

JIS

JAPANESE INDUSTRIAL STANDARD

Cross recessed head screws

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J I S

Cross recessed head screws

B 1111-1996

1. Scope This Japanese Industrial Standard specifies the steel cross recessed head screws (hereafter, referred to as “steel screws”), stainless steel cross recessed head screws (hereafter, referred to as “stainless steel screws”) and nonferrous metal cross recessed head screws (hereafter, referred to as “nonferrous metal screws”) for general use.

Remarks 1. When the steel screws, stainless steel screws and nonferrous metal screws are generically called, these are simply called “screws”.

2. The screws not in accordance with the text of this Standard are specified in the Annex.

3. The standards cited in this Standard are given in the Attached Table 5.

4. The International Standards corresponding to the text of this Standard are given in the Attached Table 6.

2. Definitions The definitions of main terms used in this Standard are in accordance with JIS B 0101.

3. Classification The screws shall be classified as given in Table 1 according to the shapes of head.

Table 1. Classification of screws

Type	Corresponding International Standard
Cross recessed pan head screws	ISO 7045 : 1994
Cross recessed countersunk head screws	ISO 7046-1 : 1994 ISO 7046-2 : 1990
Cross recessed raised countersunk head screws	ISO 7047 : 1994

4. Qualities The qualities ⁽¹⁾ of the screws shall be in accordance with Table 2. The geometrical tolerances and surface conditions of screws shall be in accordance with the following :

- (1) The geometrical tolerances of screws shall be in accordance with JIS B 1021 Attached Table 1.
- (2) The permissible limits in respect to the surface discontinuities of screws, unless particularly designated, shall be in accordance with JIS B 1041 or JIS B 1043.
- (3) The screws shall generally be not processed with surface treatment. Particularly when the surface treatment of plating or the like is required, it shall be designated by the purchaser.

When the electroplating is to be processed, JIS B 1044 shall be referred to.

Note ⁽¹⁾ Product grade, tolerance class of screw threads and mechanical properties.

Table 2. Quality of screws

Type of screw	Product grade ⁽²⁾	Shape and dimensions	Screw thread			Material		Mechanical properties	
			Cross recess ⁽³⁾	Type ⁽⁴⁾	Range of designation	Tolerance class ⁽⁵⁾	Steel	Strength class	Applicable standard
							Stainless steel	Property class	
							Nonferrous metal	Material symbol	
Cross recessed pan head screws	A	Attached Table 1	Type H or Type Z	Coarse thread	M1.6 to M10	6 g	Steel	4.8	JIS B 1051
							Stainless steel	A2-50, A2-70	JIS B 1054
							Nonferrous metal	— ⁽⁶⁾	JIS B 1057
Cross recessed countersunk head screws	A	Attached Table 2	Type H or Type Z	Coarse thread	M1.6 to M10	6 g	Steel	4.8	JIS B 1051
							Steel	8.8	JIS B 1051
	A	Attached Table 3	Type H or Type Z	Coarse thread	M2 to M10	6 g	Stainless steel	A2-70	JIS B 1054
							Nonferrous metal	CU2, CU3	JIS B 1057
Cross recessed raised countersunk head screws	A	Attached Table 4	Type H or Type Z	Coarse thread	M1.6 to M10	6 g	Steel	4.8	JIS B 1051
							Stainless Steel	A2-50, A2-70	JIS B 1054
							Nonferrous metal	— ⁽⁶⁾	JIS B 1057

Notes ⁽²⁾ A of product grade shall be in accordance with JIS B 1021.

⁽³⁾ The shapes and dimensions of cross recesses shall be in accordance with JIS B 1012. However, the wing length of cross recess (m) and penetration depth of gauge (q) shall be in accordance with Attached Tables 1 to 4.

⁽⁴⁾ The types of screw thread shall be in accordance with JIS B 0205.

⁽⁵⁾ The tolerance class of screw thread shall be in accordance with JIS B 0209.

The maximum permissible dimension of the screw thread electroplated shall be that of tolerance class 4h in accordance with the text of JIS B 0209.

⁽⁶⁾ As to the material symbol of nonferrous metal, any one among the material symbols specified in JIS B 1057 shall be determined upon an agreement between the purchaser and the manufacturer.

