



Vehicle Total Body Water

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 evaluate vehicle sealing integrity of the passenger compartment and sealed cargo area for water entry.

1.2 Applicability.

1.2.1 This procedure applies to all vehicles with an enclosed passenger and sealed cargo compartment.

1.2.2 This procedure applies to all other areas of the vehicle designated to be dry under normal operating conditions.

1.3 Remarks.

Note: For reasons of personal safety, vehicles equipped with one (1) or more Supplemental Inflatable Restraint (SIR) systems shall not be used in any de-trimmed vehicle test unless all SIR systems are disabled. Refer to the appropriate service manual for instructions.

1.3.1 This procedure has been sanctioned by the Global Vehicle Sealing Team.

1.3.2 This procedure can be used for development or validation. There are specific instructions written in the text if used for development, see 3.3.

1.3.3 This procedure is not a water management evaluation.

1.3.4 This procedure includes the following static and dynamic water tests.

1.3.4.1 Static Test.

- Low Pressure Hose. Simulates home car wash.
- High Pressure Spray Wand. Simulates commercial high pressure hand car wash.
- Universal Water Test Booth (UWTB). Simulates field usage and automatic car wash stations.
- Commercial Automatic Car Wash. Simulates vehicle being run through an actual car wash cycle.
- Mist Test. Simulates vehicle parked in mist or light rain.

1.3.4.2 Dynamic Test.

- Flooded Road. Simulates driving on a flooded roadway or through a flooded underpass.

1.3.5 The Heating Ventilation and Air Conditioning (HVAC) is tested with fan and mode set to off position, unless noted otherwise in this procedure.

1.3.6 Consult UWTB General Assembly Center (GAC) Drawing No. 90016 for specifications on positioning the test vehicle inside the UWTB.

2 References

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

2.1 External Standards/Specifications.

None

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2.2 GM Standards/Specifications.

GMW15856

2.3 Additional References.

- Dongguan Yuebosi Electronics Technology Co., Ltd.
- General Assembly Center (GAC) Drawing No. 90016
- Service Manual
- Splash Vehicle Technical Specification (VTS)

3 Resources

3.1 Facilities.

Note: Contact appropriate owners of test facilities to gain permission and receive any applicable safety instructions before use.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.1 Valid calibration label shall be affixed to test equipment in a prominent place.

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 Universal Water Test Booth (UWTB).

3.1.3.1 UWTB shall have water capacity for conducting a separate spray mist test for duration of 2 h.

3.1.3.2 A remote on/off switch to control UWTB water flow from inside vehicle is recommended.

3.1.4 Automatic Car Washes. Commercial automatic car wash station Milford Proving Grounds (MPG) touchless car wash type located in Building 7 or equivalent.

3.1.5 Standard water supply outlet with a capacity for delivering and measuring 30 L/minute (8 gal/minute) through a 16 mm ($\frac{5}{8}$ in) minimum inside diameter (ID), 19 mm ($\frac{3}{4}$ in) outside diameter (OD) hose. A calibrated flow measurement device is required to accurately measure water flow rate.

3.1.6 Flooded Underpass Simulation Test. Use a 76.2 m (250 ft) covered water trough, Milford Proving Grounds, Milford, Michigan, or equivalent, with water depths of 15.2 cm (6 in) and 30.4 cm (12 in).

3.1.6.1 Run deepest Water Fording Depth Required by Marketing of Specific Off-Road Vehicles from Splash Vehicle Technical Specification (VTS) 3.2.1.6.2.1 Exterior Ambient Water Management Chart (Confirm capability of Deep Water Development/Validation Test Vehicle with Splash Engineer to avoid Powertrain (PT) or Component Issues). This Water Fording Depth is the only additional Data Point added from Matrix (i.e., 410 mm (16.14 in) at 8 km/h (5 mph) for Full Size Trucks). See also Appendix C, Figure C1.

