

RULES FOR MEASUREMENT OF NOISE FROM NEW MOTOR VEHICLES

1-CCR-204-4

I. ~~Scope of Regulations.~~ STATEMENT OF BASIS AND PURPOSE

~~This regulation contains procedures implementing paragraph 6 of Article 35, Chapter 66, of the Colorado Revised Statutes 1963, as amended, which applies to the measurement of noise from motor vehicles sold or offered for sale in the State of Colorado. STATUTORY AUTHORITY FOR THIS RULE IS FOUND IN §25-12-106 (2). THE PURPOSE OF THE RULE IS TO ESTABLISH A TEST PROCEDURE FOR MEASURING NOISE PRODUCED FROM NEW MOTOR VEHICLES SOLD OR OFFERED FOR SALE IN COLORADO.~~

~~(a) 1.0 These THIS regulations RULE doES not pertain to authorized emergency vehicles.~~

1.1 SOUND MEASUREMENTS SHALL CONFORM TO CODE OF FEDERAL REGULATIONS TITLE 40 PART 205 (TRANSPORTATION EQUIPMENT NOISE EMISSIONS CONTROLS) AND CURRENT TEST PROCEDURES OF THE SOCIETY OF AUTOMOTIVE ENGINEERS.

II. ~~Personnel.~~

~~Persons selected to conduct noise measurement testing or to measure noise level of vehicles operated on a highway shall have been trained and qualified in the techniques of sound measurement and the operation of sound measuring instruments.~~

III. ~~Instrumentation.~~

~~Equipment used in making vehicle noise measurements shall be selected by technically trained personnel and shall meet the following requirements:~~

~~(a) Sound Level Meter. The sound level meter shall meet the requirements of ANSI Standard 4-1961, except that the B and C weighting networks and the slow acting indicator need not be incorporated in the instrument.~~

~~(b) Sound Level Calibrator. The sound level calibrator shall be the auxiliary closed-coupler calibrator specified in ANSI Standard 4-1961.~~

~~(c) Windscreen or Nose Cone. Any windscreen or nose cone used with the sound level meter shall be calibrated in accordance with instructions of the manufacturer of the microphone or sound level meter.~~

~~(d) Tachometer. A tachometer shall be used to determine when maximum rated engine speed is attained in conducting the tests specified in Section VI of these regulations. Maximum rated engine speed is defined as engine speed at maximum rated horsepower.~~

IV. ~~Noise Measuring Sites.~~

~~Noise measuring sites shall meet the following minimum requirements:~~

~~(a) Measuring Site for Vehicles on the Highway. The site used in measuring noise from vehicles on the highway under Section 66-35-6, CRS 1963, as amended, shall meet the following conditions:~~

~~(1) Location. The location shall be an open area free of large reflecting surfaces such as parked vehicles, signboards, buildings, bridges, hillsides, or trees within a 100 foot radius of the microphone and within a 100 foot radius of the point on the centerline of the path of the vehicle nearest the microphone. (Figure 1)~~

~~(2) Ground Condition. The surface of the ground between the microphone and the path of the vehicle shall be free of standing water, shrubbery, and of grass over 6 inches high.~~

~~(3) Roadway Surface. The surface over which the vehicle travels shall be dry and relatively smooth concrete or asphalt pavement free of extraneous material.~~

~~(b) Measuring Site for New Motor Vehicles. The site used in measuring noise from new motor vehicles under Section 66-35-6, CRS 1963, as amended, shall meet the following conditions:~~

~~(1) Location. The location shall be a flat open space free of large reflecting surfaces such as signboards, buildings, hillsides, or trees within 100 feet of the microphone and within 100 feet of the centerline of the path of the vehicle from the point where the throttle is opened to the point where the throttle is closed. (Figure 2 is an example of an acceptable layout.)~~

~~(2) Ground Condition. The surface between the microphone and the path of the vehicle shall be asphalt or concrete free of powdery snow, loose soil, or ashes.~~

~~(3) Roadway Surface. The surface over which the vehicle travels shall be dry and relatively smooth concrete or asphalt pavement free of extraneous material.~~

## **V. Microphone and Technician.**

The microphone and technician shall be positioned as follows:

~~(a) Microphone Location. The microphone shall be located  $50 \pm 1$  feet from the centerline of the lane of travel of the vehicle at a height of  $4 \pm 1/2$  feet above the plane surface of the roadway surface. (Figures 1 and 2)~~

~~(b) Microphone Orientation. The microphone shall be oriented relative to the source of the sound in accordance with the instrument manufacturer's instructions. Where the instruction manual is vague or does not include adequate information, a specific recommendation shall be obtained from the manufacturer.~~

~~(c) Technician Location. The technician making direct readings of the meter shall be positioned relative to the microphone in accordance with the instrument manufacturer's instructions. Where the instruction manual is vague or does not include adequate information, a specific recommendation shall be obtained from the manufacturer.~~

