



Global Regulatory Coastdown Procedures

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. To summarize the methods used to determine on-road vehicle losses during coastdown for the following countries:

Australia	China	India	Korea	United States
Brazil	Europe	Japan	Mexico	

1.2 Applicability. This applies to passenger vehicles, multipurpose passenger vehicles, and trucks requiring on-road coastdown measurement.

1.3 Remarks.

1.3.1 United States (U.S.) GMW14971 is the document that specifies the method to be used for conducting coastdown in the U.S. Equivalent methods may be used as allowed by the Environmental Protection Agency (EPA).

The road load is characterized by a 3-term quadratic equation of force versus speed with F_0 , F_1 and F_2 terms.

1.3.2 Europe. Regulation EC No. 715/2007 is the document that specifies the method to be used for coastdown, based on Regulation UNECE No.101. For conventional vehicles and hybrids UNECE No.101 references to UNECE No.83, for pure Electric Vehicles (EV) it refers to an Appendix of Annex 7 in UNECE No.101. The road load is characterized by a table of power vs. central speed. Out of this table of power as a function of speed, the road load can be derived and is characterized by a three term polynomial of second order delivering force as a function of speed with F_0 , F_1 and F_2 terms.

1.3.3 Japan. Japanese regulation Technical Standards (Attachment 42) and TRIAS 31-J042 (3)-01 defines the method used to determine coast road load.

The road load is characterized by a 2-term quadratic equation of force vs. speed.

1.3.4 China. Chinese regulation is GB 18352-2013. The method is based on the New European Driving Cycle (NEDC) procedures.

1.3.5 Korea. MOTIE/MOE/MOLIT Joint Fuel Economy Regulation (Collaboration regulation for Fuel economy for Motor Vehicles) specifies gasoline and diesel coastdown procedure for Fuel Economy (similar to SAE J2263). MOE Regulation (Same as EEC 70/220) for Diesel Emission coastdown.

- MOTIE: Ministry of Trade, Industry and Energy.
- MOE: Ministry of Environment.
- MOLIT: Ministry of Land, Infrastructure and Transport.

1.3.6 Mexico. The Mexican government currently has no requirements for how to measure the road load for conducting emission tests. GM Mexico uses internal procedure CA-T-005 with analysis methods from SAE J1263 to obtain road load.

The road load is characterized by coast times from 88.5 km/h to 72.4 km/h (55 mph to 45 mph) and 56.3 km/h to 40.2 km/h (35 mph to 25 mph).

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1.3.7 Australia. Australian regulations ADR 79/01 and ADR 81/01 require measuring the road load (a specific road load measurement method is not specified) to conduct exhaust emissions (ADR 79/01) and fuel economy tests (ADR 81/01). GM Holden has chosen to use SAE J1263/SAE J2263 to obtain this road load.

1.3.8 Brazil. Brazilian regulation NBR 10312 specifies the method for conducting coastdown. The regulation references SAE J1263 but specifies its own method.

1.3.9 India. Indian government specifies different road load determination methods in regulatory document MoRTH/CMVR/TAP/115-116/Issue-4, Part XIV (BS-IV), Chapter 4 Section I and II. A total 5 different methods on road/on chassis dynamometer are outlined. Currently, the test agency follows the method and test procedure as per standard IS14785-2000. Alternatively, with manufacturer's agreement cook-book or table method road load may also be used.

Vehicle road load is characterized by two coefficients "a" [N] and "b" [N/km/h²] delivering road load force (N) as a function of vehicle speed (km/h)

2 References

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

See Appendix A, Table A1 for a short description of the references in 2.1.

