



SURFACE VEHICLE STANDARD

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Recovery and Recycle Equipment for Mobile Automotive
Air-Conditioning Systems

RATIONALE

R12 has not been used in OEM vehicles since 1995. The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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Foreword—Due to the damaging effect of CFC's on the ozone layer, CFC-12 (R-12) used in mobile air-conditioning (A/C) systems must be recovered and recycled to eliminate venting refrigerant during normal service operations. This SAE Standard establishes recycle specifications for CFC-12 (R-12) so as to provide the same level of air-conditioning performance as new refrigerant.

Extensive field testing with the EPA and the auto industry indicates that CFC-12 (R-12) can be reused, provided that it is cleaned to specifications in SAE J1991. The purpose of this document is to establish the specific minimum equipment specifications required for recycle of CFC-12 (R-12) that has been directly removed from mobile systems for reuse in mobile automotive A/C systems.

1. Scope—The purpose of this SAE Standard is to provide equipment specifications for CFC-12 (R-12) recycling equipment. This information applies to equipment used to service automobiles, light trucks, and other vehicles with similar CFC-12 (R-12) air-conditioning (A/C) systems. Systems used on mobile vehicles for refrigerating cargo that have hermetically sealed systems are not covered in this document. The equipment in this document is intended for use with refrigerant that has been directly removed from, and intended to be returned to, a mobile A/C system. Should other revisions due to operational or technical requirements occur, this document may be amended.

2. References

2.1 Applicable Publications—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, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1991—Standard of Purity for Use in Mobile Air-Conditioning Systems

SAE J2196—Service Hose for Automotive Air Conditioning

2.1.2 CGA PUBLICATION—Available from CGA, Crystal Square #2, Jefferson Davis Highway, Arlington, VA 22202-4102.

CGA Pamphlet S-1.1—Pressure Relief Device Standard Part 1—Cylinders for Compressed Gases

- 2.1.3 DOT SPECIFICATION—Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

CFR 49, Section 173.304—Shippers—General Requirements for Shipments and Packagings

- 2.1.4 UL PUBLICATION—Available from Underwriters Laboratories, 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 1769—Cylinder Valves

3. **Specification and General Description**

- 3.1 The equipment must be able to extract, recover, and process CFC-12 (R-12) from mobile A/C systems. The equipment shall process the contaminated CFC-12 (R-12) samples as defined in 8.4 and shall clean the refrigerant to the level as defined in SAE J1991.
- 3.2 The equipment shall be suitable for use in an automotive service environment and be capable of continuous operation in ambient from 10 to 49 °C.
- 3.3 The equipment must be certified by Underwriters Laboratories or an equivalent EPA listed certifying laboratory.
- 3.4 The equipment shall have a label "Design Certified by (Company Name) to Meet SAE J1991." The minimum letter size shall be bold type 3 mm in height.

4. **Refrigeration Recycle Equipment Requirements**

- 4.1 **Moisture and Acid**—The equipment shall incorporate a desiccant package that must be replaced before saturated with moisture and whose mineral acid capacity is at least 5% by weight of total system dry desiccant.
- 4.1.1 The equipment shall be provided with a moisture detection device that is reliable, visible, and indicates when moisture in the CFC-12 (R-12) exceeds the allowable level and requires the filter/dryer replacement.
- 4.2 **Filter**—The equipment shall incorporate an in-line filter that will trap particulates of 15 micron spherical diameter or greater.
- 4.3 **Noncondensable Gas**
- 4.3.1 The equipment shall automatically either purge noncondensables (NCGs) if the acceptable level is exceeded or incorporate a device to alert the operator that NCG level has been exceeded. NCG removal must be part of normal operation of the equipment and instructions must be provided to enable the task to be accomplished within 30 min.
- 4.3.1.1 Pressure gauges that are used to identify NCG level shall have readable divisions of 7 kPa values in order to identify the level of excess NCGs in the refrigerant.
- 4.3.1.2 Equipment that use the manual NCG purge process shall provide a method to determine the temperature of the refrigerant in the container being purged. This is required for determining the container refrigerant pressure/temperature relationship as the container lowers in temperature during the purge process. This is required to alert the operator if they have properly operated the purge cycle and determined the amount of NCG remaining in the container that has been purged. The procedure shall be identified in the instruction manual provided with the recycling equipment.