~~(d) Bystander Location. No bystander shall be closer than 50 feet from the microphone and the vehicle being tested, except for a witness or trainee who shall be positioned beyond the technician on a line through the technician and the microphone.~~

~~(e) Speaking or excessive movement shall not be permitted by any witness, trainee or technician during the conduct of the test.~~

## **VI. Operation of New Motor Vehicles.**

New motor vehicles tested for compliance with Section 66-35-6, CRS 1963, as amended, together with any auxiliary equipment that would be in use while the vehicle is in motion on the highway, shall be operated as follows:

~~(a) Trucks, Truck Tractors, and Buses. Trucks, truck tractors, and buses that have a manufacturer's gross vehicle weight rating of 6,000 pounds or more shall be operated under full throttle conditions in accordance with the following procedure:~~

~~(1) Select the lowest numerical rear axle and/or transmission gear and an initial vehicle speed such that at wide-open throttle the vehicle will accelerate from the acceleration points:~~

~~(a) Starting at no more than two-third of maximum rated or of governed engine speed.~~

~~(b) Reaching maximum rated or governed speed within the end zone.~~

~~(c) Without exceeding 35 m.p.h. before reaching the end point.~~

~~(i) When the maximum rated RPM is attained before reaching the end zone, the approach RPM shall be decreased in 100 RPM increments until maximum rated RPM is attained within the end zone.~~

~~(ii) When maximum rated RPM is not attained until beyond the end zone, the next lower gear shall be selected until maximum rated RPM is attained within the end zone.~~

(III) ~~When the lowest gear still results in reaching maximum rated RPM beyond the end zone, the approach RPM shall be increased in 100 RPM increments until the maximum~~

(b) ~~Light Trucks, Truck Tractors, Buses, and Passenger Cars.~~ Trucks, truck tractors, and buses that have a gross vehicle rating of less than 6,000 pounds and passenger cars shall be tested at curb weight plus weight of the driver and when necessary one technician, and shall be operated as follows:

(1) ~~Gear Selection.~~ Motor vehicles equipped with three or four speed manual transmissions shall be operated in low gear. Vehicles equipped with four speed manual transmissions shall also be operated in second gear. Vehicles equipped with five speed manual transmissions shall be operated in second gear. Vehicles equipped with automatic transmissions shall be operated with transmissions engaged in low gear. Vehicles which reach maximum rated engine speed at less than 30 miles per hour or before reaching a point 25 feet beyond the microphone line shall be operated in the next higher gear. Auxiliary step-up ratios (overdrive) shall not be engaged on vehicles so equipped.

(2) ~~Acceleration Test.~~ The vehicle shall proceed along the test path at a constant approach speed of 30 miles per hour. When the front of the vehicle reaches a point 25 feet from a line through the microphone intersecting the path of the vehicle at right angles, the throttle shall be fully opened. The throttle shall be held open until the rear of the vehicle is approximately 100 feet beyond the microphone, or until the maximum rated engine speed is obtained at which point the throttle is gradually closed. Wheel slip shall be avoided during this test. (Figure 2)

(c) ~~Motorcycles.~~ Motorcycles shall be operated as follows:

(1) ~~Gear Selection.~~ Motorcycles shall be operated in second gear. Vehicles which reach maximum rated engine speed at less than 30 miles per hour or before reaching a point 25 feet beyond the microphone line shall be operated in the next higher gear.

(2) ~~Acceleration Test.~~ The vehicle shall proceed along the test path at a constant approach speed which shall correspond to either an engine speed of 60 percent of maximum rated engine speed or at 30 miles per hour, whichever is lower. When the front of the vehicle reaches a point 25 feet from a line through the microphone intersecting the path of the vehicle at right angles, the throttle shall be fully opened. The throttle shall be held open until the rear of the vehicle is approximately 100 feet beyond the microphone, or until the maximum rated engine speed is obtained at which point the throttle is gradually closed. Wheel slip shall be avoided during this test. (Figure 2)

(d) ~~Deceleration Test.~~ Deceleration tests shall be conducted as follows: The vehicle shall proceed along the test path in the gear which was used for acceleration test and at a constant approach speed equal to the maximum rated engine speed. When the front of the vehicle reaches a point 25 feet beyond a line through the microphone, the throttle shall be closed as rapidly as possible and the vehicle allowed to decelerate to approximately one-half of the maximum rated or of governed engine speed.

## **VII. Meter Operation.**

The sound level meter shall be operated in accordance with the instrument manufacturer's instructions and as follows:

(a) ~~Meter Setting.~~ The A-weighting network and the fast meter response shall be used.

(b) ~~Calibration Check.~~ An external calibration check shall be made before and after each period of use and at intervals not exceeding two hours when the instrument is in use longer than this time.

