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*भारतीय मानक मसौदा*

**फास्टनर्स — टैपिंग स्क्रू थ्रेड के साथ क्रॉस रिसेसड ड्रिलिंग स्क्रू — विशिष्टि**

*Draft Indian Standard*

**Fasteners — Drilling Screws with Tapping Screw Thread  
— Specification**

ICS 21.060.20

General Engineering and Fasteners Standards Sectional Committee, PGD 37	Last date for receipt of comment is <b>12 January 2025</b>
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**FOREWORD**

*(Formal Clauses will be added later)*

Drilling screws play a pivotal role in seamlessly joining materials and structures. These versatile screws feature sharp points and finely crafted threads that enable them to effortlessly penetrate a variety of substrates, creating secure and reliable connections. Drilling screws are engineered to provide efficiency and convenience by eliminating the need for pre-drilled holes or separate tapping processes. Their ability to create threads as they are driven into materials like metal, wood, or plastic translates into time and cost savings across industries ranging from construction, where they secure metal roofing and wall panels, to manufacturing, where they streamline assembly lines and attach components.

Drilling screws are available in a wide range of designs, offering variety in features such as head types, threading, and drilling points. The head types may include options like, flat, round, hexagonal, and pan heads, each suited for a specific application. Similarly, the threading can vary to accommodate different materials and fastening needs, such as fine or coarse threads. Additionally, the drilling points are designed with varying capacities to penetrate different materials, ranging from light gauge metal to thicker substrates. The committee responsible for the formulation of this standard has made an effort to cover the requirements of all prevalent varieties of drilling screws available in the industry.

Certain requirements of drilling screws specified in the standard, specifically the dimensions, are intended for reference only. The precise specifications can be determined through mutual agreement between the user/purchaser and the manufacturer. However, the standard specifies certain mandatory performance requirements which are to be maintained irrespective of the dimensions.

This Indian Standard covers the requirements of cross recessed drilling screws and hexagon washer head drilling screws which were previously covered under IS 18471 (Parts 1 to 3) and IS 18476 respectively. After the publication of this standard, all these standards will be superseded.

In the formulation of this standard, considerable assistance has been derived from the following International Standards:

ISO 15480 : 2019	Fasteners — Hexagon washer head drilling screws with tapping screw thread
ISO 15481 : 1999	Cross recessed pan head drilling screws with tapping screw thread
ISO 15482 : 1999	Cross recessed countersunk head drilling screws with tapping screw thread
ISO 15483 : 1999	Cross recessed raised countersunk head drilling screws with tapping screw thread
AS 3566-1 : 2002	Self-drilling screws for the building and constructional industries Part 1: General requirements
AS 3566-2 : 2002	Self-drilling screws for the building and construction industries Part 2: Corrosion

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.

## Fasteners — Drilling Screws with Tapping Screw Thread

### 1 SCOPE

This Indian Standard specifies the characteristics of drilling screws with tapping screw threads from ST 2.9 up to and including ST 6.3.

### 2 REFERENCES

<i>IS No.</i>	<i>Title</i>
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 ( <i>fourth revision</i> )
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 ( <i>third revision</i> )
IS 1367 (Part 11) : 2024/ ISO 4042 : 2022	Technical supply conditions for threaded steel fasteners: Part 11 Electroplated coating systems ( <i>fifth revision</i> )
IS 1367 (Part 13) : 2020 ISO 10684 : 2004	Technical supply conditions for threaded steel fasteners part 13 Hot dip galvanized coatings on threaded fasteners ( <i>third revision</i> )
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 screws
IS 1367 (Part 17) : 2023/ ISO 3269 : 2019	Technical supply conditions for threaded steel fasteners: Part 17 Inspections, sampling and acceptance procedure ( <i>fifth revision</i> )
IS 4206 : 2012/ ISO 888 : 2012	Dimensions for nominal lengths and thread lengths for bolts, screws and studs ( <i>second revision</i> )
IS 5957 : 2003/ ISO 1478 : 1999	Screw threads for thread forming tapping screws dimensions ( <i>second revision</i> )
IS 7478 : 2011/ ISO 4757 : 1983	Cross recesses for screws ( <i>second revision</i> )
IS/ISO 10683 : 2018	Fasteners — Non-electrolytically applied zinc flake coating systems
IS 11362 : 1985/ ISO 7721 : 1983	Head configuration and gauging of countersunk head screws
IS 19078 : 2024/ ISO 10666 : 1999	Drilling screws with tapping screw thread — Mechanical and functional properties

### 3 DIMENSIONS

3.1 Unless otherwise agreed between the user/purchaser and the manufacturer, the dimensions of the drilling screws shall be as given in Table 1.

3.2 The dimensions and tolerances of self-drilling screws with the head shape other than those mentioned in Table 1 shall be as agreed upon between the user and the manufacturer. However, the screws shall conform to the requirements as given in 6 and 9.

3.3 For self-drilling screws with integrated/captive washers (*see* Fig.1), the dimensions and other properties of the washer shall be as mutually agreed upon between the user/purchaser and the manufacturer.

