भारतीय मानक
Indian Standard

IS 5143 : 2024

एडजस्टेबल एक्सिलरी बैसाखी — विशिष्टि

(तीसरा पुनरीक्षण)

Adjustable Axillary Crutches — Specification

(Third Revision)

ICS 11.180.10

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September 2024 **Price Group 6**

Artificial Limbs, Rehabilitation Appliances and Equipment for the Persons with Disability Sectional Committee, MHD 09

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Artificial Limbs, Rehabilitation Appliances and Equipment for the Persons with Disability Sectional Committee had been approved by the Medical Equipment and Hospital Planning Division Council.

This standard was first published in 1969 and subsequently revised in 1982. The second revision of this standard was published in 1988 to include alternate design of the crutch and provision for use of aluminium alloy for manufacture of crutches. This revision of this standard has been brought out to align the cross references to the latest standards and to incorporate the updated designation of materials. This revision includes the following amendments to IS 5143 : 1988:

a) Amendment No. 1 March 1993;
b) Amendment No. 2 September 1994; and
c) Amendment No. 3 January 2000.

The composition of the Committee, responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

Indian Standard

ADJUSTABLE AXILLARY CRUTCHES — SPECIFICATION

(Third Revision)

1 SCOPE

This standard specifies functional and dimensional requirements of adjustable axillary wooden or aluminum crutches.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 399 : 1963	Classification of commercial timbers and their zonal distribution
IS 1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium — Specification (*third revision*)
IS 1259 : 2022	Specification for vinyl coated fabrics (*fourth revision)*
IS 1573 : 1986	Specification for electroplated coatings of zinc on iron and steel (*second revision*)
IS 1741 : 2019	Latex foam rubber products — Specification *(first revision*)
IS 1868 : 1996	Anodic coatings on aluminum and its alloys — Specification (*third revision*)

3 MATERIALS

3.1 Wood

The wooden crutches shall be made from the species of timber suitable for the purpose intended. A list of timber species is given in **Annex A** for guidance.

3.2 Aluminum

The aluminum crutches shall be made from standard aluminum alloy sections. The selection of particular section shall meet the test requirements.

3.3 Mild Steel

The metallic components of the wooden crutches/alternate design shall be manufactured from any suitable mild steel.

3.4 Leather Cloth

The arm piece shall have a covering of good quality leather cloth on twill backing [*see* also Grade 3 of IS 1259].

3.5 Foam Rubber

The padding for the arm piece shall be of a good quality foam rubber (*see* IS 1741).

3.6 PU and Plastic

Arm Piece and Hand Piece can also be manufactured from Integral PU foam with engineering plastic insert.

4 SHAPE AND DIMENSIONS

The general shape and dimensions of the crutches shall be as given in Fig. 1 read with Table 1 or as given in Fig. 2 read with Table 2.

5 WORKMANSHIP AND FINISH

5.1 The surfaces of the crutch shall be smooth and the edges shall be even and rounded. The corresponding holes on either bow/side bar shall be situated at the same distance from one end of the crutch and shall be equally spaced. The holes on the legs shall be equally spaced. The wooden components of the crutch except arm piece shall be given a protective coat of a good grade of clear or pale colored transparent varnish or both. Painting shall be permitted as an alternate protective coating. The varnish shall be applied before the crutch is assembled. The varnished surface shall be smooth, uniform and hard and shall be free

from bubbles and tackiness. The varnished surface shall not peel off. The mild steel component shall be chromium plated over nickel in accordance with service Grade 0 of IS 1068 or Zinc plated with service Grade 1 of IS 1573.

5.2 Side bars of the aluminum crutches shall be anodized as for Grade AC 10 of IS 1868.

6 TESTS

6.1 Strength Test

The strength of the crutches shall be tested as given in **6.1.1** to **6.1.3**.

6.1.1 The crutch shall be suitably supported at 60° to the horizontal as given in Fig. 3 (a) with the foot extended to its maximum length and the hand piece in the second hole from the arm piece end. A load as given below shall be suspended from the center of the hand piece. The deflection shall not exceed the values indicated in Table 3.

