



AEROSPACE STANDARD

AS6886™**REV. A**

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Superseding AS6886

(R) Counterfeit Materiel: Assuring Acquisition and
Use of Authentic and Conforming Refrigerant

RATIONALE

There are changes to the international refrigerant regulations that are incorporated in this standard. This standard is intended to provide guidance and requirements for users during the purchase and use of refrigerants.

FOREWORD

To assure customer satisfaction, industry organizations must provide safe and reliable refrigerants that meet or exceed customer and regulatory authority requirements. The globalization of industry and the resulting diversity of local/regional/national requirements and expectations have complicated this objective. End-product organizations face the challenge of assuring the quality and integrity of materiel purchased from suppliers throughout the world and at all levels within the supply chain. Suppliers and processors face the challenge of delivering materiel to multiple customers having varying quality expectations and requirements.

This document standardizes requirements, practices, and methods related to: (a) refrigerant supply chain management, procurement, inspection, and tests/evaluation to assure the authenticity and conformance of refrigerant being acquired and (b) response strategies when suspect or confirmed counterfeit refrigerant is discovered.

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1. SCOPE

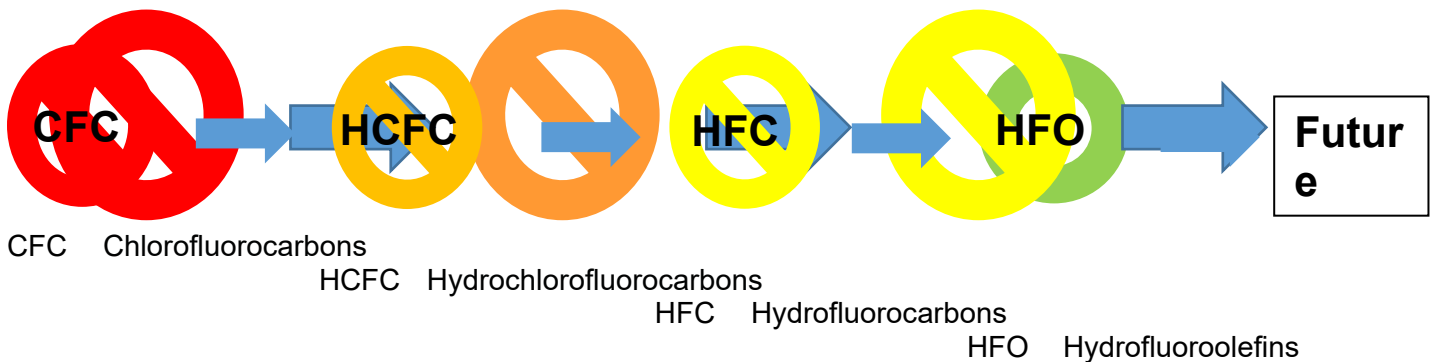
1.1 Protocols for Refrigerants

Counterfeiting of refrigerants has seen a dramatic rise over the past decades. This rise can be partially attributed to global restrictions placed on production and use of refrigerants by the 1987 Montreal Protocol, the 1997 Kyoto Protocol, and the 2016 Kigali Amendment to the Montreal Protocol [1, 2]. These protocols and the amendment regulate the gradual phase-out and strict regulations on the use of refrigerants with high Ozone Depletion Potential (ODP) and high Global Warming Potential (GWP). These protocols require that older refrigerants be replaced with more environmentally friendly products and necessitate redesigned, updated, or replaced equipment to operate efficiently with these new refrigerants.

1.2 Reasons for Counterfeit Refrigerants

These protocols require the staggered phase-out of these regulated refrigerants, allowing some countries a longer time to comply with the phase-down (e.g., Article 5 countries). This staggered system has created an opportunity for brokers diverting high ODP and/or GWP refrigerants from countries with fewer restrictions to countries with tighter restrictions. The increasing use of air conditioning and refrigeration in developing nations has increased the demand and cost of refrigerants, which makes counterfeiting refrigerants a very profitable criminal activity.

Refrigerant changes since the 1980s:



First, the very environmentally damaging (high ODP) Chlorofluorocarbons (CFCs) were replaced by Hydrochlorofluorocarbons (HCFCs). However, since HCFCs also have ODP and GWP, they were replaced by Hydrofluorocarbons (HFCs). But that was not a perfect solution since some HFCs have significant GWP, so they are in the process of being replaced by Hydrofluoroolefins (HFOs) and future alternatives.

