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Protective helmets for motorcycle users — Specification

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Foreword

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Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 308, Personal protective gear

Protective helmets for motorcycle users — Specification

1 Scope

This draft Uganda Standard specifies the requirements and test methods for protective helmets intended for the protection of the driver or of the rider and the passenger while riding motorcycles of any kind, including motorized bicycles/tricycles, mopeds, motorbikes, quad bikes and scooters with or without side-car

This standard excludes helmets worn by participants in the competitive events.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
acceleration
rate of change of velocity measured in m/s^2

3.2
acceleration of a body due gravity
rate of change of velocity of a free falling body

3.3
basic plane of a headform
plane relative to the headform that corresponds to the basic plane of the human head

3.4
basic plane of the human head (Frankfort Horizontal Plane)
plane that is located at the central point of the upper margin of the external auditory meatus (portion) and the inferior margins of the orbits of the eyes (orbitale)

3.5
central vertical axis
line relative to the headform that lies in the median plane of symmetry, and that is normal to the basic plane at a point equidistant from the front and back of the headform

3.6
crown
point where the central vertical axis meets the top of the headform

3.7
cushioning material
soft material used to ensure a comfortable fit of the helmet on the head

3.8
drop height
vertical distance between the lowest point (impact point) of the elevated helmet and the impact surface on a drop test apparatus

3.9
fastening system
devices used to connect all components of the helmet

3.10
frontal plane
vertical plane that is perpendicular to the median and reference planes and passes through the crown (See Figure 2)

3.11
helmet
protective gear to be worn on the head intended to reduce the risk of head injury while riding on a motorcycle and including

- a shock attenuating system,
- the retention system, and
- manufacturer's attachments (if any)

3.12
helmet model
category of helmets that do no differ in such essential respects as the materials, dimensions, construction of the helmet, retention system or the protective padding

3.13
helmet positioning index (HPI)
the vertical distance measured at the median plane, from the front edge of the helmet to the basic plane, when the helmet is placed on the reference headform

3.14
horizontal plane
plane that passes across the body at right angles to both the frontal and median plane

3.15
maximum value of acceleration, amax
highest point on the acceleration-time curve, encountered during impact, in units of g

3.16
median plane
vertical plane that passes through the headform from front to back and divides the headform into right and left halves

3.17
permanent marking and warning
information that remains legible and cannot be removed under conditions of normal use

3.18
rear
Point at the posterior intersection of the median and reference planes

3.19
reference plane
a construction plane parallel to the basic plane of the headform at a distance from it which is of the size of the headform

3.20
retention system
system which secures the helmet firmly to the head by passing under the mandible in whole or in part when adjusted according to manufacturer's instructions

3.21
support assembly
the drop assembly in the monorail or twin wire drop system minus the weight of the headform, ball clamp bolts, and accelerometer

3.22
test area
the area on and above the test line where an impact site shall be located

3.23
test line
the line that defines the boundaries of the test area

3.24
peak
an attachment to the helmet intended to reduce sun glare

3.25
visor
a transparent protective screen extending over the eyes and covering part or all of the face

3.26
Motorcycle users
a rider or passenger of the motorcycle

3.27
shell
This is the strong outer surface of the helmet that distributes the impact over a large surface area, and therefore reduces the local forces applied to the skull and brain

3.28
Helmet goggles
close-fitting glasses with side shields, for protecting the eyes from glare and any foreign objects such as dust, water

4 General requirements

4.1 Materials

4.1.1 All materials used shall be known not to be adversely affected by ordinary household soap and cleaners as recommended by the manufacturer. Paints, glues and finishes used in manufacturing shall be compatible with the materials used in the construction of the helmet.

4.1.2 Material coming in contact with wearer's head shall not be of any type known to cause skin irritation or disease or undergo significant loss of strength, flexibility, or other physical changes as a result of contact with perspiration, oil or grease from the wearer's head.

4.1.3 Materials used shall not emit any toxic substances that are detrimental to human health

4.1.4 Adhesive material used to attach padding or straps to the helmet shall be of a formulation that will not alter the chemical or physical properties of the materials to an extent as to reduce their protective qualities.

4.1.5 All materials used in the fabrication of helmets shall be known to be suitable for use in the design of protective helmets. The materials shall not undergo appreciable alteration due to aging or normal use, such as exposure to sun, extremes of temperature, and rain. All materials used in the construction of the helmet shall be resistant to polymeric changes / physical changes when exposed to temperatures from -10 °C to 50 °C.