6.1.2 With crutch in the same position as in **6.1.1**, the load as indicated in Table 4 shall be lifted to height of 50 mm [*see* Fig. 3 (b)] and dropped:

No damage shall be noticed.

6.1.3 With the crutch in the same position as in **6.1.1**, a load as indicated in Table 5 shall be suspended from the hand piece. The weight shall be drawn out by 150 mm as given in Fig. 3 (c) and allowed to swing freely till rest. The crutch shall not show any sign of damage after the test.

6.2 Drop Test

Each assembled crutch shall be dropped three times from a height of 1.5 m with the axis of the crutch horizontal on a hard floor. The crutch shall not break, crack or assume a new set at the end of the test.

7 MARKING

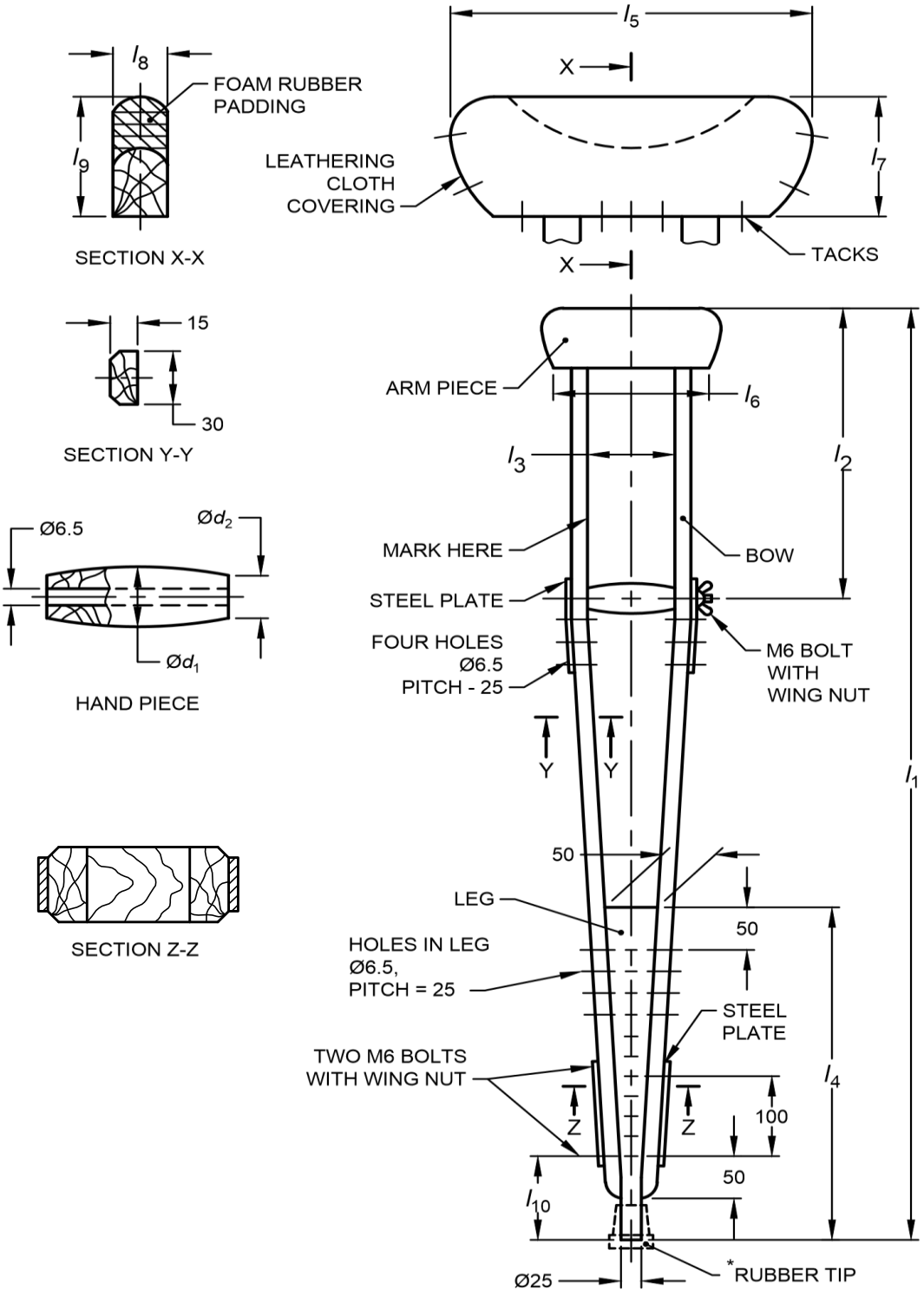
7.1 Each crutch shall be legibly marked on one of the Side Bar/Bow above the hand piece with size and manufacturer's name, initials or recognized trade-mark.

