



eBoost Mechanical Backup Electronic Parking Brake Motor On Caliper Brake Assist

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 procedure evaluates vehicle braking stability for vehicles which use the Electronic Parking Brake Motor On Caliper to supplement brake performance when a vehicle with eBoost is in mechanical backup.

1.2 Applicability. This procedure is applicable to vehicles with eBoost brake system which use the Electronic Parking Brake (EPB) Motor On Caliper (MoC) to supplement brake performance when in mechanical backup.

1.3 Remarks. Any questions concerning this procedure can be directed to the Vehicle Performance Owner – Stability or the Vehicle Performance Owner – Deceleration.

2 References

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

2.1 External Standards/Specifications.

ASTM E1136-93 ASTM E1337-90

2.2 GM Standards/Specifications.

GMW14920 GMW15053 GMW15209 GMW15417
GMW15052 GMW15102

2.3 Additional References.

CG5482 EPB Motor On Caliper Overlay Performance

3 Resources

3.1 Facilities.

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.

3.1.3 Vehicle Weighing Station. For measuring the vehicle weight; at least, the mass (weight) at each axle and with ballast materials.

3.1.4 Road Test Surface.

3.1.4.1 Pavement Friction. Unless otherwise specified, the road test surface produces a peak friction coefficient (PFC) of 0.9 when measured using ASTM E1136-93 standard reference test tire, in accordance with Method ASTM E1337-90 at a speed of 64.4 km/h (40 mph), without water delivery.

3.1.4.2 Gradient. Except for the parking brake gradient holding test, the test surface has no more than a 1% gradient in the direction of testing and no more than a 2% gradient perpendicular to the direction of testing.

3.1.4.3 Lane Width. Road tests are conducted on a test lane 3.5 m wide.

3.2 Equipment.

3.2.1 Equipment to measure the PFC of the test road surface is required if the high friction road test surface is not known to have a PFC of > 0.9 .

3.2.2 Data acquisition and recording equipment that supports a minimum sample rate of 100 Hz on all channels is required. When using a system that can use multiple scan rates, the sample rate for all temperature channels is 10 Hz and the sample rate for all other channels is 100 Hz.

3.2.3 The following information must be automatically recorded in phase continuously throughout each test run such that values of the variables can be cross referenced in real time. The instrumentation required is detailed for each test segment.

3.2.3.1 Brake Balance.

- a. Service Brake Pedal Force.
- b. Brake Hydraulic Line Pressure at each corner.
- c. Vehicle deceleration.
- d. Vehicle speed, including means to capture speed at time of brake application.
- e. Wheel Speed at each corner.
- f. Wheel Torque at each corner.
- g. Brake pad/lining temperatures.
- h. Ambient air temperature.

3.2.3.2 Brake Stability Testing.

- a. Accelerometer Oriented to Measure Longitudinal Acceleration. The accelerometer must be capable of measuring a minimum of 1.2 g, with an accuracy of 0.01 g.
- b. Accelerometer Oriented to Measure Lateral Acceleration. The accelerometer must be capable of measuring a minimum of 1.2 g, with an accuracy of 0.01 g.
- c. Angular Rate Sensor Oriented to Measure Yaw Velocity. The angular rate transducer must be capable of measuring at ± 50 degrees/s with an accuracy of 0.01 degrees/s.
- d. Steering wheel angle transducer and constraint.
- e. Driver readable deceleration indicator.
- f. Brake Hydraulic Line Pressure at each corner.
- g. Wheel Speed at each corner.
- h. Vehicle speed, including means to capture speed at time of brake application.
- i. Brake application indicator or pedal force transducer.

3.3 Test Vehicle/Test Piece.

3.3.1 Test vehicle selection should consider the combination of wheelbase, type and size of tires, body type and front to rear mass (weight) distribution which is representative of the extreme characteristics of the vehicle family. Pre-test analysis should be completed to select the appropriate vehicle for test.

3.3.2 Burnished tires and brake rotors/linings are required for testing.

3.4 Test Time.

Calendar time: 6 d to 8 d
Test time: 36 h to 48 h
Coordination time: 8 h

3.5 Test Required Information. See CG5482 for applicability of GMW14920, GMW15052, GMW15053, GMW15102, GMW15209, and GMW15417.

3.6 Personnel/Skills. The Chassis Controls Engineer shall conduct testing along with the eBoost supplier calibration engineer. Both engineers shall have participated in the development and calibration of the electronic parking brake motor on caliper brake assist.