4.2 The shell

The shell shall be designed to deform during collision. It provides protection against direct penetration and it also protects the energy absorbing padding inside the helmet from abrasions and knocks during daily use

4.3 Protective Padding

It shall be of expanded polystyrene or any other material having similar properties

4.4 Comfort Padding

It shall be of expanded polyurethane foam, polyethylene or any other suitable material having similar properties

4.5 Retention System (chin strap)

The criteria for selection of material for chin strap and headband shall be sweat-resistant, non- irritant and shall not be known to cause skin diseases

5 Construction requirements

5.1 General

5.1.1 The protective helmet may be fitted with ear flaps and a neck curtain. It may also have a detachable peak, a visor and may also have a lower face cover

5.1.2 Ventilation shall be provided for increasing the comfort of the user

5.1.3 Where means for attaching a visor are not provided, the profile at the front edge shall not prevent the wearing of goggles

5.1.4 The helmets goggles should be free of obvious damage, dents among other defects

5.2 Shell

5.2.1 The shell shall cover all areas above plane AA and shall extend 'downwards at least as far as the lines CDEF on both sides on the headform (see Fig. 2A).

5.2.2 At the rear, the rigid parts and, in particular. the shell shall not be within a cylinder of diameter 100 mm, with axis situated at the intersection of the medium plane of symmetry of the headform and of a plane parallel to and 110 mm below the reference plane (see Fig. 2B).

5.2.3 The helmet shall not affect the wearer's ability to hear. Ventilation may be provided for increasing the comfort of the user. The outer surface shall be perfectly smooth. Above the reference plane, the shape shall be in the form of a continuous, convex curve. except where shaping is provided for functional purposes. Below the reference plane, irregularities in the curve shall be smoothly faired. The shell shall not incorporate an Integral peak, but may incorporate in integral lower face cover. Where means for attaching a visor are not provided, the profile at the front edge shall not prevent the wearing of goggles.

5.2.4 There shall be no external projections greater than 5 mm above the outer surface of the shell. Where a goggle fitting is provided at the rear of the helmet and is designed to be detachable, this requirement shall not apply to such a fitting

5.2.5 Any external projections other than press-fasteners shall be smooth and adequately faired. Rivet heads shall be radiused and shall not project more than 2 mm above the outer surface of the shell

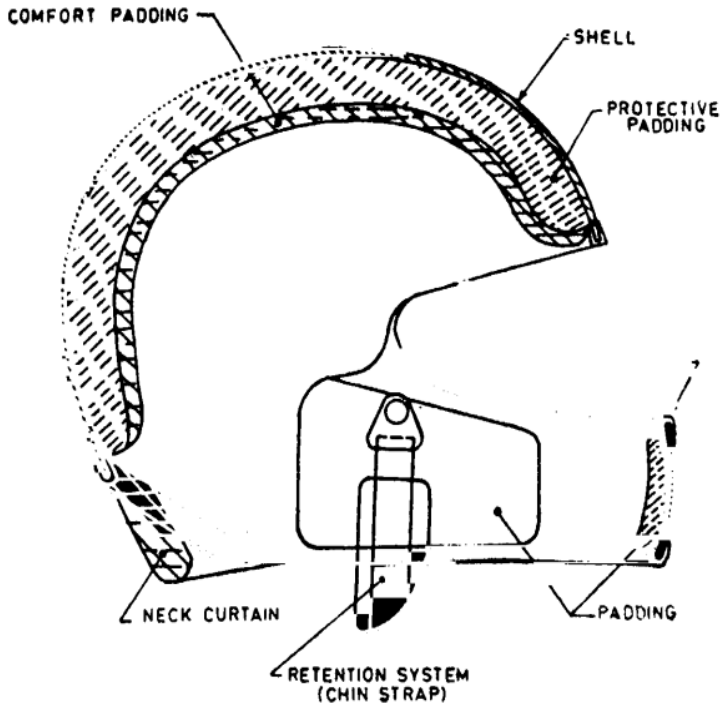


FIG. 1 A TYPICAL SKETCH SHOWING INTERNAL COMPONENTS OF HELMET

5.3 Retention system

5.3.1 The helmet shall be held in place on the wearer's head by means of a retention system which is secured under the lower jaw. All parts of the retention system shall be permanently attached to the system or to the helmet.

5.3.2 The minimum width of the retention system straps shall be 15 mm.

5.3.3 If the retention system includes a chin-strap, the strap shall be not less than 20 mm wide under a load of 150 ± 5 N. The chin strap may not include a chin-cup since the latter is integral with the shell.

