



Weather Strip Squeak-Itch Evaluation Procedure

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 standard describes a test to evaluate and rank the squeak and itch performance of a seal and its contacting surface under dynamic conditions.

1.2 Applicability. This procedure is applicable to any automotive sealing components and their adjacent surfaces. The concepts presented in this procedure could be applied to itch testing of any automotive engineering materials. However, the specifics of testing non-sealing components are not addressed in this document.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ISO 532

2.2 GM Standards/Specifications.

None

2.3 Additional References. None.

3 Resources

3.1 Facilities. An acoustically treated chamber capable of reducing the interior background noise level to an N10 Instationary Zwicker Loudness level of 0.5 sones or less (vibration system operating with the fixture and no test sample). Additionally, the chamber shall permit the conditioning of the air to the specified temperature and humidity limits as described in 4.2.1.

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 Vibration System. A vibration system capable of the random specification as described in 4.2.3. A permanent magnet type electro-dynamic shaker is recommended. The shaker in conjunction with the test fixture must be capable of meeting the noise criteria specified in 3.1.

3.2.2 Measurement System. The measurement system shall consist of:

- A calibrated American National Standards Institute (ANSI) Type 1 microphone.
- A handheld calibrator producing a calibration tone of 94 dB at 1000 Hz.
- A sound data acquisition system (SDAS) capable of yielding real time (Instationary) Zwicker Loudness. The HEAD Acoustics Artemis system is recommended. If other systems are used, the user must be able to demonstrate correlation to Artemis. This is required as there is currently no industry accepted standard for real time loudness.

GM Confidential

© Copyright 2015 General Motors Company All Rights Reserved

July 2015

Page 1 of 6

- The system should additionally provide the capability for recording the sound output of the parts under test to a digital file for audio playback at a later date.

3.2.3 Test Control System. The test control system and shaker must be capable of providing digital random control.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Specimen. Three (3) specimens must be tested. Specimens shall be individual pieces or cut sections of rubber, plastic, or substrate 75 mm in length or mutually acceptable and appropriate to component use. When testing in the transverse direction, the sample length shall be 75 mm. Mating surface should, where possible, approximate the profile and surface in actual use to accommodate the probable displacement or interference force of the specimens.

3.3.2 Fixtures. Fixturing systems should enable close approximation of materials, deflection and fit of the vehicle components. Fixturing must be quiet enough to allow the test system to meet the noise criteria specified in 3.1. It must not introduce extraneous vibration into the test specimen interface.

The fixture must be capable of precisely applying compressive displacements in the normal force direction. It should also have the capability of applying compliant type loading, as opposed to dead weight type loading of the test specimen. Transducers and digital readouts must be capable of displaying the amount of compression in both displacement (mm) and force (N).

The fixture shall also be stiff in all directions, other than the direction of defined motion. The cross axis motion shall be less than 10% of the motion in the desired direction of motion, as measured as close to the sample interface as possible.

The fixture must be capable of testing seals in both the longitudinal and in the transverse direction.

3.4 Test Time.

Calendar time:	1 day
Test time:	2 hours
Coordination time:	24 hours

3.5 Test Required Information. The test requestor must provide the appropriate seal compression information for the parts being tested. Compression height and/or load must be derived from nominal value on the part drawing or in the math data file.

3.6 Personnel/Skills. A skilled technician or an engineer can perform this test procedure. Test personnel shall have a working knowledge of:

- Specific shaker being used and its amplifier or controller.
- Specific Digital Random Controller being used.
- Specific Environmental conditioning device being used and its controller.
- HEAD Acoustics Artemis Analyzer and Recorder or equivalent analyzer/recorder.
- Fixturing for vibration testing.

4 Procedure

4.1 Preparation. All surfaces shall be clean and free of dirt or oils. All test samples and mating surfaces shall be thoroughly cleaned with isopropyl rubbing alcohol and allowed to dry prior to testing. During and after washing, the test surface must not be touched with bare skin.

In most cases, cured anti-itch coatings that are used for automotive weather strips are chemically stable when cleaned with isopropyl alcohol. However, some coatings might be compromised by the application of rubbing alcohol. If the seal to be tested cannot be cleaned with alcohol, then the seals should be cleaned with Ivory Bar Soap (or equivalent), rinsed with distilled water and allowed to dry at ambient temperature for 12 h prior to testing. The test surface must not be touched with bare skin during or after washing.

4.2 Conditions.

4.2.1 Environmental Conditions. Unless otherwise specified, the standard test environment shall be $5^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and $85\% \pm 5\%$ relative humidity. Test specimens and mating surfaces should be exposed to the specified

GM Confidential

© Copyright 2015 General Motors Company All Rights Reserved

July 2015

Page 2 of 6