

PS:4708/2005 (R)

**PAKISTAN STANDARD SPECIFICATION
F O R
THREE WHEELER AUTO VEHICLES
(I.C.S. No. 43.080.99)**



(All Rights Reserved)

**Pakistan Standards and Quality Control Authority(PSQCA)
Standards Development Centre (SDC)
39-Garden Road, Saddar, Karachi-74400**

**PAKISTAN STANDARD SPECIFICATION
FOR
THREE WHEELER AUTO VEHICLES**

**MEMBER LIST OF SECTIONAL COMMITTEE
FOR PRIME MOVERS (MDC-13).**

Chairman

Engr. Syed Ali H . Naqvi,
Dy. General Manager,
M/s. Karachi Shipyard & Engineering Works (Pvt) Ltd.
Karachi.

Participants

1. Mr. M. Yamin Khan,
DIG Traffic,
Sindh Police,
Karachi.
2. Director,
Industries,
Government of Sindh,
Karachi.
3. Mr. Noor-ul-Haq Kakar
Secretary District Regional Transport Authority
Quetta, Balochistan.
4. Engr. Dr. Khursheed Mahmood,
Professor,
On behalf of Chairman
Mechanical Engg. Department,
NED University of Engg. & Technology,
Karachi.
5. Mr. Asif Farid
General Manager (AT&TC),
Representing EDB
6. Mr. Shoukat Ali
Pakistan Machine Tool Factory
Landhi, Karachi.

7. Mr. Tanveer Ahmed Siddiqui
Executive Quality Control Department
Sindh Engineering (Pvt) limited (PACO)
Karachi.
8. Mr. Midhat Azim Kidwai
Chief Executive officer,
M/s. Suzuki Motorcycles,
Karachi.
9. Mr. Yunus Dawood,
Chairman & Chief Executive Officer,
M/s. Dawood Yahama Limited,
Karachi.
10. Mr. Maqsood Ahmed Basra
General manager,
M/s. Atlas Honda Limited
Sheikhupura Road, Lahore.
11. Mr. Saeed Ahmed Khan,
Chief Commercial Manager
P.C.I.C.S., Limited (Sohrab Motorcycle)
Lahore.
12. Engr. Muhammad Siddiqui,
Deputy Manager,
Pak. Suzuki Motor Company
13. Mr. Rana Abdul Qayyum,
M/s. Miraj Auto,
Lahore.
14. Mr. Mohammad Farooq Bhatti,
M/s. Blue Star Automobile,
S.I.E.
Kohat.
15. Dr. Naeem
M/s. Memon Associate
Hyderabad.
16. Mr. Riaz Ahmed,
Manager,
M/s. Supper Star Auto Rickshaw and Motorcycle,
Lahore.

PAKISTAN STANDARD SPECIFICATION FOR THREE 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 Sectional Committee for prime movers, (MDC-13) was approved and endorsed by the Mechanical Engineering Divisional Council.
- 0.2** This Pakistan Standard has been prepared after taking assistance, from the following Pakistan Standards, Canadian Standard, Thai Standard and the Environmental Protection Agency (EPA) regulation, which is acknowledged with thanks.
- i. PS: 4710-2001 Mopeds and motorcycles with two wheels – Masses- Vocabulary.**
 - ii. PS: 4712-2001 Motorcycles-Brakes and braking devices-tests and measurement.**
 - iii. PS: 4713-2001 Three- Wheel mopeds and motorcycles – masses – vocabulary.**
 - iv. Canadian Documents: Motor vehicle safety regulations – vehicle emission (Standard 1100)**
 - v. TIS: 1105-2535 (1992) Motorcycles Safety requirements**
 - vi. 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 auto rickshaw, 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 Three Wheeler Auto Vehicles (Auto-Rickshaw).

- 1.1 This standard specifies requirements marking and labeling , sampling and criteria for conformity.
- 1.2 This standard covers only three wheelers Auto Rickshaw with a kerb mass less than or equal to 680 kg, maximum designed speed exceeding 40 km /hour (25.m.p.h) and cylinder capacity up to 175 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 Three Wheeler Auto vehicle (Auto-Rickshaw): means a vehicle that has a head lamp, tail lamp, stop lamp and three wheels and a kerb mass of less than or equal to 680 Kg. It does not include a restricted – used Auto-Rickshaw, a competition vehicle and all terrain vehicle, a vehicle that has an engine displacement of less than 100cc or a vehicle that, with a 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. 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 auto-rickshaw, 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 auto rickshaw.
- (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 auto rickshaw are developed

iii. Types of braking systems

(a) Independent braking system

In the case of vehicles with three symmetrically arranged wheels in relation to the longitudinal median axis, with a maximum mass not exceeding 1000 kg and either an engine cylinder capacity exceeding 50 cc or a design speed exceeding 50 km / hour system which acts on one or two wheels.

