



SURFACE VEHICLE STANDARD

J3062™

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Superseding J3062 JUN2015

Automotive Refrigerant Air-Conditioning Hose Requirements

RATIONALE

SAE J3062 has been revised to include R-152a refrigerant to the scope of the standard. Requirements for hose identification, permeation, and charge density for R-152a refrigerant are also included. This revision also adds a new "Type G" thermoplastic, textile reinforced, thermoplastic cover hose construction. An Option 2 moisture ingress procedure was added similar to SAE J3143. Editorial changes were made to several sections for improved clarity.

1. SCOPE

The scope of SAE J3062 covers hose intended for containing and circulating lubricant, liquid, and gaseous R-134a, R-152a, and/or R-1234yf refrigerant in automotive air-conditioning systems. The hose shall be designed to minimize permeation of the refrigerant, contamination of the system, and to be functional over a temperature range of -30 to 125 °C. Specific construction details are to be agreed upon between the user and supplier.

Requirements for the hose used in coupled automotive refrigerant air-conditioning assemblies are included in SAE J2064. SAE J3062 separates requirements for the hose used in these assemblies into its own standard. SAE J2064 also provides the necessary refrigerant permeation values used in SAE J2727. Mobile air-conditioning system refrigerant emissions rates are established in SAE J2727 emission charts and are important. The certified coupling of MAC hose assemblies is required in meeting certain regulatory requirements.

Therefore, the scope of SAE J2064 has been changed to establish the assembly requirements for factory and field coupled hose assemblies. A hose which meets the requirements of SAE J3062 may not meet the requirements of SAE J2064. Bulk hose produced prior to the release of this standard could be labeled "SAE J2064" and may not meet the requirements of SAE J3062.

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.

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Full document details: SAE J3062_202101

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https://www.sae.org/standards/content/J3062_202101

Documents

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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.

SAE J639	Safety Standards for Motor Vehicle Refrigerant Vapor Compression Systems
SAE J2064	Coupled Automotive Refrigerant Air-Conditioning Hose Assemblies
SAE J2727	Mobile Air-Conditioning System Refrigerant Emission Charts for R-134a and R-1234yf
SAE J2911	Procedure for Certification that Requirements for Mobile Air-Conditioning System Components, Service Equipment, and Service Technician Training Meet SAE J Standards
SAE J3143	Non-Metallic, Non-Reinforced Automotive Air-Conditioning Refrigerant Line Assembly Requirements

2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D380	Methods of Testing Rubber Hose
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3. MANUFACTURE

3.1 Size

Standard dimensions are given in the first column of Table 1. Other sizes are permitted as long as 4.1 is satisfied.

3.2 Types

Including, but not limited to, the following:

3.2.1 Type A - Elastomeric, Textile Reinforced

The hose shall be built having a suitable seamless synthetic elastomeric tube. The reinforcement shall consist of textile yarn, cord, or fabric adhered to the tube and cover. The outer cover shall be heat- and ozone-resistant synthetic elastomer.

3.2.2 Type B - Elastomeric, Wire Reinforced

The hose shall be built having a suitable seamless synthetic elastomeric tube. The reinforcement shall consist of steel wire adhered to the elastomeric tube. The cover shall consist of a heat-resistant textile yarn impregnated with a synthetic elastomeric cement.

3.2.3 Type C - Barrier, Textile Reinforced

The hose shall have a suitable thermoplastic barrier between elastomeric layers. The reinforcement shall consist of suitable textile yarn, cord, or fabric adhered to the tube and cover. The outer cover shall be heat- and ozone-resistant synthetic elastomer.

3.2.4 Type D - Thermoplastic, Textile Reinforced, Elastomeric Cover

The hose shall have a suitable thermoplastic tube. The reinforcement shall consist of a suitable textile yarn, cord, or fabric adhered to the tube and cover. The outer cover shall be heat- and ozone-resistant synthetic elastomer.

3.2.5 Type E - Veneer, Textile Reinforced

The hose shall have a suitable thermoplastic veneer lining the inside diameter with an elastomeric tube outer layer. The reinforcement shall consist of a textile yarn, cord, or fabric adhered to the tube and cover. The cover shall be heat- and ozone-resistant synthetic elastomer.

