



TANZANIA STANDARD

FTZS 1231-2:2020 - Motor vehicles – Motorcycles for general use – Part 2: Specifications for three wheeled motorcycles

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- *National Development Corporation (NDC)
- Weights and Measures Agency (WMA)
- Tanzania Industrial Research Development Organization (TIRDO)
- *Aluminium Africa Limited
- National Institute of Transport (NIT)
- *Dar es Salaam Institute of Technology (DIT)
- Ministry of Works
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The organization marked with an asterisk (*) in the above list together with the following were directly represented on the Technical Committee entrusted with the preparation of this Tanzania Standard:

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- Land Transport Regulatory Authority (LATRA)
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Motor vehicles – Motorcycles for general use – Part 2: Specifications for three wheeled motorcycles

O Foreword

This draft Tanzania Standard aims at addressing the safety related characteristics and operational requirements for the three wheeled motorcycles. These three wheeled motorcycles are currently being operated for public transportation of passengers and cargo and are being used on the basis of either private or commercial purposes.

Recently, the country has experienced the introduction of different types and models of three wheeled motorcycles. These three wheeled motorcycles are available at different levels of quality performance.

Therefore, to address the safety need for the occupants of three wheeled motorcycles, the Automotive Components Technical Committee under the supervision of Mechanical Engineering Divisional Standards Committee has prepared this Tanzania Standard. The standard addresses also the safety requirements of the other road users and pedestrians.

During the preparation of this Tanzania Standard, assistance was derived from the following publications:

ISO 9131: 1993, *Three wheel mopeds and motor cycles – dimensions - vocabulary*, published by International Organization for Standardization.

SANS 569: 2007, *Open sided passenger vehicles*, published by South African National Bureau of Standards.

Tanzania Occupation Health and Safety Act of 2003.

1 Scope

This draft Tanzania Standard covers the safety related performance characteristics of the three wheeled motorcycles having one wheel at front and two wheels at the rear. The standard specifies the three wheeled motorcycles with the maximum gross vehicle mass (GVM) of 1250 kg. It covers also motor cycles fixed with the sidecar.

2 References

For the purpose of this Tanzania Standard the following references shall apply:

TZS 698:2005, *Road vehicles – Code of practice for inspection and testing of used motor vehicles for road worthiness*

TZS 983:2007, *Air Quality - Vehicular exhaust emissions limits*

TZS 1591:2013, *Motorcycle and scooter tyres-Specification*

TZS 1331:2009, *Motor vehicles – Motorcycles for general use. Part 1: Specification for two wheeled motorcycles*

3 Definitions

For the purpose of this Tanzania Standard the following definitions shall apply:

3.1 axle

This is the real or imaginary axis of the single wheel or two symmetrical wheels of the three wheeled motorcycle,.

3.2 wheel plane

This is the centre plane of the wheel rim normal to the spin axis of the wheel.

3.3 wheel centre

This is a point at which the spin axis of the wheel intersects the wheel plane (see clause 3.2).

3.4 longitudinal (vehicle) median plane; plane y

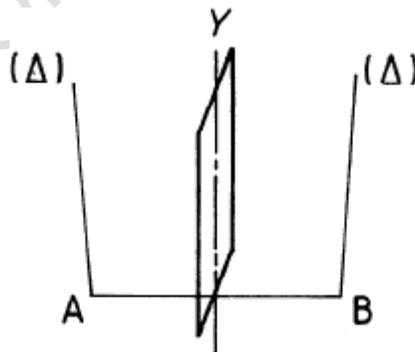
3.4.1 For two-wheeled motorcycles with side-car: longitudinal median plane of the vehicle without side-car, as defined in clause 3.4. 2

3.4.2 For other three-wheeled cycles: vertical plane Y passing through the mid-point of AB, perpendicular to AB, for rear axle, , A and B being defined as follows:

3.4.3 For each wheel, the vertical plane through its axis cutting the wheel plane (see clause 3.2) following a straight line A which meets the supporting surface of the vehicle at one Point;

3.4.4 A and B are two points which correspond to two wheels, both of which are either steering or powered, situated respectively at either end of the same real or imaginary axle.

