Steering Wheel Torsional Test

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. In driving operation and in particular during parking maneuvers torsional loads are applied to the steering wheel. The purpose of this test is to determine the effect of such loads on the service life of the steering wheel. A torque of 70 Nm maximum may be applied to the steering wheel rim when the driver is seated in normal seat position. This value shall be used for the test.

1.2 Foreword. Not applicable.

1.3 Applicability. Steering wheels of the entire vehicle range.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

None

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Clamping fixture to hold steering wheel rim.

3.2.2 Steering column shaft with torsion arm (See Figure 1).

3.2.3 Pneumatic or hydraulic actuator with manual or automatic force control.

Optional: Direct connection of column shaft to hydraulic rotary actuator capable of 70 Nm torque (See Figure 2).

3.3 Test Vehicle/Test Piece. Require three (3) steering wheel armatures.

3.4 Test Time. Not applicable.

Calendar time:	days
Test hours:	hours
Coordination hours:	hours

3.5 Test Required Information. Not applicable.

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3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation.

4.1.1 The steering wheel shall be mounted on the steering column shaft. The nut/bolt shall be tightened with the minimum torque. Wait for fastener adhesive patch to cure before proceeding with torsional test as specified by adhesive supplier. **Note:** If not specified wait 72 h (See Appendix A).

4.1.1.1 Paint stripe the fastener to the wheel interface (See Figure 3).

4.1.2 The steering wheel shall be clamped with the shaft to the fixture at steering wheel rim.

4.1.3 The actuator (hydraulic or pneumatic) shall be connected with the torsion arm of the steering shaft (See Figure 1).

Note: Optional rotary actuator attachment (See Figure 2).

4.2 Conditions.

4.2.1 Environmental Conditions. The test shall be performed at + 23 °C ± 5 °C.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.2.2.1 The test frequency shall be 1.5 Hz. A sine wave shall be aimed.

Note: If using rotary actuator test frequency target of 60 cycles/minute (1 Hz).

4.3 Instructions.

4.3.1 The actuator shall be adjusted to produce a torsional load on the steering wheel of 70 Nm maximum attainable at the steering wheel hub.

4.3.2 After completion of 325 000 cycles, the residual torque of the shaft nut/bolt shall be determined and recorded.

4.3.3 The steering wheel shall be inspected for cracks and defects of the armature assembly.

4.3.4. Record if nut/bolt movement from paint stripe.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results.

5.2.1 No cracks or defects of the armature assembly are permissible before the specified number of cycles are completed.

5.2.2 Steering wheel fastener shall not rotate from initial scribe mark.

5.2.3 Steering wheel attachment to steering shaft shall be “tight” with no increase in axial and radial lash.

5.2.4 Steering wheel fastener break-away torque shall be >5 Nm.

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