GM	WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW14153

Laboratory Evaluation of Power Sunroof Sounds

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 describes a laboratory method for evaluating the noise of a power sunroof system when mounted on a fixture.

1.2 Applicability. Passenger vehicles and on-road vehicles equipped with power sunroofs.

1.3 Remarks. The noise of a power sunroof system during opening and closing is evaluated using the Zwicker loudness method.

Each mode of operation (opening and closing) is evaluated independently and then the results from each mode are compared together. For power accessory systems that have multiple modes of operation, an attribute indicating good quality is consistency among the modes. Therefore, it is important that the sound of each mode be nearly the same.

This method does not evaluate all the sound quality issues that may occur during power sunroof operation such as grating sounds, sandy/gravelly sounds, etc., any of which can make a sunroof system, with acceptable loudness, unacceptable for use in the vehicle.

This method does not evaluate the structure-borne sound that can result when the power sunroof system is mounted to a vehicle. It is assumed that a power sunroof system that has poor sound quality in a laboratory situation will also have poor sound quality when mounted on the vehicle. Identification of airborne noise problems using a laboratory test is an efficient use of resources because it does not require a full vehicle.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14155

2.3 Additional References. None.

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 Test Room. Details given in Master Procedure GMW14155.

3.1.4 Test Fixture. The fixture shall consist of framework to support, using vibration isolators, a roof panel with the sunroof assembly in a manner that simulates the way the assembly is mounted in a vehicle (body position).

3.2 Equipment. Details given in Master Procedure GMW14155.

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3.3 Test Vehicle/Test Piece. Roof panel with the power sunroof subsystem.

3.4 Test Time.

Calendar time:	1 to 2 days
Test time:	1 to 2 hours
Coordination time:	1 to 2 hours

3.5 Test Required Information. Unless otherwise specified the voltage setting for the DC power supply shall be 14.0 VDC ± 0.5 VDC.

3.6 Personnel/Skills. Details given in Master Procedure GMW14155.

4 Procedure

4.1 Preparation.

4.1.1 General preparation given in Master Procedure GMW14155.

4.1.2 Mount the sunroof subsystem on the test fixture or prepare it for free-free suspension.

4.1.3 Position the fixture or suspend sunroof system in the center of the test room in body position.

4.1.4 Connect the electrical power to the sunroof subsystem using an appropriate cable and control switch. The power supply and controls must be located outside the test room. Adjust to the voltage specified in the requirement.

4.1.5 Mount two (2) microphones and preamplifiers on microphone stands.

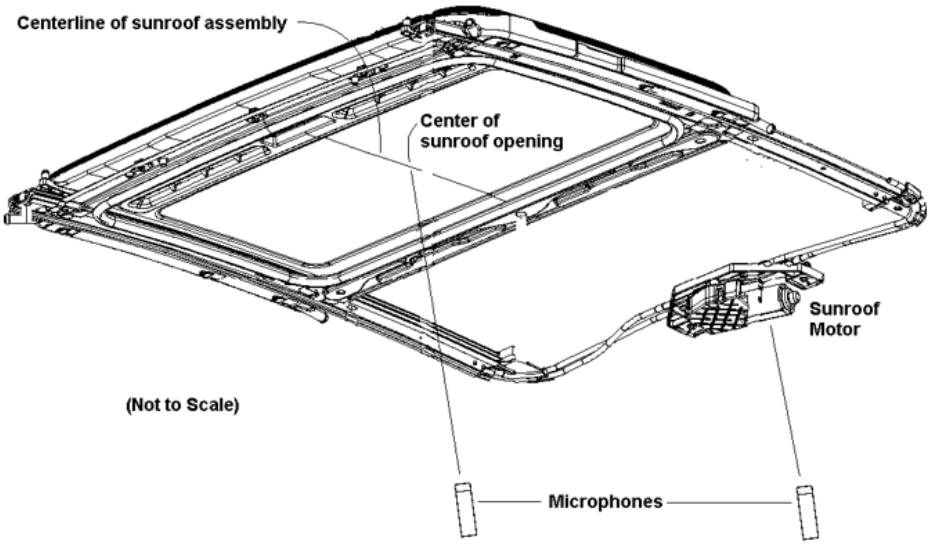
4.1.6 Connect each preamplifier to a microphone power supply via an extension cable.

4.1.7 Connect the power supply (AC output) to the Sound Recording System. The Sound Recording System and controls must be located outside the test room if they make noise that will interfere with the test.

4.1.8 Calibrate the microphones, power supplies and digital recording system as described in Master Procedure GMW14155.

4.1.9 Position the microphones as shown in Figures 1 and 2. One (1) microphone shall be positioned directly under the center of the sunroof opening and pointed at it from a distance of 500 mm. A second microphone shall be positioned directly under the center of the motor of the sunroof and pointed at it from a distance of 500 mm. The microphones shall be pointed in a manner that is perpendicular to sunroof assembly in both the cross-car and fore-aft directions. The tolerance for all microphone position distances is ± 20 mm.

Figure 1: Microphone Positioning



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