

TECHNICAL MANUAL



LINDSTROM FASTENER GROUP

FIVE LOCATIONS TO SERVE YOU...

LINDSTROM METRIC, LLC QUALITY POLICY

The Quality Policy of Lindstrom Metric, LLC is based on customer satisfaction. We strive for continuous improvement in our quality systems, to the objectives of our company: Supplying products that meet or exceed our customer's requirements; Providing a service that results in customer satisfaction; Continuous development of a dependable vendor base. We are committed to continuous improvement in quality, and the assessment of the quality system to assure its suitability to meet the requirements of our company and the requirements of our customers.

This policy has been formulated by the President of Lindstrom Metric, LLC. The policy is explained and discussed at the general orientation training given to all existing and new employees. The policy is also posted in conspicuous locations throughout the company.

President



VIRG LINDSTROM PRESIDENT / CEO

Date: 8/20/97

THE ULTIMATE SOURCE!



LINDSTROM FASTENER GROUP

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6 SHELTER DRIVE, SUITE C • GREER, SOUTH CAROLINA 29650
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MEGA METRIC

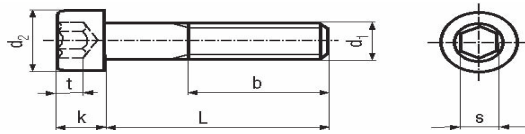
DIVISION OF LINDSTROM METRIC, LLC

6 SHELTER DRIVE, SUITE A • GREER, SOUTH CAROLINA 29650
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Product	Standard	Similar and / or Comparison	Section	Page		
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Flange Socket Head Cap Screws				1	4	
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Low Head Socket Cap Screws W/Pilot	DIN 6912			1	5	
Low Head Socket Cap Screws	DIN 7984			1		
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Slotted Flat Head Machine Screws	DIN 963	ISO 2009	ANSI B 18.16.7 M	JIS B 1101	5	5
Phillips Flat Head Machine Screws	DIN 965	ISO 7046	ANSI B 18.16.7 M	JIS B 1111	5	6
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LFG 01/01/09 Revised

SOCKET HEAD CAP SCREWS DIN 912/ ISO 4762 / ANSI B 18.3.1 M



Head Diameter d2 max. allows for Knurled Head

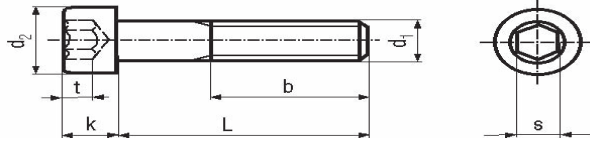
Thread Size d1	(M1.4)		M1.6		M2		M2.5		M2.6		M3		M4	
Thread Pitch	0.3		0.35		0.4		0.45		0.45		0.5		0.7	
Thread Length b	14		15		16		17		NA		18		20	
Head Dia. d2	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	2.46	2.74	2.86	3.14	3.62	3.98	4.32	4.68	4.82	5.18	5.32	5.68	6.78	7.22
ISO 4762 (1997)			2.86	3.14	3.62	3.98	4.32	4.68			5.32	5.68	6.78	7.22
ANSI B 18.3.1 M (1986)			2.87	3.14	3.65	3.98	4.33	4.68			5.32	5.68	6.80	7.22
Head Height k	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	1.26	1.40	1.46	1.60	1.86	2.00	2.36	2.50	2.46	2.60	2.86	3.00	3.82	4.00
ISO 4762 (1997)			1.46	1.60	1.86	2.00	2.36	2.50			2.86	3.00	3.82	4.00
ANSI B 18.3.1 M (1986)			1.52	1.60	1.91	2.00	2.40	2.50			2.89	3.00	3.88	4.00
Key Size nominal s	1.3		1.5		1.5		2		2		2.5		3	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	1.32	1.36	1.52	1.56	1.52	1.56	2.02	2.06	2.02	2.06	2.52	2.58	3.02	3.08
ISO 4762 (1997)			1.52	1.56	1.52	1.56	2.02	2.06			2.52	2.58	3.02	3.08
ANSI B 18.3.1 M (1986)			1.520	1.545	1.520	1.545	2.020	2.045			2.52	2.56	3.020	3.071
Key Engagement t	min.		min.		min.		min.		min.		min.		min.	
DIN 912 (1983)	0.6		0.7		1		1.10		1.2		1.3		2	
ISO 4762 (1997)			0.7		1		1.10				1.3		2	
ANSI B 18.3.1 M (1986)			0.8		1		1.25				1.5		2	
Thread Size d1	M5		M6		M8		M10		M12		(M14)		M16	
Thread Pitch	0.8		1		1.25		1.5		1.75		2		2	
Thread Length b	22		24		28		32		36		40		44	
Head Dia. d2	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	8.28	8.72	9.78	10.22	12.73	13.27	15.73	16.27	17.73	18.27	20.67	21.33	23.67	24.33
ISO 4762 (1997)	8.28	8.72	9.78	10.22	12.73	13.27	15.73	16.27	17.73	18.27	20.67	21.33	23.67	24.33
ANSI B 18.3.1 M (1986)	8.27	8.72	9.74	10.22	12.70	13.27	15.67	16.27	17.63	18.27	20.6	21.33	23.58	24.33
Head Height k	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	4.82	5.00	5.7	6.0	7.64	8.00	9.64	10.00	11.57	12.00	13.57	14.00	15.57	16.00
ISO 4762 (1997)	4.82	5.00	5.7	6.0	7.64	8.00	9.64	10.00	11.57	12.00	13.57	14.00	15.57	16.00
ANSI B 18.3.1 M (1986)	4.86	5.00	5.85	6.00	7.83	8.00	9.81	10.00	11.79	12.00	13.77	14.00	15.76	16.00
Key Size nominal s	4		5		6		8		10		12		14	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	4.020	4.095	5.02	5.14	6.02	6.14	8.025	8.175	10.025	10.175	12.032	12.212	14.032	14.212
ISO 4762 (1997)	4.020	4.095	5.02	5.14	6.02	6.14	8.025	8.175	10.025	10.175	12.032	12.212	14.032	14.212
ANSI B 18.3.1 M (1986)	4.020	4.084	5.020	5.084	6.020	6.095	8.025	8.115	10.025	10.127	12.032	12.146	14.032	14.159
Key Engagement t	min.		min.		min.		min.		min.		min.		min.	
DIN 912 (1983)	2.5		3		4		5		6		7		8	
ISO 4762 (1997)	2.5		3		4		5		6		7		8	
ANSI B 18.3.1 M (1986)	2.5		3		4		5		6		7		8	
Thread Size d1	(M18)		M20		(M22)		M24		(M27)		M30		M33	
Thread Pitch	2.5		2.5		2.5		3		3		3.5		3.5	
Thread Length b	48		52		56		60		66		72		78	
Head Dia. d2	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	26.67	27.33	29.67	30.33	32.61	33.39	35.61	36.39	39.61	40.39	44.61	45.39	49.61	50.39
ISO 4762 (1997)			29.67	30.33			35.61	36.39			44.61	45.39		
ANSI B 18.3.1 M (1986)			29.53	30.33			35.48	36.39			44.42	45.39		
Head Height k	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	17.57	18.00	19.48	20.00	21.48	22.00	23.48	24.00	26.48	27.00	29.48	30.00	32.38	33.00
ISO 4762 (1997)			19.48	20.00			23.48	24.00			29.48	30.00		
ANSI B 18.3.1 M (1986)			19.73	20.00			23.70	24.00			29.67	30.00		
Key Size nominal s	14		17		17		19		19		22		24	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	14.032	14.212	17.05	17.23	17.05	17.23	19.065	19.275	19.065	19.275	22.065	22.275	24.065	24.275
ISO 4762 (1997)			17.05	17.23			19.065	19.275			22.065	22.275		
ANSI B 18.3.1 M (1986)			17.050	17.216			19.065	19.243			22.065	22.319		
Key Engagement t	min.		min.		min.		min.		min.		min.		min.	
DIN 912 (1983)	9		10		11		12		13.5		15.5		18	
ISO 4762 (1997)			10				12				15.5			
ANSI B 18.3.1 M (1986)			10				12				15.0			

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.

