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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J2209

REV. FEB1999

Issued 1992-06
Revised 1999-02

Superseding J2209 JUN92

Submitted for recognition as an American National Standard

CFC-12 (R-12) Refrigerant Recovery Equipment for Mobile Automotive Air-Conditioning Systems

Foreword—CFCs deplete the stratospheric ozone layer that protects the earth against harmful ultraviolet radiation. To reduce the emissions of CFCs, the 1990 Clean Air Act requires recycle of CFC-12 (R-12) used in mobile air-conditioning (A/C) systems to eliminate system venting during service operations. SAE J1990 established equipment specifications for on-site recovery and re-use of CFCs in mobile A/C systems. Establishing recovery equipment specifications for CFC-12 (R-12), provides service facilities with equipment to assure that venting of refrigerant will not occur.

1. Scope

Scope—The purpose of this SAE Standard is to provide equipment specifications for CFC-12 (R-12) recovery for return to a refrigerant reclamation facility that will process it to the appropriate ARI Standard (Air Conditioning and Refrigerant Institute) or allow for recycling of the recovered refrigerant in equipment that is certified to meet the requirements of SAE J1991. Under the existing rule, the U.S. EPA requires refrigerant removed from a mobile air-conditioning (A/C) system using recovery equipment certified to meet SAE J2209 can only be recycled using equipment meeting SAE J1991 that is owned by the same company or individual.

It is not acceptable that the refrigerant removed from a mobile A/C system, with this equipment, be directly returned to a mobile A/C system.

This information applies to equipment used to service automobiles, light trucks, and other vehicles with similar CFC-12 (R-12) systems.

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 J639—Vehicle Service Coupling
SAE J1771—Criteria for Refrigerant Identification Equipment for Use with Mobile Air-Conditioning Systems
SAE J1990—Extraction and Recycle Equipment for Mobile Automotive Air-Conditioning Systems
SAE J2196—Service Hose for Automotive Air Conditioning

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2.1.2 ARI PUBLICATION—Available from Air Conditioning and Refrigeration Institute, 1501 Wilson Boulevard, Sixth Floor, Arlington, VA 22209.

ARI 700—Specifications for Fluorocarbon Refrigerants

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

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

2.1.4 DOT PUBLICATION—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

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

UL 1769—Cylinder Valves

3. Specifications and General Description

3.1 The equipment must be able to extract CFC-12 (R-12) from a mobile A/C system.

3.2 The equipment discharge or transfer fitting shall be unique to prevent the unintentional use of extracted CFC-12 (R-12) to be used for recharging auto air conditioners.

3.3 The equipment shall be suitable for use in an automotive service garage environment as defined in 6.8.

3.4 Equipment Certification—The equipment must be certified by Underwriters Laboratories or an equivalent EPA listed certifying laboratory to meet SAE J2209.

3.5 Label Requirements—The equipment shall have a label "Design Certified by (Company name) to meet SAE J2209 for use with CFC-12 (R-12). The refrigerant from this equipment must be processed to the appropriate ARI 700 specification before reuse in a mobile A/C system." The minimum letter size shall be bold type 3 mm in height.

4. Safety Requirements

4.1 The equipment must comply with applicable federal, state, and local requirements on equipment related to the handling of CFC-12 (R-12) material. Safety precautions or notices, label, related to the safe operation of the equipment shall also be prominently displayed on the equipment and should also state "CAUTION—SHOULD BE OPERATED BY CERTIFIED PERSONNEL." The safety identification shall be located on the front near the controls.

4.2 The equipment must comply with applicable safety standards for electrical and mechanical requirements.

5. Operating Instructions

5.1 The equipment manufacturer must provide operating instructions, necessary maintenance procedures, and source information for replacement parts and repair.

5.2 The equipment must prominently display the manufacturer's name, address, and any items that require maintenance or replacement that affect the proper operation of the equipment. Operation manuals must cover information for complete maintenance of the equipment to assure proper operation.

5.3 The equipment manufacturer shall provide a warning in the instruction manual regarding the possibility of refrigerant contamination in the mobile A/C system being serviced.

