भारतीय मानक **IS 3934 : 2023**

Indian Standard

वस्त्रादि — कताई और डब्लिंग फ्रेमों के एलुमिनियम के प्लगनुमा स्पिंडल — विशिष्टि

(तीसरा पुनरीक्षण)

Textiles — Aluminium Plug Type Spindles for Spinning and Doubling frames — Specification

(Third Revision)

ICS 59.120.10

भारतीय मानक ब्यूरो
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March 2023 **Price Group 7**

Textile Machinery and Accessories Sectional Committee, TXD 14

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Textile Machinery and Accessories Sectional Committee had been approved by the Textiles Division Council.

Spindle is a hollow cylindrical tube, consists of mainly two parts **(**upper parts bolster**)** and capable to run high speed**.** Normally upper part of spindle is taper, which holds ring cop and bolster is fixed to the ring rail by nut**.** Spindle is driven by tape at the position of whorl**.**

This standard was originally published in 1966 and subsequently revised in 1974 and 1989. This revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

a) Title of the standard has been modified;
b) Marking, packing and sampling clauses have been modified; and
c) References to Indian standards have been updated.

The composition of the committee responsible for the formulation of this standard is listed 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 the same as that of the specified value in this standard.

Indian Standard

TEXTILES — ALUMINIUM PLUG TYPE SPINDLES FOR SPINNING AND DOUBLING FRAMES — SPECIFICATION

(Third Revision)

1 SCOPE

This standard prescribes the requirements for aluminum plug type spindles, spring grip type having following tapers suitable for use with warp tubes conforming to IS 3625 (Part 1):

a) 1 : 40 taper spindles;

b) 1 : 64 taper spindles; and

c) 1 : 38 taper spindles.

2 REFERENCES

The standards listed in Annex A 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 editions of the standards listed in Annex A.

3 NOMENCLATURE

For the purpose of this standard, the nomenclature as indicated in Fig. 1 shall apply.

4 MANUFACTURE

4.1 Material

For the manufacture of components of spindles, suitable materials shall be chosen so as to meet the requirements specified. For choosing the materials, reference may be made to the following Indian Standards:

Component	*Material*	*Reference to*
Plug	Aluminium	IS 733
Blade	Chrome alloy steel	IS 1570 (Part 4)
Wharve	Free cutting steel or Grey cast iron	IS 4431 or Grade 25 of IS 210

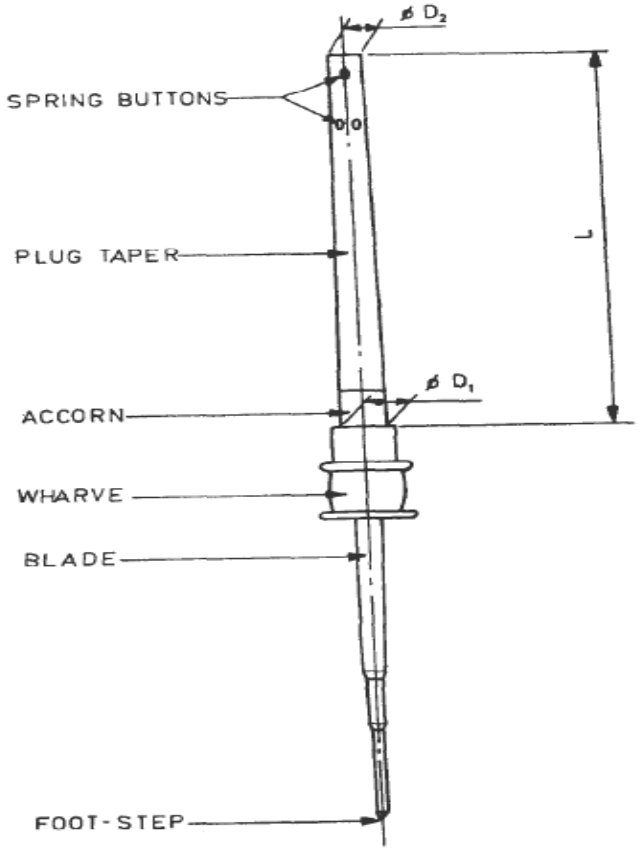

FIG. 1 TYPICAL ALUMINIUM PLUG SPINDLE WITH SPRING BUTTONS

4.2 Workmanship and Finish

The spindles shall be free from scratches, seals, cracks, pit marks, traces of rust, burrs and any other surface defect. The spindle blade shall have perfect smooth ground finish with roughness not exceeding 1 pm except the bearing portion where it shall be not more than 0.5 µm.

