



COMMONWEALTH OF AUSTRALIA
AUSTRALIAN DESIGN RULE ADR 39A
FOR
MOTOR CYCLE NOISE

The intention of this Australian Design Rule is to define limits on external noise emitted from *Motor Cycles* in order to limit the contribution by these vehicles to community noise.

The Australian Transport Advisory Council has recommended to Commonwealth, State and Territory Governments that all vehicles specified below shall comply with this Australian Design Rule.

APPLICABILITY

VEHICLE CATEGORY (As defined in Part 1 of "ADR Definitions")	MANUFACTURED ON OR AFTER	
Moped 2 wheels	(LA)	N/A
Moped 3 wheels	(LB)	N/A
Motor Cycle	(LC)	1 March 1988
Motor Cycle and Side-car	(LD)	1 March 1988
Motor Tricycle	(LE)	1 March 1988
Passenger Car	(MA)	N/A
Forward Control Passenger Vehicle	(MB)	N/A
Off-road Passenger Vehicle	(MC)	N/A
Light Omnibus	(MD)	N/A
Heavy Omnibus	(ME)	N/A
Light Goods Vehicle	(NA)	N/A
Medium Goods Vehicle	(NB)	N/A
Heavy Goods Vehicle	(NC)	N/A
Very Light Trailer	(TA)	N/A
Light Trailer	(TB)	N/A
Medium Trailer	(TC)	N/A
Heavy Trailer	(TD)	N/A

N/A - Not Applicable

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39A.1 DEFINITIONS

- 39A.1.1 All 'Defined Terms' are identified in the text (other than the title of the Rule) by being in italics and by having the first letter of each main word capitalised. For convenience, definitions for certain 'Defined Terms' used in this Rule are set out below. Definitions for all other 'Defined Terms' are given in Part 2 of "ADR Definitions".
- 39A.1.2 Motor Cycle Type - for the purpose of type approval, *Motor Cycles* shall be of the same *Motor Cycle Type* if they do not differ in such essential respects as:
- 39A.1.2.1 the kind of engine (two-stroke or four-stroke etc.; number and capacity of cylinders; number of carburettors; arrangement of valves; *Net Engine Power*, and *Engine Speed at Maximum Power*).
- 39A.1.2.2 number and ratios of gears; and
- 39A.1.2.3 *Silencing Systems Type*
- 39A.1.3 Silencing System - a complete set of components necessary for limiting the noise made by a *Motor Cycle* and its exhaust.
- 39A.1.4 Silencing Systems Type - *Silencing Systems* which do not differ in such essential respects as:
- 39A.1.4.1 that their components do not bear different trade names or marks;
- 39A.1.4.2 that the characteristics of the materials constituting a *Silencing System Component* are not different or that the *Silencing System Components* do not differ in shape or size;
- 39A.1.4.3 that the operating principles of at least one *Silencing System Component* are not different; and
- 39A.1.4.4 that their *Silencing System Components* are not assembled differently.
- 39A.1.5 Silencing System Component - one of the individual constituent parts whose assembly constitutes the *Silencing System*. These *Silencing System Components* are, in particular, the exhaust manifold, the exhaust piping, the expansion chamber, the silencer proper etc. If the engine intake is equipped with an air filter and the filter's presence is essential to ensure observance of the prescribed sound level limits, the filter must be regarded as a *Silencing System Component* and bear the markings prescribed in Section 2 of this Rule.
- 39A.1.6 Net Engine Power (NEP) - the maximum power output at the fly-wheel of an engine representing a standard version in all parts

including intake and exhaust system, the fan, water pump or cooling blower, as the case may be, fuel pump, injection pump and unloaded generator with standard carburettor adjustment and ignition or injection timing as the case may be, using a commercial fuel as prescribed for the vehicle, and at the coolant and lubricant temperatures occurring in normal operation.

The measured maximum power output shall be converted to standard conditions of barometric pressure and temperature (101.3 kPa, 20 degrees Celsius) according to the following formula:

$$NEP = \frac{101.3}{b} \times \sqrt{\frac{(273 + t)}{(273 + 20)}} \times (\text{measured maximum power output})$$

where: b = the observed barometric pressure in the laboratory, in kiloPascals (kPa)
t = the temperature of the air at the engine air intake, in degrees Celsius.

