GM	WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW17364

Driveline Shaft Insertion Force Test of Rotating Shaft Seals

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 standard is to check for rolled dust lip and spring pop-off during assembly. This setup includes maximum shaft interference and maximum Shaft to Bore Misalignment (STBM).

1.2 Applicability. This standard applies to shaft seals included in driveline components or assemblies. This is not intended to apply to seals for powertrain, engines, or transmissions applications. This is not for seals without a spring on the main seal lip (i.e., Poly Tetra Fluoro Ethylene (PTFE) and wiper seals).

1.3 Remarks.

1.3.1 Expectation is no rolled seal lips, no spring pop-off, no Outer Diameter (OD) leakage, no seal pop out, and suitable insertion/retention force.

1.3.2 Refer to 5.2 for additional expectations.

1.3.3 Test lab shall provide the Design Release Engineer (DRE) with test results written in Data Sheet CG4362.

Note: Deviations from the specifications in this standard are permissible when authorized by the DRE.

Note: Test at maximum and minimum of STBM and Dynamic Run Out (DRO), calculated from design tolerance stack-ups that include bending deflection and shaft-to-bore coaxiality. Request this information from the assembly designer or Tier 1 Supplier.

Note: Test at speeds (S) and temperatures (T) specified in the Vehicle Technical Specification (VTS). Request these from the DRE. Run tests using Table 2, Default Test Values, when approved by the DRE.

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.

- CG4362
- Vehicle Technical Specifications (VTS)

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.

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3.1.3 Testing area shall be orderly and clean. Food, drink, spills and trash shall not be visible. Test altering contamination, both metallic and non-metallic, shall be kept separate from testing samples and equipment.

3.2 Equipment.

3.2.1 An insertion force test machine with programmable speed controller is required.

3.2.2 Measurement gauges or devices shall have a label showing the most recent date of calibration check.

3.3 Test Vehicle/Test Piece.

3.3.1 Test a minimum of four (4) seals (reference 4.1.1, Seal Preparation).

3.3.2 After operation and radial load measurement, the lip loading must exceed a measurement result of 0.1 N/mm of circumference upon a shaft with Least Material Condition (LMC) dimensions.

3.3.3 Refer to 5.2 for additional expectations.

3.4 Test Time.

Calendar time:	7 days
Test time:	136 hours
Coordination time:	32 hours

Note:

Project Schedule Long: 2 days (measurement time + one (1) tester running six (6) times until suspend time).

Project Schedule Short: 2 days (measurement time + six (6) testers running simultaneously until expected time).

Measurement Time: 2 days (four (4) seals + all shafts + all bores + all installations, i.e., STBM and DRO).

3.4.1 Run test for 10 h or until all torques are measured. Suspend test after 24 h. Complete testing of four (4) seals may require 2 days or more depending on number of testers used.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills.

3.6.1 Test operator shall have reading skills suitable for understanding this specification. Operator shall be able to perform simple calculations on an electronic calculator and identify measurements exceeding the tolerance. Operator shall be able to make accurate measurements with calipers, scales and gages.

3.6.2 Test Technician should be proficient in operation of the facilities listed in 3.1, as well as in proper selection and operation of the equipment listed in 3.2, and familiar with the general operation of seals.

4 Procedure

4.1 Preparation.

4.1.1 Seal Preparation.

4.1.1.1 Mark seals Number 1 through Number 4.

4.1.1.2 Measure diameters and widths before inserting seal into seal test machine.

4.1.1.3 See Table 1 for measurements to report. Record results in Data Sheet CG4362.

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