



Powertrain Pressure Spray Wash Test Procedure

1 Scope

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 test procedure is to determine the robustness of Powertrain components to withstand exposure to pressure spray wash. This robustness may include characterizations such as: fastening, adhesion, lamination, erosion, and appearance.

1.2 Foreword. A pressure spray wash is a high pressure fluid spray, typically consisting of tap water, at a given flow pressure and volumetric flow rate. A pressure spray washer may be utilized by the vehicle operator to clean Powertrain components, as considered in the vehicle installed exposure condition and position.

A vehicle operator pressure spray wash example may be considered as a car wash hand operated coin spray washer. In addition, a vehicle operator pressure spray wash example may be considered as a mobile electric, or gas, motor powered driven pump type sprayer.

1.3 Applicability. This test procedure applies to Powertrain components which may experience in-vehicle field exposure to pressure spray wash. This component exposure shall be considered in proper vehicle installed position and orientation. Typically these components may be considered as those located in upper regions of the Powertrain compartment, which may be more easily and directly accessed by a pressure spray washer.

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.

Powertrain (Commodity Specific) Statement of Requirements, Appendix C Component Technical Specification

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 Facility Description. Test facility may be indoors or outdoors, and within reasonable access to tap water. Cleanliness must be such that contaminants or debris shall not be introduced into the pressure spray wash stream.

3.1.3.1 Indoor Test Space. Typically consisting of a floor fluid drain, to remove residual pressure spray wash fluid away from test sample(s). Temperature range should be ambient, which may be considered as room temperature (e.g., 19 °C to 24 °C).

3.1.3.2 Outdoor Test Space. Typically providing adequate fluid drainage, to remove residual pressure spray wash fluid away from test sample(s). Temperature range should be ambient, considered within the typical vehicle operating range, but above freezing (e.g., from $> 0^{\circ}\text{C}$ to 40°C).

3.2 Equipment. The pressure spray wash equipment shall be adequate to meet the parameters in Table 1.

Table 1: Pressure Spray Wash Equipment Parameters

Class ^{Note 1}	Spray Temperature ($^{\circ}\text{C}$)	Minimum Flow Pressure (bar)	Minimum Flow Rate (L/minute)	Spray Fan Angle ^{Note 2} (degrees)
A	10 to 25 ^{Note 3}	137	7.5	15 ± 5
B	80 ± 5	80		20 ± 5

Note 1: Class to be defined per Statement of Requirement Appendix C/Component Technical Specification.

Note 2: The spray fan angle shall be considered as total inclusive angle (see Appendix A, Figure A1).

Note 3: Temperature may alternatively be considered as available tap water temperature, per GM responsible engineer approval.

3.3 Test Vehicle/Test Piece. Component sample(s) shall be oriented in a fashion to simulate the pressure spray wash as the component may experience during in-vehicle exposure. Component sample(s) shall be mounted and secured so that pressure spray wash does not dislodge sample from test fixture. Multiple component samples may be in fixture, in effort to test multiple samples at once through same cycles.

3.4 Test Time. Test time is 3 minutes/sample, per the defined cycles.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation. Test sample(s) must be representative of intended design, subassembly, finishes, and coatings. Test samples must be clean and free of debris prior to initiation of pressure spray wash test.

4.1.1 Sample Size. The test sample size shall be three (3), unless GM responsible engineer specifies otherwise.

4.2 Conditions.

4.2.1 Environmental Conditions. Ambient temperature condition, within vehicle typical operating range, but above freezing (i.e., from $>0^{\circ}\text{C}$ to 40°C).

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.

4.2.3 Sample Conditioning.

4.2.3.1 The test sample(s) are to be conditioned at same ambient test conditions for a minimum of 4 h.

4.2.3.2 Paints, inks, and other similar coatings must cure a minimum of 72 h, prior to the previously defined test sample conditioning.

4.2.3.3 If acrylic adhesives are utilized within any portion of a sample subassembly, condition at room temperature for a minimum of 24 h, prior to the previously defined test sample conditioning.

4.3 Instructions. With sample(s) securely attached to fixture, pressure spray wash is to be applied by sweeping back and forth slowly (i.e., approximate rate of 0.2 m/s to 0.5 m/s) to all exposed surfaces of given sample. It is understood that the manual sweep is arbitrary, and due care shall be considered to maintain a reasonably representative sweep speed.

See Appendix A, Figure A2 for illustration of spray distance and spray angles.

See Appendix B, Table B1 for example test sample matrix.

4.3.1 Spray Distance. Pressure spray distance (i.e., distance from spray apparatus outlet to sample surface, in the spray direction) shall be $305\text{ mm} \pm 50\text{ mm}$.