39A.1.7 Engine Speed at Maximum Power (ESMP) - the engine speed expressed in rpm at which *Net Engine Power* is developed by an engine as determined by the manufacturer of the engine or of a vehicle incorporating this engine or an agent of either of them and published or made available to the public and, where that engine speed has been determined with the *Net Engine Power* of the engine being determined in different ways, means the greater or greatest of the engine speeds so determined and published or made available.

39A.1.8 Motor Cycle - for the purposes of this Rule, this term includes vehicle categories LC, LD and LE.

39A.2 MARKING REQUIREMENTS

39A.2.1 The *Silencing System Components* shall be marked with:

39A.2.1.1 the trade name or mark of the manufacturer of the *Silencing System* and of its components; and

39A.2.1.2 the trade description given by the manufacturer.

39A.2.2 Such markings shall be clearly legible and be indelible.

39A.3 LABELLING REQUIREMENTS

39A.3.1 The *Motor Cycle* shall carry information in accordance with the following requirements:

39A.3.1.1 the information shall be embossed or etched in a readily visible position or carried on a label of plastic or metal which is welded, riveted or otherwise permanently attached in a similarly visible position;

- 39A.3.1.2 the information shall be affixed so that it cannot be removed without being destroyed or defaced;
- 39A.3.1.3 the information shall be in the English language in block letters and numerals which shall be of a colour contrasting with their background and which shall be not less than 3 mm in height; and
- 39A.3.1.4 the information shall comprise the heading "STATIONARY NOISE TEST INFORMATION" and a statement containing the recorded stationary sound level value and the 50 percent *ESMP* value in the following format:

Tested dB(A) at rpm
Silencing System: (manufacturer)
Identification: (trade description)

39A.4 REQUIREMENT FOR MANUFACTURERS TO SUPPLY INFORMATION

- 39A.4.1 With every *Motor Cycle* the manufacturer shall include the following notice in the owners manual or handbook:

"TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Owners are warned that the law may prohibit:

- a) The removal or rendering inoperative by any person other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; and
- (b) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person."
- 39A.4.2 With every *Motor Cycle*, the manufacturer shall provide written instructions for the proper maintenance, use and repair of the vehicle in order to provide reasonable assurance of the elimination or minimisation of the degradation of noise control equipment throughout the life of the *Motor Cycle*.

39A.5 SPECIFICATIONS

39A.5.1 General specifications

- 39A.5.1.1 The *Motor Cycle*, its engine and its *Silencing System* shall be so designed, constructed and assembled as to enable the *Motor Cycle*, in normal use, despite the vibration to which it may be subjected, to comply with the requirements of this Rule.
- 39A.5.1.2 The *Silencing System* shall be so designed, constructed and assembled as to be able to resist the corrosive action to which it is exposed.

- 39A.5.1.3 The fitment in the *Silencing System* of removable objects such as orifice plates and restrictors is disallowed.
- 39A.5.2 Specifications Regarding Sound Levels
- 39A.5.2.1 Methods of measurement
- 39A.5.2.1.1 The sound level shall be measured by the two methods described in Annex 1 to this Rule for the *Motor Cycle* in motion and for the *Motor Cycle* when stationary.¹
- 39A.5.2.2 The sound level measured by the method described in Annex 1, paragraph 3.1 to this Rule, when the *Motor Cycle* is in motion, shall not exceed the limits prescribed in Annex 1, Appendix 2, Table 1, to this Rule for the category to which the *Motor Cycle* belongs.
- 39A.5.2.3 The sound level meter shall be monitored throughout each test. The highest sound level obtained shall be rounded to the nearest 0.5 dB(A).
- 39A.5.2.4 The sound level measured by the method described in Annex 1, paragraph 3.2 to this Rule, when the *Motor Cycle* is stationary, shall not exceed the limit prescribed in Annex 1, Appendix 2, Table 2 to this Rule.
- 39A.6 DETERMINATION OF COMPLIANCE
- 39A.6.1 A test on a *Motor Cycle* may be accepted as demonstrating compliance for other *Motor Cycles* of the same *Motor Cycle Type*.
- 39A.7 ALTERNATIVE STANDARDS
- 39A.7.1 The technical requirements of ECE Regulation 41/01 - Motor Cycle Noise, shall be accepted as equivalent to the technical requirements of Clause 39A.5.2.2 of this Rule for the ride-by test.
- 39A.7.2 The technical requirements of ECE Regulation 41/01 - Motor Cycle Noise, shall be accepted as equivalent to the technical requirements of Clause 39A.5.2.4 of this Rule for the stationary test provided that:
- 39A.7.2.1 the test is carried out at 50 percent *ESMP*; and
- 39A.7.2.2 the maximum sound level recorded for the test does not exceed 94 dB(A).

