



Laboratory Evaluation of Power Mirror 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 mirror system when mounted on a fixture.

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

1.3 Remarks. The noise of a power mirror system during mirror travel is evaluated using the Zwicker loudness method.

Each of the four modes of operation (up, down, in (inboard), out (outboard)) are 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 mirror operation such as grating sounds, sandy/gravelly sounds, etc., any of which can make a mirror, with acceptable loudness, unacceptable for use in the vehicle.

This method does not evaluate the structure-borne sound that can result when the power mirror system is mounted to a vehicle. It is assumed that a power mirror 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

3 Resources

3.1 Facilities.

- **Test Room:** Details given in GMW14155 (Subsystem or Component Sound Master Laboratory Recording and Evaluation Procedure, Customer Actuated Sound).
- **Test Fixture:** Aluminum Sheet Metal Fixture for holding mirror at body position mounted to a bench or stand using vibration isolators. (e.g., 2 mm thick aluminum plate bent to a 75 degree angle - with two welded braces on the sides or a flat 2 mm thick aluminum plate with a bracket for mounting to a microphone stand – See examples in Figures A1 and A2 in Appendix A).

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.

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3.2 Equipment. Details given in GMW14155.

3.3 Test Vehicle/Test Piece.

3.4 Test Time.

Calendar time: 1 d to 2 d

Test time: 1 h to 2 h

Coordination time: 1 h to 2 h

3.5 Test Required Information. Unless otherwise specified the voltage setting for the DC power supply shall be $14.0 \text{ VDC} \pm 0.5 \text{ VDC}$.

3.6 Personnel/Skills. Details given in GMW14155.

4 Procedure

4.1 Preparation.

4.1.1 General preparation given in GMW14155.

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

4.1.3 Clamp the test fixture to a stand or suspend the mirror in body position in the Test Room.

4.1.4 Connect the electrical power to the mirror 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 the microphone and preamp on the microphone stand.

4.1.6 Connect the preamp to the 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 microphone, power supply, and digital recording system as described in GMW14155.

4.1.9 With the mirror face in the mid, up/down and inboard/outboard positions, position the microphone so that it is pointed towards the center of the mirror face at a distance of 500 mm. The mirror is assumed to be either suspended in a free-free condition or mounted to an isolated fixture (see Figure 1).

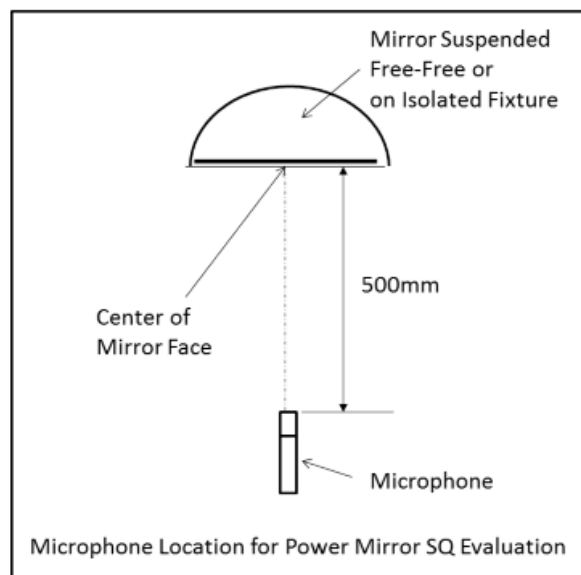


Figure 1: Microphone Location for Power Mirror SQ Evaluation

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