



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

GB/T 40625-2021

**Indoor measurement methods for noise emitted by accelerating
motor vehicles**

Issued on: October 11, 2021

Implemented on: May 1, 2022

Issued by: SAMR; SAC

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1 Scope

This Standard specifies vehicle acceleration calculation requirements for engineering method - indoor measurement method for noise emitted by accelerating motor vehicles, measuring instruments, laboratory requirements, chassis dynamometer requirements, measurement procedures, test methods and test reports.

This Standard applies to M and N category vehicles.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 3730.2, Road vehicle. Masses. Vocabulary and codes (GB/T3730.2-1996, idt ISO1176:1990)

GB/T 3785.1, Electroacoustics - Sound level meters - Part 1: Specifications (GB/T3785.1-2010, IEC 61672-1:2002, IDT)

GB/T 3785.3, Electroacoustics - Sound level meters - Part 3: Periodic tests (GB/T 3785.3-2018, IEC 61672-3:2013, IDT)

GB/T 5910, Passenger cars. Mass distribution (GB/T 5910-1998, idt ISO2416:1992)

GB/T 6882-2016, Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and hemi-anechoic rooms (ISO 3745:2012, IDT)

GB/T 15089, Classification of power-driven vehicles and trailers

GB/T 15173-2010, Electroacoustics - Sound calibrators (IEC 60942:2003, IDT)

The vehicle shall be fixed on the drum. Make, in the whole test process, the error of the

distance between the center line CC' of the vehicle and each microphone array $\pm 0.05\text{m}$.

Pre-acceleration shall be used to ensure that the vehicle obtains a more stable acceleration within the acceleration calculation distance.

If the trailer cannot be separated from the tractor, the trailer shall be ignored when passing the virtual line BB'. If the vehicle is equipped with more than two-wheel drive devices, please select the drive mode used on normal roads for testing. If the vehicle is equipped with an auxiliary manual transmission or multiple gear shafts, then the position for normal city driving shall be used. In all cases, avoid the use of gear ratios for slow motion, parking or braking.

9.5.1.2 Speed selection requirements The test speed v_{test} shall be $50\text{km/h} \pm 1\text{km/h}$. When the vehicle reference point is on the virtual line PP', the test speed v_{test} shall be reached. If the test speed is modified according to the requirements of 9.5.1.3.2, the modified test speed shall be used for both acceleration and constant speed testing.

Avoid vehicle skidding during measurement. To avoid excessive skidding, it is advisable to control the engine speed and vehicle speed ratio between the acceleration phase and the constant speed state.

9.5.1.3 Gear selection requirements

9.5.1.3.1 General requirements The measurement gear is determined according to the relationship between the test acceleration $a_{\text{wot test}}$ and the reference acceleration $a_{\text{wot ref}}$ that can be achieved when the acceleration device is fully opened.

For test vehicles equipped with different transmission software programs or common driving modes (such as sports mode, winter mode, and adaptive mode), the automobile manufacturer shall provide instructions and verification.

The acceleration value of the mode used by the test vehicle in the measurement is closest to $a_{\text{wot ref}}$.

9.5.1.3.2 For test vehicles equipped with devices or equipment capable of locking the gear ratio Gear selection shall meet the following conditions:

a) If the gear i test acceleration value $a_{\text{wot test},i}$ does not exceed the test acceleration upper limit $a_{\text{wot max}}$, and the difference with the reference acceleration $a_{\text{wot ref}}$ is within $\pm 5\%$ of $a_{\text{wot ref}}$, then use this gear to measure.

vehicle speed v_{test} when reaching the target engine speed condition is higher than 50km/h , then gradually reduce its target speed condition with 5% maximum net power speed until the gear $i+1$ vehicle speed v_{test} is not higher than 50km/h .

NOTE: Additional devices or equipment can be used to lock the gear ratio.

9.5.2.3.3 For vehicles that cannot lock the gear ratio for measurement The gear selector

shall be placed in the fully automatic control position. During the measurement process, the driver shall ensure that the vehicle can shift to a lower gear with greater acceleration. However, it is not allowed to shift to a higher gear with a lower acceleration (except after the vehicle reference point passes through line BB'). Electronic or mechanical devices are allowed to prevent the vehicle from downshifting to a gear that is not commonly used when driving on the road during the measurement process. If the engine target speed condition can be met, then the gear selection refers to 9.5.2.3.2. If the engine target speed condition cannot be met, then only the target vehicle speed condition is considered when measuring, and v_{test} is within the range of 35km/h $\pm$ 5km/h. If the target vehicle speed condition can be met during the measurement process, then use this speed for measurement. If the target vehicle speed condition cannot be met, then two conditions are measured: One is that the exit speed v_{test} is within the range of 40km/h~45km/h; The other is that v_{test} is in the range of 25km/h~30km/h. If the speed condition of v_{test} in the range of 25km/h~30km/h still cannot be achieved, then only measure in the range of v_{test} of 40km/h~45km/h. Record the maximum sound pressure level of the vehicle passing through the measurement area.

9.5.2.3.4 Powertrain without rotating engine speed For vehicles equipped with a powertrain system without rotating engine speed, only the vehicle speed v_{target} BB' is required to meet the target condition.

The following conditions can be used to meet the target vehicle speed v_{target} BB' in 9.5.2.2:

- a) If the engine speed requirement cannot be met, then only the target vehicle speed v_{target} BB' needs to be met;
- b) If neither the target engine speed nor the target vehicle speed v_{target} BB' requirements can be met, then the following two test conditions shall be carried out:

The target vehicle speed $v_{BB'1}$ of the first test condition shall meet the requirements of formula (15) and the target vehicle speed $v_{BB'2}$ of the second test condition shall meet the requirements of formula (16):