Wooden — Adjustable Axillary Crutches — Specification
TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:

Association for the Physically Disabled of Kenya
Kenyatta University
Ministry of Medical Services (MOMS) - Orthopedic Technology
Ministry of Medical Services (MOMS) – Occupational Therapy
National Council of People with Disabilities (NCPWD)
Kenya Medical Training College (KMTC)
Ministry of Public Health & sanitation
Kenyatta National Hospital
National Association for Orthopedic Technologist in Kenya (NAOTS)
Isole Engineering Works
Ministry of Nairobi Metropolitan Development
Handicap International
Kenya Bureau of Standards - Secretariat

REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.
Wooden — Adjustable Axillary Crutches — Specification
DKS 1319: 2010

Foreword

This Kenya Standard was prepared by the TC 132 Assistive Products for persons with disabilities Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

The development of this standard was found necessary to improve on the quality of the materials from which crutches are made.

During the preparation of this standard, reference was made to the following documents:

SABS 491:1996 Wooden crutches

Acknowledgement is hereby made for the assistance derived from these sources.
Wooden — Adjustable Axillary Crutches —Specification

1 Scope

This Kenya Standard specifies requirements for the materials, dimensions and construction of four sizes of wooden crutches, each adjustable in length.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent editions of the standards indicated below. Information on currently valid national and international standards can be obtained from the Kenya Bureau of Standards.

3 Definitions

For the purposes of this standard, the following definitions shall apply:

3.1 Acceptable
Acceptable to the parties concluding the purchase contract, but in relation to the certification mark and to inspections carried out by the KEBS, acceptable to the Kenya Bureau of Standards.

3.2 Armpad
A cover of rubber or other acceptable material that serves as padding for the armpiece (see 3.3) of the wooden crutch.

3.3 Armpiece; crutch-head:
The part of a wooden crutch that is inserted under the arm.

3.4 Bow (of a crutch)
The part of a wooden crutch that connects the armpiece (see 3.3) to the footpiece (see 3.9).

3.5 Checked knot; check
A knot in the wood used in the manufacture of crutches, in which the surface is broken by checks.

3.6 Crutch Tip
A rubber ferrule that is fitted to the lower end of the extension of a wooden crutch, and that serves to prevent the crutch from slipping.

3.7 Defective
A wooden crutch that fails in one or more respects to comply with the relevant requirements of the standard.

3.8 Equivalent defect
A defect for which no provision is made in the standard but the effect of which is equivalent to that of a permissible defect.

3.9 Extension piece
The lower end of a wooden crutch, to which the crutch tip (see 3.6) is fitted.

3.10 Handgrip; Handpiece
The part of a wooden crutch that provides support for the hand.

3.11 Slope of grain
The natural deviation of the straightness of the grain along the longitudinal axis of a piece of timber.

4 Requirements

4.1 Dimensions
The dimensions of the crutch (see figure 1) shall conform to the dimensions for one of the sizes given in
Table 1 — Crutch sizes (see figure 1)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td><strong>Size 1</strong></td>
<td><strong>Size 2</strong></td>
<td><strong>Size 3</strong></td>
<td><strong>Size 4</strong></td>
<td><strong>Tolerance</strong></td>
</tr>
<tr>
<td>A</td>
<td>825 max</td>
<td>1 000 max</td>
<td>1 250 max</td>
<td>1 500 max</td>
<td>± 5</td>
</tr>
<tr>
<td>B</td>
<td>725 min</td>
<td>850 min</td>
<td>1 025 min</td>
<td>1 275 min</td>
<td>± 5</td>
</tr>
<tr>
<td>C</td>
<td>20.25</td>
<td>20.25</td>
<td>20.25</td>
<td>20.25</td>
<td>± 0.5</td>
</tr>
<tr>
<td>D</td>
<td>20.25</td>
<td>20.25</td>
<td>20.25</td>
<td>20.25</td>
<td>± 0.5</td>
</tr>
<tr>
<td>E</td>
<td>305</td>
<td>325</td>
<td>340</td>
<td>430</td>
<td>± 5</td>
</tr>
<tr>
<td>F</td>
<td>160</td>
<td>160</td>
<td>205</td>
<td>205</td>
<td>± 5</td>
</tr>
<tr>
<td>G</td>
<td>75 min</td>
<td>75 min</td>
<td>105 min</td>
<td>105 min</td>
<td>± 1</td>
</tr>
<tr>
<td>H</td>
<td>350</td>
<td>400</td>
<td>470</td>
<td>470</td>
<td>± 2</td>
</tr>
<tr>
<td>I</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>± 0.5</td>
</tr>
</tbody>
</table>

4.2 Weight
The mass of a crutch, without armpad and crutch tip, shall not exceed the appropriate of the values given in table 2.

