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मानक

IS 2203 (1993): Wooden cross arms - [CED 9: Timber and Timber Stores]



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भारतीय मानक

लकड़ी के कॉस आर्म – विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

WOODEN CROSS ARMS — SPECIFICATION (Second Revision)

UDC 621·315·654 : 674·7

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BUREAU OF INDIAN STANDARDS MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELHI 110002

Price Group 2

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Timber Sectional Committee had been approved by the Civil Engineering Division Council.

With the publication of Indian Standard specification for wood, concrete, and steel poles for overhead power and telecommunication lines, a specification for wooden cross arms for use with the poles became necessary and this standard lays down the general requirements for such cross arms. The species of timber for cross arms have been classified into three classes, depending upon the modulus of rupture of small specimens as in the case of wood poles.

This standard was first published in 1962 and then revised in 1976. In this second revision the list of species of timber suitable for cross arm has been updated, in view of identification of more species through research.

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: 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

WOODEN CROSS ARMS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers the general requirements of wooden cross arms for poles for overhead power and telecommunication lines.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
287 : 1973	Recommendations for maxi- mum permissible moisture content of timber used for different purposes (second revision)
401 : 1982	Code of practice for preser- vation of timber (third revision)
707 : 1976	Glossary of terms applicable to timber technology and utilization (second revision)
876 : 1992	Specification for wood poles for ovehead power and tele- communication lines (third revision)
1708 : 1986	Method of testing of small specimens of timber (second revision)
3364 (Part 2): 1976	Methods of measurement and evalution of defects: Part 2 Converted timber

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 707 : 1976 shall apply.

4 MATERIAL

4.1 Timbers suitable for wooden cross arms given in Annex A are categorized into the following three different groups based on the modulus of rupture of small specimens (see IS 1708 : 1986) tested in green condition, that is, above 25 percent moisture content:

Group A — Very strong timber having modulus of rupture in bending of 85 N/mm² and over, represented by sal (Shorea robusta).

- Group B Strong timber having modulus of rupture in bending of 65 to 85 N/mm², represented by teak (*Tectona grandis*)
- Group C Moderately strong timber having modulus of rupture in bending of 45 to 65 N/mm², represented by chir (*Pinus roxburghii*).

4.2 Selection of Material

4.2.1 As far as possible, the wood pole (see IS 876: 1992) and cross arms shall be of the same species or at least species of the same group.

4.2.2 The blank shall be well-seasoned preferably to about 15 percent moisture content or as recommended in IS 287 : 1973, before the slots, holes, etc, are cut through it.

5 DEFECTS

5.1 The prohibited and permissible defects shall be as given in 5.2 and 5.3. The measurement of defects shall be done as provided for in IS 3364 (Part 2): 1976.

5.2 Prohibited Defects

All finished cross arms shall be completely free from the following defects:

- a) Brashness;
- b) Cross breaks;
- c) Reaction wood;
- d) Decay;
- e) Decayed knots, unsound knots and knots more than 50 mm in diameter;
- f) Shakes;
- g) Splits extending from top to bottom or from side to side; and
- h) Pitch seams.

5.3 Permissible Defects

The following defects may be permitted in the finished cross arms to the extent specified below.

5.3.1 Checks

Checks not exceeding 20 percent of the length and 10 percent in depth and not more than two in number shall be permitted except in hole zones.

5.3.2 Pitch Streaks

Pitch streaks shall not exceed one-sixth the width or one-third the length of the face in which they appear.

5.3.3 Cross Grain

Cross grain shall not be more than 1 in 15 in the middle section. Localized deviation in grain may be permitted if the grains do not deviate more than 25 mm in every 250 mm length.

5.3.4 Insect Hole

Not more than three insect holes each not exceeding 3 mm in diameter.

5.3.5 Knots

Knots shall not exceed the size given in Table 1. All knots falling on the boundary of the hole zones shall be considered as knots within the boundary of the hole zone.

6 WORKMANSHIP

6.1 All surfaces of the cross arms shall be finished smooth with a planer. All the holes, slots and curves shall also be smooth inside and not splintered.

6.2 All cross arms shall be bevelled on the corners of the best edge to identify this from the upper and lower halves of the arms.

7 DIMENSIONS AND TOLERANCES

7.1 Dimensions

7.1.1 The dimensions and drilling details of cross arms shall conform to the drawing furni-shed by the purchaser.

7.1.2 The dimensions for wooden cross arms normally used for 11 kV lines shall be as given in Table 2.

7.2 Tolerances

A tolerance of $\pm 5 \text{ mm}$ is permitted on the external dimensions of the cross arms and $\pm 2 \text{ mm}$ for the holes, slots, etc.

8 PRESERVATIVE TREATMENT

8.1 All the cross arms of non-durable species and sapwood of durable species shall be treated in accordance with IS 401 : 1982 in the same manner as for wood poles.

8.2 Preliminary Treatment

The untreated cross arms shall be given as soon as possible, a prophylactic treatment in accordance with IS 401 : 1982 to prevent insect attack and fungal damage.

9 STORAGE

The treated and untreated cross arms shall be stacked on creosoted or otherwise treated crossers at least 150 mm clear of the ground so as to permit good circulation of air and to prevent any possible attack by decaying agents.

10 TESTS

10.1 All the cross arms shall be examined in accordance with drawings supplied by the purchaser and shall conform to the requirements of this standard.

10.2 One percent of a lot tendered, subject to a maximum of five cross arms, shall be subjected to a two-point loading bending test for a period of 10 minutes with a load to be specified for each design with a communication line. There shall no undue crushing near of any the hole or slots. If any sample fails in this test, a further 2 percent, subject to a minimum of 10 cross arms shall be subjected to the same test. If there is any failure in the second test, the whole lot shall be rejected.