DIN 912 (1983) / ISO 4762 (1997) / ANSI B 18.3.1M (1982) - LGF 01/01/09 Revised

See Next Page For Additional Information

SOCKET HEAD CAP SCREWS DIN 912/ ISO 4762 / ANSI B 18.3.1 M



Head Diameter d2 based on Knurled Head

Thread Size d1	M36		(M39)		M42		(M45)		M48		M56		M64	
Thread Pitch	4		4		4.5		4.5		5		5.5		6	
Thread Length b	84		NA		96		NA		108		124		140	
Head Dia. d2	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	53.54	54.46	57.54	58.46	62.54	63.46	66.54	67.46	71.54	72.46	83.46	84.54	95.46	96.54
ISO 4762 (1997)	53.54	54.46			62.54	63.46			71.54	72.46	83.46	84.54	95.46	96.54
ANSI B 18.3.1 M (1986)	53.37	54.46			62.31	63.46			71.27	72.46				
Head Height k	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	35.38	36.00	38.38	39.00	41.38	42.00	44.38	45.00	47.38	48.00	55.26	56.00	63.26	64.00
ISO 4762 (1997)	35.38	36.00			41.38	42.00			47.38	48.00	55.26	56.00	63.26	64.00
ANSI B 18.3.1 M (1986)	35.64	36.00			41.61	42.00			47.58	48.00				
Key Size nominal s	27		27		32		32		36		41		46	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	27.065	27.275	27.065	27.275	32.08	32.33	32.08	32.33	36.08	36.33	41.08	41.33	46.08	46.33
ISO 4762 (1997)	27.065	27.275			32.08	32.33			36.08	36.33	41.08	41.33	46.08	46.33
ANSI B 18.3.1 M (1986)	27.065	27.319			32.080	32.461			36.080	36.461				
Key Engagement t	min.		min.		min.		min.		min.		min.		min.	
DIN 912 (1983)	19		22		24		24		28		34		38	
ISO 4762 (1997)	19				24				28		34		38	
ANSI B 18.3.1 M (1986)	18				21				24					

Thread Size d1	M72		M80		M90		M100	
Thread Pitch	6		6		6		6	
Thread Length b	156		172		192		212	
Head Dia. d2	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	107.46	108.54	119.46	120.54	134.37	135.63	149.37	150.63
Head Height k	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	71.26	72.00	79.26	80.00	89.13	90.00	99.13	100.00
Key Size nominal s	55		65		75		85	
	min.	max.	min.	max.	min.	max.	min.	max.
DIN 912 (1983)	55.10	55.40	65.10	65.40	75.10	75.40	85.12	85.47
Key Engagement t	min.		min.		min.		min.	
DIN 912 (1983)	43		48		54		60	

Property Class	12.9		8.8sd 16mm		8.8sd 16mm		10.9		A2 /A4-50		A2 /A4-70		A2 /A4-80	
Tensile Strength	176900 psi		116000 psi		120350 psi		150800 psi		72500 psi		101500 psi		116000 psi	
Yield Strength	159500 psi		92800 psi		95700 psi		136300 psi		30450 psi		65250 psi		87000 psi	
Rockwell Hardness (HRC)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	39	44	22	32	23	34	32	39	NA	NA	NA	NA	NA	NA

Property Class	Steel	Steel	Stainless Steel
	12.9	8.8 & 10.9	A2 & A4
Finish	Furnace Black		Plain
Thread Tolerance	5g6g		6g

Diameters & Lengths With () are not recommended for new design.
M1.4, 2.6, 39 and 45 are no longer included in DIN 912.
M1.4, 2.6, 18, 22, 27, 33, 39, and 45 are no longer included in ISO 4762.
 The basic difference between DIN 912-12.9 (1983) / ISO 4762-12.9 (1997) and ANSI B 18.3.M (1986) is both DIN and ISO have a thread tolerance of 5g6g, while ANSI has a thread tolerance of 4g6g, which may not be readily available on a worldwide basis.
ANSI B 18.3.1 M is only available in Property Class 12.9.

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.
 DIN 912 (1983) / ISO 4762 (1997) / ANSI B 18.3.1M (1982) - LGF 05/01/08 See Next Page For Additional Information

SOCKET HEAD CAP SCREWS DIN 912/ ISO 4762 / ANSI B 18.3.1 M

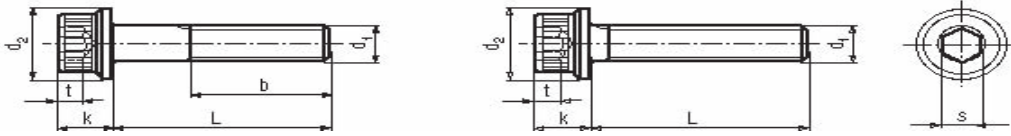
Length Tolerance	DIN 912		ISO 4762		ANSI B18.3.1M M1.6 Thru M10		ANSI B18.3.1M M12 Thru M20		ANSI B18.3.1M Over M20	
	min.	max.	min.	max.						
Nominal Length										
2	1.8	2.2	1.8	2.2						
2.5	2.3	2.7	2.3	2.7	2.2	2.8				
3	2.8	3.2	2.8	3.2	2.7	3.3				
4	3.76	4.24	3.76	4.24	3.7	4.3				
5	4.76	5.24	4.76	5.24	4.7	5.3				
6	5.76	6.24	5.76	6.24	5.7	6.3				
8	7.71	8.29	7.71	8.29	7.7	8.3				
10	9.71	10.29	9.71	10.29	9.7	10.3				
12	11.65	12.35	11.65	12.35	11.7	12.3				
(14)	13.65	14.35								
16	15.65	16.35	15.65	16.35	15.7	16.3	15.7	16.3		
(18)	17.65	18.35								
20	19.58	20.42	19.58	20.42	19.6	20.4	19.6	20.4		
(22)	21.58	22.42								
25	24.58	25.42	24.58	25.42	24.6	25.4	24.6	25.4		
(28)	27.58	28.42								
30	29.58	30.42	29.58	30.42	29.6	30.4	29.6	30.4		
35	34.5	35.5	34.5	35.5	34.6	35.4	34.6	35.4		
40	39.5	40.5	39.5	40.5	39.6	40.4	39.6	40.4	39.3	40.7
45	44.5	45.5	44.5	45.5	44.6	45.4	44.6	45.4	44.3	45.7
50	49.5	50.5	49.5	50.5	49.6	50.4	49.6	50.4	49.3	50.7
55	54.4	55.6	54.4	55.6	54.3	55.7	54	56	53.5	56.5
60	59.4	60.6	59.4	60.6	59.3	60.7	59	61	58.5	61.5
65	64.4	65.6	64.4	65.6	64.3	65.7	64	66	63.5	66.5
70	69.4	70.6	69.4	70.6	69.3	70.7	69	71	68.5	71.5
(75)	74.4	75.6								
80	79.4	80.6	79.4	80.6	79.3	80.7	79	81	78.5	81.5
(85)	84.3	85.7								
90	89.3	90.7	89.3	90.7	89.3	90.7	89	91	88.5	91.5
(95)	94.3	95.7								
100	99.3	100.7	99.3	100.7	99.3	100.7	99	101	98.5	101.5
110	109.3	110.7	109.3	110.7	109.3	110.7	109	111	108.5	111.5
120	119.3	120.7	119.3	120.7	119.3	120.7	119	121	118.5	121.5
130	129.2	130.8	129.2	130.8	129	131	128.5	131.5	128	132
140	139.2	140.8	139.2	140.8	139	141	138.5	141.5	138	142
150	149.2	150.8	149.2	150.8	149	151	148.5	151.5	148	152
160	159.2	160.8	159.2	160.8	159	161	158.5	161.5	158	162
(170)	169.2	170.8								
180	179.2	180.8	179.2	180.8	179	181	178.5	181.5	178	182
(190)	189.1	190.9								
200	199.1	200.9	199.075	200.925	199	201	198.5	201.5	198	202
220	219.1	220.9	219.075	220.925	218	222	217.5	222.5	217	223
240	239.1	240.9	239.075	240.925	238	242	237.5	242.5	237	243
260	258.95	261.05	258.95	261.05	258	262	257.5	262.5	257	263
280	278.95	281.05	278.95	281.05						
300	298.95	301.05	298.95	301.05	298	302	297.5	302.5	297	303
320	318.85	321.15								
340	338.85	341.15								
360	358.85	361.15								
380	378.85	381.15								
400	398.85	401.15								
420	418.75	421.25								
440	438.75	441.25								
460	458.75	461.25								
480	478.75	481.25								
500	498.75	501.25								

