Draft Sri Lanka Standard

HEXAGON BOLTS FOR GENERAL PURPOSES

Part 1 - Dimensions of Product grades A and B

SLS 977 : Part 1 : 1992

Gr.

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SRI LANKA

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Part 1 - Dimensions of Product grades A and B

FOREWORD

This standard was approved by the Sectoral Committee on Metal and Metal Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on .....

Since there are several types of bolts used for different applications, a series of standards have been formulated on hexagon bolts to fall in line with the international standards published by the International Organization for Standardization (ISO). These standards comprise of the following;

Hexagon bolts for general purposes

Part 1 Dimensions of Product Grades A and B
Part 2 Dimensions of Product Grade C
Part 3 Dimensions of Product Grade B - Reduced shank
Part 4 Dimensions of Product Grades A and B -Fine pitch thread
Part 5 General Requirements

There are three grades of hexagon bolts as follows, the grading being according to the range of tolerance:

a) Grade A - Most precise
b) Grade B - Semi precise
c) Grade C - Least precise.

This part deals with product Grades A and B only. Part 5 of this standard specifies, inter alia, the grading of hexagon bolts.

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 an observation shall be rounded off in accordance with CS 102. The number of figures to be retained in the rounded off value shall be the same as that of the specified value in this standard. The Sri Lanka Standards Institution gratefully acknowledges the use of the following publication of the International Organization for Standardization (ISO) in the preparation of this standard:

ISO 4014 Hexagon bolts - Product Grades A and B.

1 SCOPE

This standard specifies dimensions for hexagon bolts of product Grades A and B. For Product Grade A, the thread diameters covered range from M 1.6 to M 24 and nominal lengths upto and including 10 d or 150 mm whichever is shorter. For Product Grade B thread diameters include over M 24 and upto M 64, and nominal lengths over 10 d or 150 mm whichever is shorter.

2 REFERENCES

CS 102 Presentation of numerical values
SLS 268 ISO metric screw threads

3 GRADES

The grades of hexagon bolts covered in this part shall be as follows (see Foreword):

a) Grade A - Most precise
b) Grade B - Semi precise

4 DIMENSIONS

4.1 Bolt

Dimensions of hexagon bolts shall be as given in Table 1 and Table 2 (see Fig. 1)

4.2 Thread

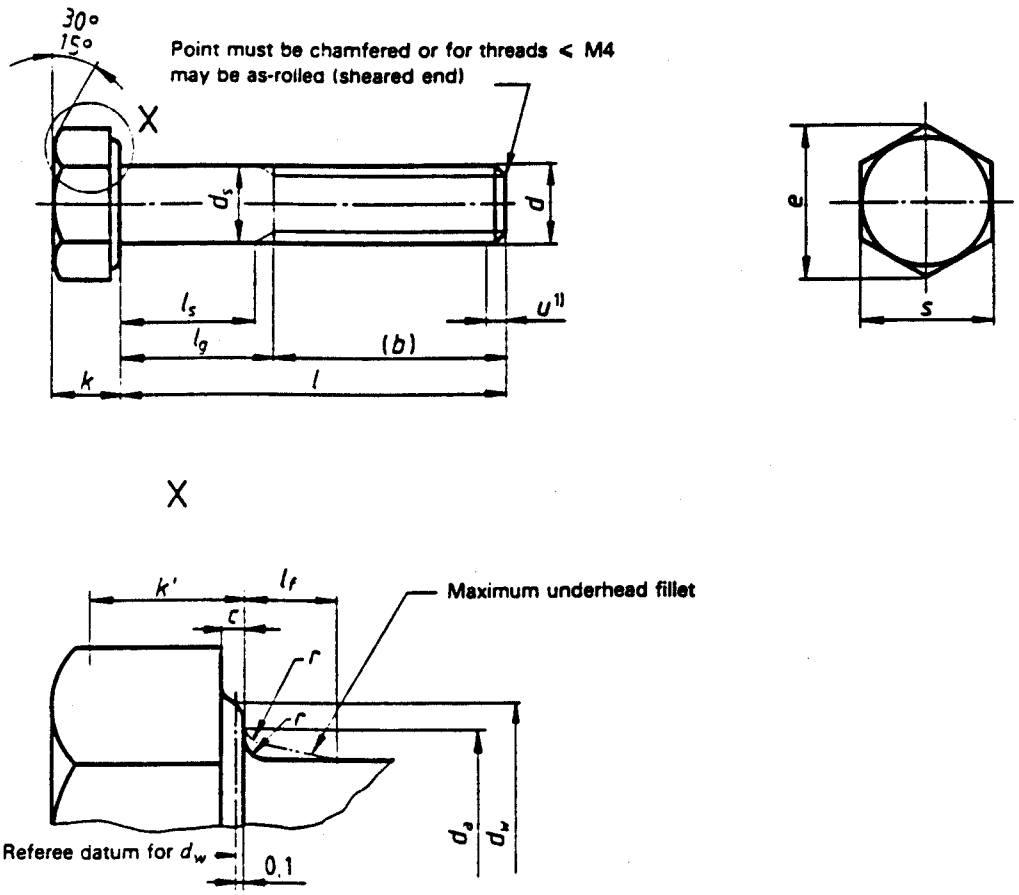
4.2.1 The thread shall be ISO metric coarse screw thread as specified in SLS 268.

