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| SURFACE VEHICLE STANDARD | J2913™ | OCT2016 |
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| Superseding J2913 FEB2011 | | |
| R-1234yf [HFO-1234yf] Refrigerant Electronic Leak Detectors, Minimum Performance Criteria | | |

RATIONALE

Modification of this standard to include "Definition of Equipment Used for Certification" for prototype or preproduction product used for certification as stated in SAE J2911. In addition, modification to include certification grace period and recertification requirements for the specific revision to this standard.

1. SCOPE

This SAE Standard provides testing and functional requirements to meet specified minimum performance criteria for electronic probe-type leak detectors. The equipment specified here will identify smaller refrigerant leaks when servicing motor vehicle air conditioning systems, including those engineered with improved sealing and smaller refrigerant charges to address environmental concerns and increase system efficiency. This document does not address any safety issues concerning the equipment design or use beyond that of sampling a flammable refrigerant save those described in 3.1 and 3.2 of this document. All requirements of this standard shall be verified in SAE J2911.

1.1 Purpose

The purpose of this SAE Standard is to establish minimum performance criteria for a modern class of electronic probe-type leak detectors intended for use in automotive air conditioning systems with R-1234yf, an A2L flammable refrigerant.

1.2 Grace Period

This revision is subject to a 0 day grace period from the date of publication. After the grace period, only the most recent version of this standard may be used for certification and/or recertification. To certify equipment to the prior version of this standard, actual laboratory testing, not merely the signing of a contract, etc. must have begun prior to the publication date of this new version. No laboratory certification to any prior version of this standard, shall be accepted by SAE for listing under the provisions of J2911 after 90 days from the publication date of this revision.

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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.

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| SAE J639 | Safety Standards for Motor Vehicle Refrigerant Vapor Compression Systems |
| SAE J2791 | HFC-134a Refrigerant Electronic Leak Detectors, Minimum Performance Criteria |
| SAE J2845 | R-1234yf [HFO-1234yf] and R-744 Technician Training for Service and Containment of Refrigerants Used in Mobile A/C Systems |
| SAE J2911 | Procedure for Certification that Requirements for Mobile Air Conditioning System Components, Service Equipment, and Service Technician Training Meet SAE J Standards |
| 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) |

3. TECHNICAL REQUIREMENTS

3.1 The detector shall be tested to meet the performance specifications of this standard by an independent testing facility as defined in SAE J2911, and in accordance with the procedures set for in SAE J2911. The independent testing facility shall maintain all documentation related to its testing, including calibration and maintenance data for its equipment, for a period of five years following the test of the specific detector.

3.1.1 The manufacturer may state certification of compliance with this Standard (including use of any labeling) only after meeting the requirements in SAE J2911 "Procedure for Certification That Requirements for Mobile Air Conditioning System Components, Service Equipment and Service Technicians Meet SAE J Standards". See Appendix B.

3.1.2 To certify pre-production or prototype units as defined in SAE J2911, they shall not be marketed with a label indicating that they meet the appropriate SAE standard until the following requirement is met. The SAE label shall not be applied to these units until the independent laboratory has confirmed that the manufacturer has made, in one month's serial production, at least 150 completed serial production units.

3.2 The detector shall be suitable for use in safely identifying R-1234yf an A2L flammable refrigerant. As a safety factor against use of a more flammable refrigerant in vehicle service, the marketer shall certify that at peak sensitivity, the temperature anywhere within the detector does not exceed 400 °C (752 °F) so that ignition cannot occur. This shall be verified by prolonged exposure of any component subject to producing high temperature to a flammable propane-air mixture, such as from a propane torch.

3.2.1 If any components may operate at that temperature or above, they shall meet ANSI/ISA 12.12.01 and/or be enclosed or housed in a location within the detector that will, in case of separation at any connections within the refrigerant sampling flow route, prevent refrigerant from coming into contact with same.

3.2.2 If any components, such as switches, solenoids and motors, come into contact with the refrigerant sample, they shall be of arc-suppression design as specified in ANSI/ISA12.12.01.

3.2.3 The detector shall be suitable for use in an automotive service garage and operate in ambient temperatures of 15 to 49 °C (59 to 120 °F).

- 3.3 The detector shall have at least three scales that can be manually selected: (1) 4 g/year (0.15 ounce/year); (2) 7 g/year (0.25 ounce/year); (3) 14 g/year (0.5 ounce/year).
- 3.4 If it passes, the detector shall carry a label that states "Design certified by (name of independent testing laboratory) to meet SAE J2913 with lettering in bold face type at least 3 mm high.
- 3.5 If it does not pass, the detector may be retested subject to the limits of Section 10. If a detector fails beyond these retest limits, it may be retested only after the marketer has documented changes made to correct the failure and given the data to the independent testing laboratory. A detector shall pass the procedures in Sections 7 and 8. A failure in either or both of those sections requires a complete retest. The detector also shall meet the requirements of Section 9, passing the no-false-triggering requirement for transmission oil and engine oil (Nos. 14 and 15) and clearing within 20 seconds after a permitted false-trigger.

4. WHAT SHALL ACCOMPANY THE DETECTOR

- 4.1 The marketing company shall provide operating instructions for the detector that cover calibration, normal usage, maintenance, trouble shooting and spare parts.
- 4.2 Tools, adapters and needed adjustment and calibration devices (including calibration and/or reference bottles) for the detector shall be included with the detector.
- 4.3 The marketing company shall provide all needed safety information and labeling.
- 4.4 The marketing company shall provide the Section 10 list of all common under hood chemicals that may affect the operation of an electronic leak detector and indicate by Y if this detector will false-trigger from exposure to each of the chemicals on the list, or N if it will not false-trigger.
- 4.5 The resistance to false triggering shall be based on the test procedures described in Section 9. False triggering is defined as the detector making the same or similar indication (sound and/or light) as if it detected a refrigerant leak.

5. REQUIRED BASIC FUNCTIONS

- 5.1 The detector may self-calibrate or require manual calibration, but once calibrated for an operation, it shall hold that calibration for a time sufficient to perform the operations described in Sections 7 and 8 (including 8.1 to 8.6). This does not preclude automatic recalibration for a probe that has been inserted into a contaminated atmosphere (as per Section 8), readjustment of sensitivity by operator selection, or an audible-and-or-visual warning of a condition beyond the operating scope of its design. The latter shall be obviously different from the indication of a refrigerant leak, although the same functional trigger may be used. Example: a steady indicator light versus a flashing indicator light.
- 5.2 The detector shall demonstrate automotive garage durability by continuing to function normally after being dropped 1.2 m (4 feet) to a hard surface, such as a concrete floor, four times. This test may be performed with the detector in a protective caddy, provided the caddy is a standard part of the basic detector kit, and does not affect in-shop use of the detector, or testing of the detector under all procedures in Sections 7, 8, 9, and 10.
- 5.3 The detector shall demonstrate automotive garage durability by continuing to function normally after being turned on and
 - 5.3.1 The probe tip has been submerged to a depth of 6 mm (0.25 inch) in a pan of water and drawn through the water at a rate of 75 mm (3 inch) per second for 2 seconds and
 - 5.3.2 Then, after wiping clean and given any other cleaning/maintenance prescribed by the manufacturer in its operating instructions manual, including but not limited to a sensor replacement or filter change.