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DRAFT
PAKISTAN STANDARD SPECIFICATION FOR TRICYCLE L2, L4 & L5 CATEGORY AND QUADRICYCLE L6 & L7 CATEGORY VEHICLES
DPSS: 4708-2023 (Draft)

PSQCA Complex, Standardization, Plot-ST-7/A, Block-3, Scheme No.36, Gulistan-e-Jauher, Karachi.

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Table of Contents

0.

PAKISTAN STANDARD SPECIFICATIONS
FOR
L2, L4, L5, L6 AND L7 CATEGORY AUTO VEHICLES

PSS: XXXX-2023 (Draft)

0 FOREWORD

NOT Withstand any other standard for "L2, L4, L5, L6 and L7" category vehicles (as defined in the *Consolidated Resolution on the Construction of Vehicles* ECE/TRANS/WP.29/78/Rev.5) except "PSS 4708-2023"

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 and finalized by the Technical Committee for Three Wheeler Auto Vehicles (TC-03) and was approved and endorsed by the National Standards Committee on _____.

0.2 This Pakistan Standard is prepared after taking into consideration the views and suggestions of manufacturers, specialists and utilizing agencies. This Pakistan Standard has been revised after considering WP.29 Regulations for the complete vehicle standard specification. Pakistan has become signatory and it is imperative to follow, if we want to export our products Worldwide.

0.3 This Pakistan Standard was first prepared in 2001 and then revised in 2005, 2008, 2009 and 2012. Now keeping in view, the latest developments for accommodating WP-29 Regulations of L Category, hence the necessary amendments have been made in this standard.

0.4 This standard is subject to periodical review in order to keep pace with developments in technologies and these vehicles acceptable worldwide so that Pakistan export of automobile may increase many folds. Any suggestion for improvement will be recorded and placed before the concerned committee in due course.

0.5 With reference to National Standard Committee Meeting Ref: # PSQCA/SDC/AUTO/NSC/DMM-19/2020, Dated 08-03-2023, Standard for L6, L7 is also being incorporated in this document.

1 SCOPE

1.1 This Standard specifies the requirements for 'L' Category Vehicles including gasoline & electric vehicles (L2, L4, L5, L6 & L7) Category which have either separate closed rear area or an open platform normally used for the transport of goods and passengers.

1.2 This standard specifies marking, labeling, sampling requirements, testing and distribution criteria for conformity.

1.3 This standard covers General vehicle specifications, Active Safety, Passive Safety, General Safety and Environment Safety.

1.4 This standard does not cover competition vehicles and special purpose vehicles. (Other than Disable Persons vehicles and Ambulances.)

2 DEFINITIONS

2.1 Vehicle: A 'L-category' vehicle that is ready to use on road and comprising of the following;

2.1.1 Single/coupled chassis frame

2.1.2 Complete body, built with hood frame, hood cover and driver seat

2.1.3 Passenger seats in accordance with the applicable specifications (as per specs define in each category)

2.1.4 A wind screen (for closed cabin type vehicles)

2.1.5 At least one head lamp, turn signals, reflectors for vehicle broad configurations (specified in Table 1)

2.1.6 Power-train comprising of a single engine/electric motor(s) having suitable power to weight ratio, an efficient and

2.1.7 Safe transmission and safe braking system

2.1.8 An efficient and safe steering system.

2.1.9 Speedo meter, Neutral indicator and Temperature gauge (for water cooled engines only).

2.1.10 Power-driven vehicle: Means any gasoline/diesel engine or electric powered, self-propelled, wheeled, road vehicle other than a rail-borne vehicle.

2.1.11 Motor vehicle: Means any power-driven vehicle which is normally used for carrying persons or goods by road or for drawing, on the road, vehicles used for the carriage of persons or goods. This term embraces trolley-buses, that is to say, vehicles connected to an electric conductor and not rail-borne. It does not cover vehicles such as agricultural tractors, which are only incidentally used for carrying persons or goods by road or for drawing, on the road, vehicles used for the carriage of persons or goods.

2.1.12 Passenger: Means the travelers of the vehicle including driver of the vehicle are said to be the passengers.

2.1.13 Driver: Means the person who operates the machine/vehicle in a manner as specified by the manufacturer.

2.1.14 Manufacturer: Means the person or body who is responsible to the Type Approval Authority (TAA) for all aspects of the type of approval process and for ensuring the conformity of production. It is not essential that the person or body is directly involved in all stages of the construction of the vehicle or component which is the subject of the approval process.

2.1.15 Vehicle type: Vehicle type is a Group of attributes used to define the vehicle. The vehicle type can define the mode of transportation and which units of measure are used for volume and weight. The vehicle category, as defined

a) The gross vehicle mass,
b) Velocity maximum;
c) A different type of braking device;
d) The engine type;
e) The final drive ratios;
f) The tire dimensions.
g) Single/ chassis frame
h) Complete body with hood frame, hood cover and driver seat

2.1.16 Classification of Vehicles: Vehicle category classifies a land vehicle or trailer for regulatory purposes. This standard applies only to the following categories of vehicles:

A. Category L2:

A three-wheeled vehicle of any wheel arrangement with an engine cylinder capacity in the case of a thermic engine not exceeding 50 cm3 and whatever the means of propulsion a maximum design speed not exceeding 50 km/h.

B. Category L4:

A vehicle with three wheels asymmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm3 or whatever the means of propulsion at a maximum design speed exceeding 50km/h (motor cycles with sidecars).

C. Category L5:

A vehicle with three wheels symmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in case of a thermic engine exceeding 50 cm3 or whatever the means of propulsion at a maximum design speed exceeding 50 km/h.

D. Category L6:

A vehicle with four wheels whose unladen mass is not more than 350 kg, not including the mass of the batteries in case of electric vehicles, whose maximum design speed is not more than 50 km/h and whose engine cylinder capacity does not exceed 50 cm3 for spark ignition engine, or whose maximum net power output does not exceed 4 kW in the case of other internal combustion engine, or whose maximum continuous rated power does not exceed 4 kW in the case of electric engines.

E. Category L7:

A vehicle with four wheels, other than that classified for the category L6, whose unladen mass is not more than 400kg (550 kg for vehicles intended for carrying of goods), not including the mass of batteries in the case of electric vehicles and whose maximum continuous rated power does not exceed 15 kW.

*[Note: **For better understanding of classification of vehicle and the sub-classification of vehicle please see Annex-I. In this annex each vehicle is defined through photographs for easy understanding also because "L" category of vehicle has very wide range of products and uses in the world that's why its classification is further divided into sub-classification also.]*

2.2 Passenger: A person that travels in the vehicle including driver of the vehicle.

2.3 Test Speed: Means the vehicle speed measured the moment the driver begins to actuate the brake control(s). For tests where the simultaneous actuation of two controls is specified, the vehicle speed is taken from the point the first control is actuated as defined in UN Regulation No. 78.

2.4 Transmission: Means the combination of components that provide the functional link between the control and the brake as defined in UN Regulation no. 78

2.5 Audible Signals of Cycles: The provision of a bell is compulsory on cycles with auxiliary engines (if this category of vehicle is provided for in National Regulations). This bell may, however, be replaced by a warning device. This audible sound shall be in conformity with the provisions of UN Regulation No. 28, however the sound-pressure level of the device fitted to the vehicle shall be equal to or greater than 76 dB(A).

2.6 Braking system and components

2.6.1 A*ntilock Brake System (ABS)*" means a system which senses wheel slip and automatically modulates the pressure producing the braking forces at the wheel(s) to limit the degree of wheel slip.

2.6.2 "*Baseline test*" means a stop or a series of stops carried out in order to confirm the performance of

the brake prior to subjecting it to a further test such as the heating procedure or wet brake stop.

2.6.3 "Brake" means those parts of the brake system where the forces opposing the movement of the vehicle are developed.

2.6.4 "Brake system" means the combination of parts consisting of the control, transmission, and brake, but excluding the engine, whose function it is to progressively reduce the speed of a moving vehicle, bring it to a halt, and keep it stationary when halted.

2.6.5 "Combined brake system (CBS)" means:

2.6.6 For vehicle categories L5, L6 and L7: a service brake system where the brakes on all wheels are operated by the actuation of a single control.

2.6.7 "Components of the braking system" means one of the individual parts which, when assembled, constitute the braking system.

2.6.8 "Control" means the part actuated directly by the rider in order to supply or control the energy required for braking the vehicle to the transmission.

2.6.9 "Different types of braking systems" means devices which differ in such essential respects as:

a) Components having different characteristics;

b) A component made of materials having different characteristics, or a component differing in shape or size;

c) A different assembly of the components.

2.6.10 "Driver mass" means the nominal mass of a driver that shall be 75 kg (subdivided into 68 kg occupant mass at the seat and 7 kg luggage mass).

2.6.11 "Engine disconnected" means when the engine is no longer connected to the driving wheel(s).

2.6.12 "Gross vehicle mass" or "maximum mass" means the technically permissible maximum laden mass as declared by the manufacturer.

2.6.13 "Initial brake temperature" means the temperature of the hottest brake before any brake application.

2.6.14 "Laden" means so loaded as to attain the gross vehicle mass as defined in paragraph 2.12.

2.6.15 "Lightly loaded" means mass in running order plus 15 kg for test equipment, or the laden condition, whichever is less. In the case of ABS tests on a low friction surface (Annex 3, paragraphs 9.4. to 9.7.), the mass for test equipment is increased to 30 kg to account for outriggers.

2.6.16 "Mass in running order" means the sum of the unladen vehicle mass and driver mass.

2.6.17 "Peak braking coefficient (PBC)" means the measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre.

2.6.18 Power-assisted braking system" means a brake system in which the energy necessary to produce the braking force is supplied by the physical effort of the rider assisted by one or more energy supplying

devices, for example vacuum assisted (with vacuum booster).

2.6.19 "Secondary brake system" means the second service brake system on a vehicle equipped with a combined brake system.

2.6.20 “Service brake system" means a brake system which is used for slowing the vehicle when in motion.

2.6.21 "Single brake system" means a brake system which acts on only one axle.

2.6.22 "Split service brake system (SSBS)" means a brake system that operates the brakes on all wheels, consisting of two or more subsystems actuated by a single control designed so that a single failure in any subsystem (such as a leakage type failure of a hydraulic subsystem) does not impair the operation of any other subsystem.

2.6.23 "Stopping distance" means the distance travelled by the vehicle from the point the rider begins to actuate the brake control to the point at which the vehicle reaches a full stop. For tests where the simultaneous actuation of two controls is specified, the distance travelled is taken from the point the first control is actuated.

2.6.24 "Test speed" means the vehicle speed measured the moment the driver begins to actuate the brake control(s). For tests where the simultaneous actuation of two controls is specified, the vehicle speed is taken from the point the first control is actuated.

2.6.25 "Transmission" means the combination of components that provide the functional link between the control and the brake.

2.6.26 "Unladen vehicle mass" means the nominal mass of the vehicle as indicated by the manufacturer(s) including all factory fitted equipment for normal operation of that vehicle (e.g. fire extinguisher, tools, spare wheel), plus coolant, oils, 90 per cent of fuel and 100 per cent of other gas or liquids, as specified by the manufacturer.

2.6.27 "Vehicle type" means a sub-category of L-category vehicles as defined in para 2.1.14 above.

2.6.28 "Vmax" means either the speed attainable by accelerating at a maximum rate from a standing start for a distance of 1.6 km on a level surface, with the vehicle lightly loaded, or the speed measured in accordance with ISO 7117:1995.

2.6.29 "Wheel lock" means the condition that occurs when there is a slip ratio of 1.00.

2.6.30 "Emergency braking signal" means logic signal indicating emergency braking specified in paragraphs 5.1.15. to 5.1.15.2. of this Regulation.

2.6.31 "Braking Signal" means a logic signal indicating when illumination of the stop lamp is required or allowed as specified in paragraph 5.1.17. of this Regulation.

2.6.32 Electric Regenerative Braking System" means a braking system which, during deceleration, provides for the conversion of vehicle kinetic energy into electrical energy and is not part of the service

braking system. “Disable the antilock brake system" means to put the system into a state where it will no longer fulfil the technical requirements in paragraph 9 of Annex 3 to this Regulation."

2.8 Vehicle Mass and Dimensions

2.8.1 Mass of a vehicle in running order: means the mass of an un-laden vehicle with bodywork, and with coupling device in the case of a towing vehicle, or the mass of the chassis with cab if the manufacturer does not fit the bodywork and/or coupling device, including coolant, oils, 90 per cent of fuel, 100 per cent of other liquids except used waters, tools, spare wheel, driver (75 kg).

2.8.2 Laden Vehicle Mass: Vehicle laden with the maximum limits of loadable mass as claimed by O.E.M

2.8.3 Un-laden Vehicle Mass: The verifiable vehicle mass as defined by the O.E.M. without any passenger and carriage loads.

2.8.4 Maximum Dimensions: The maximum dimensions authorized for L-Category three or four-wheel motor vehicles are as follows;

Length	4.0 meter
Width	2.0 meter
Height	2.50 meter

2.8.5 Maximum Masses:

2.8.5.1 The maximum un-laden masses for L-Category three or four-wheel motor vehicles are as follows (no account is taken of the mass of traction batteries for electric vehicles):

I. 270 kgs for Tricycles: of Category L2.

II. 425 kgs for tricycles; of category, L5

2.8.5.2 The maximum un-laden masses for L-Category three or four-wheel motor vehicles are as follows (no account is taken of the mass of traction batteries for electric vehicles):

a) 270 kgs for Tricycles: of Category L2.

b) 425 kgs for tricycles; of category, L5

2.8.5.3 Four-wheel motor vehicles (Quadricycles) (L6 and L7 category) (no account is taken of the mass of traction batteries for electric vehicles)

a) 350 kg; of category of L6

b) 450 kg; of category L7 for transport of passengers

c) 600kg; of category L7 for transport of goods

2.9 Attainable Speed Test: Max. Speed multiplied by 0.95 that a vehicle can attain when tested on a vehicle test bench without any air resistance simulation mechanism.

2.10 Emission from Engine: Smoke, Carbon-monoxide, Hydrocarbon and Oxides of Nitrogen (HC + NOx) in addition to the sound emitted from vehicle during idling [as per SRO 742(1)/93] and load condition. [Smoke valid and HC + NOx optional; till implementation of Ministry of Environment's S.R.O.72(Ke)/2009] as defined in UN Regulation no. 40.

2.10.1 Hydrocarbons**:** Hydrocarbon compounds derived from non-combustion or incomplete combustion of fuel in the engine emitted during idling and load condition. (To be measured and added toNOx).

2.10.2 Oxides of Nitrogen: Compound of nitrogen and oxygen resulting from combustion in the engine. (To be measured and added to HC).

2.10.3 Carbon-monoxide: Carbon-monoxide resulting from incomplete combustion in the engine.

2.10.4 Smoke: The particulate matter emitted through the vehicle exhaust as measure with some suitable equipment (i.e., smoke gun/ pump using ringlemann chart or smoke meter).

2.11 Sound Level: It means the root-mean-square of the values measured in dBA that are recorded at 7.5 meters from source. "dBA" means the A-weighted sound level in decibels, measured using a sound level meter as defined in UN Regulation no. 28.

2.12 Horn Sound: It means the root-mean-square of the values measured in dBC that are recorded during testing of the vehicle as emitted from vehicle horn. "dBC" means the C-weighted sound level in decibels, measured using a sound level meter as defined in UN Regulation no. 28.

2.13 Decibel (dB): It 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.

2.14 Engine Leak Prevention Test: Any suitable system to assure leak prevention of engine or its parts

2.15 Engine Idling RPM Test: The rotational speed of an engine in rotations per minute (RPM) at which the engine is in idling condition to ensure uniform engine tune-up of vehicle as tested by any suitable RPM meter at idle speed.

2.16 Ground Clearance:

The ground clearance between the axles means the shortest distance between the ground plane and the lowest fixed point of the vehicle as mentioned in ECE/TRANS/WP.29/78/Rev.6. Ground clearance beneath one axle means the distance beneath the highest point of the arc of a circle passing through the center of the tyre footprint of the wheels on one axle and touching the lowest fixed points of the vehicles between the wheels.

2.17 Road Clearance:

The road Clearance for the purpose of this Pakistan Standard shall be defined as the height of any part of a vehicle that would touch first if the height of a conventional speed breaker (a continuous heaped surface on road perpendicular to the traffic flow direction) is gradually increased. The road clearance is to be measured using laden vehicle with standard vehicle equipment. Road clearance may not be affected by the differential or any such part of the vehicle that does not create any hindrance in crossing a conventional speed breaker due to the height provided by tires while crossing such surfaces as mentioned in ECE/TRANS/WP.29/78/Rev.6.

