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**Sound Levels for
Motorcycles — SAE J331a**

SAE RECOMMENDED PRACTICE

APPROVED MAY 1975

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Report of Vehicle Sound Level Committee and Motorcycle Committee
Approved May 1975.

1. SCOPE - This SAE Recommended Practice establishes the test procedure, environment, and instrumentation for determining sound levels typical of normal motorcycle operation.

2. INSTRUMENTATION

2.1 The following instrumentation shall be used, where applicable:

2.1.1 A sound level meter which meets the Type 1 or SLA requirements of American National Standard Specification for Sound Level Meters, S1.4-1971. As an alternative to making direct measurements using a sound level meter, a microphone or sound level meter may be used with a magnetic tape recorder and/or a graphic level recorder or indicating instrument provided that the system meets the requirements of SAE Recommended Practice, Qualifying a Sound Data Acquisition System - J184.

2.1.2 An acoustic calibrator with an accuracy of ± 0.5 dB (see paragraph 7.4.4).

2.1.3 A calibrated engine speed tachometer having the following characteristics:

(a) Steady-state accuracy of better than 1%.

(b) Transient response: Response to a step input will be such that within 10 engine revolutions the indicated rpm will be within 2% of the actual rpm.

2.1.4 A speedometer with steady-state accuracy of at least $\pm 10\%$.

2.1.5 An anemometer with steady-state accuracy of at least $\pm 10\%$ at 19 km/h (12 mph).

2.1.6 An acceptable wind screen may be used with the microphone. To be acceptable, the screen must not affect the microphone response more than ± 1 dB for frequencies of 20-4000 Hz or $\pm 1-1/2$ dB for frequencies of 4000-10,000 Hz.

3. TEST SITE

3.1 The test site shall be a flat open space free of large sound-reflecting surfaces (other than the ground), such as parked vehicles, signboards, buildings or hillsides, located within 30m (100 ft) radius of the microphone location and the following points on the vehicle path:

(a) The microphone point

(b) A point 15m (50 ft) before the microphone point.

(c) A point 15m (50 ft) beyond the microphone point.

3.2 The measurement area within the test site shall meet the following requirements and be laid out as described:

3.2.1 The surface of the ground within at least the triangular area formed by the microphone location and the points 50 ft (15.2m) prior to and 50 ft (15.2m) beyond the microphone point shall be dry concrete or asphalt, free from snow, soil or other extraneous material.

3.2.2 The vehicle path shall be of relatively smooth, dry concrete or asphalt, free of extraneous materials such as gravel, and of sufficient length for safe acceleration, deceleration and stopping of the vehicle.

3.2.3 The microphone shall be located 15m (50 ft) from the centerline of the vehicle path and 1.2m (4 ft) above the ground plane.

3.2.4 The following points shall be established on the vehicle path:

(a) Microphone point-a point on the centerline of the vehicle path where a normal through the microphone location intersects the vehicle path.

(b) End point-a point on the vehicle path 30m (100 ft) beyond the microphone point.

(c) Acceleration point-a point on the vehicle path 7.5m (25 ft) prior to the microphone point.

3.2.5 The test area layout in Fig. 1 shows a directional approach from left to right with one microphone location, for purposes of clarity. Sound level measurements are to be made on both sides of the vehicle; therefore, it will be necessary to establish either a second microphone point on the opposite side of the vehicle path with a corresponding clear area or end points and acceleration points for approaches from both directions.

4. TEST WEIGHT

4.1 At the start of the test series, the vehicle shall be filled with fuel and lubricant to not less than 75% of capacity.

4.2 The combined weight of the test

rider and test equipment used on the vehicle shall be not more than 79 kg (175 lb) nor less than 75 kg (165 lb). Weights shall be placed on the vehicle

saddle behind the driver to compensate for any difference between the actual driver/equipment load and the required 75 kg (165 lb) minimum.