(b) Combined braking system

In the case of vehicle with three symmetrical arranged wheels in relation to the longitudinal median axis, with a maximum mass not exceeding 100 kg and either an engine cylinder exceeding 50 cc or a design speed exceeding 50 km / hour system which operates on all the three wheels.

iv. Auto Rickshaw loading

(a) **Laden auto rickshaw:** Auto rickshaw laden so as to reach its manufacturer's maximum total mass as defined in PS:4710:2001 or PS: 4713:2001, including the mass of the rider and the equipment or instrumentation as described in clause 5.3 of PS 4712:2001, with the mass distribution(s) on the axles as stated by the auto rickshaw manufacturer.

(b) **Unladen auto rickshaw:** Auto rickshaw in the condition vehicle kerb mass as defined in PS: 4710:2001 or in the condition bare chassis mass in working order as defined in PS: 4713:2001 to which are added the mass of the rider, the equipment and instrumentation as described in clause 5.3 of PS:4712:2001

v. **Maximum speed:** Speed which the auto rickshaw can attain when tested in accordance with PS:4711:2001

3. EMISSION

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

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 Ringmann scale during engine acceleration more.	To be compared with Ringmann chart at and distance of 6 meters or more				
2.	Carbon Monoxide	<p style="text-align: center;"><u>Emission Standards</u></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;"><u>New Vehicle</u></td> <td style="text-align: center; border: none;"><u>Used Vehicle</u></td> </tr> <tr> <td style="text-align: center; border: none;">4.5 %</td> <td style="text-align: center; border: none;">** 6 %</td> </tr> </table>	<u>New Vehicle</u>	<u>Used Vehicle</u>	4.5 %	** 6 %	Under idling condition: Non-dispersive infrared detection through gas analyzer.
<u>New Vehicle</u>	<u>Used Vehicle</u>						
4.5 %	** 6 %						
3.	Noise	85 dB A	Sound-meter at 7.5 meters from the source.				

* Optional for Petrol & CNG drive 2 & 3 wheeler Auto Vehicle.

** 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 auto rickshaw, number, letter or mark representing the model of the engine corresponding to the auto rickshaw.

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: Auto rickshaws 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 5 000 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 ± 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 ± 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 auto rickshaws 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 Auto Rickshaw	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. Specification for three wheeler auto vehicle (Auto rickshaw) should be as per table –2

9. The chassis provided as per Table –3

10. Carriage / Body (optional)

- a) The carriage /seating space should be of any suitable design with the provision as per table –3
(The carriage / seating space may be fixed along with the motorcycle after exclusion of its rear wheel)
- b) One design of carriage / seating space is shown in figure 1.

- 11.** The specification of two wheeler auto vehicle (Auto rickshaw) should be as specified in table 2 to 4.

Table-2
SPECIFICATIONS FOR 2 OR 4 – STROKE THREE WHEELER AUTO VEHICLES (AUTO RICKSHAW)

S. #	Item	Specifications	Reference standard/ documents
01	Load Bearing Capacity	Excluding the driver weight, this three wheeler should bear a load of 400 kg (max)	
02	Wheel Track	1070 to 1160 mm.	
03	Total Length	2150 to 2900 mm.	
04	Total Width	1200 to 1350 mm.	
05	Maximum Height	1650 to 1950 mm	
06	Wheel Base	1650 to 2000 mm	
07	Engine	2 or 4 Stroke	
08	Bore	44 to 65 mm	
09	Brake	Hydraulic / Mechanical, Drum	
10	Hand Brake (Parking Brake)	Shall be provided	
11	Turning circle	4300 to 5850mm	
12	Piston displacement	80 to 200 cc	
13	Capacity of Fuel Tank	4 liter (min)	
14	Consumption	25 km / liter (min)	
15	Speed	Up to 75 Km / hour	
16	Fuel	Petrol / CNG	
17	Suspension	Front: Shock absorber and adjustable balance rods Rear: Leaf spring	
18	Transmission	4/5 forward + 1 reverse* 1 litre (min)	
19	Lubricating oil Sump capacity	1.5 litre	
20	Clutch type	Wet multi disc type	
21	Battery	12 V 40 Amp.	
22	Head light	25/ 25 w	
23	Horn	80 dB (min)	
24	Ignition	Hand kick starter	
25	Exterior Sound / Emission Standard level	Smoke (optional)**	EPA Standard