3 PROCEDURE FOR THE ADMINISTRATIVE REQUIREMENTS FOR THE APPROVAL OF L2, L4, L5, L6 AND L7 CATEGORY VEHICLE (THREE WHEEL AND FOUR WHEEL)

3.1 APPLICATION FOR APPROVAL

3.1.1 The application for approval of a vehicle type with regard to its construction, safeties and environmental protection shall be submitted by the vehicle manufacturer or by their authorized representative.

3.1.2 This document includes only the requirements for categories L2, L4, L5, L6 and L7 Tricycles and Quadricycles.

3.1.3 The under mentioned documents in triplicate should be attached with this application:

3.1.3.1 A description of the vehicle type with regard to the items specified in paragraph 2.1 and in Annex-I. The symbols identifying the vehicle type shall be specified;

3.1.3.2 A vehicle, sample representative of the vehicle type to be approved, shall be submitted to the technical service responsible for conducting the approval verifications.

3.1.3.3 A list of type of approval certification about active safety as per table, duly identified, constituting the vehicle as mentioned in Annex-I.

3.2 APPROVAL

3.2.1 If the vehicle type submitted for approval pursuant to this Standard meets the requirements, at least, the approval of that vehicle type shall be granted.

3.2.2 An approval number shall be assigned to each type approved. Its first two digits shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation, if any, at the time of issuance of the approval. The same applicant Party shall not assign the same number to the same vehicle type equipped with another type of devices such as (brake system, lighting system, exhaust system etc.) or to another vehicle type.

3.2.3 There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation

3.2.4 The approval mark shall be clearly legible and be indelible.

3.2.5 The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.

3.2.6 Annex 2 to this Regulation gives examples of arrangements of Approval marks.

3.2.7 Assemblers shall assure warranty of vehicle for at least three (03) months or 5000km whichever comes earlier, in-case of defects the assemblers shall offer free service /spare parts

3.2.8 The assembler /manufacturer shall offer availability of after sales service and parts/

maintenance through authorized service dealer workshop in the area of sales.

3.2.9 The assembler /manufacturer shall be responsible for informing the public on change of model.

3.2.10 The assembler /manufacturer shall establish sales dealerships and service cum spare parts facilitation through warranty centers in major cities of the country and publicize their address in a way that the public should be aware of these facilities.

3.2.11 The assembler /manufacturer shall not sell any vehicle without sales tax invoice and is bound to submit quarterly production reports; in accordance of applicable S.R.O. of Ministry of Science and Technology; to PSQCA.

3.2.12 Checklist of documentation to be shown at the time of inspection as evidence of QA /QC for Assembly units defined by PSQCA is annexed (Annex-A).

3.2.13 QA/QC Check List: (See Annex – A).

3.3 CONFORMITY OF PRODUCTION

3.3.1 Every vehicle (system) approved to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth. In order to verify that the requirements are met, suitable controls of the production shall be carried out.

3.3.2 The approval holder shall ensure existence of procedures for the effective control of the quality of products.

3.3.3 The approval holder shall provide access to the control equipment necessary for checking the conformity to each type approval.

3.3.4 The approval holder shall Ensure that data of test results are recorded and that annexed documents shall remain available for a period to be determined in accordance with the Type Approval Authority

3.3.5 The approval holder shall analyze the results of each type of test, in order to verify and ensure the stability of the product characteristics making allowance for variation of industrial production

3.3.6 The approval holder shall ensure that any sampling of samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production

3.3.7 The Type Approval Authority which has granted type approval may at any time verify the conformity control methods applicable to each production unit.

3.3.8 In every inspection, the test books and production survey records shall be presented to the visiting inspector; The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.

3.3.9 When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application, the inspector shall select samples to be sent to the Technical Service which has conducted the type-approval tests

3.3.10 The Type Approval Authority may carry out any test prescribed in this Regulation. The normal frequency of inspections authorized by the Type Approval Authority shall be once every two years. In the case where negative results are recorded during one of these visits, the Type Approval Authority's shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.

3.4 MARKING AND LABELLING

3.4.1 At least there shall be affixed, legibly, clearly and permanently; to any part of the engine and chassis of every vehicle; number, letter or mark representing the model of the vehicle corresponding to the engine and chassis.

3.4.2 Any unit that manufacturer's products complying with this standard shall use the PS Mark in connection with its products only after having received license from the Pakistan Standards and Quality Control Authority. Sale of production without PS Mark is prohibited.

3.4.3 Vehicle Technical Specification to be Communicated:

I. General: Manufacturer's Name, Address, Name of model and variants, Category of vehicle, Max. Design Speed, km/h.

II. Transmission: Type (Manual/Automatic/semi-automatic); Overall transmission ratio 1st, 2nd, 3rd, 4th, 5th, Over drive.

III. Weight (kg): Weight in running order, Front axle, Rear axle, Un-laden vehicle weight, combined weight of Front axle & Rear axle.

IV. Service Braking system: Type (drum / disc/leading/trailing), Front, Rear, Other, Make, Front, Rear, Other.

V. Services Control System (operate by Hand/foot): Front, Rear, Combined Free play of Control, front, Rear, Combined, Brake Pedal ratio, Hand lever ratio.

VI. Services Brake – Transmission Type: Mechanical/Hydraulic

VII. Services Brake Drum or Disc Effective Dia mm: Front, Rear and other Material (if the braking surface is non-ferrous).

a. Nominal Size of master cylinder mm

b. Nominal Size of wheel cylinder mm: Front, Rear, and other

c. Parking Brake: Braking Wheel, Type, Control (operated by hand /foot), Locking devices

VIII. Tyre: Tyre size and ply rating, Front wheel, Rear wheel and other wheel, Inflation Pressure-Un-laden(kg/cm²), Front, Rear, Other wheel Inflation Pressure-Laden kg/cm², Front, Rear and other wheel.

3.5 CRITERIA FOR LOT AND SAMPLING FOR CONFORMITY TESTIING

3.5.1 LOT SIZE: Vehicles of the same type as those previously deemed to comply with this standard, which are manufactured or delivered or purchased at the same time.

a. A lot shall not exceed 500 in number for the purpose of QA /QC.

b. A minimum number of 5 - 10 units must be offered for sampling of 03 units (to be picked up at random) for inspection / surveillance by PSQCA.

3.6 TESTING P ROCEDURES & RECORDS:

A sequence of test cases in execution order, and any associated actions that may be required to set up the initial preconditions and any wrap up activities post execution.

3.7 TEST RECORDS:

In –house testing of samples and records of test shall be maintained for a minimum period of 2 years.

3.8 VEHICLE SPECIFICATIONS:

3.8.1 The specifications for L-Category Vehicles shall be in compliance with the General Requirements as mentioned in Table-1-5.

3.8.2 The specifications for Quadricycles shall be in compliance with the General Requirements as mentioned in Table- 6–13

3.8.3 The specifications for Electric Vehicle shall be in compliance with the General Requirements Table-15.

TABLE-01

Construction of Vehicle for Category **L5 TRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UNR eg	PS-4708
1.	Overall length	≤ 4000 mm	To be measured using extreme ends.		
2.	Overall Width with folded mirrors	≤ 2000 mm	To be measured using extreme ends.		
3.	Overall Height from the ground	≤ 2500 mm	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track (mm)	950 – 1450	To be measured from the center of the wheel on either side		
5.	Wheel base (mm)	1400 - 3500	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang	≤1300 mm	Distance from the extreme ends to the start of the wheel		
7.	Unladen Weights kgs (maximum)	350 kgs - 500 kgs	Vehicle Weight including all standard accessories and lubricants without passenger measured		
8.	Available seat size per passenger	38 cm x 38 cm (min.)	Padding Thickness should be 25mm min for comfortable level		
9.	Passenger seat backrest	40 cm x 38 cm (min.)	Optional for driver seat.		
10.	Passenger Seating height	30 cm (min.)	May be reduced to 22 cm (min.) in case bucket seats are used		
13.	Leg room for each passenger	33 cm (min.)	Physical measurement to be taken		
14.	Driver Seat (mm/inch)	W: 410/16 x T 25mm	Thickness should be 25mm min for comfortable level		
15.	Driver Seat Height (mm/inch)	410/16 from floorboard	Thickness should be 25mm min for comfortable level		
16.	Driver seat back rest (mm/inch)	410 / 16 x 410/16 x 25mm L x W x T Suitably Foam Filled	Thickness should be 25mm min for comfortable level		
17.	Roof	Soft / Hard Roof for providing weather resistance to occupants	Shall cover all area from wind screen to extreme rear and sides.		
18.	Roof height for each passenger	90cm (min.)	To be measured from highest point of Seat(s) vertically		

			upwards.		
19.	Ground clearance (cm) Min	10	From the levelled surface		
20.	Partitions	Safety bars	Shall be provided between each seating row / compartment.		
21.	Engine	4 Stroke Reciprocating Internal Combustion Engine	To be Examine on test bench as per standard		
22.	Engine Capacity (cc/HP/KW)	≥150cc	Shall have suitable power to weight ratio.		
23.	Fuel Tank	Fire and leak resistant suitable material.	To be fire resistant and leak proof/ physical inspection		
24.	Fuel Tank Capacity	10 Liters (min)	Minimum capacity		
25.	Turning circle diameter	700 cm (max.)	To be measured for both sides		
26.	Suspension a): Front b): Rear	a): Independent Suspension / Coil Spring b): Rigid / Independent	As per standard		
27.	Transmission	4 Forward + 1 Reverse Direct / Through Shaft	There shall be reverse gear System.		
28.	Doors	Optional. Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs		
29.	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
30.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
31.	Wheels	Min 8" – Max 10" Dia Rim Size			
32.	Spare wheel	Same as service tyre			
33.	Tool Kit	Plier x 1 Screw Driver x 1 Spanner (10 x 12) & (14 x 16) x 2 Plug Spanner x 1 Wheel Jack with handle x 1 Wheel Spanner x 1	As per PS standards	75	4708-75
34.	Battery (for all devices except power storage in		As per PS standards		

	case of electrically driven vehicle) for gasoline/CNG/LPG vehicle	12 Volts 26 Ah (min.)			
35.	Number Plates a): Front b): Rear	Standard Visible / Conspicuous space for number plates at the front and rear of the vehicle shall be provided?	Should be able to accommodate the government issued standard size number plate.		
ACTIVE SAFETY for Category L5 TRICYCLE, Mandatory Requirements					
1.	Parking Brake	Mechanical	To keep a fully laden vehicle stationary when parked at a slope of 18%	8	4708-78
2.	Brakes	Mechanical for rickshaw and hydraulic for all others	Mandatory for rear wheels only	8	4708-78
3.	Head Lamp	Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Single light / Double light To be verified through a lux meter	57	4708-57
4.	Front Side Lamp Units	Emitting white light visible from a distance of 7.5 meters in dark. Amber yellow turn signals visible at 45^0 angle from a distance of 15 meters in day lights.	To be verified through a lux meter	50	4708-50
5.	Rear Lamp Units	Tail lamps emitting red light visible from a distance of 15 meters in dark operational when front beam is switched on. Brake indicator lamps emitting red light visible at a distance of 20 meters when operated in day light. Amber yellow turn signals visible at a distance of 15 meters in day light. Reverse gear indicator lamp emitting white light visible at a distance of 20 meters and giving a reasonable view to driver for reversing the vehicle.	To be verified through a lux meter	50	4708-50
6.	Parking Light a): Front b): Rear	Emitting white light visible from a distance of 7.5 meters in dark. Amber yellow turn signals visible at 45^0 angle from a distance of	To be verified through a lux meter	0	4708-50

		15 meters in day lights.			
7.	Brake Lights	Tail lamps emitting red light visible from a distance of 15 meters in dark operational when front beam is switched on. Brake indicator lamps emitting red light visible at a distance of 20 meters when operated in day light. Amber yellow turn signals visible at a distance of 15 meters in day light. Reverse gear indicator lamp emitting white light visible at a distance of 20 meters and giving a reasonable view to driver for reversing the vehicle.	To be verified through a lux meter	0	4708-50
8.	Reverse Light	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 4 ft inches	To be verified through a lux meter	0	4708-50
9.	Direction Indicators	Brake indicator lamps emitting red light visible in day light when brakes are applied	To be verified through a lux meter	0	4708-50
10	Reflector	The size of each reflector must be 400mm^2 at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.		4708-3
11.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	1	4708-81
12.	Electric wiring system	12 V. Meeting Standard IP67	Safety insulated, Shall have proper color coding		
13.	Attainable speed	≥50 km / hr (.)	Shall be measured using a laden vehicle.		
PASSIVE SAFETY for Category L5 TRICYCLE, Mandatory Requirements					
1.	Rear Seating protection (in case the last row of seat(s) faces backwards of the vehicle.	At least a safety bar/chain	Extended from one side of the vehicle to the other at extreme rear and above the seating height but not above the minimum backrest height	6	4708-16
2.	Entrance level for passengers (in case of un-laden vehicle)	30cm – 55cm	As per PS standard		

GENERAL SAFETY for Category L5 TRICYCLE, Mandatory Requirements.					
1.	Speedometer/Odometer	Having Speed indication and distance counter with units.	Accuracy should be confirmed on vehicle test bench	39	4708-39
2.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision.	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	3	4708-43
3.	Wipers	Electric / Manual,	Shall be provided to clear at least 50% of screen area.		
ENVIRONMENT SAFETY for Category L5 TRICYCLE, Mandatory Requirements					
1.	Vehicle noise emissions	85 dbA (max.)	Calculate from db Meter and sensors		4708-9
2.	Vehicle's Horn sound emissions	105 dbC (max.)	Calculate from db Meter and sensors	8	4708-28
3.	Exhaust muffler	Steel pipe extended from engine to the rear end of the vehicle but not protruding beyond rear end of vehicle	Not to extend beyond extreme rear of body and shall nearly horizontal		
4	Exhaust gas emissions	4.5% (NDIR) max. As per NEQS for Motor Vehicles. Exhaust and Noise vide No. (SRO 72(KE)/2009)	For smoke & CO	0	4708-40
5.	CNG / LPG cylinders & kits	OGRA Approved			

TABLE-02

Construction of vehicle for Category **L5 LOADER TRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Wheel track	100cm – 145cm	To be measured from the center of the wheel on either side		
2.	Wheel base	165cm - 250cm	To be measured from the center of the front wheel to the center of rear wheel		
3.	Seating Capacity	1 (Driver Only)			
4.	Unladen Weights kgs (maximum)	425 kgs	Vehicle weight including all standard accessories without passenger measured.		
5.	Partitions between driver & cargo	Safety bars of suitable material	Shall be provided appropriately placed with seat..		
6.	Doors mm/ft a): Front b): Rear:	N/A	Should be connected through hooks and springs		
7.	Body Construction	Made of suitable material to protect from weather and dust	Shall provide protection from weather and dust		

		with enough strength to protect minor side impacts	through floor and abnormal vibration with suitable strengths.		

TABLE-03

Construction of vehicle for Category **L5 PASSANGER 3 SEAT TRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Seating Capacity	3			
2.	Unladen Weights kgs (maximum)	500 kg	Vehicle weight including all standard accessories without passenger measured		
3.	Engine Capacity cc/HP/Kw	≥150cc	Shall have suitable power to weight ratio.		
4.	Fuel Tank	Fire and leakage resistant suitable material	To be fire and leakage resistant, Physical inspection		
5.	Fuel Tank Capacity	10 liters	Minimum Capacity		
6.	Doors mm/ft a): Front b): Rear:	a) Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs		
7.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
8	Attainable speed	≥ 50 km/h	Shall be measured using a laden vehicle.		

TABLE-04

Construction of vehicle for Category **L5 PASSANGER 5 SEAT TRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Seating Capacity	5			
2.	Unladen Weights kgs (maximum)	500 kg	Vehicle weight including all standard accessories without passenger measured		
3.	Engine Capacity cc/HP/Kw	≥175cc	Shall have suitable power to weight ratio.		
4.	Fuel Tank	Fire and leakage resistant suitable material	To be fire and leakage resistant, Physical inspection		
5.	Fuel Tank Capacity	10 liters	Minimum Capacity		
6.	Doors mm/ft a): Front b): Rear:	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs		
7.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
8	Attainable speed	≥ 50 km/h	Shall be measured using a laden vehicle.		

