SURFACE VEHICLE RECOMMENDED PRACTICE

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Manual Slack Adjuster Test Procedure

RATIONALE

Manual brake (slack) adjusters have been replaced by automatic brake adjusters since 1994. They are still used for aftermarket and certain special applications. The test procedure for these adjusters have not changed and are not expected to change due to the newer technology.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE Truck and Bus Foundation Brake Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE

This SAE Recommended Practice is intended for testing of manual slack adjusters as they are used in service, emergency, or parking brake systems for vehicles that can be licensed for on-road use.

1.1 Purpose

This document establishes an accelerated laboratory test procedure for manual slack adjusters to determine their integrity and durability in various functional modes and environmental conditions.

2. REFERENCES

2.1 Applicable Publication

The following publication forms a part of this specification to the extent specified herein.

2.1.1 ASTM Publication

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 B 117 Practice for Operating Salt Spray (Fog) Apparatus

3. FUNCTIONAL TEST

At ambient temperature of 27 °C ± 11 °C (80 °F ± 20 °F), the following functional tests should be performed.

3.1 Adjusting Torque

Per the manufacturer's recommendations, rotate the adjusting shaft with a torque wrench a sufficient number of turns such that the worm wheel rotates one revolution in each direction. Record the maximum torque.

3.2 Backlash

Mount a slack adjuster in an appropriate rigid fixture so that no movement is allowed between the fixture and the worm wheel. Measure and record the free movement of the slack adjuster arm at a distance of 152.4 mm (6 in) from the center of the worm wheel by applying a torque of 6.78 Nm ± 0.34 Nm (60 in-lb ± 3 in-lb) in each direction. Rotate adjusting shaft such that the worm wheel rotates to a new position of 72 degrees ± 3 degrees from the previous position and make the backlash check. Repeat this procedure until 5 measurements have been made covering the worm wheel circumference.

Measurements may be taken at any arm length; however, the data shall be factored in terms of 152.4 mm (6 in) arm length.

4. CORROSION RESISTANCE

Test unit(s) must be exposed to a continuous salt spray test for 96 h per ASTM B 117. Then they must air dry for 72 h at ambient temperature of 27 °C ± 11 °C (80 °F ± 20 °F).

4.1 Per the manufacturer's recommendations, rotate adjusting shaft until worm wheel has made one complete revolution each direction. Record the maximum torque in each direction.

4.2 Check and record the adjustment retaining function as recommended by the manufacturer.

5. DURABILITY

Conduct this test at ambient temperature of 27 °C ± 11 °C (80 °F ± 20 °F).

5.1 General Test Setup

5.1.1 Position the slack adjuster so that the area of the manual adjustment mechanism is in compression or tension, as shown in Figure 1, as recommended by the manufacturer, during the application of a load to the slack adjuster lever arm. Bidirectional slack adjusters, those that can be used in either compression or tension mode as explained in Figure 1, shall be tested in each mode with separate slack adjusters.

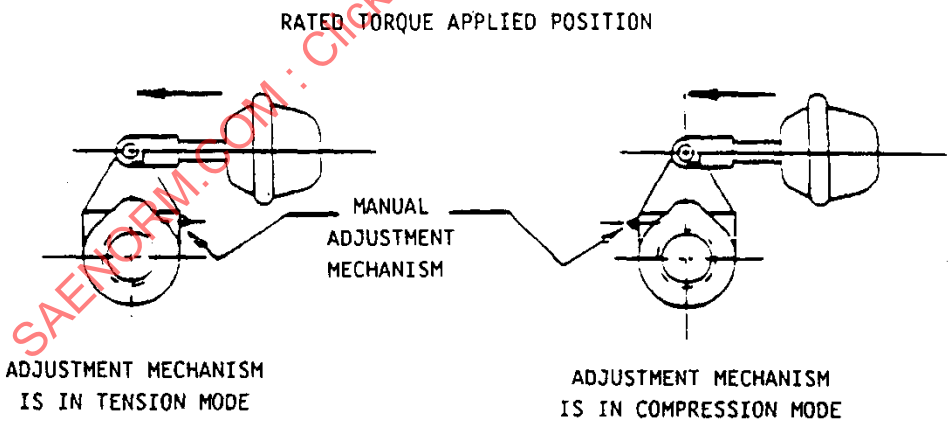

FIGURE 1 - MANUAL SLACK ADJUSTER TEST PROCEDURE—TENSION VERSUS COMPRESSION MODE

5.1.2 Adjust the unit so that with the rated torque (manufacturer's recommended load X effective lever length) applied, the actuator push rod is perpendicular (90 degrees ± 3 degrees) to the effective lever arm.

5.1.3 Establish a residual torque of 22.6 Nm ± 11.3 Nm (200 in-lb ± 100 in-lb) on the slack adjuster. This simulates internal brake frictions and brake return springs (where applicable).

5.1.4 With the rated torque applied and the unit adjusted to the previous requirements, position a shut-off device so that an equivalent overstroke of 6.4 mm (0.25 in) maximum at 152.4 mm (6 in) lever length will discontinue the test.

5.1.5 Apply the test torque per 5.2.2 against a resisting force, resulting in a total deflection rate of 15 to 30 minutes min per 113 Nm (1000 in-lb) torque.

5.1.6 Establish the necessary time cycle controls to obtain the torque application and release requirements per the following:

a. Total Cycle Time: 4.0 s

b. Maximum Application Time: 1.0 s

c. Minimum Dwell Time: 1.0 s

d. Release to residual torque for balance of cycle time

5.2 Gear Set Integrity Test

5.2.1 Provide a reference mark on the adjusting shaft and worm wheel to assure return to original position after torque check per 5.2.3.

5.2.2 The slack adjuster test cycle shall be run in the sequence as in Table 1:

TABLE 1 - SLACK ADJUSTMENT TEST CYCLES

Number of Cycles	Percent of Rated Torque
155 000	40
35 000	60
8 500	80
1 500	100

5.2.3 Measure and record the adjustment torque per the following schedule of Number of Cycles:

Number of Cycles
50 000
100 000
155 000
190 000
198 500
200 000

To measure adjustment torque, record the maximum torque required to turn the adjusting shaft five turns clockwise and ten turns counter-clockwise. Return the adjusting shaft to the original position and continue the test.

5.3 Housing Integrity Test

5.3.1 After completion of 5.2.3, continue cycling at rated torque for 30 000 cycles. Repositioning or replacing of the gear set or its equivalent is permissible at any time during the housing test.

5.3.2 Inspect for visible structural fractures through the use of dye penetrant and record the findings.