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.

DIN 912 (1983) / ISO 4762 (1997) / ANSI B 18.3.1M (1982) - LGF 05/01/08

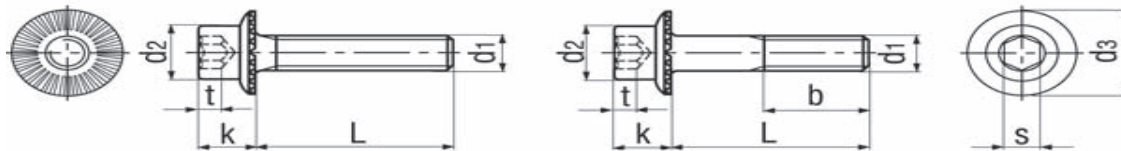
[See Previous Page For Additional Information](#)

SOCKET HEAD CAP SCREWS WITH FLANGE ATTACHED



Thread Size d1	M4	M5	M6	M8	M10	M12	Material	Steel		
Thread Pitch	0.7	0.8	1	1.25	1.5	1.75	Property Class	12.9		
Thread Length b	14	16	18	22	26	30	Finish	Furnace Black		
Head Dia. to include Flange d2	9	11	12.5	17	21	24	Thread Tolerance	6g		
Head Height to include Flange k	4	5	6	8	10	12	Tensile Strength	176900 psi		
Key Size s	3	4	5	6	8	10	Yield Strength	159500 psi		
Key Engagement t	2.2	2.5	3	4	5	6		Rockwell Hardness (HRC)	min.	max.
Length L	Thread Length						Full Thread	Partial Thread		
8										
10										
12										
16										
20										
25										
30										
35										
40										
50										
60										
70										
80										
90										
100										

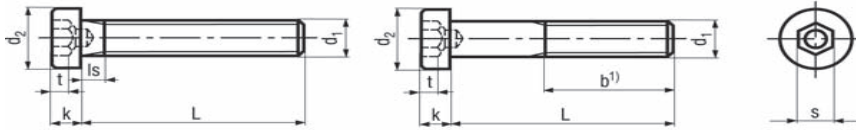
SOCKET HEAD CAP SCREWS WITH SERRATED (LOCKING) FLANGE ATTACHED



Thread Size d1	M5	M6	M8	M10	M12	Material	Steel	
Thread Pitch	0.8	1	1.25	1.5	1.75	Property Class	100	
Thread Length b	22	24	28	32	36	Finish	Furnace Black	
Head Dia. max. d2	9	11	14	17	19	Thread Tolerance	6g	
Flange Dia. max. d3	11	13.5	17	19.5	22.5	Tensile Strength	min.	max.
Head Height to include Flange k	5	6	8	10	12	Rockwell Hardness (HRC)	145000 psi	174000 psi
Key Size s	4	5	6	8	10		min.	max.
Key Engagement t	2.5	3	4	5	6	Length L	Thread Length	
10								
12								
16								
20								
25								
30								
35								
40								
45								
50								

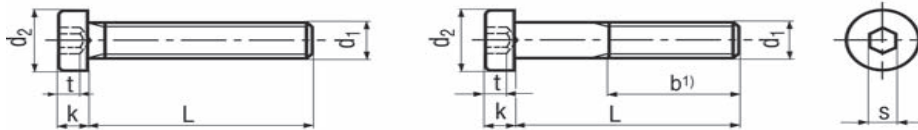
For More Detailed Information, Please Refer To Bossard BN 1392 and 3873, Which Are the Governing Standards.

LOW HEAD SOCKET HEAD CAP SCREWS WITH PILOT RECESS DIN 6912



Thread Size d1		M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24	(M27)	M30	(M33)	M36
Thread Pitch		0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	3	3.5	3.5	4
Shank Length min. ls		1.4	1.8	2.5	3.2	3.5	4.2	4.5	5	5.5	6.5	6.5	7	8	8.5	9.5	10.5
Thread Length b1 (min.)	For Lengths ≤125mm	14	16	18	22	26	30	34	38	42	46	50	54	60	66	72	78
	For Lengths >125mm≤200mm					32	36	40	44	48	52	56	60	66	72	78	84
	For Lengths >200 mm								57	61	65	69	73	79	85	91	97
Head Dia. d2	min.	6.78	8.28	9.78	12.73	15.73	17.73	20.67	23.67	26.67	29.67	32.61	35.61	39.61	44.61	49.61	53.54
	max. = nominal	7.00	8.50	10.00	13.00	16.00	18.00	21.00	24.00	27.00	30.00	33.00	36.00	40.00	45.00	50.00	54.00
Head Height k	min.	2.66	3.32	3.82	4.82	6.28	7.28	8.28	9.78	10.73	11.73	12.73	13.73	15.73	17.23	19.17	21.17
	max. = nominal	2.80	3.50	4.00	5.00	6.50	7.50	8.50	10.00	11.00	12.00	13.00	14.00	16.00	17.50	19.50	21.50
Key Size s	Nominal Size	3	4	5	6	8	10	12	14	14	17	17	19	19	22	24	27
	min.	3.02	4.02	5.02	6.02	8.025	10.025	12.032	14.032	14.032	17.05	17.05	19.065	19.065	22.065	24.065	27.065
	max.	3.10	4.12	5.14	6.14	8.175	10.175	12.212	14.212	14.212	17.23	17.23	19.275	19.275	22.275	24.275	27.275
Key Engagement t	min.	1.48	1.88	2.38	2.88	3.35	3.85	4.35	5.35	5.85	6.32	6.82	6.82	8.32	8.82	9.82	11.28
	max.	1.72	2.12	2.62	3.12	3.65	4.15	4.65	5.65	6.15	6.68	7.18	7.18	8.68	9.18	10.18	11.72

