



Sunroof Water Runoff

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 if water enters the vehicle's passenger compartment or drips onto customer when the sunroof is opened and closed, or cycled through the vent mode.

The intent of this test is to assure the customer that water is not entering the vehicle when the sunroof is cycled through any of the mode settings.

Note: Due to the many different vehicle configurations, this test may have to be modified, at the engineer's discretion, to assure performance under reasonable customer usage.

1.2 Applicability. All GM vehicles having moveable power or manual sunroof(s)/moonroof(s).

1.3 Remarks. This procedure is used to observe the amount of water that enters the passenger compartment when the sunroof closure panel is opened or closed after rainfall, melted snow, car wash, etc. It is not a procedure for evaluating water leaks into the passenger compartment.

This procedure is most effective when done early in a program since changes are less costly.

This procedure may be used either as a vehicle or subsystem evaluation.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14264

2.3 Additional References. None.

3 Resources

3.1 Facilities. The facility must have the following:

- Standard water supply capable of 30.3 L/minute (8 gal/minute) flow through a 16 mm (5/8 in) minimum inside diameter 19 mm (3/4 in) outside diameter hose.
- Water drainage.
- Level area.

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.

3.2.1 Stop watch to measure time of water application.

3.2.2 Water hose measuring 16 mm (5/8 in) minimum inside diameter and 19 mm (3/4 in) outside diameter.

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3.2.3 Equipment to measure water flow rate through (3.2.2) hose at 30.3 L/minute (8 gal/minute).

3.3 Test Vehicle/Test Piece.

3.3.1 Test vehicle or buck representative of design intent. Test vehicle must have correct trim heights such that the vehicle attitude is correct (since attitude may affect water runoff).

3.3.2 Sunroof must have all design intent components that might affect water entry into the passenger compartment. These include deflectors, moldings, glass, seals, gutters, etc.

Preliminary tests may need to be made to evaluate whether a particular component may be worst case, i.e., deflectors.

All options that may impact water runoff should be evaluated, i.e., manual verses power open.

3.4 Test Time.

Calendar time: 0.5 day

Test time: 2 hours

Coordination time: 2 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Personnel familiar with the test procedure setup.

4 Procedure

4.1 Preparation.

4.1.1 Place vehicle on level area in facility.

4.1.2 Cycle sunroof and return to the fully closed position.

4.2 Conditions.

4.2.1 Environmental Conditions. Ambient temperatures shall be above freezing.

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 Turn on water at hose to a flow rate of 30.3 L/minute (8 gal/minute).

4.3.2 Direct (sweep) hose for 1 minute over entire roof surface and other adjacent surfaces maintaining a hose nozzle distance of 15 cm to 31 cm (6 in to 12 in). Do not concentrate water directly into open interfaces such as gutters or weatherstrip. Include all moldings, trim, etc., on the roof surfaces. The objective is for the roof to have the maximum amount of water it is capable of holding.

4.3.3 Remove and shut off hose. Allow water to run off for 20 s for test repeatability.

4.3.4 Cycle sunroof to full open position as quickly as a particular design allows. Record opening time for future test reference.

For manual sunroofs, open as quickly as is reasonable, but not greater than 10 s.

Observe if any water enters the passenger compartment during the opening process.

4.3.5 Allow the sunroof to remain open for 1 minute and observe if any water enters the passenger compartment. Record observations as "Opening Test". After 1 minute in the open position, move the sunroof to a closed position. Observe if any water enters the passenger compartment during the closing cycle. Record this observation as "Closing Test". The sunroof should be closed in less than 10 s for a manual sunroof or as quickly as design allows for a power sunroof.

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