3.2 Equipment.

3.2.1 Flashlight to observe water leaks. See 7.1 for subjective rating scale and issue reporting.

3.2.2 Fiber optic scope with video capabilities or equivalent means of observing and recording water leaks in inaccessible places (optional).

3.2.3 Numbered peel off stickers or equivalent to identify leak sites. China markers shall only be used on non-visible surfaces due to possible staining damage they may cause.

3.2.4 Hand applied, air dry sealants for sealing major leaks during test. This permits test to be continued without contaminating the test vehicle with large amounts of water.

3.2.5 High pressure spray wand system equipped with a $\frac{1}{4}$ MEG-SSTC2507 fan spray nozzle (available from Dongguan Yuebosi Electronics Technology Co., Ltd.) or equivalent. Operating pressure set to 7580 kPa at 13 L/minute (1100 psi at 3.4 gal/minute).

3.2.6 A quantity of 16 mm ($\frac{5}{8}$ in) minimum ID 19 mm ($\frac{3}{4}$ in) OD hose for delivering 30 L/minute (8 gal/minute) of water.

3.2.7 Camera with photoflash to record leak areas.

3.2.8 Shop towels for cleaning up water leaks inside vehicle.

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- 3.2.9 Stopwatch for recording both cumulative time and time from start of test when water leak is first detected.
- 3.2.10 Wet type vacuum for removing large amounts of water leaked into vehicle.
- 3.2.11 Optional handheld radio for communicating from inside test vehicle.
- 3.2.12 Dental mirror to aid in locating leaks.
- 3.2.13 Thermal imaging system for root causing leak source/pathway (optional).
- 3.2.14 Snorkel for those vehicles susceptible to water ingestion into engine via the air inlet.
- 3.2.15 Inclination device/facility to incline the vehicle to 6 degree side tilt and 11 degree longitudinal inclination.

3.3 Test Vehicle/Test Piece.

- 3.3.1 If a subsystem or component rather than a complete vehicle is being tested, the subsystem or component material and number of samples shall be described in detail on data sheet.
- 3.3.2 Development Vehicle representative of design intent; but may not be representative of final production build process.
- 3.3.3 Validation Vehicle representative of production and design intent.
- 3.3.4 The test vehicle shall be within design trim height specifications. This ensures that the vehicle height will be properly located relative to the UWTB nozzles.

3.4 Test Time.

Calendar time:	5 days
Test time:	24 hours
Coordination time:	16 hours

3.5 Test Required Information.

- 3.5.1 Specifications for adjustment of vehicle doors, rear end closures, windows, etc., are required for vehicle preparation, setup and/or root cause analysis.
 - 3.5.1.1 All specifications are to be supplied by the test requestor. If specifications are not supplied, the vehicle shall be tested "as received" and documented as such on the appropriate data collection sheet and test report.
- 3.5.2 All de-trim instructions will be supplied by the test requestor and noted on the test request.
 - 3.5.2.1 When de-trimming vehicle, note if removal or reinstallation of any components may affect test results.
- 3.5.3 All other test specific instructions shall be provided by the test requestor and noted on the test request.
- 3.5.4 The test conductor will be responsible for adding vehicle and test information on appropriate data sheet.

3.6 Personnel/Skills.

- 3.6.1 Experience and knowledge about facility operation and equipment safety.
- 3.6.2 Experience in observing, recording, and determining source of water entry into vehicle.

4 Procedure

4.1 Preparation.

Note: The following notes apply to all de-trim activities.

- Driver's seat and restraint systems must be reinstalled to design intent specifications prior to dynamic tests due to safety considerations.
- If any bolts in floor pan are removed due to carpet removal, the bolts must be reinstalled with design intent seal prior to test.
- All other trim attachment holes exposed during de-trim must be sealed to design intent condition prior to test.

Example: Remove attachment pins from door trim pads and reinstall in appropriate door inner panel holes (to evaluate leaks through attachment part).

4.1.1 Complete vehicle de-trim requires removal of the following items (see 4.1.1.1 thru 4.1.1.8).

- 4.1.1.1 All seats except driver's seat (if required, reinstall after carpet removal).
- 4.1.1.2 Door header garnish moldings.