7.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed there under, and the product(s) may be marked with the Standard Mark.

8 PACKING

The crutches shall be packed as agreed to between the purchaser and the supplier.



**SEE* IS : 5150-1969 'RUBBER, TIPS FOR CRUTCHES AND WALKING STICKS'.

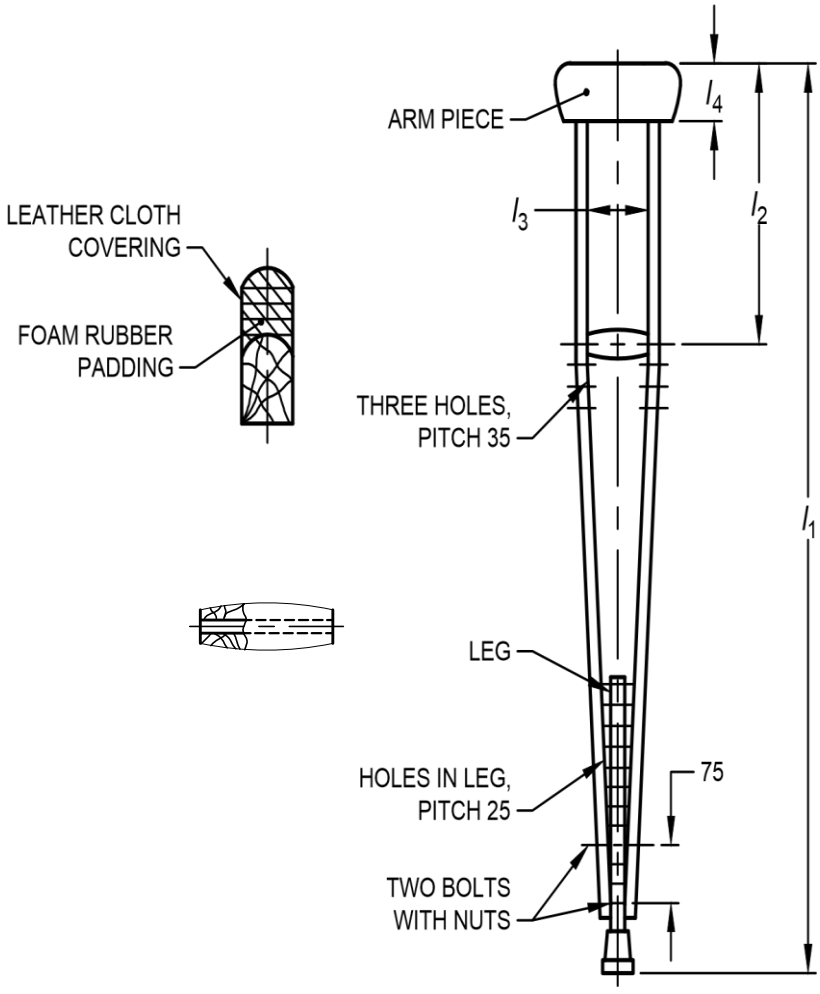
All dimensions in millimetres.

FIG. 1 ADJUSTABLE AXILLARY CRUTCH

Table 1 Dimensions of Crutches

(*Clause 4*)

Sl No.	$l_1 \pm 10$		$l_2 \pm 5$	$l_3 \pm 5$	$l_4 \pm 5$	$l_5 \pm 5$	$l_6 \pm 5$	$l_7 \pm 5$	$l_8 \pm 2$	$l_9 \pm 2$	$l_{10} \pm 5$	$d_1 \pm 22$	$d_2 \pm 2$
	Fully Withdrawn	Fully Extended											
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	600	776	150	75	300	150	120	60	35	30	100	25	20
ii)	775	950	300	75	300	150	120	60	35	30	100	25	20
iii)	950	1 125	325	75	400	150	120	60	35	30	100	25	20
iv)	1 125	1 300	350	100	400	200	150	70	35	30	100	35	25
v)	1 300	1 475	425	100	400	200	150	70	35	30	100	35	25



All dimensions in millimetres.