1.3 Counterfeiting Refrigerant

Counterfeiters primarily target aftermarket nonrefillable or returnable cylinders or cans of refrigerant. Methods may include tampering with the nonrefillable valves; refilling or topping off the contents of the containers; painting or repainting and re-stenciling the exterior cylinders or cans to try to emulate genuine products; and/or replacing the valves. Forged trademarks and falsified outer markings or fake company names with similar appearance to internationally known manufacturers are examples of labeling used by counterfeiters on generic cylinders/cans. Counterfeiters may also reuse genuine, brand-name packaging or manufacture counterfeit packaging and then put forged/falsified generic cylinders/cans containing unknown contents inside the packaging. The market trend to eliminate color designation of containers further complicates visual identification to distinguish authentic versus non-authentic content and/or containers.

1.4 Extent of Counterfeit Refrigerants

Counterfeit refrigerants continue to flood markets around the world. Between 2010 and 2019, European and U.S. Armed Forces reported significant contamination in vehicles/equipment returning from the Middle East. The areas commonly targeted have high demand for refrigerants, limited inspections, and/or a lack of general knowledge about the issues with counterfeits. The April 2013 United Nations Threat Assessment "Transnational Organized Crime in East Asia and the Pacific" estimates that counterfeit refrigerants and illegal trafficking in high ODP refrigerants has a flow volume of 3660 tons per year, totaling around \$67.7 million [3].

Example:

Methyl chloride (R-40) and other substances have been used in counterfeiting various common refrigerants. Methyl chloride is currently not used for refrigeration because it is toxic (Class B2 per ASHRAE Standard 34), corrosive, flammable, and unstable. It is still commonly used in the production of plastics and is very inexpensive to purchase. When R-40 is blended with other refrigerants, the mix can mimic the pressure/temperature curve of R-134a, making it difficult to detect using conventional pressure gauge tests.

According to the R-40 Safety Data Sheet, it is a flammable colorless gas [4]. It is a suspected human carcinogen and is also a potent narcotic [5]. In the presence of moisture in air or in water, methyl chloride can be highly reactive with magnesium and sodium. R-40 is extremely corrosive to plastics and aluminum. Furthermore, when corroding aluminum, R-40 also reacts with the aluminum to form trimethyl aluminum (a clear fluid), which is pyrophoric in air and reacts violently with water, carbon dioxide, halon, oxidizers, alcohols, carbon tetrachloride, halogens and halogenated hydrocarbons, and many other substances. (In other words, when exposed to air, the trimethyl aluminum can spontaneously combust, and then when trying to put out the fire using common fire suppressants such as water, carbon dioxide, or halon, it can explode violently.)

R-134a is among a wide variety of refrigerants being counterfeited, and many substances other than R-40 (methyl chloride) are being used as the counterfeiting refrigerants. Other common refrigerant counterfeiting schemes involve recovering refrigerants from old equipment and/or using other “filler” materials such as flammable hydrocarbons (methane, ethane, propane, or butane) to increase the output of the counterfeit refrigerants. Obviously, there can be unknown/dangerous interactions from mixing multiple chemicals and contaminants.

1.5 Regulatory Considerations

Continuing changes to the regulatory landscape have increased the value of some regulated refrigerants, which fosters a growing demand for counterfeit refrigerants. Market demand and evolving importation restrictions are encouraging counterfeiters to represent regulated (i.e., restricted by regulation) substances as unregulated refrigerants.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. For references with dates, only the edition cited applies. For references without dates, the latest edition of the referenced document applies. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (Outside U.S. and Canada), www.sae.org.

AIR6273 Terms, Definitions, and Acronyms, Counterfeit Materiel or Electrical, Electronic, and Electromechanical Parts

2.1.2 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

DoDI 4140.67 DoD Counterfeit Prevention Policy

DoDI 5200.49 Oversight of the Collection and Exchange of Information Using the Government-Industry Data Exchange Program

DoDM 4160.21-M DoD Disposition Manual

Available from <https://govinfo.gov>.

FAR 52.246-15 Certificate of Conformance

Available from <http://www.gidep.org/>.

SD-25 Government-Industry Data Exchange Program (GIDEP) Policies and Procedures

2.1.3 AHRI Publications

Available from AHRI, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, Tel: 703-524-8800, <https://www.ahrinet.org>.

AHRI Standard 700 Specification for Fluorocarbon Refrigerants

2.1.4 ASHRAE Publications

Available from ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 30092, Tel: 800-527-4723 (U.S. and Canada only) or 404-636-8400, www.ashrae.org.

ASHRAE Standard 34 Designation and Safety Classification of Refrigerants

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (Outside U.S. and Canada), www.sae.org.

