Exterior Sound Level Measurement Procedure for Self-Propelled Agricultural Field Equipment — SAE J1008

SAE Recommended Practice
Approved May 1978

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PREPRINT

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EXTERIOR SOUND LEVEL MEASUREMENT PROCEDURE FOR SELF-PROPELLED AGRICULTURAL FIELD EQUIPMENT—SAE J1008

SAE Recommended Practice

Report of Construction, Agricultural and Off-Road Machinery Sound Level Technical Committee approved May 1978.
Rationale statement available.

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.

2. Instrumentation

2.1 A sound level meter which meets the Type 1 requirements of American National Standard, Specification for Sound Level Meters, S1.4-1971.

2.2 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, 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 shall be specified in the test report.

2.3 An acoustic calibrator—accuracy within ±0.5 dB (see paragraph 4.2.5).

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

2.5 An anemometer or other device for measurement of ambient wind speed. Recommended accuracy is 10% at the highest wind speed allowed. (See paragraph 4.2.4).

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

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

3. Procedure

3.1 Test Site

3.1.1 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.

3.1.2 The minimum measurement area (see Fig. 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.

3.1.3 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 Fig. 1).

3.1.4 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 paragraph 4.2.4).

3.2 Machine Operating Condition

3.2.1 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).

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

3.2.3 The machine shall approach Line L (or Line N) headed toward Line M (see Fig. 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.

3.3 Measurement

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

3.3.2 The sound level meter shall be set for fast response and the A-weighting network. When using alternative measurement systems, (see paragraph 2.2), the final resulting data shall be A-weighted with fast response characteristics.

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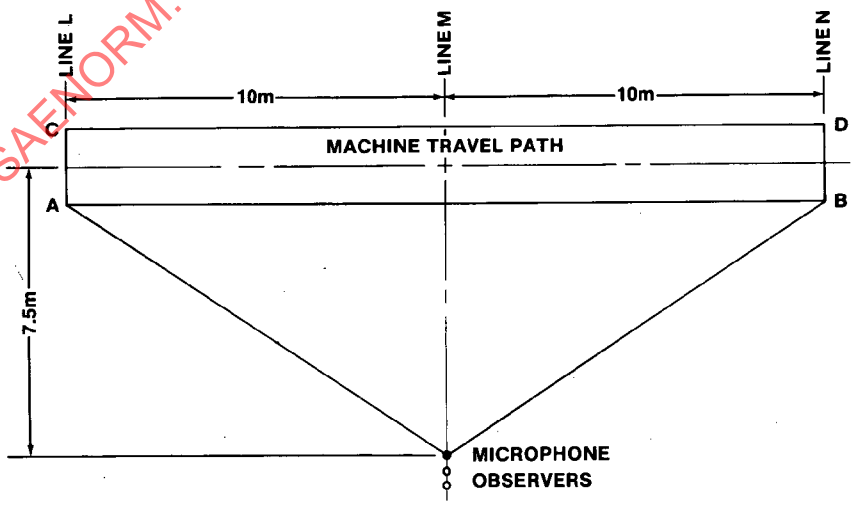

FIG. 1

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.