



Controlled angle under the head ensures maximum flushness and side wall contact. Non-slip Hex socket prevents marring of material.

Equivalent Standards

ISO 10642, ASME B18.3.5M,
DIN 7991, BS 4168-8

Mechanical Properties

Material: Unbrako High Grade Alloy Steel
Property Class: 012.9
Heat Treatment: Rc 39-44
Shear Strength: 630 N/mm²
Min. Elongation: 9%
Tensile Strength: 1040 Mpa
Shear Strength: 630 Mpa
Yield Strength: 945 Mpa

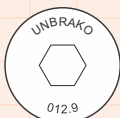
Notes

1. Thread Class: ANSI B1.13M, ISO262
2. Working Temperature: -50°C to +300°C
3. For sizes up to and including M20 Head Angle shall be 92°/90°, over M20 Head Angle be 62°/60°.
4. Torque calculated in accordance with VDI2230 - "Systematic calculation of high duty bolted joints" with $\sigma 0.2 = 720 \text{ N/mm}^2$ and $\mu = .125$ for plain finish and $\mu = 0.094$ for plated.

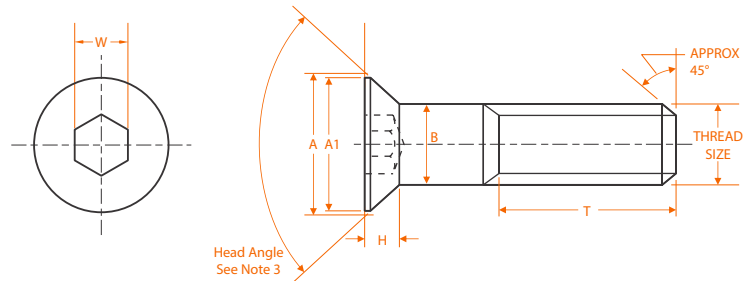
Length 'L' Tolerance (mm)

Screws Over	Up to and including	Tolerance
-	50	±0.25
50	80	±0.50
80	120	±0.70
120	250	±0.80
250	-	±1.02

Head Marking



Head markings may vary slightly depending on manufacturing practice. UNBRAKO and UNB are recognized identifications for M5 diameter & larger.



Product Dimensions

Thread size nom.	Pitch	Theoretical Diameter A max	Head Diameter A1 min	Body Dia B max	Hex Socket Size W nom.	Head Height H ref.	Thread Length T ref.
M3	0.50	6.72	5.82	2.98	2.0	1.86	18
M4	0.70	8.96	7.80	3.98	2.5	2.48	20
M5	0.80	11.2	9.78	4.98	3.0	3.10	22
M6	1.00	13.44	11.73	5.97	4.0	3.72	24
M8	1.25	17.92	15.73	7.97	5.0	4.96	28
M10	1.50	22.40	19.67	9.97	6.0	6.20	32
M12	1.75	26.88	23.67	11.97	8.0	7.44	36
(M14)	2.00	30.24	26.67	13.96	10.0	8.12	40
M16	2.00	33.60	29.67	15.96	10.0	8.80	44
(M18)	2.50	36.96	32.61	17.96	12.0	9.48	48
M20	2.50	40.32	35.61	19.96	12.0	10.11	52
(M22)	2.50	37.38	35.61	21.96	14.0	13.32	56
M24	3.00	40.42	38.61	23.96	14.0	14.22	60

Recommended Seating Torques				Tensile Load
Unplated		Plated		
N-m	lbf.in.	N-m	lbf.in.	
1.4	12	1.1	9	5.28
3.4	30	2.6	22	9.22
6.8	60	5.1	45	14.90
11.0	97	8.3	73	21.10
28.0	248	21.0	186	38.40
55.0	486	41.0	365	60.90
95.0	840	71.0	630	88.50
150.0	1,330	112.0	990	121.00
237.0	2,100	177.0	1,570	165.00
340.0	3,000	255.0	2,250	202.00
480.0	4,250	360.0	3,190	257.00
637.0	5,640	477.0	4,220	318.00
746.0	6,600	585.0	5,180	371.00

General Note: Flat, countersunk head cap screws and button head cap screws are designed and recommended for moderate fastening applications: machine guards, hinges, covers, etc. They are not suggested for use in critical high load strength applications where socket head cap screws should be used. Also due to their head configuration they may not meet the minimum ultimate tensile requirements for property class 12.9 as specified in EN ISO 898-1. They are nevertheless required to meet the other material and property requirements for property class 12.9.