TABLE-05

Construction of vehicle for Category **L5 PASSANGER 7 SEAT TRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Seating Capacity	7			
2.	Unladen Weights kgs (maximum)	500 kg	Vehicle weight including all standard accessories without passenger measured		
3.	Engine Capacity cc/HP/Kw	200cc	Shall have suitable power to weight ratio.		
4.	Fuel Tank	Fire and leakage resistant suitable material	To be fire and leakage resistant, Physical inspection		
5.	Fuel Tank Capacity	10 liters	Minimum Capacity		
6.	Doors mm/ft a): Front b): Rear:	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs		
7.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
8	Attainable speed	≥ 50 km/h	Shall be measured using a laden vehicle.		

TABLE-06

Construction of Vehicle for Category **L6, L7 QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
		Mechanically operated to keep a fully laden vehicle stationary when parked at a slope of 18% (Refer to Annxure – II)	Shall be operated by the rider while seated in a driving position	78	4708-78
	a): Front b): Rear	Hydraulic/ Mechanical Drum/Disc Drum/Disc	Mandatory for all wheels	78	4708-78
3.	Electric wiring system	12 V. Meeting Standard IP67	Safety insulated, Shall have proper colour coding.		
4.	Suspension a): Front b): Rear	a): Independent Suspension b): Rigid or Independent	As per standards.		
5.	Transmission	4 or 5 Speed Forward + 1 Reverse	There shall be reverse gear System.		
6.	Engine	4 Stroke Reciprocating Internal Combustion Engine	Analysis on engine test bench		

7.	Tool Kit	Plier x 1 Screw Driver x 1 Spanner (10 x 12) & (14 x 16) x 2 Plug Spanner x 1 Wheel Jack with handle x 1 Wheel Spanner x 1	There should be at least one kit with each unit.		
8.	Battery for ignition, switches, horn etc	12 Volts 20 Ah (min.)	Inspect each cell of battery. As per PS standard.		
9.	Number Plates a): Front b): Rear	Standard Visible / Conspicuous space for number plates at the front and rear of the vehicle shall be provided?	Should be able to accommodate the government issued standard size number plate.		
10.	Leg room (mm/inch)	405/25	Physical measurement to be taken.		
11.	Front Parking Light	Two obligatory lamps showing to the front on either emitting white light	To be verified through Lux meter	50	4708-50
12.	Brake Lights	Brake indicator lamps emitting red light visible in day light when brakes are applied	To be verified through Lux meter	50	4708-50
13.	Drive mechanism	4 Stroke Reciprocating Internal Combustion Engine/Rotary Internal Combustion Engine / Electric Motor	Shall have suitable power to weight ratio.		
14.	Reverse Light	Emitting white light visible in day light	To be verified through Lux meter	50	4708-50
15.	Direction Indicators	Amber yellow turn signals, two on the front and two on the rear on each side. Option of two on side panels. Front direction indicator should be visible at 45 degree angle	To be verified through Lux meter	50	4708-50
16.	CNG / LPG cylinders & kits	OGRA approved	As per standards		
17.	Entrance level for passengers (in case of un-laden vehicle) (mm/inch)	150 – 450 mm / 6 – 16 inches	As per PS standards		
18.	Electric wires	12 V	Should be insulated as per standard		

ACTIVE SAFETY for Category **L6, L7 QUADRICYCLE,** Mandatory Requirements.

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Parking Brake	Mechanically operated to keep a fully laden vehicle stationary when parked at a slope of 18% (Refer to Annxure – II)	Shall be operated by the rider while seated in a driving position	78	4708-78
2.	Service Brakes	For **L6 & L7** Vehicles shall have configurations that enable a rider to actuate the service brake system control while seated in the normal driving position and with both hands on the steering control.	Braking distance For **L6** Single front brake nly $S \leq 0.1\ V + 0.0143\ V^2$ Single rear brake only $S \leq 0.1\ V + 0.0143\ V^2$ For CBS or Split brakes	78	4708-78

		A foot-actuated service brake system which operates on the brakes on all wheels, by way of either: (a) A split service brake system; or (b) A CBS that operates the brakes on all wheels Drum/Disc Drum/Disc	$S \leq 0.1 V + 0.0087 V^2$ Braking for L7 vehicles $S \leq 0.1 V + 0.0077 V^2$ Where V is the speed of the vehicl in km/hr when brake is applied on a wheels.		
3.	Head Lamp	Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Single light / Double light To be verified through Lux meter	57	4708-57
4.	Front Side Lamp Units	Emitting white light visible from a distance of 7.5 meters in dark. Amber yellow turn signals visible at 45^0 angle from a distance of 15 meters in day lights.	To be verified through Lux meter	50	4708-50
5.	Rear Lamp Units	Tail lamps emitting red light visible from a distance of 15 meters in dark operational when front beam is switched on. Brake indicator lamps emitting red light visible at a distance of 20 meters when operated in day light. Amber yellow turn signals visible at a distance of 15 meters in day light. Reverse gear indicator lamp emitting white light visible at a distance of 20 meters and giving a reasonable view to driver for reversing the vehicle.	To be verified through Lux meter	50	4708-50
6.	Parking Light a): Front b): Rear	Emitting white light visible from a distance of 7.5 meters in dark. Amber yellow turn signals visible at 45^0 angle from a distance of 15 meters in day lights.	To be verified through Lux meter	50	4708-50
7.	Brake Lights	Tail lamps emitting red light visible from a distance of 15 meters in dark operational when front beam is switched on. Brake indicator lamps emitting red light visible at a distance of 20 meters when operated in day light. Amber yellow turn signals visible at a distance of 15 meters in day	To be verified through Lux meter	50	4708-50

		light. Reverse gear indicator lamp emitting white light visible at a distance of 20 meters and giving a reasonable view to driver for reversing the vehicle.			
8.	Reverse Light	Two obligatory lamps showing to the rear on either side emitting white light	To be verified through Lux meter	50	4708-50
9.	Direction Indicators	Indicator lamps emitting yellow light visible in day light when operated	To be verified through Lux meter	50	4708-50
10	Reflector	The size of each reflector must be 10cm x 2cm minimum at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
11.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear	81	4708-81
12.	Electric wiring system	12 V. Meeting Standard IP67	Safety insulated, Shall have proper colour coding.		

GENERAL SAFETY for Category **L6, L7 QUADRICYCLE,** Mandatory Requirements.

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Speedometer/Odometer	Having Speed indication and distance counter with units.	Accuracy should be confirmed on vehicle test bench	39	4708-39
2.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision.	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43

ENVIRONMENT SAFETY for Category **L6, L7 QUADRICYCLE,** Mandatory Requirements.

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Exhaust Pipe	Steel pipe extended from engine to the rear end of the vehicle but not protruding beyond rear sides or end of vehicle Exhaust pipe should be fitted in such a way that it should not cause any fire by touching any body material of the vehicle	Not to extend beyond extreme rear of body and shall nearly horizontal		
2.	Vehicle noise emissions (Scale A Noise)	85 dbA (max.) at a distance of 3 meters	Must comply with National Environmental Quality Standards for Motor Vehicle Exhaust and Noise Vide No.(S.R.O 72(KE)/2009)	9	4708-9
3.	Exhaust gas emissions (CO)	4.5% (NDIR) max.		40	4708-40
4.	Vehicle's Horn sound emissions (Scale C)	105 dbC (max.)		28	4708-28
5.	CNG / LPG cylinders & kits	OGRA Approved	As per standards		

TABLE-07

Construction of Vehicle for Category **L6 ATV QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length mm (max)	4000	To be measured using extreme ends.		
2.	Overall Width with folded mirrors mm (max)	2000	To be measured using extreme ends.		
3.	Overall Height mm (max)	2500	To be measured from the levelled ground surface to the extreme height of the vehicle		
4.	Wheel track (mm)	1060 - 1140	To be measured from the center of the wheel on either side		
5.	Wheel base (mm)	1780 - 2050	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang: a) Front: (max) mm / inch b) Rear: (max) c) Side: (max)				
7.	Seating Capacity	1			
8.	Unladen Weights kgs (maximum)	350	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size	N/A	N/A		
10.	Passenger seat backrest	N/A	N/A		
11.	Passenger Seating height	N/A	N/A		
12.	Driver seat (minimum)	L: 760 mm / 36 inch W: 305 mm / 12 inch	Thickness should be at least 25mm for comfortable level		
13.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
14.	Roof height	N/A	N/A		
15.	Protection from Weather	N/A	N/A		
16.	Ground clearance (cm) Min	10	From the levelled surface.		
17.	Partitions	N/A	N/A		
18.	Engine Capacity cc/HP/Kw	50cc, 6kW	To be examined on test bench as per standards.		
19.	Fuel Tank	Fire and leak resistant suitable Material	To be fire resistant and leak proof, physical inspection		
20.	Fuel Tank Capacity	15 liters	As per PS standards.		
21.	Turning circle diameter	4m – 6m	To be measured for both sides		
22.	Doors mm/ft a): Front b): Rear:	N/A	N/A		
23.	Floor board	N /A	N/A		
24.	Body Construction	N/A	N/A		
25.	Wheels	Min 8” – Max 10” Dia Rim Size	Jack and wheel spanner shall be provided	75	4708-75
26.	Spare wheel	N/A	N/A	75	4708-75
27.	Suspension a) Front b) Rear	NA	NA		

ACTIVE SAFETY for Category **L6 ATV QUADRICYCLE,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Attainable Speed	≥ 45 km/hr	Shall be measured using a laden vehicle.		
2.	Head Lamp	Minimum one light fitted in the center on the front. Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	To be verified using a Lux meter	57	4708-57
3.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 3ft 6inches	To be verified using a Lux meter	50	4708-50
4.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3

TABLE-08

Construction of Vehicle for Category **L6 PASSANGER QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length mm (max)	4000	To be measured using extreme ends.		
2.	Overall Width with folded mirrors (mm)	2000	To be measured using extreme ends.		
3.	Overall Height max mm	2500	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track (mm)	1120 - 1400	To be measured from the centre of the wheel on either side		
5.	Wheel base (mm)	1780 - 2050	To be measured from the centre of the front wheel to the center of the rear wheel		
6.	Overhang: (mm/inch) a) Front: (max) b) Rear: (max) c) Side: (max)	a) 305 / 12 b) 455 / 18 c) 100 / 4	Distance from the extreme ends to the start of the wheel		
7.	Seating Capacity	2			
8.	Unladen Weights kgs (maximum)	425 kgs (max)	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size mm/inch	410/16 x 410/16 x 25mm Thk Equal L x W	Thickness should be 25mm for comfortable level		
10.	Passenger seat backrest mm/inch	410/16 x 410/16 x 25mm Thk Equal L x W	Thickness should be 25mm for comfortable level		
11.	Passenger Seating height mm/inch	410/16 From floor board	May be reduced to 22 cm (min.) in case bucket seats are used		
12.	Driver Seat (mm/inch)	W: 410/16 x 25mm Thk	Thickness should be 25mm for		

			comfortable level		
13.	Driver Seat Height mm/inch	410 / 16 from floor board	As per PS standards		
14.	Driver seat back rest mm/inch	410/16 x 410/16 x 25mm Thk	Thickness should be 25mm for comfortable level		
15.	Roof	Soft Roof Water resistant if installed	Shall cover all area from wind screen to extreme rear and sides.		
16.	Roof height mm / inch	1350/54 from the floor board	To be measured from highest point of Seat(s) vertically upwards.		
17.	Protection with Weather	To covered with suitable hard or soft material if installed.	Shall cover all area from wind screen to extreme rear and sides.		
18.	Ground clearance (cm) Min	10	From the levelled surface		
19.	Partitions	N/A	Shall be provided between each seating row / compartment.		
20.	Engine Capacity	≤ 50 cc or 6 kW	To be examined on test bench as per standards.		
21.	Fuel Tank	Fire and leak resistant suitable Material	To be fire resistant and leak proof, physical inspection		
22.	Fuel Tank Capacity	15 liters	As per PS standards.		
23.	Turning circle diameter	8m – 12m	To be measured for both sides		
24.	Doors mm/ft a): Front b): Rear:	a) Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts b) Optional	Should be connected through hooks and springs Subject to the design requirement according to the provision		
25.	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
26.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
27.	Wheels	10” -12” Dia Rim size	Jack and wheel spanner shall be provided	75	4708-75
28.	Spare Wheels	Same as service tyre	Jack and wheel spanner shall be provided	75	4708-75
29.	Suspension a) Front b) Rear	a) Independent b) Rigid / Independent			

ACTIVE SAFETY for Category **L6 PASSANGER QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Attainable Speed	≤45 km/hr (min.)	Shall be measured using a laden vehicle.		
2.	Head Lamp	Minimum two light fitted on either side on the front. Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	To be verified using a Lux meter	57	4708-57
3.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not	To be verified using a Lux meter	50	4708-50

		exceeding height of 4 ft			
4.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3

GENERAL SAFETY for Category **L6 PASSANGER QUADRICYCLE,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43
2.	Wipers	Equipped with minimum of one motorized wiper to be provided covering at least 60% of the front windscreen when used	Shall be provided to clear at least 50% of screen area.		

TABLE-09

Construction of Vehicle for Category **L6 LOADER QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length mm/inch (max)	3700	To be measured using extreme ends.		
2.	Overall Width with folded mirrors (mm)	1500	To be measured using extreme ends.		
3.	Overall Height max (mm)	2500	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track (mm)	1120 - 1450	To be measured from the center of the wheel on either side		
5.	Wheel base (mm)	1780 - 2440	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang mm/in a) Front: (max) b) Rear: (max) c) Side: (max)	a) 405 / 16 b) 610 / 24 c) 100 / 4	Distance from the extreme ends to the start of the wheel		
7.	Seating Capacity	2			
8.	Unladen Weights (kgs) (maximum)	500	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size (mm/inch)	410/16 x 410/16 x 25mm Equal L x W x T	As per standards		
10.	Passenger seat backrest (mm/inch)	410/16 x 410/16 Suitably Foam Filled min 25mm thickness	Optional for driver seat.		
11.	Seating height for each passenger (mm/inch)	410/16 from floor board	May be reduced to 22 cm (min.) in case bucket seats are used		
13.	Driver Seat (mm/inch)	410/16 x 25mm thickness	Thickness should at least 25mm for		

			comfortable level		
14.	Driver Seat Height (mm/inch)	410/16 from floor board	As per PS standard		
15.	Driver seat back rest (mm/inch)	410/16 x 410/16 Suitably foam filled 25mm Thk	Thickness should at least 25mm for comfortable level		
16.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
17.	Roof height	1350/54 mm/inch from the floor board	To be measured from highest point of Seat(s) vertically upwards.		
18.	Protection with Weather	To covered with suitable hard or soft material	Shall cover all area from wind screen to extreme rear and sides.		
19.	Ground clearance (cm) (min)	10	From the levelled surface		
20.	Partitions	Steel Safety Bar or suitable material	Shall be provided between each seating row / compartment.		
22.	Engine Capacity cc/HP/Kw	≤ 50cc or 6kW	Shall have suitable power to weight ratio.		
23.	Fuel Tank	Fire proof and leakage resistant material	To be fire resistant and leak proof, physical inspection		
24.	Fuel Tank Capacity	15 liters	As per PS standards.		
25.	Turning circle diameter	8m – 12m	To be measured for both sides		
28.	Doors mm/ft a): Front b): Rear:	Lockable Doors with glass windows to be provided to give visibility for safe driving. Suitable protection through solid material i.e., Fiberglass, PVC or metal sheets to be used for door construction. a. Vehicle for Goods: 2 Doors b. Vehicle for Passengers: 4 Doors	Should be connected through hooks and springs		
29.	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
30.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
31.	Wheels	Min 10" – Max 12" Dia Rim Size	Jack and wheel spanner shall be provided	75	4708-75
32.	Suspension a) Front b) Rear	a) Independent b) Rigid / Independent			

ACTIVE SAFETY for Category **L6 LOADER QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
2.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81
3.	Attainable Speed	≥45 km/hr (min.)	Shall be measured using a laden vehicle. (May be 25km/hr for electric vehicles).		

4.	Head Lamp	Minimum two light fitted on either side on the front. Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Double light To be verified through Lux meter	50	4708-50
5.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 4 ft	To be verified through Lux meter	50	4708-50

GENERAL SAFETY for Category **L6 LOADER QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43
2.	Wipers	Equipped with Minimum of one motorized Wiper to be provided covering at least 60% of the front windscreen when used	Shall be provided to clear at least 50% of screen area.		

