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Westfield Fasteners Product Specification:

DIN 933 - Hex Head Set Screw (Fully Threaded Hex Bolt)

This product guide contains the specification for metric threaded Hex Head Set Screws, a series of standard parts available from Westfield Fasteners. The basis of this specification is the internationally recognised DIN standard DIN 933.

Product Description

Commonly referred to as a set screw or simply as a bolt. The fully threaded DIN 933 hex head set screw is distinct from its partially threaded DIN 931 Hex Bolt counterpart. A standard spanner or ratchet is typically used to fit this product. Used for decades on all types of assembly throughout the world. As with the DIN 931 hex bolt, the hex drive allows a higher torque to be applied over other drive systems. The newer standard ISO 4017 specifies differences in head dimensions for M10, M12, M14 and M22 thread diameters from DIN 933.

Scope of the DIN Standard

DIN standard DIN 933 specifies the characteristics, tolerances and variation in form of metric sized hex head set screws, and covers thread diameters from M1.6 up to and including M52. Mechanical properties for these items are defined in ISO 898 and ISO 3506. Table 1 below defines the overall dimensions and tolerances for hexagon head set screws, whilst table 2 defines the same for what are considered non-preferred threads. Table 3 defines the tolerance on the shank length.

DIN 933 has specific provision for mild steel, 8.8 and 10.9 hi-tensile steel, stainless steel and non ferrous metals, which may include brass.

Although the DIN 933 standard has now been withdrawn and superceded by ISO 4017, off the shelf parts are generally still manufactured to the older specification.

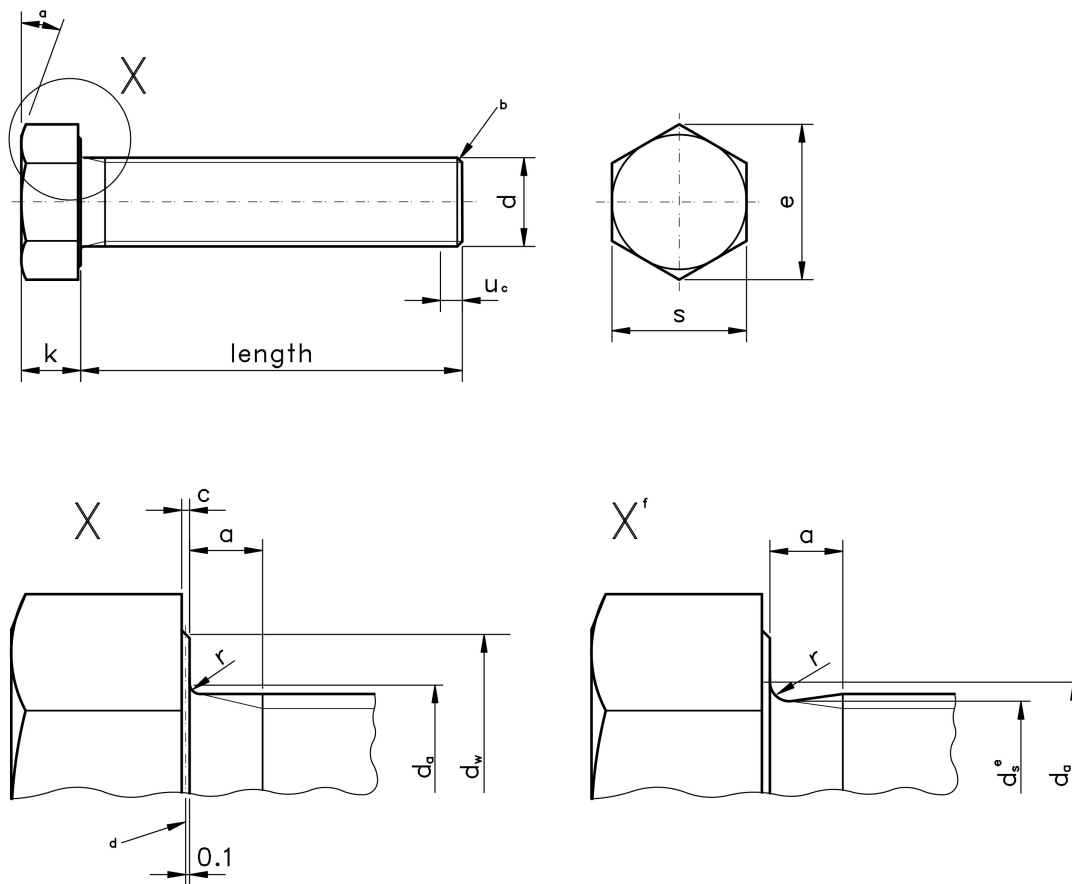


Figure 1: Hexagon Head Set Screw

Notes to figure 1:

- Point (b) is chamfered or for threads equal to or greater than M4, it may be as-rolled (sheared end).
- There may be up to 2 incomplete threads at the end of the bolt (c).
- d - reference datum for d_w .
- d_s pitch diameter (e).
- Permissible alternative shape (f).

Variations from DIN 933

ISO 4017, which replaces DIN 933, specifies revised dimensions and tolerances for hex head set screws, most particularly new head dimensions for M10, M12, M14 and M22. Parts conforming specifically to ISO 4017 can be sourced, but are subject to availability.