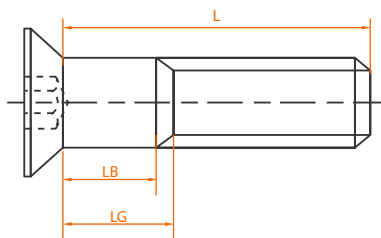
Body and Grip Length Dimensions

- LG is the maximum grip length and is the distance from the bearing surface to the first complete thread.
- LB is the minimum body length and is the length of the unthreaded cylindrical portion of the shank.
- Dimensions for LB and LG are calculated from the following formula:

T Ref = (2x Nominal Dia) plus 12mm.

LG max = Nominal length "L" minus "T"

LB min = Nominal length "L" minus (T + 5 pitches)



Length	M3		M4		M5		M6		M8		M10		M12	
L Nom.	L _B (min)	L _G (max)	L _B (min)	L _G (max)	L _B (min)	L _G (max)	L _B (min)	L _G (max)	L _B (min)	L _G (max)	L _B (min)	L _G (max)	L _B (min)	L _G (max)
30														
35	14.5	17.0	11.5	15.0										
40	19.5	22.0	16.5	20.0	14.0	18.0								
45	24.5	27.0	21.5	25.0	19.0	23.0	16.0	21.0						
50	29.5	32.0	26.5	30.0	24.0	28.0	21.0	26.0	15.75	22.0				
55	34.5	37.0	31.5	35.0	29.0	33.0	26.0	31.0	20.75	27.0				
60			36.5	40.0	34.0	38.0	31.0	36.0	25.75	32.0	20.5	28.0		
65			41.5	45.0	39.0	43.0	36.0	41.0	30.75	37.0	25.5	33.0	20.2	29.0
70			46.5	50.0	44.0	48.0	41.0	46.0	35.75	42.0	30.5	38.0	25.2	34.0
80			56.5	60.0	54.0	58.0	51.0	56.0	45.75	52.0	40.5	48.0	35.2	44.0
90					64.0	68.0	61.0	66.0	55.70	62.0	50.5	58.0	45.2	54.0
100					74.0	78.0	71.0	76.0	65.70	72.0	60.5	68.0	55.2	64.0
110							81.0	86.0	75.70	82.0	70.5	78.0	65.2	74.0
120							91.0	96.0	85.70	92.0	80.5	88.0	75.2	84.0
130									95.70	102.0	90.5	98.0	85.2	94.0
140									105.70	112.0	100.5	108.0	95.2	104.0
150									115.70	122.0	110.5	118.0	105.2	114.0

Length	M14		M16		M18		M20		M22		M24	
L Nom.	L _B (Max.)	L _G (Max.)	L _B (Max.)	L _G (Max.)	L _B (Max.)	L _G (Max.)	L _B (Max.)	L _G (Max.)	L _B (Max.)	L _G (Max.)	L _B (Max.)	L _G (Max.)
70	20.0	30.0										
80	30.0	40.0	26.0	36.0								
90	40.0	50.0	36.0	46.0	29.5	42.0						
100	50.0	60.0	46.0	56.0	39.5	52.0						
110	60.0	70.0	56.0	66.0	49.5	62.0	45.5	58.0				
120	70.0	80.0	66.0	76.0	59.5	72.0	55.5	68.0	51.5	64.0		
130	80.0	90.0	76.0	86.0	69.5	82.0	65.5	78.0	61.5	74.0	55.0	70.0
140	90.0	100.0	86.0	96.0	79.5	92.0	75.5	88.0	71.5	84.0	65.0	80.0
150	100.0	110.0	96.0	106.0	89.5	102.0	85.5	98.0	81.5	94.0	75.0	90.0
160			106.0	116.0	99.5	112.0	95.5	108.0	91.5	104.0	85.0	100.0
180			126.0	136.0	119.5	132.0	115.5	128.0	111.5	124.0	105.0	120.0
200					139.5	156.0	135.5	148.0	131.5	144.0	125.0	140.0
220									151.5	164.0	145.0	160.0
240											165.0	180.0