5.3.4 Chin straps shall be fitted with a device to adjust and maintain tension in the strap.

5.3.5 If a retention system includes a quick-release mechanism, then the method of release of this mechanism shall be self-evident. Any levers, tabs, buttons or other components which need to be operated to release the mechanism shall be coloured red, those parts of the rest of the system which are visible when closed shall not be similarly coloured, and the mode of operation shall be permanently indicated.

5.3.6 The buckle of the retention system shall be designed so as to preclude any possibility of incorrect manipulation. It shall not be possible for the buckle to be left in a partially closed position.

5.4 Effectiveness of retention system

When tested in accordance with annex D at ambient temperature, the helmet shall remain on the test headform.

5.5 Strength of retention system

When tested in accordance with annex E, the retention system shall not detach and the maximum elongation of the retention system shall not exceed 25 mm when measured between preliminary and test load positions.

5.6 Peripheral vision

All helmets shall allow unobstructed vision through a minimum angle of 105˚ to the left and right sides of the median plane when measured in accordance with the procedure described in Annex B.

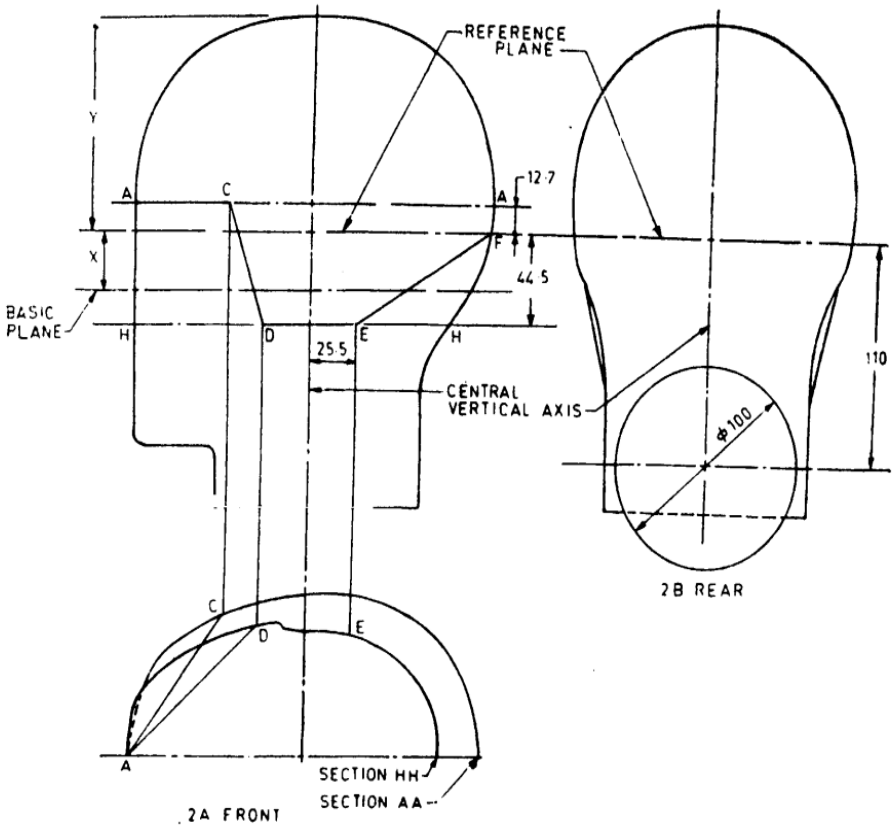


Fig 2-Orientational Planes

Table 1: Head form (Dimensions in millimetres)

Headforms	Size	X	Y	AC	HD
A	500	24	89.5	80	88
C	520	25	93	82	90
E	540	26	96	84	92
G	560	27	99	86	94
J	570	27.5	102.5	87	95
K	580	28	104	88	96
M	600	29	107	90	98
O	620	30	110	92	100

5.7 Penetration resistance

When tested in accordance with Annex C at ambient temperature no contact with the headform by the test dowel shall be made within any aperture on the helmet

5.8 Sound attenuation

When measured in accordance with Annex J, the sound drop shall not be more than 10 dB.

5.9 Rigidity

When tested in accordance with Annex G

a) In the test along each axis, the deformation measured under the 630 N load shall not exceed that measured under the initial 30 N load by more than 40 mm.

b) After restoration of the 30 N load, the deformation measured shall not exceed that measured under the initial 30 N load by more than 15 mm.