TABLE-10

Construction of Vehicle for Category **L7 ATV QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Overall length mm/ft (max)	4000	To be measured using extreme ends.		
2.	Overall Width with folded mirrors mm/ft (max)	2000	To be measured using extreme ends.		
3.	Overall Height from the ground mm/ft (max)	2500	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track mm	1120 - 1400	To be measured from the center of the wheel on either side		
5.	Wheel base mm	1780 - 2440	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang (mm/inch) a) Front: (max) b) Rear: (max) c) Side: (max)		NA		
7.	Seating Capacity	2	As per PS standards		
8.	Unladen Weights kgs (max)	450	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size (mm/inch)	410/16 x 410/16 x 25mm Thk	Thickness should at least 25mm for comfortable level		
10.	Passenger seat backrest	N/A	N/A		
11.	Passenger Seating height (mm/in)	410/16	May be reduced to 22 cm (min.) in		

			case bucket seats are used		
12.	Partitions	N/A	N/A		
13.	Driver Seat (mm/inch) (minimum)	355/14	Thickness should at least 25mm for comfortable level		
14.	Driver Seat Height mm/inch (minimum)	410/16 from floor board	Thickness should at least 25mm for comfortable level		
15.	Driver seat back rest	N/A	N/A		
16.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
17.	Roof height	N/A	To be measured from highest point of Seat(s) vertically upwards.		
18.	Protection with Weather	N/A	Shall cover all area from wind screen to extreme rear and sides.		
19.	Ground clearance (cm) Min	10	From the levelled surface.		
20.	Engine Capacity cc/HP/Kw	≤ 70cc, 6kW	Shall have suitable power to weight ratio.		
21.	Fuel Tank	Fire proof and leakage resistant suitable material	To be fire resistant and leak proof, physical inspection		
22.	Fuel Tank Capacity	15 liters	As per PS standards.		
23.	Turning circle diameter	6 m – 8 m	To be measured for both sides		
24.	Doors mm/ft a): Front b): Rear:	N/A	N/A		
25.	Floor board	N/A	N/A		
26.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
27.	Wheels (Minimum)	8" – 10" Dia Rim size	Jack and wheel spanner shall be provided	75	4708-75
28.	Spare wheel	Same as service tyre	Jack and wheel spanner shall be provided	75	4708-75
29.	Footrests for Driver	Must be available on both sided	Strong enough to bear the load		
30.	Number Plates a): Front b): Rear	Standard Visible / Conspicuous space for number plates at the front and rear of the vehicle shall be provided?			
31.	Suspension a) Front b) Rear	a) Independent b) Rigid / Independent			

ACTIVE SAFETY for Category **L7 ATV QUADRICYCLE,** Mandatory Requirements.

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
2.	Rear View mirrors	Provided externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81
3.	Attainable Speed	≤ 70 km/hr (min.)	Shall be measured using a laden vehicle. (May be 25km/hr for electric vehicles).		
4.	Head Lamp	Minimum one light fitted in the center on the front. Low beam at 0mm 16500 lux(min.)	Double light To be verified by PSQCA (Measuring instrument not	57	4708-57

		75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	mandatory for Unit)		
5.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 3ft 6inches		50	4708-50

TABLE-11

Construction of Vehicle for Category **L7 PASSANGER (2-SEATER) QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length mm/inch (max)	4000	To be measured using extreme ends.		
2.	Overall Width with folded mirrors mm/inch	2000	To be measured using extreme ends.		
3.	Overall Height mm/inch	2500	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track mm	1120 - 1400	To be measured from the center of the wheel on either side		
5.	Wheel base mm	1780 - 2440	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang a) Front: (max) Mm/inch b) Rear: (max) c) Side: (max)	a) 305 / 12 b) 455 / 18 c) 100 / 4	Distance from the extreme ends to the start of the wheel		
7.	Seating Capacity	2	As per PS standards.		
8.	Unladen Weights kgs (maximum)	450 kg (max)	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size (mm/inch)	410/16 x 410/16 x 25mm Thk			
10.	Passenger seat backrest (mm /inch)	410 / 16 x 410 / 16 Suitably Foam Filled min 25mm Thk	Optional for driver seat.		
11.	Passenger Seating height mm/inch	410/25 from floor board	May be reduced to 22 cm (min.) in case bucket seats are used		
12.	Driver Seat (mm/inch)	410/16 x 25mm Thickness	Thickness should be 25mm for comfortable level		
13.	Driver Seat Height (mm/inch)	410/16 from floor board	As per standards		
14.	Driver seat back rest (mm/inch)	410/16 x 410/16 x 25 mm Thk	Thickness should be 25mm for comfortable level		
15.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
16.	Roof height	1350 / 54 mm / inch from the floor board	To be measured from highest point of Seat(s) vertically upwards.		
17.	Protection with Weather	To covered with suitable hard or soft material	Shall cover all area from wind screen to extreme rear and sides.		
18.	Ground clearance	10 cm min	From the levelled surface.		
19.	Partitions	N/A	N/A		
20.	Wheels	10" – 12" Dia Rim size	Jack and wheel spanner shall be provided	75	4708-75

21.	Spare wheel	Same as the service tyre	Jack and wheel spanner shall be provided	75	4708-75
22.	Engine Capacity cc/HP/Kw	≤ 250 cc or 15 kW	Shall have suitable power to weight ratio.		
23.	Fuel Tank	Fire proof and leakage resistant safety material	To be fire and leak resistant, physical inspection		
24.	Fuel Tank Capacity	15 liters	Minimum capacity		
25.	Turning circle diameter	8m – 12m	To be measured for both sides		
26.	Doors mm/ft a): Front b): Rear:	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs or hinges		
27.	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
28.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
29.	Suspension a) Front b) Rear	a) Independent b) Rigid / Independent			

ACTIVE SAFETY for Category **L7 PASSANGER (2-SEATER) QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Head Lamp	Minimum two light fitted on either side on the front. Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Double light To be verified through Lux meter	57	4708-57
2.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 4 ft	To be verified through Lux meter	50	4708-50
3.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
4.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81
5.	Attainable Speed	≤ 70 km / hr (max.)	Shall be measured using a laden vehicle.		

GENERAL SAFETY for Category **L7 PASSANGER (2-SEATER) QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**

1.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43
2.	Wipers	Equipped with Minimum of one motorized Wiper to be provided covering at least 60% of the front windscreen when used	Shall be provided to clear at least 50% of screen area.		

TABLE-12

Construction of Vehicle for Category **L7 PASSANGER (4-SEATER) QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length (mm/in) (max)	3700	To be measured using extreme ends.		
2.	Overall Width with folded mirrors Max (mm/inch)	1500	To be measured using extreme ends.		
3.	Overall Height (mm/inch)	2500	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track (mm)	1120 - 1400	To be measured from the center of the wheel on either side		
5.	Wheel base (mm)	1780 - 2440	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang (mm/inch) a) Front: (max) b) Rear: (max) c) Side: (max)	a) 305 / 12 mm / ft b) 455 / 18 mm/ ft c) 100 / 4 mm / ft	Distance from the extreme ends to the start of the wheel		
7.	Seating Capacity (persons)	4	As per PS standards		
8.	Unladen Weights kgs (max)	450	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size (mm/in)	410/16 x 410/16 x 25mm Thk	As per standard.		
10.	Passenger seat backrest (mm/in)	410/16 x 410/16 x 25mm Thk Suitably Foam Filled	Thickness should be 25mm for comfortable level		
11.	Passenger Seating height (mm / inch)	410/16 from floor board	May be reduced to 22 cm (min.) in case bucket seats are used		
12.	Driver Seat (mm/inch)	410/16 x 25mm Thk	Thickness should be 25mm for comfortable level		
13.	Driver Seat Height	410/16 from floor board	As per standard.		
14.	Driver seat back rest (mm/inch)	410/16 x 410/16 x 25mm Thk	Thickness should be 25mm for comfortable level		
15.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
16.	Roof height	1350/54 mm/inch from the floor board	To be measured from highest point of Seat(s) vertically upwards.		
17.	Protection with Weather	To covered with suitable hard or soft material	Shall cover all area from wind screen to extreme rear and sides.		
18.	Ground clearance (cm) (min)	10	From the levelled surface		
19.	Partitions	N/A	Shall be provided between each seating row / compartment.		

20.	Turning circle diameter	8 m – 12 m	To be measured for both sides		
21.	Engine Capacity cc/HP/Kw	≤ 250cc or 15kW	Shall have suitable power to weight ratio.		
22.	Fuel Tank	Fire proof and leakage resistant suitable material	To be fire and leak resistant/ physical Inspection		
23.	Fuel Tank Capacity	15 liters	As per PS standards		
24.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
25.	Wheels	Min 10" – 12" Dia Rim size	Jack and wheel spanner shall be provided	75	4708-75
26.	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
27.	Doors mm/ft a): Front b): Rear:	a) Both front and rear Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs		
28.	Spare wheel	Same as the service tyre	Jack and wheel spanner shall be provided	75	4708-75
29.	Suspension a) Front b) Rear	a) Independent b) Rigid / Independent			

GENERAL SAFETY for Category **L7 PASSANGER (4-SEATER) QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Head Lamp	Minimum two light fitted on either side on the front. Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Double light To be verified through Lux meter	57	4708-57
2.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 4 ft	To be verified through Lux meter	50	4708-50
3.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
4.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81
5.	Electric wiring system	12 V. Meeting Standard IP67	Safety insulated, Shall have proper colour coding.		
6.	Attainable Speed	≤ 70 km/hr (min.)	Shall be measured using a laden vehicle.		

GENERAL SAFETY for Category **L7 PASSANGER (4-SEATER) QUADRICYCLE,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43
2.	Wipers	Equipped with Minimum of one motorized Wiper to be provided covering at least 60% of the front windscreen when used	Shall be provided to clear at least 50% of screen area.		

TABLE-13

Construction of Vehicle for Category **L7 LOADER QUADRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length (mm) (maximum)	3700	To be measured using extreme ends.		
2.	Overall Width with folded mirrors (mm)	1500	To be measured using extreme ends.		
3.	Overall Height (mm)	2500	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track (mm)	1120 - 1450	To be measured from the center of the wheel on either side		
5.	Wheel base (mm)	1780 - 2440	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang (mm/in) a) Front: (max) b) Rear: (max) c) Side: (max)	a) 405 / 16 b) 610 / 24 c) 100 / 4	Distance from the extreme ends to the start of the wheel		
7.	Seating Capacity (persons)	2	As per standards		
8.	Unladen Weights kgs (max)	≤600 kgs	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Passenger seat size mm/inch	410/16 x 410/16 x 25mm Thk Equal L x W	Thickness should be 25mm for comfortable level		
10.	Passenger seat backrest (mm/in)	410/16 x 410/16 x 25mm Thk Suitably Foam Filled	Thickness should be 25mm for comfortable level		
11.	Passenger Seating height (mm/in)	410/16 from floor board	May be reduced to 22 cm (min.) in case bucket seats are used		
12.	Driver Seat (mm/inch)	410/16 x 25mm Thk	Thickness should be 25mm for comfortable level		
13.	Driver Seat Height (mm/inch)	410/16 from floor board	As per standard		
14.	Driver seat back rest (mm/in)	410/16 x 410/16 Suitably foam filled	Thickness should be 25mm for comfortable level		
15.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
16.	Roof height	1350/54 mm/inch from the floor	To be measured from highest point		

		board	of Seat(s) vertically upwards.		
17.	Protection with Weather	To covered with suitable hard or soft material	Shall cover all area from wind screen to extreme rear and sides.		
18.	Ground clearance (cm) (min)	10			
19.	Partitions	Steel Safety Bar or suitable material (Polyvinyl or Fiberglass)	Shall be provided between each seating row / compartment.		
20.	Turning circle diameter	8 m – 12 m	To be measured for both sides		
21.	Engine Capacity cc/HP/Kw	≤ 250 cc or 15 kW	Shall have suitable power to weight ratio.		
22.	Fuel Tank	Fire proof suitable material	To be fire and leak resistant/ physical Inspection		
23.	Fuel Tank Capacity	15 liters	As per PS standards		
24.	Doors mm/ft a): Front b): Rear:	a) Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts b) N/A	Should be connected through hooks and springs		
25.	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
26.	Body Construction	Well fitted structure providing protection against dust and abnormal vibrations with suitable strength	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
27.	Wheels	Min 10inch – 12in Rim size	Jack and wheel spanner shall be provided	75	4708-75
28.	Spare wheel	Same as service tyre	Jack and wheel spanner shall be provided	75	4708-75
29	Suspension a) Front b) Rear	a) Independent / Coil b) Rigid / Independent			
30.	Brake System	Vehicle shall be equipped with: A parking brake system; and A foot-actuated service brake system which operates on the brakes on all wheels, by way of either: **a.** A split service brake system; or **b.** A CBS that operates the brakes on all wheels and a secondary brake system, which may be the parking brake system.	Refer to Annx-II to this document	78	

ACTIVE SAFETY for Category **L7 LOADER QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Head Lamp	Minimum two light fitted on either side on the front. Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Double light To be verified through Lux meter	57	4708-57

2.	Parking Light a): Front b): Rear	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 4 ft	To be verified through Lux meter	50	4708-50
3.	Reflector	The size of each reflector must be 10cm x 2 cm at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
4.	Attainable Speed	≤70 km/hr (min.)	Shall be measured using a laden vehicle. (May be 25km/hr for electric vehicles).		
5.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81

GENERAL SAFETY for Category **L7 LOADER QUADRICYCLE,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43
2.	Wipers	Equipped with Minimum of one motorized Wiper to be provided covering at least 60% of the front windscreen when used	Shall be provided to clear at least 50% of screen area.		

TABLE: 14

Construction of Vehicle for Category **L5, 3-WHEELER ELECTRIC AUTO RICKSHAW**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No	**Detail Of Standards**	**Limits**	**Criteria**	**UNReg**	**PS-4708**
1	Motor Power	850 ~ 2500 Watts	Measured on Standard Test Bench		
2	Motor Type	DC Brush Less Motor	As Above		
3	Battery	48V30AH (min)	Conforming to PS: 4082/206-1* (*Optional for Dry Batteries)		
4	Transmission	Differential Drive, 4/5 Speed Forward + 1 Reverse			
5	Range	On a full single Battery charge the vehicle range shall not be less than continuous 60 km.			
6	Climbing Ability	Should be able to climb minimum of 100 gradient with full load on 25% of battery charge.			
7	Front Wheel Size	2.75-14		75	4708-75
8	Real Wheel Size	2.75-14		75	4708-75
9	Brake type	Front Disc/ Rear Drum		78	4708-78

10	Head Light	Low Beam 16500 Lux @ 00 (min) and 12,500 Lux @ 75mm (min) at 7.5 meters distance (min).		57	4708-57
11	Dimension (L x W x H)	2500*1500*1000 mm			
12	Weight	148Kg Chassis Weight			
13	Max. loading Capacity	250 ~ 500 Kg			
14	Charging System & Period	6 to 8 Hours (per full charging)			
15	Battery charger	48V (3 Amp)			
16	Electric Motor for Electric vehicle	Not exceed more than 6 kW (max. rated continuous power) with appropriate Motor Control Unit (MCU) according to IP-67 Standard certification. Should be able to climb minimum of 10° gradient with full load on 25% of battery charge.			
17	Battery Type for Electric vehicle	Sealed Lead Acid/ Lithium-ion battery or advanced technology Battery disposal instructions to be provided by the manufacturer as notified by Environment Department			
18	Battery size and range for Electric vehicle	**For Internal Combustion Engine:** Maximum capacity 6 kWh with mandatory battery management system complying to IP-65 standards **For Electric Vehicle:** Battery range shall not be less than 100 km continuous (min)in a single charge			
19	Drive Mechanism	Electric Motor			
20	Maximum Power Output	6 kW			
21	Ground Clearance	10 cm (Min)			
22	Roof Material	Suitable Waterproof Material to cover all the areas and to protect the driver / passengers from all types of weather			

23	Roof Height	96 cm (min) from the highest point of seat vertically upwards			
24	Spare Wheel	Suitably placed for easy replacement on road. Should be of similar size as wheels in operational use. Jack and Wheel Spanner shall be provided.		75	4708-75
25	Body Structure	Well fitted structure providing protection against dust and abnormal vibrations with suitable strength			
26	Instrument Gauges and Indications on dash board	Suitable light indication for turn signal, gear position of transmission, high beam and gauge for Fuel must be provided.			

