

540 CMR: REGISTRY OF MOTOR VEHICLES

540 CMR 3.00: MOTORCYCLE NOISE ABATEMENT

Section

3.01: Purpose, Scope and Applicability

3.02: Allowable Noise Levels for Motorcycles

3.03: Stationary Motorcycle Noise Measurement Procedures

3.01: Purpose, Scope and Applicability

540 CMR 3.00 is adopted by the Registrar of Motor Vehicles in accordance with M.G.L. c. 90, §§ 7T and 7U and establishes sound level limits, test procedures and instrumentation to be utilized in measuring and testing of motorcycle noise emissions levels for motorcycles in use within the Commonwealth. The test procedures shall be used by:

- (a) law enforcement personnel, who are authorized by M.G.L. c. 90 to determine whether a motorcycle is in violation of M.G.L. c. 90, § 16 or § 7U; or
- (b) any personnel authorized by the Registrar to conduct re-inspections at an approved referee inspection station challenge facility.

3.02: Allowable Noise Levels for Motorcycles

(1) Statutory Standard for Motorcycles intended for use in the Commonwealth. No person shall operate a motorcycle within the Commonwealth unless it complies with the noise standards contained in M.G.L. c. 90, § 7U.

(2) Registry of Motor Vehicles stationary noise level testing. The Registrar adopts the following stationary noise levels which correlate with the non-stationary levels established by M.G.L. c. 90, § 7U.

- (a) Motorcycles required to be registered under M.G.L. c. 90, § 2 for operation on the ways of the commonwealth shall not exceed the following noise levels when operated at ½ redline speed:
 - 99 dBA if manufactured after 1/1/86
 - 102 dBA if manufactured before 1/1/86
- (b) Off-road motorcycles required to be registered under M.G.L. c. 90B shall not exceed 105dBA when operated at ½ redline speed.
- (c) For purposes of 540 CMR 3.00, redline speed is defined as the lowest numerical engine speed included in the red-zone of the motorcycle tachometer. If the particular motorcycle has no tachometer, a hand held tachometer meeting the specifications of 540 CMR 3.03(4) shall be used together with ½ of the redline speed as specified by the manufacturer of the particular motorcycle.

3.03: Stationary Motorcycle Noise Measurement Procedures

The following stationary noise measurement procedures for motorcycles shall be used in testing motorcycle noise levels by:

- (a) law enforcement personnel who have reason to believe that a motorcycle operator is in violation of M.G.L. c. 90, §7U or 16; or
- (b) any person authorized by the Registrar to conduct a noise level challenge test.

(1) Test Site.

- (a) The test site shall be a flat, open surface free of large sound reflecting surfaces (other than the ground) such as parked vehicles, signboards, buildings, or hillsides located within 5 m (16 ft) of the motorcycle being tested and the location of the microphone.
- (b) The surface of the ground within the test site shall be paving or hard packed earth, level within an average slope of not greater than 40 mm per meter (or 0.5 inch per foot), and shall be free of loose or powdered snow, plowed soil, grass of a height greater than 150 mm (six in), trees, or other extraneous material.

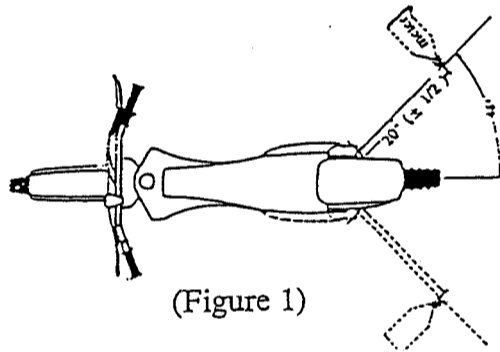
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(2) Procedure.

- (a) The rider shall sit astride the motorcycle in normal riding position with both feet on the ground. If this is not possible because of the seat height of the motorcycle, or because the motorcycle is three-wheeled, the rider shall sit in the normal riding position with one or both feet on the footrests. If necessary, an assistant may hold the motorcycle by the forks, front wheel or handlebars, or, in the alternative, the rider may use a box, rock, or other object to rest his or her feet upon to steady the motorcycle, so long as the motorcycle's longitudinal plane of symmetry is vertical and stationary.
- (b) The rider shall run the engine with the gearbox in neutral at a speed equal to $\frac{1}{2}$ of the rated engine redline speed.
- (c) The engine of the motorcycle shall be at normal operating temperature during the test.

(3) Measurements.

- (a) The sound level meter shall be set for the A-weighting network and should be set for slow dynamic response.
- (b) Tests shall be made on each side of the motorcycle having an exhaust outlet.
- (c) The sound level meter shall be located 0.5 ± 0.01 m (20 ± 0.5 in) behind the exhaust outlet; at a height within 0.01 m (0.5 in) of the height of the exhaust outlet; and at a 45 ± 10 deg angle to the normal line of travel of the motorcycle. If there is more than one exhaust outlet per side, the sound level meter shall be located with reference to the rear most outlet.
- (d) The longitudinal axis of the meter shall be in a plane parallel to the ground plane. The axis of the microphone shall be oriented for free field response as specified by the manufacturer. (See Fig. 1.)



- (e) No wire or other rigid means of distance measurement shall be attached to the sound measuring system.
 - (f) The sound level test sample shall be that measured during steady state operation at the engine speed (± 200 rpm) equal to one-half of the rated engine red-line speed measured on the loudest side of the motorcycle (if outlet located on both sides). The test speed in rpm shall also be recorded.
 - (g) The ambient sound level (including wind effects) at the test site due to sources other than the motorcycle being measured shall be at least 10 dB lower than the sound level produced by the motorcycle under test.
 - (h) Wind speed, as measured by the anemometer at the test site shall be less than 20 mph.
 - (i) While making sound level measurements, not more than one person other than the rider, the measurer, and the assistant (if necessary) shall be within 3 m (10 ft) of either the motorcycle under test or the microphone, and that person shall be directly behind both the measurer and the microphone.
 - (j) Calibration of the sound level meter using the sound level calibrator shall be made immediately before the first test of each test day and should be made at the end of each test day. Field calibrations should be made at intervals of no more than one hour.
- (4) Instrumentation. The following noise measurement instrumentation shall be used:
- (a) A sound level meter meeting the Type 1, Type S1A, Type 2, or Type S2A requirements of American National Standards, Institute Specification for Sound Level Meters, S1.4-1983 as described in the manufacturer's specification.
 - (b) A sound level calibrator with an accuracy of ± 0.5 dB.

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(c) A windscreen which does not affect microphone response more than ± 1 dB for frequencies of 63-400 Hz and ± 1.5 dB for frequencies of 4000-10 000 Hz.

(d) An engine speed tachometer or other means of determining engine speed, with a steady state accuracy of $\pm 3\%$ at the test speed. (This requirement is usually met by the motorcycle's engine tachometer. A hand held tachometer is recommended in the event that an engine tachometer is unavailable).

(e) An anemometer with steady state accuracy of $\pm 10\%$ at 9 m/s (20 mph).

(5) References. Portions of 540 CMR 3.03 were taken from document SAE J1287 with the permission of SAE (The Society of Automotive Engineers, Inc.), 400 Commonwealth Drive, Warrendale, PA 15096, (412-776-4841). Copies of that document may be obtained from SAE.

REGULATORY AUTHORITY

540 CMR 3.00: M.G.L. c. 90, §§ 7T and 7U.

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