Table 2 – Weight of crutch

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crutch size</strong></td>
<td><strong>Mass Kg. Max.</strong></td>
</tr>
<tr>
<td>1</td>
<td>0.875 ± 0.050</td>
</tr>
<tr>
<td>2</td>
<td>1.0 ± 0.075</td>
</tr>
<tr>
<td>3</td>
<td>1.25 ± 0.100</td>
</tr>
<tr>
<td>4</td>
<td>1.375 ± 0.120</td>
</tr>
</tbody>
</table>

4.3 Materials

4.3.1 Timber

4.3.1.1 Hardwood and softwood may be used together in the construction of a crutch, provided that variations in colour are kept to a minimum.

4.3.1.2 Laminated timber
Laminated timber shall comply with the relevant requirements of exposure class 3 or 4 of KS1319. In the case of laminated softwood, finger joints shall not be permitted.

4.3.1.3 Moisture content
At the time of manufacture of the crutch, the moisture content of the timber (other than laminated timber) shall be (11±3) %.

4.3.1.4 Slope of grain
The slope of the grain shall not be more than 3° on any face and on any side.

4.3.1.5 Defects
Defects (a) and (b) below shall not be permitted in the various components of the crutch, except in the armpiece; defect (c) shall not be permitted in any component of the crutch:

a) Knots of maximum size one-quarter of the part of the face or side (measured over the longitudinal axis of the knot) (but not more than one per armpiece).

b) Up to four surface checks, each not exceeding 25 mm in length, 1 mm in width and 3 mm in depth.

c) Discoloration (excluding natural variations in the colour of the timber).

4.3.2 Rubber

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4.3.2.1 Crutch Tips
Crutch Tips shall be of a rubber that complies with the requirements for type S2 rubber KS ISO 24419-1&2 except that the hardness shall be 60 IRH degrees to 70 IRH degrees.

4.3.2.2 Armpads
Armpads shall be of foam rubber or other acceptable material that has a density of 450 kg/m³ to 600 kg/m³ and shall be manufactured from one piece of material.

4.3.3 Metal

4.3.3.1 Metal components
All metal components shall have a breaking strength of at least 385 MPa and, if not intrinsically corrosion resistant, shall have a metal coating of which the corrosion resistance complies with KS ISO 1456.

4.3.3.2 Bolts and nuts
Where bolts and nuts are used for adjusting a crutch, the nuts shall be of the wing type. Adjustments to a crutch shall be possible without the use of any tools.

4.3.4 Adhesives
Adhesives used for laminating shall comply with the requirements for an adhesive of exposure class 3 of KS.

4.4 Construction

4.4.1 General
The construction of a crutch shall correspond in general with that outlined in figure 1.

4.4.2 Adjustment of handgrip
Each bow shall make provision for at least three adjustments of the handgrip, at a distance of 20 mm to 25 mm apart (see dimension D in table 1).

4.4.3 Adjustment/attachment of foot piece
The lower ends of the bow shall have two holes each (at least 100 mm apart) for attachment and adjustment of the footpiece (see figure 1).

4.4.4 Foot pieces
Foot pieces may be of solid wood or of laminated timber. The footpiece shall have holes of diameter 6 mm, spaced at 20 mm to 25 mm centres, for adjustment of the footpiece. The number of holes shall be in accordance with the number given in table 3, appropriate to the size of crutch.

Table 3 – Adjustment/attachment holes in footpiece

<table>
<thead>
<tr>
<th>Size of crutch</th>
<th>Number of holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
</tr>
</tbody>
</table>

4.4.5 Crutch tip
The tread diameter of the crutch tip shall exceed the footpiece diameter by 18mm, and the tread pattern shall have a depth of at least 5mm. The crutch tip shall fit tightly around the footpiece (see item 1 in table 1).

4.4.6 Handgrip
The handgrip shall preferably be barrel-shaped and of the dimensions given in table 4.
Table 4 – Dimensions of handgrip

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crutch size</td>
<td>Length mm. min</td>
<td>Centre diameter mm. min.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>105</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>105</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

4.4.7 Armpiece
The armpiece shall be of shaped construction to fit the user’s armpit comfortably and to provide for firm attachment to the top of the bow.

4.4.8 Finish
The various components of a crutch shall be smoothly finished to prevent any discomfort to the user. One coat of sanding sealer and two coats of clear nitrocellulose lacquer shall be applied to all components before they are assembled.

