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## Westfield Fasteners Product Specification:

# DIN 7984 - Hexagon Socket Head Cap Screws with Low Head

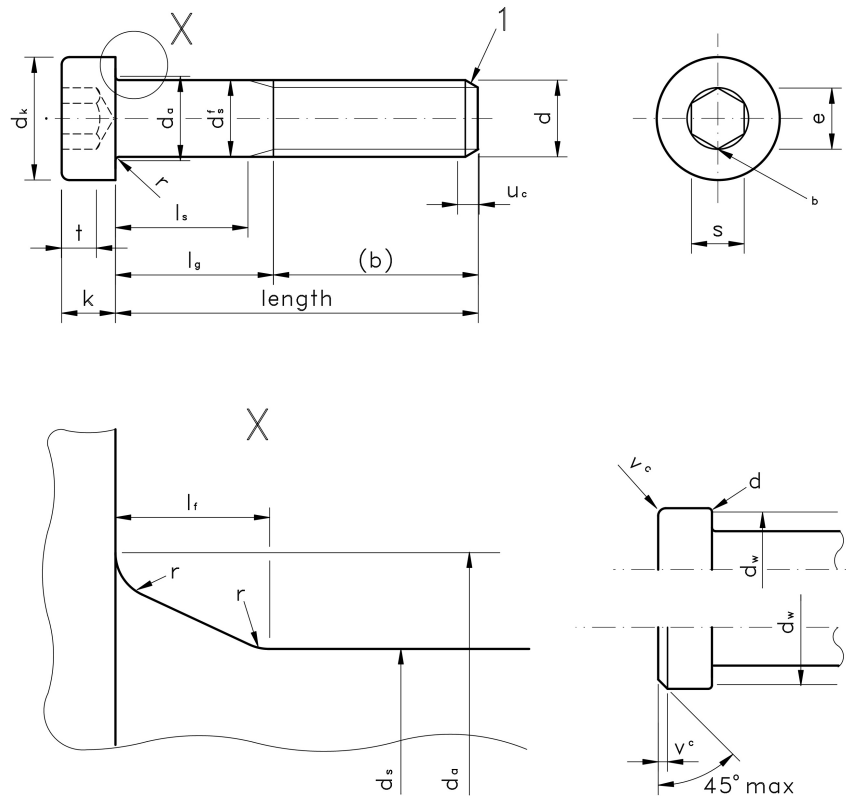
This product guide contains the specification for metric threaded socket low head cap screws as available from Westfield Fasteners. The basis of this specification is the DIN standard DIN 7984.

## Product Description

Similar to the DIN 912 socket cap screw but with a lower head height and smaller hex drive, the DIN 7984 is used where space is limited. Please note that thread lengths on partial threaded shanks are a minimum, and consequently a full thread may be supplied where a partial thread is indicated by the data.

## Scope of the DIN standard.

DIN standard 7984 specifies the tolerances and the permissible variation in form of hexagon socket cap low head screws, and covers metric thread diameters from M3 up to and including M24. Mechanical properties for these items are defined in ISO 898 and ISO 3506. Table 1 below defines the overall dimensions and tolerances of this screw type. Table 2 defines the tolerances on the shank length, whilst tables 3 and 4 show the reduced minimum ultimate tensile loads for class 8.8 and stainless steel variants respectively of this product. The information in tables 3 and 4 is presented here because due to their head design socket low head cap screws are considered to have reduced loadability over other screw types, as defined in ISO 898 and ISO 3506.



Maximum underhead fillet,  $l_{f,max} = 1.7 r_{max}$

$$r_{max} = \frac{d_{a,max} - d_{s,max}}{2}$$

**Figure 1: Socket Head Low Cap Screw**

**Notes to figure 1:**

- The chamfered end (1) conforms to DIN EN ISO 4753. There may be up to 2 incomplete threads at the end of the bolt.
- A slight rounding or countersink at the mouth of the socket (b) may be present.
- The top edge of the cap head (Vc) can be chamfered or rounded.
- The bottom edge of the cap head (d) can be chamfered or rounded.
- f - ds (shank diameter) only applies where ls (unthreaded shank), min is specified.

