

ICS 43.020



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Road load determination of road vehicles
(English Translation)**

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1 Scope

This document describes the method for road test determination of road load and the methods for wind tunnel and chassis dynamometer determination.

This document is applicable to Category-N1 vehicles, as well as Category-M1 and Category-M2 vehicles below 3,500 kg.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 3730.1 Terms and Definitions of Motor Vehicles, Trailers and Combination Vehicle - Part

1.Types

GB/T 3730.2 Road Vehicle - Masses - Vocabulary and Codes

GB 18352.6-2016 Limits and Measurement Methods for Emissions from Light-duty Vehicles (CHINA 6)

3 Terms and Definitions

The terms and definitions defined in GB/T 3730.1, GB/T 3730.2 and GB 18352.6-2016, and the following are applicable to this document.

3.1

road load

The resistance to the movement of a vehicle measured by the coasting method or an equivalent method.

NOTE: it includes the frictional resistance of the transmission system.

3.2

running resistance

The resistance torque opposite to the running direction of a vehicle measured by a torque meter installed on the driving wheels of the vehicle.

NOTE: road load refers to road load or running resistance.

3.3

aerodynamic drag

A force generated by the air that is opposite to the running direction of a vehicle.

3.4

rolling resistance

A force on the tires that is opposite to the running direction of a vehicle.

3.5

reference speed

A vehicle running speed used to determine road load or chassis dynamometer load.

3.6

reference atmospheric conditions

Unified atmospheric conditions, which are specified as follows.

- a) Atmospheric pressure. $p_0 = 100 \text{ kPa}$;
- b) Atmospheric temperature. $T_0 = 20 \text{ }^\circ\text{C}$;
- c) Dry air density. $\rho_0 = 1.189 \text{ kg/m}^3$;
- d) Wind speed. 0 m/s .

3.7

stationary anemometry

On a test road that can represent the wind speed conditions, use an anemometer for the measurement of wind speed and direction.

3.8

onboard anemometry

Use an anemometer mounted on the test vehicle, measure the wind speed and direction.

3.9

wind correction

In stationary anemometry or onboard anemometry, correct the effect of wind speed on road load.

3.10

aerodynamic stagnation point

When the airflow surrounding an object and the relative motion of the object are divided into flows in two or more directions, the airflow diverging point.

3.11

test mass

The sum of the reference mass of the test vehicle, the mass of optional equipment and the mass of representative load.

NOTE 1: the reference mass refers to the curb weight of the test vehicle, plus 100 kg.

NOTE 2: the mass of optional equipment refers to the mass of other selected optional equipment combinations, in addition to the standard vehicle equipment specified by the manufacturer's technical conditions.

If it is impossible to conduct the test in both forward and backward directions on the same test road (for example, only one-way traffic is allowed on an oval test road), wind speed and direction shall be measured on each part of the test road. At this moment, the type of anemometer used shall be determined based on the higher measured wind speed, and whether the wind correction can be exempted shall be determined based on the lower measured wind speed.

5.1.1.2 Atmospheric temperature

During the test, the atmospheric temperature shall be between 5 °C ~ 40 °C.

If the temperature difference between the maximum temperature and minimum temperature measured during the coasting test is greater than 5 °C, each coasting shall be individually

corrected based on the arithmetic mean of the temperatures measured during the test. At this moment, each coasting shall be separately calculated, and the road load coefficient shall be individually corrected. The final road load coefficient shall be calculated based on the arithmetic mean of the above-mentioned individual corrections.

The test may be carried out within the temperature range of 1 °C ~ 5 °C in accordance with the requirements of the vehicle manufacturer.

5.1.2 Test road

The test road surface shall be flat, clean, dry and hard, with a texture and composition representative of current typical urban roads and highway pavements, with no obstructions or wind barriers that may impede road load measurement.

The longitudinal gradient of the test road shall not exceed $\pm 1\%$.

The gradient difference between any 3 m on the test road shall not exceed $\pm 0.5\%$. If the two-way coasting test cannot be carried out on the same road (for example, oval test road that only allows one-way traffic), then, the sum of the longitudinal gradients of the parallel test sections shall be within the range of 0% ~ 0.1%, and the maximum arc of the test road shall be not greater than 1.5%.

5.2.1.1 Vehicle status

The test vehicle shall be properly driven and the tires shall be run-in in accordance with the test demands. The tread depth of the test vehicle shall not be lower than 50% of the initial tread depth.

The test vehicle shall be in normal conditions specified by the manufacturer or be set up in accordance with the purpose of the test. There shall be no atypical friction resistance in the tire pressure, wheel alignment, body height, lubricants in the transmission system and wheel shall not exceed the maximum reference speed.

5.3.1.1 Selection of speed points

At least four speed points shall be selected, v_j ($j = 1, 2, 3, 4$, etc.) to obtain the road load curve based on vehicle speed. The maximum speed point shall not be lower than the maximum reference speed, and the minimum speed point shall not be higher than the minimum reference speed.

The reference speed shall start from 20 km/h and increase in steps of 10 km/h. The maximum reference speed shall be determined based on the following provisions.

a) The maximum reference speed shall be 130 km/h, which can be adjusted to 120 km/h for pure electric vehicles. The determination of road load and the setting of chassis dynamometer shall be performed at the same reference speed point.