5.10 Shock absorption

When tested in accordance with Annex F, the peak headform acceleration (amax) shall not exceed 275 g.

5.11 Visors

5.11.1 The systems of attachment of a visor to a helmet shall be such that the visor is removable. It must be possible to manoeuvre the visor out of the field of vision with a simple movement of one hand.

5.11.2 Visors shall be free from any significant defects likely to impair the vision, such as bubbles, scratches, inclusions, dull spots, holes, mould marks, scratches or other defects originating from the manufacturing process in the field of vision.

5.11.3 Visors shall in addition be sufficiently transparent, shall not cause any noticeable distortion of object as seen through the visor, shall be resistant to abrasion, not easily broken and shall not give rise to any confusion between the colour used in road traffic sign and signals.

5.12 Helmet goggles

5.12.1 Impact strength properties

The goggles shall not be broken or fragments with an edge angle of less than 60° appear after being broken.

5.12.2 Visible light transmittance

The visible light transmittance in the visual field of the goggles should be greater than or equal to 85%.

5.12.3 Haze

The haze in the visual field of the goggles should be less than or equal to 10%.

5.12.4 Wear resistance

Carry out the sand falling test according to the method specified in (check for test method), and the goggles should be free of obvious damage, dents among other defects, etc.;

5.13 Mass

The mass of the helmet shall not exceed 1500 g

5.14 Sizes

Helmets shall be of the sizes matching to the sizes of headform of 500, 510, 520, 530, 540, 550, 560, 570, 580 590, 600, 610, 620, 630 and 640 mm

6 Packaging

Helmets shall be packaged in materials that prevent them from damage during transportation and storage

7 Labelling

Helmets shall be legibly and indelibly marked/labelled with the following information:

a) manufacturer’s name, address and/or trademark;

b) the model name or model number of the product;

c) mass of helmet to the nearest 20 g;

d) the size or size range of the circumference of the helmet, quoted as the circumference (in millimetres) of the head which the helmet is intended to fit;

e) the date of manufacture of the product;

f) country of origin;

g) warnings; and

h) instructions

Annex A
(normative)

Conditioning Environments

A.1 General

A.1.1 Helmets shall be conditioned to one of the following environments prior to testing. All test helmets shall be stabilized within the ambient condition for 4 h to 24 h prior to further conditioning and testing.

A.1.2 After each conditioning, the helmet shall be visually inspected. There shall be no signs of cracking or appreciable distortion of the retro reflective material

A.2 Ambient conditioning

The sample shall be exposed to a temperature of 22 °C ± 5 °C and a relative humidity not exceeding 75 % for 4 h to 24 h.

A.3 Low temperature conditioning

The sample shall be exposed to a temperature of -10 °C ± 3 °C for 4 h to 24 h. Testing shall begin within 60 s of removal from the low temperature conditioning chamber and all helmet testing shall be completed within 5 min after removal from the conditioning environment. Helmets may be returned to the conditioning environment in order to meet this requirement. Helmets shall remain in the conditioning environment for 15 min for each 5 min that they are out of the conditioning environment.

A.4 Elevated temperature condition

The sample shall be exposed to a temperature of 50 °C ± 3 °C for 4 h to 24 h. Testing shall begin within 60 s of removal from the low temperature conditioning chamber and all helmet testing shall be completed within 5 min after removal from the conditioning environment. Helmets may be returned to the conditioning environment in order to meet this requirement. Helmets shall remain in the conditioning environment for 15 minutes for each 5 min that they are out of the conditioning environment.

A.5 Water immersion condition

The sample shall be fully immersed, “crown” down in potable water at a temperature of 23 °C ± 5 °C to a crown depth of 305 mm ± 25 mm for 4 h to 24 h.

Testing shall begin within 60 s of removal from the low temperature-conditioning chamber and all helmet testing shall be completed within 5 min after removal from the conditioning environment. Helmets may be returned to the conditioning environment in order to meet this requirement. Helmets shall remain in the conditioning environment for 15 min for each 5 min that they are out of the conditioning environment.

Annex B
(normative)

Peripheral vision test

B.1 Apparatus

Measurement may be performed with a physical measuring device (that is, peripheral vision template or a test headform with point K clearly marked) or with laser measurement equipment.

B.2 Procedure

B.2.1 Position the helmet on a reference headform in accordance with the HPI and place a 50 N preload ballast on top of the helmet to set the comfort or fit padding.

