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मसौदा

औद्योगिक स्टेपल – विशिष्टि

Draft Indian Standard

Industrial Staples — Specification

ICS 21.060.20

General Engineering and Fasteners Sectional Committee, PGD 37	Last date for receipt of comment is **22 August 2025**

FOREWORD

(*Formal clauses will be added later*)

Industrial staple pins have a wide range of applications across various sectors due to their versatility and strength. In manufacturing and packaging industries, they are used to secure heavy-duty cartons, crates, and corrugated boxes, ensuring safe transport and storage of goods. In construction, they are employed for fastening insulation materials, roofing felt, and wire meshes. Upholstery and furniture-making rely on staple pins for attaching fabrics, leathers, and padding to wooden frames.

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.

1 SCOPE

1.1 This standard covers the requirements of industrial staple pins.

1.2 This Indian Standard does not the cover the requirements of stationery/office staples. They are covered separately under IS 5348.

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 edition of these standards.

3 MATERIAL

3.1 The staple shall be pre-formed from wires with the chemical composition as specified in Table 1.

Table 1 Chemical Composition of Staple Wire
(*Clause* 3.1)

Sl No.	Material	Chemical Composition Conforming to Grade
(1)	(2)	(3)
ii)	Mild steel	Grade 1, 2, 3, 8, 8M or 9 conforming to IS 7887
iii)	High carbon steel	Grade HC 38, HC 42, HC 60 or HC 62 conforming to IS 7904
iii)	Stainless-steel	Grade X04Cr19Ni9 conforming to IS 6603

3.2 The ultimate tensile strength of the wire shall conform to the values specified in Table 2. The ultimate tensile strength shall be measured after the wire drawing and heat treatment processes, and before the staple making process. The testing shall be done in accordance with IS 1608 (Part 1).

Table 2 Ultimate Tensile Strength of Staple Wire
(*Clause* 3.2)

Sl No.	Chemical Composition Conforming to Grade	Ultimate Tensile Strength, N/mm^2
(1)	(2)	(3)
ii)	Grade 1, 2, 3, 8, 8M or 9 conforming to IS 7887	500-1200
iii)	Grade HC 38, HC 42, HC 60 or HC 62 conforming to IS 7904	1000-1700

iii)	Grade X04Cr19Ni9 conforming to IS 6603	1000-1200

4 SHAPE AND DIMENSIONS

4.1 Unless otherwise agreed to between the user/purchaser and the manufacturer, the dimensions of industrial staples shall be as given in Fig. 1 and Table 3. However, the tolerance wherever specified in Table 3 and in **4.2** shall apply.

4.2 Tolerances

4.2.1 The tolerance on width, *W*, shall be as given in the table below:

Width, mm	*Tolerance*, mm
$W \leq 12$	± 0.1
$12 < W \leq 40$	± 0.5
$W > 40$	± 0.6

4.2.2 The tolerance on length, *L*, shall be as given in the table below:

Length, mm	*Tolerance*, mm
$L < 12$	± 0.3
$12 \leq L < 40$	± 0.5
$L \geq 40$	± 0.6

