



Powertrain Mounts - Dynamic Stiffness and Loss Angle Evaluation Procedure

1 Scope

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. The purpose of this procedure is to define the process of determining the dynamic stiffness and loss angle characteristics of elastomeric powertrain mounts (see GMW14738).

1.2 Foreword. Mount dynamic stiffness and loss angle characteristics are key components in isolating noise and vibration of the road and powertrain from the vehicle interior.

1.3 Applicability. This test procedure is appropriate for use with all powertrain mounts, including elastomeric, decoupled hydraulic mounts, non-decoupled hydraulic mounts, and fixed decoupler hydraulic mounts. As new technologies evolve, additional requirements may be added.

2 References

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

2.1 External Standards/Specifications.

SAE J1085

2.2 GM Standards/Specifications.

GMW14738

2.3 Additional References.

Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities. See GMW14738.

3.2 Equipment. See GMW14738.

3.3 Test Vehicle/Test Piece. Powertrain (engine or transmission) mount. Associated brackets are also desirable.

3.4 Test Time. Test time varies and is influenced by equipment, fixture availability, test conditions, and number of samples. Calendar time is intended to allow for fixture development time.

Calendar time: 2 to 3 days

Test hours: 4 to 8 hours

Coordination hours: 1 to 2 hours

3.5 Test Required Information. The following specific information is required for powertrain mounts to facilitate fixture development, test setup, and data organization:

3.5.1 Engine and Transmission Regular Production Option (RPO).

3.5.2 Part usage.

3.5.3 In vehicle location.

3.5.4 Test direction.

3.5.5 Mean load (preload) (and direction) (N) (-) compression/(+) tension.

3.5.6 Test displacement(s) (peak-to-peak) (mm).

3.5.7 Test frequency (or range) (Hz).

3.5.8 Test frequency (step) (Hz).

3.5.9 Desired report format.

3.5.10 Desired plots.

The required information shall be submitted on the regionally approved test request form. For an example of the GM North America (GMNA) form see Appendix A.

3.6 Personnel/Skills. See GMW14738.

4 Procedure

4.1 Preparation. See GMW14738.

Note: The mass of the fixture located on the stationary platen shall be minimized to reduce errors due to mass-inertia accelerations. The fixture located on the moving platen shall be rigid to eliminate any possibility of structural resonance near operating frequencies. More specific guidance for the development of appropriate test fixtures is included in GMW14738.

4.2 Conditions.

4.2.1 Environmental Conditions. See GMW14738.

4.2.2 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.

4.2.2.1 Powertrain Mounts. Recommended test conditions for powertrain mounts are documented in Appendix B.

4.3 Instructions. See GMW14738.

Note: If static and dynamic rates are to be tested, perform the static testing first.

5 Data

5.1 Calculations. See GMW14738.

5.2 Interpretation of Results. Results should be reviewed to ensure that they are characteristic of the part design. Unexpected variation in rate, damping, or phase angle could indicate errors associated with test fixtures or procedure.

The results from 5.1 should satisfy the SSTS requirement.

5.3 Test Documentation. The result of this test is a plot of dynamic stiffness and loss angle (damping) versus frequency for each test condition (see GMW14738).

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.

7 Notes

7.1 Glossary.

ADAMS: A software tool that provides capability to model Multi-Body Dynamics. Static and Dynamic analysis is performed to study noise and vibration

and vehicle dynamics performance of subsystems and vehicles.

MTDES and ADAMS: Interactive programs designed to optimize an engine mounting system for both engine motion control and noise and vibration problems.

IOD Initiation of Damping: The displacement at which damping exceeds one half of the specified peak damping at the specified peak frequency.

7.2 Acronyms, Abbreviations, and Symbols.

GMNA	GM North America
IOD	Initiation of Damping
N&V	Noise and Vibration
RLDA	Road Load Durability Analysis
RPO	Regular Production Option
SSTS	Subsystem Technical Specification

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15615

9 Release and Revisions

This standard was originated in May 2007. It was first approved by the Global N&V Powertrain Mounting Harmonization Team in June 2007. It was first published in June 2007.

Issue	Publication Date	Description (Organization)
1	JUN 2007	Initial publication.
2	OCT 2012	Five year refresh. (Global N&V Powertrain Induced VPO Team)