NOTE – The longitudinal (vehicle) median plane is also called the longitudinal plane of symmetry or zero Y plane”



3.5 minimum turning circle diameters

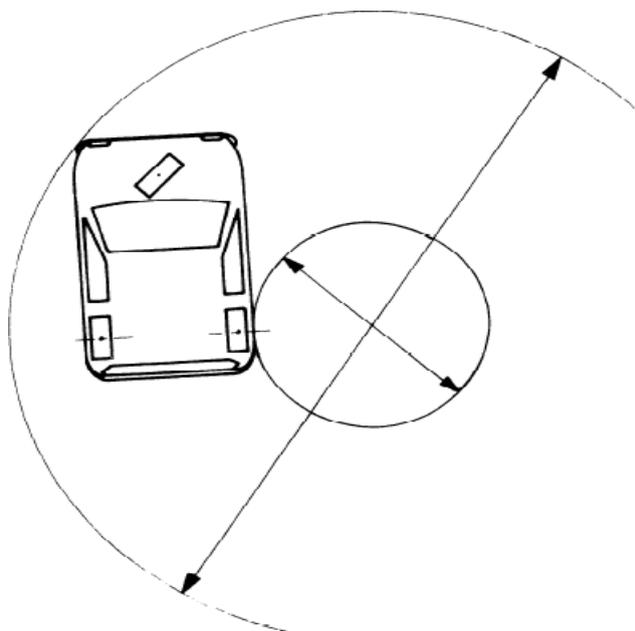
This is a diameter of the outermost circle circumscribing the extension on the supporting plane of any wheel plane (see clause 3.2) of the three wheeled motorcycle, the steered wheel(s) being turned to full lock.

3.6 turning clearance circle diameter

The turning clearance circle diameters, with the steering-wheel turned to full lock, are

- a) The diameter of the largest circle beyond which are located the projections onto the supporting surface of all parts of the vehicle;
- b) The diameter of the smallest circle within which are located the projections onto the supporting surface of all parts of the vehicle.

NOTE - Each vehicle has left-hand and right-hand turning clearance circles.



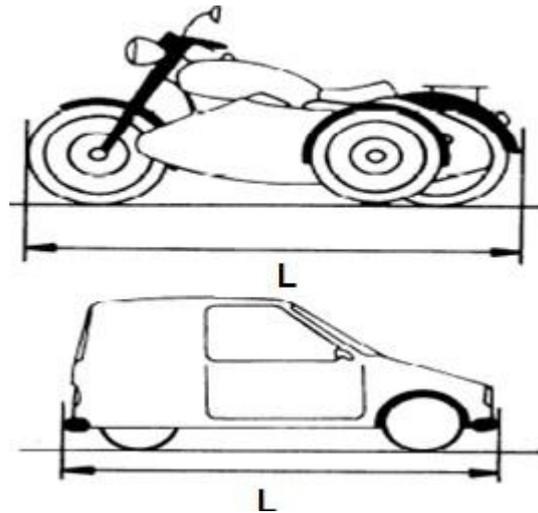
3.7 three wheeled motorcycle

The three wheeled motor cycle whose GVM weight does not exceed 1250 kg.

3.8 overall length of the three wheeled motorcycle (L)

This is the distance between two vertical planes perpendicular to the longitudinal median plane (see clause 3.4) and touching respectively the front and rear of the three wheeled motorcycle.