3.2.6 Type F - Veneer, Barrier, Thermoplastic Liner

The hose shall have a suitable thermoplastic veneer liner with a thermoplastic barrier between elastomeric layers. The reinforcement shall consist of a suitable textile yarn, cord, or fabric adhered to the tube and cover. The cover shall be heat- and ozone-resistant elastomer.

3.2.7 Type G - Thermoplastic, Textile Reinforced, Thermoplastic Cover

The hose shall have a suitable thermoplastic material lining the inside diameter. The reinforcement shall consist of a suitable textile yarn, cord, or fabric adhered to the tube and cover. The cover shall consist of a heat resistant thermoplastic material.

NOTE: Caution should be taken when routing a Type G hose in applications where the hose may be subjected to UV light (outside under hood applications). In these cases, the hose cover material shall be resistant to UV exposure. Type G hose shall be subjected to tests specified in 6.8, 6.11, and 6.12 of SAE J3143, as well as those described later in this standard.

3.3 Moisture Vapor Ingression Hose Classes

The following classes are established based upon hose material configuration.

Class I - Not greater than 0.039 g/cm²/year H₂O

Class II - Not greater than 0.111 g/cm²/year H₂O

4. HOSE IDENTIFICATION

4.1 Bulk Hose Identification

The hose shall be identified with the SAE number, refrigerant, type, class, and size of inside diameter in fraction of inches and/or metric millimeter equivalents, and hose manufacturer's code marking. This marking shall appear on the outer cover of the hose at intervals not greater than 380 mm.

4.2 Hose Identification

A hose marked "J3062 – R-134a," "J3062 – R-152a," "J3062 – R-1234yf," or "J3062 – R-134a/R-152a/R-1234yf" signifies that it has been tested and meets the requirements of SAE J3062 for the marked refrigerant(s).

5. TESTING

The test procedures described in the current issue of ASTM D380 shall be followed whenever applicable.

5.1 Sample Conditioning

5.1.1 Hose Types A, B, C, D, E, and F

Charged samples shall be stabilized for 24 hours at 23 °C ± 2 °C prior to testing. Samples shall be checked to ensure specified charge and identify charge loss.

5.1.2 Hose Type G

Charged samples shall be stabilized for a minimum of 16 hours at 23 °C ± 2 °C, 50% ± 10% relative humidity prior to testing. Samples shall be checked to ensure specified charge and identify charge loss.

5.2 Permeation Test

5.2.1 Test Specimens - 107 cm Samples

The test specimens are to consist of four coupled hose assemblies that have 107 cm minimum of exposed hose between couplings. Three of the coupled hose assemblies are to be used for determining the permeation rate through the hose at a specific temperature. The fourth coupled and plugged hose assembly is to be used for a control hose.

One end of each hose assembly is to be fitted with a capped charge fitting. The other end is to be attached to a canister (optional) or plugged with a fitting. If a canister is used, the coupled hose assemblies are to be connected to canisters each having an internal volume of $510 \text{ cm}^3 \pm 25 \text{ cm}^3$ and having a minimum burst strength of 8.6 MPa.

5.2.2 Charging Procedure and Initial Weights

The coupled hose assemblies are to be weighed and recorded to 0.01 g to establish an initial weight prior to charging. The test samples (control sample not charged) are to be evacuated then charged with refrigerant to $70\% \pm 3\%$ of the internal volume of the assembly and then reweighed. Cooling of samples is recommended for ease of charging.

5.2.3 Temperature Exposure

The test temperature is $80^\circ\text{C} \pm 2^\circ\text{C}$.

5.2.4 Establish Constant Loss Rate

Weigh the samples at the end of the first 24 hour temperature exposure and weighing at periodic intervals (minimum period must be 24 hours). The weighing's shall be reported in net loss of grams, charged sample weight loss minus control sample weight loss. The net weight loss versus time shall continue to be recorded until steady state is reached. Steady state is reached when the last four readings are within 10% of the lowest reading or after 25 days, whichever comes first.