5 REQUIREMENTS

5.1 Dimensions

The recommended dimensions of spindles are given in Tables 1, Table 2 and Table 3 when read with Fig. 1. The top and bottom diameter of plug shall be subject to a tolerance of - 0.05 mm at top and - 0.10 mm at bottom.

NOTE — In case spindles with different dimensions are manufactured for specific requirements of a buyer, the tolerance specified for top and bottom diameter of plug shall, however, apply.

5.1.1 The wharve diameter shall be subject to a tolerance of ± 0.1 mm and ± 0.2 mm for pulley made of steel and cast iron respectively.

Table 1 Dimensions for Aluminium Plug Type Spindles, Taper 1 : 40

(*Clause* 5.1 and *Fig.* 1)

All dimensions in millimetres

Sl No.	Nominal Length	Series 0		Series 1		Series 2		Series 3	
	L	D_1	D_2	D_1	D_2	D_1	D_2	D_1	D_2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	(170)	-	-	17.0	12.75	16.00	11.75	15.00	10.75
ii)	180	-	-	18.50	14.00	17.00	12.50	16.00	11.50
iii)	(190)	-	-	18.50	13.75	17.00	12.25	16.00	11.25
iv)	200	22.00	17.00	20.00	15.00	18.50	13.50	17.00	12.00
v)	(210)	22.00	16.75	20.00	14.75	18.50	13.25	17.00	11.75
vi)	220	24.00	18.50	22.00	16.50	20.00	14.50	18.50	13.00
vii)	(230)	24.00	18.25	22.00	16.25	20.00	14.25	18.50	12.75
viii)	240	27.00	21.00	24.00	18.00	22.00	16.00	20.00	14.00
ix)	(250)	27.00	20.75	24.00	17.75	22.00	15.75	20.00	13.75
x)	260	30.00	23.50	27.00	20.50	24.00	17.50	22.00	15.50
xi)	(270)	30.00	23.25	27.00	20.25	24.00	17.25	22.00	15.25
xii)	280	33.00	26.00	30.00	23.00	27.00	20.00	24.00	17.00
xiii)	(290)	33.00	25.75	30.00	22.75	27.00	19.75	24.00	16.75
xiv)	300	36.00	28.50	33.00	25.50	30.00	22.50	27.50	19.50

NOTES

1 The values in brackets should be avoided wherever possible.

2 The values in the area framed are preferred.

3 The spindles with dimensions specified under Series 0 are generally suitable for use with ring diameter of 45 to 51 mm, Series 1 with 42 mm, Series 2 with 38 mm and Series 3 with 32 mm ring diameter.

4 The values of D_1 are an integer as per ISO practice.

Table 2 Dimensions for Aluminium Plug Type Spindles, Taper 1 : 64

(*Clause* 5.1 and *Fig.* 1)

All dimensions in millimetres

Sl No.	Nominal Length	Series 0		Series 1		Series 2		Series 3	
	L	D_1	D_2	D_1	D_2	D_1	D_2	D_1	D_2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	(170)	-	-	17.00	14.34	16.00	13.34	15.00	12.34
ii)	180	-	-	18.50	15.69	17.00	14.18	16.00	13.18
iii)	(190)	-	-	18.50	15.69	17.00	14.18	16.00	13.18
iv)	200	22.00	18.88	20.00	16.88	18.50	15.38	17.00	13.88
v)	(210)	22.00	18.88	20.00	16.88	18.50	15.38	17.00	13.88
vi)	220	24.00	20.56	22.00	18.56	20.00	16.56	18.00	14.56
vii)	(230)	24.00	20.41	22.00	18.41	20.00	16.41	18.00	14.41
viii)	240	27.00	23.25	24.00	20.25	22.00	18.25	20.00	16.25
ix)	(250)	27.00	23.09	24.00	20.09	22.00	18.09	20.00	16.09
x)	260	30.00	25.94	27.00	22.94	24.00	19.94	22.00	17.94
xi)	(270)	30.00	25.78	27.00	22.78	24.00	19.78	22.00	17.78
xii)	280	33.00	28.62	30.00	25.62	27.00	22.62	24.00	19.62
xiii)	(290)	33.00	28.47	30.00	25.47	27.00	22.47	24.00	19.47
xiv)	300	36.00	31.31	33.00	28.31	30.00	25.31	27.00	22.31

NOTES

1 The values in brackets should be avoided wherever possible.

2 The values in the area framed are preferred.

3 The spindles with dimensions specified under Series 0 are generally suitable for use with ring diameter of 45 to 51 mm, Series 1 with 42 mm, Series 2 with 38 mm and Series 3 with 32 mm ring diameter.