¹ A test is made on a stationary *Motor Cycle* in order to provide a reference value for administrations which use this method to check *Motor Cycles* in use.

METHODS AND INSTRUMENTS FOR MEASURING THE NOISE
MADE BY *MOTOR CYCLES*

1 MEASURING INSTRUMENTS

1.1 Instrumentation for Sound Level Measurements

1.1.1 Specification

- 1.1.1.1 A sound level meter complying with the type requirements specified in Australian Standard 1259-1982 for a type 1 (precision) sound level meter shall be used (IEC 651 is equivalent to Australian Standard 1259-1982). Alternatively a sound level meter complying with the requirements of American National Standard Specification ANSI S1.4 Type 1 may be used. The use of a nominal 12 millimetre (half inch) diameter microphone is recommended.

Settings

The sound level meter shall be set to the A-weighted scale and "F" response. The instructions given by the manufacturer of the sound level meter regarding its operation shall be followed.

Auxiliary Equipment

Auxiliary equipment (windshields, extension cables etc.) used with the sound level meter shall be selected and used in accordance with the instructions of the manufacturer of the sound level meter. Where tape recorders and associated instruments and equipment are used in the measurement of sound pressure levels, the tape recorder shall comply with the requirements of Australian Standard 2680-1984 for a type A recorder and the performance of the complete sound recording and replay system shall be demonstrated as not being inferior to that obtained by the use of a type 1 sound level meter (see Australian Standard 1259-1982).

Field Performance Check

The performance of the instrumentation shall be checked with a pistonphone or other portable reference sound source appropriate to the sound level meter immediately before and after measurements are made. If the sound level meter registers a discrepancy greater than \pm one dB between consecutive checks, any measurements in the interval between the 2 checks shall be considered invalid.

Calibration

The sound level meter, including any extension cable, shall be calibrated in accordance with Australian Standard 1259-1982 at least every 12 months. The instrument used to check the performance of the sound level meter must itself be checked for its stated accuracy at least every 12 months.

Instrumentation for Engine Speed Measurements

The rotational speed of the engine shall be measured by a tachometer whose accuracy is within 3 percent of the actual speed of rotation.

2

CONDITIONS OF MEASUREMENTSite

The measurements shall be made at an open site where the ambient and wind noise levels are at least 10 dB(A) below the noise level being measured. The above-mentioned area may take the form of an open space of 50 m radius having a central part of at least 10 m radius, practically level, consisting of concrete, asphalt or similar material and not covered with powdery snow, tall grass, loose soil, ashes or the like. During the test nobody shall stand in the measurement area, except the observer and the rider, whose presence must have no influence on the meter reading.

2.1.2 The surface of the test track used to measure the noise of *Motor Cycles* in motion shall be such as not to cause excessive tyre noise.

2.1.3 Measurements shall not be made under adverse weather conditions. Any sound peak which appears to be unrelated to the characteristics of the general sound level of the *Motor Cycle* shall be ignored in taking the readings. If a windguard is used, its influence on the sensitivity and the directional characteristics of the microphone shall be taken into account.

Vehicle

Measurements shall be made on *Motor Cycles* with rider only.

2.2.2 The tyres of the *Motor Cycle* shall be of the correct size and shall be inflated to the prescribed pressure(s) for the *Motor Cycle* in its unladen condition.

2.2.3 Before the measurements are started, the engine shall be brought to its normal operating conditions as regards:

2.2.3.1 temperatures;

2.2.3.2 tuning;

2.2.3.3 fuel; and

2.2.3.4 sparking plugs, carburettor(s), etc., (as appropriate).

2.2.4 If the *Motor Cycle* is equipped with devices which are not necessary for its propulsion, but which are used whilst the *Motor Cycle* is in normal service on the road, those devices shall be in operation in accordance with the specifications of the manufacturer.

3 METHODS OF TESTING3.1 Measurement of Noise of *Motor Cycles* in Motion3.1.1 General conditions of test

3.1.1.1 At least two measurements shall be made on each side of the *Motor Cycle*. The maximum sound level for each run including invalid readings and reasons for their invalidation shall be recorded in the test report.

