



Durability Event: Square Turns

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 subject a vehicle to paved road maneuvers near the limit of lateral tractive capability representative of greater than average customer service. Although this procedure is written for 25 km/h, some regions may specify a different speed due to the adherence properties of a region's road surface.

1.2 Applicability. The test instructions covered in this standard are intended for use in passenger car and truck testing and should be adapted at all major GM test sites:

- Desert Proving Ground - Yuma - USA
- Guangde Proving Ground - China
- Lang Lang Proving Ground - Australia
- Milford Proving Ground - USA

This global test procedure is intended to document the test facility requirements and driving instructions necessary to properly execute this durability module. Regional test procedures exist in order to implement this global procedure at the various GM proving grounds. Each regional test procedure includes the driving instructions for the specific access roads to and from the test facility, references to local signs and landmarks, and any other region-specific information necessary to implement this GMW durability module.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15444 GMW15445

2.3 Additional References.

2.3.1 Guangde. DR.GD.Q5

2.3.2 Lang Lang. DR.LL.71G0

2.3.3 Milford. DR.MF.Q5

2.3.4 Yuma. DR.YU.Q5

3 Resources

3.1 Facilities. The specific location/facility used at each proving ground varies. Refer to the appropriate proving ground driving instruction document.

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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3.2 Equipment. Refer to the appropriate proving ground driving instruction document.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time. The time required to execute this module varies by proving ground. Refer to the appropriate proving ground driving instruction document in 2.3.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Refer to the appropriate proving ground driving instruction document.

4 Procedure

4.1 Preparation. Refer to the appropriate proving ground driving instruction document.

4.2 Conditions.

4.2.1 Environmental Conditions. If severe weather results in driving conditions which are not safe, testing should be postponed until 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. This module includes eight (8) FULL LEFT turns followed by eight (8) FULL RIGHT turns, all sixteen turns at 25 km/h (15 mph). However, the order is not important. It is acceptable to perform the right turns first followed by the left turns.

Note: This procedure is NOT intended to generate high steering wheel forces. The driver must avoid steering hard into the steering stops (end of steering travel).

4.3.1 Location. Test Pad with four queue cones set at a minimum distance of 20 m apart.

4.3.1.1 Left Turns. ACCELERATE (LIGHT) to 25 km/h while approaching the right side of the Square Turn cones. Rapidly turn the steering wheel FULL LEFT once the vehicle passes the first queue cone maintaining 25 km/h (15 mph) through the turn. Then straighten the steering wheel to set up for the next queue cone.

Repeat the preceding steps seven (7) more times for a total of eight (8) left turns.

4.3.1.2 Right Turns. At the eighth left turn, steer the vehicle completely around the queue cone and run diagonally across the queue cones (through the center) to set up for right hand turns maintaining 25 km/h (15 mph). Rapidly turn the steering wheel FULL RIGHT once the vehicle passes the first queue cone maintaining 25 km/h (15 mph) through the turn. Then straighten the steering wheel to set up for the next queue cone.

Repeat the preceding steps seven (7) more times for a total of eight (8) right turns.

STOP (LIGHT) once passed the eighth right turn

4.3.1.3 Diagram. Appendix A, Figure A1 Diagram of Square Turns shows the progression of turns for this module.

5 Data

5.1 Calculations. Refer to the appropriate durability test standard.

5.2 Interpretation of Results. Refer to the appropriate durability test standard.

5.3 Test Documentation. Refer to the appropriate durability test standard.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

In general, a risk assessment needs to be performed for every driving instruction prior to executing this standard. (**Note:** National law needs to be considered while performing a risk assessment.) The required rating of risk by exposure probability and possible violation will be done in a separate document. Every identified risk must be named inside the risk assessment for the relevant driving instruction in order to announce that risk to employees. Within the risk assessment, the vehicle equipment and different vehicle build stages have to be considered. After performing a risk assessment, non-acceptable risk needs to be mitigated by appropriate countermeasures. Here

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