भारतीय मानक

Indian Standard

IS 18480 (Part 1) : 2023
ISO 7049 : 2011

क्रॉस रिसेस्ड टैपिंग पेंच

भाग 1 पैन हैड

Cross Recessed Tapping Screws

Part 1 Pan Head

ICS 21.060.20

भारतीय मानक ब्यूरो
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October 2023 **Price Group 5**

General Engineering and Fasteners Sectional Committee, PGD 37

NATIONAL FOREWORD

This Indian Standard (Part 1) which is identical to ISO 7049 : 2011 'Cross-recessed pan head tapping screws' issued by the International Organization for Standardization was adopted by the Bureau of Indian Standards on the recommendation of the General Engineering and Fasteners Standards Sectional Committee and approval of the Production and General Engineering Division Council.

Cross recessed tapping screws are a type of fastener designed for efficiently joining two or more materials together. These are externally threaded fasteners that 'tap' their own mating threads in metallic and non-metallic (such as plastic) materials. Some screws require a hole, while others drill their own hole (self-drilling). These screws feature a unique cross-shaped indentation on their head, which corresponds to a specialized screwdriver or bit. This design allows for easy and secure driving of the screw into the material.

Tapping screws are also sometimes called sheet metal screw. Cross recessed tapping screws can be used for fastening objects to thin metal, wood or plastic. These screws are commonly used in a wide range of industries, including woodworking, metalworking, electronics, automotive, and more.

This standard is published in 3 parts. Other parts in this series are:

Part 2 Countersunk (flat) head
Part 3 Raised countersunk (flat) head

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 225 Fasteners — Bolts, screws, studs and nuts — Symbols and designations of dimensions	IS 8536 : 2021/ISO 225 : 2010 Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions (*second revision*)	Identical
ISO 1478 Tapping screws thread	IS 5957 : 2003/ISO 1478 : 1999 Screw threads for thread forming tapping screws dimensions (*second revision*)	Identical
ISO 2702 Heat-treated steel tapping screws — Mechanical properties	IS 7178 : 2018/ISO 2702 : 2011 Heat-treated steel tapping screws — Mechanical properties (*fourth revision*)	Identical

(*Continued on third cover*)

Indian Standard

CROSS RECESSED TAPPING SCREWS

PART 1 PAN HEAD

1 Scope

This International Standard specifies the characteristics of cross-recessed pan head tapping screws with thread sizes from ST 2,2 to ST 9,5 inclusive.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and descriptions of dimensions*

ISO 1478, *Tapping screws thread*

ISO 2702, *Heat-treated steel tapping screws — Mechanical properties*

ISO 3269, *Fasteners — Acceptance inspection*

ISO 3506-4, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 4: Tapping screws*

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4757, *Cross recesses for screws*

ISO 4759-1, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*

ISO 8992, *Fasteners — General requirements for bolts, screws, studs and nuts*

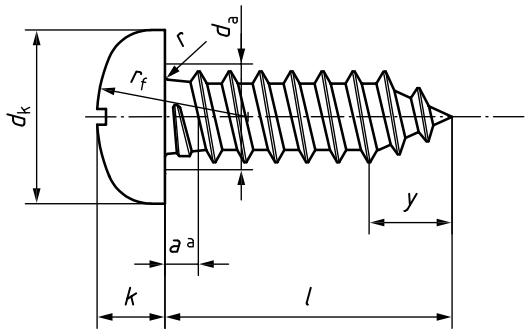
ISO 10683, *Fasteners — Non-electrolytically applied zinc flake coatings*

ISO 16048, *Passivation of corrosion-resistant stainless-steel fasteners*

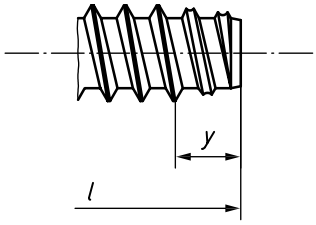
3 Dimensions

See Figure 1 and Table 1.