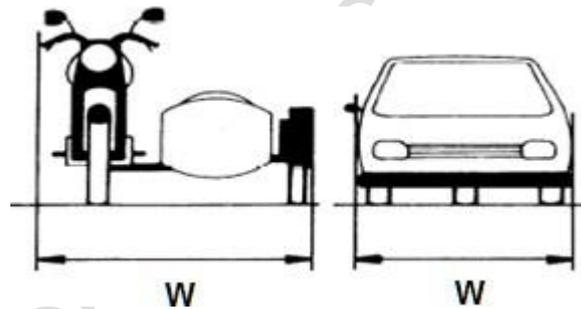
NOTE – All parts of the vehicle and, in particular, any parts projecting to front or rear (bumpers, mud guards, etc.), are contained between these two planes.



3.10 overall width of the three wheeled motorcycle (W)

This is the distance between two planes parallel to the longitudinal median plane (see clause 3.4) and touching the three wheeled motorcycle on either side of this plane.

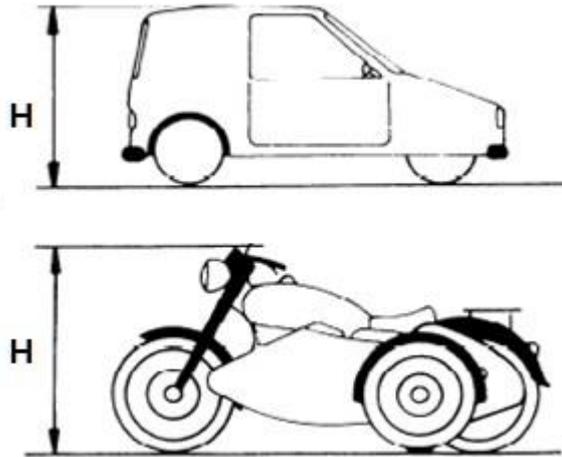
NOTE – All parts of the vehicle and, in particular, any lateral projections of fixed parts, are contained between these two planes.



3.11 overall height of three wheeled motorcycle (H)

This is the distance between the supporting surface and a horizontal plane touching the top-most part of the three wheeled motorcycle.

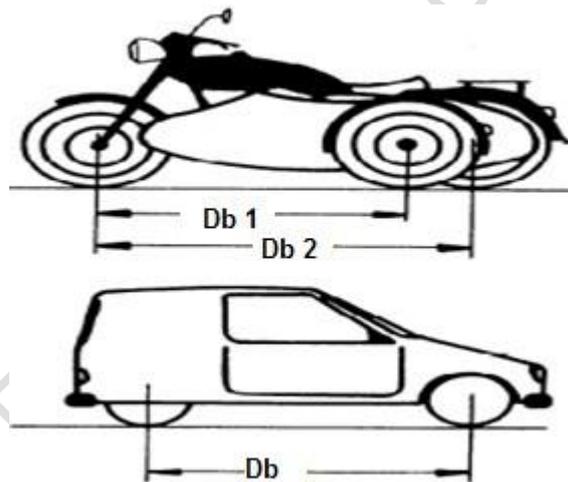
NOTE – All fixed parts of the vehicle are contained between these two planes.



3.12 wheel base (Db)

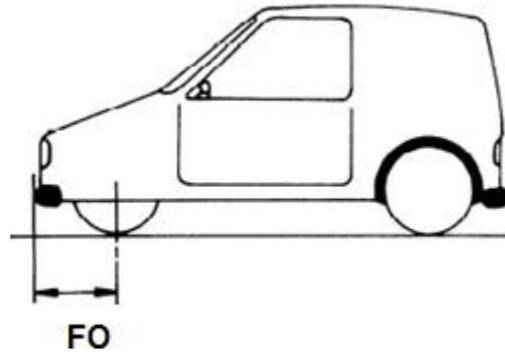
This is the distance, on the supporting surface, between two vertical planes perpendicular to the longitudinal median plane (3.4) and passing through the wheel centres (3.3).

NOTE - If the values of left and right wheelbases are different, both dimensions are stated, separated by a dash, the first one corresponding to the left side.



