Maximum Sound Level Potential For Motorcycles — SAE J47

SAE RECOMMENDED PRACTICE

APPROVED MAY 1975

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MAXIMUM SOUND LEVEL POTENTIAL FOR MOTORCYCLES - SAE J47

SAE Recommended Practice

Report of Vechile Sound Level Committee and Motorcycle Committee approved May 1975.

1. SCOPE

This SAE Recommended Practice establishes the test procedure, environment and instrumentation for determining maximum sound level potential for motorcycles.

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 S1A 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 6.4.4)

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 An anemometer with steady-state accuracy within ± 10% at (19 km/h) 12 mph.

2.1.5 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 ±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 (30.4m) (100ft) radius of the microphone location and the following points on the vehicle path:

(a) The microphone point.

(b) A point (15.2m) (50 ft) before the microphone point.

(c) A point (15.2m) (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 (15.2m) 50 ft prior to and (15.2m) 50 ft 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 (15.2m) (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 (7.6m) (25 ft) beyond the microphone point.

(c) Acceleration point-a point on the vehicle path at least (7.6m) (25 ft) prior to the microphone point established by the method described in paragraph 4.1.

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 establsh either a second microphone location 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. PROCEDURE

4.1 To establish the acceleration point, the end point shall be approached in low gear from the reverse direction at a constant road speed obtained from 60% of the engine speed at maximum rated

net horsepower. When the front of the vehicle reaches the end point, the throttle shall be rapidly and fully opened to accelerate past the microphone point under wide-open throttle. By trail, the lowest transmission gear shall be selected that will result in the vehicle traveling the shortest distance from the end point to the place where the engine speed at maximum rated net horsepower is reached, but which is not less than (7.6mm)(24ft) past the microphone point. The location of the front of the vehicle on the vehicle path when the engine speed at maximum rated net horsepower is attained shall be the acceleration point for test runs to be made in the opposite direction.

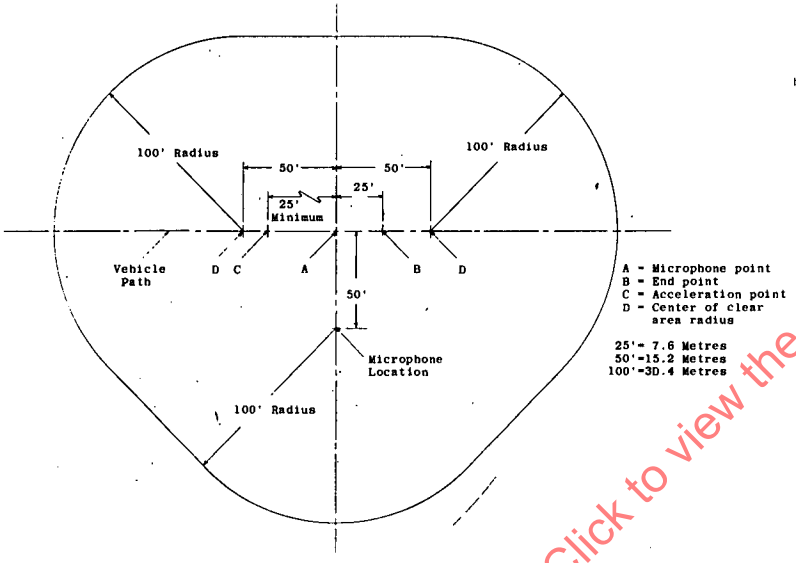

FIG. 1

4.1.1 When the procedure described in paragrah 4.1 results in a dangerous or unusual operating condition such as wheel spin, front wheel lifting, or other unsafe conditions, the next higher gear shall be selected for the test and the procedure rerun to establish the acceleration point. In any event, the procedure shall result in the vehicle being at the end point when the engine speed at maximum rated net horsepower is attained.

4.2 For the test under acceleration, the vehicle shall proceed along the vehicle path at a constant approach speed in the gear selected in paragraph 4.1 and at 60% of the engine speed at maximum rated net horsepower. When the front of the vehicle reaches the acceleration point, the throttle shall be rapidly and fully opened. Full acceleration shall continue until the engine speed at maximum rated net horsepower is reached, which shall be at the end point, at which time the throttle shall be closed. Wheel slip which affects the maximum sound level shall be avoided, and the manufacturer's safe maximum engine speed shall not be exceeded.

4.3 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.

4.3.1 For the test under deceleration, the vehicle shall approach the end point from the reverse direction at the engine speed at maximum rated 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 shall be allowed to decelerate to an engine speed of 1/2 the rpm at maximum rated net horsepower.

4.4 Sufficient preliminary runs to familiarize the driver and to establish the engine operating conditions shall be made before measurements begin. The engine temperature shall be within the normal operating range prior to each run.

5. MEASUREMENTS

5.1 The sound level meter shall be set for fast response and for the A-weighting network.

5.2 The meter shall be observed while the vehicle is accelerating or decelerating. The highest sound level obtained for each run shall be recorded, ignoring unrelated peaks due to extraneous ambient noises.

5.3 At least six measurements shall be made for each side of the vehicle. Sufficient measurements shall be made until at least four readings from each side are within 2 dB of each other. The highest and lowest readings shall be discarded; the sound level for each side shall be the average of the four, which are within 2 dB of each other. The sound level reported shall be for that side of the vehicle having the highest sound level.

5.4 The ambient sound level (including wind effects) at the test site due to sources other than the vehicle being measured shall be at least 10 dB lower than the sound level produced by the vehicle under test.

5.5 Wind speed at the test site during tests shall be less the 19 km/h (12 mph).

6. GENERAL COMMENTS

6.1 Technically competent personnel should select equipment, and the tests should be conducted only by trained and