities Meetings on Semiconductors (GAMS)

GAMS, founded in 1999 by a multilateral Joint Statement on Semiconductors, aims to promote the fair and open global trade and growth of the global semiconductor market through improved mutual understanding between industries and governments and reports into the World Semiconductor council. GAMS is undertaking counterfeit prevention issues, see Clause A.3.