LOW HEAD SOCKET HEAD CAP SCREWS DIN 7984



DIN 6912 / 7984		
Nominal Length L	Length Tolerance	
	min	max
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.5	35.5
40	39.5	40.5
45	44.5	45.5
50	49.5	50.5
55	54.4	55.6
60	59.4	60.6
65	64.4	65.6
70	69.4	70.6
(75)	74.4	75.6
80	79.4	80.6
(85)	84.3	85.7
90	89.3	90.7
(95)	94.3	95.7
100	99.3	100.7
110	109.3	110.7
120	119.3	120.7
130	129.2	130.8
140	139.2	140.8
150	149.2	150.8
160	159.2	160.8
(170)	169.2	170.8
180	179.2	180.8
(190)	189.075	190.925
200	199.075	200.925

Thread Size d1		M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24	25	24.58	25.42
Thread Pitch		0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	(28)	27.58	28.42
Thread Length b1 (min.)	For Lengths ≤125mm	12	14	16	18	22	26	30	34	38	42	46	50	54	30	29.58	30.42
	For Lengths >125mm≤200mm					28	32	36	40	44	48	52	56	60	35	34.5	35.5
	For Lengths >200 mm									57	61	65	69	73	40	39.5	40.5
Head Dia. d2	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	60	59.4	60.6
	max. = nominal	5.50	7.00	8.50	10.00	13.00	16.00	18.00	21.00	24.00	27.00	30.00	33.00	36.00	65	64.4	65.6
Head Height 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	70	69.4	70.6
	max. = nominal	2.00	2.80	3.50	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	(75)	74.4	75.6
Key Size s	Nominal Size	2	2.5	3	4	5	7	8	10	12	12	14	14	17	80	79.4	80.6
	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	17.05	(85)	84.3	85.7
	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	17.23	90	89.3	90.7
Key Engagement 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	(95)	94.3	95.7
	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	100	99.3	100.7

Diameters & Lengths With () are not recommended for new design.

Property Class	Steel	Stainless Steel
	8.8	A2 & A4
Finish	Furnace Black	Plain
Thread Tolerance	6g	6g

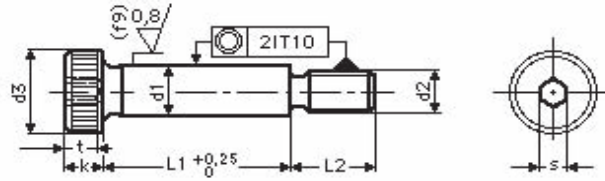
DIN 6912
DIN 7984
Neither of these designs are intended for high strength applications.

DIN 7984 Standard only covers through 100mm long.

For More Detailed Information, Please Refer To Complete DIN Standard , Which Is The Governing Standard.

DIN 6912 (1985) / DIN 7984 (1970)- LFG 05/01/08

SOCKET HEAD SHOULDER (STRIPPER) BOLTS ISO 7379



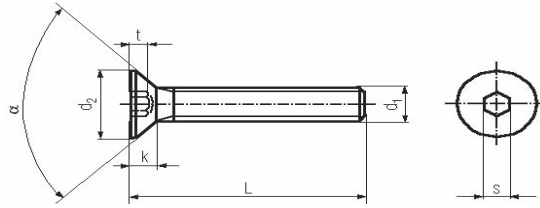
Shoulder Diameter (d1)	6 (1)	8	10	12 (1)	16
Shoulder min.	5.960	7.951	9.951	11.941	15.941
Shoulder max.	5.990	7.987	9.987	11.984	15.984
Shoulder Diameter Tolerance	-0.10 mm to -.040 mm		-0.13 mm to -.049 mm		-0.16 mm to -.059 mm
Shoulder Length Tolerance	+0.25 mm				
Thread Size & Pitch (d2)	M5x0.8	M6x1	M8x1.25	M10x1.5	M12x1.75
Thread Class	5g6g				
Thread Length (L2)	9.5	11	13	16	18
Head Diameter (d3)	10	13	16	18	24
Head Height (max.) (k)	4.50	5.50	7.00	9.00	11.00
Head Height (min.) (k)	4.32	5.32	6.78	7.78	9.73
Drive Size (s)	3	4	5	6	8
Drive Depth (min.) (t)	2.4	3.3	4.2	4.9	6.6
min. Tensile Strength (PSI)	159500		159500	159500	159500
Shear Strength (PSI)	95700		95700	95700	95700
Rockwell Hardness	C39-C44				

Shoulder Diameter (d1)	20	24 (1)	Shoulder Bolts	Material	12.9
Shoulder min.	19.928	23.928		Finish	Furnace Black
Shoulder max.	19.980	23.980	Shoulder	Ground	
Shoulder Diameter Tolerance	-.020 mm to -.072 mm		<p>Due to the undercut between the shoulder and the thread, the tightening torque has to be lowered from the normal torque for 12.9 material. The 12.9 material is to increase wear resistance on the shoulder.</p>		
Shoulder Length Tolerance	+0.25 mm				
Thread Size & Pitch (d2)	M16x2	M20x2.5			
Thread Class	5g6g				
Thread Length (b)	22	27			
Head Diameter (d3)	30	36	<p>The basic difference between ~ISO 7379 (1983) and ANSI B 18.3.3M (1986) is ANSI has a thread tolerance of 4g6g.</p>		
Head Height (max.) (k)	14.00	16.00			
Head Height (min.) (k)	13.73	15.73	<p>(1) These sizes are not included in the ISO 7379 standard, but are the accepted sizes in today's market. ISO recognizes 6.5, 13, and 25mm, but these sizes are not readily available outside of production quantities.</p>		
Drive Size (s)	10	12			
Drive Depth (min.) (t)	8.8	10			
min. Tensile Strength (PSI)	159500				
Shear Strength (PSI)	95700				
Rockwell Hardness	C39-C44				

For More Detailed Information, Please Refer To complete ISO Standard , Which Is The Governing Standard.

ISO 7379 (1983) - LFG 01/01/09 Revised

FLAT HEAD SOCKET CAP SCREWS DIN 7991 / ISO 10642 / ANSI B18.3.5M



*******Notice*******
 Lindstrom Metric, LLC will supply all Flat Head Socket Cap Screws With Full Thread, not according to below formulas.

Thread Size d1		(M2)	(M2.5)	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24
Thread Pitch		0.4	0.45	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3
Head Angle a		90°	90°	90°	90°	90°	90°	90°	90°	90°	90°	90°	90°	90°	60°	60°
DIN 7991 Thread Length Formula	For Lengths ≤125mm	10	11	12	14	16	18	22	26	30	34	38	42	46	50	54
	For Lengths >125mm≤200mm						24	28	32	36	40	44	48	52	56	60
	For Lengths >200 mm								45	49	53	57	61	65	69	73
ISO 10642 & ANSI B18.3.5M use a shank length / grip length formula to determine thread length. - Refer to full ISO or ANSI standard for more details.																
DIN 7991 Head Dia. d2	min.	3.7	4.7	5.7	7.64	9.64	11.57	15.57	19.48	23.48	26.48	29.48	32.38	35.38	35.38	38.38
	max. = nominal	4.0	5.0	6.0	8.00	10.00	12.00	16.00	20.00	24.00	27.00	30.00	33.00	36.00	36.00	39.00
ISO 10642 Head Dia. d2	min.			5.54	7.53	9.43	11.34	15.24	19.22	23.12	26.52	29.01		36.05		
	max. = theoretical			6.72	8.96	11.20	13.44	17.92	22.40	26.88	30.80	33.60		40.32		
ANSI B18.3.5M Head Dia. D2	min.			5.35	7.80	9.75	11.70	15.65	19.50	23.40	26.18	23.76		34.60		
	max. = theoretical			6.72	8.96	11.20	13.44	17.92	22.40	26.88	30.24	33.60		40.32		

ISO 10642 & ANSI B18.3.5M use a theoretical value for the max head diameter, which represents the exact diameter of a hole countersunk to exactly 90° in which a screw having the maximum head size will fit flush. - Refer to full ISO or ANSI standard for more details.