2.1 External Standards/Specifications.

70/220/EEC	MOE Regulation
98/77/EC	MoRTH/CMVR/TAP/115-116
ADR 79/01	NBR 10312
ADR 81/01	SAE J1263
EC No. 715/2007	SAE J2263
EPA OMS Circular 55C	Technical Standards (Attachment 42)
GB 18352-2013	TRIAS 31-J042 (3)-01
IS14785-2000	UNECE No. 83
ISO 28580	UNECE No. 101

2.2 GM Standards/Specifications.

GMW14971

2.3 Additional References.

- Anemometer-Based Coast or Drive Software
- CA-T-005 (**Note:** The supplier shall work with the responsible GM engineer to comprehend this requirement.)
- Collaboration Regulation for Fuel Economy for Motor Vehicles

3 Resources

3.1 Facilities.

- **Australia:** GM Holden use the circular track at Holden's Proving Ground near the town of Lang Lang, Australia.
- **Brazil:** GMB uses the Cruz Alta Proving Ground straight track. It has levered pavement and is 2.5 km long.
- **China:** Same as Europe.
- **Europe** See Regulation UNECE No.101. For conventional vehicles and hybrids UNECE No.101 references to UNECE No.83, for pure EVs it refers to an Appendix of Annex 7 in UNECE No.101.

The road must:

- Be level.
- Be sufficiently long.
- Have a constant slope to $\pm 0.1\%$ and must not exceed 1.5% .
- GME currently uses the IDIADA proving ground in Spain.

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- **India:** Road load determination test is conducted by government approved test agency. Currently, the test agency uses straight track at VRDE, Ahmednagar.
 - a. Test track shall be dry, level with a Coefficient of adhesion not less than 0.8.
 - b. Longitudinal slope of the track shall not exceed 0.5% and shall be constant within $\pm 0.1\%$ over measuring strip.
- **Japan:** See Technical Standards (Attachment 42) and TRIAS 31-J042 (3)-01.
 - a. The road shall be dry, straight, level, and paved with no discontinuous windbreak plates or the like.
 - b. The proving ground shall be equipped with devices and facilities which make it possible to measure the atmospheric conditions.
- **Korea:** GMK currently uses the KATRI proving ground.(Government facility.)
- **Mexico:** GM Mexico procedure currently uses public roads for CA-T-005.
- **United States:** See SAE J2263 and GMW14971. GMNA uses the North-South Straightaway at Milford Proving Ground. Any other facility meeting SAE J2263 requirements may be used.

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 U.S. See SAE J2263. A notable piece of equipment is the on-board anemometer to measure wind velocity.

3.2.2 Europe. See Regulation EC No. 715/2007.

3.2.3 Japan. See Technical Standards (Attachment 42) and TRIAS 31-J042 (3)-01.

3.2.4 China. Same as Europe.

3.2.5 Korea. See Collaboration regulation for Fuel economy for Motor Vehicles and MOE Regulation.

3.2.6 Mexico. See CA-T-005.

3.2.7 Australia. See SAE J2263 and/or SAE J1263.

3.2.8 Brazil. See NBR 10312.

3.2.9 India. See IS14785-2000 (section 6 – Instrumentation).

3.3 Test Vehicle/Test Piece.

3.3.1 U.S. See GMW14971.

3.3.2 Europe. See Regulation EC No. 715/2007. Highlights are:

3.3.2.1 Vehicle with the most aerodynamically disadvantageous HVAC configuration shall be tested.

3.3.2.2 The choice of tires shall be based on the rolling resistance, as per Annex III:

- The tires with the highest rolling resistance shall be chosen, measured according to ISO 28580.
- If there are more than three tire rolling resistances, the tire with the second highest rolling resistance shall be chosen.
- The rolling resistance characteristics of the tires fitted to production vehicles shall reflect those of the tires used for type approval.

3.3.2.3 The testing mass shall be reference mass of the vehicle with the highest inertia range.

3.3.2.4 The test vehicle shall have the largest heat exchanger.

3.3.2.5 The vehicle must be in normal running order and adjustment after having been run-in for at least 3000 km (1864 mi).

3.3.3 Japan. See Technical Standards (Attachment 42) and TRIAS 31-J042 (3)-01.

3.3.4 China. Same as Europe.

3.3.5 Korea. See Collaboration regulation for Fuel economy for Motor Vehicles and MOE Regulation.

3.3.6 Mexico. See CA-T-005.

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