4 The values of D_1 are an integer as per ISO practice.

5.2 Trueness of Spindles

The spindles shall meet the requirements given below for trueness.

Take a spindle from the test sample. Mount the spindle rigidly at a slight inclination in two bearings, one positioned directly below the wharve and the other at the foot-step (*see* Fig. 2). Set four dial-gauges one each at the position indicated in the figure. Rotate by hand, the upper position of the plug through one complete revolution and read the run-out from the gauges. If none of the readings exceeds maximum permissible run-out as given in the following table, the spindle shall be considered true:

Position	*Maximum Permissible Run-Out*
5 mm to 10 mm from top but above buttons	0.05 mm
Approximately 10 mm above the tube setting	0.05 mm
Centre of wharve	0.05 mm
5 mm above the tip	0.01 mm

5.3 Hardness of Blade

The hardness of blade as measured on 'C' scale of Rockwell hardness tester according to the method prescribed in IS 1586 (Part 1) shall be as follows:

a) 5 mm from bottom tip	58 to 64 HRC
b) Bearing portion	56 to 62 HRC

5.4 Buttons

The plug shall be provided with buttons with projection of (0.7 ± 0.2) mm which should get flushed in level with the surface of the plug.

6 MARKING

6.1 The box containing spindles shall be marked with the following:

a) Name of the material;
b) Manufacturer's name and trade-mark;
c) Lift and taper of spindles;
d) Number of spindles in a box;
e) Gross and net mass;
f) Lot/batch number;
g) Country of origin; and
h) Any other information required by the law in force and/or by the buyer.

Table 3 Dimensions for Aluminium Plug Type Spindles, Taper 1 : 38

(*Clause* 5.1 and *Fig.* 1)

All dimensions in millimetres

Sl No.	Nominal Length	Series 0		Series 1		Series 2		Series 3	
	L	D_1	D_2	D_1	D_2	D_1	D_2	D_1	D_2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	(170)	–	–	17.00	12.53	16.00	11.53	15.00	10.53
ii)	180	–	–	18.50	13.76	17.00	12.26	16.00	11.26
iii)	(190)	–	–	18.50	13.76	17.00	12.26	16.00	11.26
iv)	200	22.26	17.00	20.26	15.00	18.76	13.50	17.00	11.74
v)	(210)	22.27	16.75	20.27	14.75	18.77	13.25	17.00	11.48
vi)	220	24.28	18.50	22.28	16.50	20.28	14.50	18.78	13.00
vii)	(230)	24.30	18.25	22.30	16.25	20.30	14.25	18.80	12.75
viii)	240	27.31	21.00	24.31	18.00	22.31	16.00	20.31	14.00
ix)	(250)	27.32	20.75	24.32	18.75	22.32	15.75	20.32	13.75
x)	260	30.34	23.50	27.34	20.50	24.34	17.50	22.34	15.50
xi)	(270)	30.35	23.25	27.35	20.25	24.35	17.25	22.35	15.25
xii)	280	33.36	26.00	30.36	23.00	27.36	20.00	24.36	17.00
xiii)	(290)	33.37	25.75	30.37	22.75	27.37	19.75	24.37	16.75
xiv)	300	36.39	28.50	33.39	25.50	30.39	22.50	27.39	19.50

NOTES

1 The values in brackets should be avoided wherever possible.

2 The values in the area framed are preferred.

3 The spindles with dimensions specified under Series 0 are generally suitable for use with ring diameter of 45 mm to 51 mm, Series 1 with 42 mm, Series 2 with 38 mm and Series 3 with 32 mm ring diameter.

6.2 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 thereunder, and the products may be marked with the Standard Mark.

7 PACKING

Each spindle shall be coated with a rust preventive material. The spindles shall be packed in suitable boxes strong enough to withstand normal hazards of storage and transportation. They shall be packed in such a way that they do not get bent or scratched by pressing against one another or against the walls of the box.