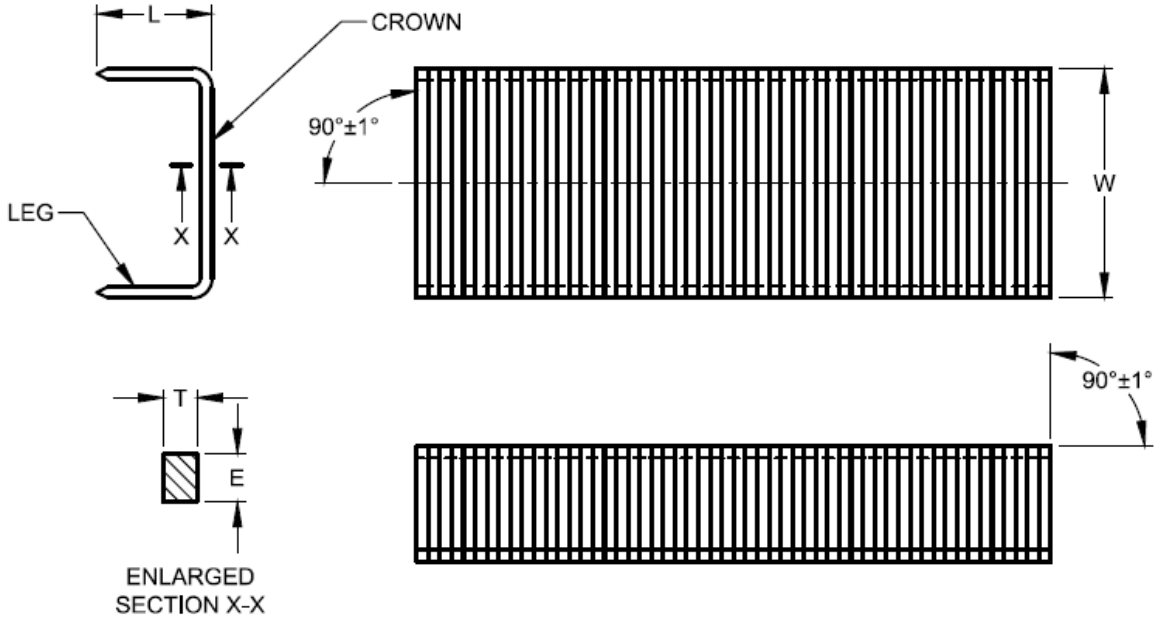


FIG. 1 CROWN STAPLES

Table 3 Dimensions of Staples

(*Clause* 4)

All dimensions in millimeters

Sl No.	Series No.[1)]	*W*	*L*	*E* ± 0.03	*T* ± 0.03
(1)	(2)	(3)	(4)	(5)	(6)
i)	97	4.50	6.0-25.0	0.90	0.70
ii)	97	4.70	6.0-18.0	0.95	0.65
iii)	4J	5.10	6.0-25.0	1.20	0.57
iv)	90	5.55	9.0-40.0	1.20	0.94
		5.70	10.0-45.0	1.25	1.0
v)	92	8.60	10.0-50.0	1.25	1.0
vi)	71	9.0	4.0-16.0	0.75	0.54
vii)	N (14)	10.34	15.0-60.0	1.45	1.30
viii)	13	10.60	4.0-10.0	0.75	0.50
ix)	T50 (A11)	10.60	6.0-14.0	0.50	0.60
x)	N(100)	10.75	16.0-50.0	1.55	1.36
xi)	10F	11.30	2.5-16.0	0.70	0.50
xii)	80	12.80	3.0-16.0	0.90, 0.95	0.61, 0.71
xiii)	T-10	12.75	10.0	0.695	0.50
xiv)	T-13	12.75	13.0	0.695	0.50
xv)	23	12.80	6.0-13.0	0.75	0.525, 0.61
xvi)	24	12.80	6.0-12.0	0.75	0.50
xvii)			6.0-25.0	0.60	0.40
xviii)	P88	13.20	12.0-25.0	1.15	0.53
xix)	32	32.0	9.0-22.0	1.90	0.83
xx)	590	24.30	16.0-32.0	1.80	0.85
xxi)	BCS2 (16WC)	24.90	12.0-50.0	1.61	1.40
xxii)	P	26.50	12.0-50.0	1.58	1.35
xxiii)	35	34.7	15.0-22.0	2.21	0.79

[1)] The series numbers specified are based on the most commonly used industry practice for identifying staples. However, manufacturers may use different series number for the dimensions provided in the table.

5 CHISEL ANGLES

Staple end shall either have chiseled point end or divergent point end or double chiseled point end for the smooth penetration of staple in respective material. The chisel angles of the staples shall be as specified in Fig. 2 and Table 4.

Table 4 Chisel Angles
(*Clause* 5)

Sl No.	Type	α	β
(1)	(2)	(3)	(4)
i)	Type A (Chiseled point)	50° to 90°	-
ii)	Type B (Divergent point)	30° to 45°	-
iii)	Type C (Double chiseled point)	15° to 25°	35° to 45°

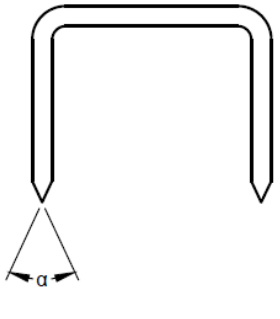


FIG. 2 (A) TYPE A (CHISELED POINT)

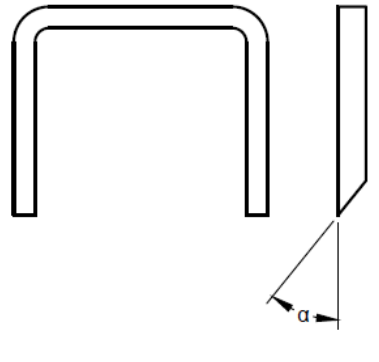


FIG. 2 (B) TYPE B (DIVERGENT POINT)