3.4 The dimensions of self-drilling screws which are partially threaded (*see* Fig.2) shall be as agreed between the user/purchaser and the manufacturer. However, the screws shall conform to the requirements given in 6 and 9.



FIG. 1(A) WASHER HEAD WITH CAPTIVE WASHER

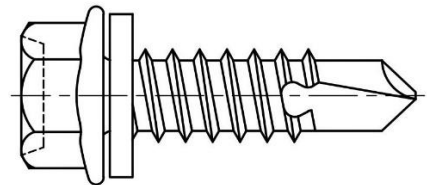


FIG. 1(B) FLANGE HEAD WITH CAPTIVE WASHER

FIG.1 DRILLING SCREWS WITH CAPTIVE WASHER

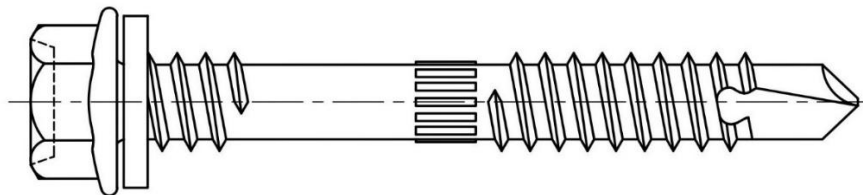


FIG.2 PARTIALLY THREADED FLANGE HEAD DRILLING SCREW WITH CAPTIVE WASHER

**Table 1 Dimensions**  
(Clause 3.1)

SI No.	Type of Screw	Dimensions
(1)	(2)	(3)
i)	Cross recessed pan head drilling screws	<i>see</i> Fig. 3 and Table 2
ii)	Cross recessed countersunk head drilling screws	<i>see</i> Fig. 3 and Table 3
iii)	Cross recessed raised countersunk head drilling screws	<i>see</i> Fig. 3 and Table 4
iv)	Cross recessed wafer head drilling screws	<i>see</i> Fig. 4, Table 5 and Table 6
v)	Cross recessed bugle head drilling screws	<i>see</i> Fig. 5 and Table 7
vi)	Hexagon socket bugle head drilling screws	<i>see</i> Fig. 5 and Table 8
vii)	Hexagon washer head drilling screws	<i>see</i> Fig. 6 and Table 9
viii)	Hexagon flange head drilling screws	<i>see</i> Fig. 7 and Table 10

#### **4 GENERAL REQUIREMENTS**

The general requirements of self-drilling screws shall be in accordance with IS 1367 (Part 1).

#### **5 DRIVE**

The dimensions of cross recess (wherever applicable) shall be in accordance with IS 7478.

#### **6 MECHANICAL PROPERTIES**

**6.1** Self-drilling screws made up of steel shall conform to all the requirements specified in IS 19078.

**6.2** Self drilling screws made up of stainless steel shall conform to the chemical composition and hardness requirements of grade A2 or A4 or C1 as specified in IS 1367 (Part 14/Sec 4).

#### **7 THREADS**

Unless otherwise agreed between the user and the manufacturer, the dimensions of threads shall be in accordance with IS 5957.

#### **8 TOLERANCES**

Unless otherwise specified, self-drilling screws shall conform to product grade A in accordance with IS 1367 (Part 2).

#### **9 FINISH (COATING)**

**9.1** Drilling screws made up of steel shall either be electroplated in accordance with IS 1367 (Part 11) or hot dip galvanized in accordance with IS 1367 (Part 13) or zinc flake coated in accordance with IS 10683. However, any other requirements or other finishes or coatings can be agreed between the supplier and the purchaser.

**9.2** Self drilling screws made up of stainless steel shall be supplied clean and bright condition.

## 10 DESIGNATION

Self-tapping screws shall be designated by the type of head, thread size, nominal length, type of material, type of drive (wherever applicable).

*Examples:*

- a) A cross-recessed pan head tapping screw with thread size ST 3.5, nominal length  $l = 16$  mm, made of steel (St), and cross recess Type Z is designated as follows:

Self-Drilling Screw IS 18481 — ST 3.5 × 16 — St — Z

- b) A hexagon washer head drilling screws tapping screw with thread size ST 3.5, nominal length  $l = 16$  mm, made of stainless steel (A4-20H), is designated as follows:

Self-Drilling Screw IS 18481 — ST 3.5 × 16 — A4-20H

## 11 MARKING

11.1 The following shall be marked on the package:

- a) Designation and type of coating;
- b) Manufacturer's name, initials or trademark; and
- c) Month and year of manufacture or batch/lot number.

### 11.2 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.

## 12 SAMPLING AND ACCEPTANCE PROCEDURE

The sampling and acceptance procedure shall be in accordance with IS 1367 (Part 17).

