

SOUND POWER DETERMINATION—EARTHMOVING MACHINERY—STATIC CONDITION

This Document is equivalent to ISO 6393-1985.

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. Scope—The requirements for setting up and operating the machinery, the microphone array and the size of the hemispherical measurement surface are given in this standard. This standard shall be used in conjunction with ISO 4872-1978, which gives the basic criteria for the acoustic environment, instrumentation, microphone positions, procedures for the measurement of the A-weighted sound pressure levels and the calculation of the A-weighted sound power levels.

1.1 Purpose—This SAE Standard sets forth the procedures to be used in determining the exterior A-weighted equivalent continuous sound power level emitted by earthmoving machinery defined in SAE J1057 JUN81.

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.

SAE J1057 JUN81—Identification Terminology of Earthmoving Machines

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

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

ANSI S1.23-1976—(1983) Method for the Designation of Sound Power Emitted by Machinery and Equipment

ISO 1585-1982—Road vehicles—Engine test code—Net power

ISO 4872-1978—Acoustics—Measurement of airborne noise emitted by construction equipment intended for outdoor use—Method for determining compliance with noise limits

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- 2.1.3 IEC PUBLICATIONS—Available from International Electrotechnical Commission, 3, rue de Verambe, P.O. Box 131, 1211 Geneva 20, Switzerland.

IEC Publication 651 (1979) Type 1—Precision Sound Level Meters
IEC Publication 804 (1985)—Integrating/Averaging Sound Level Meters

- 2.2 Related Publications**—The following publications are provided for information purposes only and are not a required part of this document.

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

SAE J184 AUG87—Qualifying a Sound Data Acquisition System
SAE J245—Engine Rating Code—Spark Ignition
SAE J270—Engine Rating Code—Diesel

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

ANSI S1.1-1960 (R1976)—Acoustical Terminology
ANSI S1.13-1971 (R1986)—Methods for the Measurement of Sound Pressure Levels
ISO 6165-1978—Earthmoving machinery—Basic types—Vocabulary
ISO 6393-1985—Acoustics—Measurement of airborne noise emitted by earthmoving machinery—Method for determining compliance with limits for exterior test condition

3. *Instrumentation*

- 3.1** The sound level meter and/or appropriate components of the measuring instrumentation shall meet the Type I requirements of the ANSI S1.4-1983, IEC 651(1979), or IEC 804(1985) specifications for sound level meters.

- 3.2** An acoustical calibrator for use in calibration prior to and after test sequence [accuracy within ± 0.5 dB(A)—(see paragraph 5.2.3)].

- 3.3** A microphone windscreen shall not be used except when it is required to reduce wind induced noise that is within 15 dB(A) of the sound level of the source being measured. When a windscreen is used, it shall not affect the sound level of the source being measured by more than ± 0.5 dB(A) under zero wind speed conditions.

NOTE—In practice, windscreens are seldom required to reduce A-weighted wind induced noise, with the possible exception of microphone locations in the fan blast of the machine.

- 3.4** An anemometer or other device for use in measurement of ambient wind speed and direction (accuracy within $\pm 10\%$ at 20 km/h).

- 3.5** A power source (engine) speed indicator for ensuring that constant manufacturer's specified engine speed is maintained during the test sequence (accuracy within $\pm 2\%$ of the indicated reading).

- 3.6** A thermometer for use in measurement of ambient temperature (accuracy within ± 1 °C).

4. *Procedure*

- 4.1 Test Site**—The test environment shall satisfy the criteria described in ISO 4872-1978, Section 4 and Annex A. Ideally, measurements should be made in a test environment that provides a free field over a reflecting plane. There shall be no sound reflecting obstacles within a distance from the source equal to three times the radius of the measurement hemisphere.

4.2 Hemisphere Size—The radius of the microphone array hemisphere shall be determined by the length of the basic machine structure. This is the length, denoted by l in Figures 1 to 6, which encloses the main body of the machine and excludes major attachments such as dozer blades, buckets, and booms.

The radius of the measurement surface is obtained from Table 1 according to the basic length, l , of the machine.

