

**PAKISTAN STANDARD SPECIFICATIONS**  
**FOR**  
**TWO WHEELER MOTORCYCLE**

**PS: 4707 -2010 (R)**



**PAKISTAN STANDARDS & QUALITY CONTROL AUTHORITY**  
**STANDARDS DEVELOPMENT CENTRE**  
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**PAKISTAN STANDARDS SPECIFICATION  
FOR  
TWO WHEELER AUTO VEHICLES**

**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 Technical Committee (TC-13) for “Prime Movers” was approved and endorsed by the Mechanical Engineering National Standards Committee on 26-01-2011.(for Motor Cycle & Mopeds see ICS No. 43.140 & 43.120 Electric Road Vehicles).
- 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 that 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, 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 electrical & four stroke engines and minimizing the environmental pollution for these engines and economizing for 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, Electric Motorcycles/Mopeds/Scooters).

- 1.1 This standard specifies marking, labeling, sampling requirements and distribution criteria for conformity.
- 1.2 This standard covers only motorcycles with laden & unladen mass of less than 400 kg, a maximum designed speed exceeding 40 km per hour and cylinder capacity up to minimum 50 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 cm<sup>3</sup> (3.1 cubic inches) or a vehicle that, with an 80 kg driver, can
  - (a) start from a dead stop using only the engine, or electric motor which can
  - (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 is 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”.

**NOTE:** Only PS Mark battery should be used.

**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.



**4. ENGINE NOISE TEST:**

**4.1** “Sound level” means the root-mean-square of the values measured in dBA that are recorded during testing.

**4.2** “dBA” means the A-weighted sound level in decibels, measured using a sound level meter.

**4.3** “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.

**4.4 Engine Torque Test:**

“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 ).

**5. Marking and labeling:**

**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 and its maximum rated engine speed corresponding to the motorcycle.

**5.2** Any person who manufacture 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 500 in number.

**6.1.2 Sampling:**

Three samples shall be drawn at random from the lot.

**7. Testing:** i) Raw material  
ii) Sub- assembly i.e. galvanized coating and paint thickness.  
iii) Finished Product

In-house testing of samples on test stand and record should be maintained for six months.

**7.1 General Requirements for Testing Line:**

**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 diluents 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. The temperature of oil before and after test should be recorded.
- 7.2.2** The motorcycles tested must be approximately horizontal during the test 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 <sup>2</sup>
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 Test Result:**

In-house testing of samples and keeping the record of test for six months.

- 7.2.5** During the test, the speed shall be plotted against time so that the correctness of the cycles performed can be assessed. The temperature of the cooling water and the crank-case oil should also be recorded.

**8. DISTRIBUTION STANDARD:**

- A.** For establishment of Brand Distribution and service systems, the domestic manufacturer / assembler and foreign automaker / importer / agents will comply the following conditions.
1. It must be imported directly from the manufacturer or through authorized export or import agent.
  2. Assure warranty for at least 6 months.
  3. To offer maintenance services through authorized services dealer workshop.
- B.** Manufacturer will be responsible for informing the public on change of model.
- C.** To establish, sale service and spare parts network in major cities of the country and to publicizing their address in a way that the public is aware of these facilities.
- D.** Manufacturers / assemblers will not provide product to un-authorized dealer.
- E.** Manufacturers / assemblers will provide product to dealer with Sales Tax Invoice and will submit declaration on stamp paper to comply with the Sales Tax Act 1990.

**9. Other Specifications:**

- 9.1** The specifications of two-wheeler auto vehicle (Motorcycle) shall be as specified below in the Table – 1.
- 9.2** The specifications of two-wheeler auto vehicle (Electric) shall be as specified below in the Table – 2.

