SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J34

REV. JUL2005

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Superseding J34 JUN2001

Exterior Sound Level Measurement Procedure for Pleasure Motorboats

1. Scope

This SAE Recommended Practice establishes the procedure for measuring the maximum exterior sound level of pleasure motorboats while being operated under a wide open throttle condition or a maximum speed of 70 km/h (43.5 mph). It is intended as a guide toward standard practice and is subject to change to keep pace with experience and technical advances.

1.1 Relationship of SAE Standard to ISO Standard

Same Subject-Technically Different.

1.2 Rationale

Changes in this Revision: The response on the A-weighted network was changed from “Fast” to “Slow”. This resolves the primary difference between ISO 14509 and this document and also reduces the erroneous/unrepeatable results obtained because of wave slaps to the hull.

To avoid safety issues a conversion factor was added to convert sound level readings taken at 25 m (82.5 ft) to sound level readings at 15 m (50 ft).

The high speeds achieved by today’s modern boats in many cases do not allow for a safe pass-by test at wide open throttle, consequently the specification for maximum boat speed during the pass-by test has been limited to 70 km/h (43.5 mph) which also agrees with ISO 14509.

A relationship to this document and ISO 14509 was added.

2. References

2.1 Applicable Publications

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

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
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Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

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2.1.1 ASA PUBLICATION

Available from Acoustical Society of America, http://asa.aip.org, or from ANSI, 25 West 43rd Street, New York, NY 10036-8002, http://www.ansi.org.

ANSI S1.4—American National Standard Specification for 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 J1970—Shoreline Sound Level Measurement Procedure for Recreational Motorboats
SAE J 2005—Stationary Sound Level Measurement Procedure for Recreational Motorboats

2.2.2 ASA PUBLICATIONS

Available from Acoustical Society of America, http://asa.aip.org, or from ANSI, 25 West 43rd Street, New York, NY 10036-8002, http://www.ansi.org.

ANSI S1.1—Acoustical Terminology
ANSI S1.13—Measurement of Sound Pressure Levels in Air

2.2.3 ISO PUBLICATION

Available from International Organization for Standardization (ISO), 1 rue de Varembe, Case Postale 56, CH-1211, Geneve 20, Switzerland/Suisse or from ANSI, 25 West 43rd Street, New York, NY 10036-8002, http://www.ansi.org.

ISO 14509—Measurement of Airborne Sound Emitted by Powered Recreational Craft

3. Instrumentation

The following instrumentation shall be used for the measurement required.

3.1 A sound level meter which meets ANSI Standard S1.4 Type 1 Specification for Sound Level Meters.

3.2 A microphone windscreen that does not affect the overall reading by more than ±0.5 dB(A).

3.3 A sound level calibrator. (See 5.3.)

3.4 A wind speed anemometer.

3.5 An engine speed tachometer.

3.6 A calibrated speedometer or radar gun.

4. Procedure

4.1 Measurement Site

A suitable site is the shore of a body of water or a dock projecting out from the shore into the body of water. If the measurement is made from a dock, the dock shall be of open construction so that it presents a minimum of reflecting surfaces. The area around the microphone and boat being measured shall be free of large obstructions or reflective surfaces, such as buildings, high embankments, sea walls, hills, large piers, or breakwaters, etc. for a minimum distance of 30 m (100 ft). Three markers (buoys or posts) shall be placed in line, 50 m (165 ft) apart, to mark the course the boat is to follow while being tested. The site should be set up similar to that shown in Figure 1.

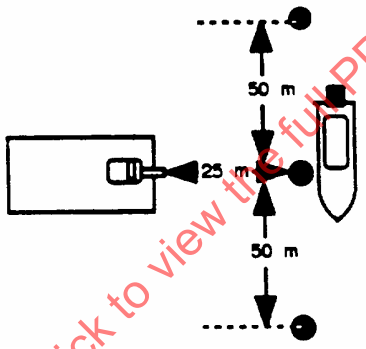

FIGURE 1—MEASUREMENT SITE DIAGRAM

4.2 Boat Operation

4.2.1 The boat shall pass all three markers within a distance of 3 m (10 ft) maximum on a straight course at full throttle with the engine operating at the midpoint of the manufacturer's recommended full throttle rpm range or 70 km/h+0/-3 km (43.5 mph+0/-2mph) if the boats full throttle speed exceeds 70 km/h (43.5 mph).

4.2.2 The engine speed tolerance shall be ±100 rpm if this falls within the recommended full throttle speed range.

If a single top speed rpm is recommended, the tolerance shall be +0, -100 rpm.

4.2.3 For boats with motors or drive systems which are equipped with adjustable trim, the trim angle shall be adjusted so that the propeller thrust is parallel to the plane of the hull.

4.2.4 Boats which are sold with the power units installed (e.g., inboards and stern drives) shall be tested in this combination. Outboard motorboats shall be tested with a motor or motors for which the boat is rated.

4.3 Measurements

4.3.1 The microphone shall be placed 25 m (82.5 ft) from the line determined by the three markers, normal to the line and opposite the center marker. It shall be positioned 1.2 to 1.5 m (4 to 5 ft) above the water, and no less than 0.6 m (2 ft) above the surface of the shore, dock, or platform. If on a dock or platform the microphone shall be placed near or beyond the end of the dock or platform.

4.3.2 The meter shall be set for slow response and the A-weighting network.

4.3.3 The observer reading the meter shall not be closer than arm's length from the microphone. Only one other person may be within 15 m (50 ft) of the microphone and that person shall be directly behind the observer reading the meter.

4.3.4 The meter shall be observed during the entire pass-by with the boat passing within 0.5 to 1 m (~1 to 3 ft) on the far side of all three markers. The applicable reading shall be the highest sound level measured during the pass-by provided that the background sound level is at least 10 dB lower than the boat being measured.

A measurement shall be invalid if changes in the background sound level affect the applicable reading.

Background sound level includes wind effects, noise from boats other than the one being measured, wave action, boat wakes, and other extraneous noises. Peak readings due to hull slaps which create intermittent sound levels shall be disregarded.

4.3.5 Measurements shall be made only when the wind speed is below 19 km/h (13 mph).

4.3.6 The observer shall record the applicable reading and the background sound levels taken immediately before and immediately after the applicable reading.

4.3.7 At least two measurements shall be made for each side of the boat. The sound level for each side of the boat shall be the average of the first two readings for each side which are within 1 dB of each other. The sound level reported shall be that of the louder side of the boat.

If readings are required to be given at the 15 m (50 ft) distance it is permissible to add 2.6 dB to the sound levels recorded during the above tests at the 25 m (82.5 ft) distance.

5. General Requirements

5.1 The measurements shall be conducted only by persons qualified by training to perform these measurements.

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 consulted for both recommended operation of the instrument and precautions to be observed.

5.3 Proper acoustical calibration shall comprise the complete measurement system including extension cables, etc. Field calibration shall be performed immediately before and after each test sequence.