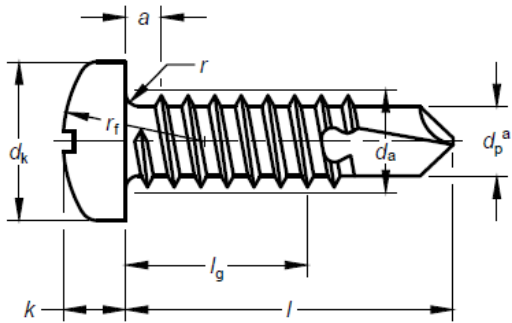


FIG. 3(A) PAN HEAD

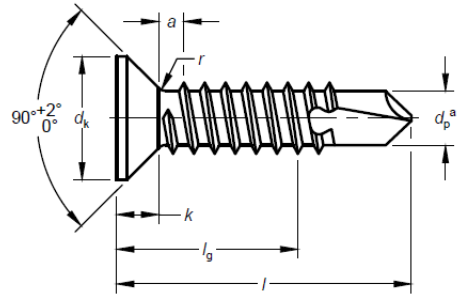


FIG.3(B) COUNTERSUNK HEAD

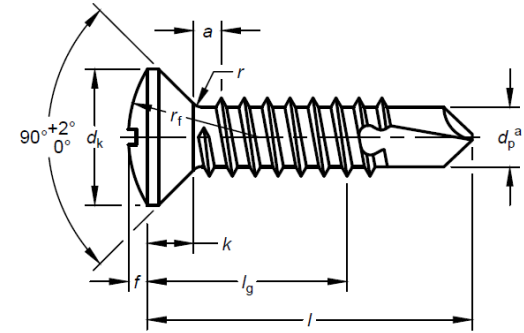


FIG. 3(C) RAISED COUNTERSUNK HEAD

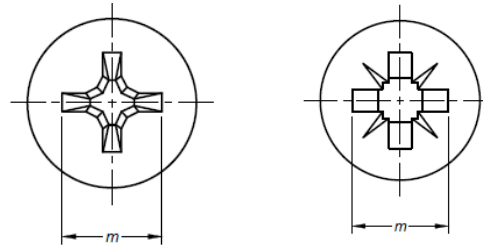


Fig. 1(D) TYPE H AND TYPE Z CROSS RECESS

FIG. 3 CROSS RECESSED DRILLING SCREWS (PAN HEAD, COUNTERSUNK HEAD AND RAISED COUNTERSUNK HEAD)

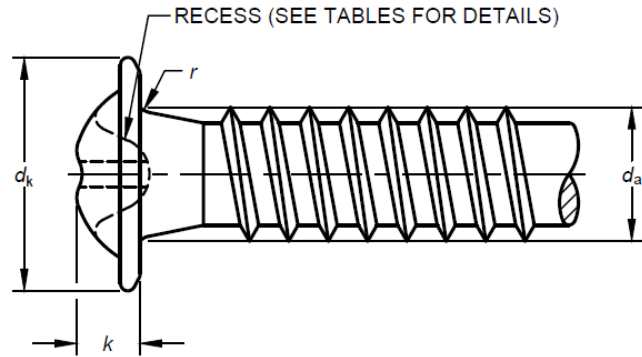


FIG. 4(A) WAFER HEAD (STYLE 1)

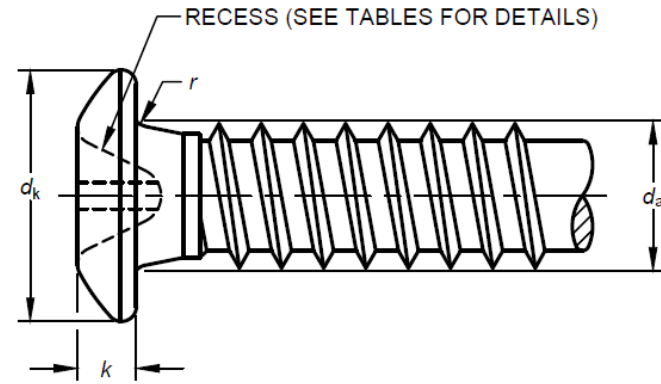


FIG. 4(B) WAFER HEAD (STYLE 2)