ACTIVE SAFETY for Category **L5 3-WHEELER ELECTRIC RICKSHAW,** Mandatory Requirements

Sr. No.	**Detail of Standards**	**Limits (with units)**	**Criteria**	**UN Reg**	**PS-4708**
1.	Parking Brake	Mechanical	To keep a fully laden vehicle stationary when parked at a slope of 15^0	78	4708-78
2.	Brakes	Mechanical for rickshaw and hydraulic for all others	Mandatory for rear wheels only	78	4708-78
3.	Head Lamp	Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Single light / Double light To be verified through a lux meter	57	4708-57
4.	Front Additional Lamp	**Parking Light:** White Emitting Light visible from distance of 7.5 meters in dark (Front + Rear) **Turn Signal:** Yellow Amber Light visible at 45° (min) from a distance of 15 meter in day light. **Fog Lamps (Optional):** White or Yellow Light suitable to be used in fog or smog visible at 5 meters (min) in dark	To be verified through a lux meter	50	4708-50
5.	Rear Lamp Units	**Tail Lamp:** Emitting red light visible from a distance of 15 meters (min) in dark having synchronized operation with Front Head	To be verified through a lux meter	50	4708-50

		Lights & Parking Lights. **Brake Indication Light:** Emitting red light visible at a distance of 20 meters when operated in day light. **Turn Signal:** Yellow Amber Light visible at a distance of 15 meters in day light. **Reverse Indication Light:** Emitting White Light visible at distance of 20 meters and giving the reasonable view to driver for reversing the vehicle in dark.			
6.	Reflectors	Front & Rear sides, Back side	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
7.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81
8.	Electric wires (Rule 202 of MVR, 1969)	All electric wires, leads and harnesses should have suitable color coding and follow IP-65 standards	Safety insulated, Shall have proper colour coding.		
9.	Speed (km/h)	≥50 Km/h	Shall be measured using a laden vehicle.		

PASSIVE SAFETY for Category L5, **3-WHEELER ELECTRIC RICKSHAW,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Rear Seating protection (in case the last row of seat(s) faces backwards of the vehicle.	At least a safety bar/chain	Extended from one side of the vehicle to the other at extreme rear and above the seating height but not above the minimum backrest height	16	4708-16
2.	Entrance level for passengers (in case of un-laden vehicle)	30cm – 55cm	As per PS standard		

GENERAL SAFETY for Category L5, **3-WHEELER ELECTRIC RICKSHAW,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Speedometer/Odometer	Having Speed indication and distance counter with units.	Accuracy should be confirmed on vehicle test bench	39	4708-39
2.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision.	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43

3.	Wipers	Electric / Manual,	Shall be provided to clear at least 50% of screen area.		

ENVIRONMENT SAFETY for Category **L-Category Vehicles (Including L2 & L5) 3-WHEELER ELECTRIC VEHICLES,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Vehicle noise emissions (Scale A Noise)	85 dbA (max.)	Calculate from db Meter and sensors	9	4708-9
2.	Vehicle's Horn sound emissions (Scale C)	105 dbC (max.)	Calculate from db Meter and sensors	28	4708-28

TABLE: 15

Construction of Vehicle for Category **L6- ELECTRIC QUADRICYCLES (GENERAL SPECS)**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No	Detail Of Standards	Limits	Criteria	UNReg	PS-4708
1	Motor Power	Up to 6000 Watts	Measured on Standard Test Bench		
2	Motor Type	DC. Brush Less Motor is preferred	As Above		
3	Battery	48V48AH (min)	Conforming to PS: 4082/206-1* (*Optional for Dry Batteries)		
4	Transmission	Differential Drive, or with Gears 4/5 Speed Forward + 1 Reverse			
5	Range	On a full single Battery charge the vehicle range shall not be less than continuous 100 km.			
6	Climbing Ability	Should be able to climb minimum of 100 gradient with full load on 25% of battery charge.			
7	Charging System & Period	6 to 8 Hours (per full charging)			
8	Battery charger (min)	48V (3 Amp)			
9	Electric Motor for Electric vehicle	Not exceed more than 10 kW (max. rated continuous power) with appropriate Motor Control Unit (MCU) according to IP-67 Standard certification. Should be able to climb minimum of 10° gradient with full load on 25% of battery charge.			
10	Battery Type for Electric vehicle	Sealed Lead Acid/ Lithium-ion battery or advanced technology			

		Battery disposal instructions to be provided by the manufacturer as notified by Environment Department			
11	Battery size and range for Electric vehicle	**For Electric Vehicle:** Battery range shall not be less than 100 km continuous (min)in a single charge			
12	Drive Mechanism	Electric Motor			

TABLE: 16

Construction of Vehicle for Category **L7- ELECTRIC QUADRICYCLES (GENERAL SPECS)**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No	**Detail Of Standards**	**Limits**	**Criteria**	**UNReg**	**PS-4708**
1	Motor Power	Up to 15000 Watts	Measured on Standard Test Bench		
2	Motor Type	DC. Brush Less Motor is preferred	As Above		
3	Battery	48V48AH (min)	Conforming to PS: 4082/206-1* (*Optional for Dry Batteries)		
4	Transmission	Differential Drive, or with Gears 4/5 Speed Forward + 1 Reverse			
5	Range	On a full single Battery charge the vehicle range shall not be less than continuous 100 km.			
6	Climbing Ability	Should be able to climb minimum of 100 gradient with full load on 25% of battery charge.			
7	Charging System & Period	6 to 8 Hours (per full charging)			
8	Battery charger (min)	48V (3 Amp)			
9	Electric Motor for Electric vehicle	Not exceed more than 20 kW (max. rated continuous power) with appropriate Motor Control Unit (MCU) according to IP-67 Standard certification. Should be able to climb minimum of 10° gradient with full load on 25% of battery charge.			
10	Battery Type for Electric vehicle	Sealed Lead Acid/ Lithium-ion battery or advanced technology Battery disposal instructions to be provided by the manufacturer as notified by Environment Department			

11	Battery size and range for Electric vehicle	**For Electric Vehicle:** Battery range shall not be less than 100 km continuous (min)in a single charge			
12	Drive Mechanism	Electric Motor			

TABLE-17

Construction of Vehicle for Category **L2 TRICYCLE**, Mandatory Requirements.

MANUFACTURING SPECIFICATIONS

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Overall length (max.)	3000 mm	To be measured using extreme ends.		
2.	Overall Width with folded mirrors	1500 mm	To be measured using extreme ends.		
3.	Overall Height from the ground	2000 mm	To be measured from the levelled ground surface to the extreme height of the vehicle.		
4.	Wheel track	95 cm – 125cm	To be measured from the center of the wheel on either side		
5.	Wheel base	150 cm - 230 cm	To be measured from the center of the front wheel to the center of the rear wheel		
6.	Overhang	100 cm (max.)	Distance from the extreme ends to the start of the wheel		
7.	Seating Capacity	2			
8.	Unladen Weights kgs (maximum)	280 kgs	Vehicle Weight including all standard accessories and lubricants without passenger measured		
9.	Available seat size per passenger	38 cm x 38 cm (min.)	Thickness should be 25mm min for comfortable level		
10.	Passenger seat backrest	40 cm x 38 cm (min.)	Optional for driver seat.		
11.	Passenger Seating height	30 cm (min.)	May be reduced to 22 cm (min.) in case bucket seats are used		
12.	Leg room for each passenger	33 cm (min.)	Physical measurement to be taken		
13.	Driver Seat (mm/inch)	W: 410/16 x T 25mm	Thickness should be 25mm min for comfortable level		
14.	Driver Seat Height (mm/inch)	410/16 from floorboard	Thickness should be 25mm min for comfortable level		
15.	Driver seat back rest (mm/inch)	410 / 16 x 410/16 x 25mm x W x T Suitably Foam Filled	Thickness should be 25mm min for comfortable level		
16.	Roof	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
17.	Roof height for each passenger	90cm (min.)	To be measured from highest point of Seat(s) vertically upwards.		
18.	Protection with Weather	Soft Roof Water resistant	Shall cover all area from wind screen to extreme rear and sides.		
19.	Ground clearance (cm) Min	10	From the levelled surface		

20.	Partitions	Safety bars ?	Shall be provided between each seating row / compartment.		
21.	Engine	4 Stroke Reciprocating Internal Combustion Engine	To be Examine on test bench as per standard		
22.	Engine Capacity (cc/HP/KW)	≤ 50cc or 4kW	Shall have suitable power to weight ratio.		
23.	Fuel Tank	Fire and leak resistant suitable material	To be fire resistant and leak proof/ physical inspection		
24.	Fuel Tank Capacity	07 Liters (min)	Minimum capacity		
25.	Turning circle diameter	700 cm (max.)	To be measured for both sides		
26.	Suspension a): Front b): Rear	a): Independent Suspension / Coil Spring b): Rigid / Independent	As per standard		
27.	Transmission	4 Forward + 1 Reverse Direct / Through Shaft	There shall be reverse gear System.		
28.	Doors	Optional. Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Should be connected through hooks and springs		
29	Floor board	Made of suitable sheet metal material not less than 22 gauge closely fitted and covered with rubber mat to prevent smoke or dust from entering	Shall provide protection from dust through floor and abnormal vibration with suitable strengths.		
30.	Body Construction	Made of suitable material to protect from weather and dust with enough strength to protect minor side impacts	Shall provide protection from weather and dust through floor and abnormal vibration with suitable strengths.		
31.	Wheels	Min 8" – Max 10" Dia Rim Size			
32.	Spare wheel	Same as service tyre			
33.	Tool Kit	Plier x 1 Screw Driver x 1 Spanner (10 x 12) & (14 x 16) x 2 Plug Spanner x 1 Wheel Jack with handle x 1 Wheel Spanner x 1	As per PS standards	75	4708-75
34.	Battery (for all devices except power storage in case of electrically driven vehicle) for gasoline/CNG/LPG vehicle	12 Volts 26 Ah (min.)	As per PS standards		
36.	Number Plates a): Front b): Rear	Standard Visible / Conspicuous space for number plates at the front and rear of the vehicle shall be provided?	Should be able to accommodate the government issued standard size number plate.		
37.	Drive mechanism	4 Stroke Reciprocating Internal Combustion Engine/Rotary Internal Combustion Engine / Electric Motor	Shall have suitable power to weight ratio. As per the category standards		

ACTIVE SAFETY for Category **L2 TRICYCLE,** Mandatory Requirements.

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Parking Brake	Mechanical	To keep a fully laden vehicle stationary when parked at a slope of 15^0	78	4708-78
2.	Brakes	Mechanical for rickshaw and hydraulic for all others	Mandatory for rear wheels only	78	4708-78
3.	Head Lamp	Low beam at 0mm 16500 lux(min.) 75mm12500 lux(min.) and shall be adjustable to give a view of the road at 7.5 meter	Single light / Double light To be verified through a lux meter	57	4708-57
4.	Front Side Lamp Units	Emitting white light visible from a distance of 7.5 meters in dark. Amber yellow turn signals visible at 45^0 angle from a distance of 15 meters in day lights.	To be verified through a lux meter	50	4708-50
5.	Rear Lamp Units	Tail lamps emitting red light visible from a distance of 15 meters in dark operational when front beam is switched on. Brake indicator lamps emitting red light visible at a distance of 20 meters when operated in day light. Amber yellow turn signals visible at a distance of 15 meters in day light. Reverse gear indicator lamp emitting white light visible at a distance of 20 meters and giving a reasonable view to driver for reversing the vehicle.	To be verified through a lux meter	50	4708-50
6.	Parking Light a): Front b): Rear	Emitting white light visible from a distance of 7.5 meters in dark. Amber yellow turn signals visible at 45^0 angle from a distance of 15 meters in day lights.	To be verified through a lux meter	50	4708-50
7.	Brake Lights	Tail lamps emitting red light visible from a distance of 15 meters in dark operational when front beam is switched on. Brake indicator lamps emitting red light visible at a distance of 20 meters when operated in day light. Amber yellow turn signals visible at a distance of 15 meters in day light. Reverse gear indicator lamp emitting white light visible at a distance of 20 meters and giving a reasonable view to driver for reversing the vehicle.	To be verified through a lux meter	50	4708-50

8.	Reverse Light	a) Two obligatory lamps showing to the front on either side emitting white light b) Two Red lamps not exceeding height of 3 ft	To be verified through a lux meter	50	4708-50
9.	Direction Indicators	Brake indicator lamps emitting red light visible in day light when brakes are applied	To be verified through a lux meter	50	4708-50
10	Reflector	The size of each reflector must be 400mm^2 at each side.	To mark not less than 10cm from the extreme boundaries of vehicle.	3	4708-3
11.	Rear View mirrors	Provided internally & externally so fitted as to enable the driver to have view of the road in the rear of vehicle	Shall provide a clear view of rear Total	81	4708-81
12.	Electric wiring system	12 V. Meeting Standard IP67	Safety insulated, Shall have proper colour coding.		
13.	Attainable speed	40 km / hr (max.)	Shall be measured using a laden vehicle.		

PASSIVE SAFETY for Category **L2 TRICYCLE,** Mandatory Requirements

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Rear Seating protection (in case the last row of seat(s) faces backwards of the vehicle.	At least a safety bar/chain	Extended from one side of the vehicle to the other at extreme rear and above the seating height but not above the minimum backrest height	16	4708-16
2.	Entrance level for passengers (in case of un-laden vehicle)	30cm – 55cm	As per PS standard		

GENERAL SAFETY for Category **L2 TRICYCLE,** Mandatory Requirements.

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Speedometer/Odometer	Having Speed indication and distance counter with units.	Accuracy should be confirmed on vehicle test bench	39	4708-39
2.	Wind Screen	Laminated / Tempered Clear Glass with no distortion of vision.	Clear that would not cause distortion of vision and such type of glass which do not harm/injure the driver passenger in case of breakage/collision.	43	4708-43
3.	Wipers	Electric / Manual,	Shall be provided to clear at least 50% of screen area.		

ENVIRONMENT SAFETY for Category **L2 TRICYCLE,** Mandatory Requirements.

Sr. No.	Detail of Standards	Limits (with units)	Criteria	UN Reg	PS-4708
1.	Vehicle noise emissions (Scale A Noise)	85 dbA (max.)	Calculate from db Meter and sensors	9	4708-9
2.	Vehicle's Horn sound emissions (Scale C)	105 dbC (max.)	Calculate from db Meter and sensors	28	4708-28

3.	Exhaust muffler	Steel pipe extended from engine to the rear end of the vehicle but not protruding beyond rear end of vehicle	Not to extend beyond extreme rear of body and shall nearly horizontal		
4	Exhaust gas emissions (CO)	4.5% (NDIR) max.	Calculate from smoke tester	40	4708-40
5.	CNG / LPG cylinders & kits	OGRA Approved			

ANNEX – A

#	DESCRIPTION OR RECORD (REF.)	AVAILABILITY OF RECORD		REMARKS
1	**QA/QC records of critical parts**	**Yes**	**No**	
A	Frame			
B	Wheel hub(s)			
C	Axel(s)			
D	Rim(s)			
E	Fuel tank			
F	Handle			
G	Speedometer unit			
H	Head light unit			
I	Tail light unit			
J	Winker(s)			
K	Painted parts			
L	Ni, Cr Plated parts			
M	Seats and other body parts			
N	Exhaust muffler			
O	Brake system units			
P	Gear units			
Q	Engine components (QA/QC Certificate in case of import			
R	Engine testing (RMP, Noise etc.)			
2	**Main Assembly QA/QC records**			
A	Torques			
B	Fitment			
C	Harness			
D	Aesthetics			
3	**PDI QA / QC record**			
A	Critical torques			
B	Electric systems			
C	Fitments			
D	Exhaust gas emissions			
E	Noise emissions			
F	Horn sound emission			
G	Test bench / Road test setup			
4	**Critical Testing Facilities**			
A	Exhaust gas emission analyzer			
B	Sound level meter			
C	Engine test stand			
D	Vehicle test bench			
E	Torque wrench(es)			
F	Vernier calipers / measuring tapes / measuring scales			
G	Depth gauges / thread gauges / micro meter			
H	Measuring cylinders / beaker			
I	Coating thickness meter / Cross hatch test set-up			

ANNEX- A-I

Classification of Power-Driven Vehicles

Power driven Vehicles classify into following categories according to ECE/TRANS/WP.29/78/Rev.6

a. Category L
b. Category M
c. Category N

Category L Vehicle:

Means a motor vehicle designed and constructed primarily for the carriage of passengers having an unladen vehicle mass of no more than 400 kg or of goods having an unladen vehicle mass of no more than 500 kg with two, three or four wheels and, in the case of four wheeled vehicles, with limited performance and mass.

Category M Vehicle:

Power driven vehicle having at least four wheels or more wheels designed and constructed for the carriage of passengers having:

a. an unladen vehicle mass of more than 400kg
b. an engine power higher than 15 kW.

There are three sub categories M1, M2 and M3

Category M1:

Vehicle used for the carriage of passengers and comprising not more than eight seats in addition to the driver's seat.

Category M2:

Vehicle used for the carriage of passengers and comprising more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding 5 tons.