NOTE Peripheral vision clearance may be determined when the helmet is positioned for marking the test lines.

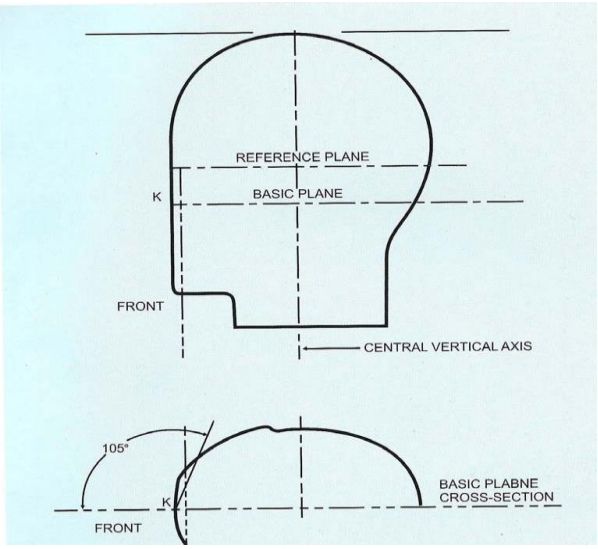
B.2.2 Peripheral vision is measured horizontally from each side of the median plane around the point K (see Figure 3)

B.2.3 Point K is located on the front surface of the reference headform at the intersection of the basic and median planes

B.3 Results

The vision shall not be obstructed within 105^0 from the point K on each side of the median plane.

Figure 3 — Principal planes and reference points of a headform



Annex C
(normative)

Penetration resistance test

C.1 Apparatus

The apparatus for the penetration test shall include a full size reference headform

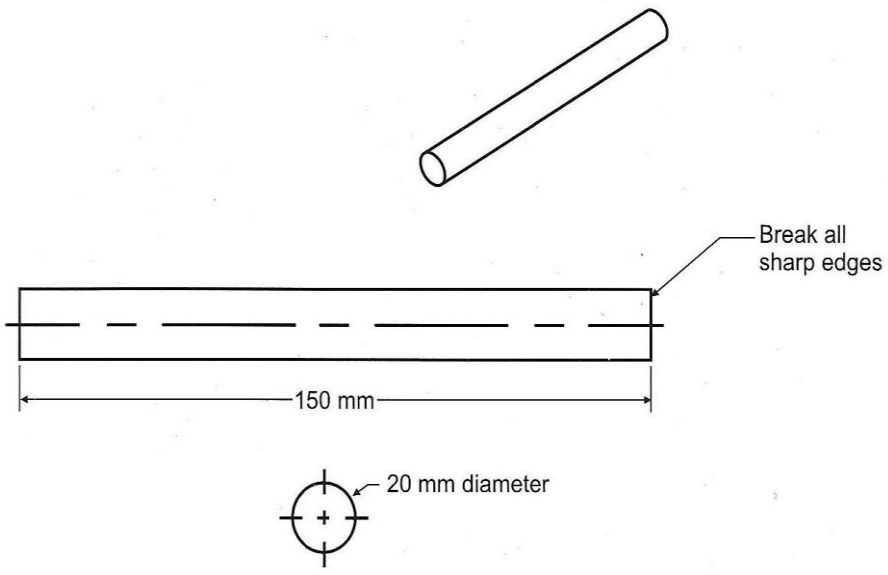
C.2 Procedure

C.2.1 Position the helmet on a reference headform in accordance with the HPI and place a 50 N preload ballast on top of the helmet to set the comfort or fit padding.

C.2.2 Using a metal test dowel with a diameter of 20 mm (see Figure 4) attempt to make contact with the headform by trying to enter any part of the metal dowel end through all of the openings of the helmet.

C.2.3 Record the location of any metal dowel to headform contact.

Figure 4 — Metal dowel for Penetration resistance test



Annex D
(normative)

Effectiveness of retention system test

D.1 Apparatus

The apparatus for the retention system effectiveness test shall include a full size reference headform

D.2 Procedure

D.2.1 Secure the reference headform to a fixture that will prevent headform movement when a tangential force is applied to the helmet.

