भारतीय मानक

Indian Standard

IS 18741: 2024

कंक्रीट कीलें — विशिष्टि

Concrete Nails — Specification

ICS 21.060.50

भारतीय मानक ब्यूरो
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May 2024 **Price Group 5**

General Engineering and Fasteners Standards Sectional Committee, PGD 37

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the General Engineering and Fasteners Standards Sectional Committee had been approved by the Production and General Engineering Division Council.

Concrete nails are manufactured from high strength carbon steel wires. These nails are available in different shank diameters and different lengths to suit multiple range of applications. The structure of the nail has a circular section (shank) and a flat head. Grooves on the shank significantly improves the reliability of the connection with more grip with the fastened surface. Concrete nails are one of the most common types of nails used in the construction industry. These nails are designed for manual hammer driving into medium strength concrete, solid blocks, plain concrete walls, solid wood, steel sheets to wood joining applications. Concrete nails can also be driven by power actuated tools, which is beyond the scope of this standard.

There is no requirement of pre-holes to fasten these concrete nails since they are hardened to withstand heavy load on to the required hardened surfaces like concrete walls. Manually driven nails may also be used for light duty fixing applications including, but not limited to, clamps, electrical pipes, cables, water pipelines, repair work, temporary form work, light wood framing or similar, where specific load bearing capacities are not required. Some of the major features of concrete nails include:

a) They are harder with excellent fixing strength;

b) They have excellent anti-bending, anti-cracking properties while fastening; and

c) Different special shank varieties, including smooth, grooved, and twisted (spiral) shanks, are available based on the specific application.

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

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

CONCRETE NAILS — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements of concrete nails of shank diameter from 3.2 mm to 5.3 mm manually driven into concrete with the use of hammer.

1.2 This standard does not cover the requirements of proprietary nails which are driven into concrete with the help of power actuated tools.

2 REFERENCES

The standards given below standard contain provision which, through reference in this text, constitute provision 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 these standards are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 1573 : 1986	Specification for electroplated coatings of zinc on iron and steel (*second revision*)
IS 1586 (Part 1) : 2018/ ISO 6508-1 : 2016	Metallic materials — Rockwell hardness test: Part 1 Test method (*fifth revision*)
IS 5528 : 2024/ ISO 9227 : 2022	Corrosion tests in artificial atmospheres — Salt spray tests (*second revision*)
IS 7904 : 2018	High carbon steel wire rods — Specification (*second revision*)

3 SYMBOL

For the purpose of this standard, the following letter symbols have the meaning indicated against each:

d — Minor diameter of the shank (in case of grooved and twisted concrete nails)

D — Major shank diameter of the nail

f — Width of the fins in case of grooved and twisted concrete nails

G — Straightness of the shank of the nail

H — Head diameter of the nail

L — Length of the nail

t — Head thickness of the nail

4 TYPES

For the purpose of this standard, concrete nails shall be of the following 3 types:

a) Concrete nails, grooved;
b) Concrete nails, twisted (spiral); and
c) Concrete cable clip nails.

5 DIMENSIONS

5.1 The dimensions of concrete nails (grooved and twisted) shall be as given in Fig. 1 and Table 1.

5.2 The dimensions of concrete cable clip nails shall be as given in Fig. 2, Fig. 3 and Table 2.

5.3 For grooved concrete nails, the number of grooves on the peripheral surface of nails shall be 8 to 10 depending on the of the manufacturer's requirements.

5.4 The flute angle for twisted concrete nails shall be 65° ± 5° (*see* Fig. 4) and the number of starts shall be 3 to 5 (*see* Fig. 5).

6 MATERIAL REQUIREMENTS

Concrete nails shall be manufactured from the grades HC38, HC42, HC46, HC48, HC50, HC52 or HC56 confirming to IS 7904.

7 HEAT TREATMENT

7.1 Heat treatment (hardening and tempering/quenching and tempering) shall be carried out after making the nails. The temperature and soaking time depend upon on the grade of the material and shank diameter of the nails. After hardening process, tempering shall be carried out to meet out the required hardness (*see* **7.2** and **7.3**) and uniform micro structure of the nail.

