



Electronic Brake Control Module (EBCM) Based Driveline Protection Performance

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. The purpose of this standard is to determine the performance of a vehicle equipped with Electronic Brake Control Module (EBCM) based driveline protection. This standard may be used for development or validation of requirements within the GM Vehicle Technical Specification (VTS) and for regional regulations.

Four (4) different areas of driveline protection are considered; side to side axle differential protection, front to rear halfshaft/center differential protection, all wheel drive (AWD) thermal protection and power hop protection.

1.2 Applicability. This standard is applicable for vehicles equipped with EBCM based driveline protection.

1.3 Remarks. Not applicable.

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.

- CG4273, EBCM Based Driveline Protection for GMW17528
- Electrical Subsystem Technical Specification (SSTS), Electronic Brake Command Module (EBCM)
- Vehicle Technical Specification (VTS)

3 Resources

3.1 Facilities. Test is to be conducted on a variety of specialty surfaces (such as the Ceramic Tiles, Basalt Tiles, Fenn Holden Single Bump, Belgian Blocks and the 7.2% Durability Hill at the Milford Proving Ground (MPG)).

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. Required signals and data collection channels are recorded in CG4273.

3.3 Test Vehicle/Test Piece. See Section 4.

3.4 Test Time.

Calendar time:	4 days to run entire procedure (note that not all sections would apply to all vehicles)
Test time:	14 hours
Coordination time:	1 day

3.5 Test Required Information. Possible sources are:

Electronic Brake Command Module (EBCM) Subsystem Technical Specification (SSTS).

3.6 Personnel/Skills. Chassis controls engineer certified to run braking tests.

4 Procedure

4.1 Preparation.

4.1.1 Build or verify the test vehicle with the EBCM based Driveline Protection System. Record vehicle and brake system information in the test record (see CG4273, Appendix A). The vehicle to be tested must be in safe operating condition. Condition of tire, brake and suspension components should be inspected carefully. All vehicle safety equipment must be in proper operating condition.

4.1.2 Inflate tires to manufacturer's recommended pressure or per test engineer's instructions.

4.2 Conditions.

4.2.1 Environmental Conditions. Dry asphalt test surfaces are required unless otherwise specified.

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. Follow the instructions and record vehicle reactions according to CG4273.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Results of vehicle reactions from testing and any comments are recorded in CG4273.

5.3 Test Documentation. The vehicle information, test information and test results shall be published following GM corporate protocol using the Evaluation Report template and the approved engineering document management system/repository.

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 technical measures are preferred because these are independent from attendant circumstances. In case technical measures are not appropriate, organizational and/or personal measures will apply. This includes training, wearing of Personal Protection Equipment, or arrangement of idle time.

6.1 Safety Precautions.

6.1.1 Instrumentation and other test equipment must be securely mounted in accordance with proving grounds traffic safety guidelines for mounting and usage of in-vehicle instrumentation.

6.1.2 All running lights and vehicle safety features must be operational according to proving grounds rules for running lights and power windows. Exterior lights must not be obscured by styling add-ons, covers or camouflage packages. The horn may be disabled because of steer angle transducer installation.

6.1.3 A helmet is required in accordance with the regulations of the test facility. The vehicle should never be operated in a manner where the vehicle leaves the roadway or goes onto the shoulder for any reason.

6.1.4 Check for proper attachment of the steering wheel to the gear via the intermediate shaft. If it feels loose or abnormal, do not run the test until the parts are properly assembled according to the intended design.