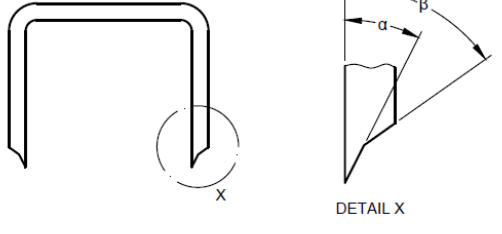


FIG. 2 (C) TYPE C (DOUBLE CHISELED POINT END)

FIG. 2 CHISEL TYPES

6 WORKMANSHIP AND FINISH

6.1 The staples shall be pre-formed and glued together, one behind the other, in the form of a channel. Both ends of staples shall have chiseled points. The gluing of staples shall be smooth and even, such that the staples adhere to each other without loosening in handling while being fitted into the stapler. Also, the gluing shall be such as to afford easy exit of the staples from the vertical chute without clogging and jamming the stapler.

6.2 One link of staples shall be free from injurious defects in use as uneven rows of legs, camber, chippings, and distortion of legs, clearances and ill adhesion.

6.3 The temper of the wire shall be such as to permit penetration and clinching to a firm seat without buckling or fracturing of the crown or leg when tested as specified in **7.1.**

6.4 The staple may be supplied in different color coating as agreed to between manufacturer and purchasers.

7 PERFORMANCE TESTS

7.1 Staple Penetration Test

7.1.1 *Apparatus*

A flat rectangular surface shall be prepared out of any natural soft wood. The average wood humidity shall be 12 ± 3 percent (*see* IS 11215) and testing shall be done as per **7.1.2** at a temperature of 25 °C ± 2 °C. The thickness of the wood shall be at least 1.2 times the leg length of staple used.

NOTE — Some of the common natural soft woods include deodar, pine, plywood, teak.

7.1.2 *Test Method*

Insert a magazine of industrial staples in a staple tacker or pneumatic/electric/cordless stapler. The staples shall penetrate in wood and shall not show any buckling, fracture of the crown or malformation as per the stapling acceptance matrix specified in Table 5. Also, the remaining staple magazine shall not be found in a broken condition.

7.2 Corrosion Resistance Test

The testing for neutral salt spray (NSS) shall be carried out as per IS 5528 for a period of exposure as 5 h. After the testing, the test surface shall remain free from red corrosion products when examined by the unaided eye or with normal corrected vision. Slight staining shall not be a cause for rejection.

8 FINISH

8.1 The material shall be supplied in bright drawn, copper coated, galvanized, zinc-aluminum coated or tin coated finish as agreed to between the user/purchaser and the manufacturer.

8.2 The galvanized coating of the steel wire shall conform to the requirements of light coating as specified in IS 4826. The coating test for other finishes shall be as agreed to between the user/purchaser and the manufacturer.

9 SAMPLING

Unless otherwise agreed to between the purchaser and the supplier, the sampling procedure given in Annex B shall be followed.

10 MARKING

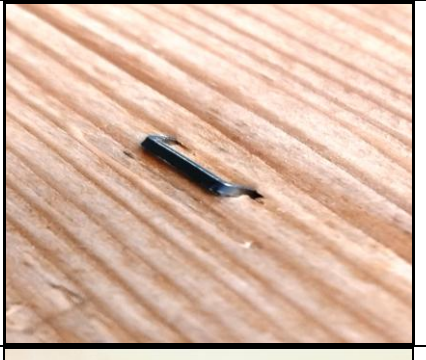
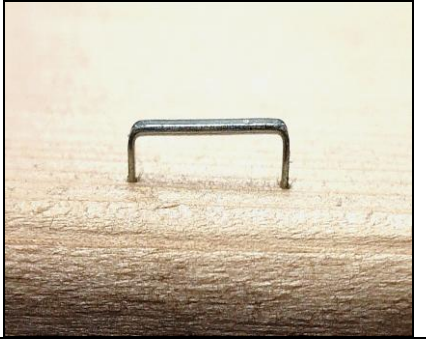
10.1 Each packet of staples shall be marked with:

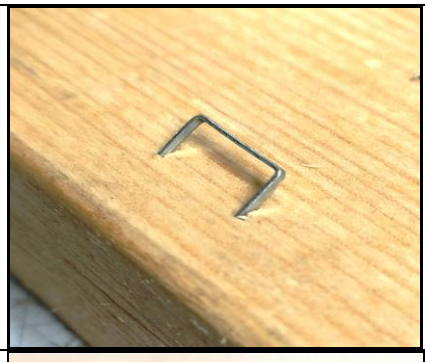
a) Manufacturer's name initials or trade-mark;
b) Series number of the staple;
c) Length of the staple; and
c) Quantity per box.