7.2 Grooved concrete nails and twisted concrete nails shall have a minimum core hardness of 45 HRC. The method of test shall be in accordance with [*see* IS 1586 (Part 1)].

7.3 Cable clip nails shall have a core hardness of 50 HRC. The method of test shall be in accordance with [*see* IS 1586 (Part 1)].

8 SURFACE TREATMENT

Nails covered by this standard shall be electroplated with zinc with service grade number 1 in accordance with IS 1573. The requirement of additional coatings shall be as agreed to between the user/purchaser and the manufacturer.

9 TESTING METHODS

9.1 Bend Test

9.1.1 The bend test shall be carried out manually with the use of bench vice. Clamp the sharp side of the nail with a minimum clamping of 40 percent to 50 percent of its total length and hammer it at the head side or else by any hand or power device that will deform the sample closely about a mandrel of specified diameter through a minimum of 20° without causing much damage to the nail surface. The testing shall be done after heat treatment and electroplating.

9.1.2 The sample shall be considered to have failed if fracture occurs prior to attainment of the required minimum bend angle.

9.2 Salt Spray Test

When tested in accordance with the neutral salt spray (NSS) test as specified in IS 5528 for 48 h, 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. The testing shall be done after heat treatment and electroplating.

10 WORKMANSHIP

Concrete nails covered by this specification shall be true to shape, well-finished, free from imperfections, clean, and free of corrosion.

11 PACKAGING

11.1 Packaging of nails shall be so as to preserve the contents in good condition and to ensure acceptance and safe delivery by common or other carriers to the point of delivery. In addition, the containers shall be so made that the contents can be removed partially without destroying the ability of the container to serve as a receptacle for the remainder of the contents.

11.2 Nails should be packed in 1 kg (Net) packets and 25 packets/carton that is 25 kg net mass in a carton box. However, the packing quantity can be changed upon buyer's request.

12 MARKING

12.1 Packaging of concrete nails shall be marked with the following details:

a) Type of nail;

b) Shank diameter and length of nail;

c) Net weight of the packaging; and

d) The manufacturer's identification and/or name.

12.2 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 product(s) may be marked with the Standard Mark.

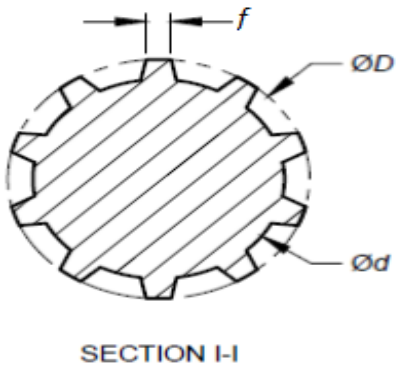

FIG.1 DIMENSIONS (GROOVED AND TWISTED CONCRETE NAILS)

Table 1 Concrete Nails (Grooved and Twisted)

(*Clause* 5.1)

All dimensions are in millimetres.

Sl No.	*L* ± 1.0	*D* ± 0.1	*H* ± 0.2	*t* ± 0.1	*f* ± 0.05	*d* ± 0.05	*G* ± 0.05
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	26.0	3.2 to 3.6	7.5	2.0	0.5	2.9	0.5
ii)	38.0	3.6 to 4.0	7.5	2.0	0.5	3.3	0.5
iii)	50.0	4.0 to 4.2	7.5	2.0	0.5	3.7	0.5
iv)	64.0	4.0 to 4.2	7.5	2.0	0.5	3.7	0.5
v)	76.0	4.5 to 4.8	8.0	2.0	0.6	4.1	0.5
vi)	100.0	4.5 to 4.8	8.0	2.0	0.6	4.1	0.5
vii)	125.0	4.7 to 5.0	8.2	2.0	0.6	4.3	0.5
viii)	150.0	5.0 to 5.3	8.5	2.0	0.6	4.6	0.5

