



Insulation, Engine Compartment

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 Scope. For all insulations of engine compartment.

1.2 Mission/Theme. This standard defines the test conditions and the requirements imposed on the durability of engine compartment insulation.

1.3 Classification. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ISO 362

2.2 GM Standards/Specifications.

GMW3059

GMW14264

GMW14528

GMW3425

GMW14452

GMW14177

GMW14555

3 Test Preparation and Evaluation

3.1 Resources.

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 Facilities. Corresponding to the respective test method.

3.1.4 Equipment. Corresponding to the respective test method.

3.1.5 Test Vehicle/Test Piece. Engine compartment insulation in installed condition and loose for test unit.

3.1.6 Test Time. Not applicable.

3.1.7 Test Required Information. Not applicable.

3.1.8 Personnel/Skills. Not applicable.

3.2 Preparation. Not applicable.

3.3 Conditions.

3.3.1 Environmental Conditions. Corresponding to the respective test method.

3.3.2 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.

3.4 Instructions. Not applicable.

3.5 Data. Not applicable.

3.6 Safety. This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM Department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. The results shall be compiled in a test report with reference to the respective test.

The measuring equipment sheet with documentary evidence of calibration shall be attached to the respective result sheet for the corresponding test results.

4 Requirements and Procedure

4.1 General. The tests and requirements shall be taken from the respective material specification.

4.2 Test on Engine Compartment Insulation. Test according to GMW14452.

4.3 Engine Compartment and Underbody Temperatures. Test according to GMW14555.

4.4 Noise Measurement. Measurement of the noise radiated by accelerated road vehicles (exterior pass-by noise) according to ISO 362 and subjective evaluation according to GMW14264.

4.5 Dynamic Loading in Continuous Test.

4.5.1 Program G0. Test in Program G0 with salt trough according to GMW3425 (e.g., for new development or new supplier).

4.5.2 Validation Test on Electrodynamic or Hydraulic Shaker. This test can be performed instead of the Program G0 described in paragraph 4.5.1. The Validation Test on Electrodynamic or hydraulic shaker is performed only if the Program G0 is not run. It is one or the other. The engine compartment insulation shall be fixed in a metal hood (design position) or in a test frame at the fixing points specified in the release. The bolted joint/fixing shall correspond to the release.

The test frame shall be screwed on to the vibrating table of the shaker so that it is flat and in such a way that a vertical excitation can be initiated which corresponds to the excitation in the vehicle.

The frame shall have sufficient rigidity within the test frequency range to exclude feedback effects on the test parts. The actual value acceleration pick-up shall be attached at the respective point in the engine compartment insulation where the greatest vibration amplitude ranges are to be expected. The vibration amplitude being excited on the vibration table shall be selected in such a way that the vibration amplitude required $s_{\max}$ in the resonance of the engine compartment insulation appears on the actual value acceleration pick-up.

4.5.2.1 The following tests shall be performed on the same test piece in the order stated:

4.5.2.1.1 Test Type Residence in Resonance. Test frequency is the resonance frequency with the greatest sharpness determined previously for the engine compartment insulation in a resonance search. Vibration amplitude $s_{\max}$ as specified by the component drawing. Number of vibration cycles 2×10^7 (If not otherwise stated in the component drawing, $s_{\max} = \pm 4 \text{ mm}$ shall be selected).

4.5.2.1.2 Test Type Frequency Sweep.

- Sweep rate: 1 octave/minute
- Number of vibration cycles 10^5