4.2.2 Tolerance on screw thread shall conform to Class 6g as specified in SLS 268 Part 4.

3 Dimensions

NOTE – Symbols and descriptions of dimensions are specified in ISO 225.

Dimension in millimetres



1) Incomplete thread $u < 2P$

Table 1 — Preferred threads

Dimensions in millimetres

Thread, d			M1,6	M2	M2,5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64
P [1]			0,35	0,4	0,45	0,5	0,7	0,8	1	1,25	1,5	1,75	2	2,5	3	3,5	4	4,5	5	5,5	6
b ref.		2)	9	10	11	12	14	16	18	22	26	30	38	46	54	66	–	–	–	–	–
		3)	–	–	–	–	–	–	–	–	–	–	44	52	60	72	84	96	108	–	–
		4)	–	–	–	–	–	–	–	–	–	–	–	–	73	85	97	109	121	137	153
c		min.	0,1	0,1	0,1	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
		max.	0,25	0,25	0,25	0,4	0,4	0,5	0,5	0,6	0,6	0,6	0,8	0,8	0,8	0,8	0,8	1	1	1	1
d_a		max.	2	2,6	3,1	3,6	4,7	5,7	6,8	9,2	11,2	13,7	17,7	22,4	26,4	33,4	39,4	45,6	52,6	63	71
d_s		nom. = max.	1,6	2	2,5	3	4	5	6	8	10	12	16	20	24	30	36	42	48	56	64
	Product grade $\frac{A}{B}$	min.	1,46	1,86	2,36	2,86	3,82	4,82	5,82	7,78	9,78	11,73	15,73	19,67	23,67	–	–	–	–	–	–
			–	–	–	–	–	–	–	–	–	–	15,57	19,48	23,48	29,48	35,38	41,38	47,38	55,26	63,26
d_w	Product grade $\frac{A}{B}$	min.	2,27	3,07	4,07	4,57	5,88	6,88	8,88	11,63	14,63	16,63	22,49	28,19	33,61	–	–	–	–	–	–
			–	–	–	–	–	–	–	–	–	–	22	27,7	33,25	42,75	51,11	59,95	69,45	78,66	88,16
e	Product grade $\frac{A}{B}$	min.	3,41	4,32	5,45	6,01	7,66	8,79	11,05	14,38	17,77	20,03	26,75	33,53	39,98	–	–	–	–	–	–
			–	–	–	–	–	–	–	–	–	–	26,17	32,95	39,55	50,85	60,79	71,3	82,6	93,56	104,86
l_f		max.	0,6	0,8	1	1	1,2	1,2	1,4	2	2	3	3	4	4	6	6	8	10	12	13
k		nom.	1,1	1,4	1,7	2	2,8	3,5	4	5,3	6,4	7,5	10	12,5	15	18,7	22,5	26	30	35	40
	Product grade A	min.	0,975	1,275	1,575	1,875	2,675	3,35	3,85	5,15	6,22	7,32	9,82	12,285	14,785	–	–	–	–	–	–
		max.	1,225	1,525	1,825	2,125	2,925	3,65	4,15	5,45	6,58	7,68	10,18	12,715	15,215	–	–	–	–	–	–
	Product grade B	min.	–	–	–	–	–	–	–	–	–	–	9,71	12,15	14,65	18,28	22,08	25,58	29,58	34,5	39,5
		max.	–	–	–	–	–	–	–	–	–	–	10,29	12,85	15,35	19,12	22,92	26,42	30,42	35,5	40,5
k' [5]	Product grade $\frac{A}{B}$	min.	0,66	0,89	1,1	1,31	1,87	2,35	2,7	3,61	4,36	5,12	6,87	8,6	10,35	–	–	–	–	–	–
			–	–	–	–	–	–	–	–	–	–	6,8	8,51	10,26	12,8	15,46	17,91	20,71	24,15	27,65
r		min.	0,1	0,1	0,1	0,1	0,2	0,2	0,25	0,4	0,4	0,6	0,6	0,8	0,8	1	1	1,2	1,6	2	2
s		nom. = max.	3,2	4	5	5,5	7	8	10	13	16	18	24	30	36	46	55	65	75	85	95
	Product grade $\frac{A}{B}$	min.	3,02	3,82	4,82	5,32	6,78	7,78	9,78	12,73	15,73	17,73	23,67	29,67	35,38	–	–	–	–	–	–
			–	–	–	–	–	–	–	–	–	–	23,16	29,16	35	45	53,8	63,1	73,1	82,8	92,8