* Optional for Motorcycle Rickshaw

** Optional for Petrol & CNG drive 2& 3 wheeler Auto Vehicle.

Table-3**PROVISION TO BE PROVIDED FOR CHASSIS OF AN AUTO RICKSHAW**

N A M E	SPECIFICATION
ENGINE	Shall be 2 & 4 stroke with minimum power of 100 cc.
SUSPENSION	Shall be of leaf spring or coil spring and shock absorber. Adjustable balance rods shall also be used.
TRANSMISSION	Shall be rear wheel drive power transmitted to both the rear wheels by differential through chain or propeller shaft.
BRAKES	Front brake shall be mechanical and rear brakes shall be hydraulic/mechanical.
HAND BRAKES	Should be provided.
TURNING CIRCLE	Turning Circle shall be 488 cm (16 feet) (maximum)
WIND SCREEN	Shall be of glass or plastic so constituted or treated that if fractured, it does not fly into fragments capable of causing severe cuts.
WIND WIPER	Manual or electrical windscreen wiper shall be fitted.
EXHAUST PIPE	Exhaust pipe shall be extended up to the extreme rear side middle of the chassis outlet thereof shall be placed far enough to prevent smoke or fumes from entering the vehicle.
ELECTRIC WIRE LAMPS	<p>All electric wires and leads shall be adequately insulated.</p> <p>a) Two obligatory lamps showing white light visible from a distance of 150 cm (5 feet), shall be fitted in the front</p> <p>b) Two red lamps not exceeding height of 106 cm (3' and 6") shall be fitted on the rear side of the vehicle.</p> <p>c) There shall be one headlamp fitted in the center on front side.</p>
SPARE WHEEL	Shall be equipped with a spare wheel with tyre.

Table-4**PROVISION TO BE PROVIDED FOR THE CARRIAGE OF AN AUTO RICKSHAW.**

NAME	SPECIFICATION
SEATING CAPACITY	Three (3) or Seven (7) persons including driver.
SAFETY BAR	There shall be a partition between the driver and passengers and with safety bars.
PROVISION OF DOORS,	(OPTIONAL)
PROTECTION FROM WEATHER	The passengers shall be provided protection from weather by means of fiberglass or any suitable water-resistant material.
OVER HANG	Rear over hang shall not be more than 68 cm (27 inches).
SEAT	Every passenger shall be provided with at least 38 cm (15") x 38 cm (15") seats.
SEATING HEIGHT	Shall not be less than 30 cm (12 inches) measured from floor board.
BACKREST	Every passenger shall be provided with backrest of 40 cm (16 inches) height minimum.
ROOF	Watertight roof shall be provided which shall cover completely the area from windscreen to the extreme rear edge of the vehicle.
HEIGHT OF ROOF	The internal height of the roof measured from the seat level to any point vertically above each seat shall not be more than 1060mm.
LEG ROOM BACK	Every passenger shall be provided with legroom not less than 32.5 cm (13 inches).
FLOOR BOARD	Shall be strong made of suitable material so closely fitted covered to prevent smoke or dust from entering in.
ENTRANCE LEVEL	In case of empty vehicle the entrance level (step of floor board) shall not be less than 30 cm (12 inches) and more than 55 cm (22 inches).
MIRRORS	Shall be provided internally and externally so fitted as to enable the driver to have view of the road in the rear of the vehicle.

INDICATORS	<p>a) There shall be four indicators. Two shall be fitted on the front and two on the rear on left and right side of the body in each case.</p> <p>b) The front direction indicator shall be visible at 45° on rear side.</p> <p>c) Two stoplights shall be fitted on rear side in red color indicate its stationary position.</p> <p>d) No decoration light shall be fitted on exterior of the body.</p>
OVERALL LENGTH	Shall not be more than 289 cm (9 feet and 6 inches).
OVERALL WIDTH	Shall not be more than 142 cm (4 feet and 8 inches).
OVERALL HEIGHT	Shall not be more than 182 cm (6 feet) measured from the ground shall be equipped with a spare wheel with tyre.
CONSTRUCTION OF BODY	<p>Shall be of steel construction Steel sheet, steel angle or steel section or steel tube of following gauge shall be used</p> <ol style="list-style-type: none"> a. M.S. sheet of 14 gauge per 2.1 mm. b. Steel pipe of 20 x 20 x 1.5 mm for side walls of body reinforcement and pillars. c. For re-enforcement of pillars steel angle iron of 32 x 6 x 3 mm 1 1/4" x 1/4" x 1/8 min square steel pipe (20 x 20 x 1.2 mm) d. To fasten the body to the Chassis for re-enforcement steel flat plate 32 x 6 mm 1 (1/4" x 1/4" min.). e. Steel angle 40x40x2.5 mm/ steel square pipe 40x40x3mm in the Chassis frame f. For re-enforcement of the chassis Steel angle 30 x 30 x 2 mm g. For the linkage of rickshaw chassis with the Motorcycle, steel pipe of 30x30x2 mm h. For differential tubular pipe of 48 x 5 mm i. For making bridge on the different a steel tubular pipe 42 x 4 mm.