5. Shapes and dimensions The shapes and dimensions of the screws shall be in accordance with Attached Tables 1 to 4.

6. Materials The materials of the screws shall be in accordance with the following:

- (1) The material of steel screws shall be in accordance with 3. of the text of JIS B 1051.
- (2) The material of stainless steel screws shall be in accordance with 5. of JIS B 1054.
- (3) The material of nonferrous metal screws shall be in accordance with 4. of JIS B 1057.

7. Inspections The inspection of screws shall be in accordance with the following:

- (1) The inspection on the mechanical properties shall be carried out in accordance with JIS B 1051 for the steel screws, with JIS B 1054 for stainless steel screws, and with JIS B 1057 for nonferrous metal screws, and the results shall conform to the strength class, property class and material symbol of Table 2.
- (2) The inspection on the shapes and dimensions (except cross recess), screw threads and geometrical tolerances shall be carried out by the measuring method in accordance with JIS B 1071 or a method instead of this, and the results shall conform to Table 2 and Attached Tables 1 to 4. However, as to the go ring gauge on the screw threads processed with the electroplating, that for 4h in accordance with JIS B 0251 shall be used.

As to the shapes and dimensions of countersunk head of Attached Tables 2 and 3, the gauge inspection specified in JIS B 1013 should be preferable.

- (3) The inspection of the cross recess shall be carried out by measuring in accordance with 3.2.2 or 4.2.2 of JIS B 1012, and the results shall conform to the value of gauge penetration depth (q) of Attached Tables 1 to 4.

The wing length (m) of cross recess shall be excluded from the object of inspection.

Remarks : The inspection on the engagement of the cross recess of Type H cross recessed head screw with the gauge shall be as agreed between the purchaser and the manufacturer, and, unless particularly impedimental, it shall be carried out in accordance with 3.2.3 of JIS B 1012, and it shall be considered to be acceptable when the screw does not fall down by the self mass. However, this shall not be applied to that of which nominal length (l) is 7 times or over the nominal diameter (d) of screw thread.

This inspection on the engagement is not specified in the corresponding International Standards.

- (4) The inspection on the surface discontinuities, unless particularly designated, shall be carried out in accordance with JIS B 1041 or JIS B 1043, and the results shall conform to the permissible limits specified in these standards.
- (5) The acceptance inspection, unless particularly designated, shall be in accordance with JIS B 1091.

8. Designation The screws shall be designated by the Standard number, type of screws, product grade, designation of thread (d) $\times$ nominal length (l), symbol of strength class of mechanical properties (symbol of property class in the case of stainless steel screw, material symbol in the case of nonferrous metal screw), type of cross recess (') and designated matter.

Note (') As to the cross recessed countersunk head screw of Attached Table 3, when the identification of series 1 (deep type) and series 2 (shallow type) of cross recess is required, series number (1 or 2) shall be appended in succession after the type (H or Z) of cross recess (for example H1, H2).

Remarks 1. The Standard number, unless particularly required, may also be omitted.

2. As to the designated matter, the shape of screw end, type of surface treatment, etc. shall be indicated as required.

Examples :

(In the case of steel screw of Attached Table 1)	JIS B 1111	Cross recessed pan head screw	- A	- M5 × 20 - 4.8	- H	- A2K ^(*)	
(In the case of steel screw of Attached Table 2)	JIS B 1111	Cross recessed countersunk head screw	- A	- M5 × 20 - 4.8	- H		
(In the case of nonferrous metal screw of Attached Table 3)		Cross recessed countersunk head screw	- A	- M5 × 20 - CU2	- H1	- Flat point	
(In the case of stainless steel screw of Attached Table 4)		Cross recessed raised countersunk head screw	- A	- M5 × 20 - A2-70	- Z		
	(Standard number)	(Type of screw)	(Product grade)	(d × l)	(Symbol of strength class)	(Type of cross recess)	(Designated matter)

Note ^(*) A2K is in accordance with the symbol in Annex D to JIS B 1044.