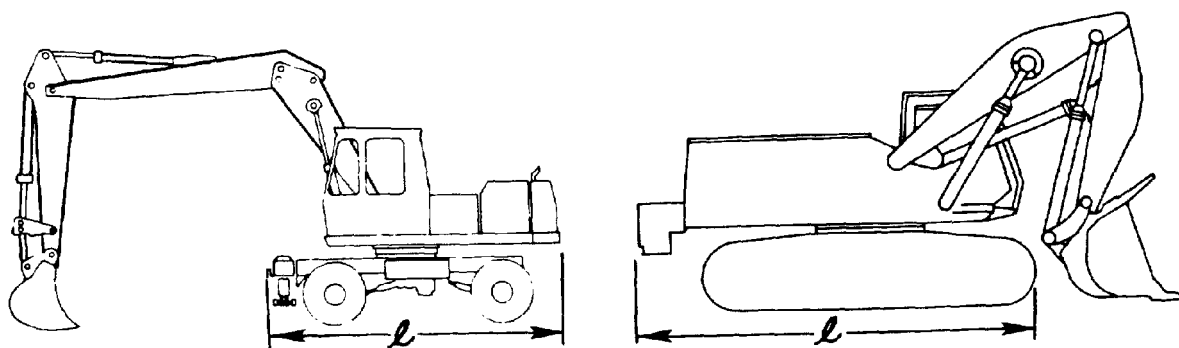


FIGURE 1—

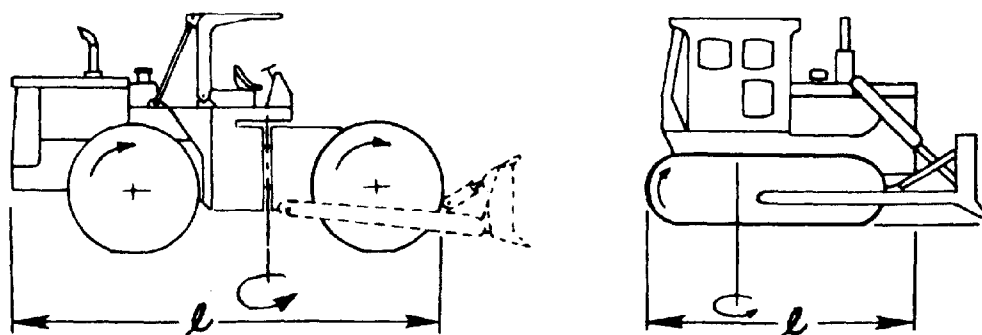


FIGURE 2—

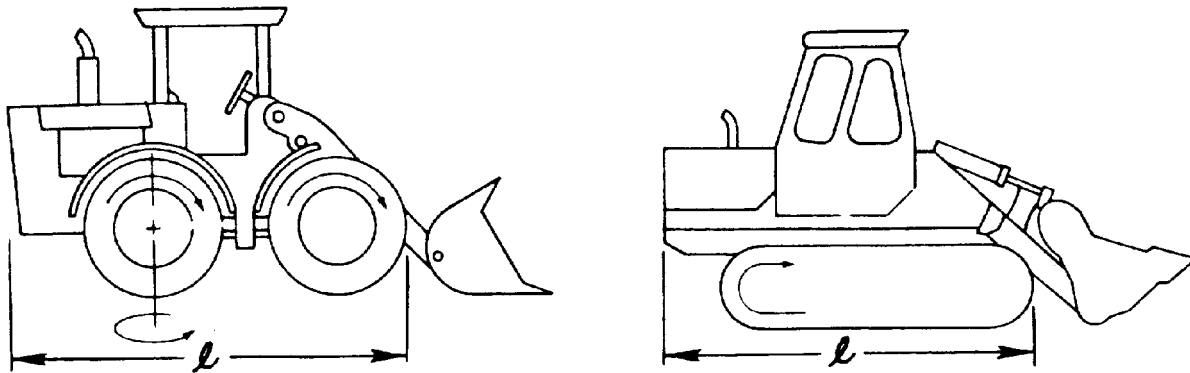


FIGURE 3—

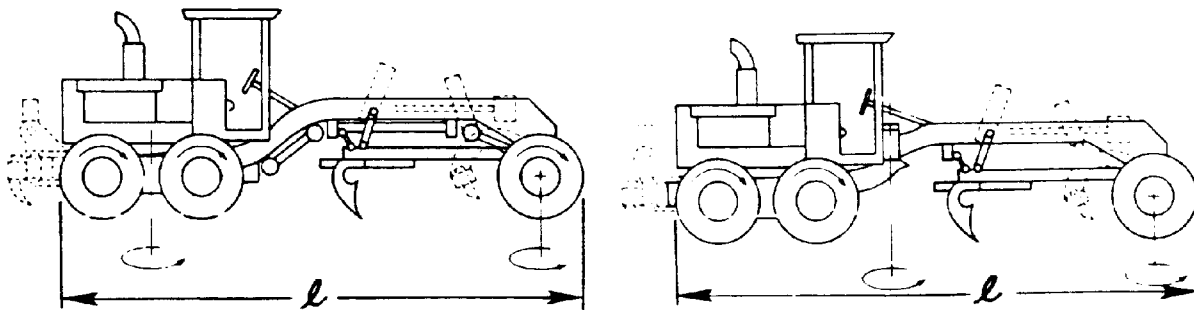


FIGURE 4—

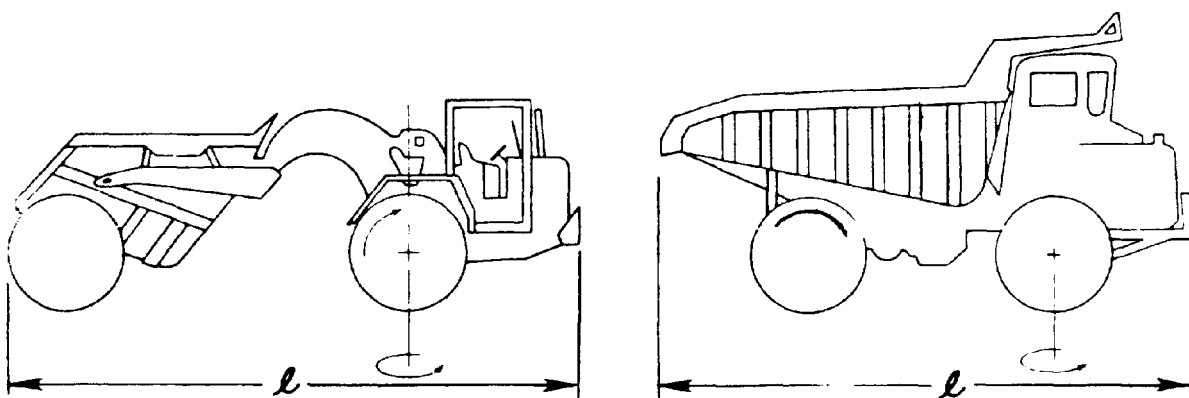


FIGURE 5—