Category M3:

Vehicle used for the carriage of passengers and comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 tons.

Category N Vehicle:

Power driven vehicle having at least four wheels or more wheels designed and constructed for the carriage of goods. There are three sub categories N1, N2 and N3

Category N1:

Vehicle used for the carriage of goods and having maximum mass not exceeding 3.5 tons.

Category N2:

Vehicle used for the carriage of passengers and having maximum mass exceeding 3.5 tons but not exceeding 12 tons.

Category N3:

Vehicle used for the carriage of passengers and having maximum mass exceeding 12 tons.

Sub Classification of Category L:

This standard is specifically dealing with L2, L4, L5, L6 and L7. Category L vehicles further sub divided into following branches,

a. Category L1 Vehicles
b. Category L2 Vehicles
c. Category L3 Vehicles
d. Category L4 Vehicles
e. Category L5 Vehicles
f. Category L6 Vehicles
g. Category L7 Vehicles

Category L2 Vehicles:
A three wheeled vehicle of any wheel arrangement with an engine cylinder capacity in the case of a thermic engine not exceeding 50 cm3 and whatever the means of propulsion a maximum design speed not exceeding 50 km/h.

Category L4 Vehicles:
A vehicle with three wheels asymmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm3 or whatever the means of propulsion a maximum design speed exceeding 50km/h (motor cycles with sidecars).

Category L5 Vehicles:
A vehicle with three wheels symmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in case of a thermic engine exceeding 50 cm3 or whatever the means of propulsion a maximum design speed exceeding 50 km/h.

Category L6 Vehicles:
A vehicle with four wheels whose unladen mass is not more than 350 kg, not including the mass of the batteries in case of electric vehicles, whose maximum design speed is not more than 50 km/h and whose engine cylinder capacity does not exceed 50 cm3 for spark ignition engine, or whose maximum net power output does not exceed 4 kW in the case of other internal combustion engine, or whose maximum continuous rated power does not exceed 4 kW in the case of electric engines.

Category L7 Vehicles:
A vehicle with four wheels, other than that classified for the category L6, whose unladen mass is not more than 400kg (550 kg for vehicles intended for carrying of goods), not including the mass of batteries in the case of electric vehicles and whose maximum continuous rated power does not exceed 15 kW.

Vehicle Category L type and Sub Classification:

Category	Category name	Common classification criteria
L5	All L-Category Vehicle other than 2 wheel	1. Length ≤ 4000mm 2. Width ≤ 2000mm and 3. Height ≤2500mm
		

				
L5e-A	**L5e-B**	**L5e-C**	**L5e-U**	**L5e-U1**

This L5e Category is fully complying with Pakistan Motor Vehicle Ordinance 1965 Clause-------- of Chapter ------under the definition of Motor Cab for carrying passenger not more than 10 including driver, sub-category A, B and C falls in this category.

Category	**Category name**	**Common classification criteria**
L5e	Powered tricycle Motor Cab	(1) three wheels and powered by a propulsion as listed under (3) and (2) mass in running order ≤ 350 kg for passenger and ≤ 1500Kg for Cargo carrier (3) three-wheel vehicle that cannot be classified as a L2e vehicle
L5e-A	Tricycle	(4) L5e vehicle other than those complying with the specific classification criteria for a L5e-B vehicle and (5) With a maximum of three seating positions, including the seating position of the driver.
L5e-B	Tricycle	(6) Designed as a passenger and their goods carrying vehicle and accessible by maximum two sides. (7) Equipped with a maximum of five seating positions, including the seating position for the driver (8) Exclusively designed for the carriage of persons with an enclosed, passenger compartment.
L5e-C	Tricycle	(9) designed as a passenger carrying vehicle and characterized by an open passenger compartment to meet the cultural requirement for male and female passengers and accessible by three sides at least and maximum design speed ≤ 45 Km/h (10) Equipped with a maximum of less than ten seating positions, including the seating position for the driver and (a) Exclusively designed for the carriage of persons
L5e-U & L5e-U1	Tricycle	(11) Designed for carrying goods and or utilities with open deck for the goods or with Closed container type

		
L6e-A	**L6e-BP**	**L6e-BU**

"Category L6":

A vehicle with four wheels whose unladen mass is not more than 350kg, not including the mass of the batteries in case of electric vehicles, whose maximum design speed is not more then 45km/h and whose engine cylinder capacity does not exceed 6 kW in case of other internal combustion engine, or whose maximum continuous rated power does not exceed 6 kW in the case of electric engines.

Category	Category name	Common classification criteria
L6e	Light Quadricycle	(1) Four wheels and powered by a propulsion (2) Maximum design vehicle speed ≤ 45 km/h (3) Mass in running order ≤ 425 kg (4) Engine capacity ≤ 50 cm3 (5) Equipped with a maximum of two seating positions, including the seating position for the driver
Sub-categories	**Subcategory Name**	**Supplemental sub-classification criteria**
L6e-A	Light on-road quad	(1) Maximum continuous net power ≤ 4 kW (2) Maximum speed 28mph (3) Mass running order up to 425 kg and max engine capacity is 50 cc.
L6e-B	Light quadri-mobile	(1) Enclosed driving and passenger compartment accessible by maximum three sides (2) Maximum continuous rated or net power ≤6 kW
L6e-BP	Light Quadricycle for passenger transport	(1) L6e-B vehicle is mainly designed for passenger transport (2) L6e-B other than those complying with the specific classification criterion for a L6e-BU vehicle
L6e-BU	Light Quadricycle for utility purposes	(1) Exclusively designed for carriage of goods with an open or enclosed, virtually even and horizontal loading bed that meets the following criteria a. Length loading bed x width loading bed > 0.3 x Length vehicle x Width vehicle b. An equivalent loading bed area as defined above in order to install machines and/or equipment c. Designed with the loading bed area which is clearly separated by a rigid partition from the area reserved for the vehicle occupants d. The loading bed area shall be able to carry a minimum volume represented by a 600 mm cube

	
L7e-A	**L7e-B**
	
L7e-CU	**L7e-CP**

"Category L7":

A vehicle with four wheels, other than that classified for the category L6, whose unladen mass is not more than 450kg (600 kg for vehicles intended for carrying of goods), not including the mass of batteries in the case of electric vehicles and whose maximum continuous rated power does not exceed 15 kW.

Category	Category name	Common classification criteria
L7e	Heavy Quadricycle	(1) Four wheels and powered by a propulsion (2) <450 kg for transport of passenger (3) <600 kg for transport of goods (4) L7e vehicle that cannot be classified as L6e vehicle
Sub-categories	**Subcategory Name**	**Supplemental sub-classification criteria**
L7e-A	Heavy on-road quad	(1) L7e vehicle not complying with the specific classification criteria for a L7e-B or a L7e-C vehicle (2) Vehicle designed for the transport of passengers only (3) Maximum continuous rated or net power <15 kW.
L7e-A1	A1 Heavy on-road quad	(1) Maximum two straddle seating position, including the seating position for the rider. (2) Handlebar to steer.

L7e-A2	A2 Heavy on-road quad	(1) L7e-A vehicle not complying with the specific classification criteria for a L7e-A1 vehicle (2) Maximum two non-straddle seating positions, including the seating position for the driver.
L7e-B	Heavy All Terrain quad	(1) L7e vehicle not complying with the specific classification criteria for a L7e-C vehicle (2) Ground clearance > 180 mm
L7e-B1	All terrain quad	(1) Maximum two straddle seating position, including the seating position for the rider. (2) Equipped with the handlebar to steer. Maximum design vehicle speed < 90 km/h (3) Wheel base to ground clearance ratio < 6.
L7e-B2	Side by side buggy	(1) L7e-B vehicle other than a L7e-B1 (2) Maximum three non-straddle seats of which two positioned side by side, including the seating position for the driver. (3) Maximum net power < 15 kW (4) Wheel base to ground clearance ratio < 8.
L7e-C	Heavy Quadri-mobile	(1) L7e vehicle not complying with the specific classification criteria for a L7e-B vehicle (2) Maximum net power < 15 kW (3) Maximum design vehicle speed < 90 km/h (4) Enclosed driving and passenger compartment accessible via maximum three sides
L7e-CP	Heavy Quadri-mobile for passenger transport	(1) L7e vehicle not complying with the specific classification criteria for a L7e-CU vehicle (2) Maximum four non straddle seats, including the seating position for the driver
L7e-CU	Heavy Quadri-mobile for utility purposes	(1) Exclusively designed for the carriage of goods with open or closed virtually even and horizontal loading bed that meets the following criteria: a) Length loading bed x width loading bed > 0.3 x Length vehicle x Width vehicle b) An equivalent loading bed area as defined above in order to install machines and/or equipment c) Designed with the loading bed area which is clearly separated by a rigid partition from the area reserved for the vehicle occupants d) The loading bed area shall be able to carry a minimum volume represented by a 600 mm cube (2) Maximum two non straddle seats, including the seating position for the driver

SOURCE:

Annex-1: Vehicle Standard Development dept. Survey of ECE Regulations and EC-Directive as per 1st September 2014.

ANNEX-II

Standard for Brake of Three Wheeler(Tricycles) and Four Wheelers (Quadricycles)

This standard is prepared for the first time considering Global Technical Regulation GTR3 formulated by UNECE which is set goal for the future of Pakistan Automobile Industries.

This standard specifies the need of service Brakes of three-wheel vehicles and four-wheel light duty vehicles which are covered under category of L5, L6 and L7 category of as described in: ECE/TRANS/WP.29/78/Rev.3 Consolidated Resolution on the Construction of Vehicles (R.E 3)

In order to facilitate access to the markets of member countries of WP-29 it is necessary to establish equivalence between the requirements of this standard and those of UNECE Regulation No. 78

1. BRAKING STANDARD:

Approval of vehicles of categories L2, L4, L5, L6 and L7 with regard to braking.

2. SCOPE:

This Regulation applies to vehicles of categories L2, L4, L5, L6 and L7 as defined in Annex-1. Following categories do not include;

2.1 Vehicles with a Vmax of < 25 km/h;

2.2 Vehicles equipped for disabled riders.

3. DEFINITIONS:

3.1 Types of Braking Systems

Means devices which differ in such essential respects as:

3.1.1 "*Antilock Brake System (ABS)*" - means a system which senses wheel slip and automatically modulates the pressure producing the braking forces at the wheel(s) to limit the degree of wheel slip.

3.1.2. "*Baseline test*" means a stop or a series of stops carried out in order to confirm the performance of the brake prior to subjecting it to a further test such as the heating procedure or wet brake stop.

3.1.3. "*Brake*" means those parts of the brake system where the forces opposing the movement of the vehicle are developed.

3.1.4. "*Brake system*" means the combination of parts consisting of the control, transmission, and brake, but excluding the engine, whose function it is to progressively reduce the speed of a moving vehicle, bring it to a halt, and keep it stationary when halted.

3.1.5 "*Combined brake system (CBS)*" means: For vehicle categories L_5, L_6 and L_7: a service brake system where the brakes on all wheels are operated by the actuation of a single control.

3.1.6. "*Components of the braking system*" means one of the individual parts which, when assembled, constitute the braking system.

3.1.7. "*Control*" means the part actuated directly by the rider in order to supply or control the energy required for braking the vehicle to the transmission.

3.1.8. "*Different types of braking systems*" means devices which differ in such essential respects as:

(a) Components having different characteristics;

(b) A component made of materials having different characteristics, or a component differing in shape or size;

(c) A different assembly of the components.

3.1.9. "*Driver mass*" means the nominal mass of a driver that shall be 75 kg (subdivided into 68 kg occupant mass at the seat and 7 kg luggage mass).

3.1.10. "*Engine disconnected*" means when the engine is no longer connected to the driving wheel(s).

3.1.11. "*Gross vehicle mass*" or "*maximum mass*" means the technically permissible maximum laden mass as declared by the manufacturer.

3.1.12. "*Initial brake temperature*" means the temperature of the hottest brake before any brake application.

3.1.13. "*Laden*" means so loaded as to attain the gross vehicle mass as defined in paragraph 2.12.

3.1.14. "*Lightly loaded*" means mass in running order plus 15 kg for test equipment, or the laden condition, whichever is less. In the case of ABS tests on a low friction surface (Annex 3, paragraphs 9.4. to 9.7.), the mass for test equipment is increased to 30 kg to account for outriggers.

3.1.15. "*Mass in running order*" means the sum of the unladen vehicle mass and driver mass.

3.1.16. "*Peak braking coefficient (PBC)*" means the measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre.

3.1.17. "*Power-assisted braking system*" means a brake system in which the energy necessary to produce the braking force is supplied by the physical effort of the rider assisted by one or more energy supplying devices, for example vacuum assisted (with vacuum booster).

3.1.18. "*Secondary brake system*" means the second service brake system on a vehicle equipped with a combined brake system.

3.1.19. "*Service brake system*" means a brake system which is used for slowing the vehicle when in motion.

3.1.20. "*Single brake system*" means a brake system which acts on only one axle.

3.1.21. "*Split service brake system (SSBS)*" means a brake system that operates the brakes on all wheels, consisting of two or more subsystems actuated by a single control designed so that a single failure in any subsystem (such as a leakage type failure of a hydraulic subsystem) does not impair the operation of any other subsystem.

3.1.22. "*Stopping distance*" means the distance travelled by the vehicle from the point the rider begins to actuate the brake control to the point at which the vehicle reaches a full stop. For tests where the

simultaneous actuation of two controls is specified, the distance travelled is taken from the point the first control is actuated.

3.1.23. "*Test speed*" means the vehicle speed measured the moment the driver begins to actuate the brake control(s). For tests where the simultaneous actuation of two controls is specified, the vehicle speed is taken from the point the first control is actuated.

3.1.24. "*Transmission*" means the combination of components that provide the functional link between the control and the brake.

3.1.25. "*Unladen vehicle mass*" means the nominal mass of the vehicle as indicated by the manufacturer(s) including all factory fitted equipment for normal operation of that vehicle (e.g. fire extinguisher, tools, spare wheel), plus coolant, oils, 90 per cent of fuel and 100 per cent of other gas or liquids, as specified by the manufacturer.

3.1.26. "*Vehicle type*" means a sub-category of L-category vehicles as defined in para 2.1.14 above.

3.1.27. "*Vmax*" means either the speed attainable by accelerating at a maximum rate from a standing start for a distance of 1.6 km on a level surface, with the vehicle lightly loaded, or the speed measured in accordance with ISO 7117:1995.

3.1.28. "*Wheel lock*" means the condition that occurs when there is a slip ratio of 1.00.

3.1.29. "*Emergency braking signal*" means logic signal indicating emergency braking specified in paragraphs 5.1.15. to 5.1.15.2. of this Regulation.

3.1.30. *"Braking Signal"* means a logic signal indicating when illumination of the stop lamp is required or allowed as specified in paragraph 5.1.17. of this Regulation.

3.1.31. "*Electric Regenerative Braking System*" means a braking system which, during deceleration, provides for the conversion of vehicle kinetic energy into electrical energy and is not part of the service braking system.

3.1.32. "*Disable the antilock brake system*" means to put the system into a state where it will no longer fulfil the technical requirements in paragraph 9 of Annex 3 to this Regulation."

3.2 Approval of a vehicle - Means the approval of a vehicle type with regard to braking.

3.3 Baseline Test - Means a stop or a series of stops carried out in order to confirm the performance of the brake prior to subjecting it to a further test such as the heating procedure or wet brake stop.

3.4 Brake - Means those parts of the brake system where the forces opposing the movement of the vehicle are developed.

3.5 Brake system - Means the combination of parts consisting of the control, transmission, and brake, but excluding the engine, whose function is to progressively reduce the speed of a moving vehicle, bring it to a halt, and keep it stationary when halted.

3.6 Components of the Braking System - Means one of the individual parts which, when assembled, constitutes the braking system.

3.6.1 Control - Means the part actuated directly by the rider in order to supply or control the energy required for braking the vehicle to the transmission.

3.6.2 Master Cylinder Assembly

3.6.3 Brake Piping

3.6.4 Brake Drum Assembly

3.6.5 Brake Disc Assembly

3.7 Driver mass - Means the nominal mass of a driver that shall be 75 kg (subdivided into 68 kg occupant mass at the seat and 7 kg luggage mass).

3.8 Engine disconnected - Means when the engine is no longer connected to the driving wheel(s).

3.9 Gross vehicle mass or Maximum Mass - Means the technically permissible maximum laden mass as declared by the manufacturer.

3.10 Initial brake temperature - Means the temperature of the hottest brake before any brake application.

3.11 Laden Weight - Means so loaded as to attain the gross vehicle mass.

3.12 Lightly loaded - Means mass in running order plus 15 kg for test equipment, or the laden condition, whichever is less.