**Variations from DIN 7984**

Socket low cap head screws are available in class 10.9 high tensile steel, but this class/grade is not mentioned in the DIN 7984 standard. Again, due to the reduced size of the head, these screws are considered to have reduced loadability over other screw types of this material class, and will typically be 80%.

Manufacturer and/or material markings may be present on the top face of the head.

**Table 1: Dimensions & Tolerances according to DIN 7984**

<b>Thread, d</b>		<b>M3</b>	<b>M4</b>	<b>M5</b>	<b>M6</b>	<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M14</b>	<b>M16</b>	<b>M18</b>	<b>M20</b>	<b>M22</b>	<b>M24</b>
thread pitch (standard metric coarse)		0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3
minimum thread length	b for shank length ≤ 125	12	14	16	18	22	26	30	34	38	42	46	50	54
	b for shank length > 125 and ≤ 200	-	-	-	-	28	32	36	40	44	48	52	56	60
	b for shank length > 200	-	-	-	-	-	-	-	-	57	61	65	69	73
bearing face inner diameter	d <sub>a</sub> max.	3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	20.2	22.4	24.4	26.4
head diameter	d <sub>k</sub> max.=nominal size	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36
	d <sub>k</sub> min.	5.32	6.78	8.28	9.78	12.73	15.73	17.73	20.67	23.67	26.67	29.67	32.61	35.61
unthreaded shank diameter	d <sub>s</sub> max.=nominal size	3	4	5	6	8	10	12	14	16	18	20	22	24
	d <sub>s</sub> min.	2.86	3.82	4.82	5.82	7.78	9.78	11.73	13.73	15.73	17.73	19.67	21.67	23.67
bearing face outer diameter	d <sub>w</sub> min.	4.84	6.20	7.70	9.20	12.03	15.03	17.03	19.83	22.83	25.83	28.83	31.61	23.67
socket width across corners	e min.	2.30	2.87	3.44	4.58	5.72	8.01	9.15	11.43	13.72	13.72	16	16	19.44
transition length	l <sub>f</sub> max.	0.51	0.60	0.60	0.68	1.02	1.02	1.87	1.87	1.87	1.87	2.04	2.04	2.04
head height	k max. =nominal size	2.0	2.8	3.5	4.0	5.0	6.0	7	8	9	10	11	12	13
	k min.	1.86	2.66	3.32	3.82	4.82	5.82	6.78	7.78	8.78	9.78	10.73	11.73	12.73
underhead radius	r min.	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.6	0.8	0.8	0.8
socket width across flats	s, nominal size	2	2.5	3	4	5	7	8	10	12	12	14	14	17
	s min.	2.02	2.52	3.02	4.02	5.02	7.025	8.025	10.025	12.032	12.032	14.032	14.032	17.050
	s max.	2.10	2.60	3.10	4.12	5.14	7.175	8.175	10.175	12.212	12.212	14.212	14.212	17.230
socket depth	t, nominal size	1.5	2.3	2.7	3	3.8	4.5	5	5.3	5.5	6.5	7.5	8	8
	t min.	1.38	2.18	2.58	2.88	3.65	4.35	4.85	5.15	5.35	6.32	7.32	7.82	7.82
	t max.	1.62	2.42	2.82	3.12	3.95	4.65	5.15	5.45	5.65	6.68	7.68	8.18	8.18
head edge radius / chamfer	v max.	0.3	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4

**Table 2: Shank Length Tolerance according to DIN 7984**

Shank Length (mm)	+/- (mm)
5-6	0.24
8-10	0.29
12-18	0.35
20-30	0.42
35-50	0.5
55-80	0.6
90-100	0.7

**Table 3: Minimum Ultimate Tensile Loads for Steel Screws of Property Class 8.8**

Thread, d	Minimum ultimate tensile load in N
M3	3220
M4	5620
M5	9080
M6	12900
M8	23400
M10	37100
M12	53900
M14	73600
M16	100000
M18	127000
M20	162000
M22	202000
M24	234000

**Table 4: Minimum Ultimate Tensile Loads for Stainless Steel Screws**

Thread, d	F <sub>m, min</sub> kN
M3	2.82
M4	4.92
M5	7.95
M6	11.28
M8	20.48
M10	32.48
M12	47.20
M14	64.40
M16	88.00
M18	107.20
M20	137.60
M22	169.60
M24	197.60

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