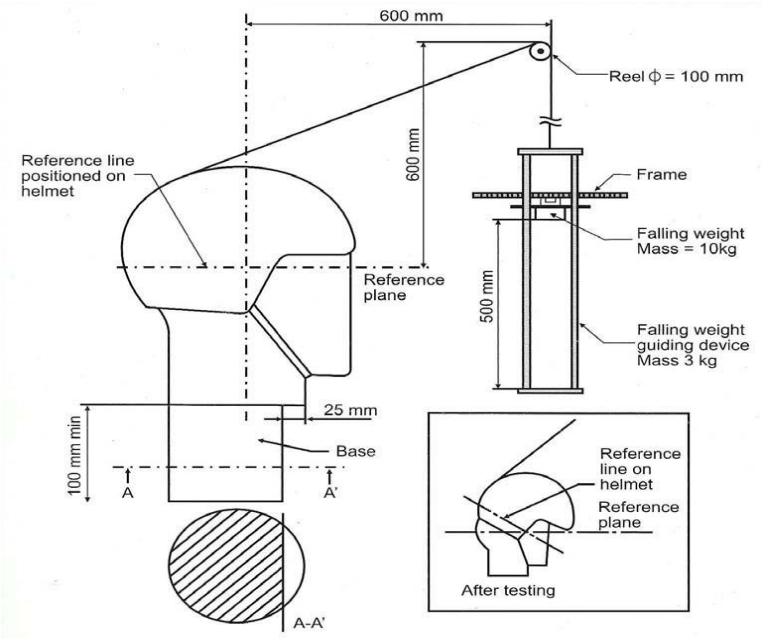
D.2.2 Position the helmet on a reference headform in accordance with the manufacturer's instruction. A flexible strap and hook mechanism shall be attached to the front lower edge of the helmet such that it is in line with the mid-sagital plane (see Figure 2).

D.2.3 The total mass of the falling weight guide apparatus shall be 3 kg ± 0.1 kg drop weight and shall be able to accommodate drop heights up to 1000 mm.

D.2.4 A 10 kg ± 0.1 kg drop weight shall then be raised to a height of 500 mm ± 5 mm. and released (see Figure 5).

D.2.5 This procedure shall be repeated with the headform rotated 180^0 and the hook mechanism attached to the rear edge of the helmet.

Figure 5 — Typical retention system effectiveness test apparatus



Annex E
(normative)

Strength of retention system test

E.1 Apparatus

E.1.1 The retention system strength test device consists of both an adjustable loading mechanism by which a static tensile load is applied to the helmet retention assembly and a means for holding the test headform and helmet stationary.

E.1.2 The retention system test device shall allow the retention assembly to be fastened around two freely moving rollers, both of which have a 12.5 mm diameter on a 75 mm centre-to-centre separation, and which are mounted on the adjustable portion of the tensile loading device (see Figure 6).

E.2 Procedure

E.2.1 Place the subject helmet on the test headform such that the basic plane is normal to the force of gravity and adjust it in accordance with the manufacturer's HPI.

E.2.2 Securely fasten the retention system around the two freely moving rollers in a manner that avoids contact between the rollers and helmet's buckle.

E.2.3 Apply a preliminary load of 45 N ± 3 N in the direction normal to the basic plane to the retention system and hold for a minimum of 30 s. Record the displacement measurement on the movable test device.

E.2.4 Increase the load to 500 N ± 5 N and maintain this for 120 s, +0 s, -10 s by adjusting the load applied to the retention system as necessary.

E.2.5 After 120 s +0 s, -10 s) at full test load, measure and record the displacement of the retention system. The maximum elongation shall be the difference between the initial measurement and the measurement taken after 120 s

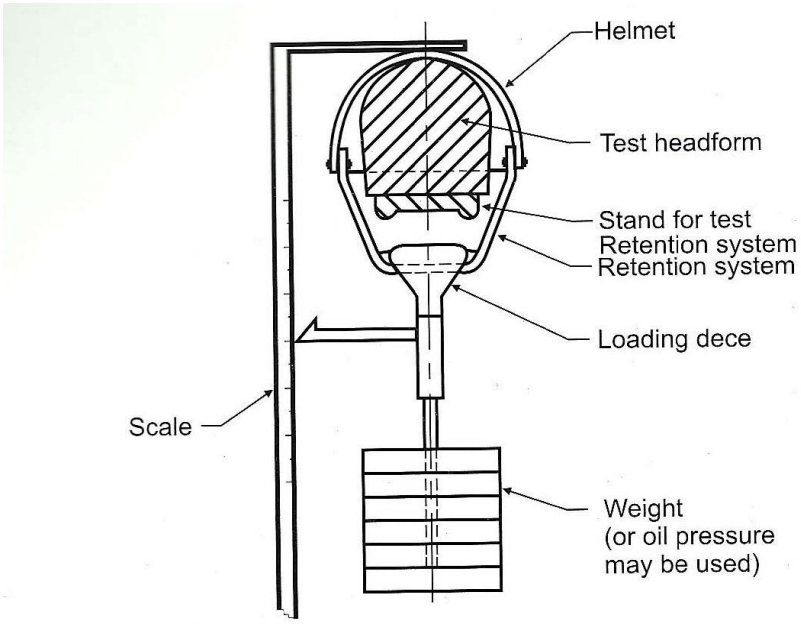


Figure 6 — Typical retention system strength test apparatus

Annex F
(normative)