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4.1.1.3 All closures trim pads.

4.1.1.4 Carpet and removable insulation pads.

4.1.1.5 Lower front body hinge pillar kick panel trim.

4.1.1.6 Rear stowage compartment trim pieces.

4.1.1.7 Spare tire, cover and jack if in rear stowage compartment.

4.1.1.8 Any other item that might prevent leak detection such as headliners or package shelf trim.

4.1.2 Partial de-trim requires removal of the following items (see 4.1.2.1 thru 4.1.2.3).

4.1.2.1 Kick pad trim.

4.1.2.2 All closure trim pads.

4.1.2.3 Rear stowage compartment panel trim pieces.

4.1.3 Adjust rear end closures, side doors, sunroof/T-top etc., per test requestor instructions.

4.1.4 Cycle doors, rear end closures, and convertible or removable tops at least one (1) time to ensure that the seals are not bonded to sealing surfaces. Always close the passenger side door first to increase test repeatability. Close rear end closure last, if applicable, to expand door seals as worst case.

4.1.5 Set windows as follows:

4.1.5.1 If equipped with power windows, run engine to ensure nominal battery voltage level is maintained. Cycle each window, independently, to full open and then full close to stall condition.

4.1.5.2 If equipped with manual windows, open and then close windows using regulators to nominal specification for torque as provided by test requestor.

Set HVAC mode and fan to "off" position unless otherwise noted. The engine must be run if system is vacuum operated. Shut off engine after setting mode and fan.

4.2 Conditions.

4.2.1 **Environmental Conditions.** Test shall not be run if wind speed exceeds an average of 13 km/h (8 mph) or if peak wind velocities exceed 19 km/h (12 mph) (for dynamic tests only).

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 Static Water Test Instructions.

Note: The following static tests may be performed in any order and may be used to assist in performing root cause analysis.

The Low Pressure Hose, High Pressure Spray Tests and Mist Test are required to replicate actual field conditions. The Mist Test simulates capillary wicking that occurs during long term rain misting.

4.3.1.1 Low Pressure Hose Test.

4.3.1.1.1 Start with a dry, clean test vehicle. One (1) or more observers should be stationed inside the vehicle during test to inspect for and record water leaks.

4.3.1.1.2 Close all doors, rear end closures or hatch. With engine running, cycle all windows down and then to fully closed position.

4.3.1.1.3 Use 16 mm ($\frac{5}{8}$ in) minimum ID 19 mm ($\frac{3}{4}$ in) OD hose adjusted to deliver 30 L/minute (8 gal/minute). The objective is to emulate an "at home" type car wash by concentrating the hose water on seams, openings and other areas such as door handles, lock cylinders, etc. Hold hose approximately 15 cm (6 in) away from surface and move hose end at 15 cm/s (6 in/s). Repeat test sequence twice.

4.3.1.1.4 Record locations of all leaks on the appropriate Data Sheet (Appendix A, Data Sheets A1 thru A3) using the following guidelines:

- Mark locations of leaks with peel off stickers, masking tape or china marker (see 3.2.3).
- Use sealer, (see 3.2.4), to seal major water leaks. Major leaks, if not sealed, can contaminate test by masking other leaks.

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- Document leaks using photos or video/fiber optic equipment, as required, for root caused analysis. See Appendix A, Data Sheets A4 thru A11.
- If carpets are not removed, roll back carpet at top front of floor pan and examine for evidence of pad wetness. Carpet roll back is not required if a moisture meter (Delmhorst Model J-2000 or equivalent) is available.
- For tests conducted without observers stationed in rear compartment, at end of test, wipe excess water off rear compartment closure. Open rear compartment closure to inspect and record severity of leaks. Dripping overhead nozzles may require vehicle to be removed from water test booth prior to inspection.

4.3.1.2 High Pressure Spray Test.

4.3.1.2.1 Start with a dry clean test vehicle. One (1) or more observers should be inside vehicle during test to inspect and record water leaks.