3.1.1.2 The microphone shall be situated $1.2 \text{ m} \pm 0.1 \text{ m}$ above ground level at a distance of $7.5 \text{ m} \pm 0.2 \text{ m}$ from the path of the *Motor Cycle's* centre line, measured along the perpendicular (PP') to that line (see Appendix 1, Fig. 1).

3.1.1.3 Two lines, AA' and BB', parallel to line PP' and situated respectively 10 m forward and 10 m rearward of that line shall be marked out on the test runway. The *Motor Cycle* shall approach line AA' at a steady speed as specified below. When the front of the *Motor Cycle* reaches the line AA'; the throttle shall be fully opened as rapidly as practicable and held in the fully-opened position until the rear of the *Motor Cycle* crosses line BB'; the throttle shall then be closed again as rapidly as possible.

3.1.1.4 The maximum value recorded at each measurement shall constitute the result of the measurement. The measurements shall be considered valid if the difference between the two consecutive measurements on the same side of the *Motor Cycle* is not more than 2 dB(A).

3.1.1.5 To allow for lack of precision in the measuring instrument the figures read from it during measurement shall each be reduced by one dB(A).

3.1.2 Determination of the Approach Speed3.1.2.1 Symbols used

The letter symbols used in this paragraph have the following meaning:

N_A : uniform engine rotational speed at the approach of line AA'

V_A : uniform *Motor Cycle* speed at the approach of line AA'.

3.1.2.2 *Motor Cycle* with a manually-operated gearbox

3.1.2.2.1 Approach speed

The uniform speed of the *Motor Cycle* at the approach line AA' shall be such that either:

$$N_A = 75 \% ESMP \text{ and } V_A \leq 50 \text{ km/h or } V_A = 50 \text{ km/h.}$$

3.1.2.2.2 Choice of gear ratio

3.1.2.2.2.1 *Motor Cycles*, whatever the engine cylinder capacity (ECC), when fitted with a gearbox having not more than four gears, shall be tested in second gear (provided that the requirements of paragraph 3.1.2.2.2.4 of this Annex are complied with).

3.1.2.2.2.2 *Motor Cycles* fitted with an engine having a cylinder capacity not exceeding 175 cm^3 and a gearbox with five or more gears shall be submitted to one test only, in third gear.

3.1.2.2.2.3 *Motor Cycles* fitted with an engine having a cylinder capacity exceeding 175 cm^3 and a gearbox with five or more gears, shall be submitted to a test in second gear and a test in third gear; the average value of the two tests (provided that the requirements of paragraph 3.1.2.2.2.4 of this Annex are complied with) shall be taken as the test result.

3.1.2.2.2.4 If during the test carried out in second gear, the stabilized engine speed at the line marking the end of the test track exceeds 110 percent of *ESMP* the test shall be carried out in third gear and the noise level measured in that gear only shall be taken as the test result.

3.1.2.3 *Motor Cycle* with an automatic gearbox3.1.2.3.1 *Motor Cycle* without a manual selector3.1.2.3.1.1 Approach speed

The *Motor Cycle* shall approach the line AA' at various uniform speeds of 30, 40, 50 km/h or at 75 percent of the maximum on-road speed if this value is lower. The condition giving the highest sound level shall be selected.

3.1.2.3.2 *Motor Cycles* equipped with a manual selector with X positions for forward drive3.1.2.3.2.1 Approach speed

The *Motor Cycle* shall approach the line AA' at a uniform speed corresponding to:

$$\text{either } N_A = 75\% ESMP \text{ and } V_A \leq 50 \text{ km/h;}$$

$$\text{or } V_A = 50 \text{ km/h and } N_A < 75\% ESMP.$$

Nevertheless, if there is a down-shift to first gear during the test, the *Motor Cycle* speed ($V_A = 50$ km/h) can be increased up to a maximum of 60 km/h in order to avoid the down-shift.

3.1.2.3.2.2 Position of the manual selector

If a manual selector with X forward positions is fitted to the *Motor Cycle* the test shall be performed with the selector in the highest position; external down-shifting (for example kick-down) shall be excluded. If an automatic down-shift occurs after the line AA', the test will be repeated using the position highest -1 and highest -2 as necessary, until the selector is placed in the highest position allowing the test to be performed without automatic down-shift (without using kick-down).

3.2 Measurement of Noise Emitted by Stationary Motor Cycles

3.2.1 Test site - local conditions see Appendix 1, Fig. 2)

3.2.1.1 Measurements should be made on a stationary *Motor Cycle* in an area which does not present a great deal of disturbance to the sound field.

