



ABS/TCS/ECS Compact Spare Tire Detection Robustness Test

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 determine whether Antilock Brake System/Traction Control System/Electronic Stability Control (ABS/TCS/ESC) electronic control module is properly detecting the installation of a compact spare tire.

1.2 Applicability. Vehicles with ABS or ABS/TCS/ESC.

1.3 Remarks. None.

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.

- Subsystem Technical Specification (SSTS)

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 Laboratory for test vehicle build and instrumentation installation.

3.1.4 Vehicle Dynamics Test Area (VDTA) that must be of sufficient size to accommodate test maneuvers without the vehicle leaving the surface.

3.2 Equipment.

3.2.1 The instrumentation used will depend upon the supplier's involvement. See 4.1.11 for more information.

3.3 Test Vehicle/Test Piece. The vehicle to be tested must be in safe operating condition.

3.4 Test Time.

Calendar time: 2 days
Test time: 8 hours
Coordination time: 6 hours

3.5 Test Required Information. See Section 4.

3.6 Personnel/Skills. Experienced Chassis Controls engineer.

4 Procedure

4.1 Preparation.

4.1.1 Identify revolutions per kilometer (rpk) range for each tire offered on the program including the compact spare tire. See Appendix A, Table A1 for an example.

4.1.2 Calculate the percent difference between the compact spare tire rpk maximum and the rpk minimum for each non-compact spare tire by dividing the compact spare tire rpk maximum by each non-compact spare tire rpk minimum and then subtracting 1.0 and then multiplying by 100. See Appendix A, Table A1 for an example.

4.1.3 Calculate the percent difference between the compact spare tire rpk minimum and the rpk maximum for each non-compact spare tire by dividing the compact spare tire rpk minimum by each non-compact spare tire rpk maximum. See Appendix A, Table A1 for an example.

4.1.4 Determine the upper range value for the required compact spare tire detection range by adding 1% to the highest percentage calculated in 4.1.2. See Appendix A, Table A1 for an example.

4.1.5 Determine the lower range value for the required compact spare tire detection range by subtracting 1% from the lowest percentage calculated in 4.1.3. See Appendix A, Table A1 for an example.

4.1.6 Verify with ABS/TCS/ESC supplier that the compact spare tire detection will detect the rpk difference between the upper value and lower value range.

4.1.7 Instrumentation Installation. All instrumentation must be securely fastened to the vehicle due to the nature of test maneuver.

4.1.8 Vehicle Preparation. Ballast vehicle to curb weight before installation of instrumentation. After installation, the vehicle must be within suspension alignment specifications (toe) with a full tank of gas. Tires should be broken in but must not have excessive wear.

4.1.9 Operators Precautions. All instrumentation must be securely fastened due to the nature of vehicle dynamics testing. The vehicle operator must use the vehicle restraint system at all times.

4.1.10 Warning Indicators. ESC and ABS warning indicators must be clearly visible and in working condition.

4.1.11 ESC Supplier Participation. It is highly recommended for chassis controls performance engineer to coordinate ESC supplier participation. Due to supplier's involvement, it is highly recommended that the test vehicle be equipped with supplier's instrumentation to assist in issue resolutions if applicable.

4.2 Conditions.

4.2.1 Environmental Conditions. Wind speed should be less than 32 km/h (20 mph), it should not be raining.

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.

Note: The test should be performed in the designated areas of a VDTA or on a dry asphalt straight away where vehicle can be safely accelerated and decelerated without interference from other vehicles.

4.3 Instructions.

4.3.1 Select a test vehicle with a non-compact spare tire used to define upper value range for detection in 4.1.4.

4.3.2 Install compact spare tire on the front axle of test vehicle and set tire pressure to 35 kPa less than placard value (recommended pressure).

4.3.3 Set non-compact spare tire pressures to 35 kPa greater than placard value (recommended pressure).

4.3.4 Conduct Quick TCS Compact Spare Tire Detection Robustness Test. Note that rear wheel drive vehicles may omit TCS evaluation with compact spare on front axle and front wheel drive vehicles may omit TCS evaluation with compact spare tire on rear axle.

4.3.4.1 Cycle Ignition. Ensure that the ABS/TCS/ESC control module simulates condition of compact spare tire being just installed. Note that the ABS/TCS/ESC control module may carryover compact spare tire detection status across ignition cycles. If the control module carries the status across ignition cycles then the status will have to be cleared to simulate compact spare tire being just installed.

4.3.4.2 Accelerate vehicle to 110 km/h (68 mph) by applying 100% accelerator pedal input.

4.3.4.3 Verify no objectionable loss of vehicle acceleration due to a possible traction control activation.

4.3.4.4 Cycle Ignition. Ensure that the ABS/TCS/ESC control module simulates condition of compact spare tire being just installed. Note that the ABS/TCS/ESC control module may carryover compact spare tire detection