AS6174 Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel

SAE J639 Safety and Design Standards for Motor Vehicle Refrigerant Vapor Compression Systems

SAE J2099 Standard of Purity for Recycled R-134a (HFC-134a) and R-1234yf (HFO-1234yf) for Use in Mobile Air-conditioning Systems

SAE J2788 HFC-134a (R-134a) Recovery/Recycle/Recharging Equipment for Mobile Air-Conditioning Systems

SAE J2843 R-1234yf (HFO-1234yf) Recovery/Recycling/Recharging Equipment for Mobile Air-Conditioning Systems

SAE J2844 R-1234yf (HFO-1234yf) New Refrigerant Purity and Container Requirements for Use in Mobile Air-Conditioning Systems

SAE J2845 R-12 (CFC-12), R-134a (HFC-134a), R-1234yf (HFO-1234yf), R-744, and R-152a (HFC-152a) Technician Training for Service and Containment of Refrigerants Used in Mobile A/C Systems

SAE J2851 Recovery Equipment for Contaminated R-134a or R-1234yf Refrigerant from Mobile Automotive Air Conditioning Systems

SAE J2912 Performance Requirements for R-134a and R-1234yf Refrigerant Diagnostic Identifiers (RDI) for Use with Mobile Air Conditioning Systems

SAE J2927 Integrated R-1234yf Refrigerant Identifier for Recovery and Recycling Equipment Used in Mobile A/C System Servicing

2.2.2 U.S. Government Publications

Available from https://obamawhitehouse.archives.gov/omb/procurement_policy_letter_91-3/.

Office of Management and Budget (OMB) Office of Federal Procurement Policy (OFPP) Letter 91-3 Reporting Nonconforming Products

2.3 Related Definitions

For the purposes of this document, the terms and definitions listed in AIR6273 and the following apply. In the event of a conflict of definitions, the definitions herein shall take precedence.

AUTHORIZED DISTRIBUTION CHANNEL: Sales conducted by the Manufacturer or their Authorized Distributor that carry the Manufacturer's rights of warranty with the product.

CERTIFICATE OF ANALYSIS (C of A, CoA): A document that certifies an analysis and gives the precise details about the refrigerant's quality and compliance to specifications. It relates specifically to the result of testing a representative sample drawn from the specific batch or lot of material. A supplier's C of A represents: that the refrigerant listed meets its specification unless otherwise specified in writing; is genuine; is not defective or suspect counterfeit; and has not been 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.

NOTE: The C of C 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. The format of Certificates of Conformances can vary. It may certify conformance to a MIL-SPEC or the manufacturer's specification but not certify conformance to a specific customer's order. This definition does not meet the requirements of FAR 52.246-15.

CERTIFICATE OF ORIGIN (C of O, CoO): A document completed by a manufacturer, an exporter, or an agent and certified by an issuing body attesting that the goods in a particular export shipment have been wholly produced, manufactured, or processed in a particular country.

DISTRIBUTION AGREEMENT: A specific written contract between the Manufacturer and the Distributor that authorizes the Distributor to resell the Manufacturer's refrigerant. Contractual terms include, but are not limited to, distribution region, distribution products or lines, and warranty flow-down from the Manufacturer. These agreements often include failure analysis support, return privileges, and product change notifications.

INDEPENDENT REFRIGERANT DISTRIBUTOR: A distributor that purchases new or reclaimed refrigerant with the intention to sell and redistribute it into the market. Purchased refrigerant may be obtained from original refrigerant manufacturers or contract manufacturers (typically from excess inventories) or from other independent refrigerant distributors. Resale of the purchased refrigerant (redistribution) may be to users or other independent refrigerant distributors. Independent refrigerant distributors do not have a distribution agreement with the original refrigerant manufacturer of the refrigerant.

ORIGINAL REFRIGERANT MANUFACTURER: An organization that designs and/or engineers refrigerant and is pursuing or has obtained the intellectual property rights to the production process and/or composition of that refrigerant.

NOTE 1: The materiel and/or its packaging are typically identified with the original refrigerant manufacturer's trademark.

NOTE 2: Original refrigerant manufacturers may contract out manufacturing and/or distribution of their product.

NOTE 3: Different original refrigerant manufacturers may supply refrigerant for the same application or to a common specification.

PACKAGING: Packaging refers to the manner in which refrigerant is packaged in preparation for use. Refrigerant may be obtained in bulk, cylinders, or cans. There may also be a cardboard box used with the cylinders and/or the cans of refrigerant.

USER: In the context of this document, it refers to entities (e.g., government, service contractor, manufacturer) that procure and install refrigerants in equipment.