Shock absorption test

F.1 Apparatus

The test apparatus for the shock absorption test shall consist of the following:

a) the test headform shall be mounted on a guided freefall system as shown in Figure 7 with an adjustable mounting for the helmeted headform to permit impacts to be delivered to any location on the helmet at or above the test line. A monorail guided freefall system shall also be acceptable. The total mass of this support assembly shall not exceed 25 % of the combined mass of the drop assembly (that is, supporting assembly plus headform). The centre of gravity of the drop-assembly unit shall lie within a cone with the vertex and forming at most 10° included angle with the vertex as the point of impact.

b) a linear accelerometer shall be placed at a centre of gravity of the test headform and its sensitive axis shall be aligned within 5˚ of the vertical when the helmet and headform are in the impact position. The accelerometer shall be capable of withstanding a maximum acceleration of 1 000 g without damage and shall have a frequency response of at least 5 Hz to 900 Hz. A triaxial accelerometer with identical performance specifications is also acceptable.

c) the flat anvil shall be made of steel or another similar rigid metal and shall be firmly attached to the base of the drop assembly. The impact face shall have a minimum diameter of 150 mm.

d) the hemispherical anvil shall be made of steel or another similar rigid metal and shall be firmly attached to the base of the drop assembly. The hemispherical anvil shall have a hemispherical impact surface with a radius of 48 ± 1 mm.

e) the rigid mount for the anvil shall consist of a solid mass of at least 135 kg, the upper surface of which shall consist of a steel plate with a minimum thickness of 12 mm and minimum surface area of 0.1 m^2.

f) the data acquisition system shall be capable of collecting impact data at a rate of not less than 10 kHz per channel.

F.2 System verification

F.2.1 The shock absorption test instrumentation shall be verified before and after each series of tests (at least at the beginning and end of each test day) by dropping a spherical impactor onto a Modular Elastomer Programmer (MEP) test surface.

F.2.2 The spherical impactor shall be a device made of low resonance material, for example, magnesium, aluminium alloy, or stainless steel that couples mechanically with the ball arm connector of the drop assembly in place of the impact test headform. When mounted, the device presents a spherically machined impact face with a radius of 73 mm on its bottom surface. All radii from the centre of the curvature of the impact face to its outer edge shall form angles of no less than 40^0 with the downward vertical axis. The centre of curvature shall be within 5 mm of the vertical axis drawn through the centre of the ball arm. The total mass of the spherical impactor drop assembly shall be 5.0 kg ± 0.1 kg.

F.2.3 The MEP shall be 152 mm in diameter and 25 mm thick, and shall have a durometer of 60 ± 2 shore A. The MEP shall be affixed to the top surface of a flat 6.35 mm thick aluminium plate. The geometric centre of the MEP pad shall be aligned with the centre vertical axis of the accelerometer.

F.2.4 The impactor shall be dropped onto the MEP at an impact velocity of 5.44 m/s ± 2 % as measured within the last 40 mm of free fall of the impactor. Typically, this requires a minimum drop height of 1.50 metres plus a height adjustment to account for friction losses. Six (6) impacts, at intervals of 75 s ± 15 s, shall be performed at the beginning and end of the test series. The first 3 of 6 impacts shall be considered warm-up drops, and their impact values shall be discarded from the series. The second 3 impacts shall be recorded. All recorded impacts shall fall within the range of 380 g to 425 g. The mean of the 3 post-test results shall not differ by more than 5% from the mean of the pre-test results. Otherwise, the results shall be discarded and the tests repeated with new samples after the source of this difference has been rectified.

F.2.5 The components of the data acquisition system, including all transducers shall be calibrated to traceable national reference standards at an interval of not greater than five years.

F.3 Helmet impact test locations

Each helmet shall be tested at four impact locations on or above the test line described in 6.3. Each impact location shall be a distance of at least one-fifth of the circumference of the test headform from any prior impact location on the helmet.