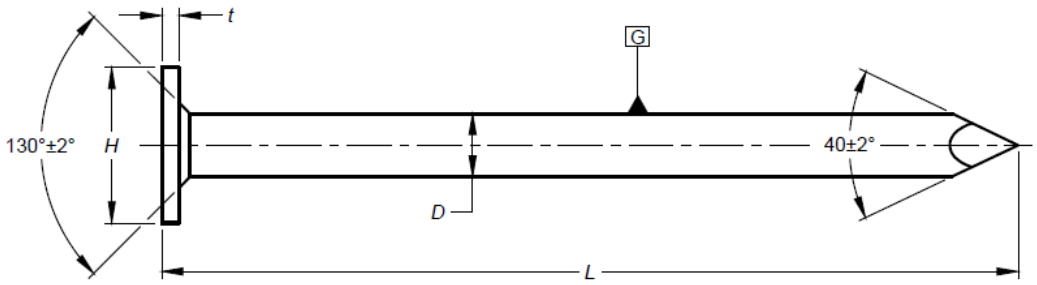

FIG. 2 DIMENSIONS (CABLE CLIP CONCRETE NAILS)

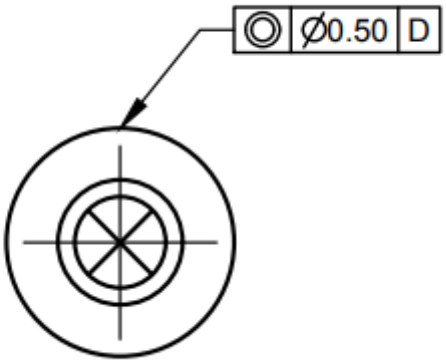

FIG. 3 CONCENTRICITY

Table 2 Concrete Nails (Cable Clip)

(*Clause* 5.2)

All dimensions are in millimetres.

Sl No.	*D* ± 0.02	*L* ± 1.0	*H* ± 0.20	*t* ± 0.1	*G* ± 0.05
(1)	(2)	(3)	(4)	(5)	(6)
i)	1.80	15.0	3.50	0.90	0.3
ii)	1.80	17.0	3.50	0.90	0.3
iii)	1.90	19.0	3.80	1.00	0.3
iv)	1.90	21.0	3.80	1.00	0.3
v)	2.20	25.0	4.50	1.00	0.3
vi)	2.50	25.0	5.60	1.00	0.3
vii)	2.50	38.0	5.60	1.00	0.3
viii)	2.50	40.0	5.00	1.00	0.3
ix)	2.70	46.0	5.70	1.00	0.3
x)	3.00	40.0	6.00	1.50	0.3
xi)	3.00	45.0	6.00	1.50	0.3
xii)	3.00	52.0	6.00	1.50	0.3
xiii)	3.00	60.0	6.00	1.50	0.3

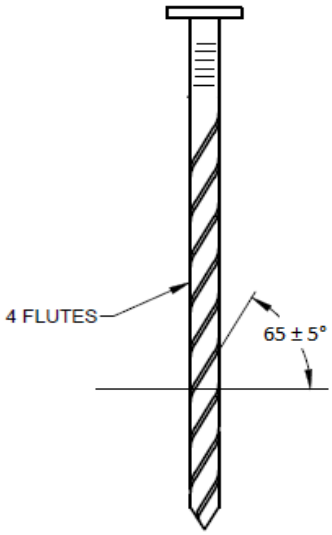

FIG. 4 FLUTE ANGLE

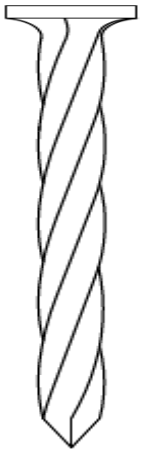

FIG. 5 TWISTED CONCRETE NAIL WITH 3 STARTS

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

General Engineering and Fasteners Standards Sectional Committee, PGD 37

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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