4.3.1.2.2 Close all doors and rear end closures or hatch. With engine running, cycle all windows down and then to fully closed position.

4.3.1.2.3 Wash vehicle seams, openings and other areas such as door handles, lock cylinders, Pressure Relief Valve (PRV) area near rear wheelhouse liner, Rear Fascia Cut Lines, Tail Light interface, etc., using hand-held high-pressure spray equipment adjusted per 3.2.5.

4.3.1.2.4 Spray wand nozzle shall be held normal to vehicle surface with a vertical orientation of the spray pattern or along the length of the Seal Joint being evaluated, placed at a distance of 30 cm $\pm$ 8 cm (12 in $\pm$ 3 in) as defined in Appendix B. Spray at 15 cm/s (6 in/s), on all seams and openings. Spray for 30 s, around complete opening for two (2) passes of each area, including around wheel house, direct spray in same direction as tire throw into rear Fascia/Wheelhouse area to simulate water coming from tire into PRV location. Spray Pickup Truck Rear Sliding Windows, Cab Mounted Lights, Center High Mounted Stop Lamp (CHMSL), etc., from 30 degree to 45 degree angle as a customer standing outside the Pickup Bed. Photos to show Spray Wand technique are in Appendix B, Figures B1 thru B11.

4.3.1.2.5 Record location of all leaks using guidelines per 4.3.1.1.4.

4.3.1.3 Universal Water Test Booth (UWTB).

4.3.1.3.1 Start with a clean dry test vehicle.

4.3.1.3.2 Locate fore/aft position of vehicle inside the UWTB by aligning centerline of front wheel to within 25 mm (1 in) of reference mark on floor drain grid. Locate the vehicle centerline position by aligning centerline of front bumper with lateral reference mark on floor drain grid. For large vans and medium duty trucks, ensure the upper row of side nozzles is turned on. Reference General Assembly Center (GAC) Drawing No. 90016 for vehicle location details.

4.3.1.3.3 Close all doors and rear end closures. With engine running, cycle all windows down and then to fully closed position.

4.3.1.3.4 Set the HVAC controls to the "OFF" condition.

4.3.1.3.5 One (1) or more observers should be stationed inside vehicle during test to inspect and record water leaks.

4.3.1.3.6 Install a plastic cover over the HVAC inlet on vehicles known to have inadequate plenum drainage. This will eliminate the potential for water entering the vehicle interior via the HVAC inlet.

4.3.1.3.7 Turn Water Test Booth on for 8 minutes. Record location of all leaks using guidelines per 4.3.1.1.4.

4.3.1.4 Mist Test.

Note: The Mist Test has been added to account for the capillary/wicking action of water that occurs over an extended time period and may result from body seals remaining wet. A Mist Test allows vehicle water saturation over an extended period of time without using large amounts of water.

4.3.1.4.1 Start with a dry clean test vehicle.

4.3.1.4.2 Locate fore/aft position of vehicle inside the UWTB by aligning centerline of front wheel to within 25 mm (1 in) of reference mark on floor drain grid. Locate the vehicle centerline position by aligning centerline of front bumper with lateral reference mark on floor drain grid. Reference General Assembly Center (GAC) Drawing No. 90016 for details.

4.3.1.4.3 Close all doors and rear end closures. With engine running, cycle all windows down and then to fully closed position.

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4.3.1.4.4 Turn on Mist Test nozzles, verifying 276 kPa (40 psi) operating water pressure. The Mist Test shall be run for a minimum of 2 h.

4.3.1.4.5 Record location of all leaks using guidelines per 4.3.1.1.4.

4.3.2 Dynamic Water Test Instructions.

Note: Reference Sections three (3) and six (6) regarding applicable safety precautions.

The following dynamic tests may be performed in any order.

Calibrate speedometer according to GMW15856 Speedometer/Odometer Calibration.