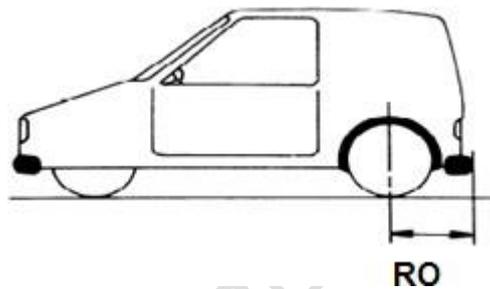
3.13 front overhang (FO)

This is the distance between the transverse vertical plane passing through the front wheel centre (3.3) and the foremost point of the three wheeled motorcycle, taking into consideration any parts rigidly attached to the three wheeled motorcycle.



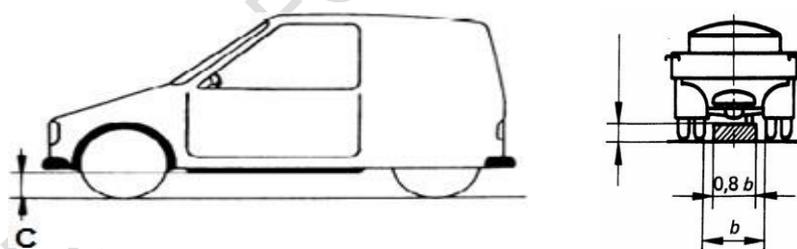
3.14 rear overhang (RO)

This is the distance between the transverse vertical plane passing through the rear wheel(s) centre(s) (3.3) and the rearmost point of the three wheeled motorcycles, taking into consideration any parts rigidly attached to the three wheeled motorcycles.



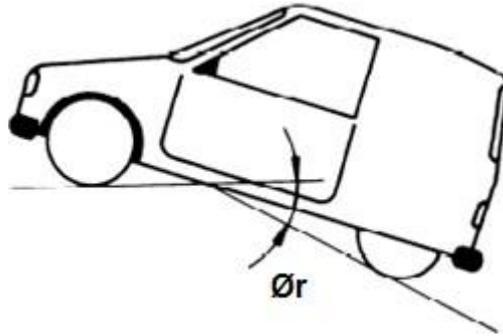
3.15 ground clearance (C)

The distance between the ground and the lowest point of the center part of the vehicle. The center part is that part contained between two planes parallel to and equidistant from the longitudinal median plane (of the vehicle) and separated by a distance which is 80 % of b that is the least distance between points on the inner edges of the wheels on any one axle.



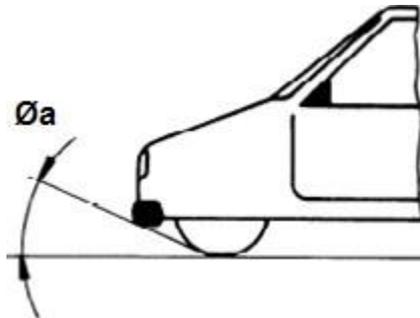
3.16 ramp angle (\emptyset_r)

This is the minimum acute angle measured between two planes perpendicular to the longitudinal median plane tangential, respectively, to the tyres of the front and rear wheels, and intersecting at a line touching the lower part of the vehicle, outside these wheels. This angle defines the largest ramp over which the vehicle can move.



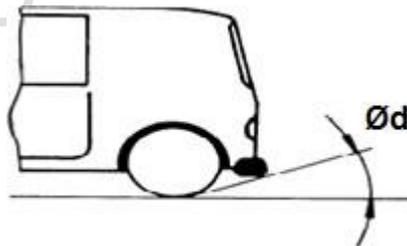
3.17 approach angle (\varnothing_a)

This is the greatest angle between the supporting surface and the plane tangential to the front tyre(s) and perpendicular to the longitudinal median plane (3.4), so that no part of, nor any part rigidly attached to, the three wheeled motorcycle lies below this plane.



