



# SURFACE VEHICLE STANDARD

J2842™

JUN2019

Issued 2011-02  
Revised 2019-06

Superseding J2842 MAY2015

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

## RATIONALE

This standard provides a testing and certification framework for an evaporator used in the passenger compartment of vehicles, as part of a MAC system. It is being updated to improve clarity on corrosion test procedure, update based on refrigerant status, and address manufacturer feedback on leak test. It is intended to appropriately minimize potential risks to persons, during normal use or service of a MAC system using R744 or R-1234yf refrigerants.

### 1. SCOPE

The intent of this standard is to establish a framework to assure that all evaporators for R-744 and R-1234yf mobile air conditioning (MAC) systems shall meet appropriate testing and labeling requirements. SAE J639 requires an assessment to be performed to minimize reasonable risks in MAC systems. The evaporator (as designed and manufactured) shall be part of that risk assessment, and it is the responsibility of the vehicle manufacturer to assure all relevant aspects of the evaporator are included. It is the responsibility of all vehicle or evaporator manufacturers to comply with the standards of this document at a minimum. (Substitution of specific test procedures by vehicle manufacturers that correlate well to field return data is acceptable.) As appropriate, this standard can be used as a guide to support risk assessments.

With regard to certification, most vehicle manufacturers have established formal production part approval processes (PPAP) where compliance certification is established and formally documented. For an evaporator manufacturer of non-original equipment parts (or a vehicle manufacturer that does not have a formal part compliance certification process), then the certification described in this standard is the requirement to which those evaporators shall comply. In this case, the evaporator manufacturer or an independent institution shall complete the evaporator certification according to SAE J2911. An example of the latter would be the completion of witness testing by the evaporator manufacturer with the submission of certification documents by the witness organization.

Refrigerant R-152a was excluded from this standard because a secondary loop refrigerant system is required. This standard also does not apply to R-134a refrigerant evaporators because it is proven in use.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2019 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

**TO PLACE A DOCUMENT ORDER:** Tel: 877-606-7323 (inside USA and Canada)  
Tel: +1 724-776-4970 (outside USA)  
Fax: 724-776-0790  
Email: CustomerService@sae.org  
http://www.sae.org

SAE WEB ADDRESS:

**SAE values your input. To provide feedback on this  
Technical Report, please visit  
[http://standards.sae.org/J2842\\_201906](http://standards.sae.org/J2842_201906)**

## 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 +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J639	Safety Standards for Motor Vehicle Refrigerant Vapor Compression Systems
SAE J1739	Potential Failure Mode and Effects Analysis in Design (Design FMEA), Potential Failure Mode and Effects Analysis in Manufacturing and Assembly Processes (Process FMEA)
SAE J2772	Measurement of Passenger Compartment Refrigerant Concentrations Under System Refrigerant Leakage Conditions
SAE J2773	Standard for Refrigerant Risk Analysis for Mobile Air Conditioning Systems
SAE J2911	Procedure for Certification that Requirements for Mobile Air Conditioning System Components, Service Equipment, and Service Technician Training Meet SAE J Standards

Spessel, C. and Philippe, M., "Reliability of Evaporators Regarding Corrosion," SAE Technical Paper 2004-01-0216, 2004, <https://doi.org/10.4271/2004-01-0216>.

### 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 Other Publications

AIAG	Measurement System Analysis Reference Manual
ANSI/UL 969-1991	UL Standard for Safety for Marking and Labeling Systems, UL 969
ISO 13043	Road Vehicles - Refrigerant Systems Used in Mobile Air Conditioning Systems (MAC) - Safety Requirements
ISO/TS16949	Quality Management Systems - Particular Requirements for the Application of ISO 9001:2000 for Automotive Production and Relevant Service Part Organizations
QDAS Leifdaten	Measurement System Capability Reference Manual
VDA Band 3	Ensuring Reliability of Car Manufacturers - Reliability Management (VDA Volume 3.1, 3rd Edition 2000)

### 3. DEFINITIONS

All physical dimensions and units are expressed in SI units and all indicated pressures are assumed to be gauge pressure unless otherwise noted.

#### 3.1 NORMAL USE

This term represents the use of the vehicle during normal driving and does not address damage that may occur in a vehicle collision (this should be addressed in the vehicle risk assessment by the vehicle manufacturer).

#### 3.2 DESIGN LIFE OF THE VEHICLE

Many vehicle manufacturers interpret this term differently and may recognize differences based on local climate conditions. This standard uses 10 years and 6000 working hours in a moderately corrosive environment similar to Central Europe as a normal design life

#### 3.3 ORIGINAL EQUIPMENT (OE)

Designation of products or components from a vehicle manufacturer, or contracted by a vehicle manufacturer, who complies with ISO/TS16949 standards.

#### 3.4 BURST PRESSURE

The minimum pressure which causes a component to structurally fail or rupture, resulting in fluid leakage.

### 4. TECHNICAL REQUIREMENTS

#### 4.1 Introduction

This standard establishes product and process design requirements, along with validation testing and acceptance criteria for evaporators intended for use with R-1234yf or R-744 refrigerants. Significant refrigerant leakage by the evaporator into the passenger cabin could potentially pose a health and safety risk to vehicle occupants. To ensure appropriate risk, evaporators and evaporator assemblies shall:

- Be designed, manufactured, and tested to minimize evaporator leakage for the design life of the vehicle.
- Meet certification and documentation standards.
- Meet requirements for evaporator labeling to ensure compliance to this standard and proper handling in service.

#### 4.2 Evaporators Used by Original Equipment (OE) Vehicle Manufacturers

Evaporators installed in new vehicles and made available for service through the distribution channels of the vehicle manufacturer or OEM supplier are considered original equipment (OE) evaporators. These OE evaporators shall comply with this standard as a minimum; substitution of specific test procedures, which correlate well to field return data, by vehicle manufacturers is acceptable. Formal compliance certification and risk assessments have been established and documented.

#### 4.3 Other Evaporators (From Non-OE Suppliers or Used by Vehicle Manufacturers Without Formal Certification and Documentation Processes)

An evaporator produced by a non-OE supplier (or used by a vehicle manufacturer without formal certification and documentation processes) may only be installed in vehicles, if the component shall fulfill the requirements described in this standard. Compliance to this standard shall be certified and documented as described below.

Certification of R-1234yf and R-744 evaporators from non-original equipment manufacturers shall meet the requirements of SAE J2911.