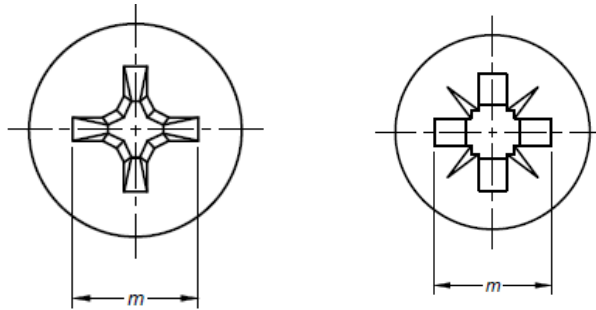


FIG. 4(C) TYPE H AND TYPE Z CROSS RECESS

FIG. 4 CROSS RECESSED WAFER HEAD DRILLING SCREWS



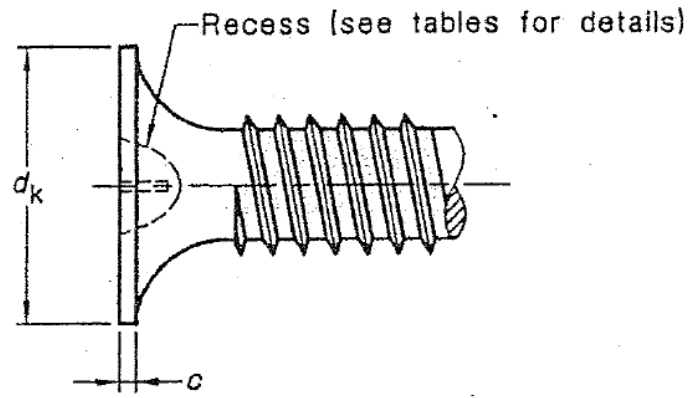


FIG. 5(A) CROSS RECESSED BUGLE HEAD

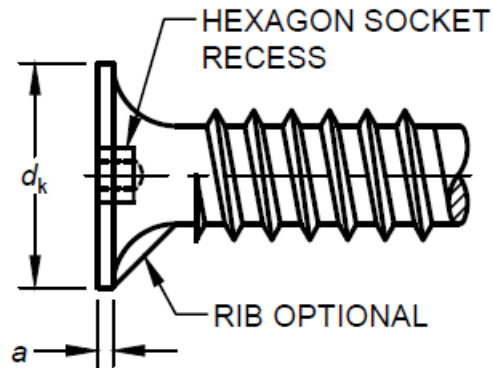


FIG. 5(B) HEXAGON SOCKET BUGLE HEADS (STYLE 1)

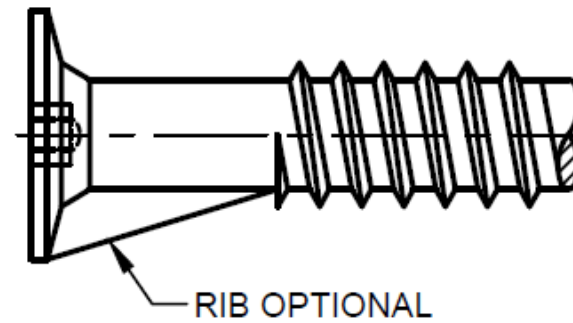


FIG. 5(C) HEXAGON SOCKET BUGLE HEADS (STYLE 2)