ISO 4014 is an equivalent standard, covering hex head bolts with a partially threaded shank.

Table 1: Dimensions & Tolerances according to DIN 933 (Preferred Threads)

Thread, d			M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48			
p			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			
a		max	1.05	1.20	1.35	1.5	2.1	2.4	3	3.75	4.5	5.25	6	7.5	9	10.5	12	13.5	15			
c		max	0.25	0.25	0.25	0.40	0.40	0.50	0.50	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	1.00	1.00			
		min	0.10	0.10	0.10	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.30	0.30		
d _a			max	2.0	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		
d _w	Product grade	A	min	2.4	3.2	4.1	4.6	5.9	6.9	8.9	11.6	15.6	17.4	22.5	28.2	33.6	-	-	-	-		
		B		-	-	-	-	5.7	6.7	8.7	11.4	15.4	17.2	22.0	27.7	33.2	42.7	51.1	59.9	69.4		
e	Product grade	A	min	3.41	4.32	5.45	6.01	7.66	8.79	11.05	14.38	18.9	21.1	26.75	33.53	39.98	-	-	-	-		
		B		3.28	4.18	5.31	5.88	7.50	8.63	10.89	14.20	18.72	20.88	26.17	32.95	39.55	50.85	60.79	71.30	82.60		
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		
			Product grade	A	max	1.22	1.52	1.82	2.12	2.92	3.65	4.15	5.45	6.56	7.68	10.18	12.72	15.22	-	-	-	-
					min	0.98	1.28	1.58	1.88	2.68	3.35	3.85	5.15	6.22	7.32	9.82	12.28	14.78	-	-	-	-
			Product grade	B	max	1.30	1.60	1.90	2.20	3.00	3.74	4.24	5.54	6.69	7.79	10.29	12.85	15.35	19.12	22.92	26.42	30.42
min	0.90	1.20			1.50	1.80	2.60	3.26	3.76	5.06	6.11	7.21	9.71	12.15	14.65	18.28	22.08	25.58	29.58			
k _w	-	-	min	0.7	0.9	1.1	1.3	1.9	2.28	2.63	3.54	4.28	5.05	6.8	8.5	10.3	12.8	15.5	17.9	20.9		
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		
s	-	-	nom=max	3.2	4	5	5.5	7	8	10	13	17	19	24	30	36	46	55	65	75		
			Product grade	A	min	3.02	3.82	4.82	5.32	6.78	7.78	9.78	12.73	16.73	18.67	23.67	29.67	35.38	-	-	-	-
					B	-	-	-	-	6.64	7.64	9.64	12.57	16.57	18.48	23.16	29.16	35.00	45.0	53.8	63.1	73.1

Table 2: Dimensions & Tolerances according to DIN 933 (Non-Preferred Threads)

Thread, d			M3.5	M7	M14	M18	M22	M27	M33	M39	M45	M52		
p			0.6	1	2	2.5	2.5	3	3.5	4	4.5	5		
a		max	1.8	3	6	7.5	7.5	9	10.5	12	13.5	15		
c		max	0.40	0.5	0.60	0.80	0.80	0.80	0.8	1.0	1.0	1.0		
		min	0.15	0.15	0.15	0.2	0.2	0.2	0.2	0.3	0.3	0.3		
d _a		max	4.1	7.8	15.7	20.2	24.4	30.4	36.4	42.4	48.6	56.6		
d _w	Product grade	A	min	5.1	9.6	20.5	25.3	30.0	-	-	-	-		
		B		-	9.4	20.1	24.8	29.5	38.0	46.5	55.9	64.7	74.2	
e	Product grade	A	min	6.58	12.12	24.49	30.14	35.72	-	-	-	-		
		B		-	11.94	23.91	29.56	35.03	45.20	55.37	66.44	76.95	88.25	
k	-	-	nom	2.4	4.8	8.8	11.5	14	17	21	25	28	33	
			max	2.52	4.95	8.98	11.72	14.22	-	-	-	-	-	
	Product grade	A	min	2.28	4.65	8.62	11.28	13.78	-	-	-	-		
			max	-	5.04	9.09	11.85	14.35	17.35	21.42	25.42	28.42	33.50	
Product grade	B	min	-	4.56	8.51	11.15	13.65	16.65	20.58	24.58	27.58	32.50		
		max	-	4.56	8.51	11.15	13.65	16.65	20.58	24.58	27.58	32.50		
k _w	-	-	min	1.6	3.19	5.96	7.8	9.6	11.7	14.4	17.2	19.3	22.8	
r	-	-	min	0.1	0.25	0.6	0.6	0.8	1	1	1	1.2	1.6	
s	-	-	nom=max	6	11	21	27	32	41	50	60	70	80	
			Product grade	A	min	5.82	10.73	21.67	26.67	31.61	-	-	-	-
						B	-	10.57	21.16	26.15	31	40.00	49.0	58.8

Table 3: Shank Length Tolerance according to DIN 933

mm	+/-	
	Product grade	
	A	B
2-3	0.2	-
4-6	0.24	-
8-10	0.29	-
12-16	0.35	-
20-30	0.42	1.05
35-50	0.5	1.25
55-80	0.6	1.5
90-120	0.7	1.75
130-150	0.8	2
160-180	-	2
200	-	2.3

For further details, please refer to the ISO/DIN standard document for this item.