



Transmission Park Detent Spring Assembly Durability Test

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. To demonstrate the durability of the transmission detent spring and roller assembly subjected to Park to lowest range detent cycling.

1.2 Applicability.

1.2.1 All automatic transmission detent roller and spring component assemblies of this type. Individual model characteristics must be evaluated before parameters can be selected for use. The actual number of cycles at each phase will depend upon sample size, reliability target, and Weibull slope. The Design/Release Engineer (DRE), Park System Technical Specialist, and Development/Validation Engineer must review and modify test target life and stop test point as appropriate for the application.

1.2.2 All passenger car and light truck transmission applications. The customer duty cycle and reliability objectives of a particular model application may require a different test target life and stop test point.

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.

- L-72 Test Procedure.
- Transmission Park System Terminology.

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 Provide ability to rotate the detent lever for design range from Park to lowest range to Park, and provide angular position control at the cycle endpoints. Reference Appendix A, Figure A1 and Table A1 for typical fixture design information.

3.2.2 Automatic method of lubrication of the detent lever profile and spring assembly while the detent spring is cycled.

3.2.3 Automatic method of test shutdown upon detection of loss of part function, maintaining accurate cycle count information, as required.

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November 2016

Page 1 of 6

3.2.4 All instrumentation is to be calibrated as required; record instrumentation details and date of calibration in test report, unless the information is otherwise preserved in the testing laboratory records or corporate archives.

3.3 Test Vehicle/Test Piece.

The Detent Roller Spring assembly should be made as design and process intent for production validation unless otherwise noted. This to be included in the final report.

3.4 Test Time.

This timing chart is based on a sample size of 12 detent springs being tested simultaneously and a target cycle count of 655 000 cycles.

Calendar time: 15 days

Test hours: 360 h

Coordination hours: 16 h

3.5 Test Required Information.

Determine the number of cycles to complete based on design life requirements, reliability, confidence, and customer use.

3.6 Personnel/Skills.

Knowledge of instrumentation fundamentals is required.

4 Procedure

4.1 Preparation.

4.1.1 Obtain in-transmission assembled test dimensions as needed. The Detent Roller Spring assembly spring force shall be measured and recorded prior to and at the conclusion of testing on all samples.

4.1.2 The assembled spring pre-load will be determined by the spring mounting position from manual shaft centerline. The shifter rotation in manual shaft degrees shall be 3.0 degrees of manual shaft rotation beyond Park detent to 3.0 degrees of manual shaft rotation beyond lowest range detent, to account for allowable shifter over-travel. Review these values with Park System DRE, Park System Technical Specialist, and Validation Engineer before test is conducted.

4.1.3 The detent lever is modified to fixture dimensions to simulate assembly's attitude in actual transmission mounting location. A new detent lever is required for each test.

4.1.4 Prior to start of test, apply released production intent transmission oil to components to simulate actual conditions.

4.1.5 Any part inspection must be done both as a pre-test and as end-of-test check points. Documentation to be included in test report.

4.1.6 Optional: The hardness at detent lever adjacent to interface area can be measured. Any other measurements as requested by test engineer can be made at any pre-defined point before, during, or after test.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

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 Assemble all detent levers on test fixture to maintain alignment.

4.3.2 Cycle between Park and lowest range positions at a rate to maintain spring contact with detent profile (nominal value of 0.5 seconds from Park to lowest range and 0.5 seconds from lowest range to Park). At the lowest detent position continue to rotate the detent lever beyond nominal valley detent to the specified over-travel. Manual shaft degrees over-travel at Park and lowest range positions may be modified by requesting engineer. Refer to 4.1.2.

4.3.3 Shut down test if load at any position cannot be maintained within 20%. Contact requestor when test has been shut down.

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November 2016

Page 2 of 6