



Halfshaft Rotating Torque Evaluation Procedure

1 Introduction

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. The purpose of this procedure is to measure the torque required to turn a halfshaft outboard joint about its output (wheel end) rotation axis when the joint is articulated at a specified angle. The procedure is intended to be conducted with the halfshaft mounted in a test fixture. The halfshaft supplier shall use this procedure for development and validation of halfshafts in compliance with the Halfshaft Subsystem Technical Specification (SSTS) document.

1.2 Applicability. This procedure is applicable to all halfshafts for which a rotating torque requirement has been specified in the program specific SSTS. This procedure is also applicable to a halfshaft mounted in a bench level test fixture. It is not applicable to the halfshaft installed in the vehicle.

1.3 Remarks. The measured torque to turn value is an integration driven subsystem requirement for Noise and Vibration (N&V). Exceeding the limit value specified in the program specific halfshaft SSTS may result in objectionable driveline induced noise and vibration caused by the halfshaft.

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.

Halfshaft Subsystem Technical Specification (SSTS)

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 A test fixture to accurately and securely position the halfshaft is required for this procedure. The test fixture shall incorporate low friction rolling element bearings to minimize the contribution of fixture bearing drag torque to the total measured rotating torque.

3.2.2 Calibrated mechanical or electronic torque wrench with peak hold feature.

3.2.3 Appropriate adapter for interface between torque wrench and halfshaft outboard joint stub shaft.

3.3 Test Vehicle/Test Piece. The test piece shall consist of a complete production halfshaft assembly, as would be installed on a production vehicle.

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3.4 Test Time.

Calendar time: 1 day
Test hours: 2 hours
Coordination hours: 2 hours

3.5 Test Required Information. Prior to performing this procedure, the outboard joint articulation angle(s) at which the torque shall be measured must be known. For validation testing, the required not-to-exceed rotating torque limit value must be known. This information is contained in the halfshaft SSTS document for the specific halfshaft under test.

3.6 Personnel/Skills. This test requires a minimum of one (1) technician or engineer trained in making halfshaft rotating torque measurements.

4 Procedure

4.1 Preparation. Not applicable.

4.2 Conditions.

4.2.1 Environmental Conditions. This procedure shall be conducted at ambient laboratory conditions, at a temperature of $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

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.

4.3 Instructions.

4.3.1 Mount the halfshaft in the test fixture such that the inboard joint angle is fixed at zero degrees and the outboard joint angle is fixed at the test angle specified in the SSTS document. Ensure that the input and output stub shafts are securely supported by bearings that enable free rotation about the shaft axes.

4.3.2 Measure and record the maximum torque required to turn the input shaft through one (1) complete revolution.

4.3.3 For SSTS requirement validation, repeat the test on a minimum of two (2) additional production samples for a minimum of three (3) samples total.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Data shall be examined for conformance to SSTS requirements. If the rotating torque exceeds the value specified in the SSTS document, the responsible General Motors supplier quality engineer shall be notified, and the test specimen shall be clearly marked with indelible paint so as not to be used in a production vehicle.

5.3 Test Documentation. The supplier shall provide a hardcopy data sheet containing test results (measured torque value and pass/fail result relative to SSTS requirement) for each halfshaft tested. The data sheet shall be annotated with the part number, specimen identification number, test date, and test conductor's name.

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

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