The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J336

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Submitted for recognition as an American National Standard

Sound Level for Truck Cab Interior

***Foreword*—**This Document has not changed other than to put it into the new SAE Technical Standards Board Format. References were changed from Section 5 to Section 2. All other section numbers have changed accordingly.

***1. Scope*—**This SAE Recommended Practice describes the equipment and procedure for determining the truck cab interior sound level over the upper half of the engine speed range. This practice applies to motor trucks and truck-tractors and does not include construction and industrial machinery.

2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J184—Qualifying a Sound Data Acquisition System
SAE J1349—Engine Power Test Code—Spark Ignition and Diesel

2.1.2 ANSI PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI S1.4-1983—Specifications for Sound Level Meters.

2.1.3 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 5128—Acoustics Measurement of Noise Inside Motor Vehicle.

2.1.4 FMVSS—Available from the Superintendent of Documents, U. S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-9320.

Title 49 CFR 393.94—Vehicle Interior Noise Levels.

***3. Instrumentation*—**The following instrumentation shall be used:

3.1 A sound level meter which meets the Type 1 or S1A requirements of American National Standard, Specification for Sound Level Meters, S1.4-1983.

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

3.2 A sound level calibrator accurate within ±0.5 dB. (See 5.2.3.)

3.3 An engine-speed tachometer accurate within ±2% of full scale.

3.4 An anemometer accurate to ±10% at 19 km/h (12 mph).

4. ***Test Procedure—***The following procedure is to be used for the purpose of this SAE Recommended Practice:

4.1 Establish a seat reference point at the intersection of the tangent lines to the predominant surfaces of the undeflected cushion and backrest at the lateral center of the seat (or intended operator location). Adjust the seat to the midpoint of its horizontal and vertical travel.

Locate the microphone, oriented vertically upward, at a point 740 mm (29 in) vertically above the seat reference point and 250 mm (10 in) laterally to the right (to the left for right-hand drive vehicles) of the seat reference point.

Position the driver so that his ear is reasonably aligned with, and approximately 150 mm (6 in) laterally from, the microphone. Seat adjustment may be made to meet this provision.

4.2 Sound level tests may be conducted with or without a trailer or body on the vehicle. The configuration shall be recorded.

4.3 The engine coolant shall be within the manufacturer's recommended operating temperature range during testing.

4.4 Vehicle windows and vents shall be in the fully closed position with all accessories "off."

4.5 The tests shall be conducted on a smooth, dry concrete or asphalt road surface. No large sound-reflecting surfaces should be within 15 m (50 ft) of the test vehicle. Wind speed should not exceed 19 km/h (12 mph). The test personnel should be aware that the direction of the wind relative to the vehicle may have an influence on the measurement.

4.6 Select a transmission and/or axle gear ratio so that approximately 80 km/h (50 mph) is obtained at rated engine speed. "Rated engine speed" is defined as the engine speed at which the engine delivers "Rated Power," as defined in SAE J1349 as specified by the engine manufacturer.

4.7 For each test run, accelerate the vehicle in the selected gear ratio of 4.6 at wide-open throttle from a beginning engine speed of one-half rated engine speed up to rated engine speed. A minimum of four test runs shall be made.

4.8 The applicable reading shall be the highest A-weighted sound level observed during each test run of 4.7. The meter shall be set for "fast exponential-time-averaging" for these measurements. The test run shall be repeated until four sound level readings are obtained with a total range of 2 dB, or less. The reported sound level shall be the average of the four highest readings within a total range of 2 dB, or less. The observer is cautioned to rerun a test run if unrelated peaks should occur because of sounds that are not caused by the vehicle.

4.8.1 If a data-recording system is used, make recordings during each test run. Record a calibration signal of known acoustic level immediately prior to, or following, each sequence of test recordings. For analysis of the test run recordings, use the calibration signal to establish playback gain and thus calibrate the analysis system. Set the level indicating instrument for “fast exponential-time-averaging” or equivalent for analysis of the recorded data.

5. General Comments

5.1 It is strongly recommended that technically qualified personnel select the equipment, and that tests are conducted only by persons trained in the current techniques of sound measurement.

5.2 Proper use of all test instrumentation is essential to obtain valid measurements. Operating manuals or other literature furnished by the instrument manufacturer should be referred to for both recommended operation of the instrument and precautions to be observed. Specific items to be considered are:

5.2.1 The effects of ambient weather conditions on the performance of all instruments (that is, temperature, humidity, and barometric pressure).

5.2.2 Proper signal levels, terminating impedances, and cable lengths on multi-instrument measurement systems.

5.2.3 Proper acoustical calibration procedure, to include the influence of extension cables, etc. Field calibration shall be made immediately before and after each test sequence. Internal calibration means is acceptable for field use, provided the external calibration is accomplished immediately before or after field use.

5.2.4 The microphone shall be supported in such a manner that mechanical vibration will not influence the sound level measurements.

5.3 The sound level of a diesel engine may be dependent on the fuel's cetane level. A diesel fuel with a cetane number between 42–50 is recommended. For gasoline-fueled engines, a fuel grade consistent with the engine manufacturer's recommendation should be used.

5.4 It is recommended that the ambient temperature be reported with the test results because ambient temperature may influence the measured sound level. If the relationship between the measured sound level and the ambient temperature is known, and the test results are to be corrected to a reference ambient temperature, 25 °C (77 °F) is recommended as the reference ambient temperature. If the test result is corrected, it must be reported as a “corrected sound level” at the reference ambient temperature of 25 °C (77 °F).

5.5 For repeated development tests where the relative change in sound level is a desired quantity, the position of the microphone in the truck cab, and the position of the driver relative to the microphone (see 4.1) should remain constant.

5.6 Road surfaces, such as those with concrete joints, which add significant noise, should be avoided.

6. Notes

6.1 **Marginal Indicia—**The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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