(c) ~~Meter Reading.~~ The reading recorded shall be the highest sound level obtained as the vehicle passes by, disregarding unrelated peaks due to extraneous ambient noises.

(d) ~~Ambient Sound.~~ Measurements shall be made only when the A-weighted ambient sound level, including wind effects, due to all sources other than the vehicle being measured is at least 10 dB lower than the sound level of the vehicle.

(e) ~~Wind.~~ Measurements shall be made only when the wind velocity is 5 miles per hour or less.

## **VIII. Vehicle Noise Level.**

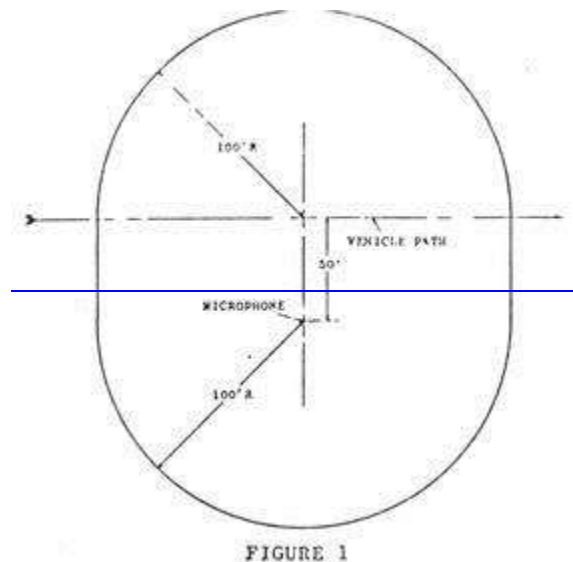
The measured noise level of a vehicle shall be reported as follows:

(a) Noise Level for Vehicles on the Highway. The sound level reading for determining compliance with 66-35-6, CRS 1963, as amended, shall be the highest reading obtained as the vehicle or combination of vehicles passes through the measuring site on the highway. Sound level readings shall be recorded on vehicles which are in lanes of travel with centerlines at or beyond 50 feet and which produce noise levels exceeding the statutory limits.

(b) Noise Level for New Motor Vehicles. The sound level readings for determining compliance of new motor vehicles with Section 66-35-6, CRS 1963, as amended, shall be obtained by making at least four measurements for each side of the vehicle.

Sufficient preliminary runs shall be made to familiarize the driver with the operation of the vehicle and to stabilize the engine operating condition. The A-weighted sound level for each side shall be the average of the two highest readings on that side which are within 2 dB of each other. The noise level reported for the vehicle shall be the sound level of the loudest side of the vehicle. Obvious vehicle malfunction shall nullify the test.

(c) Noise Level Tolerance. Tolerances are necessary due to unavoidable variations in test site, vehicle operation, test equipment, temperature and wind gradients, and inherent differences in nominally identical vehicles. Vehicles specified in CRS 66-35-6, 1963, as amended, shall not be considered in violation unless they exceed the statutory limits by more than 2 dB. New vehicles shall be designed to comply with the statutory limits of CRS 66-35-6, 1963, as amended, at time of manufacture to ensure that the vehicles will not exceed the statutory limits plus a 2 dB tolerance when tested by an enforcement agency.



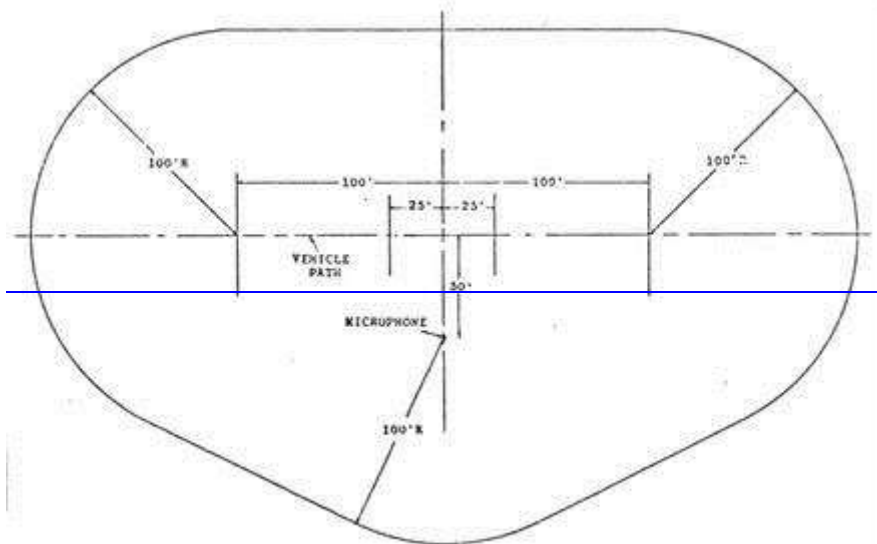


FIGURE 2