Product grade		l				l_s and l_g [6], [7]																																					
A	B																																									
nom.	min.	max.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
12	11,65	12,35	–	–	1,2	3																																				
16	15,65	16,35	–	–	5,2	7	4	6	2,75	5																																
20	19,58	20,42	–	–			8	10	6,75	9	5,5	8																														
25	24,58	25,42	–	–					11,75	14	10,5	13	7,5	11	5	8																										
30	29,58	30,42	–	–							15,5	18	12,5	16	10	14	7	12																								
35	34,5	35,5	–	–									17,5	21	15	19	12	17																								
40	38,5	40,5	–	–									22,5	28	20	24	17	22	11,75	18																						
45	44,5	46,5	–	–											25	29	22	27	16,75	23	11,5	19																				
50	48,5	50,5	–	–											30	34	27	32	21,75	28	16,5	24	11,25	20																		

For sizes above the stepped line, marked thus ———, ISO 4017 is recommended.

55	54,4	55,6	–	–													32	37	26,75	33	21,5	29	16,25	25																		
60	59,4	60,6	–	–													37	42	31,75	38	26,5	34	21,25	30																		
65	64,4	65,6	–	–															36,75	43	31,5	39	26,25	35	17	27																
70	69,4	70,6	–	–															41,75	48	36,5	44	31,25	40	22	32																
80	79,4	80,6	–	–															51,75	58	46,5	54	41,25	50	32	42	21,5	34														
90	89,3	90,7	–	–																	56,5	64	51,25	60	42	52	31,5	44	21	36												
100	99,3	100,7	–	–																	66,5	74	61,25	70	52	62	41,5	54	31	46												
110	109,3	110,7	108,25	111,75																			71,25	80	62	72	51,5	64	41	56	26,5	44										
120	119,3	120,7	118,25	121,75																			81,25	90	72	82	61,5	74	51	66	36,5	54										
130	129,2	130,8	128	132																					76	86	65,5	78	56	70	40,5	58										
140	139,2	140,8	138	142																					86	96	75,5	88	65	80	50,5	68	36	56								
150	149,2	150,8	148	152																					96	106	85,5	98	75	90	60,5	78	46	66								
160	–	–	158	162																					106	116	95,5	108	86	100	70,5	88	56	76	41,5	64						
180	–	–	178	182																							115,5	128	106	120	90,5	108	76	96	61,5	84	47	72				
200	–	–	197,7	202,3																							135,5	148	125	140	110,5	128	96	116	81,5	104	67	92				
220	–	–	217,7	222,3																									132	147	117,5	135	103	123	88,5	111	74	99	55,5	83		
240	–	–	237,7	242,3																									152	167	137,5	156	123	143	108,5	131	94	119	75,5	103		
260	–	–	257,4	262,6																											157,5	175	143	163	128,5	151	114	139	95,5	123	77	107
280	–	–	277,4	282,6																											177,5	196	163	183	148,5	171	134	159	115,5	143	97	127
300	–	–	297,4	302,6																											197,5	215	183	203	168,5	191	154	179	136,5	163	117	147
320	–	–	317,15	322,85																													203	223	188,5	211	174	199	156,5	183	137	167
340	–	–	337,15	342,85																													223	243	208,5	231	194	219	176,5	203	157	187
360	–	–	357,15	362,85																													243	263	228,5	251	214	239	195,5	223	177	207
380	–	–	377,15	382,85																															248,5	271	234	259	215,5	243	197	227
400	–	–	397,15	402,85																															268,5	291	254	279	236,5	263	217	247
420	–	–	416,85	423,15																															288,5	311	274	299	256,5	283	237	267
440	–	–	436,85	443,15																															308,5	331	294	319	276,5	303	257	287
460	–	–	456,85	463,15																																	314	339	296,5	323	277	307
480	–	–	476,85	483,15																																	334	359	316,5	343	297	327
500	–	–	496,85	503,15																																			336,5	363	317	347