DIN 7991 Head Height k	max.	1.2	1.5	1.7	2.3	2.8	3.3	4.4	5.5	6.5	7	7.5	8	8.5	13.1	14
ISO 10642 Head Height k	max. = reference			1.86	2.48	3.10	3.72	4.96	6.20	7.44	8.40	8.80		10.16		
ANSI B18.3.5M Head Height k	max. = reference			1.86	2.48	3.10	3.72	4.96	6.20	7.44	8.12	8.80		10.16		

ISO 10642 & ANSI B18.3.5M show Head Height k as a reference point only. - Refer to full ISO or ANSI standard for more details.
 For DIN 7991 / ISO 10642 / ANSI B18.3.5M, the overall length of the screw includes the head.

DIN 7991 Key Size s	Nominal Size	1.3	1.5	2	2.5	3	4	5	6	8	10	10	12	12	14	14
	min.	1.275	1.545	2.02	2.52	3.02	4.02	5.02	6.02	8.025	10.025	10.025	12.032	12.032	14.032	14.032
	max.	1.300	1.520	2.10	2.60	3.10	4.12	5.14	6.14	8.175	10.175	10.175	12.212	12.212	14.212	14.212
ISO 10642 Key Size s	Nominal Size			2	2.5	3	4	5	6	8	10	10		12		
	min.			2.02	2.52	3.02	4.020	5.02	6.02	8.025	10.025	10.025		12.032		
	max.			2.06	2.58	3.08	4.095	5.14	6.14	8.175	10.175	10.175		12.212		
ANSI B18.3.5M Key Size s	Nominal Size			2	2.5	3	4	5	6	8	10	10		12		
	min.			2.020	2.52	3.020	4.020	5.020	6.020	8.025	10.025	10.025		12.032		
	max.			2.045	2.56	3.071	4.084	5.084	6.095	8.115	10.115	10.115		12.142		
DIN 7991 Key Engagement t	min.	0.75	0.8	0.950	1.55	2.05	2.25	3.2	4.1	4.3	4.5	5.0	5.2	5.6	8.44	9.87
ISO 10642 Key Engagement t	min.			1.100	1.50	1.90	2.20	3.0	3.6	4.3	4.5	4.8		5.6		
ANSI B18.3.5M Key Engagement t	min.			1.100	1.50	1.90	2.20	3.0	3.6	4.3	4.7	4.8		5.6		

Length Tolerance	DIN 7991 / ISO 10642		ANSI B18.3.5M		Length Tolerance	DIN 7991 / ISO 10642		ANSI B18.3.5M	
	min	max	min	max		min	max	min	max
Nominal Length					Nominal Length				
(4)	3.76	4.24	3.7	4.3	30	29.58	30.42	29.5	30.5
(5)	4.76	5.24	4.7	5.3	35	34.5	35.5	34.5	35.5
(6)	5.76	6.24	5.7	6.3	40	39.5	40.5	39.5	40.5
8	7.71	8.29	7.7	8.3	45	44.5	45.5	44.5	45.5
10	9.71	10.29	9.7	10.3	50	49.5	50.5	49.5	50.5
12	11.65	12.35	11.7	12.3	(55)	54.4	55.6	54.5	55.5
(14)	13.65	14.35	13.7	14.3	60	59.4	60.6	59.5	60.5
16	15.65	16.35	15.7	16.3	(65)	64.4	65.6	64.2	65.8
(18)	17.65	18.35	17.5	18.5	70	69.4	70.6	69.2	70.8
20	19.58	20.42	19.5	20.5	(75)	74.4	75.6	74.2	75.8
(22)	21.58	22.42	21.5	22.5	80	79.4	80.6	79.2	80.8
25	24.58	25.42	24.5	25.5	90	89.3	90.7	89.2	90.8
(28)	27.58	28.42	27.5	28.5	100	99.3	100.7	99.2	100.8

*******Notice*******
 Diameters and or Lengths shown with () are not shown in some standards are not recommended for use in new design.

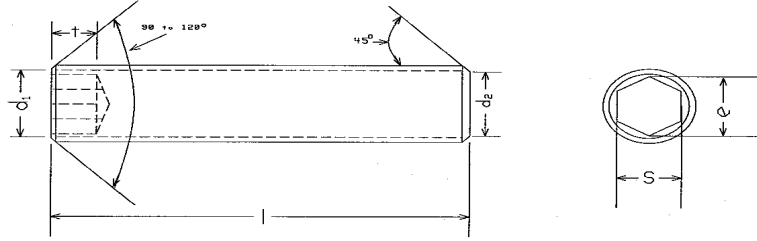
*******Notice*******
 DIN 7991, ISO 10642, and ANSI B18.3.5M are not intended for high strength applications. The only purpose of having them produced in property class 10.9 or 12.9 is to increase the wear resistance of the socket drive.

	DIN 7991 / ISO 10642		ANSI B18.3.5M
Material	Steel	Stainless Steel	Steel
Property Class	10.9	A2 & A4	12.9
Finish	Furnace Black	Plain	Furnace Black
Thread Tolerance	6g	6g	4g6g

For More Detailed Information, Please Refer To Complete DIN, ISO or ANSI Standard, Which Are The Governing Standards.

DIN 7991 (1986) / ISO 10642 (1997) / ANSI B18.3.5M (1986 Rev. 1993)- LGF 01/01/09 Revised

SOCKET SET SCREWS FLAT POINT DIN 913 / ISO 4026



Thread Size d1		(M1.4)	M1.6	(M1.8)	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24
Thread Pitch		0.3	0.35	0.35	0.4	0.45	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3
d2	min.	0.45	0.55	0.65	0.75	1.25	1.75	2.25	3.2	3.7	5.2	6.64	8.14	9.64	11.57	12.57	14.57	16.57	17.57
	max.	0.70	0.80	0.90	1.00	1.50	2.00	2.50	3.5	4.0	5.5	7.00	8.50	10.00	12.00	13.00	15.00	17.00	18.00
S	Nominal Size	0.7	0.7	0.7	0.9	1.3	1.5	2	2.5	3	4	5	6	6	8	10	10	12	12
	min.	0.711	0.711	0.711	0.889	1.270	1.520	2.020	2.520	3.020	4.020	5.020	6.020	6.020	8.025	10.025	10.025	12.032	12.032
	max.	0.724	0.724	0.724	0.902	1.295	1.545	2.045	2.560	3.080	4.095	5.095	6.095	6.095	8.115	10.115	10.115	12.142	12.142
t min.	above	0.6	0.7	0.8	0.8	1.2	1.2	1.5	2	2	3	4	4.8	5.6	6.4	7.2	8	9	10
	below	1.4	1.5	1.6	1.7	2	2	2.5	3	3.5	5	6	8	9	10	11	12	13.5	15