4.5 Strength of crutches

4.5.1 General
When a crutch is tested in accordance with 4.5.2, 4.5.3, 4.5.4 or 4.5.5 wooden components shall show no visible fractures, splinters or cracks, and metal components shall show no permanent deformation.

4.5.2 Strength test
When tested in accordance with 5.3, the crutch shall comply with the requirements of 4.5.1

4.5.3 Impact test
When tested in accordance with 5.4, the crutch shall comply with the requirements of 4.5.1

4.5.4 Torsion test
When tested in accordance with 5.5, the crutch shall comply with the requirements of 4.5.1

4.5.5 Deflection test
When tested in accordance with 5.6, the crutch shall comply with the requirements of 4.5.1, and the deflection of the crutch, measured at the longitudinal axis of the centre of the crutch and perpendicular to the longitudinal axis, shall not exceed the appropriate values given in table 5.

Table 5 – Deflection test values

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of crutch</td>
<td>Test span</td>
<td>Mass load Kg ± 0.1g</td>
<td>Maximum permissible deflection mm</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Crutch adjusted to maximum length</td>
<td>75</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>70</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>55</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5 Inspection and methods of test

5.1 Inspection
Prior to testing, examine each crutch visually for any visible defects and so record all defects that the possibility of incorrect conclusions is eliminated (should the crutch not comply with all the requirements).
Check the dimensions for compliance with table 1.

5.2 Preparation of test samples
Remove the rubber components. Adjust the crutch to its maximum user length. Tests are conducted at a temperature of between 18°C and 24°C and at a relative humidity in the range 40% to 70%, unless otherwise stated. Condition the crutch for a minimum period of 24 h.

5.3 Strength test
Support the crutch as shown in figure 2. Apply a static load of 160kg±0.1kg vertically to the armpiece for 10 min. Examine the crutch for visible damage and check for compliance with 4.5.2.

5.4 Impact test
5.4.1 Support the crutch as shown in figure 3. So adjust the handgrip that it is as near as practicable to the centre of the length of the crutch.

5.4.2 So drop a masspiece of 45kg ± 0.1kg (crutch sizes 1 and 2) or 60 kg ± 0.1 kg (crutch sizes 3 and 4) through a distance of 50 mm ± 1 mm onto the handgrip that the masspiece strikes the centre of the handgrip squarely.

5.4.3 Examine the crutch for compliance with 4.5.3.

5.5 Torsion test

5.5.1 Support the crutch as shown in figure 4.

5.5.2 Use a non-stretchable rope to so suspend a masspiece of 50 kg ± 0.1 kg from the centre of the handgrip that the centre of gravity of the masspiece is 560mm ± 1 mm below the centre of the handgrip. Draw the masspiece sideways and outwards like a pendulum in the vertical plane perpendicular to the vertical plane in which the longitudinal axis of the crutch lies and until the centre of gravity of the masspiece is at a distance of 150 mm ± 1mm from the latter vertical plane. Release the masspiece and allow it to swing freely until it stops.

5.5.3 Examine the crutch for compliance with 4.5.4.

5.6 Deflection test

5.6.1 Support the crutch as shown in figure 5. Adjust the handgrip to correspond as near to the centre of the length of the crutch as is practicable.

5.6.2 Suspend a masspiece of 50 kg ± 0.1 kg from the centre of the handgrip and measure the deflection from the unloaded position between the armpiece and the footpiece. Check for compliance with the appropriate value given in table 5.

6 Marking
Each crutch shall be permanently in-scripted with the following information:
   a) The manufacturer’s name, trade name or trade mark.
   b) Country of origin
   c) The size of the crutch; and
   d) The batch identification number.
   e) This Kenya Standard
   f) Date of manufacture and Expiry date of rubber armpads and handgrips
KS 1319: 2009

Arm piece / Crutch head

Row

G

Inner diam 21.5mm max

50 mm

40mm min.

Holes for attachment / adjustment of foot piece

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Stabilizing bracket to allow outward and sideways movements within reasonable safety limits

Handicap

Handgrip assembled in central hole (where applicable)

Retention bracket
Annex A
(normative)

Notes to purchasers

The following requirements shall be specified in tender invitations and in each order or contract:
   a) The size of crutch required (see 4.1); and
   b) The size of additional rubber components (see 4.4.5 and 4.4.7)

Annex B
(Informative)

Sampling

If the tests given in 5.3, 5.4, 5.5 and 5.6 are not feasible during consignment inspections, and unless otherwise agreed upon between the supplier and the manufacturer, a random sample of 5% from a lot is considered for evaluation.

Annex C
(informative)

Strength properties of timbers

Information on the strength properties of timbers can be found in the following publication issued by the former Department of Water Affairs, Forestry and Environmental Conservation.