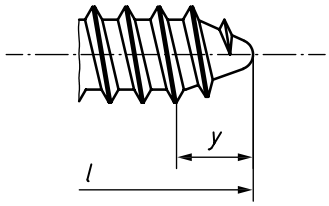
Symbols and descriptions of dimensions are specified in ISO 225.



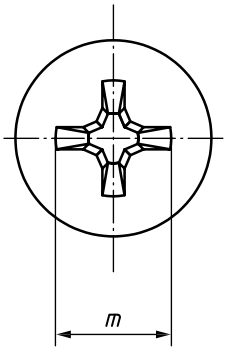
a) Type C



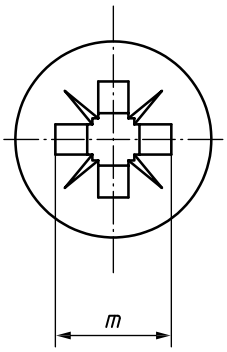
b) Type F



c) Type R



d) Type H — Cross recess



e) Type Z — Cross recess

[a] Dimension a shall be measured at the core diameter of the first full thread.

Figure 1 — Cross-recessed pan head tapping screw

Table 1 — Dimensions

Dimensions in millimetres

Thread size				ST 2,2	ST 2,9	ST 3,5	ST 4,2	ST 4,8	ST 5,5	ST 6,3	ST 8	ST 9,5
P[a]				0,8	1,1	1,3	1,4	1,6	1,8	1,8	2,1	2,1
a			max.	0,8	1,1	1,3	1,4	1,6	1,8	1,8	2,1	2,1
d_a			max.	2,8	3,5	4,1	4,9	5,6	6,3	7,3	9,2	10,7
d_k			max.	4,00	5,60	7,00	8,00	9,50	11,00	12,00	16,00	20,00
			min.	3,70	5,30	6,64	7,64	9,14	10,57	11,57	15,57	19,48
k			max.	1,60	2,40	2,60	3,10	3,70	4,00	4,60	6,00	7,50
			min.	1,40	2,15	2,35	2,80	3,40	3,70	4,30	5,60	7,10
r			min.	0,10	0,10	0,10	0,20	0,20	0,25	0,25	0,40	0,40
r_f			≈	3,2	5,0	6,0	6,5	8,0	9,0	10,0	13,0	16,0
Cross recess			Recess No	0	1	2			3		4	
	Type H		m ref.	1,9	3,0	3,9	4,4	4,9	6,4	6,9	9,0	10,1
		Penetration	max.	1,20	1,80	1,90	2,40	2,90	3,10	3,60	4,70	5,80
			min.	0,85	1,40	1,40	1,90	2,40	2,60	3,10	4,15	5,20
	Type Z		m ref.	2,0	3,0	4,0	4,4	4,8	6,2	6,8	8,9	10,1
		Penetration	max.	1,20	1,75	1,90	2,35	2,75	3,00	3,50	4,50	5,70
			min.	0,95	1,45	1,50	1,95	2,30	2,55	3,05	4,05	5,25
y ref.			Type C	2,0	2,6	3,2	3,7	4,3	5,0	6,0	7,5	8,0
			Type F	1,6	2,1	2,5	2,8	3,2	3,6	3,6	4,2	4,2
			Type R	—	—	2,7	3,2	3,6	4,3	5,0	6,3	—

l[b]												
	Type C and Type R		Type F									
nom.	min.	max.	min.	max.								
4,5	3,7	5,3	3,7	4,5		—	—	—	—	—	—	—	—
6,5	5,7	7,3	5,7	6,5			—	—	—	—	—	—	—
9,5	8,7	10,3	8,7	9,5						—	—	—	—
13	12,2	13,8	12,2	13,0		**Range**						—	—
16	15,2	16,8	15,2	16,0				**of**					
19	18,2	19,8	18,2	19,0					**preferred**				
22	21,2	22,8	20,7	22,0							**lengths**		
25	24,2	25,8	23,7	25,0									
32	30,7	33,3	30,7	32,0									
38	36,7	39,3	36,7	38,0									
45	43,7	46,3	43,5	45,0									
50	48,7	51,3	48,5	50,0									

a P = pitch of the thread.

b Sizes with lengths marked with a dash (—) cannot be manufactured.