FIG. 5 CROSS RECESSED AND HEXAGON SOCKET BUGLE HEADS DRILLING SCREWS

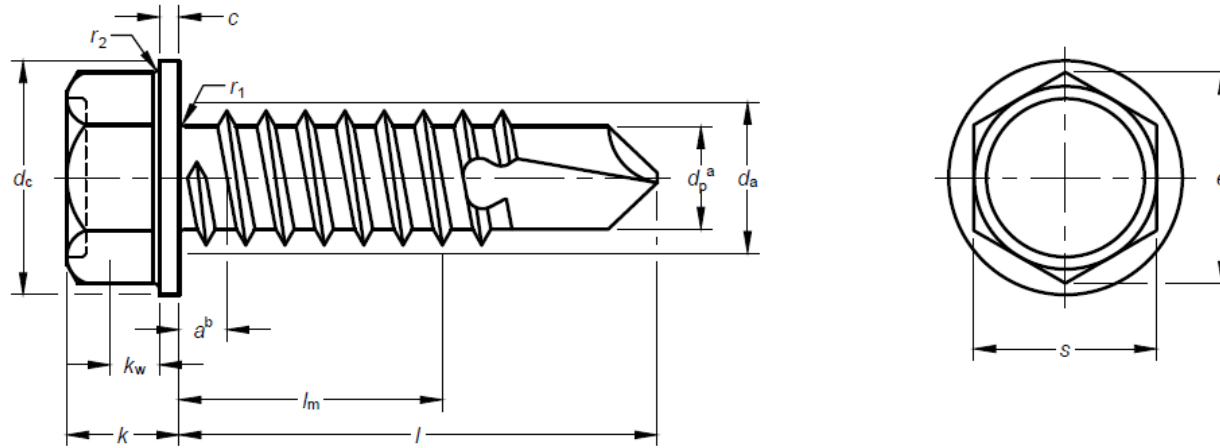


FIG. 6 HEXAGON WASHER HEAD DRILLING SCREW

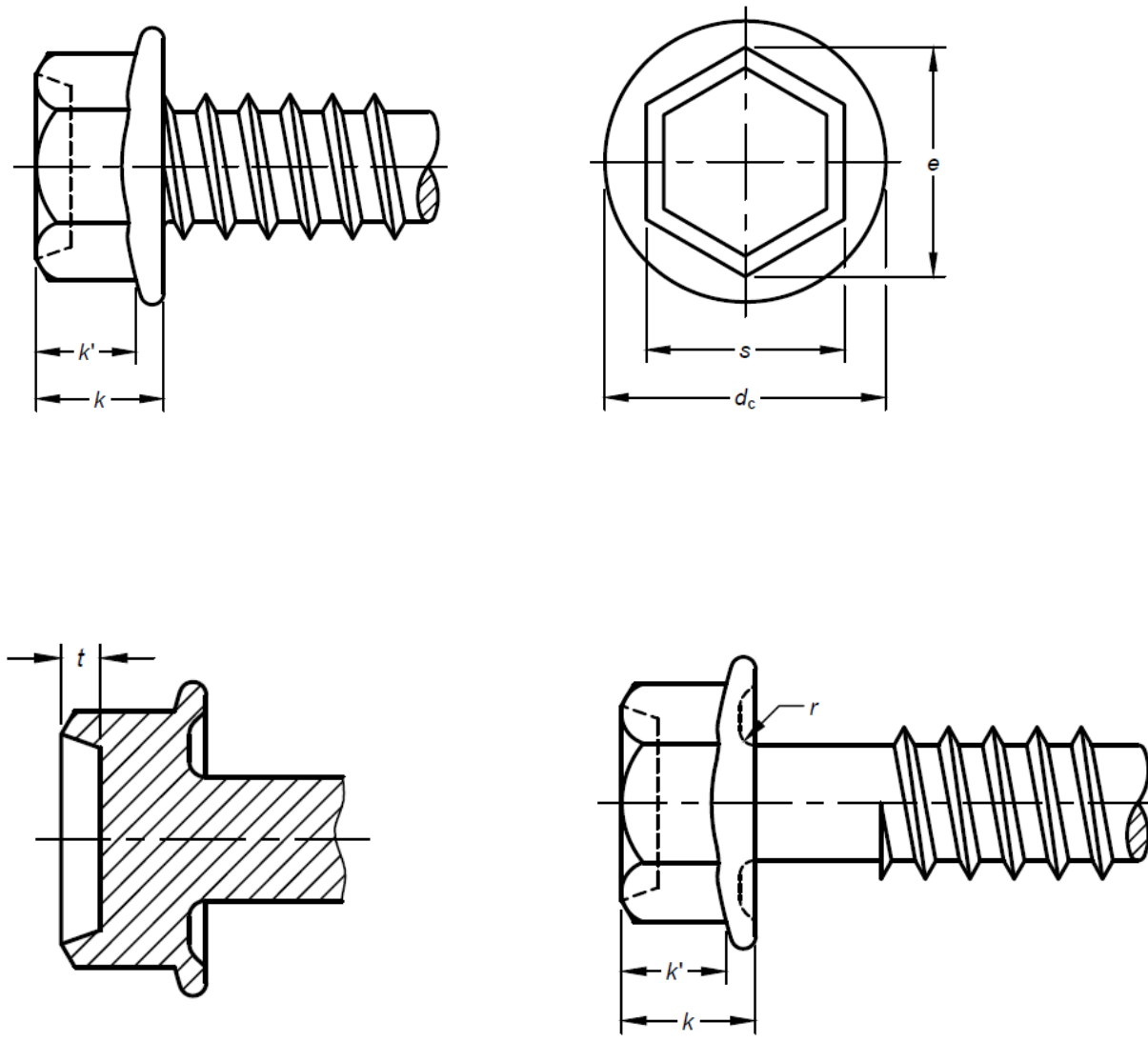


FIG. 7 HEXAGON FLANGE HEAD DRILLING SCREW

**Table 2 Dimensions of Cross Recessed Pan Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Thread size			ST2.9	ST3.5	ST4.2	ST4.8	ST5.5	ST6.3
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)
i)	$P^{1)}$			1.1	1.3	1.4	1.6	1.8	1.8
ii)	$a^{2)}$	<i>Max</i>		1.1	1.3	1.4	1.6	1.8	1.8
iii)	$d_a$	<i>Max</i>		3.5	4.1	4.9	5.6	6.3	7.3
iv)	$d_k$	<i>Max</i>		5.6	7	8	9.5	11	12
		<i>Min</i>		5.3	6.64	7.64	9.14	10.57	11.57
v)	$k$	<i>Max</i>		2.4	2.6	3.1	3.7	4	4.6
		<i>Min</i>		2.15	2.35	2.8	3.4	3.7	4.3
vi)	$r$	<i>Min</i>		0.1	0.1	0.2	0.2	0.25	0.25
vii)	$r_f$	$\approx$		5	6	6.5	8	9	10
viii)	Cross recess	Recess No.		1	2		3		
		m ref.		3	3.9	4.4	4.9	6.4	6.9
		Type H Penetration <i>Max.</i>		1.8	1.9	2.4	2.9	3.1	3.6
		<i>Min</i>		1.4	1.4	1.9	2.4	2.6	3.1
		m ref.		3	4	4.4	4.8	6.2	6.8
		Type Z Penetration <i>Max.</i>		1.75	1.9	2.35	2.75	3	3.5
ix)	Drilling range (sheet or plate thickness) <sup>3)</sup>	from		0.7	0.7	1.75	1.75	1.75	2
		to		1.9	2.25	3	4.4	5.25	6
x)	$l^{5)}$			$l_g^{4)}$					
xi)	<i>Nom</i>	<i>Min</i>	<i>Max</i>	<i>Min</i>					
xii)	9.5	8.75	10.25	3.25	2.85				
xiii)	13	12.1	13.9	6.6	6.2	4.3	3.7		
xiv)	16	15.1	16.9	9.6	9.2	7.3	5.8	5	
xv)	19	18	20	12.5	12.1	10.3	8.7	8	7
xvi)	22	21	23	Lengths to be agreed between the purchaser and the manufacturer.	15.1	13.3	11.7	11	10
xvii)	25	24	26		18.1	16.3	14.7	14	13
xviii)	32	30.75	33.25		23	21.5	21	20	
xix)	38	36.75	39.25		29	27.5	27	26	
xx)	45	43.75	46.25				34.5	34	33
xxi)	50	48.75	51.25			39.5	39	38	

<sup>1)</sup>P is the pitch of the thread.

