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SAE J1405 MAY86

Flex-Impulse Test Procedure for Hydraulic Hose Assemblies

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PARTS AND COMPONENTS REPORT

SAE J1405

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FLEX-IMPULSE TEST PROCEDURE FOR HYDRAULIC HOSE ASSEMBLIES

1. SCOPE: The procedures contained herein have been developed to establish a uniform method for comparative impulse testing of hydraulic hose assemblies with and without flexing in order to determine the effect of flexing on ultimate life of hose. The test method minimizes variables to give a comparison between flexing and non-flexing. Basic impulse test parameters are to be in accordance with SAE J343 except as modified to incorporate flexing. This test is not a requirement for SAE J517 hose.

2. TEST PROCEDURE: For optimum validity of comparison, test specimens should be cut from a continuous length of hose with alternate samples along the length designated for flexing and non-flexing impulse test.

   Those specimens designated for non-flexing should be tested in accordance with SAE J343. Those specimens designated for flexing are to be made up with free hose length in accordance with the following formula:

   Free hose length = 4.142 (min bend radius) + 3.57 (hose O.D.)

   Performance of the flex-impulse test requires a supplementary rig capable of moving one test manifold in a continuous circular pattern as shown in Fig. 1. This manifold is geared so that the center lines of the hose fittings at hose attachment stay parallel at all times. A variable drive is provided, and the number of rpm are to be controlled to 36 ± 2% of the impulse cpm. This maintains a proportionality between the number of cycles of flexing and impulse and assures that the test specimen is in a different configuration on each succeeding impulse.

   The vertical centerline of a stationary manifold is positioned a distance A from the center of revolution of the revolving manifold. This distance was determined empirically such that the test specimen is subjected to back bending motion near each fitting with the radius of bend at that point being greater than the applicable SAE minimum bend radius. However, when the

2. TEST PROCEDURE (Continued):

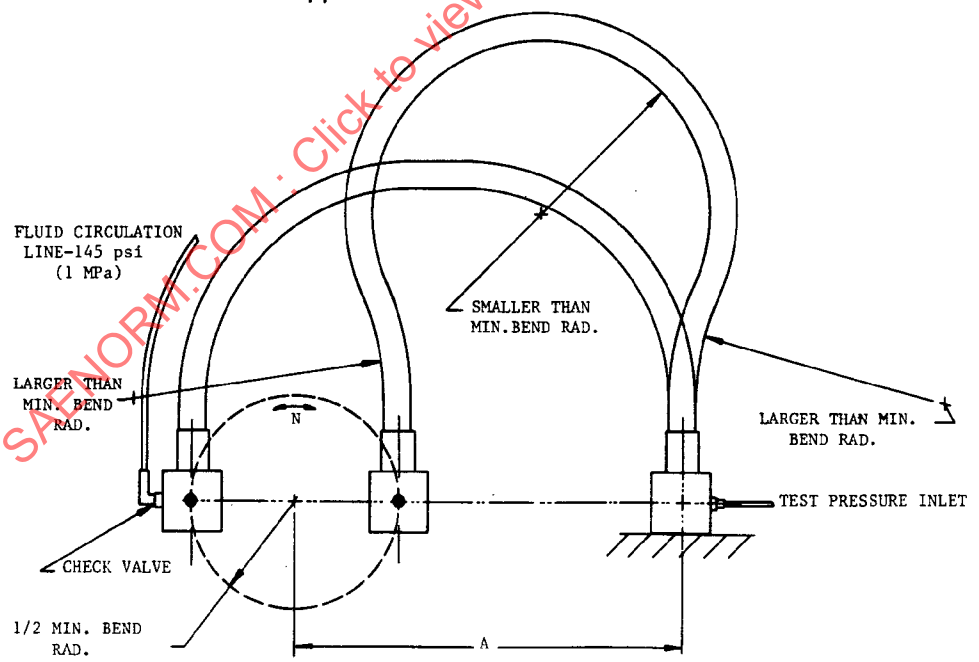
revolving manifold reaches the position nearest the stationary manifold, the bend radius inside the loop is smaller than the applicable SAE minimum bend radius.[1] Distance A is calculated with the following formula:

1.75 (min bend radius) + hose O.D.

Specimens for flex-impulse testing should be mounted with straight end fitting on the rig as described above using care to avoid imparting twist to the hose. (Angular fittings may be used, provided they are installed in such a position to assure the hose travel and geometry of Fig. 1.) A like number of samples, preferably not less than three, should be tested simultaneously and should be run to failure.

To accelerate completion of the test for comparative purposes, a pressure based on actual burst values of the hose is recommended, with flexing and non-flexing specimens to be tested at the same pressure. Suggested procedure is to first determine the average burst strength for the test length of hose and from this calculate the impulse test pressure as 35% of average burst. If this test procedure does not produce failures within the desired range, a higher or lower percentage may be used.

[1]Violation of the minimum bend radius for this test does not imply that such violation is recommended in applications.



A = 1.75 (MIN. BEND RAD.) + 1 (HOSE O.D.)

N = NO. OF REVOLUTIONS PER MINUTE
= 36% ± 2% OF IMPULSE CYCLES PER MINUTE.

FREE HOSE LENGTH = 4.142 (MIN. BEND RAD.) + 3.57 (HOSE O.D.)

FIG. 1

RATIONALE:

Not applicable.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

SAE J343, Tests and Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies

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