

**PAKISTAN STANDARDS SPECIFICATION
F O R
TWO WHEELER AUTO VEHICLES**



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**Pakistan Standards and Quality Control Authority(PSQCA)
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TWO WHEELER AUTO VEHICLES

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**PAKISTAN STANDARDS SPECIFICATION
FOR
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0. FOREWORD:

- 0.1** This Pakistan Standard was adopted by the authority of the Board of Directors for Pakistan Standards & Quality Control Authority after the draft prepared by the Sectional Committee for “Prime Movers” (MDC-13) was approved and endorsed by the Mechanical Engineering Divisional Council on _____.
- 0.2** This Pakistan Standard has been prepared after taking assistance, from the following Pakistan Standards, Japanese Standards, Canadian Standards, Thai Industrial Standard & Environmental Protection Agency (EPA) regulation which is acknowledged with thanks.
- i. PS: 4710-2001 Mopeds and motorcycles with two wheels – Masses- Vocabulary.**
 - ii. PS: 4711-2001 Motorcycles – Measurement of maximum speed.**
 - iii. PS: 4712-2001 Motorcycles-Brakes and braking devices- tests and measurement methods.**
 - iv. PS: 4713-2001 Three Wheeled mopeds and motorcycles- Masses – Vocabulary**
 - v. PS: 4714-2001 Two-Wheeled Motorcycles – Parking Stability of side- and Center-Stands.**
 - vi. JIS D 5302/97 Lead –Acid Batteries for Motor cycles.**
 - vii. Canadian Document Motor vehicle safety regulations- Vehicle Emission (standard 1100)**
 - viii. TIS: 1105-2535 (1992) Motorcycles: Safety requirements.**
 - ix. EPA – SRO No. 742(1)/93. (Emission Standard)**
- 0.3** This Pakistan Standard was first prepared in 2001 by the special committee (created for formulation of standards on 2 / 3 wheeler auto vehicles). Now keeping in view the latest development for accommodating the two and four stroke engines and minimizing the environmental pollution for these engines and economizing the use of motorcycle, this standard is revised.

- 0.4** This standard is subject to periodical review in order to keep pace with developments in technologies. Any suggestion for improvement will be recorded and placed before the concerned committee in due course.

1. Scope

This Standard specifies the requirements for Two Wheeler Auto Vehicles (Motorcycles).

- 1.1 This standard specifies requirements, marking, labeling, sampling and criteria for conformity.
- 1.2 This standard covers only motorcycles with an unladen mass of less than 400 kg, a maximum designed speed exceeding 40 km per hour and cylinder capacity up to 150 cc.
- 1.3 This standard covers safety requirements and limitation of emission of gaseous pollutants.

2. Definitions

For the purpose of this standard the following definitions apply.

- i Two Wheeler Auto vehicle (Motorcycle):** Motorcycle means a vehicle that has a head lamp, tail lamp, stop lamp and two wheels and a kerb mass of less than or equal to 680 Kg. It does not include a restricted – used motorcycle, a competition vehicle, and all – terrain vehicle, a vehicle that has an engine displacement of less than 50 cm³ (3.1 cubic inches) or a vehicle that, with an 80 kg driver, can not
- (a) start from a dead stop using only the engine, or
 - (b) exceed a speed of 40 km/hour (25m.p.h.) on a level paved surface.
- ii. Type:** Motorcycles of the same mark-maker, having the same type of engine and gear, assembled on the same main assembly jig.
- iii. Braking system and components**
- (a) **Braking System:** Combination of parts (other than the engine) the function of which is progressively to reduce the speed of a moving motorcycle, bring it to a halt and keep it stationary if it is already halted, consisting of
 - The control.
 - The transmissions;
 - The brake(s).
 - (b) **Control:** Part operated directly by the rider to supply to the transmission the energy required for braking or controlling the motorcycle.
 - (c) **Transmission:** Combination of components which provide the functional link between the control and brake.
 - (d) **Brake:** Parts of the braking system in which the forces opposing the movement of the motorcycle are developed.

iv. Types of braking systems

(a) Independent braking system

In the case of motorcycles (with an engine cylinder capacity exceeding 50 cc or a design speed exceeding 50 km / hour) system which acts on only one wheel.

(b) Combined braking system

In the case of motorcycle (with an engine cylinder capacity exceeding 50 cc or a design speed exceeding 50 km / hour) system whereby at least two brakes on different wheels are actuated by the operation of a single control.

v. Parking stand

(a) Side stand: Retractable device which supports a stationary two wheeled motorcycle by leaving both tyres in contact with the parking surface and providing a third contact area with the parking surface on only one side of the vehicle longitudinal plane.

(b) Centre / Main-stand: Retractable device which supports a stationary two wheeled motorcycle by providing two or more contact areas between the stand and parking surface. With at least one contact area on each side of the vehicle longitudinal plane. The center-stand may support the motorcycle entirely or in conjunction with one or both tyres.

vi. Lead – acid batteries for motorcycles: A battery intended to be mounted on a motorcycle for the power source of starting, lighting, ignition, etc.

The battery having such function resulted from its construction that supplement of water is not necessary because the oxygen gas generated from the positive plate react to and absorbed in the negative plate is called “sealed type battery”, and other batteries than this are classified as “vented type battery”.

Further, that battery of which high rate discharge characteristics have been improved by using the separators of lower resistance than that of conventional one among the vented type batteries is called “high performance type battery”, and the battery other than this one is called “normal type battery”.

3. EMISSION

3.1. Emission From Engine: Hydrocarbons, carbon-monoxide, and oxides of nitrogen in addition to the sound emitted from motorcycles.

