



## **Trailer Towing Test for Powertrain/Driveline**

### **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 provide an accelerated reliability and durability evaluation for the effects of trailer towing on the vehicle's powertrain and driveline.

**1.2 Applicability.** Passenger cars and light duty trucks that can be expected to tow a trailer.

**1.3 Remarks.**

**1.3.1** This test is designed to represent the operation of a greater than average severity North American trailer towing customer in an accelerated manner. The test is designed to simulate the overall damage to the vehicle's propulsion system due to trailer towing. This test does not comprehend the non-trailer towing damage to the propulsion system. A more comprehensive system evaluation can be achieved by performing this test in conjunction with appropriate non-trailer towing powertrain system evaluations (e.g., GMW16330).

**1.3.2** Table A1 Base Test for Desert Proving Ground Yuma (DPGY) in Appendix A lists the specified test events. Also detailed are the number of required cycles, time and distance for this test site. Currently, this standard is based out of the Desert Proving Ground Yuma. The development of this test standard for Dudenhofen Proving Ground is under consideration.

**1.3.3** Table A2 Vehicle Type Multipliers in Appendix A summarizes the vehicle type multipliers to achieve the test target. This multiplier accounts for the fact that customers can be expected to tow more frequently with certain vehicles than others. Use the highest multiplier that applies to the vehicle being tested.

**1.3.4** This test does not recreate every effect that trailer towing has on a vehicle. Other tests to consider are:

- GMW14402 On-Center Handling.
- GMW14403 Frequency Response.
- GMW14921 Braking with a Trailer.
- GMW15404 Control Response.
- GMW15934 Trailer Hitch Durability Test for Body Frame Integral (BFI) Vehicles Up to 3500 kg Trailer Weight Rating (TWR).

**1.3.5** Results of this test should be regarded as highly probable to also occur in the hands of some customers inasmuch as the test event contains vehicle treatments based on measured customer vehicle operation.

### **2 References**

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

**2.1 External Standards/Specifications.**

None

**2.2 GM Standards/Specifications.**

GMW14048 (ID)

GMW14264

GMW15444

GMW15445

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

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## 2.3 Additional References.

### 2.3.1 Desert Proving Ground Yuma.

DR.YU.SR

DR.YU.SV

DR.YU.TF

## 3 Resources

### 3.1 Facilities. General Motors Proving Ground:

- GM Desert Proving Ground Yuma, USA, is utilized as an operations base. This test is performed on public roads in the vicinity of Phoenix, Arizona.

**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.** Some method of accurate speed indication should be provided to the driver for accurate execution of the driving schedules. Some type of acceleration/deceleration rate indicator should also be provided to the driver.

**3.3 Test Vehicle/Test Piece.** Vehicles operated on this test for the purposes of design evaluation, design validation, etc., should be acquired in a manner appropriate to that particular test intent.

**3.3.1 Test Trailer.** It is recommended that an enclosed utility trailer be used for "light" trailer hauling 907 kg or less (2000 lb or less). A stock trailer should be used for "heavy" trailer hauling (over 907 kg (2000 lb)).

**Note:** All trailers 1361 kg (3000 lb) or more used in this test must be equipped with trailer brakes. When operated on a highway, a trailer or semi-trailer with a gross weight of 1361 kg (3000 lb) or more shall be equipped with brakes that are adequate to control the movement of and to stop and to hold the vehicle. These brakes are designed to either be applied by the driver of the towing motor vehicle from its cab or be of a type that operates automatically when the service brakes of the towing motor vehicle are applied. The brakes shall be designed and connected so that in case of an accidental breakaway of the towed vehicle, the brakes shall be automatically applied.

**3.4 Test Time.** See Appendix A.

**3.5 Test Required Information.** Not applicable.

**3.6 Personnel/Skills.** The procedures that comprise this test are intended to be performed by personnel specifically trained in the proper execution of the driving events.

## 4 Procedure

### 4.1 Preparation.

**4.1.1** Measurement of adjustments and settings may be made as deemed necessary to document the condition of the vehicle. These measurements must be made without significantly affecting the adjustment or setting being considered. The intent of these measurements is to document the condition of the vehicle without changing the state of original assembly.

**4.1.2** Vehicles being operated on this test for any other purposes (e.g., design evaluation, data acquisition) should be prepared in a manner appropriate to that particular test intent.

### 4.2 Conditions.

**4.2.1 Environmental Conditions.** The durability events can be performed in all types of weather typically experienced. However, in situations where severe weather causes certain driving maneuvers to be unsafe, events using those maneuvers should be postponed until road conditions improve.

**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 Test Scheduling Guidelines.

**4.3.1.1 Vehicle Break-in.** The vehicle should not receive any "break-in" miles unless such are specifically required or recommended in the owner's manual in such terms that more than 90% of the vehicle purchasers or

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