3.2.1.2 Every open space will be considered as a suitable test site which consists of a flat area made of concrete, asphalt or hard material having a high reflective capacity, excluding compressed or other earth surfaces, in which one can trace a rectangle whose sides are at least three metres from the extremities of the *Motor Cycle*, inside which there is no noticeable obstacle and, in particular, the *Motor Cycle* shall not be positioned at a distance less than one metre from a pavement edge when the exhaust noise is measured.

3.2.1.3 During the test nobody shall stand in the measurement area, except the observer and the rider, whose presence must have no influence on the meter reading.

3.2.2 Disturbance noise and wind interference

The ambient noise levels at each measuring point shall be at least 10 dB(A) below the levels measured during the tests in the same points.

3.2.3 Measuring method

3.2.3.1 Number of measurements

At least three measurements shall be carried out at each measuring point. The measurements should only be considered as valid if the difference between the recordings of three measurements made immediately one after the other is not greater than 2 dB(A). The highest value given by these three measurements will constitute the result.

3.2.3.2 Positioning and preparation of the *Motor Cycle*

The *Motor Cycle* shall be located in the centre part of the test area with the gear lever in neutral position and the clutch engaged. If the design of the *Motor Cycle* does not allow this the *Motor Cycle* shall be tested in conformity with the manufacturer's prescriptions for stationary engine testing. Before each series of measurements, the engine must be brought to its normal operating condition, as specified by the manufacturer.

3.2.3.3 Measuring of noise in proximity to exhaust outlet (see Appendix 1, Fig. 2)

3.2.3.3.1 Positions of the microphone

3.2.3.3.1.1 The height of the microphone above the ground should be equal to that of the outlet pipe of the exhaust gases, but in any event shall be limited to a minimum value of 0.2 m.

3.2.3.3.1.2 The microphone must be pointed towards the orifice of the gas flow and located at a distance of 0.5 m from the latter.

3.2.3.3.1.3 Its axis of maximum sensitivity must be parallel to the ground and must make an angle of $45^{\circ} \pm 10^{\circ}$ with the vertical plane containing the direction of the gas flow. The instructions of the manufacturer of the sound level meter with regard to this axis must be respected. In relation to this plane, the microphone shall be placed in such a way as to obtain the maximum distance from the longitudinal median plane of the *Motor Cycle*; in case of doubt, the position which gives the maximum distance from the contour of the *Motor Cycle* shall be selected.

3.2.3.3.1.4 In the case of a *Motor Cycle* provided with two or more exhaust outlets spaced less than 0.3 m apart, only one measurement is made; the microphone position is related to the outlet nearest to the external side of the *Motor Cycle* or, when such outlet does not exist, to the outlet which is the highest above the ground.

3.2.3.3.1.5 For *Motor Cycles* having exhaust outlets spaced more than 0.3 m apart, one measurement is made for each outlet as if it were the only one, and the highest level is noted.

3.2.3.3.2 Operating conditions of the engine

3.2.3.3.2.1 The engine speed shall be held steady at 50 percent *ESMP*.

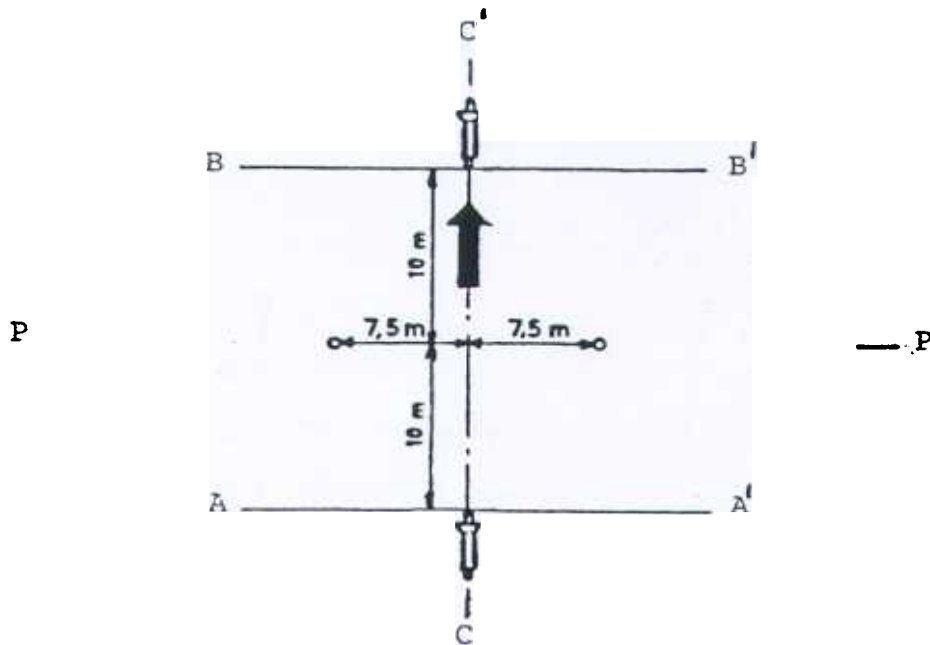
- 3.2.3.3.2.2 When constant engine speed is reached, the throttle shall be returned swiftly to the idle position. The sound level shall be measured during a period of operation consisting of a brief maintenance of constant engine speed and throughout the deceleration period, the maximum deflection of the needle being taken as the test value.