3.18 departure angle (\varnothing_d)

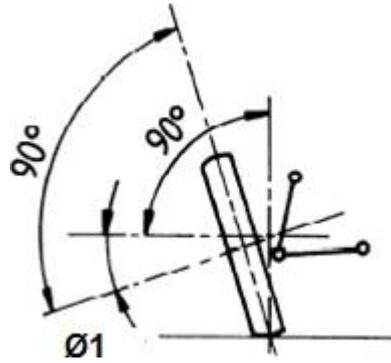
This is the greatest angle between the supporting surface and the plane tangential to the rear tyre(s) and perpendicular to the longitudinal median plane (3.4) so that no part of, nor any part rigidly attached to, the three wheeled motorcycle lies below this plane.



3.19 camber angle (\varnothing_i)

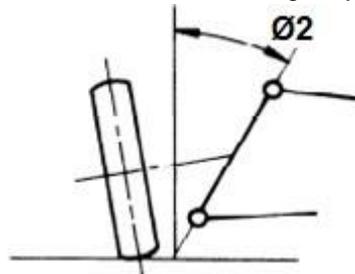
This is the acute angle between the axis of the axle-pin and a horizontal line in the vertical plane through that axis. The angle is positive when the Point of the V formed by straight lines supporting the wheel axis is directed downward.

NOTE - This angle is equal to the acute angle formed by a vertical line and the wheel planes (3.4), these two angles, considered in the same plane, having their side's perpendicular to each other.



3.20 kingpin inclination (\varnothing_2)

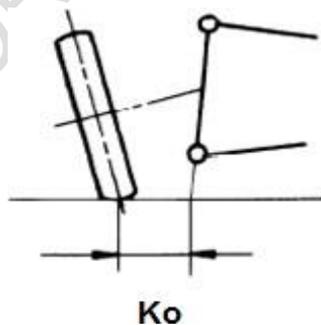
This is the projection onto a plane perpendicular to the longitudinal median plane (3.4) of the acute angle formed by the vertical and the real or imaginary swivelling axis of the stub axle.



3.21 kingpin offset (K_o)

This is the distance from the extension of the swivelling axis of the stub axle onto the supporting surface to the extension onto the same plane of the wheel plane.

NOTE - The kingpin offset shown on the drawing is positive.



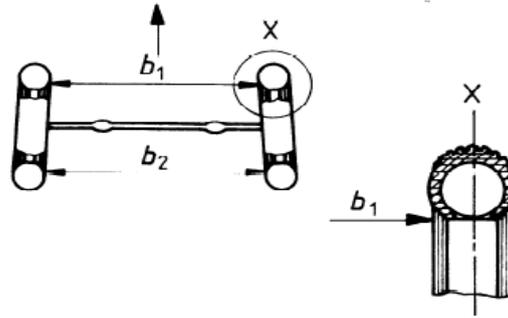
3.22 toe in

3.22.1 toe-in (length)

This is the difference ($b_2 - b_1$) between the lengths of the rear base and the forward base of an isosceles trapezium of the apices of which are the ends of the horizontal diameters of the interior contours of the rims corresponding to the same axle.

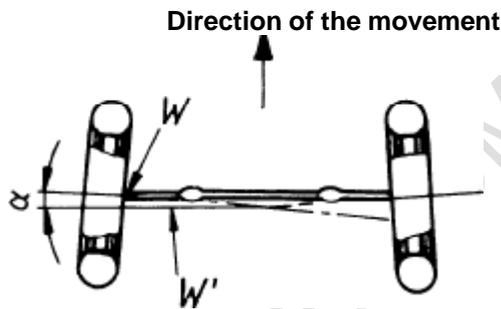
The difference is positive when the wheels are closer together in front than behind, and vice versa

Direction of the movement



3.22.2 toe in (angle)

Angle formed by the horizontal diameter of the wheel with the longitudinal median plane (3.4) or by the acute angle (α) of the vertical plane (W) passing through the axis of the axle-pin and vertical plane (W') perpendicular to the longitudinal median plane (3.4).



