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**SAE J1019 MAY86**

**Tests and Procedures  
for High-Temperature  
Transmission Oil  
Hose, Lubricating Oil  
Hose and Hose  
Assemblies**

SAE Standard  
Reaffirmed May 1986

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Submitted for Recognition as  
an American National Standard

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## PARTS AND COMPONENTS STANDARD

Submitted for recognition as an American National Standard

SAE J1019

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Reaffirms J1019

### TESTS AND PROCEDURES FOR HIGH-TEMPERATURE TRANSMISSION OIL HOSE, LUBRICATING OIL HOSE AND HOSE ASSEMBLIES

1. **SCOPE:** This standard is intended to establish uniform methods for testing and evaluation of hose and hose assemblies for use in: high-temperature transmission oil systems and high-temperature lubricating oil systems.
2. **TEST PROCEDURES:** The test procedures described in the current issue of ASTM D 380, Standard Methods of Testing Rubber Hose, shall be followed where applicable. However, in cases of conflict between the ASTM specifications and those described below, the latter shall take precedence.
3. **QUALIFICATION TESTS:** For qualification to this specification, hose and/or assemblies made therefrom shall conform to the following tests and requirements:
  - 3.1 **Dimensional Check Test:** The hose shall conform to all dimensions tabulated in the required customer specification.

Reinforcement diameter and finished outside diameter measurements shall be made by calculation from measurement of the outside circumference. Use of a flexible tape graduated to read the diameter directly shall be acceptable.

Inside diameter measurements shall be made by means of suitable expanding ball or telescoping gages.

Concentricity shall be measured both over the reinforcement and the finished outside diameter using either a dial indicator gage or a micrometer. The foot of the measuring instrument contacting the inside of the hose shall be rounded to conform to the curvature of the hose. The readings shall be taken at 90 deg intervals around the hose and acceptability based on the total variation between high and low readings.

Inside and outside diameter measurements shall be made at a minimum distance of 1.00 in (25 mm) and concentricity measurements at a minimum distance of 0.50 in (12.5 mm) back from the ends of the hose.

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3.2 Proof Test: Hose and/or hose assemblies shall be hydrostatically tested to the proof pressure specified by the end user for a period of not less than 30 s nor more than 60 s. There shall be no indication of failure or leakage.

3.3 Change in Length Test: Measurements for the determination of elongation or contraction shall be conducted on a previously untested, unaged hose assembly having at least 12.00 in (300 mm) length of free hose between hose couplings. The hose assembly shall be attached to the pressure source and pressurized to the operating pressure specified by the end user for a period of 30 s, after which time the pressure shall be released. After allowing the hose to restabilize for a period of 30 s following pressure release, reference marks 10.00 in (250 mm) apart shall be accurately placed on the hose outer cover, midway between the hose couplings. The hose shall then be repressurized to the specified pressure for a period of 30 s, after which time, while the hose is pressurized, the distance between the reference marks shall be measured. This length shall be the "final length."

The change in length shall be computed using the following formula:

$$\% \text{ change} = \frac{(\text{Final length} - \text{Original length})}{\text{Original length}} 100$$

(-%) change = contraction

(+%) change = elongation

3.4 Burst Test: Hose and/or hose assemblies on which the end fittings have been attached not over 30 d shall be subjected to a hydrostatic pressure increased at a constant rate so as to attain the minimum burst pressure specified by the end user within a period of not less than 15 s nor more than 30 s. There shall be no leakage, hose burst, or indication of failure below the specified minimum burst pressure.

3.5 Cold Flexibility Test: Hose and/or hose assemblies shall be subjected to  $-40 \pm 0, -5^{\circ}\text{F}$  ( $-40 \pm 0, -3^{\circ}\text{C}$ ) for 24 h in a straight position. After this time and while still at the specified temperature, the sample shall be evenly and uniformly bent over a mandrel having a diameter equal to twice the minimum specified bend radius. Bending shall be accomplished within a period of not less than 8 s nor more than 12 s.

Hoses of less than 1 in (25 mm) nominal inside diameter shall be bent 180 deg over the mandrel and hoses of 1 in (25 mm) nominal inside diameter and larger shall be bent 90 deg over the mandrel.

After flexing, the sample shall be allowed to warm to room temperature, then visually examined for cover cracks and subjected to the proof test. There shall be no cover cracks or leakage. (In lieu of the flexing test, hoses of 1 in (25 mm) nominal inside diameter and larger may be considered acceptable if samples of tube and cover pass the Low Temperature Test on Tube and Cover of ASTM D 380.)

3.6 Ozone Resistance Test: The cover compound shall be tested in accordance with the latest issue of ASTM D 518, Procedure B - Exposure of Looped Test Specimens, and ASTM D 1149. (Does not apply to fabric covered hose.)

- 3.7 High-Temperature Circulation Test: Test assemblies having a minimum free length of 14 in (355 mm) of hose between couplings shall be mounted on a circulating oil test unit in a straight configuration.

The ambient temperature shall be  $200 \pm 20^{\circ}\text{F}$  ( $93 \pm 11^{\circ}\text{C}$ ) and the oil temperature  $300 \pm 5^{\circ}\text{F}$  ( $149 \pm 3^{\circ}\text{C}$ ) between the inlet and outlet.

Either transmission Type A fluid, or lubricating oil to MIL-L-2104C as specified shall be circulated through the hose assemblies.

The circulating pressure should be 50-100 psi (345-690 kPa).

Entrained air in the lines must be kept to a minimum and caution must be exercised so that the free hose in the test assemblies not be in contact with the heating elements and located in such a manner as to permit good air circulation.

The test fluid should be changed every  $375 \pm 25$  h. Tests are to be run continuously except for oil change and addition or removal of samples. All shutdown time is to be recorded.

After  $750 \pm 5$  h, the test assemblies shall be removed, the oil drained, and hose allowed to cool for a minimum of 4 h.

The aged samples shall then be bent around a mandrel having a diameter 12 times the inside diameter of the hose and the cover examined (if rubber covered). No visible cracking will be permitted. The time required to bend the hose around the mandrel shall be between 8 and 12 s.

The assemblies shall then be subjected to a pressure test in a straight position for a period of not less than 30 s nor more than 60 s as follows:

Transmission oil assemblies: 500 psi (3.4 MPa)  
Lubricating oil assemblies: 200 psi (1.4 MPa)

There shall be no leakage through the hose or at the hose fitting juncture.

4. INSPECTION TEST: Inspection tests and lot sizes for inspection shall be negotiated.

RATIONALE:

Not applicable.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

ASTM D518, Procedure B - Exposure of Looped Test Specimens

ASTM D380

ASTM D1149

APPLICATION:

This standard is intended to establish uniform methods for testing and evaluation of hose and hose assemblies for use in high-temperature transmission oil systems and high-temperature lubricating oil systems.

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