4 Specifications and reference International Standards

See Table 2.

Table 2 — Specifications and reference International Standards

Material		Steel, in accordance with ISO 2702	Stainless steel
General requirements		ISO 8992	
Thread		ISO 1478	
Cross recess		ISO 4757	
Mechanical property	Steel grade/ hardness class	—	A2-20H, A4-20H, A5-20H
	International Standard	ISO 2702	ISO 3506-4
Tolerances	Product grade	A	
	International Standard	ISO 4759-1	
Finish — Coating		As processed Requirements for electroplating are specified in ISO 4042. Requirements for non-electrolytically applied zinc flake coatings are specified in ISO 10683. Additional requirements or other finishes or coatings shall be agreed between the supplier and the purchaser.	Requirements for passivation are specified in ISO 16048.
Acceptability		Acceptance inspection is specified in ISO 3269.	

5 Designation

EXAMPLE 1 A cross-recessed pan head tapping screw with thread size ST 3,5, nominal length $l = 16$ mm, made of steel (St) in accordance with ISO 2702, rounded end (Type R) and cross recess Type Z is designated as follows:

Tapping screw ISO 7049 - ST 3,5 × 16 - St - R - Z

EXAMPLE 2 A cross-recessed pan head tapping screw with thread size ST 3,5, nominal length $l = 16$ mm, made of stainless steel (A4-20H) in accordance with ISO 3506-4, rounded end (Type R) and cross recess Type H is designated as follows:

Tapping screw ISO 7049 - ST 3,5 × 16 - A4-20H - R - H

National Annex A

(*National Foreword*)

A-1 BIS CERTIFICATION MARKING

The product(s) confirming 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 frames thereunder, and the product(s) may be marked with the Standard Mark.

(*Continued from second cover*)

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 3269 Fasteners — Acceptance inspection	IS 1367 (Part 17) : 2023/ISO 3269 : 2019 Technical supply conditions for threaded steel fasteners: Part 17 Inspections sampling and acceptance procedure (*fifth revision*)	Identical
ISO 3506-4 Mechanical properties of corrosion-resistance stainless steel fasteners — Part 4: Tapping screws	IS 1367 (Part 14/ Sec 4) : 2023/ISO 3506-4 : 2009 Technical supply conditions for threaded steel fasteners: Part 14 Mechanical properties of corrosion resistant stainless steel fasteners, Section 4 Tapping screw	Identical
ISO 4042 Fasteners — Electroplated coating systems	IS 1367 (Part 11) : 2020/ISO 4042 : 2018 Technical supply conditions for threaded steel fasteners: Part 11 Electroplated coating systems *(fourth revision)*	Identical
ISO 4757 Cross recesses for screws	IS 7478 : 2011/ISO 4757 : 1983 Cross recesses for screws (*second revision*)	Identical
ISO 4759-1 Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C	IS 1367 (Part 2) : 2002/ISO 4759-1 : 2000 Technical supply conditions for threaded steel fasteners: Part 2 Tolerances for fasteners — Bolts, screws, studs and nuts — Product grades A, B and C (*third revision*)	Identical
ISO 8992 Fasteners — General requirements for bolts, screws, studs and nuts	IS 1367 (Part 1) : 2014/ISO 8992 : 2005 Technical supply conditions for threaded steel fasteners: Part 1 General requirements for bolts, screws, studs and nuts (*fourth revision*)	Identical
ISO 10683 Fasteners — Non-electrolytically applied zinc flake coating systems	IS/ISO 10683 : 2018 Fasteners — Non-electrolytically applied zinc flake coating systems	Identical

The Committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 16048	Passivation of corrosion-resistant stainless-steel fasteners

The standard also makes a reference to the BIS Certification Marking of the product, details of which are given in National 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.

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.

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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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