3.23 unladen mass

The mass of three wheeled motorcycle in running order without occupants or load, but with the fuel tank full and the usual set of tools and spare wheel(s) on board where applicable. In case of three wheeled tractors, designed for coupling to a semi-trailer, the unladen mass will be that of the drawing motorcycle.

3.24 gross vehicle weight (GVM)

This is the permissible maximum weight declared by the motorcycle manufacturer. In case of three wheeled motorcycles designed to be coupled to semi-trailer, the GVM to be taken into consideration when classifying that motorcycles, shall be the maximum weight of the tractor in running order plus the weight transferred to the tractor by the laden semi-trailer (three wheeled motorcycle) in static condition.

4 Dimensional requirements

4.1 Overall length (L)

The overall length of three wheeled motor vehicles including any parts projecting from front to rear shall not exceed 4000 mm.

4.2 Overall height (H)

The overall height of three wheeled motor vehicles including any parts projecting at the top shall not exceed 2000 mm.

4.3 Overall width (W)

The overall width of three wheeled motor vehicles including any parts projecting from sides shall not exceed 1500 mm.

4.4 Limits of ground clearance (C)

The ground clearance of any laden three wheeled motorcycles shall not be less than 180 mm.

4.5 Limits of turning radius

The minimum turning radius of any three wheeled motorcycles shall not exceed 4000 mm.

4.6 Overall masses

Three wheeled motorcycles shall have maximum GVM of 1250 kg.

4.7 Allowable toe in for side car

The sidecar wheel shall be parallel to or shall not have slight “toe – in” towards the front wheel (in the straight – ahead position).

4.8 Allowable kingpin inclination

The kingpin offset shall be allowed only for the rear wheels and the kingpin inclination shall not exceed an angle of 20° from the axis of the mounting plate surface.

4.9 Allowable camber (\emptyset_1)

The camber shall not be more than 1.75°.

4.10 Allowable angles for departure (\emptyset_d) and approach (\emptyset_a)

The three wheeled motorcycles shall have an angle of departure of not more than 46° and angle of approach of not more than 88°.

4.11 Wheel base (Db)

Shall be in accordance to manufacturer specifications

4.12 Overhangs

The overhang of any part of motor cycle in the front tyre shall not exceed 600 mm.

The overhang of any part of motor cycle in the rear tyre must not exceed 900 mm.

5 Prime mover requirements

- a) Prime mover shall be internal combustion engines, of four stroke or electric powered

6 Performance and operational requirements

6.1 Entrance

6.2 Braking requirements

All three wheeled motor vehicles shall be equipped with service brake with two independent braking systems (dual master cylinder) one of which shall act on the front wheel and the other which shall act on the rear wheels and each such system shall have an efficiency at least equivalent to that specified for an emergence or parking brake and when the two systems are applied simultaneously, the combined efficiency shall be at least to that specified for a service brake.

6.3 Speedometer

All three wheeled motor cycles shall be equipped with accurate speedometer calibrated in km/h.

6.4 Lighting requirements

Three wheeled motor cycles shall have at least one headlamp, two front parking lamps, two rear lamps, two stop lamps and number plate lamp, which shall work properly and fixed securely. The lamp fitted to a three wheeled motor vehicles shall emit a steady light when in operation and shall include the following;

6.4.1 Headlamp

The three wheeled motorcycles shall be equipped with the headlamp(s) provided that;

- a) For the three wheeled motorcycles designed with at two headlamps, shall be equipped in front on each side of its longitudinal centre line with both headlamps capable of emitting a main beam and a dipped beam.
- b) For motorcycles with side car and the three wheeled motorcycles designed with one headlamp, shall be equipped with one headlamp capable of emitting a main beam and a dipped beam.
- c) The headlamp of the three wheeled motorcycles shall be fitted at the height of not less than 450 mm and not more than 1000 mm above the ground level measured at the centre of the lamp.

