GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW15026

Powertrain Mounts without Integrated Hydraulic Damping

1 Scope

1.1 Material Description. This specification covers the materials and performance requirements for powertrain mount components without hydraulic damping engine mount (EM) used for powertrain vibration isolation in motor vehicles.

1.2 Symbols. Not applicable.

1.3 Applicability. Powertrain mounts without hydraulic damping used for powertrain vibration isolation in motor vehicles.

1.3.1 Type A. Temperature range -30 °C to +100 °C continuous and +125 °C excursion; tensile strength and permanent set on complete part tested after aging at +100 °C. (See Appendix A, Table A2.)

1.3.2 Type B. Temperature range -30 °C to +100 °C continuous and +125 °C excursion; tensile strength and permanent set on complete part tested after aging at +125 °C. (See Appendix A, Table A2.)

1.3.3 Type C. Drawing defined (e.g., using SAE J200 or ASTM D2000 line call-out). If no type of material is indicated, material of Type A is sufficient.

2 References

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

2.1 External Standards/Specifications.

ASTM D2000	ISO 188	ISO 7619-1	ISO 23529
ISO 37	ISO 815	ISO 11357-2	SAE J200
ISO 48	ISO 1431-1	ISO 13715	

2.2 GM Standards/Specifications.

GMW3059	GMW14683	GMW14735
GMW14473	GMW14684	GMW14738
GMW14682	GMW14734	GMW14739

2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

3.1 Requirements on Test Specimens. Not applicable.

3.2 Test Preparation and Evaluation Resources.

3.2.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.2.2 Test Samples. Unless otherwise specified, the shape, size and number of test pieces shall be in accordance with the relevant test procedure. For Design and Product Validation, test pieces for the material test shall be cut from at least three (3) finished parts, for Routine Quality Control, test pieces for the material test shall be cut from at least one (1) finished part.

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3.2.2.1 Samples are finished parts or to be taken from finished parts. Where the dimensions on the finished parts do not allow preparing of test pieces, tests are to be performed on sheet material of the same production batch. The same state of cure between slabs or buttons and finished parts, must be ensured by appropriate tests, which must be described in the test report.

3.2.2.2 If not otherwise stated, mechanical properties in delivery state and after heat or fluid immersion, are to be tested at +23 °C ± 5 °C and with the same test procedures. Unless otherwise stated, ambient temperature test conditions shall be held to +23 °C ± 5 °C. Unless otherwise stated, all other temperatures except +23 °C ± 5 °C shall be held to ± 3 °C.

3.2.2.3 For sampling and release testing of assembled EM according to this specification, material samples from all components designated for EM, shall be presented in the type and quantity specified by Product Development (PD).

3.2.2.4 After material release, 45 test samples shall be delivered. The test samples shall be sequentially numbered and shall be delivered without the need for solicitation with a manufacturer's test certificate.

3.2.2.5 The manufacturer's test certificate shall contain the test values of the delivered test samples, which shall be possible to verify without damaging the test samples, whereby 3.3.2 is complied with as well as the complete test result of the final samples, which the supplier has tested to the point of destruction.

3.2.2.6 It is expected that the values of all required parameters of the tolerance range of the production spread, will be represented by the submitted test samples. If this requirement is not fulfilled by the test samples, the tolerance ranges of the expected production spread of all required parameters shall be specified in the manufacturer's test certificate in addition to the individual measurement values. A quantity of components of the EM, which is determined by Product Development, shall be delivered. This quantity is determined by the dimensions and version of the components. The components shall correspond to the production state before assembly.

3.2.2.7 Conditioning. Conditioning shall be as specified in the relevant test procedure and to the test sketches on the part drawings.

3.2.3 Equipment. Conforming to the relevant test procedure.

3.2.4. **Facilities.** Conforming to the relevant test procedure.

3.2.5 Alternatives. Alternative test facilities and equipment may also be used. All measuring variables as specified in this specification shall be determined correctly with respect to its physical definition.

3.2.6 Test Required 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 manufacturer, 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.

3.2.7 Test Results. With reference to this standard, the test results shall be presented in a test report.

3.2.8 Deviations from this Standard. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

3.2.9 Dimensions and Tolerances. Dimensions and tolerances shall be specified on the engineering part drawing or in the math data file.

3.3 Material and Performance Requirements.

3.3.1 General. Before testing, the EM shall be stored in an unloaded condition at +23 °C ± 5 °C for 8 h minimum. Unless otherwise specified, the tests shall be performed at +23 °C ± 5 °C. There shall be a time period of 24 h minimum between two (2) tests on the same EM.

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If the elastomer of the EM has a paint coating, this shall be mechanically removed from the elastomer before testing to the greatest possible extent without damaging the elastomer (e.g., the EM can be deformed by a load to such an extent that the paint coating cracks and then can be removed. When this occurs, the EM shall be stored in an unloaded condition for at least 24 h before further testing).

3.3.2 Performance Requirements. Material and performance requirements for elastomeric parts shall be tested to Appendix A, Table A1.

Component tests shall be performed according to 3.3.2.1 and 3.3.2.2 and corresponding to test schedule in Appendix A, Table A1, and Table A2, with test sample selection and test sequence taken into consideration. The prescribed sequence shall be followed during testing in order to ensure that comparable results are produced.

3.3.2.1 Test Sequence and Test Schedule of EM for the Temperature Range -30 °C to +100 °C (Type A). Test sequence according to Appendix A, Table A2.

Note: Vehicle testing is only to be used for the development and/or sampling of EM. The EM shall be in the vehicle for a distance determined by Product Development under normal or specially stipulated driving conditions without problems. If the EM supplier has to perform this type of test, this shall be specially agreed upon.

3.3.2.2 Test Sequence and Test Schedule of EM for the Temperature Range -30 °C to +125 °C (Type B). Test sequence according to Appendix A, Table A2.

3.4 Additional Requirements.

3.4.1 The dimensions of the test samples shall correspond to the drawing data. Form defects that impair function are not permitted. Dimensions of non-dimensioned contours, such as notches, radii, etc., are left to the manufacturer for reaching the test values. The characteristic values and their tolerances stipulated in this standard, the release and the design drawings shall be fulfilled by the test samples.

3.4.2 All materials used shall correspond to the drawing data, the data in the release and this standard.

4 Manufacturing Process

4.1 In their as-delivered condition, the EM shall not show any blisters, material overlaps, cracks or lack of fusion to the pre-vulcanized metal parts. In addition, the parts shall not have any damage from polishing or cleaning operations or other surface defects that could impair the strength of the parts. At parting lines, a residual flash of 0.5 mm maximum thickness and 2 mm maximum height is permitted, unless otherwise specified.

4.2 The edges of metal parts shall be manufactured according to ISO 13715, work piece edges. The required edge state (form, design, etc.) is specified on the EM part drawing.

4.3 The metal and plastic parts shall be tested according to the data on the part drawing.

4.4 The static and dynamic tests of the EM shall be performed according to the data on the part drawings.

4.5 See relevant component drawings for additional requirements.

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. Samples of components or materials released to a GM material specification shall be tested for conformity with the requirements of this material specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

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