Nominal Length	Length		Minimum Depth Of Key Engagement - See t min. Above For Clarification To Actual Nominal Lengths																	
	min.	max.																		
2	1.80	2.20																		
2.5	2.30	2.70																		
3	2.80	3.20																		
(3.5)	3.26	3.74																		
4	3.76	4.24																		
5	4.76	5.24																		
6	5.76	6.24																		
8	7.71	8.29																		
10	9.71	10.29																		
12	11.65	12.35																		
(14)	13.65	14.35																		
16	15.65	16.35																		
(18)	17.65	18.35																		
20	19.58	20.42																		
(22)	21.58	22.42																		
25	24.58	25.42																		
(28)	27.58	28.42																		
30	29.58	30.42																		
35	34.5	35.5																		
40	39.5	40.5																		
45	44.5	45.5																		
50	49.5	50.5																		
55	54.4	55.6																		
60	59.4	60.6																		
70	69.4	70.6																		
80	79.4	80.6																		

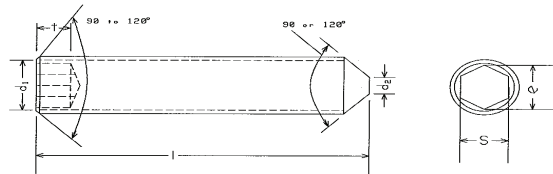
Diameters With () are not in the ISO 4026 Standard and not recommended for new design.
 Lengths With () are not in the ISO 4026 Standard and are not recommended for new design.

Property Class	Steel	Stainless Steel
		45H
Finish	Furnace Black	Plain
Thread Tolerance	5g6g	6g

For More Detailed Information, Please Refer To Complete DIN or ISO Standard, Which Are The Governing Standards.

DIN 913 (1980) / ISO 4026 (1993) - LFG 05/01/08

SOCKET SET SCREWS CONE POINT DIN 914 / ISO 4027



Thread Size d1		(M1.4)	M1.6	(M1.8)	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24
Thread Pitch		0.3	0.35	0.35	0.4	0.45	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3
d2	min.									0.9	1.4	1.9	2.4	3.25	3.25	4.25	4.25	5.25	5.25
	max.									1.5	2.0	2.5	3.0	4.00	4.00	5.00	5.00	6.00	6.00
S	Nominal Size	0.7	0.7	0.7	0.9	1.3	1.5	2	2.5	3	4	5	6	6	8	10	10	12	12
	min.	0.711	0.711	0.711	0.889	1.270	1.520	2.020	2.520	3.020	4.020	5.020	6.020	6.020	8.025	10.025	10.025	12.032	12.032
	max.	0.724	0.724	0.724	0.902	1.295	1.545	2.045	2.560	3.080	4.095	5.095	6.095	6.095	8.115	10.115	10.115	12.142	12.142
t min.	above	0.6	0.7	0.8	0.8	1.2	1.2	1.5	2	2	3	4	4.5	5.6	6.4	7.2	8	9	10
	below	1.4	1.5	1.6	1.7	2	2	2.5	3	3.5	5	6	8	9	10	11	12	13.5	15

Nominal Length	Length		Minimum Depth Of Key Engagement - See t min. Above For Clarification To Actual Nominal Lengths																	
	min.	max.																		
2	1.80	2.20																		
2.5	2.30	2.70																		
3	2.80	3.20																		
(3.5)	3.26	3.74																		
4	3.76	4.24																		
5	4.76	5.24																		
6	5.76	6.24																		
8	7.71	8.29																		
10	9.71	10.29																		
12	11.65	12.35																		
(14)	13.65	14.35																		
16	15.65	16.35																		
(18)	17.65	18.35																		
20	19.58	20.42																		
(22)	21.58	22.42																		
25	24.58	25.42																		
(28)	27.58	28.42																		
30	29.58	30.42																		
35	34.5	35.5																		
40	39.5	40.5																		
45	44.5	45.5																		
50	49.5	50.5																		
55	54.4	55.6																		
60	59.4	60.6																		
70	69.4	70.6																		
80	79.4	80.6																		

Diameters With () are not in the ISO 4027 Standard and not recommended for new design.
 Lengths With () are not in the ISO 4027 Standard and are not recommended for new design.

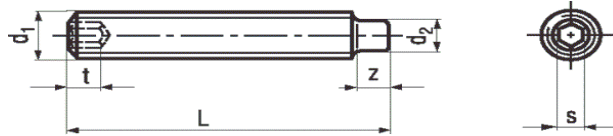
Property Class	Steel	Stainless Steel
	45H	A1, A2, A4
Finish	Furnace Black	Plain
Thread Tolerance	5g6g	6g

Angle Of Cone Point	above	90°
	below	120°

For More Detailed Information, Please Refer To Complete DIN or ISO Standard, Which Are The Governing Standards.

DIN 914 (1980) / ISO 4027 (1993) - LFG 05/01/08

SOCKET SET SCREWS DOG POINT DIN 915 / ISO 4028



Thread Size d1		(M1.4)	M1.6	(M1.8)	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24	
Thread Pitch		0.3	0.35	0.35	0.4	0.45	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	
d2	min.	0.45	0.55	0.65	0.75	1.25	1.75	2.25	3.2	3.7	5.2	6.64	8.14	9.64	11.57	12.57	14.57	16.57	17.57	
	max.	0.70	0.80	0.90	1.00	1.50	2.00	2.50	3.5	4.0	5.5	7.00	8.50	10.00	12.00	13.00	15.00	17.00	18.00	
s	Nominal Size	0.7	0.7	0.7	0.9	1.3	1.5	2	2.5	3	4	5	6	6	8	10	10	12	12	
	min.	0.711	0.711	0.711	0.889	1.270	1.520	2.020	2.520	3.020	4.020	5.020	6.020	6.020	8.025	10.025	10.025	12.032	12.032	
	max.	0.724	0.724	0.724	0.902	1.295	1.545	2.045	2.560	3.060	4.095	5.095	6.095	6.095	8.115	10.115	10.115	12.142	12.142	
t min.	above	0.6	0.7	0.8	0.8	1.2	1.2	1.5	2	2	3	4	4.8	5.6	6.4	7.2	8	9	10	
	below	1.4	1.5	1.6	1.7	2	2	2.5	3	3.5	5	6	8	9	10	11	12	13.5	15	
z	Dog pt (1)	min.	0.40	0.40	0.50	0.50	0.63	0.75	1.00	1.25	1.50	2.00	2.50	3.00	3.5	4.0	4.5	5.0	5.5	6.0
		max.	0.65	0.65	0.65	0.75	0.88	1.00	1.25	1.50	1.75	2.25	2.75	3.25	3.8	4.3	4.8	5.3	5.8	6.3
	Dog pt (2)	min.	0.80	0.80	1.00	1.00	1.25	1.50	2.00	2.50	3.00	4.0	5.0	6.0	7.00	8.00	9.00	10.00	11.00	12.00
		max.	1.05	1.05	1.25	1.25	1.50	1.75	2.25	2.75	3.25	4.3	5.3	6.3	7.36	8.36	9.86	10.36	11.43	12.43