4.3.2.1 Flooded Road, Dynamic Road Test (Flooded Underpass).

Caution: Severe engine damage can result if water enters engine via air inlet. Examine the air inlet design and install a "snorkel" if it is determined to be susceptible to water ingestion. This is a subjective decision and must be determined on a case by case basis.

4.3.2.1.1 Start with a clean dry test vehicle.

4.3.2.1.2 Lower the driver's window a minimum of 50.8 mm (2 in). All other windows to be cycled and closed.

4.3.2.1.3 Set HVAC system to outside air and controls to the "off" position or any position that will minimize the entry of outside air.

4.3.2.1.4 Drive the test vehicle into the entrance of the Flooded Road Laboratory, stop and let the vehicle soak for 1 minute, then proceed through the 76.2 m (250 ft) trough at the 152 mm (6 in) depth going 8 km/h (5 mph).

4.3.2.1.5 Exit the Flooded Road Laboratory, wait 2 minutes and then repeat pass again.

4.3.2.1.6 Record location of all leaks using guidelines per 4.3.1.1.4.

4.3.2.1.7 Repeat steps 4.3.2.1.4 thru 4.3.2.1.6 using the 304 mm (12 in) depth.

4.3.2.1.7.1 Run deepest Water Fording Depth Required by Marketing of Specific Off-Road Vehicles (see Appendix C, Figure C1) Splash Matrix to confirm Vehicle Sealing Performance.

4.4 Post Test. Root cause source of leaks and record. This may involve repairing leak sources, validating and retesting using same test method that produced leak.

4.5 Additional Testing.

4.5.1 The following are additional tests that may be considered:

4.5.1.1 Side Tilt/Longitudinal Inclination. GM Europe (GME) is only Region with Test Facility to Incline with 40 Overhead Spray Nozzles.

Note: To prove the water tightness of the vehicle under every condition in customer usage, the following tests may be considered using the inclination device/facility:

4.5.1.1.1 The body should be Inclined with 6 degree side tilt. The tightness should be checked with a maximum amount of water of 35 L/minute/m² (9.25 gal/minute) at 138 kPa (20 psi) for approximately 30 minutes exposure time.

4.5.1.1.2 The body should be Inclined with 11 degrees longitudinal inclination uphill. The tightness should be checked with a maximum amount of water of 35 L/minute/m² (9.25 gal/minute) at 138 kPa (20 psi) for approximately 30 minutes exposure time.

4.5.1.1.3 The body should be Inclined with 11 degrees longitudinal inclination downhill. The tightness should be checked with a maximum amount of water of 35 L/minute/m² (9.25 gal/minute) at 138 kPa (20 psi) for approximately 30 minutes exposure time.

4.5.1.1.4 The body should be tested with the combination of 6 degrees side tilt and 11 degrees longitudinal inclination uphill with a maximum amount of water of 35 L/minute/m² (9.25 gal/minute) at 138 kPa (20 psi) for approximately 30 minutes exposure time.

4.5.1.1.5 The body should be tested with the combination of 6 degrees side tilt and 11 degrees longitudinal inclination downhill with a maximum amount of water of 35 L/minute/m² (9.25 gal/minute) at 138 kPa (20 psi) for approximately 30 minutes exposure time.

4.5.1.1.6 Record location of all leaks using guidelines per 4.3.1.1.4.

4.5.1.2 Commercial Car Wash Test. GM North America (GMNA) is the only Region with High Pressure, 9652 kPa (1400 psi) Touchless Car Wash Test Facility.

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4.5.1.2.1 Set the centerline of the "Wheel Blaster" apparatus to the height of the door lower cut line (MPG Touchless car wash).

4.5.1.2.2 Start with a dry, clean test vehicle. One (1) or more observers should be stationed inside vehicle during test to inspect and record water leaks.

4.5.1.2.3 Set the HVAC controls to outside air (OSA) and high blower.

4.5.1.2.4 Close all doors and rear end closures. Cycle all windows, referencing 4.1.5.

4.5.1.2.5 Run test vehicle through the touchless commercial car wash station using the Number 4 program on the MPG touchless car wash. When using an outside commercial car wash, the wash selection should include a soap cycle.