3.13 Mass in running order - Means the sum of the un-laden vehicle mass and driver mass.

3.14 Peak braking coefficient (PBC) - Means the measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre.

3.15 Stopping distance - Means the distance travelled by the vehicle from the point the rider begins to actuate the brake control to the point at which the vehicle reaches a full stop. For tests where the simultaneous actuation of two controls is specified, the distance travelled is taken from the point the first control is actuated.

3.16 Test speed - Means the vehicle speed measured the moment the driver begins to actuate the brake control(s). For tests where the simultaneous actuation of two controls is specified, the vehicle speed is taken from the point the first control is actuated.

3.17 Transmission - Means the combination of components that provide the functional link between the control and the brake.

3.18 Unladen Vehicle Mass - Means the nominal mass of the vehicle as indicated by the manufacturer(s) including all factory fitted equipment for normal operation of that vehicle (e.g. fire extinguisher, tools, spare wheel), plus coolant, oils, 90 per cent of fuel and 100 per cent of other gas or liquids, as specified by the manufacturer.

3.19 Vehicle tyre - Means group of attributes used to define the vehicles. The vehicle type can define the mode of transportation and which units of measure are used for volume and weight, such as

a. The vehicle mass,

b. Velocity maximum;

c. A different type of braking device;

d. The engine type;

e. The final drive ratios;

f. The tyre dimensions.

g. Single/ Coupled chassis frame.

h. Complete body with hood frame, hood cover and driver seat.

3.20 Vmax- Means either the speed attainable by accelerating at a maximum rate from a standing start for a distance of 1.6 km on a level surface, with the vehicle lightly loaded, or the speed measured in accordance with ISO 7117:1995.

3.21 Wheel lock - Means the condition that occurs when there is a slip ratio of 1.00.

4. SPECIFICATIONS

4.1 BRAKE SYSTEM REQUIREMENTS

Each vehicle shall meet each of the tests specified for a vehicle of its category and for those brake features on the vehicle.

4.1.1 Service Brake System Control Operation

Vehicles shall have configurations that enable a rider to actuate the service brake system control while seated in the normal driving position and with both hands on the steering control.

4.1.2 Secondary brake system control operation

Vehicles shall have configurations that enable a rider to actuate the secondary brake system control while seated in the normal driving position and with at least one hand on the steering control.

4.1.3 Parking brake system

If a parking brake system is fitted, it shall hold the vehicle stationary on the slope prescribed. The parking brake system shall:

a. Have a control which is separate from the service brake system controls; and

b. Be held in the locked position by solely mechanical means. Vehicles shall have configurations that enable a rider to be able to actuate the parking brake system while seated in the normal driving position.

4.1.4 Three-wheeled vehicles of vehicles category L4 shall be equipped with a split service brake system, with at least one brake operating on the front wheel and at least one break operating on the rear wheel. A brake on the sidecar wheel is not required if the vehicle meets the performance requirements.

4.1.5 Four-wheeled vehicles of category L6 shall be equipped with a parking brake system plus one of the following service brake systems:

a. Two separate service brake systems, except CBS, which, when applied together, operate the brakes on all wheels; or

b. A split service brake system; or

c. A CBS that operates the brakes on all wheels and the secondary brake system which may be the parking brake system.

4.1.6 Category L5 and category L7 vehicles shall be equipped with:

4.1.6.1 A parking brake system; and

4.1.6.2 A foot-actuated service brake system which operates on the brakes on all wheels, by way of either:

a. A split service brake system; or

b. A CBS that operates the brakes on all wheels and a secondary brake system, which may be the parking brake system.

4.1.7 In cases where two separate service brake systems are installed, the systems may share a common brake, if a failure in one system does not affect the performance of the other.

4.1.8 For vehicles that use hydraulic fluid for brake force transmission, the master cylinder shall:

a. Have a sealed, covered, separate reservoir for each brake system;

b. Have a minimum reservoir capacity equivalent to 1.5 times the total fluid displacement required to satisfy the new to fully worn lining condition with the worst case brake adjustment condition; and

c. Have a reservoir where the fluid level is visible for checking without removal of the cover.

4.1.9 All warning lamps shall be mounted in the rider's view.

4.1.10 Vehicles that are equipped with a split service brake system shall be fitted with a red warning lamp, which shall be activated:

a. When there is a hydraulic failure on the application of a force of ≤ 90 N on the control; or

b. Without actuation of the brake control, when the brake fluid level in the master cylinder reservoir falls below the greater of:

(i) That which is specified by the manufacturer; and

(ii) That which is less than or equal to half of the fluid reservoir capacity.

4.1.11 To permit function checking, the warning lamp shall be illuminated by the activation of the ignition switch and shall be extinguished when the check has been completed. The warning lamp shall remain on while a failure condition exists whenever the ignition switch is in the "on" position.

4.2 DURABILITY

4.2.1 Wear of the brakes shall be compensated for by means of a system of automatic or manual adjustment.

4.2.2 The friction material thickness shall either be visible without disassembly, or where the friction material is not visible, wear shall be assessed by means of a device designed for that purpose.

4.2.3 During all the tests in this Regulation and on their completion, there shall be no friction material detachment and no leakage of brake fluid.

4.3 MEASUREMENT OF DYNAMIC PERFORMANCE

The method used to measure performance is as specified in the respective tests. There are three ways in which the service
brake system performance may be measured:

4.3.1 MFDD (Mean Fully Developed Deceleration):

$$d_m = \frac{V_b^{\,2} - V_e^{\,2}}{25.92 \cdot (S_e - S_b)}$$

V1 = vehicle speed when rider actuates the control
V_b = vehicle speed at 0.8 V1 in km/h
V_e = vehicle speed at 0.1 V1 in km/h
S_b = distance travelled between V1 and Vb in meters
S_e = distance travelled between V1 and Ve in meters

4.3.2 Stopping distance:

Based on the basic equations of motion:

$S = 0.1 \cdot V + (X) \cdot V^2$

Where:
S = stopping distance in meters
V = vehicle speed in km/h
X = a variable based on the requirement for each test

To calculate the corrected stopping distance using the actual vehicle test speed, the following formula is used:

$Ss = 0.1 \cdot Vs + (Sa - 0.1 \cdot Va) \cdot Vs^2/Va^2$

Where:

Ss = corrected stopping distance in meters
Vs = specified vehicle test speed in km/h
Sa = actual stopping distance in meters
Va = actual vehicle test speed in km/h

Note: This equation is only valid when the actual test speed (Va) is within ± 5 km/h of the specified test speed (Vs).

4.3.3 Continuous Deceleration Recording

For the burnishing procedure and tests such as the wet brake and heat fade – heating procedure, there is a continuous

recording of the vehicle's instantaneous deceleration from the moment a force is applied to the brake control until the end

of the stop.

4.3.4 Brake lining materials.

Brake linings shall not contain asbestos.

4.4 TESTS:

The braking tests (test conditions and procedures) which vehicles submitted for approval are required to undergo, and the braking performance required, as prescribed here under:

4.5 TEST CONDITIONS, PROCEDURES AND PERFORMANCE REQUIREMENTS.

4.5.1 GENERAL

4.5.1.1 Test surfaces

4.5.1.1.1 High friction surface:

(a) Applicable to all dynamic brake tests excluding the ABS tests where a low-friction surface is specified;

(b) The test area is a clean and level surface, with a gradient ≤ 1 per cent;

(c) The surface has a nominal peak braking coefficient (PBC) of 0.9, unless otherwise specified.

4.5.1.1.2 Low friction surface:

(a) Applicable to all dynamic brake tests where a low-friction surface is specified;

(b) The test area is a clean, dry and level surface, with a gradient ≤ 1 per cent;

(c) The surface has a PBC of ≤ 0.45.

4.5.1.2 Measurement of PBC:

The PBC is measured as determined by the approval authority using either:

(a) The American Society for Testing and Materials (ASTM) E1136 standard reference test tyre in accordance with ASTM

Method E1337-90, at a speed of 40 miles/h without water delivery; or

(b) The method specified in the Appendix to Annex 4 of UNECE Regulation No. 78, 01 series of amendments.

4.5.1.3 Parking brake system tests:

The specified test slope has a clean and dry surface that does not deform under the mass of the vehicle.

4.5.1.4 Test Lane Width:

For three-wheeled vehicles (vehicle categories L2, L4, L5, L6, and L7) the test lane width is

2.5 m plus the
vehicle width.

4.5.1.5 Ambient Temperature

The ambient temperature is between 4 °C and 45 °C.

4.5.1.6 Wind Speed

The wind speed is not more than 5 m/s.

4.5.1.7 Test Speed Tolerance

The test speed tolerance is ± 5 km/h.
In the event of the actual test speed deviating from the specified test speed, the actual stopping distance is corrected using the formula in paragraph 4.3.2.

4.5.1.8 Automatic Transmission

Vehicles with automatic transmission shall complete all tests - whether they are for "engine connected" or "engine disconnected".
If an automatic transmission has a neutral position, the neutral position is selected for tests where "engine disconnected" is specified.

4.5.1.9 Vehicle Position and Wheel Lock

(a) The vehicle is positioned in the center of the test lane for the beginning of each stop;
(b) Stops are made without the vehicle wheels passing outside the applicable test lane and without wheel lock.

4.5.1.10 Test Sequence

Test order	Paragraph
1. Dry stop - single brake control actuated	4.3 4.5.2.6
2. Dry stop - all service brake controls actuated	4.4 5
3. Wet brake	4.5 6
4. Heat fade	4.6 7
5. If fitted:	
5.1. Parking brake system	4.7 8
5.3. Partial failure, for split service brake systems	4.8 9

Note 1/: Heat fade is always the last test to be carried out.

4.5.2 Preparation

4.5.2.1 Engine idle speed

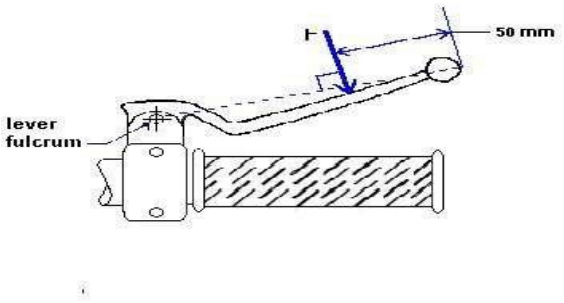
The engine idle speed is set to the manufacturer's specification.

4.5.2.2 Tyre pressures

The tyres are inflated to the manufacturer's specification for the vehicle loading condition for the test.

4.5.2.3 Control application points and direction

For a hand control lever, the input force (F) is applied on the control lever's forward surface perpendicular to the axis of the lever fulcrum and its outermost point on the plane along which the control lever rotates (see figure below).
The input force is applied to a point located 50 mm from the outermost point of the control lever, measured along the axis between the central axis of the fulcrum of the lever and its outermost point.



For a foot control pedal, the input force is applied to the center of, and at right angles to, the control pedal.

4.5.2.4 Brake temperature measurement

As determined by the approval authority, the brake temperature is measured on the approximate center of the braking path of the disc or drum using:
(a) A rubbing thermocouple that is in contact with the surface of the disc or drum; or
(b) A thermocouple that is embedded in the friction material.

4.5.2.5 Burnishing procedure

The vehicle brakes are burnished prior to evaluating performance. This procedure may be completed by the manufacturer:
(a) Vehicle lightly loaded;
(b) Engine disconnected;
(c) Test speed:
Initial speed: 50 km/h or 0.8 Vmax, whichever is lower;
Final speed = 5 to 10 km/h;
(d) Brake application:
(i) Each service brake system control actuated separately;
(e) Vehicle deceleration:
(i) Single front brake system only:
3.0-3.5 m/s2 for vehicle categories L4;

(ii) Single rear brake system only: 1.5-2.0 m/s2;
(iii) CBS or split service brake system: 3.5-4.0 m/s2;
(f) Number of decelerations: 100 per brake system;
(g) Initial brake temperature before each brake application ≤ 100 °C;
(h) For the first stop, accelerate the vehicle to the initial speed and then actuate the brake control under the conditions specified until the final speed is reached. Then reaccelerate to the initial speed and maintain that speed until the brake temperature falls to the specified initial value. When these conditions are met, reapply the brake as specified. Repeat this procedure for the number of specified decelerations. After burnishing, adjust the brakes in accordance with the manufacturer's recommendations.

4.5.2.6 DRY STOP TEST - SINGLE BRAKE CONTROL ACTUATED

Vehicle condition:

(a) The test is applicable to all vehicle categories;
(b) Laden:
For vehicles fitted with CBS and split service brake systems: the vehicle is tested in the lightly
loaded condition in addition to the laden condition;
(c) Engine disconnected.
The test is applicable to all vehicle categories;

4.5.2.7 Test conditions and Procedure:

(a) Initial brake temperature: ≥ 55 °C and ≤ 100 °C;
(b) Test Speed
(i) Vehicle categories L1, L2 and L6: 40 km/h or 0.9 Vmax, whichever is lower;
(ii) Vehicle categoriesL3, L4 and L5and L7: 60 km/h or 0.9 Vmax, whichever is lower;
(c) Brake Application:
(i) Each service brake system control actuated separately;
(d) Brake actuation force:
(i) Hand control: ≤ 200 N;
(ii) Foot control: ≤ 350 N for vehicle categories L1, L2, L3, L4 and L6;
≤ 500 N for vehicle category L5; L7
(e) Number of stops: until the vehicle meets the performance requirements, with a maximum of 6 stops;
(f) For each stop, accelerate the vehicle to the test speed and then actuate the brake control under the conditions
specified in this paragraph.

4.5.2.8 Performance Requirements

When the brakes are tested in accordance with the test procedure set out, the stopping distance shall be as specified in column 2 or the
MFDD shall be as specified in column 3:

Column1	Column 2	Column 3

Vehicle Category	STOPPING DISTANCE (S) (Where V is the specified test speed in km/h and S is the required stopping distance in metres)		MFDD
Single brake system, front wheel(s) braking only:			
L2 and L6	$S \leq 0.1\ V + 0.0143$ V2		≥ 2.7 m/s2
L5 and L7	Not applicable		Not applicable
L4	$S \leq 0.1\ V + 0.0105$ V2		≥ 3.6 m/s2
Single brake system, rear wheel(s) braking only:			
L2 and L6	$S \leq 0.1\ V + 0.0143$ V2		≥ 2.7 m/s2
L5 and L7	Not applicable		Not applicable
L4	$S \leq 0.1\ V + 0.0105$ V2		≥ 3.6 m/s2
Vehicles with CBS or split service brake systems: for laden and lightly loaded conditions:			
L1, L2 and L6	$S \leq 0.1\ V + 0.0087$ V2		≥ 4.4 m/s2
L5 and L7	$S \leq 0.1\ V + 0.0077$ V2		≥ 5.0 m/s2
L4	$S \leq 0.1\ V + 0.0071\ V2$		≥ 5.4 m/s2
Vehicles with CBS – secondary service brake systems:			
ALL	$S \leq 0.1\ V + 0.0154$ V2		≥ 2.5 m/s2

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5 DRY STOP TEST – ALL SERVICE BRAKE CONTROLS ACTUATED

5.1 Vehicle condition:

(a) The test is applicable to vehicle categories L2, L4, L5, L6 and L7
(b) Lightly loaded
(c) Engine disconnected.

5.2 Test conditions and procedure:

(a) Initial brake temperature: ≥ 55 °C and ≤ 100 °C;
(b) Test speed: 100 km/h or 0.9 Vmax, whichever is lower;
(c) Brake application:
Simultaneous actuation of both brake controls, in the case of a vehicle with two service brake systems or actuation of the single brake control in the case of a vehicle with one service brake system.

(d) **Brake actuation force:**
Hand control: ≤ 250 N;
Foot control: ≤ 400 N for vehicle category L2, L4;
≤ 500 N for vehicle category L5, L6, L7

(e) Number of stops: until the vehicle meets the performance requirements, with a maximum of 6 stops;
For each stop, accelerate the vehicle to the test speed and then actuate the brake controls under the conditions specified in this paragraph.

5.3 Performance requirements

When the brakes are tested in accordance with the test procedure, the stopping distance (S) shall be $S \leq 0.0060\ V2$ (where V is the specified test speed in km/h and S is the required stopping distance in meters).