Nominal Length	Length		Minimum Depth Of Key Engagement - See t min. Above For Clarification To Actual Nominal Lengths																	
	min.	max.																		
2	1.80	2.20																		
2.5	2.30	2.70																		
3	2.80	3.20																		
(3.5)	3.26	3.74																		
4	3.76	4.24																		
5	4.76	5.24																		
6	5.76	6.24																		
8	7.71	8.29																		
10	9.71	10.29																		
12	11.65	12.35																		
(14)	13.65	14.35																		
16	15.65	16.35																		
(18)	17.65	18.35																		
20	19.58	20.42																		
(22)	21.58	22.42																		
25	24.58	25.42																		
(28)	27.58	28.42																		
30	29.58	30.42																		
35	34.5	35.5																		
40	39.5	40.5																		
45	44.5	45.5																		
50	49.5	50.5																		
55	54.4	55.6																		
60	59.4	60.6																		
70	69.4	70.6																		
80	79.4	80.6																		

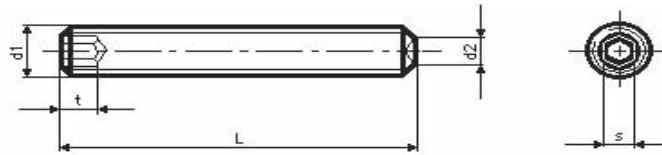
Diameters With () are not in the ISO 4028 Standard and not recommended for new design.
 Lengths With () are not in the ISO 4028 Standard and are not recommended for new design.

Property Class	Steel	Stainless Steel
	Finish	45H Furnace Black
Thread Tolerance	5g6g	6g

Length Of Dog Point	above	1
	below	2

For More Detailed Information, Please Refer To Complete DIN or ISO Standard, Which Are The Governing Standards.

SOCKET SETS CUP POINT DIN 916 / ISO 4029



Thread Size d1		(M1.4)	M1.6	(M1.8)	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24
Thread Pitch		0.3	0.35	0.35	0.4	0.45	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3
d2	min.	0.45	0.55	0.65	0.75	0.95	1.15	1.75	2.25	2.75	4.7	5.7	7.64	8.64	9.64	11.57	13.57	15.57	15.57
	max.	0.70	0.80	0.90	1.00	1.20	1.40	2.00	2.50	3.00	5.0	6.0	8.00	9.00	10.00	12.00	14.00	16.00	16.00
S	Nominal Size	0.7	0.7	0.7	0.9	1.3	1.5	2	2.5	3	4	5	6	6	8	10	10	12	12
	min.	0.711	0.711	0.711	0.889	1.270	1.520	2.020	2.520	3.020	4.020	5.020	6.020	6.020	8.025	10.025	10.025	12.032	12.032
	max.	0.724	0.724	0.724	0.902	1.295	1.545	2.045	2.560	3.080	4.095	5.095	6.095	6.095	8.115	10.115	10.115	12.142	12.142
t min.	above	0.6	0.7	0.8	0.8	1.2	1.2	1.5	2	2	3	4	4.8	5.6	6.4	7.2	8	9	10
	below	1.4	1.5	1.6	1.7	2	2	2.5	3	3.5	5	6	8	9	10	11	12	13.5	15

Nominal Length	Length		Minimum Depth Of Key Engagement - See t min. Above For Clarification To Actual Nominal Lengths																	
	min.	max.																		
2	1.80	2.20																		
2.5	2.30	2.70																		
3	2.80	3.20																		
(3.5)	3.26	3.74																		
4	3.76	4.24																		
5	4.76	5.24																		
6	5.76	6.24																		
8	7.71	8.29																		
10	9.71	10.29																		
12	11.65	12.35																		
(14)	13.65	14.35																		
16	15.65	16.35																		
(18)	17.65	18.35																		
20	19.58	20.42																		
(22)	21.58	22.42																		
25	24.58	25.42																		
(28)	27.58	28.42																		
30	29.58	30.42																		
35	34.5	35.5																		
40	39.5	40.5																		
45	44.5	45.5																		
50	49.5	50.5																		
55	54.4	55.6																		
60	59.4	60.6																		
70	69.4	70.6																		
80	79.4	80.6																		

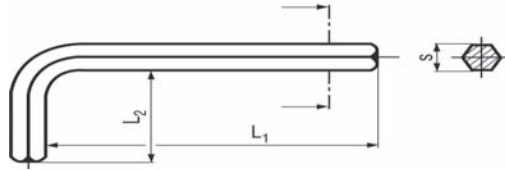
Diameters With () are not in the ISO 4029 Standard and not recommended for new design.
 Lengths With () are not in the ISO 4029 Standard and are not recommended for new design.

Property Class	Steel	Stainless Steel
	45H	A1, A2, A4
Finish	Furnace Black	Plain
Thread Tolerance	5g6g	6g

For More Detailed Information, Please Refer To Complete DIN or ISO Standard, Which Are The Governing Standards.

DIN 916 (1980) / ISO 4029 (1993) - LFG 05/01/08

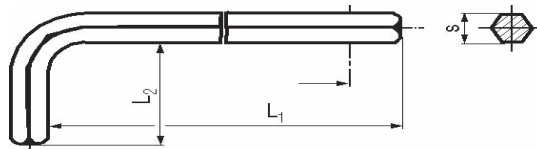
HEX KEYS REGULAR DIN 911 / ISO 2936 / ANSI B 18.3.2M



Din 911 Key Size s	s Tolerance		Long Arm L1	Short Arm L2	Rockwell Hardness	Fits Dia. Socket Cap Screws	Fits Dia. Socket Set Screws	Fits Dia. Button & Flat Socket Screws	Fits Dia. Shoulder Screws	Fits Dia. Low Head Socket Screws	
	min.	max.									
(0.7)	0.698	0.711	32	6	52 HRC		1.4/1.6				
(0.9)	0.876	0.889	32	10			2				
(1.3)	1.244	1.270	40	12			1.4	2.5	2		
(1.5)	1.460	1.500	45	14			1.6/2	3	2.5		
(2)	1.960	2.000	50	16			2.5/2.6	4	3	3	
2.5	2.460	2.500	56	18			3	5	4	4	
3	2.952	3.000	63	20			4	6	5	5	
4	3.952	4.000	71	25			5	8	6	8	
5	4.952	5.000	80	28			6	10	8	10	
6	5.942	6.000	90	32			8	12/14	10	12	
(7)	6.942	7.000	95	34	50 HRC					10	
8	7.942	8.000	100	36			10	16	12	16	
10	9.930	10.000	112	40	48 HRC		12	18/20	14/16	20	
12	11.890	12.000	125	45			14	22/24	20	12	
14	13.890	14.000	140	55	45 HRC		16/18	24		20	
17	16.890	17.000	160	60			20/22				24
19	18.870	19.000	180	70			24/27				
22	21.870	22.000	200	80			30				
24	23.870	24.000	224	90			33				
27	26.870	27.000	250	100			36/39				
32	31.840	32.000	315	125			42/45				
36	35.840	36.000	355	140		48					

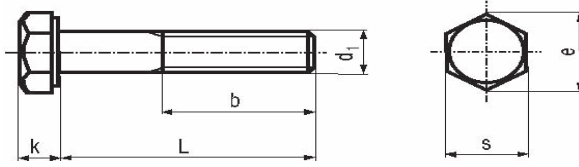
The dimensions for ANSI B 18 3.2M and ISO 2936 are basically the same and should have little if any impact during use of same.