**9.1 TABLE –1: SPECIFICATIONS FOR 4 – STROKE TWO WHEELER AUTO VEHICLE (MOTORCYCLE)**

Sr.#	ITEMS	SPECIFICATIONS		REF. STANDARD/ METHODS
(1)	(2)	(3)		(4)
1	Type of engine	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	(min)45 km/liter up to 100 cc (min)30 km / liter 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 0.9 liter (min) up to 100 cc		
7.	Battery	12 volt with PS Mark / PSQCA certified only		
8.	Brake (Front /Rear)	Drum type / Disc type		
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	Side Parking & Center / main Stands		
17.	Head light	Beam type 20 watts (min)		
18.	Tail light	Red color with 5 watts built in separate reflector of area 600 mm <sup>2</sup> (min)		
19.	Turn signal	Yellow or orange (blinking type) with 05 watts (min)		
20.	Brake light	Red color with 10 watts (min)		
21.	Side reflector L/R	Yellow or orange area 300 mm <sup>2</sup>		
22.	Horn	80 dB (min) on C-Scale		
23.	Chain cover	Full cover / Half cover		
24.	Back view Mirrors	Shall be provided and so fitted on right and left sides of the handle bar to enable the rider to have a back view of the road in the rear of the vehicle.		
25.	<b><u>Speedometer</u></b>  a. Calibration  b. Clear lens visibility  c. Clear needle visibility	<b><u>Requirements</u></b>  With test bench speedometer that should already be calibrated  Clearly visible digits through lens in day and in dark  Clearly visible needle in day light and in dark		
<b>Quality Standard for vehicle Exhaust and Noise</b>				
26.	Carbon monoxide , (CO)	<u>Emission standards</u>  <u>New vehicle</u> <u>Used vehicle</u>  4.5 (max)      6% (max.)		Under idling condition: Non-dispersive infrared detection through gas analyzer.  Amended EPA-SRO No. 742(I)/93(2008)
27.	Noise	85 dBA (max.)		Sound-meter at 7.5 meters from the source  Amended EPA-SRO No. 742(I)/93(2008)
28.	Smoke , (HC)	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  Amended EPA-SRO No. 742(I)/93(2008)

**9.2 TABLE –2: SPECIFICATIONS FOR ELECTRIC MOTORCYCLE / MOPEDS / SCOOTERS**

Sr.	ITEMS	SPECIFICATIONS		REF. STANDARD/ METHODS
(1)	(2)	(3)		(4)
1.	Driven (Electric Power)	Electric Motor		
2.	Over all length Over all width Over all height	2200 mm (max) 850 mm (max) 1300 mm (max)		
3.	Running Time/Fuel Consumption	80 km per Full Charging (max.)		
4.	Fuel Consumption/Running Time	35 km/liter per Full Charging (min.)		
5.	Battery	Rechargeable Dry Battery with Charger.		
6.	Charging Time	4 to 5 hours per Full Charge(max.)		
7.	Charging Speed	16Vx3=48V (20x3=60Amp)		
8.	Brake	Rear & Front, Should be Provided		
9.	Transfer of Power (Drive System)	Chain / Shaft / Belt drive		
10.	Dry weight	150 kg (max.)		
11.	Starting	Kick starter and or self start		
12.	Frame	Back bone or Under bone or cradle type metallic strong body		
13.	Speed	40 ~ 80 km per hour		
14.	Stands	Both (Side & Main) Stands		
15.	Head light	Beam type 20 watts (min)		
16.	Tail light	Red color with 5 watts built in separate reflector of area 600 mm <sup>2</sup> (min)		
17.	Turn signal	Yellow or orange (blinking type) with 05 watts (min)		
18.	Brake light	Red color with 10 watts (min)		
19.	Side reflector L/R	Yellow or orange area 300 mm <sup>2</sup> (min)		
20.	Horn	80 dB (min.) on C-Scale		
21.	Back view Mirrors	Shall be provided and so fitted on right and left sides of the handle bar to enable the rider to have a back view of the road in the rear of the vehicle.		
22.	Maximum Torque	Greater than 50cc (Defro Motor Power) / 2 hp		
23.	Caring Capacity	With 80 kg driver can: a. be started from dead stop b. Exceed speed of 40 km/hr		
24.	<b>Speedometer</b> a. Calibration b. Clear lens visibility(Digital) c. Clear needle visibility	<b>Requirements:</b> With test bench speedometer that should already be calibrated. Clearly visible digits through lens in day and in dark. Clearly visible needle in day light and in dark.		
25.	Carbon monoxide	<u>Emission standards</u> <u>New vehicle</u> <u>Used vehicle</u> 4.5 % (max)      6 % (max.)	Under idling condition: Non-dispersive infrared detection through gas analyzer.	N/A
26.	Noise	85 dBA (max.)	Sound-meter at 7.5 meters from the source	Amended EPA-SRO No. 742(I)/93(2008)
27.	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	N/A