11 MARKING

11.1 Each cross arm shall be marked legibly and indelibly with the following:

- a) Group of wooden cross arm,
- b) Species of timber by symbol (see Annex A),
- c) Year of manufacture,
- d) Indication of the source of manufacture, and
- e) Year of preservative treatment.

11.1.1 Each wooden cross arm may also be marked with the Standard Mark.

Description	Diameters of Knots, mm			
· · · · · · · · · · · · · · · · · · ·	In M	In End Section,		
	Upper half	Lower half	Halves Together	
Single knot in any hole zone	7.5	12.5 to 17.5	25.0	
Single knot in any 100 mm length between hole zones	12.5	25.0 to 30.0	37-5	
Sum of diameters in any hole zone	25.0	30.0	50.0	
Sum of diameters in any 100 mm length between hole zones	50-0	62-5	87•5	

Table 1 Maximum Permissible Size of Knots

(Clause 5.3.5)

NOTE — The sum of diameters is the total allowance for upper and lower halves together. If the space between adjacent hole zones is less than 100 mm the sum of the diameters in that space shall not exceed the allowance for single knot in lower half.

Table 2 Dimensions of Wooden Cross Arms for 11 kV Lines

(Clause 7.1.2)

SI No.	Particulars of Cross Arms	Length in Metres	Cross Section	Diameters of the Holes in mm (see col 12 for the distances of the holes from the centre)			Distances of the Respective Holes from the Centre				
				Central Hole	For Brac- ings, A	For Pin Insu- lator, B	For Disc Insu- lator Clamp	For Cradle Wire Attach- , ment,	For Cast Iron Knobs E	For Cradle Guard , F	Arms
							С	D			
(1)	(2)	(3)	(4) mm x mn	(5) n	(6)	(7)	(8)	(9)	(10)	(11)	(12) mm
i)	For span up to	1.07	100 × 76	17.5	14.5	20.5	_		<u> </u>		A = 305 on either side R = 457 on either side
ii)	For span above 106.7 to 152.4 m	1.37	100 × 76	17.5	14.5	20.5	—	. —	-	-	A = 305 on either side B = 610 on either side
iii)	For dead end and guarding	1.68	100 × 76	17•5	14.5	20.5	17-:	5	-		A = 610 on either side B = 305 on right side, if required
											C = 762 on either side & 152 on right side
iv)	For guarding along the road	1.68	100 × 76	17.5	14.5	20.5	-	17.5	-	—	A = 610 on either side B = 457 on either side
v)	For saq with guarding up to 0.76 m	1· 52	100 × 76	17.5	14.5	17.5	-	-	-	17.5	D = 762 on either side A = 457 on either side B = 229 on either side & 533 on either side
vi)	For saq with guarding above 0.76 to 1.22 m	1.83	100 × 76	17.5	14.5	17•5	. –		-	17.5	F = 686 on either side A = 457 on either side B = 229 on either side & 686 on either side
vii)	For saq above 1.22 to 1.47 m	1.98	10 × 760	17:5	14.5	17.5	-		17.5	_	F = 838 on either side A = 610 on either side B = 305 on either side & 914 on left side E = 914 on right side

ANNEX A

[Clauses 4.1 and 11.1 (b)]

SPECIES OF TIMBERS SUITABLE FOR CROSS ARMS

GROUP A

Trade Name

Botanical	Name	Symbol

Babul	Acacia arabica	BAB
Ballagi	Poeciloneuron indicum	BAL
Bruguiera	Bruguiera spp.	BRU
Hopea	Hopea parviflora	HOP
Mesua	Mesua ferrea	MES
Sal	Shorea robusta	SAL
Sianchor (Kayea)	Mesua assamica (Syn. Kayea assamia)	SIA

GROUP B

Ash	Fraxinus spp.	ASH
Axlewood (Bakli)	Anogeissus latifolia	AXL
Benteak	Lagerstroemia lanceolata	BEN
Bijasal	Pterocar pus marsupium	BIJ
Black chuglum	Terminalia manii	BCH
Black locust	Robinia pseud-acacia	BLO
Blue gum	Eucalyptus globulus	BGU
Casuarina	Casuarina equisetifolia	CAS
Eucalyptus	Eucalyptus camaldulensis	EUC
Gurjan	Dipterocarpus spp.	GUR
Hollong	Dipterocarpus macrocarpus	HON
Irul	Xylia xylocarpa	IRU
Indian oak	Quercus spp.	IOA
Kindal	Terminalia alataulata	KIN
Laurel	Terminalia alata	LAU
Lendi	Lagestroemia parviflora	LEN
Mundani	Acrocar pus fraxinifolius	MUN
Mysore gum	Eucalyptus tereticornis	MGU
Piney	Kingiodendron pinnatum	PIN
Poon	Calophyllum spp.	POO
Sissoo	Dalbergia sissoo	SIS
Sundri	Heritiera spp.	SUN
Tali	Palaquim polyanthum	TAL
Teak	Tectona grandis	TEA
White chuglum	Terminalia bialata (sapwood)	WCH

GROUP C

Ariun	Terminalia arjuna	ARJ
Chir	Pinus roxburghii	CHR
Deodar	Cedrus deodara	DEO
Garuga	Garuga pinnata	GAU
Hollock	Terminalia myriocarpa	HOL
Jarul	Lagerstroemia speciosa	JAR
Makai	Shorea assamica	MAK
Pvinma	Lagerstroemia hypoleuca	PYI
Su-babul	Leucaena leucocephala	SBA
Tad (Palmyra)	Borassus flabellifer	TAD
While bombwe	Terminalia procera	WBO

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