4 INTERPRETATION OF RESULTS

- 4.1 The figure recorded shall be that corresponding to the highest sound level. Should that figure exceed by more than one dB(A) the maximum sound level authorized for the category of *Motor Cycle* tested, a second series of two measurements shall be made. Three out of the four results so obtained must fall within the prescribed limits.

Appendix 1

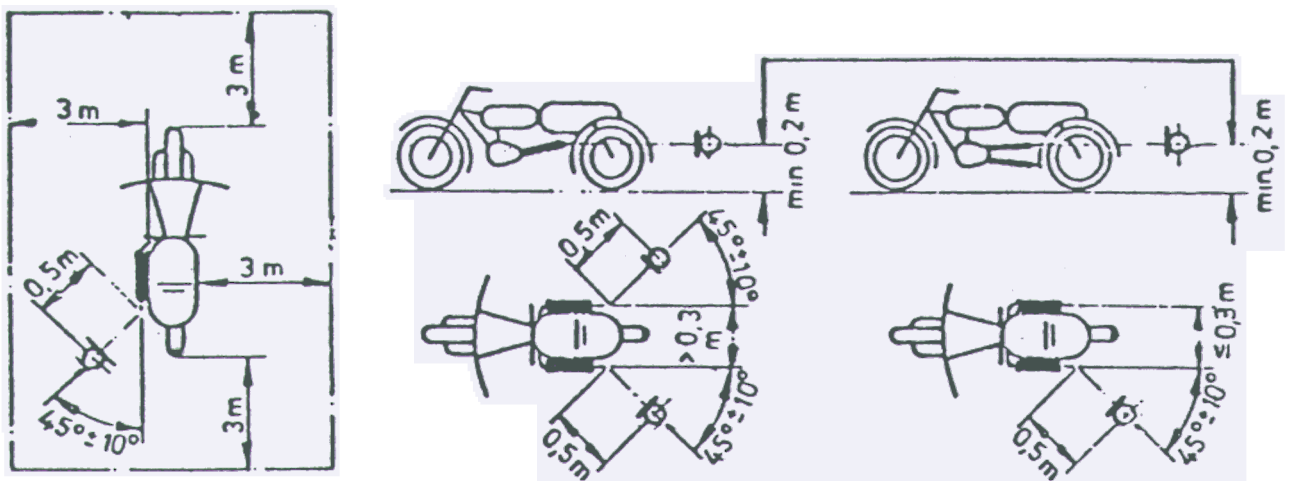
MEASURING POSITIONS FOR MOTOR CYCLES IN MOTION



1)

MEASURING POSITIONS FOR STATIONARY MOTOR CYCLES

Height of exhaust pipe centre - line



2)

Appendix 2

Table 1

MAXIMUM PERMISSIBLE SOUND LEVEL
FOR RIDE - BY TEST (NEW MOTOR CYCLES)

<u>Category of Motor Cycle</u>	<u>Engine Cylinder Capacity (ECC)</u>	<u>Values expressed in dB(A)</u>
First category	$ECC \leq 80 \text{ cm}^3$	77
Second category	$80 \text{ cm}^3 < ECC \leq 175 \text{ cm}^3$	80
Third category	$ECC > 175 \text{ cm}^3$	82

Table 2

MAXIMUM PERMISSIBLE SOUND LEVEL
FOR STATIONARY TEST (NEW MOTOR CYCLES)

<u>Category of Motor Cycle</u>	<u>Engine Cylinder Capacity</u>	<u>Values expressed in dB(A)</u>
A11	A11	94