5.4 Recovery equipment having refrigerant identification equipment shall meet the requirements of SAE J1771.

5.5 Recovery equipment not having refrigerant identification capability shall have instructions in the equipment manual covering possible contamination problems to the equipment and container contamination of existing recycled refrigerant in the equipment.

6. Functional Description

6.1 The equipment must be capable of ensuring recovery of the CFC-12 (R-12) from the system being serviced, by reducing the system pressure to a minimum of 102 mm of mercury below atmospheric. To prevent system delayed outgassing, the unit must have a device that assures that the refrigerant has been recovered from the A/C system.

6.1.1 Testing laboratory certification of the equipment capability is required which shall process contaminated refrigerant samples at specific temperatures.

6.2 The equipment must be preconditioned with 13.6 kg of the standard contaminated CFC-12 (R-12) at an ambient of 21 °C before starting the test cycle. Sample amounts are not to exceed 1.13 kg with sample amounts to be repeated every 5 min. The sample method fixture defined in SAE J1990 Figure 1 shall be operated at 24 °C. Contaminated CFC-12 (R-12) samples shall be processed at ambient temperatures of 10 to 49 °C without the equipment shutting down due to any safety devices employed in this equipment.

6.2.1 Contaminated CFC-12 (R-12) sample

6.2.2 Standard contaminated CFC-12 (R-12) refrigerant, 13.6 Kg sample size, shall consist of liquid CFC-12 (R-12) with 100 ppm (by weight) moisture at 21 °C and 45 000 ppm (by weight) mineral oil 525 suspension nominal and 770 ppm by weight of noncondensable gases (air).

6.3 Portable refillable containers used in conjunction with this equipment must meet applicable DOT standards.

6.3.1 The container color must be gray with yellow top to identify that it contains used CFC-12 (R-12) refrigerant. It must be permanently marked on the outside surface in black print at least 20 mm high "DIRTY CFC-12 (R-12)—DO NOT USE, MUST BE REPROCESSED".

6.3.2 The portable refillable container shall have a SAE 3/8 in flare male thread connection as identified in SAE J639 CFC-12 (R-12) High Pressure Charging Valve Figure 2.

6.3.3 During operation, the equipment shall provide overfill protection to assure that the storage container liquid fill does not exceed 80% of the tank's rated volume at 21 °C per DOT standard, CFR title 49, Section 173.304 and the American Society of Mechanical Engineers.

6.4 Additional Storage Tank Requirements

6.4.1 The cylinder valve shall comply with the standard for cylinder valves, UL 1769.

6.4.2 The pressure relief device shall comply with the pressure relief device standard part 1, CGA pamphlet S-1.1.

6.4.3 The container assembly shall be marked to indicate the first retest date, which shall be 5 years after date of manufacture. The marking shall indicate that retest must be performed every subsequent 5 years. The marking shall be in letters at least 6 mm high. SAE J2296 provides an inspection procedure.

6.5 All flexible hoses must meet SAE J2196 for service hoses.

6.6 Service hoses must have shutoff devices located within 30 cm of the connection point to the system being serviced to minimize introduction of noncondensable gases into the recovery equipment during connection and the release of the refrigerant during disconnection.

6.7 The equipment must be able to separate the lubricant from recovered refrigerant and accurately indicate the amount removed from the system during processing in 30 mL units.

6.7.1 The purpose of indicating the amount of lubricant removed is to ensure that a proper amount is returned to the mobile A/C system for compressor lubrication.

6.7.2 Refrigerant dissolved in this lubricant must be accounted for to prevent system lubricant overcharge of the mobile A/C system.

6.7.3 Only new lubricant, as identified by the system manufacturer, should be replaced in the mobile A/C system.

6.7.4 Removed lubricant from the system and/or the equipment shall be disposed of in accordance with applicable federal, state, and local procedures and regulations.

6.8 The equipment must be capable of continuous operation in ambient of 10 to 49 °C and comply with 6.1.

6.9 The equipment should be compatible with leak detection material that may be present in the mobile A/C system.

7. For test validation the equipment is to be operated according to the manufacturer's instructions.

8. Notes

8.1 **Marginal Indicia—**The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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