SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1008

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Sound Measurement—Self-Propelled Agricultural Equipment—Exterior

1. ***Scope***—This SAE Recommended Practice sets forth the instrumentation and procedures to be used in measuring exterior sound levels of self-propelled agricultural field equipment of 15 kW (20 net engine hp) or greater. It is not intended to cover operation of safety devices (such as alarms), or equipment used primarily in stationary operation. The sound levels obtained by using this test procedure are repeatable and representative of the higher range of sound levels generated by the machine in normal road transport. The sound levels are not intended to represent the average or equivalent sound levels over a field use cycle.

1.1 **Rationale**—This document is superseded by ISO 7216.

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

SAE J184 MAR85—Qualifying a Sound Data Acquisition System

2.1.2 ANSI PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI S1.1-1960 (1971)—Acoustical Terminology
ANSI S1.2-1962 (R 1971)—Physical Measurement of Sound
ANSI S1.4-1983—Specifications for Sound Level Meters
ANSI S1.13-1971—Methods for the Measurement of Sound Pressure Levels

2.1.3 ISO PUBLICATION—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 362 1981—Measurement of Noise Emitted by Vehicles

2.2 **Other Publications**

O.E.C.D. —Standard Code for the Official Testing of Agricultural Tractors
EEC Directive 74/151/EEC Annex VI

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Tel: 877-606-7323 (inside USA and Canada)
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3. *Instrumentation*

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

3.2 As an alternative to making direct measurements with a sound level meter, a microphone or sound level meter may be used with a magnetic tape recorder and/or graphic level recorder or other indicating instruments, providing the measurement system meets the intended accuracy of SAE J184 MAR85, Qualifying a Sound Data Acquisition System, for the frequency range of concern. The inaccuracies in the magnetic tape recorder frequency response, especially at lower frequencies, must not affect the overall reading by more than ±0.5 dB(A). The frequency range over which the alternate measurement system meets the requirements of SAE J184 MAR85 shall be specified in the test report.

3.3 An acoustic calibrator - accuracy within ±0.5 dB (see 5.2.5).

3.4 A microphone windscreen that does not affect the overall reading by more than ±0.5 dB(A) shall be used.

3.5 An anemometer or other device for measurement of ambient wind speed. Recommended accuracy is 10% at the highest wind speed allowed. (See 5.2.4.)

3.6 A thermometer for measurement of ambient temperature - recommended accuracy ±1°C (1.8°F).

3.7 A barometer for measurement of atmospheric pressure - recommended accuracy ±1 kPa (0.3 in Hg).

4. *Procedure*

4.1 Test Site

4.1.1 The test area shall consist of a flat, open space, free of large vertical or near vertical reflecting surfaces such as signboards, buildings, or hillsides, located within 30 m (100 ft) of either the microphone or machine being tested.

4.1.2 The minimum measurement area (see Figure 1) shall consist of the triangle formed by the microphone location, and points A and B; and the rectangle formed by points A, B, C, and D. The measurement area may be surfaced with concrete, asphalt, or similar reflective materials, and shall not be covered with powdery snow, high grass, loose soil, or ashes. The measurement surface should be described in the test report.

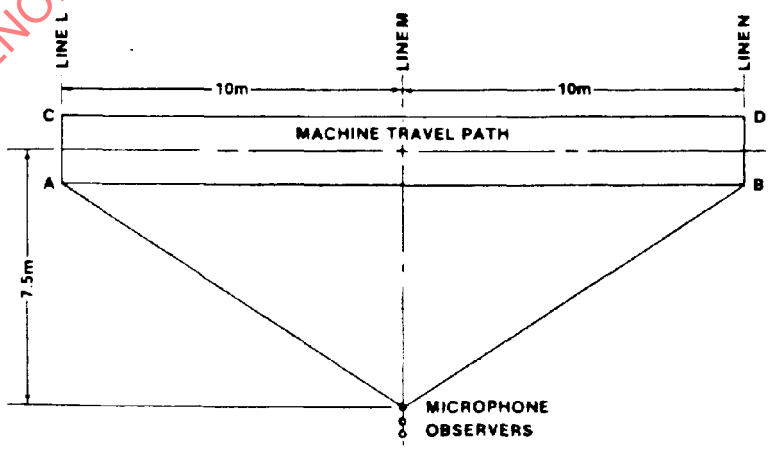

FIGURE 1—

4.1.3 Since bystanders have appreciable influence on propagation of sound waves, not more than one person, other than the observer recording data; and the machine operator shall be within 15 m (49 ft) of the machine or microphone, and that person shall be directly behind the observer recording data, on a line through the microphone and observer (see Figure 1).

4.1.4 The ambient sound level (including wind effects) shall be at least 10 dB(A) lower than the sound level of the machine being tested (see 5.2.4).

4.2 Machine Operating Condition

4.2.1 All tests will be conducted with the machine in normal road transport configuration. Harvesting machinery will be tested with harvesting heads removed, if clearance to the microphone is less than 3 m (10 ft).

4.2.2 The machine shall be allowed to reach at least minimum operating engine and transmission temperatures before testing.

4.2.3 The machine shall approach line L (or Line N) headed toward Line M Figure 1 at a steady speed of three quarters of maximum engine speed used in normal road transport. When the front of the machine reaches Line L (or Line N), the throttle shall be fully opened as rapidly as possible and held there until the rear of the machine passes Line N (or Line L), and then closed as rapidly as possible. The highest transmission gear or variable speed ratio that will permit reaching rated engine speed within the area between Lines L and N shall be used.

4.3 Measurement

4.3.1 The microphone shall be located at a height of 1.2 m (4 ft) above the ground plane.

4.3.2 The sound level meter shall be set for fast response and the A-weighting network. When using alternative measurement systems (see 3.2), the final resulting data shall be A-weighted with fast response characteristics.

4.3.3 The ambient wind speed, ambient temperature, atmospheric pressure, and ambient A-weighted sound level shall be measured and recorded at the microphone locations used for testing.

4.3.4 Measurement shall be made at a distance of 7.5 m (25 ft) measured in a direction normal to the centerline of the travel path (see Figure 1). Tests shall be made in both directions of travel without changing microphone location.

4.3.5 The sound level meter needle movement or readout shall be observed during the test at the specified microphone location. The highest value observed shall be recorded for each test. Each test shall be repeated until there are two readings within 2 dB(A) of each other. The reported value shall be the average of these two values that are within 2 dB(A) of each other. If there are two pairs of readings that are within 2 dB(A) of each other, the average of the higher pair shall be reported. The final reported exterior sound level of the machine shall be the average sound level for the side having the highest readings.

5. General Comments

5.1 It is recommended that persons technically trained and experienced in the current techniques of sound level measurements select the instrumentation and conduct the test.

5.2 Proper usage 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 instruments and precautions to be observed.