[illegible] P = pitch of thread.

[illegible] l_{nom} < 125 mm.

[illegible] 125 mm < l_{nom} < 200 mm.

[illegible] > 200 mm.

[illegible] – b

[illegible] – 5 P

[illegible] l_g is the minimum grip length.

NOTE — The popular lengths are defined in terms of lengths l_s and l_g:

[illegible] product grade A above the stepped line, marked thus – – – –

[illegible] product grade B below this stepped line.

Table 2 — Non-preferred threads

Dimensions in millimetres

Thread, d			M3,5	M14	M18	M22	M27	M33	M39	M45	M52	M60
P [1]			0,6	2	2,5	2,5	3	3,5	4	4,5	5	5,5
b ref.		[2]	13	34	42	50	60	–	–	–	–	–
		[3]	–	40	48	56	66	78	90	102	116	–
		[4]	–	–	–	69	79	91	103	115	129	145
c		min.	0,15	0,15	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3
		max.	0,4	0,6	0,8	0,8	0,8	0,8	1	1	1	1
d_a		max.	4,1	15,7	20,2	24,4	30,4	36,4	42,4	48,6	56,6	67
d_s	nom. = max.		3,5	14	18	22	27	33	39	46	52	60
	Product grade A	min.	3,32	13,73	17,73	21,67	–	–	–	–	–	–
	Product grade B	min.	–	–	17,57	21,48	26,48	32,38	38,38	44,38	51,26	59,26
d_w	Product grade A	min.	5,07	19,37	25,34	31,71	–	–	–	–	–	–
	Product grade B	min.	–	–	24,85	31,35	38	46,55	55,86	64,7	74,2	83,41
e	Product grade A	min.	6,58	23,36	30,14	37,72	–	–	–	–	–	–
	Product grade B	min.	–	–	29,56	37,29	45,2	55,37	66,44	76,95	88,25	99,21
l_f		max.	1	3	3	4	6	6	6	8	10	12
k		nom.	2,4	8,8	11,5	14	17	21	25	28	33	38
	Product grade A	min.	2,275	8,62	11,285	13,785	–	–	–	–	–	–
		max.	2,525	8,98	11,175	14,215	–	–	–	–	–	–
	Product grade B	min.	–	–	11,15	13,65	16,65	20,58	24,58	27,58	32,5	37,5
		max.	–	–	11,85	14,35	17,35	21,42	25,42	28,42	33,5	38,5
k' [5]	Product grade A	min.	1,59	6,03	7,9	9,65	–	–	–	–	–	–
	Product grade B	min.	–	–	7,81	9,56	11,66	14,41	17,21	19,31	22,75	26,25
r		min.	0,1	0,6	0,6	0,8	1	1	1	1,2	1,6	2
s	nom. = max.		6	21	27	34	41	50	60	70	80	90
	Product grade A	min.	5,82	20,67	26,67	33,38	–	–	–	–	–	–
	Product grade B	min.	–	–	26,16	33	40	49	58,8	68,1	78,1	87,8