9. Markings

9.1 Marking on products The marking on products of the screws shall be in accordance with the following :

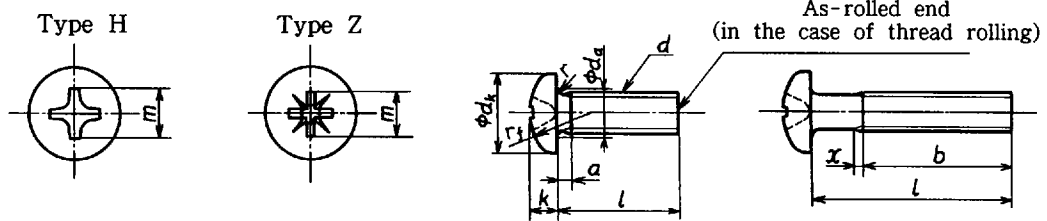
- (1) The steel screws shall be in accordance with 6.1 of JIS B 1051.
- (2) The stainless steel screws shall be in accordance with 8.1 of JIS B 1054.
- (3) The nonferrous metal screws shall be in accordance with 7.1 of JIS B 1057.

9.2 Marking on packages The packages of screws shall be marked with the following information on the outer face.

- (1) Type of screw
- (2) Designation of thread × nominal length
- (3) Symbol of strength class (in the case of steel screws),
Symbol of property class (in the case of stainless steel screws, the combined symbol of steel type and strength class),
Symbol of material symbol (in the case of nonferrous metal screws)
- (4) Type of cross recess (Indicate the distinction of Type H or Type Z.)
- (5) Designated matter
- (6) Quantity
- (7) Manufacturer's name or abbreviation (For the abbreviation, its registered trademark should be used as far as possible.)

Attached Table 1. Shape and dimensions of cross recessed pan head screws

Cross recess



Unit : mm

Designation of thread d ⁽⁹⁾			M1.6	M2	M2.5	M3	(M3.5)	M4	M5	M6	M8	M10			
Pitch (P)			0.35	0.4	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5			
a	Max.		0.7	0.8	0.9	1	1.2	1.4	1.6	2	2.5	3			
b	Min.		25	25	25	25	38	38	38	38	38	38			
d_a	Max.		2	2.6	3.1	3.6	4.1	4.7	5.7	6.8	9.2	11.2			
d_k	Nom. = Max.		3.2	4.0	5.0	5.6	7.00	8.00	9.50	12.00	16.00	20.00			
	Min.		2.9	3.7	4.7	5.3	6.64	7.64	9.14	11.57	15.57	19.48			
k	Nom. = Max.		1.30	1.60	2.10	2.40	2.60	3.10	3.70	4.6	6.0	7.50			
	Min.		1.16	1.46	1.96	2.26	2.46	2.92	3.52	4.3	5.7	7.14			
r	Min.		0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.25	0.4	0.4			
r_f	Approx.		2.5	3.2	4	5	6	6.5	8	10	13	16			
x	Max.		0.9	1	1.1	1.25	1.5	1.75	2	2.5	3.2	3.8			
No. of cross recess			0			1			2			3		4	
Cross recesses	Type H	m	Ref.	1.7	1.9	2.7	3	3.9	4.4	4.9	6.9	9	10.1		
		Penetration depth of gauge (q)	Max.	0.95	1.2	1.55	1.8	1.9	2.4	2.9	3.6	4.6	5.8		
			Min.	0.70	0.9	1.15	1.4	1.4	1.9	2.4	3.1	4.0	5.2		
	Type Z	m	Ref.	1.6	2.1	2.6	2.8	3.9	4.3	4.7	6.7	8.8	9.9		
		Penetration depth of gauge (q)	Max.	0.90	1.42	1.50	1.75	1.93	2.34	2.74	3.46	4.50	5.69		
			Min.	0.65	1.17	1.25	1.50	1.48	1.89	2.29	3.03	4.05	5.24		
l ⁽¹⁰⁾			(Informative reference) Approximate mass per 1000 pieces in kg (Density : 7.85 kg/dm ³)												
Nominal length ⁽⁹⁾	Min.	Max.													
3	2.8	3.2	0.099	0.178	0.336										
4	3.76	4.24	0.111	0.196	0.366	0.544									
5	4.76	5.24	0.123	0.215	0.396	0.588	0.891	1.3							
6	5.76	6.24	0.134	0.233	0.426	0.632	0.951	1.38	2.32						
8	7.71	8.29	0.157	0.27	0.486	0.72	1.07	1.53	2.57	4.37					
10	9.71	10.29	0.18	0.307	0.546	0.808	1.19	1.69	2.81	4.72	9.96				
12	11.65	12.35	0.203	0.344	0.606	0.896	1.31	1.84	3.06	5.07	10.6	19.8			
(14)	13.65	14.35	0.226	0.381	0.666	0.984	1.43	2	3.31	5.42	11.2	20.8			
16	15.65	16.35	0.245	0.418	0.726	1.07	1.55	2.15	3.56	5.78	11.9	21.8			
20	19.58	20.42		0.492	0.846	1.25	1.79	2.46	4.05	6.48	13.2	23.8			
25	24.58	25.42			0.996	1.47	2.09	2.85	4.67	7.36	14.8	26.3			
30	29.58	30.42				1.69	2.39	3.23	5.29	8.24	16.4	28.8			
35	34.5	35.5					2.68	3.62	5.91	9.12	18	31.3			
40	39.5	40.5						4.01	6.52	10	19.6	33.9			
45	44.5	45.5							7.14	10.9	21.2	36.4			
50	49.5	50.5								11.8	22.8	38.9			
(55)	54.05	55.95								12.6	24.4	41.4			
60	59.05	60.95								13.5	26	43.9			

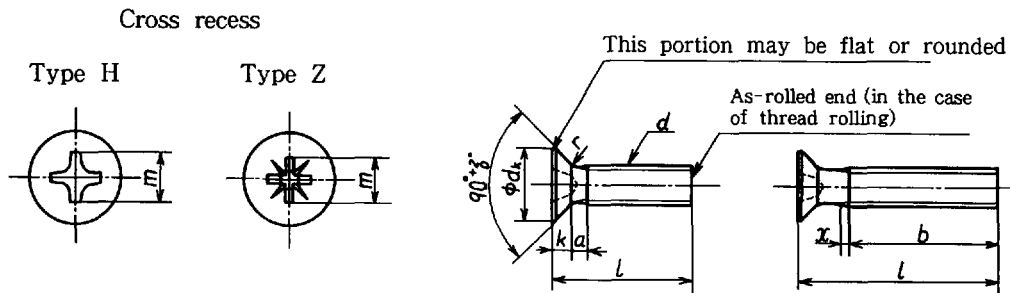
Notes ⁽⁹⁾ The designation of thread and nominal length in parentheses should not preferably be used.

⁽¹⁰⁾ The preferable nominal length to the designations of thread shall be those given in the frame of bold lines, and those of shorter nominal length than the position of dotted lines shall be the full threads. In this case, $b = l - a$.

Remarks 1. The diameter of unthreaded part (body) shall generally be approximately the same as the pitch diameter of screw thread, but may also be approximately the same as the nominal diameter of screw thread.

However, its diameter shall be smaller than the maximum value of major diameter of thread.

2. The shape of screw end shall be as-rolled end in the case of thread rolling, and be as chamfered end in the case of screw thread cutting. When other screw end is required, it shall be designated by the purchaser, provided that the shape and dimensions of the screw end shall generally conform to the specification of JIS B 1003.
3. This Table is in accordance with ISO 7045.

Attached Table 2. Shape and dimensions of cross recessed countersunk head screws
(for strength class 4.8)

Unit : mm

Designation of thread d ⁽⁹⁾			M1.6	M2	M2.5	M3	(M3.5)	M4	M5	M6	M8	M10	
Pitch (P)			0.35	0.4	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
a	Max.		0.7	0.8	0.9	1	1.2	1.4	1.6	2	2.5	3	
b	Min.		25	25	25	25	38	38	38	38	38	38	
d_k ⁽¹¹⁾	Max. of theoretical dimension		3.6	4.4	5.5	6.3	8.2	9.4	10.4	12.6	17.3	20	
	Actual dimension	Nom. = Max.	3.0	3.8	4.7	5.5	7.30	8.40	9.30	11.30	15.80	18.30	
		Min.	2.7	3.5	4.4	5.2	6.94	8.04	8.94	10.87	15.37	17.78	
k ⁽¹¹⁾	Nom. = Max.		1	1.2	1.5	1.65	2.35	2.7	2.7	3.3	4.65	5	
r	Max.		0.4	0.5	0.6	0.8	0.9	1	1.3	1.5	2	2.5	
x	Max.		0.9	1	1.1	1.25	1.5	1.75	2	2.5	3.2	3.8	
No. of cross recess			0			1		2		3	4		
(12)	Type H	m	Ref.	1.6	1.9	2.9	3.2	4.4	4.6	5.2	6.8	8.9	10
		Penetration depth of gauge (q)	Max.	0.9	1.2	1.8	2.1	2.4	2.6	3.2	3.5	4.6	5.7
			Min.	0.6	0.9	1.4	1.7	1.9	2.1	2.7	3.0	4.0	5.1
	Type Z	m	Ref.	1.6	1.9	2.8	3	4.1	4.4	4.9	6.6	8.8	9.8
		Penetration depth of gauge (q)	Max.	0.95	1.20	1.73	2.01	2.20	2.51	3.05	3.45	4.60	5.64
			Min.	0.70	0.95	1.48	1.76	1.75	2.06	2.60	3.00	4.15	5.19
l ⁽¹³⁾			(Informative reference) Approximate mass per 1000 pieces in kg (Density : 7.85 kg/dm ³)										
Nominal length ⁽⁹⁾			Min.	Max.									
3	2.8	3.2	0.058	0.101	0.176								
4	3.76	4.24	0.069	0.119	0.206	0.291							
5	4.76	5.24	0.081	0.137	0.236	0.335	0.573	0.825					
6	5.76	6.24	0.093	0.152	0.266	0.379	0.633	0.903	1.24				
8	7.71	8.29	0.116	0.193	0.326	0.467	0.753	1.06	1.48	2.38			
10	9.71	10.29	0.139	0.231	0.386	0.555	0.873	1.22	1.72	2.73	5.68		
12	11.65	12.35	0.162	0.268	0.446	0.643	0.993	1.37	1.96	3.08	6.32	9.54	
(14)	13.65	14.35	0.185	0.306	0.507	0.731	1.11	1.53	2.2	3.43	6.96	10.6	
16	15.65	16.35	0.208	0.343	0.567	0.82	1.23	1.68	2.44	3.78	7.6	11.6	
20	19.58	20.42		0.417	0.687	0.996	1.47	2	2.92	4.48	8.88	13.6	
25	24.58	25.42			0.838	1.22	1.77	2.39	3.52	5.36	10.5	16.1	
30	29.58	30.42				1.44	2.07	2.78	4.12	6.23	12.1	18.7	
35	34.5	35.5					2.37	3.17	4.72	7.11	13.7	21.2	
40	39.5	40.5						3.56	5.32	7.98	15.3	23.7	
45	44.5	45.5							5.92	8.86	16.9	26.2	
50	49.5	50.5							6.52	9.73	18.5	28.8	
(55)	54.05	55.95								10.6	20.1	31.3	
60	59.05	60.95								11.5	21.7	33.8	

Notes ⁽¹¹⁾ As to dimensions d_k and k , refer to JIS B 1013.⁽¹²⁾ The cross recesses are in accordance with the series 1 (deep) specified in JIS B 1014.

- (¹³) The preferable nominal lengths to the designations of thread shall be within the frame of bold lines, and those of shorter nominal length than the positions of broken lines shall be full threads. In this case, $b = l - (k + a)$.

Remarks 1. The diameter of unthreaded portion (body) shall generally be approximately pitch diameter of screw thread, but may be approximately the nominal diameter of screw thread.

However, its diameter shall be smaller than the maximum value of major diameter of screw thread.

2. The shape of screw end shall be as-rolled end in the case of thread rolling, and be as chamfered end in the case of thread cutting. When any other screw end is required, purchaser shall designate. However, the shape and dimension of the screw end shall generally be in accordance with JIS B 1003.
3. This Table is in accordance with ISO 7046-1.