



Peak Vehicle Performance Evaluation for Manual Transmission Vehicles

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. This standard describes the approach when testing the acceleration 0 km/h to 100 km/h (like the journalist trade press usually perform) for evaluation of the performance of manual transmissions. It provides testing of the dynamic strength of the driveline components.

1.2 Applicability. Passenger cars, multipurpose passenger vans and light commercial vehicles (includes light duty pickup trucks) equipped with manual transmissions.

1.3 Remarks. This test is typically run by GM Global Propulsion Systems and is used for development and validation.

This tests performance parts has formerly been known as the "New Journalist Test" (or NJT; a document no. has never been assigned).

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14264 GMW15628

2.3 Additional References.

- Subsystem Technical Specification
- Vehicle Technical Specification

3 Resources

3.1 Facilities. Equivalent roads with similar friction characteristics may be acceptable.

- High Speed or Measurement Track at proving ground Dudenhofen.
- Milford Proving Ground (MPG) – North-South Straightaway.
- Desert Proving Ground (DPG) – East Straightaway.
- Brazil, Cruz Alta Proving Ground.
- Korea, Chenog-na PG GM Korea Proving Grounds.

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.

- Ambient, transmission and axle oil sump thermocouples and temperature display.

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- Calibrated tachometer or equivalent.

Note: All instrumentation shall be calibrated as required.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Vehicle. Vehicle shall be equipped for driveline being tested with highest rotating inertia.

3.3.2 Vehicle Ballast. Production intent vehicle curb weight plus 200 kg ($\approx$ 440 lb.) inclusive driver on front seats.

3.3.3 Clutch. Known clamp load within the design intent upper-tolerance zone.

3.3.4 Clutch Hydraulics. Production intent clutch hydraulics with intended restricted orifice and damper, if applicable.

3.3.5 Clutch Pedal. Production intent clutch pedal and return spring if so equipped.

3.3.6 Clutch pedal pad removed.

3.3.7 Tires that give the highest prop-shaft reaction torque (which is typically the largest diameter released tire size, but other factors such as tread design, tread width, etc. may influence that).

3.3.8 New test components, assembled according to specification.

3.3.9 If there is no request mentioned in Subsystem Technical Standard (SSTS) or Vehicle Technical System (VTS) perform the test with two samples.

3.4 Test Time.

Calendar time: 3 d

Test time: 10 h

Coordination time: 16 h

3.5 Test Required Information. Possible sources are:

- Statement of Requirements (SOR).
- Vehicle Technical Specifications (VTS).
- Subsystem Technical Specifications (SSTS).
- Analysis Development Validation Plan (ADVP).
- Validation Cross Reference Index (VCRI).
- Application engineer.
- Development Groups.
- Drawings.

3.6 Personnel/Skills. Ability to evaluate driveline noise in vehicles according to GMW14264.

Ability to conduct end of test inspection of test parts if required.

4 Procedure

4.1 Preparation.

4.1.1 Install new transmission.

4.1.2 Prior to the test the engineer shall:

4.1.2.1 Record tire pressure and tire specifications

4.1.2.2 Check all fluid levels. Fill as required.

4.1.2.3 Set tire pressure to recommended specifications.

4.1.3 Pre-test Rating according to GMW14264.

4.1.3.1 Rate drivetrain for "pre-test" noise using GMW14264 and record on Data Sheet A1 (Appendix A).

4.1.3.2 Rate leaks using GMW14264 and record on Data Sheet B1 (Appendix B).

4.1.4 Install instrumentation to measure ambient temperature and transmission/axle lubricant temperatures and perform an operational check.

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4.1.5 Put vehicle on hoist and conduct inspection on the following:

- Engine Mounts.
- Suspension.
- Frame and Body Supports.
- Axle Housing.
- Other reaction supporting members.

4.1.6 Ballast test-vehicle with 200 kg (inclusive driver). Ballast shall be loaded on front seats, arranged left and right equally.

4.1.7 Deactivate air-conditioning compressor.

4.1.8 Deactivate traction control during the entire test if "driver selected option" equipped.

4.1.9 Equipment Break-In. A break-in is recommended for new engines and transmissions. It is mandatory if new axles incorporated.

4.1.9.1 Complete as follows:

- Cycle 1: Accelerate lightly, while up-shifting lightly to 100 km/h ($\approx$ 60 mph), then:
- Cycle 2: Vary speed (80 km/h to 100 km/h $\approx$ 50 mph to 60 mph) for a distance of 5 km ($\approx$ 3 miles) in top gear, then:
- Cycle3: Decelerate lightly, while lightly downshifting to a stop, then:
- Repeat Cycle 1 through Cycle 3 until a distance of (100 km to 200 km) is attained. A minimum of 200 km is mandatory if rear axle is included in the validation (in such case measure during break-in temperature of bell, transmission, axle).

4.2 Conditions.

4.2.1 Environmental Conditions.

4.2.1.1 Road surface shall be dry. Test will be conducted on leveled circular or straight track.

4.2.1.2 Ambient temperature shall be (-5 °C to 30 °C) High ambient temperatures are not desired since engine power is lowered and may affect test results.

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 Test Required Information. See 3.5.

4.3 Instructions.

Note: Terminate test if temperature of transmission oil exceeds permissible long or short term value according to oil type and specifications.

4.3.1 Stop the test vehicle and leave the proving track.

4.3.2 Total Test Cycles. Test procedure completion includes ten (10) test cycles.

4.3.3 Forward Launch.

4.3.3.1 Increase engine speed until 5000 rpm (Diesel engine: 4200 rpm) with engaged 1st gear at still standing vehicle (in case of any engine speed limitations rev up to engine speed limit. Note deviations in Data Sheet B1, Appendix B.)

4.3.3.2 Engage clutch with Snap engagement techniques (see 7.1.1.4), go to wide-open-throttle at the same time.

4.3.3.3 Accelerate with Wide Open Throttle (WOT) up close to maximum engine speed and change into the next gear.

Note: Selected launch style may be different for different architecture vehicles (e. g., Rear Wheel Drive (RWD), Front Wheel Driver (FWD), All Wheel Drive (AWD) with varying size and output engine).

4.3.4 Up-Shift. Shift to next gear(s) until reach of 130 km/h ($\approx$ 80 mph) or 0.4 km ($\frac{1}{4}$ miles), whichever is longer. Use Quick shift procedure (see 7.1.2.1) and Rapid clutch engagement techniques during all up-shift.

Note: Elevated peak vehicle speed shall be defined at engineers' discretion.

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