8 SAMPLING

8.1 In a consignment, all aluminium plug spindles of the same type and dimensions shall be grouped to constitute a lot. Sampling shall be done from each lot.

8.2 For the characteristics of workmanship and finish, dimensions, trueness of spindles and buttons, sampling and criteria for conformity shall be in accordance with IS 2500 (Part 1) at inspection level 3 and AQL 1.0 percent.

8.3 For hardness of blade, samples shall be selected at random and tested at the rate of 1 per 100 spindles of the lot subject to a minimum 2 and maximum 10 tests. There should be no failure if the lot is to be accepted under this clause.

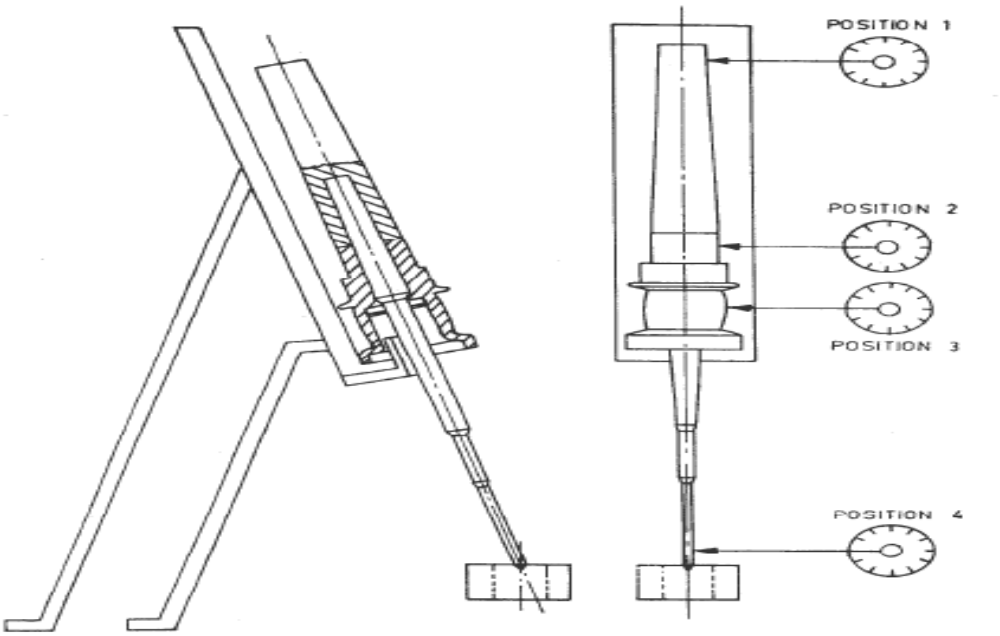

FIG. 2 ASSEMBLY FOR THE TESTING OF TRUENESS OF SPINDLE

ANNEX A
(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 210 : 2009	Grey iron castings — Specification (*fifth revision*)
IS 733 : 1983	Specification for wrought aluminum and aluminum alloy bars, rods and sections (for general engineering purposes) (*third revision*)
IS 1570 (Part 4) : 1988	Schedules for wrought steels: Part 4 Alloy steels (Alloy Constructional and Spring Steels) with specified chemical composition and mechanical properties (*first revision*)
IS 1586 (Part 1) : 2018	Metallic materials - Rockwell hardness test: Part 1 Test method (*fifth revision*)
IS 2500 (Part 1) : 2000	Sampling procedures for inspection by attributes: Part 1 Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection (*third revision*)
IS 3625 (Part 1) : 2020	Specification for Warp Tubes for Ring Spinning and Doubling Spindles: Part 1 Specific Requirements (*third revision*)
IS 4431 : 1978	Specification for carbon and carbon-manganese free-cutting steel (*first revision*)

ANNEX B
(*Foreword*)

COMMITTEE COMPOSITION
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Bhowmick Calculator, Kolkata	SHRI GOUTAM BHOWMICK SHRI VIVEKANANDA BHOWMICK (*Alternate*)
Central Manufacturing Technology Institute, Bengaluru	SHRI B. R. MOHANRAJ SHRI K. SARAVANAN (*Alternate*)
Confederation of Indian Textile Industry, New Delhi	SHRI AJAY KUMAR
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This Indian Standard has been developed from Doc No.: TXD 14 (20068).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi