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JAPANESE INDUSTRIAL STANDARD

Road vehicles — Measurement methods of noise emitted by exhaust systems

JIS D 1616—1995

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Road vehicles — Measurement methods
of noise emitted by exhaust systems

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1. Scope This Japanese Industrial Standard specifies the measurement methods of noise emitted by exhaust system of road vehicles (hereafter referred to as "exhaust system").

Remarks: The following standards are cited in this Standard:

JIS B 8002	General rules for test code of reciprocating internal combustion engines
JIS B 8006	Pressure measurements of performance for reciprocating internal combustion engines
JIS B 8007	Temperature measurements of performance for reciprocating internal combustion engines
JIS C 1505	Precision sound level meters
JIS D 1001	Road vehicles — Engine power test code
JIS D 1024	Measurement of noise emitted by accelerating road vehicles
JIS Z 8731	Methods of measurement and description of A-weighted sound pressure level

2. Definitions For the purpose of this Standard, the following definitions apply:

- (1) exhaust system The devices for emitting the combustion gas out of combustion chamber of engine and the generic term of exhaust manifold, exhaust pipe, muffler, etc.
- (2) exhaust gas pressure The pressure at exhaust port or exhaust pipe.
- (3) exhaust noise The noise generated when exhaust gas is exhausted from exhaust outlet.
- (4) exhaust shell noise The noise emitted from the surface of exhaust manifold, exhaust pipe, muffler, etc. by a stimulus of exhaust gas and the like.

3. Test item Items of the measurement shall be as follows. But, actual vehicle measurement shall be done when it is necessary.

- (1) Bench test
 - (a) Exhaust noise measurement
 - (b) Output power, exhaust pressure and exhaust temperature measurement
- (2) Actual vehicle measurement
 - (a) Exhaust noise measurement

4. Measurement method

4.1 Bench test The bench test that the engine is set on the bench and operated, then exhaust noise, output power, exhaust pressure and exhaust temperature are measured shall be as follows:

Remarks: Abnormal sound from exhaust system, exhaust shell nose, tone colour, gas leakage and so on shall be observed.

(1) Measurement condition The measurement condition shall be as follows:

(a) Sound level meter The sound level meter to be used for measurement shall be the precision sound level meter specified in JIS C 1505 or those equivalent thereto in characteristic.

(b) Place of measurement The place where the measurement is carried out shall be anechoic room or place not influenced by reflected sound and other noise than exhaust noise as far as possible. In the case of outdoor place, the wind velocity shall not be more than 5 m/s.

The background noise of measurement place shall be in accordance with 6. of JIS Z 8731.

(c) Test engine and attachments The engine and the attachments used for measurement shall be in accordance with agreement between the parties concerned with delivery.

The engine shall be maintained in the state of normal operation conforming to 3. (2) of JIS D 1001 before the measurement.

(d) Shape of exhaust system Length, shape, curvature and pipe diameter of the exhaust system used for measurement shall be similar as nearly as possible to the practical use on the car.

(e) Position of microphone Position of the microphone shall be 50 cm apart from the exhaust outlet in the direction of 45°, and the sensing surface shall be faced to the exhaust outlet (see Attached Fig. 1). But in case of two outlets placed at an interval of 30 cm or less, the position of the microphone shall be 50 cm apart in the direction of 45° from the middle point between both exhaust outlets as shown in Attached Fig. 2, and the sensing surface is faced to the middle point of two outlets.

For other cases they shall be in accordance with the agreement between parties concerned with delivery.

(f) Operation of engine In the operation of engine, the rotation speed is varied within the range from the lowest speed at which stable revolution of engine is possible to the highest speed by controlling the load of dynamometer.

(2) Measuring method Measurement of exhaust noise, output power, exhaust pressure and exhaust temperature shall conform to the following methods.

Measurement shall be done twice or more.