<sup>2)</sup>a is the distance from the underside of the head to the first major diameter of the thread.

<sup>3)</sup>In order to determine the nominal length  $l$ , it may be necessary to add an air gap (if present) to the individual sheet or plate thicknesses.

<sup>4)</sup> $l_g$  is the distance from the underside of the head to the last major diameter of the thread. For the

lengths of drilling screws,  $l$ , greater than 50 mm, the tolerance shall be  $\pm 1.25$  mm and  $l_g$  shall be as agreed to between the user and the manufacturer.

<sup>5)</sup>For lengths greater than 50 mm, the tolerance values shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.

**Table 3 Dimensions of Cross Recessed Countersunk Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Thread size			ST2.9	ST3.5	ST4.2	ST4.8	ST5.5	ST6.3		
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)		
(9)	(10)			(11)	(12)	(13)	(14)	(15)	(16)		
i)	$P^1$			1.1	1.3	1.4	1.6	1.8	1.8		
ii)	$a^2$	<i>Max</i>			1.1	1.3	1.4	1.6	1.8	1.8	
iii)	$d_k$	Theoretical <sup>3)</sup> <i>Max</i>			6.3	8.2	9.4	10.4	11.5	12.6	
		Actual <i>Max</i>			5.5	7.3	8.4	9.3	10.3	11.3	
iv)	<i>Min</i>			5.2	6.9	8	8.9	9.9	10.9		
v)	$k$	<i>Max</i>			1.7	2.35	2.6	2.8	3	3.15	
vi)	$r$	<i>Max</i>			1.2	1.4	1.6	2	2.2	2.4	
vii)	Cross recess	Recess No.			1	2			3		
		Type H	m refs			3.2	4.4	4.6	5.2	6.6	6.8
		Penetration	<i>Max</i>			2.1	2.4	2.6	3.2	3.3	3.5
		<i>Min</i>			1.7	1.9	2.1	2.7	2.8	3	
		m ref.			3.2	4.3	4.6	5.1	6.5	6.8	
		Type Z	Penetration <i>Max</i>			2	2.2	2.5	3.05	3.2	3.45
viii)	Drilling range (sheet or plate thickness) <sup>4)</sup>	<i>Min</i>			1.6	1.75	2.05	2.6	2.75	3	
		from			0.7	0.7	1.75	1.75	1.75	2	
to			1.9	2.25	3	4.4	5.25	6			
ix)	$l^6$			$l_g^5$							
x)	<i>Nom</i>	<i>Min</i>	<i>Max</i>	<i>Min</i>							
xi)	13	12.1	13.9	6.6	6.2	4.3	3.7				
xii)	16	15.1	16.9	9.6	9.2	7.3	5.8	5			
xiii)	19	18	20	12.5	12.1	10.3	8.7	8	7		
xiv)	22	21	23	Lengths to be agreed between the purchaser and the manufacturer.	15.1	13.3	11.7	11	10		
xv)	25	24	26		18.1	16.3	14.7	14	13		
xvi)	32	30.75	33.25		23	21.5	21	20			
xvii)	38	36.75	39.25		29	27.5	27	26			
xviii)	45	43.75	46.25		34.5	34	33				
xix)	50	48.75	51.25	39.5	39	38					

<sup>1)</sup>P is the pitch of the thread

<sup>2)</sup>a is the distance from the underside of the head to the first major diameter of the thread.

<sup>3)</sup>see IS 11362.

<sup>4)</sup>In order to determine the nominal length  $l$  it may be necessary to add an air gap (if present) to the individual sheet or plate thicknesses.

<sup>5)</sup> $l_g$  is the distance from the underside of the head to the last major diameter of the thread. For the lengths of drilling screws,  $l$ , greater than 50 mm, the tolerance shall be  $\pm 1.25$  mm and  $l_g$  shall be as agreed to between the user and the manufacturer.

<sup>6)</sup>For lengths greater than 50 mm, the tolerance values shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.

