

Safety Standards for Motor Vehicle Refrigerant Vapor Compression Systems

RATIONALE

This document covers refrigerant system design and safety related requirements for refrigerants used in mobile air conditioning (MAC) systems and is being revised to comprehend R-1234yf. The current wording of 4.1.1 prohibits refrigerants that are rated less than A2L which would exclude R-152a. Later in the document, J639 defines the fittings for R-152a. The intent of this revision is to insure safe mobile air conditioning systems by forcing proper risk assessments and appropriate design solutions while correcting this conflict with regards to R152a.

1. SCOPE

This SAE Standard applies to refrigerant vapor compression systems that provide cooling and/or heating for passenger cars, light trucks and commercial vehicles (on and off road) that use automotive type mobile air conditioning [MAC] systems. Large trucks, buses and other vehicles that do not use typical automotive a/c systems or use refrigerants not listed in this document are not covered by this standard. This standard covers any vehicle with a MAC system using a belt or electric motor driven compressor.

This document provides standards for design, assembly, test and service of MAC systems to minimize environmental, health and safety impacts. Also included are cautionary statements for the service industry to alert technicians to the inadvisability and possible health or safety effects associated with venting refrigerant during service. It is not intended to restrict the use, or further development, of other types of refrigeration systems for mobile air conditioning applications. This document may be amended or additional safety standards created should other systems become practical. This document addresses only HFC-134a (R-134a), carbon dioxide (R-744), and HFO-1234yf (R-1234yf) refrigerants. To prevent system contamination all refrigerants used in mobile air conditioning vapor compression systems require unique service fittings and service equipment. The unique service fittings are intended to eliminate the potential for system refrigerant cross-contamination during service activity.

CFC-12 (R-12) is no longer in use in new MAC systems. The service fitting description is maintained as a reference for older vehicles still in use. When retrofitting an R-12 system to use R-134a or when removing R-12 (vehicle disposal) use service equipment designed for R-12 and certified to meet the requirements of SAE J1990 (R-12 recovery and recycle equipment).

HFC-152a is an A2 flammable refrigerant as classified by ASHRAE 34 and should be used only with a secondary loop application. However, until MAC systems are developed to use R-152a (HFC-152a), no SAE Standards for system design, service equipment or service procedures have been established. The R-152a service fittings described within this Standard were established as part of the industries evaluation of replacement refrigerants and are maintained for future design guidance and to prevent potential refrigerant cross contamination.

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http://www.sae.org/technical/standards/J639_201112**

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

2.1.1.1 System Design Guidelines

- SAE J2683 Refrigerant Purity and Container Requirements for Carbon Dioxide (CO₂ R-744) Used in Mobile Air-Conditioning Systems
- SAE J2772 Measurement of Passenger Compartment Refrigerant Concentrations Under System Refrigerant Leakage Conditions
- SAE J2776 Refrigerant Purity and Container Requirements for New HFC-134a 1,1,1, 2-Tetrafluoroethane Refrigerant Used in Mobile Air-Conditioning Systems
- SAE J2844 R-1234yf (HFO-1234yf) New Refrigerant Purity and Container Requirements For Use in Mobile Air-Conditioning Systems

2.1.1.2 System Components

- SAE J2842 R-1234yf and R744 Design Criteria and Certification for OEM Mobile Air Conditioning Evaporator and Service Replacements

2.1.1.3 Service Activities

- SAE J2197 HFC-134a (R-134a) Service Hose Fittings for Automotive Air-Conditioning Service Equipment
- SAE J2297 Ultraviolet Leak Detection: Stability and Compatibility Criteria of Fluorescent Refrigerant Leak Detection Dyes for Mobile R-134a and R-1234yf (HFO-1234yf) Air-Conditioning Systems
- SAE J2670 Stability and Compatibility Criteria for Additives and Flushing Materials Intended for Aftermarket Use in R-134a (HFC-134a) and R-1234yf (HFO-1234yf) Vehicle Air-Conditioning Systems
- SAE J2888 HFO-1234yf Service Hose, Fittings and Couplers for Mobile Refrigerant Systems Service Equipment

2.1.1.4 Technician Service Procedures

- SAE J2845 R-1234yf [HFO-1234yf] and R-744 Technician Training for Service and Containment of Refrigerants Used in Mobile A/C Systems

2.1.1.5 Service Equipment

- SAE J1990 Recovery and Recycle Equipment for Mobile Automotive Air-Conditioning 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 J2209 CFC-12 (R-12) Refrigerant Recovery Equipment for Mobile Automotive Air-Conditioning Systems
- SAE J2296 Retest of Refrigerant Container
- SAE J2788 HFC-134a (R-134a) Recovery/Recycle/Recharging Equipment for Mobile Air-Conditioning Systems
- SAE J2791 HFC-134a Refrigerant Electronic Leak Detectors, Minimum Performance Criteria
- SAE J2810 HFC-134a (R-134a) Refrigerant Recovery Equipment for Mobile Automotive Air-Conditioning Systems (Superseding J1732 NOV1998)
- SAE J2843 R-1234yf [HFO-1234yf] Recovery/Recycling/Recharging Equipment for Flammable Refrigerants for Mobile Air-Conditioning Systems
- SAE J2851 R-1234yf [HFO-1234yf] Refrigerant Recovery Equipment for Mobile Automotive Air-Conditioning Systems
- SAE J2912 Performance Requirements for R-134a and R-1234yf Refrigerant Diagnostic Identifiers for Use with Mobile Air Conditioning Systems
- SAE J2913 R-1234yf [HFO-1234yf] Refrigerant Electronic Leak Detectors, Minimum Performance Criteria
- SAE J2927 R-1234yf Refrigerant Identifier Installed In Recovery and Recycling Equipment for Use With Mobile A/C Systems

2.1.1.6 Retrofit Documents

- SAE J1660 Fittings and Labels for Retrofit of CFC-12 (R-12) Mobile Air-Conditioning Systems to HFC-134a (R-134a)
- SAE J1661 Procedure Retrofitting CFC-12 (R-12) Mobile Air-Conditioning Systems to HFC-134a (R-134a)

2.1.1.7 Reference Documents

- SAE J51 Refrigerant 12 Automotive Air-Conditioning Hose
- SAE J1627 Performance Criteria for Electronic Refrigerant Leak Detectors
- SAE J1628 Technician Procedures for Refrigerant Leak Detection in Service of Mobile Air Conditioning Systems
- SAE J1657 Selection Criteria for Retrofit Refrigerants to Replace CFC-12 (R-12) in Mobile Air-Conditioning Systems
- SAE J1658 Alternate Refrigerant Consistency Criteria for Use in Mobile Air-Conditioning Systems
- SAE J1659 Vehicle Testing Requirements for Replacement Refrigerants for CFC-12 (R-12) Mobile Air-Conditioning Systems
- SAE J1662 Compatibility of Retrofit Refrigerants with Air-Conditioning System Materials
- SAE J1732 HFC-134a (R-134a) Refrigerant Recovery Equipment for Mobile Automotive Air-Conditioning Systems