FIG. 2 ADJUSTABLE AXILLARY CRUTCH, ALTERNATE DESIGN

Table 2 Alternate Dimensions of Crutches

(*Clause* 4)

Sl No.	$l_1 \pm 10$		$l_2 \pm 5$	$l_3 \pm 5$	$l_4 \pm 5$
	Fully Withdrawn	Fully Extended			
(1)	(2)		(3)	(4)	(5)
i)	600	800	200	80	55
ii)	825	1 025	275	80	55
iii)	1 050	1 250	350	100	80
iv)	1 275	1 475	425	100	80

Table 3 Load and Corresponding Deflection Limits

(*Clause* 6.1.1)

Sl No.	Size		Load	Permissible Deflection at the Centre, *Max*
	Wooden Design	Alternate Design	N	mm
(1)	(2)		(3)	(4)
i)	1 and 2	1 and 2	500	30
	3,4 and 5	3 and 4	700	50

Table 4 Load Drop Test Limits

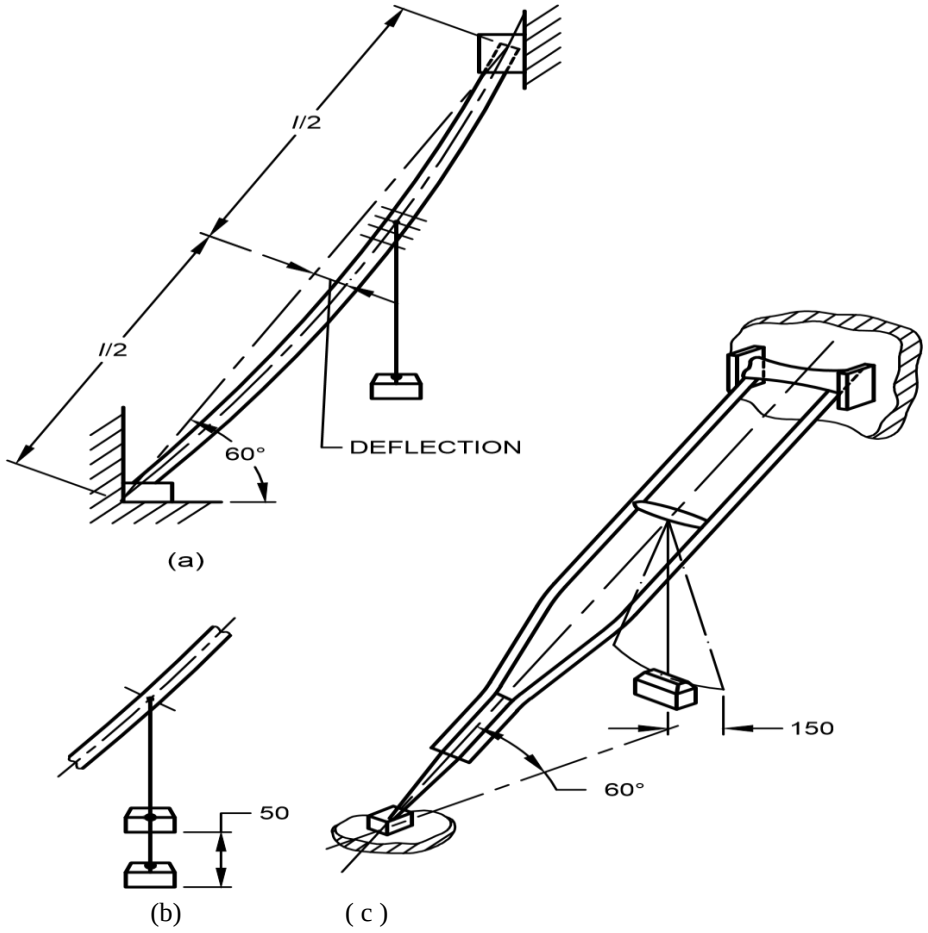
(*Clause* 6.1.2)