**Table 4 Dimensions of Cross Recessed Raised Countersunk Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Thread size			ST2.9	ST3.5	ST4.2	ST4.8	ST5.5	ST6.3		
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)		
i)	$P^1$			1.1	1.3	1.4	1.6	1.8	1.8		
ii)	$a^2$	Max			1.1	1.3	1.4	1.6	1.8		
iii)	$d_k$	Theoretical <sup>3)</sup>	Max		6.3	8.2	9.4	10.4	11.5	12.6	
		Actual	Max		5.5	7.3	8.4	9.3	10.3	11.3	
iv)	Min			5.2	6.9	8	8.9	9.9	10.9		
v)	$f$	$\approx$			0.7	0.8	1	1.2	1.3	1.4	
vi)	$k$	Max			1.7	2.35	2.6	2.8	3	3.15	
vii)	$r$	Max			1.2	1.4	1.6	2	2.2	2.4	
viii)	Cross recess	Recess No.			1	2			3		
		Type H	m ref.		3.2	4.4	4.6	5.2	6.6	6.8	
		Penetration	Max		2.1	2.4	2.6	3.2	3.3	3.5	
		Min			1.7	1.9	2.1	2.7	2.8	3	
		m ref.			3.2	4.3	4.6	5.1	6.5	6.8	
		Type Z	Penetration Max		2	2.2	2.5	3.05	3.2	3.45	
ix)	Drilling range (sheet or plate thickness) <sup>4)</sup>	from			0.7	0.7	1.75	1.75	1.75	2	
		to			1.9	2.25	3	4.4	5.25	6	
x)	$l^6$			$l_g^5$							
xi)	Nom		Min	Max	Min						
xii)	13		12.1	13.9	6.6	6.2	4.3	3.7			
xiii)	16		15.1	16.9	9.6	9.2	7.3	5.8	5		
xiv)	19		18	20	12.5	12.1	10.3	8.7	8	7	
xv)	22		21	23	Lengths to be agreed between the purchaser and the manufacturer.	15.1	13.3	11.7	11	10	
xvi)	25		24	26		18.1	16.3	14.7	14	13	
xvii)	32		30.75	33.25		23	21.5	21	20		
xviii)	38		36.75	39.25		29	27.5	27	26		
xix)	45		43.75	46.25					34.5	34	33
xx)	50		48.75	51.25					39.5	39	38

<sup>1)</sup>  $p$  is the pitch of the thread

<sup>2)</sup>  $a$  is the distance from the underside of the head to the first major diameter of the thread.

<sup>3)</sup> see IS 11362.

<sup>4)</sup> In order to determine the nominal length  $l$  it may be necessary to add an air gap (if present) to the individual sheet or plate thicknesses.

- <sup>5)</sup>  $l_g$  is the distance from the underside of the head to the last major diameter of the thread. For the lengths of drilling screws,  $l$ , greater than 50 mm, the tolerance shall be  $\pm 1.25$  mm and  $l_g$  shall be as agreed to between the user and the manufacturer.
- <sup>6)</sup> For lengths greater than 50 mm, the tolerance values shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.



**Table 5 Dimensions of Cross Recessed Wafer Head Drilling Screws (Style 1)**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Size	ST3.5	ST4.2	ST4.8		
(1)	(2)	(3)	(4)	(5)		
i)	$d_k$	<i>Min</i>	6.73	7.77	8.94	
		<i>Max</i>	6.86	8.18	9.53	
ii)	Taper diameter, $d_a$	<i>Min</i>	4.06	4.57	4.83	
		<i>Max</i>	4.32	4.83	5.21	
iii)	$k$	<i>Min</i>	1.39	1.65	1.52	
		<i>Max</i>	1.65	1.90	2.03	
iv)	$r$	<i>Min</i>	0.25	0.25	0.38	
		<i>Max</i>	0.51	0.51	0.89	
v)	Cross recess, Type H	Cross recess number	2			
		Penetration depth	<i>Min</i>	1.27	1.27	1.90
			<i>Max</i>	1.88	1.90	2.67
vi)	Length, $l$	<sup>1)</sup>				

<sup>1)</sup> The nominal length of the screw shall be agreed to between the user/purchaser and the manufacturer. However, tolerance on length shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.

**Table 6 Dimensions of Cross Recessed Wafer Head Drilling Screws (Style 2)**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Size		ST4.8	
(1)	(2)		(3)	
i)	$d_k$	<i>Min</i>	9.07	
		<i>Max</i>	9.47	
ii)	Taper diameter, $d_a$	<i>Min</i>	4.83	
		<i>Max</i>	5.26	
iii)	$k$	<i>Min</i>	1.65	
		<i>Max</i>	1.91	
iv)	$r$	<i>Min</i>	0.38	
		<i>Max</i>	0.89	
v)	Cross recess, Type H	Cross recess number	2	
		Penetration depth	<i>Min</i>	2.13
			<i>Max</i>	2.74
vi)	Length, $l$	<sup>1)</sup>		

<sup>1)</sup> The nominal length of the screw shall be agreed to between the user/purchaser and the manufacturer. However, tolerance on length shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.

