



Power Transfer Unit (PTU) Short Cycle Fatigue

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. The purpose of this specification is to evaluate the performance of the Power Transfer Unit (PTU) under an operating load.

1.2 Foreword. This procedure was developed to be able to begin testing the PTU before a full vehicle level duty cycle is available.

1.3 Applicability. This specification is for Power Transfer Units used in both All Wheel Drive cars and All Wheel Drive light trucks.

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. The tests shall be performed in the designated testing environment at each GM regional site. The environment specified in the Vehicle Technical Specification (VTS) must be used for validation purposes. The ambient temperature shall be between 18 °C and 25 °C.

3.2 Equipment. The test equipment shall be capable of accurately applying the loading conditions described in this document. The equipment must be able to apply these inputs at vehicle-specific levels (forces, etc.) and frequencies specified separately by GM for each vehicle program or PTU. All measurement equipment must be capable of accurately making the measurements specified.

3.3 Test Vehicle/Test Piece. A test PTU is required and must be specified by test requester. The PTU should be qualified to represent model year design content. Any prototype, development addition or modification should be noted on the test request and report.

3.4 Test Time.

Calendar time: 10 days

Test hours: 200 hours

Coordination hours: 8 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

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Page 1 of 3

4 Procedure

4.1 Preparation. Not applicable.

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 Setup. The PTU is to be completely filled with fluid and tracer dye added to detect any leaks. There is no PTU break-in for this test procedure.

4.3.2 Test Cycle.

4.3.2.1 Ramp the PTU input speed to 1.4 rpm in the forward direction and the PTU input torque to the required amount. The ramp time is 19 s.

4.3.2.2 Hold this time and torque for one full revolution of the PTU input shaft; and then both torque and speed are ramped down, again using 19 s ramp time.

4.3.2.3 Repeat 4.3.2.1 through 4.3.2.2 three times.

4.3.2.4 Next, rotate the PTU input in the reverse direction at a speed of 1.4 rpm and the required torque. Again utilize a ramp time of 19 s and hold this for one (1) full revolution of the PTU input shaft.

4.3.2.5 Ramp down the torque and speed.

4.3.2.6 The three forward and the one reverse rotation constitutes one full cycle of the test. This is repeated for a total of 1000 cycles.

4.3.2.7 An additional five cycles are then completed at an increased torque defined by the requesting engineer.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. Not applicable.

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, corporate 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.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

PTU Power Transfer Unit

VTS Vehicle Technical Specification

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW16716

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February 2012

Page 2 of 3

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