F.4 Method

F.4.1 The helmet shall be placed on the appropriate headform according to the manufacturer's helmet positioning index (HPI). The helmet shall be dropped onto the flat anvil with an impact velocity of 6.0 m/s ± 3 %. Typically, this requires a minimum drop height of 1.83 m, plus a height adjustment to account for friction losses. The helmet shall be dropped onto the hemispherical anvil with an impact velocity of 5.2 m/s ± 3 %. Typically, this requires a minimum drop height of 1.38 m, plus a height adjustment to account for friction losses.

F.4.2 The impact velocity shall be measured during the last 25 mm free-fall for each test. Following impact, the drop assembly shall be raised and the headform shall be oriented to another impact site.

F.4.3 The first impact shall be made not more than 60 s after the helmet has been removed from the conditioning environment. Following testing, the helmet shall be immediately returned to its conditioning environment for a minimum of 15 min before another impact test is conducted.

Annex G
(normative)

Rigidity test

G.1 Procedure

G.1.1 The helmet, after undergoing ambient-temperature and hygrometry conditioning, shall be placed between two parallel plates by means of which a known load can be applied along the longitudinal axis 6/ (line LL in the Figure 10) or the transverse axis (line TT in the figure).

G.1.2 The surface of the plates shall be large enough to contain a circle of at least 65 mm in diameter. An initial load of 30 N shall be applied, at a minimum plates speed of 20 mm/min, and after two minutes the distance between the two plates shall be measured.

G.1.3 The load shall then be increased by 100 N, at a minimum plates speed of 20 mm/min, and then wait for two minutes. This procedure shall be repeated until the application of a load of 630 N

G.1.4 The load applied to the plates shall be reduced to 30 N, at a minimum plates speed of 20 mm/min; the distance between the plates shall then be measured.

G.1.5 The helmet used for the test along the longitudinal axis shall be a new helmet, and another new helmet shall be used for the test along the transverse axis

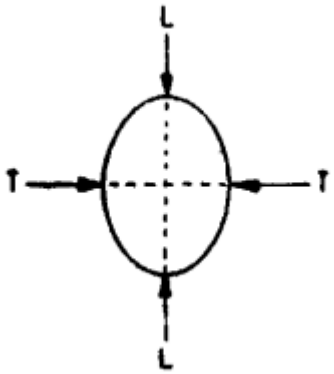


Fig-Rigidity test axes

Annex H
(Normative)

Audibility test

H.1 Apparatus

H.1.1 Measuring apparatus

Measuring apparatus shall consist of a headform and sound level meter. The microphone of sound level meter shall be fitted at a place corresponding to the right or left human ear's location.

NOTE - For this test weighing network Curve A shall be used

H.1.2 Sound source

The sound surface shall be a horn (which has sound pressure level range of 90 to 115 dB(A). The sound source shall be located so that sound is incident from back of the headform.

H.2 Procedure

This test shall be carried out under the prevailing atmospheric conditions and the background noise level shall be such that the reading indicated on the sound level meter by the noise is at least 10 dB of below that of the horn sound level.

This test shall be carried out in an open space in which there is no obstacle within a radius of 12 m and no acoustical focussing affects or nearby parallel walls. The horn shall be mounted 1.2 m above the ground and shall be fixed in a rigid manner on a base whose mass shall be at least 10 times that of the horn and not less than 15 kg and shall be adjustable side ways and up and down.

The sound waves are emitted from the horn by using suitable 12 V dc power supply and are directed towards the rear of the headform at the distance of 2 m.

The two readings are taken with and without helmet. The difference shall be recorded to the nearest dB

Annex J
(Normative)

Sound attenuation test

J.1 The sound test is done with a meter mounted inside a helmeted headform at the left or the right ear location.

J.2 The location should be uninterrupted for 12 m radius without any acoustic materials, as in open ground.

J.3 A horn is sounded (90-115 dB, ambient sound should be 10 dB or less) 2 metres from the helmet, mounted rigidly 1.2 m off the ground on a stand.

J.4 The sound level is measured at the sound meter location with and without the helmet covering it

Bibliography

[1] US 774:2011, *Protective helmets for motorcyclists - Specification*

[2] DKS 77:2012, *Protective helmets for motorcyclists – Specification*

[3] IS 4151:1993, *Protective helmets for motorcycle riders – Specification*

[4] Nepal standard, *Protective helmets for motorcycle riders – Specification*

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