**Table 7 Dimensions of Cross Recessed Bugle Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Size		ST 3.5	ST 3.9	ST 4.2
(1)	(2)		(3)	(4)	(5)
i)	Head Diameter, $d_k$	<i>Min</i>	7.90	7.90	7.90
ii)	Head edge thickness, $c$	<i>Min</i>	0.46	0.46	0.46
		<i>Max</i>	0.81	0.81	0.81
iii)	Cross recess number		Type H, 2	Type H, 2	Type H, 2
iv)	Cross recess penetration value	<i>Min</i>	2.59	2.59	2.26
		<i>Max</i>	3.17	3.17	3.17
v)	Length, $l$		<sup>1)</sup>		

<sup>1)</sup> The nominal length of the screw shall be agreed to between the user/purchaser and the manufacturer. However, tolerance on length shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.

**Table 8 Dimensions of Hexagon Socket Bugle Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Size Designation	ST 6.3
(1)	(2)	(3)
i)	$d_k$	Min
		13.59
ii)	Length, $l$	Max
		14.61
1) The nominal length of the screw shall be agreed to between the user/purchaser and the manufacturer. However, tolerance on length shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.		

**Table 9 Dimensions of Hexagon Washer Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Thread size	ST2.9	ST3.5	ST4.2	ST4.8	ST5.5	ST6.3
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	$P^{1)}$	1.1	1.3	1.4	1.6	1.8	1.8
ii)	$a$	Max	1.1	1.3	1.4	1.6	1.8
iii)	$c$	Min	0.4	0.6	0.8	0.9	1.0
iv)	$d_a$	Max	3.5	4.1	4.9	5.6	6.3
v)	$d_c$	Max	6.3	8.3	8.8	10.5	11
		Min	5.8	7.6	8.1	9.8	10
vi)	$e$	Min	4.28	5.96	7.59	8.71	10.95
vii)	$k$	Max	2.8	3.4	4.1	4.3	5.4
		Min	2.5	3.0	3.6	3.8	4.8
viii)	$k_w^{2)}$	Min	1.3	1.5	1.8	2.2	3.1
ix)	$r_1$	Min	0.1	0.1	0.2	0.2	0.25
x)	$r_2$	Max	0.2	0.25	0.3	0.3	0.4
xi)	$s$	Max	4.00	5.50	7.00	8.00	10.00
		Min	3.82	5.32	6.78	7.78	9.78
xii)	Drilling range (sheet or plate thickness) <sup>3)</sup>	from	0.7	0.7	1.75	1.75	2.0
		to	1.9	2.25	3.0	4.4	6.0
xiii)	$t^{4)}$	$l_m^{5)}$					
xiv)	Nom	Min	Max	Min			
xv)	9.5	8.75	10.25	3.25	2.85	Screws with too short lengths	
xvi)	13	12.1	13.9	6.6	6.2	4.3	3.7
xvii)	16	15.1	16.9	9.6	9.2	7.3	5.8

xviii)	19	18.0	20.0	12.5	12.1	10.3	8.7	8	7
xix)	22	21.0	23.0	Length to be agreed between the purchaser and the manufacturer	15.1	13.3	11.7	11	10
xx)	25	24.0	26.0		18.1	16.3	14.7	14	13
xxi)	32	30.75	33.25		23	21.5	21	20	
xxii)	38	36.75	39.25		29	27.5	27	26	
xxiii)	45	43.75	46.25		34.5	34	33		
xxiv)	50	48.75	51.25		39.5	39	38		

<sup>1)</sup> $P$  is the of the thread.

<sup>2)</sup> $k_w$  is the wrenching height.

<sup>3)</sup>In order to determine the nominal length  $l$  needed for the application, it can be necessary to add an air gap (if present) to the individual sheet or plate thickness(es).

<sup>4)</sup>For lengths greater than 50 mm, the tolerance values shall be in accordance with product A as specified in Table 1 of IS 4206. For nominal lengths other than those specified in the table, the nearest value of length shall be taken to calculate tolerance.

<sup>5)</sup> $l_m$  is the distance from the bearing face to the last major diameter of the thread.

**Table 10 Dimensions of Hexagon Flange Head Drilling Screws**  
(Clause 3.1 and Table 1)

All dimension are in millimetres.

SI No.	Size	ST 3.5	ST 4.2	ST 4.8	ST 5.5	ST 6.3	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
i)	$s$	<i>Min</i>	6.20	6.20	7.78	7.78	9.32
		<i>Max</i>	6.35	6.35	7.92	7.92	9.52
ii)	Washer diameter, $d_e$	<i>Min</i>	8.38	9.40	10.67	13.97	13.97
		<i>Max</i>	9.14	10.29	11.43	14.78	15.49
iii)	$e, Min$	6.91	6.91	8.64	8.64	10.39	
iv)	Wrenching height, $k$	<i>Min</i>	1.90	2.41	2.79	3.61	4.06
		<i>Max</i>	2.29	2.79	3.30	3.94	4.70
v)	$k$	<i>Min</i>	3.05	3.68	4.32	5.08	5.84
		<i>Max</i>	3.43	4.32	4.83	5.92	6.60
vi)	Indent depth, $t, Max$	1.14	1.14	1.40	1.65	1.91	
vii)	Fillet radius, $r, Min$	0.25	0.38	0.38	0.51	0.76	