l					l_s and l_g [6], [7]																			
Product grade A			Product grade B																					
nom.	min.	max.	min.	max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.	l_s min.	l_g max.
20	19,58	20,42	–	–	4	7																		
25	24,58	25,42	–	–	9	12																		
30	29,58	30,42	–	–	14	17																		
35	34,5	35,5	–	–	19	22																		
40	39,5	40,5	–	–	For sizes above the stepped line, marked thus ———, ISO 4017 is recommended																			
45	44,5	45,5	–	–																				
50	49,5	50,5	–	–																				
55	54,4	55,6	–	–																				
60	59,4	60,6	–	–			16	26																

65	64,4	65,6	–	–			21	31																							
70	69,4	70,6	–	–			26	36	15,5	28																					
80	79,4	80,6	–	–			36	46	25,5	38																					
90	89,3	90,7	–	–			46	56	35,5	48	27,5	40																			
100	99,3	100,7	98,25	101,75			56	66	45,5	58	37,5	50	25	40																	
110	109,3	110,7	108,25	111,75			66	76	55,5	68	47,5	60	35	50																	
120	119,3	120,7	118,25	121,75			76	86	65,5	78	57,5	70	45	60																	
130	129,2	130,8	128	132			80	90	69,5	82	61,5	74	49	64	34,5	52															
140	139,2	140,8	138	142			90	100	79,5	92	71,5	84	59	74	44,5	62															
150	149,2	150,8	148	152					89,5	102	81,5	94	69	84	54,5	72	40	60													
160	–	–	158	162					99,5	112	91,5	104	79	94	64,5	82	50	70													
180	–	–	178	182					119,5	132	111,5	124	99	114	84,5	102	70	90	55,5	78											
200	–	–	197,7	202,3							131,5	144	119	134	104,5	122	90	110	75,5	98	59	84									
220	–	–	217,7	222,3							138,5	151	126	141	111,5	129	97	117	82,5	105	66	91									
240	–	–	237,7	242,3									146	161	131,5	149	117	137	102,5	125	86	111	67,5	95							
260	–	–	257,4	262,6									166	181	151,5	169	137	157	122,5	145	106	131	87,5	115							
280	–	–	277,4	282,6											171,5	189	157	177	142,5	165	126	151	107,5	135							
300	–	–	297,4	302,6											191,5	209	177	197	162,5	185	146	171	127,5	155							
320	–	–	317,15	322,85											211,5	229	197	217	182,5	205	166	191	147,5	175							
340	–	–	337,15	342,85													217	237	202,5	225	186	211	167,5	195							
360	–	–	357,15	362,85													237	257	222,5	245	206	231	187,5	215							
380	–	–	377,15	382,85													257	277	242,5	265	226	251	207,5	235							
400	–	–	397,15	402,85															262,5	285	246	271	227,5	255							
420	–	–	416,85	423,15															282,5	305	266	291	247,5	275							
440	–	–	436,85	443,15															302,5	325	286	311	267,5	295							
460	–	–	456,85	463,15																	306	331	287,5	315							
480	–	–	476,85	483,15																	326	351	307,5	335							
500	–	–	496,85	503,15																			327,5	355							

1) P = pitch of thread.

2) For lengths $l_{nom} \leq 125$ mm.

3) For lengths 125 mm $< l_{nom} \leq 200$ mm.

4) For lengths $l_{nom} > 200$ mm.

5) $b_{min} = 0,7\ b_{min}$

6) $l_{g\,max} = l_{nom} - b$

$l_{g\,min} = l_{g\,max} - 5P$

7) l_g is the minimum grip length.

NOTE — The popular lengths are defined in terms of lengths l_s and l_g:

— product grade A above the stepped line, marked thus — — — —

— product grade B below this stepped line.