6 WET BRAKE TEST

6.1 General:

(a) The test is comprised of two parts that are carried out consecutively for each brake system:
(i) A baseline test based on the dry stop test - single brake control actuated;
(ii) A single wet brake stop using the same test parameters as in (i), but with the brake(s) being continuously sprayed with water while the test is conducted in order to measure the brakes' performance in wet conditions;
(b) The test is not applicable to a parking brake system, unless it is the secondary brake;
(c) Drum brakes or fully enclosed disc brakes are exempt from this test unless ventilation or open inspection ports are present;
(d) This test requires the vehicle to be fitted with instrumentation that gives a continuous recording
of brake control force and vehicle deceleration. The MFDD and the stopping distance measurements are not appropriate in this case.

6.2 Vehicle condition:

(a) The test is applicable to all vehicle categories;
(b) Laden:

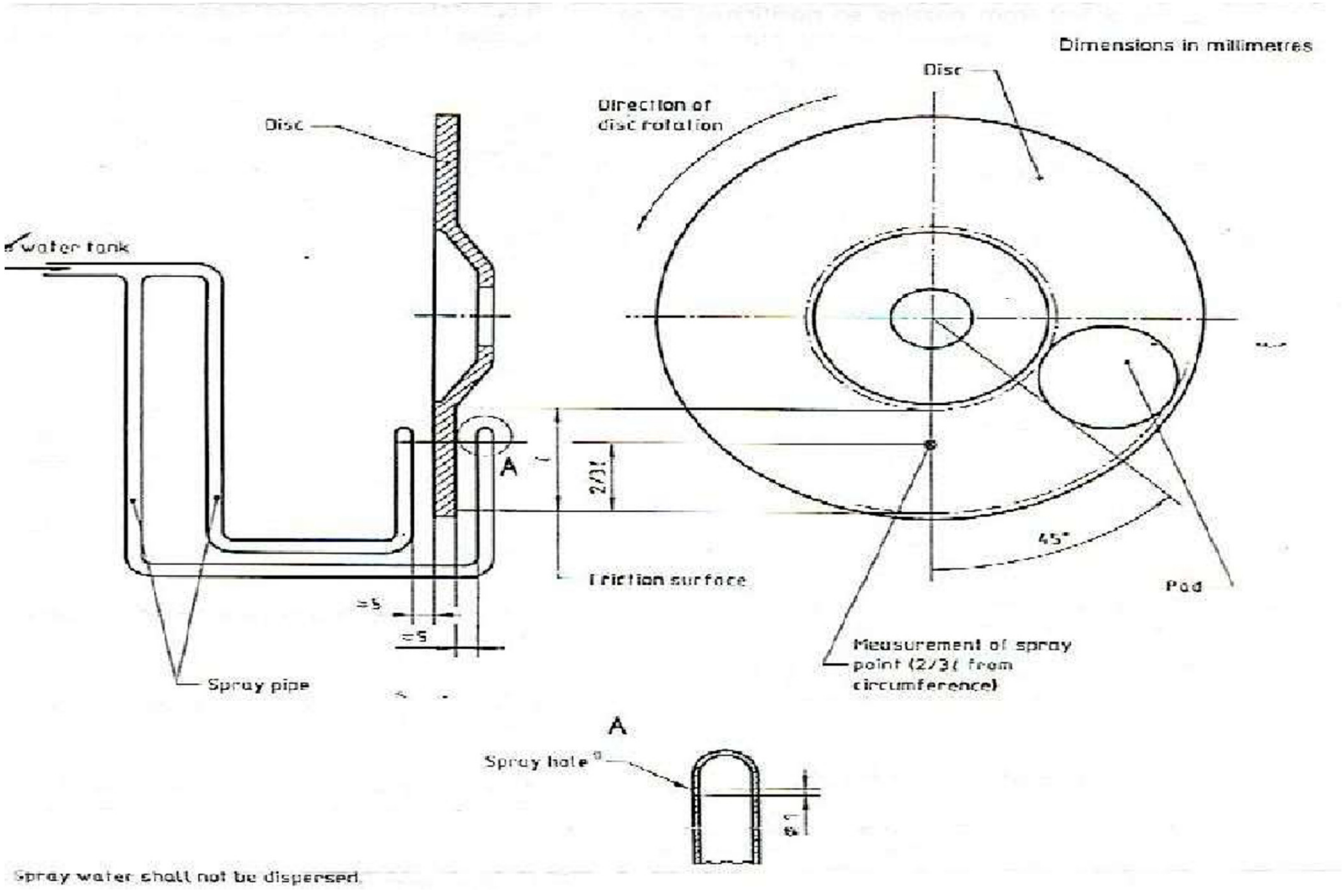
For vehicles fitted with CBS and split service brake systems: the vehicle is tested in the lightly

loaded condition in addition to the laden condition;

(c) Engine disconnected;

(d) Each brake is fitted with water spray equipment:

(i) Disc brakes: Sketch of water spray equipment:



The disc brake water spray equipment is installed as follows:

a. Water is sprayed onto each brake with a flow rate of 15 liters/hr. The water is equally distributed on each side of the rotor;

b. If the surface of the rotor has any shielding, the spray is applied 45° prior to the shield;

c. If it is not possible to locate the spray in the position shown on the sketch, or if the spray coincides with a brake ventilation hole or similar, the spray nozzle may be advanced by an additional 90° maximum from the edge of the pad, using the same radius;

(ii) Drum brakes with ventilation and open inspection ports:

The water spray equipment is installed as follows:

a. Water is sprayed equally onto both sides of the drum brake assembly (on the stationary back plate and on the rotating drum) with a flow rate of 15 liters/h;

b. The spray nozzles are positioned two thirds of the distance from the outer circumference of the rotating drum to the wheel hub center;

c. The nozzle position is □ 15□ from the edge of any opening in the drum back plate.

6.3 Baseline test

6.3.1 Test conditions and procedure:

(a) The test in section 4.5.2.6. (dry stop test - single brake control actuated) is carried out for each brake system but with the brake control force that results in a vehicle deceleration of 2.5 – 3.0 m/s2, and the following is determined:

(i) The average brake control force measured when the vehicle is travelling between 80 per cent and 10 per cent of the specified test speed;

(ii) The average vehicle deceleration in the period 0.5 to 1.0 seconds after the point of actuation of the brake control;

(iii) The maximum vehicle deceleration during the complete stop but excluding the final 0.5 seconds;

(b) Conduct 3 baseline stops and average the values obtained in (i), (ii), and (iii).

6.3.2 Wet brake stop

6.3.3 Test conditions and procedure:

(a) The vehicle is ridden at the test speed used in the baseline test set out with the water spray equipment operating on the brake(s) to be tested and with no application of the brake system;

(b) After a distance of ≥ 500 m, apply the averaged brake control force determined in the baseline test for the brake system being tested;

(c) Measure the average vehicle deceleration in the period 0.5 to 1.0 seconds after the point of actuation of the brake control;

(d) Measure the maximum vehicle deceleration during the complete stop but excluding the final 0.5 seconds.

6.3.4 Performance requirements

When the brakes are tested in accordance with the test procedure, the wet brake deceleration performance shall be:

(a) The value measured ≥ 60 per cent of the averaged deceleration values recorded in the baseline test, i.e. in the period 0.5 to 1.0 seconds after the point of application of the brake control; and

(b) The value measured ≤ 120 per cent of the averaged deceleration values recorded in the baseline test, i.e. during the complete stop but excluding the final 0.5 seconds.

7 HEAT FADE TEST

7.1 General:

(a) The test comprises three parts that are carried out consecutively for each brake system:

i. A baseline test using the dry stop test - single brake control actuated;(section 8)

ii. A heating procedure which consists of a series of repeated stops in order to heat the brake(s);

iii. A hot brake stops using the dry stop test - single brake control actuated (article 4.3), to measure the brake's performance after the heating procedure;

(b) The test is applicable to vehicle categories L2, L4, L5, L6 and L7;

(c) The test is not applicable to parking brake systems and secondary service brake systems;

(d) All stops are carried out with the vehicle laden;

(e) The heating procedure requires the vehicle to be fitted with instrumentation that gives a continuous recording of brake control force and vehicle deceleration. The MFDD and stopping distance measurements are not appropriate for the heating procedure. The baseline test and the hot brake stop require the measurement of either MFDD or the stopping distance.

7.2 Baseline test

7.2.1 Vehicle condition:

(a) Engine disconnected.

7.2.2 Test conditions and procedure:

(a) Initial brake temperature: ≥ 55 °C and ≤ 100 °C;
(b) Test speed: 60 km/h or 0.9 Vmax, whichever is lower;
(c) Brake application:
Each service brake system control actuated separately;
(d) Brake actuation force:
Hand control: ≤ 200 N;
Foot control: ≤ 350 N for vehicle categories L2 and L4;
≤ 500 N for vehicle category L5, L6 and L7;
(e) Accelerate the vehicle to the test speed, actuate the brake control under the conditions specified and record the
control force required to achieve the vehicle braking performance specified.

7.3 Heating procedure

7.4 Vehicle condition:

(a) Engine transmission:
(i) From the specified test speed to 50 per cent specified test speed: connected, with the highest appropriate
gear selected such that the engine speed remains above the manufacturer's specified idle speed;
(ii) From 50 per cent specified test speed to standstill: disconnected.

7.5 PREPARATION OF THE VEHICLE

7.5.1 The vehicle manufacturer before offering the vehicle shall ensure that vehicle sample must be run at least 1000Km.
7.5.2 The brake lever free and pedal free play shall be adjusted according to manufacturer's recommendations for optimum braking performance.
7.5.3 The weight of testing personnel/driver seated on the vehicles while testing and the instrumentation installed on the vehicle shall be considered part of vehicle mass. The additional load shall be selected and mounted in normal operating condition in such a way that actual mass during testing shall not exceed the specified laden or un-laden mass by more than 25 kg. Weight distribution among axles should be at the closest possible values recommended by the manufacturer. However, if sum of maximum recommended axle weight exceeds the gross vehicle weight, the actual weight on each axle shall be in proportionate to the same ratio of the gross vehicle weight to the sum of maximum recommended axle. Actual load condition shall be recorded in the report.
7.5.4 The tires should be in good condition and should run in along with the vehicle. Declaration of the vehicle manufacturer shall be accepted as compliance to this sub-clause.
7.5.5 At the start of the test, tires shall be cold and shall be inflated to the pressure specified for respective load condition of the vehicle.

7.6 Test Conditions and Procedure:

(a) Initial brake temperature prior to first stops only: ≥ 55 °C and ≤ 100 °C;
(b) Test speed:
Single brake system, front wheel braking only: 100 km/h or 0.7V max, whichever is lower;
Single brake system, rear wheel braking only: 80 km/h or 0.7V max, whichever is lower;
CBS or split service brake system: 100 km/h or 0.7V max, whichever is lower;
(c) Brake application: Each service brake system control actuated separately;
(d) Brake actuation force:
(i) For the first stop:
The constant control force that achieves a vehicle deceleration rate of 3.0 - 3.5 m/s2 while the vehicle is decelerating between 80 per cent and 10 per cent of the specified speed;
If the vehicle is unable to achieve the specified vehicle deceleration rate, this stop is carried out to meet the deceleration requirements.
(ii) For the remaining stops:
i. The same constant brake control force as used for the first stop;
ii. Number of stops: 10;
iii. Interval between stops: 1000 m;
(e) Carry out a stop to the conditions specified in this paragraph and then immediately use maximum acceleration to reach the specified speed and maintain that speed until the next stop is made.

7.7 Hot Brake Stop

7.8 Test Conditions and Procedure

Perform a single stop under the conditions used in the baseline test for the brake system that has been heated during the procedure. This stop is carried out within one minute of the completion of the procedure. With a brake control application force less than or equal to the force used during the test.

7.9 Performance Requirement:

When the brakes are tested in accordance with the test procedure.
(a) The stopping distance: $S2 \leq 1.67\ S1 - 0.67 \times 0.1V$
Where: S1 = corrected stopping distance in meters achieved in the baseline test

S2 = corrected stopping distance in meters achieved in the hot brake stop
V = specified test speed in km/h; or

(b) The MFDD ≥ 60 per cent of the MFDD recorded in the test set out in paragraph 4.6.2.

8 Parking brake system test – for vehicles equipped with parking brakes

8.1 Vehicle condition:

(a) The test is applicable to vehicle categories L2, L4, L5, L6, and L7;
(b) Laden;
(c) Engine disconnected.

8.2 Test conditions and procedure:

(a) Initial brake temperature: ≤ 100 °C;
(b) Test surface gradient = 18 percent;
(c) Brake actuation force:
Hand control: ≤ 400 N;
Foot control: ≤ 500 N;
(d) For the first part of the test, park the vehicle on the test surface gradient facing up the slope by applying the parking brake system under the conditions specified in this paragraph. If the vehicle remains stationary, start the measurement of the test period;
(e) On completion of the test with vehicle facing up the gradient, repeat the same test procedure with the vehicle facing down the gradient.

8.3 Performance requirements:

When tested in accordance with the test procedure, the parking brake system shall hold the vehicle stationary for 5 minutes when the vehicle is both facing up and facing down the gradient.

9 Partial Failure Test – for split service brake systems

9.1 General information:

(a) The test is only applicable to vehicles that are equipped with split service brake systems;

(b) The test is to confirm the performance of the remaining subsystem in the event of a hydraulic system leakage failure.

9.2 Vehicle condition:

(a) The test is applicable to vehicle categories L4, L5, L6, and L7;

(b) Lightly loaded;

(c) Engine disconnected.

9.3 Test conditions and procedure:

(a) Initial brake temperature: ≥ 55 °C and ≤ 100 °C;

(b) Brake actuation force: Hand control: ≤250 N; Foot control: ≤400 N

(c) Test speeds: 50 km/h and 100 km/h or 0.8 V max whichever is lower;

(d) Number of stops: until the vehicle meets the performance requirements, with a maximum of 6 stops for each test speed;

(e) Alter the service brake system to induce a complete loss of braking in any one subsystem. Then, for each stop, accelerate the vehicle to the test speed and then actuate the brake control under the conditions specified in this paragraph;

(f) Repeat the test for each subsystem.

9.4 Performance requirements:

When the brakes are tested in accordance with the test procedure set out,

(a) The stopping distance (S) shall be ≤ 0.1 V + 0.0117 V2 (where V is the specified test speed in km/h and S is the required stopping distance in meters) or the MFDD shall be ≥ 3.3 m/s2.

10 INSTRUMENTATION

10.1 Installation of instruments should be as per recommendation of instrument manufacturer. All instruments shall be mounted in such a way that they do not affect the performance or stability of the vehicle and do not disturb the driver while normal driving of a vehicle and carrying out the test.

10.2 Appropriate switches shall be fixed to control lever and Brake Pedal such that actuation of controls signaled to the instruments. Alternatively, brake light switch of the vehicle may be used, if possible to do so.

10.3 Instruments must be calibrated according to instrument manufacturer's instructions before commencement of a test series.

10.4 A time device would be needed to control actuation of both lever/paddle simultaneously, and record the time interval elapsed between actuation of two controls.

10.5 Instruments for Stopping Distance

10.6 Contactless electronic speed and distance measuring instruments or speed measuring system using an additional wheel when used, should meet the following least count and accuracy requirements.

Parameter	Least count	Accuracy
Speed	0.1km/h	± 1 percent at the prescribed

Distance	0.1 m	speed for the test
Time		

10.7 Instruments for Deceleration

Deceler meters should be installed on test vehicle properly such that its position is not likely to be disturbed during tests. This shall be fitted as close to center of gravity of vehicle as possible in longitudinal and lateral plane. Before commencement of each run, leveling of instrument within the limits prescribed by the instrument manufacturer shall be ensured.

The accuracy of the instrument for deceleration should be within ± 3 per cent

10.8 For calculating mean fully developed deceleration/mean deceleration, it is essential that graph of deceleration is fairly uniform. It is not possible to lay down norms for steady features of this graph as this is influenced by many testing factors, mainly response of the rider. Hence, general engineering should be followed. The graph illustrated in Fig. 3 is typically valid graph and the graph illustrated in Fig. 4 shall be considered invalid. Methods of calculations of deceleration are also illustrated in Fig. 3.

10.9 Instrument for Control Force

10.10 Suitable load cells shall be used for measuring braking force and recommended least count accuracy should be within the limit of 10N (1kg) and 20N (2kg) respectively.

10.11 Instrument for Speed Measurement

10.12 While measuring stopping distance by instruments, speed is also measured by these systems.

10.13 A proper fixture need to be designed to measure the force applied on the brake paddle. One is to install force sensor other way is using pressure sensor and distance measuring device.

10.14 While measuring deceleration, a speedometer may be used. This may be the one fitted on the vehicle. Appropriate temporary marking shall be made on the dial of speedometer in such a way that the actual speed of the vehicle. Measuring tolerance should be within a limit of +1 km/h of the specified initial speed. There shall be suitable markings for all necessary test speed.