10.2 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.

Table 5 Stapling Acceptance Matrix
(*Clause* 7.1.2)

Sl No.	Failure Descriptions	Failure Diagram	Acceptance (Yes/No)
(1)	(2)	(3)	(4)
i)	Flush with Surface		Yes
ii))	Width above surface		Yes
iii))	Slight angle/ width above		No
iv)	Above surface		No

v)	Severe angle/ Above surface		No
vi)	Raised corner/ angled		No

ANNEX A
(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 1608 (Part 1) : 2022/ ISO 6892-1 : 2019	Metallic materials — Tensile testing: Part 1 Method of test at room temperature (*fifth revision*)
Doc: No. PGD/14/27124	Staples — Specification (*second revision*)
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 5528 : 2024/ ISO 9227 : 2022	Corrosion tests in artificial atmospheres — Salt spray tests (*second revision*)
IS 6603 : 2024	Stainless steel semi-finished products, bars, wire rods and bright bars — Specification (*second revision*)
IS 7887 : 1992	Mild steel wire rod for general engineering purpose — Specifications (*first revision*)
IS 7904 : 2018	High carbon steel wire rods — Specifications (*second revision*)
IS 11215 : 1991	Moisture content of timber and timber products — Methods for determination (*first revision*)
IS 1608 (Part 1) : 2022	Metallic materials — Tensile testing: Part 1 Method of test at room temperature

ANNEX B

(*Clause* 9)

SAMPLING AND CRITERIA FOR CONFORMITY OF STAPLES

B-1 LOT

B-1.1 In any consignment, all the packets containing the staples of the same type and size, manufactured by the same factory, during the same period and under similar conditions of production shall be grouped together to constitute a lot.

B-1.2 Number of packets to be selected from each lot shall depend upon the size of the lot and shall be in accordance with column 2 and 3 of Table 6.

B-1.2.1 These packets shall be selected from the lot at random. In order to ensure the randomness of the selection, procedure as given in IS 4905 : 2015 shall be followed.

B-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 From each of the selected packets, 3 magazines shall be selected at random, so that the number of magazines selected from each lot shall be in accordance with column 2 and 4 of Table 6. The magazines so selected from each lot shall then be divided into 2 groups at random, one containing two-third of magazines (for dimensional requirements) and another containing one-third of magazines (for performance test).

B-2.2 From each of the magazines selected as per **B-2.1** for dimensional requirements, select 2 staples at random, so that the number of staples to be selected from each lot shall be in accordance with column 2 and 6 of Table 6. These staples shall be examined for dimensional requirements as per **3.1**. A staple failing to satisfy these requirements shall be termed as defective. The lot shall be considered as conforming to dimensional requirements if the number of defectives found in the sample is less than or equal to corresponding permissible number of defectives (*see* column 7 of Table 6).

B-2.3 The lot which has been found as conforming to dimensional requirements, shall then be tested for performance tests.

B-2.4 The magazines selected as per **B-2.1** for performance requirements shall be tested for staple penetration test (*see* **7.1**). A staple failing to satisfy this requirement shall be termed as defective. The lot shall be considered as conforming if the number of defectives found in the sample is less than or equal to corresponding permissible number of defectives (*see* column 9 of Table 6).

B-2.5 A lot which has been found as conforming to dimensional requirements and performance tests shall then be tested for corrosion resistance. For this purpose, 20 staples

shall be selected from the lot at random and subjected to this test. The lot shall be considered as conforming to the requirement if none of the staples show any sign of rusting.

B-2.6 The lot shall be accepted if **B-2.2**, **B-2.4** and **B-2.5** are satisfied, otherwise the lot shall be rejected

Table 6 Sample Size and Permissible Number of Defectives

(*Clauses* B-1.2, B-2.1, B-2.2 and B-2.4)

Sl No.	**Lot Size (Number of Packets)**	**Sample Size**		**For Dimensional Requirements**			**Performance Test** (*see* **7.1**)	
		Number of packets	Number of Magazines	Sample Size (No. of Magazines)	Sample Size (No. of Staples)	Permissible Number of defectives	Sample Size (No. of Magazines)	Permissible No. of Defectives
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Up to 100	5	15	10	20	1	5	1
ii)	101 to 300	8	24	16	32	2	8	2
iii)	301 to 1000	13	39	26	52	3	13	3
iv)	1000 and above	20	60	40	80	5	20	5