5.2.5 Loss Rate Determination

No charged specimen may lose more than 40 g during the first 24 hour period. The permeation rate for each specimen may be determined as follows:

- For samples that meet the 10% rule: Establish the slope of steady-state net loss in grams per day for the 107 cm length specimen and multiply by factors in Table 1 to obtain permeation rate.
- For samples that run for 25 days: The final weighing period, in which the data recorded will be used to determine the permeation rate, shall be the last 5 days or 7 days of the test period. The samples during the final period shall be weighed five times, at least 24 hours apart. The total net weight loss for the final period, divided by the number of days in the period is multiplied by the factors in Table 1 to obtain the permeation rate.

At the end of the temperature exposure period, the refrigerant charge remaining shall be 50% of the original charge minimum. At the conclusion of the test, the refrigerant charge in each specimen shall be exhausted to a suitable reclamation container.

Table 1 - Conversion factors

Nominal Hose Size mm (inch)	Mean Hose ID mm (inch)	Multiply g/day by Factor Shown to Obtain kg/m ² /year	Multiply g/day to Obtain lb/ft ² /year
8 (5/16)	8.1 (0.320)	13.414	2.748
10 (13/32)	10.6 (0.418)	10.251	2.100
13 (1/2)	13.0 (0.510)	8.358	1.713
16 (5/8)	16.1 (0.635)	6.749	1.383
19 (3/4)	19.4 (0.765)	5.601	1.148

In order to obtain conversion factor for hoses not listed in Table 1, use the following equations:

$$\text{for kg/m}^2/\text{year, Factor} = 108.66/D$$

where:

$$D = \text{inner diameter (mm)}$$

$$\text{for lb/ft}^2/\text{year, Factor} = 0.877/D$$

where:

$$D = \text{inner diameter (inches)}$$

5.2.6 Acceptance Determination

The hose shall not be permeable to a refrigerant loss at a rate greater than those listed in Table 2.

Table 2 - Permeation limits

Hose Type	Refrigerant	
	R-134a	R-1234yf/R-152a
A, B	15 kg/m ² /year	18 kg/m ² /year
C, D, E, F, G	5 kg/m ² /year	5 kg/m ² /year
C _u , D _u , E _u , F _u , G _u	1.5 kg/m ² /year	1.5 kg/m ² /year

_u Designates ultra low permeation limit.

5.2.6.1 Permeation Test - Type G Hose

For Type G hose, refer to SAE J3143, 6.2 for test specimens, test procedure, and post testing.

5.3 Coupling Integrity

Coupling integrity tests the ability of both the hose and the crimped fitting (coupling) to meet the following acceptance criteria. SAE J3062 ensures that the specific manufacturers hose can be successfully coupled to a fitting. It is the hose coupler's responsibility per SAE J2064 to ensure that the combination of their coupling type and crimp details along with a SAE J3062 approved hose will meet the same acceptance criteria at all possible combinations of dimensional tolerances.

For Type G hose, refer to SAE J3143, 6.10 for test specimens, test procedure, and post testing.

5.3.1 Test Specimens

Six coupled assemblies shall have 76 mm ± 3 mm of exposed hose and 56 mm ± 8 mm of straight tubing between the couplings with suitable connector and sealed at the other (pinch-welding permitted). Each assembly is attached to a canister with a minimum internal volume of 900 cm³ and equipped with a charging fitting. The minimum canister volume ensures a maximum pressure loss of 0.10 MPa between recharges. A seventh coupled assembly is used as a volatility sample to account for weight losses not associated with refrigerant losses.

5.3.2 Test Procedure with the Appropriate Refrigerant

5.3.2.1 Charging

Calculate the internal volume of the hose and canister assembly. Charge the canister assembly with an amount of refrigerant compatible lubricant equivalent to half of the internal volume of the hose assembly. Calculate the charge weight of refrigerant by multiplying the system volume less the lubricant volume by using the table below. Evacuate the sample, without removing the lubricant, and add the charge weight ±1 g of refrigerant and record original weight. Check all fittings to ensure against extraneous refrigerant leakage. After charging, agitate the assembly to ensure mixing with the lubricant and wetting of all internal surfaces. Hoses need to be dry to obtain accurate weighing's. All weighing's are to be made at 18 to 29 °C to the nearest 0.01 g.