4.5.1.2.6 Record location of all leaks using guidelines per 4.3.1.1.4.

4.5.2 Set windows, doors, rear end closures, etc., to both high and low limits of design specifications and retest.

4.5.3 Retest vehicle with frameless door glass by opening door and rolling window fully up and then slamming door since glass with seal differently to the body under these conditions.

5 Data

5.1 Calculations.

5.1.1 Data is to be recorded on the appropriate Data Sheet in Appendix A (Data Sheets A1 thru A3), which are in an MS Excel spreadsheet format. Contact the GM Lead Engineer for further instructions.

5.1.2 Data documentation sheets are named and described as follows:

- Water Leaks Data Collection Sheet used to record the details of the leak, the conditions of the test and any reference documentation.
- Incident Observations/Actions used to record root cause observations and any corrective actions taken during the test activities.
- Water Leaks Summary used to summarize leak locations and final root cause determination.
- Master Photo List used to describe any attached photo documentation that supports test results.

5.2 Interpretation of Results.

5.2.1 The requesting engineer is responsible for the final interpretation of test results.

5.3 Test Documentation.

5.3.1 Test documentation is to be completed in accordance with appropriate standard work instructions.

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.

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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.

6.1.5 Check to be certain that all wheel lugs are present and have the specified torque. Loose or missing wheel fasteners are to be replaced, installed or tightened before the test may begin.

6.1.6 The driver's seatbelt must be worn at all times during the test. Passengers accompanying the test operator must also be safely belted in the vehicle, preferably in the right rear seat.

Note: Passengers are allowed for observation or training purposes.

6.1.7 If a crossbar is used to hold the steering wheel angle transducer base plate, the passenger side airbag is to be disabled or disconnected.

7 Notes

7.1 Glossary.

Complete Vehicle De-trim: Removal of all interior trim components necessary to expose sealed joints and source/path of water leaks. See 4.1.1 thru 4.1.1.8 for details.

Partial Vehicle De-trim: Removal of selected interior trim components when test vehicles cannot be completely de-trimmed. The data must be identified as a partial de-trim. See 4.1.2 thru 4.1.2.3 for details.

Water Leak Rate: A subjective rating scale used to document the severity of water leaks (where possible) for each opening as follows:

Severity of Water Leak	Rating
No leak	N
Few drops or slow drip rate	D
Steady stream or fast drop rate	S
Flood	F

Water Leaks: Entry of one (1) drop or more of water into the passenger or sealed cargo area of a vehicle. (Flocking Wet Out at Corner, could be determined by Program Team as Bud of Problem, should be reviewed as a Problem Tracking and Reporting System (PRTS) Issue to document concern, see Appendix B, Figure B10).

7.2 Acronyms, Abbreviations, and Symbols.

CHMSL	Center High Mounted Stop Lamp
GAC	General Assembly Center
GME	GM Europe
GMNA	GM North America
HVAC	Heating Ventilation and Air Conditioning
ID	Inside Diameter
MPG	Milford Proving Ground
N&V	Noise and Vibration
OD	Outside Diameter
OSA	Outside Air
PRTS	Problem Tracking and Reporting System
PRV	Pressure Relief Valve
PT	Powertrain
SIR	Supplemental Inflatable Restraint
UWTB	Universal Water Test Booth
VPO	Vehicle Performance Owner

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8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW14528

9 Release and Revisions

This standard was originated in October 2005. It was first approved by the Global Vehicle Sealing Team (GMNA, GME, LAAM, AP) in February 2006. It was first published in March 2006.

Issue	Publication Date	Description (Organization)
1	MAR 2006	Initial publication.
2	DEC 2012	Five year refresh. (Global Noise and Vibration Council)
3	JUN 2015	Updated to show specific Test Procedure Techniques - High Pressure Spray Wand and Test Exposures for Deep Water Fording (where required per VTS). (Global N&V VPO Team - Sealing & Contaminant Intrusion)

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