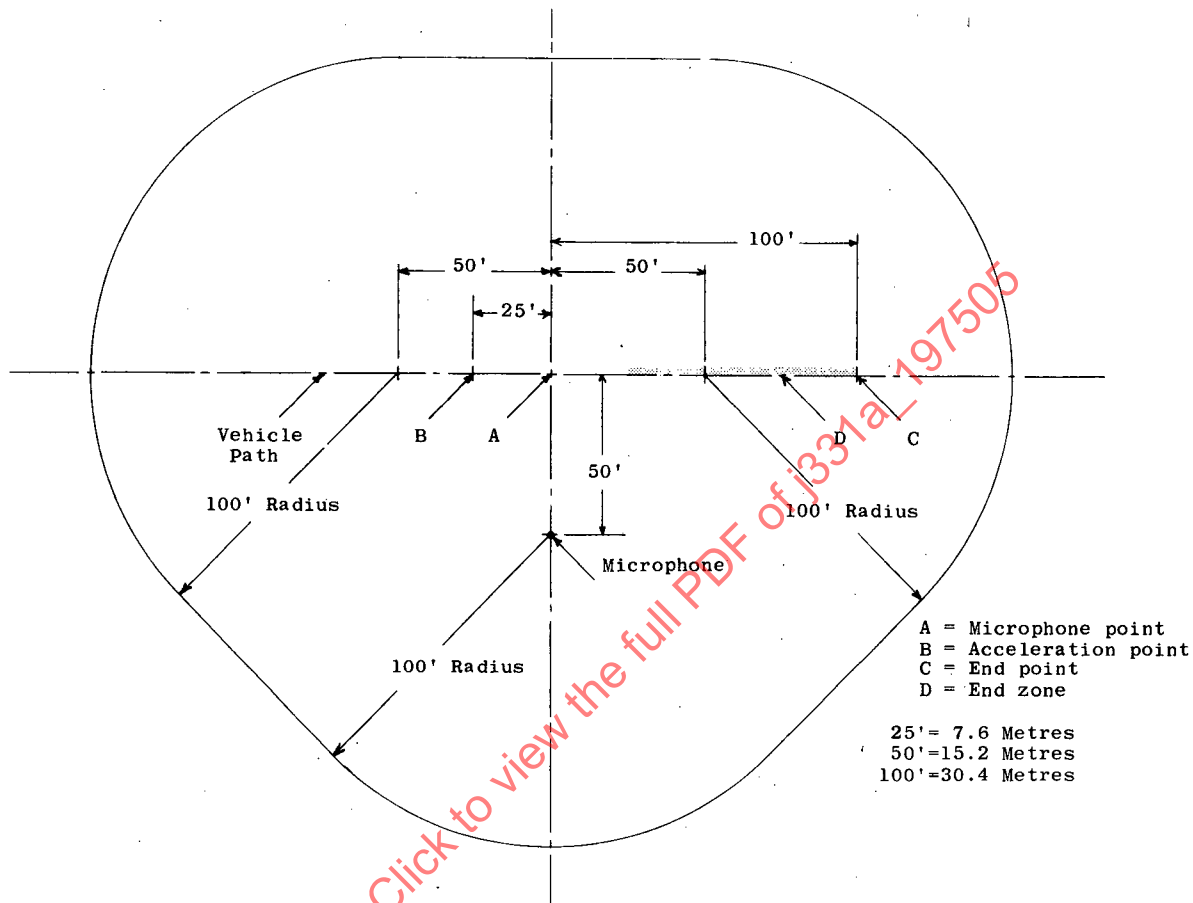


FIG. 1

5. PROCEDURE

5.1 The vehicle shall use second gear unless during the test under acceleration the engine speed at maximum rated net horsepower is reached before the vehicle reaches a point 7.5m (25 ft) beyond the microphone point, in which case the vehicle shall be tested in third gear.

5.2 For the test under acceleration, the vehicle shall proceed along the vehicle path at a constant approach speed which shall correspond to either an engine speed of 60% of the engine speed at maximum rated net horsepower or a vehicle speed of 48 km/h (30 mph), whichever is slower. When the front of the vehicle reaches the acceleration point, rapidly and fully open the throttle and accelerate until the front of the vehicle is 30 m (100 ft) beyond the microphone point, or until the engine speed at maximum rated horsepower is reached, at which point

the throttle shall be closed. Wheel slip which effects the maximum sound level shall be avoided.

5.3 When excessive or unusual noise is noted during deceleration, the following test shall be performed with sufficient runs to establish maximum sound level under deceleration:

5.3.1 For the test under deceleration, the vehicle shall proceed along the vehicle path at an engine speed at maximum rated net horsepower in the gear selected for the test under acceleration. At the end point, the throttle shall be rapidly and fully closed, and the vehicle allowed to decelerate to an engine speed of one-half of the rpm at maximum rated net horsepower.

5.4 Sufficient preliminary runs to familiarize the driver and to establish the engine operating conditions shall be made before measurements begin. The