6.4.2 Lighting devices and reflectors

- a) All three wheeled motorcycles shall be equipped with parking lamp of red colour that;
 - i) In front with two parking lamps which shall be visible directly from the front; or
 - ii) In rear with two parking lamps which shall be visible directly from the rear
- b) All three wheeled motorcycles shall be equipped with brake lights which shall be red in colour.
- c) All three wheeled motorcycles shall be equipped with indicating lights which shall be orange in colour.
- d) All three wheeled motorcycles shall be equipped with reverse lights which shall be white in colour.

6.4.3 Visibility distance of lights

Every headlamp emitting beam of lights shall be so adjusted and maintained that;

- a) It shall be capable of adequately illuminating an area ahead of three wheeled motorcycle concerned enabling the driver to see any person, vehicle or substantial object at a distance of at least 10 metres ahead and
- b) It can be distinguished by the use of device which simultaneously shall cause or allow the dipped beam of light to be emitted or continue to be emitted from a headlamp.

6.5 Emission requirements

The emission of the three wheeled motorcycles shall be in accordance to TZS 983.

6.6 Requirements for noise levels

The noise levels of the three wheeled motorcycles using internal combustion engine shall be in accordance to TZS 698 and table 1.

Table 1 – Limits for noise level of motorcycles (In idle mode at a distance of 1 m)

| Motorcycle category by cm ³ | Limits in dB(A) |
|----------------------------------------|-----------------|
| Up to and including 80 | 77 |
| Between 80 and 175 (incl.) | 79 |
| Above 175 | 80 |

6.7 Tyres and rims requirements

The rims and tyres shall be fixed and shall only carry the load as specified by the manufacturer of the rims and tyres. Each tyre and rim shall provide enough strength to support the vehicle when it is fully loaded. The tyres shall be in accordance to the TZS 1591.

6.8 Side mirrors requirements

The three wheeler shall be fitted with side mirrors

6.9 Steering

The parts of the steering gear shall be maintained in condition which enables the three wheeled motorcycle to be steered safely and efficiently.

6.10 Tilt stability

When tilted with a mass of 75 kg positioned on each seating position and fitted with any special equipment, such as jacks, spare tyre and toolboxes, and full fuel tank, the three wheeled motorcycle shall be capable of being tilted sideways to an angle of at least 28° in either direction from the upright position without overturning.

7 Other requirements

It shall also be capable of being tilted longitudinally to an angle of at least 30° in either direction from the upright position without overturning.

The result may be obtained by calculation or by use of a tilt table or any other suitable method.

7.1 Loads and seating accommodations

The limitations on three wheeled motorcycle, axle, and tyre loads specified by the manufacturers shall not be exceeded when determined with an occupant loading of 75 kg per person per seating position, with all equipment which is fitted or which is intended to be fitted to three wheeled motorcycle in position and, where relevant, with the tank filled to capacity, a jack(s), tools, and spare wheel(s).

7.2 Occupant safety`

Occupant safety system shall comply with the following:

- a) All seats shall be fitted with the safety belts of at least two - point type.
- b) If the three wheeled motorcycle is open roof, the occupants (passengers and the driver) shall wear protective helmets.
- c) The safety and helmets shall be designed in such way to be able to protect occupant during the accident.
- d) There shall be means of covering occupants during the rain for the open sided three wheeled motorcycles.
- e) The three wheeled motor cycles used for public use purpose shall be provided with the entrance positioned on the left hand side only. The openings from the right hand side shall be blocked by providing two guard rails positioned along the middle of the right hand side entrance spaced at 20 cm apart. The guard rail shall withstand a load of 300 N being applied in any direction without causing permanent deformation.
- f) For single occupant's compartment the three wheeled shall have windscreen made of laminated glass.

7.3 Vehicle Identification

An identification plate that contains at least the following information of the organization responsible for the manufacturing shall be permanently affixed inside the three wheeled motorcycle:

The name of the organization;

- a) The date of manufacturing; and
- b) Identification code of the vehicle
- c) Maximum GVM

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