3.2 Hydrocarbons: Hydrocarbon compounds derived from non-combustion or incomplete combustion of fuel in the engine.

- 3.3 Carbon-monoxide:** Carbon-monoxide resulting from incomplete combustion in the engine.
- 3.4 Oxides of Nitrogen:** Compounds of nitrogen and oxygen resulting from combustion in the engine.
- 3.5 “Sound level”** means the root-mean-square of the values measured in dBA that are recorded during testing.
- 3.5.1** “dBA” means the A-weighted sound level in decibels, measured using a sound level meter.
- 3.5.2** “decibel” or “dB” means 20 times the logarithm to the base 10 of the ratio of the measured sound pressure relative to a reference sound pressure of 20 mPa.
- 3.6** “rated engine speed” or “maximum rated engine speed” means the rotational speed of an engine in revolutions per minute (RPM) at which the maximum horsepower of the engine is attained. (maximum rated engine speed).

4. REQUIREMENTS FOR EMISSION

- 4.1** The following requirements for emission shall be met

Table-1
Quality Standard for vehicle exhaust and noise

S. No.	Parameter	Standard (maximum permissible limit)	Measuring
1.	Smoke	40 % or 2 on the Ringlmann scale during engine acceleration more.	To be compared with Ringlmann chart at and distance of 6 meters or more
2.	Carbon Monoxide	<u>Emission Standards</u> New Vehicle Used Vehicle 4.5 % * 6 %	Under idling condition: Non-dispersive infrared detection through gas analyzer.
3.	Noise	85 dBA	Sound-meter at 7.5 meters from the source.

* shall not be applicable in the case of licensing process.

5. Marking and labelling

- 5.1** At least there shall be affixed, legibly, clearly and permanently, to any part of the engine of every motorcycle, number, letter or mark representing the model of the engine corresponding to the motorcycle.
- 5.2** Any person who manufactures products complying with this standard may use the PS Mark in connection with his products only after having received a license from the Pakistan Standard and Quality Control Authority.

6. Sampling and criteria of conformity for production conformity test

- 6.1 Lot:** Motorcycles of the same type as those previously deemed to comply with this standard which are manufactured or delivered or purchased at the same time, not to exceed 5000 in number.

6.1.2 Sampling

Three sample shall be drawn at random from the lot.

7. Testing

7.1 General Requirements

- 7.1.1** All analytical equipment shall have an accuracy of measurement to within $\pm 3\%$. The flame ionization analyzer for hydrocarbon determination shall be capable of reaching 90 % of full scale in less than 1 second.
- 7.1.2** The content of the test and calibration gases shall not differ by more than $\pm 2\%$ from the reference value of each gas. The diluent shall be nitrogen.

7.2 Test condition

- 7.2.1** The temperature in the test room shall be maintained between 20°C throughout the test.
- 7.2.2** The motorcycles tested must be approximately horizontal during the test so as to avoid any abnormal distribution of the fuel.
- 7.2.3** The blower shall incorporate a dynamometer, be capable of producing a wind speed variable to the speed of the roller, so that within the range of 10-50 km/h. the initial linear wind speed is within 10 % of the relative speed. For roller speeds below 10 km/h, the wind speed may be very low. The final section of the blower shall have the following characteristics.

Cross-sectional area	0.4	m ²
Height of lower edge above the ground	0.15 - 0.20	m
Distance from the front of motorcycle	0.3 - 0.45	m

- 7.2.4 During the test, the speed shall be plotted against time so that the correctness of the cycles performs can be assessed. The temperatures of the cooling water and the crank-case oil should also be recorded.
8. The specification of two wheeler auto vehicle (Motorcycle) shall be as specified in table 2.

Table –2

SPECIFICATION FOR 2 & 4 – STROKE TWO WHEELER AUTO VEHICLES
(MOTORCYCLE)

SL.#	ITEMS	SPECIFICATIONS	REFERENCE STANDARD METHODS
(1)	(2)	(3)	(4)
1	Type of engine	Two & Four stroke	
2.	Over all length Over all width Over all height	2200 mm (max) 850 mm (max) 1300 mm (max)	
3.	Wheel base	1150 mm (min)	
4.	Fuel consumption	45 km/liter (min) up to 100 cc 30 km / liter (min) above 100 cc	
5.	Fuel tank capacity	4 liter (min)	
6.	Lubricating oil capacity (min)	0.9 to 1.2 liter (min) for above 100 cc 0.5 liter (min) up to 100 cc	
7.	Battery	12 volt	
8.	Brake (Front /Rear)	Drum type / Disc type	PS:4712/2001
9.	Transmission	Three to five	
10.	Dry weight	150 kg (max)	
11.	Clutch	Wet multiple type	
12.	Starting	Kick starter and or self start	
13.	Frame	Back bone or cradle type, strong body	
14.	Maximum speed	180 km / hour	
15.	Drive system	Chain or direct Axle	
16.	Stands	Parking sides & Center / main stand	
17.	Head light	Beam type 20 watts (min)	
18.	Tail light	Red colour with 5 watts built in separate reflector of area 600 mm ² (min)	
19.	Turn signal	Yellow or orange (blinking type) 5 watts (min)	
20.	Brake light	Red colour 10 watts (min)	
21.	Side reflector L/R	Yellow or orange area 800 mm ²	
22.	Horn	80 dB (min) C scale	
23.	Chain cover	Full cover / half cover	
24.	Back view Mirrors	Shall be provided and so fitted on right and left side of the handle bar to enable the rider to have view of the road in road in the rear of the vehicle	
25.	Exterior sound / Emission Standard level	See Table -1	EPA - SRO