



SURFACE VEHICLE STANDARD

J1287™**APR2017**Issued 1980-06
Revised 2017-04

Superseding J1287 MAY2008

Measurement of Exhaust Sound Pressure Levels of Stationary Motorcycles

RATIONALE

This document was revised to allow the use of sound level meters and calibrators conforming to earlier specified ANSI standards. Minor changes were also made to the scope to reflect the recent development of SAE J2825 for roadside enforcement of sound pressure levels for on-highway motorcycles.

1. SCOPE

This SAE Standard establishes the test procedure, environment, and instrumentation for determining the exhaust sound pressure levels of motorcycles under stationary conditions. Since initial publication, it has been successfully applied to regulation and monitoring of sound pressure levels of off-highway vehicles, and that remains its recommended application. Users of SAE J1287 for the purpose of roadside enforcement of sound pressure levels for on-highway motorcycles have reported difficulties with its implementation in that application. In response, SAE J2825 was developed, and is recommended for measurement of exhaust sound pressure levels of stationary on-highway motorcycles. Care must be taken not to confuse stationary sound pressure levels with total motorcycle sound pressure levels. This test does not evaluate total motorcycle sound during operation. For this purpose, SAE J331 or SAE J47 is recommended. Any allowable sound limits (dBA) set in relation to SAE J1287 for exhaust sound pressure level should not conflict with the allowable sound limits (dBA) for total sound pressure level per the EPA requirements specified in the US Code of Federal Regulations, 40 Part 205.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J47 Maximum Sound Level Potential for Motorcycles

SAE J184 Qualifying a Sound Data Acquisition System

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Documents
Document Sharing Hub

SAE J213 Motorcycle Classifications

SAE J331 Sound Levels for Motorcycles

SAE J1349 Engine Power Test Code - Spark Ignition and Compression Ignition—Net Power Rating

SAE J2825 Measurement of Exhaust Sound Pressure Levels of Stationary On-Highway Motorcycles

2.1.2 ANSI Publications

Copies of these documents are available online at <http://webstore.ansi.org/>

ANSI/ASA S1.4 PART 1 / IEC 61672:1

American National Standard Electroacoustics - Sound Level Meters - Part 1: Specifications (a nationally adopted international standard)

ANSI/ASA S1.40 American National Standard Specifications and Verification Procedures for Sound Calibrators

2.1.3 Code of Federal Regulations

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

Title 40, Part 205 Transportation Equipment Noise Emission Controls

3. DEFINITIONS

3.1 FIELD CALIBRATION

Calibration of the sound level meter using an external sound level calibrator, an internal calibration means, or any other method which will ensure the required accuracy of sound level meter readings.

3.2 LONGITUDINAL PLANE OF SYMMETRY

As defined in SAE J213.

3.3 RATED ENGINE SPEED

The engine speed in revolutions per minute at which the engine delivers its maximum Net Brake Power as defined in SAE J1349, as determined by the manufacturer.

4. INSTRUMENTATION

The following instrumentation shall be used:

4.1 A sound level meter meeting the Type 1, Type S1A, Type 2, or Type S2A requirements of ANSI/ASA S1.4 -2014 / PART 1 / IEC 61672:1 or ANSI S1.4-1983 (R2006) or ANSI S1.4 1983.

4.1.1 As an alternative to making direct measurements using a sound level meter, a microphone or sound level meter may be used with a recorder or other indicating instrument, provided the system meets the requirements of SAE J184.

4.2 A sound level calibrator with an accuracy of ± 0.5 dB conforming to ANSI/ASA S1.40-2006 (R2011) or ANSI S1.40-1984 (R 1997) (see 7.8) or ANSI S1.40-1984 R1997

- 4.3 A windscreen which does not affect microphone response more than ± 1 dB for frequencies of 63 to 4000 Hz and ± 1.5 dB for frequencies of 4000 to 10000 Hz.
- 4.4 An engine speed tachometer or other means of determining engine speed, with a steady-state accuracy of $\pm 3\%$ at the test speed.
- 4.5 An anemometer with steady-state accuracy of $\pm 10\%$ at 9 m/s (20 mph).

5. TEST SITE

- 5.1 The test site shall be a flat, open surface free of large sound-reflecting surfaces (other than the ground) such as parked vehicles, signboards, buildings, or hillsides located within 5 m (16 feet) of the motorcycle being tested and the location of the microphone.
- 5.2 The surface of the ground within the area described in 5.1 shall be paving or hard-packed earth, level within an average slope of 40 mm/m (0.5 in/ft), and shall be free of loose or powdered snow, plowed soil, grass of a height greater than 150 mm (6 inches), trees, or other extraneous material.

6. PROCEDURE

- 6.1 A rider shall sit astride the motorcycle in normal riding position with both feet on the ground. If this is not possible because of the seat height of the motorcycle, and for three-wheeled motorcycles, the rider shall sit in the normal riding position with one or both feet on the footrests. If necessary, an assistant may hold the motorcycle by the forks, front wheel, or handlebars so that it is stationary with its longitudinal plane of symmetry vertical. In the alternative, the rider may use a box, rock, or other object to rest his feet upon to steady the motorcycle, as long as the motorcycle longitudinal plane of symmetry is vertical and stationary.
 - 6.1.1 The rider shall run the engine with the gearbox in neutral at an rpm equal to one-half of the rated engine speed (± 200 rpm) for 1 to 2 seconds.
 - 6.1.2 If no neutral is provided, the motorcycle shall be operated either with the rear wheel(s) at least 50 mm (2 inches) clear of the ground or with the drive chain or belt removed, or with the clutch, if the motorcycle is so equipped, disengaged.
- 6.2 The engine of the motorcycle under test shall be at normal operating temperature during the test.

7. MEASUREMENTS

- 7.1 The sound level meter shall be set for the A-weighting network and for slow dynamic response (see Appendix A, Section A.1).
- 7.2 Tests shall be made on each side of the motorcycle having an exhaust outlet.
- 7.3 The microphone shall be located behind, $0.5 \text{ m} \pm 0.01 \text{ m}$ (20 inches $\pm 1/2$ inch) from, and within 0.01 m (1/2 inch) of the same height as the exhaust outlet and at a $45^\circ \pm 10^\circ$ angle to the normal line of travel of the motorcycle. If there is more than one exhaust outlet per side, the microphone shall be located with reference to the rearmost outlet. The longitudinal axis of the microphone shall be in a plane parallel to the ground plane. The axis of the microphone shall be oriented as specified by the instrument manufacturer (see Figure 1).
- 7.4 No wire or other rigid means of distance measurement shall be attached to the sound measuring system.
- 7.5 The ambient sound pressure level (including wind effects) at the test site due to sources other than the motorcycle being measured shall be at least 10 dB lower than the sound pressure level produced by the motorcycle under test.