Sl No.	Size		Load
	Wooden Design	Alternate Design	N
(1)	(2)		(3)
i)	1 and 2	1 and 2	500
ii)	3, 4 and 5	3 and 4	700

Table 5 Load Suspension Test Limits

(*Clause* 6.1.3)

Sl No.	Size		Load Suspended	Suspensions below the Top of the Hand Piece
	Wooden Design	Alternate Design	N	mm
(1)	(2)		(3)	(4)
i)	1 and 2	1 and 2	500	300
ii)	3, 4 and 5	3 and 4	700	500



All dimensions in millimetres.
FIG. 3 STRENGTH TEST ON CRUTCHES

ANNEX A

(*Clause* 3.1)

SPECIES OF TIMBER FOR ADJUSTABLE AXILLARY CRUTCHES

A-1 SPECIES

The wood for crutches may be of one of the species listed below [*see also* IS 399].

Sl No.	*Standard Trade Name*	***Local Name***	*Botanical Name*
(1)	(2)	(3)	(4)
i)	Ash	hum (Kash), sun (Pun)	*Fraxinus* sp
ii)	Sola	bhola (Asm), kimbu (Ban and Nep	*Morus laevigata Wall*
iii)	Dhaman	phalsa (Pun), gonver (Kol), dadsal, thadsal (Guj, Mar and Kan)	*Grawia* sp
iv)	Mulberry	Shahtut (Hin and Pun), tut (Pun)	*Morus* sp
v)	Padauk	Padauk (And)	*Pterocarpua delbergioides Roxb.*
vi)	Red cedar	—	—
vii)	Sandan	bandhan, pandhan (Hin), ruta (Kol) Panan, sandan, tinnas, tinsa (Hin) sannan (Pun), tiwas(MP), telus (Dangs) tanach (Guj), Karimuttal (Kan), tewas (Mar)	*Ougeinia oo/einensis* (*Roxb.*) *Hochreut*
viii)	Silver Oak	—	*Grevillea robusta A. Cunn.*
ix)	Sissoo	Shisham (Hin), talhi (Pun)	*Dalbergia sissoo Roxb.*
x)	White cedar	Billdevdari (Kan), Vella-gil	*Dysoxylum malabaricum Bedd*
xi)	Neem Chameli	Jalneem	*Milling-Tonia Hostensis*
	Indian Oak	Indian Oak	*Quereus* spp.

Table (*Concluded*)

Sl No.	*Standard Trade Name*	*Local Name*	*Botanical Name*
(1)	(2)	(3)	(4)
		chalun (HP)	*Populus* Spp.
xii)	Poplar	Bahanphalash (Pun)	
		chalan (Sirmur)	
xiii)	Bonsum	Angari (Nep)	*Phoebe* Spp.
xiv)	Willow	—	Salix Spp.

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Artificial Limbs, Rehabilitation Appliances and Equipment for the Persons with Disability Sectional Committee, MHD 09

Organization	*Representative(s)*
All India Institute of Medical Sciences, New Delhi	DR SANJAY WADHWA **(*Chairperson*)**
All India Institute of Medical Sciences, New Delhi	SHRI AJAY BABBAR SHRI ANIL KUMAR (*Alternate*)
Artificial Limbs Manufacturing Corporation of India, Kanpur	SHRI A. K. SINGH SHRI VISHAL SHUKLA (*Alternate*)
Bhagwan Mahaveer Viklang Sahayata Samiti, Jaipur	DR TARUN KUMAR KULSHARESTHA DR DEEPENDRA MEHTA (*Alternate*)
Defence Bio-Engineering and Electromedical Laboratory, Ministry of Defence, Bengaluru	DR S. N. KARTIK DR V. MALLIKARJUNA REDDY M. (*Alternate* I) A. HEMALATHA (*Alternate* II)
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Member Secretary
MS GURPREET KAUR
SCIENTIST 'C'/DEPUTY DIRECTOR
(MEDICAL EQUIPMENYT AND HOSPITAL PLANNING), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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