HEX KEYS (LONG ARM) ~ DIN 911



Din 911 Key Size s	s Tolerance		Long Arm L1	Short Arm L2	Rockwell Hardness	Fits Dia. Socket Cap	Fits Dia. Socket Set	Fits Dia. Button & Flat	Fits Dia. Shoulder	Fits Dia. Low Head Socket	
	min.	max.									
(1.5)	1.460	1.500	88	15	52 HRC	1.6/2	3	2.5			
(2)	1.960	2.000	90	16			2.5/2.6	4	3	3	
2.5	2.460	2.500	110	18			3	5	4	4	
3	2.952	3.000	125	20			4	6	5	6	
4	3.952	4.000	150	25			5	8	6	8	
5	4.952	5.000	150	28			6	10	8	10	
6	5.942	6.000	200	32			8	12/14	10	12	
8	7.942	8.000	200	36	50 HRC	10	16	12	16	12	
10	9.930	10.000	200	40	48 HRC	12	18/20	14/16	20		
12	11.890	12.000	250	45			14	22/24	20	12	
14	13.890	14.000	300	55	45 HRC	16/18	24			20	
17	16.890	17.000	350	60			20/22				24
19	18.870	19.000	350	70			24/27				

For More Detailed Information, Please Refer To Complete DIN Standard, Which Is The Governing Standard.



DIN 931 / ISO 4014 Partial Thread
DIN 933 / ISO 4017 Full Thread

Width Across Flats (s)	M2		M3		M4		M5		M6		(M7)		M8	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	3.82	4.00	5.32	5.50	6.78	7.00	7.78	8.00	9.78	10.00	10.73	11.00	12.73	13.00
ISO 4014/4017 (1988)	3.82	4.00	5.32	5.50	6.78	7.00	7.78	8.00	9.78	10.00			12.73	13.00
JIS B 1180 (1977)													11.75	12.00
ANSI B 18.2.3.1M (1979)							7.78	8.00	9.78	10.00			12.73	13.00

Head Height (k)	M2		M3		M4		M5		M6		(M7)		M8	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	1.28	1.52	1.88	2.12	2.68	2.92	3.35	3.65	3.85	4.15	4.65	4.95	5.15	5.45
ISO 4014/4017 (1988)	1.275	1.525	1.875	2.125	2.675	2.925	3.35	3.65	3.85	4.15			5.15	5.45
JIS B 1180 (1977)													5.35	5.65
ANSI B 18.2.3.1M (1979)							3.35	3.65	3.85	4.15			5.1	5.5

Comparable Thread Lengths For DIN - ISO - JIS - ANSI													
DIN 931	M2	M3	M4	M5	M6	(M7)	M8						
Lengths ≤125mm	10	12	14	16	18	20	22						
Lengths >125mm≤200mm				22	24	26	28						
Lengths >200 mm							41						
ISO 4014	M2	M3	M4	M5	M6	(M7)	M8						
Lengths ≤125mm	10	12	14	16	18		22						
Lengths >125mm≤200mm													
Lengths >200 mm													
JIS 1180	M2	M3	M4	M5	M6	(M7)	M8						
Lengths ≤125mm							22						
Lengths >125mm≤200mm													
Lengths >200 mm													
ANSI B18.2.3.1M	M2	M3	M4	M5	M6	(M7)	M8						
Lengths ≤125mm				16	18		22						
Lengths >125mm≤200mm				22	24		28						
Lengths >200 mm				35	37		41						

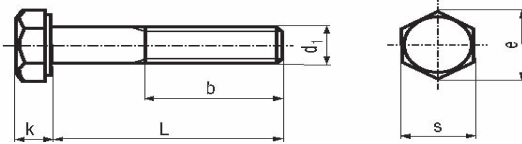
Width Across Flats (s)	M10		M12		(M14)		M16		(M18)		M20		(M22)	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	16.73	17.00	18.67	19.00	21.67	22.00	23.67	24.00	26.67	27.00	29.67	30.00	31.61	32.00
ISO 4014/4017 (1988)	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00	26.67	27.00	29.67	30.00	33.38	34.00
JIS B 1180 (1977)	13.75	14.00	16.65	17.00										
ANSI B 18.2.3.1M (1979)	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00			29.16	30.00		

Head Height (k)	M10		M12		(M14)		M16		(M18)		M20		(M22)	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	6.22	6.58	7.32	7.68	8.62	8.98	9.82	10.18	11.28	11.72	12.28	12.72	13.78	14.22
ISO 4014/4017 (1988)	6.22	6.58	7.32	7.68	8.62	8.98	9.82	10.18	11.285	11.715	12.285	12.715	13.785	14.215
JIS B 1180 (1977)	6.8	7.2	7.8	8.2										
ANSI B 18.2.3.1M (1979)	6.17	6.63	7.24	7.76	8.51	9.09	9.68	10.32			12.12	12.88		

Comparable Thread Lengths For DIN - ISO - JIS - ANSI													
DIN 931	M10	M12	(M14)	M16	(M18)	M20	(M22)						
Lengths ≤125mm	26	30	34	38	42	46	50						
Lengths >125mm≤200mm	32	36	40	44	48	52	56						
Lengths >200 mm	45	49	53	57	61	65	69						
ISO 4014	M10	M12	(M14)	M16	(M18)	M20	(M22)						
Lengths ≤125mm	26	30	34	38	42	46	50						
Lengths >125mm≤200mm			40	44	48	52	56						
Lengths >200 mm							69						
JIS 1180	M10	M12	(M14)	M16	(M18)	M20	(M22)						
Lengths ≤125mm	26	30											
Lengths >125mm≤200mm													
Lengths >200 mm													
ANSI B18.2.3.1M	M10	M12	(M14)	M16	(M18)	M20	(M22)						
Lengths ≤125mm	26	30	34	38		46							
Lengths >125mm≤200mm	32	36	40	44		52							
Lengths >200 mm	45	49	53	57		65							

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.

DIN 931/933 / ISO 4014/4017 / JIS B1180 / ANSI B 18.2.3.1M



DIN 931 / ISO 4014 Partial Thread
DIN 933 / ISO 4017 Full Thread

Width Across Flats (s)	M24		(M27)		M30		(M33)		M36		(M39)		M42	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	35.38	36.00	40	41	45	46	49	50	53.8	55.0	58.8	60.0	63.1	65.0
ISO 4014/4017 (1988)	35.38	36.00	40	41	45	46	49	50	53.8	55.0	58.8	60.0	63.1	65.0
ANSI B 18.2.3.1M (1979)	35	36			45	46			53.8	55.0				

Head Height (k)	M24		(M27)		M30		(M33)		M36		(M39)		M42	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	14.78	15.22	16.65	17.35	18.28	19.12	20.58	21.42	22.08	22.92	24.58	25.42	25.58	26.42
ISO 4014/4017 (1988)	14.785	15.215	16.65	17.35	18.28	19.12	20.58	21.42	22.08	22.92	24.58	25.42	25.58	26.42
ANSI B 18.2.3.1M (1979)	14.56	15.44			17.92	19.48			21.62	23.38				

Comparable Thread Lengths For DIN - ISO - JIS - ANSI													
DIN 931	M24	(M27)	M30	(M33)	M36	(M39)	M42						
Lengths ≤125mm	54	60	66	72	78	84	90						
Lengths >125mm≤200mm	60	66	72	78	84	90	96						
Lengths >200 mm	73	79	85	91	97	103	109						
ISO 4014	M24	(M27)	M30	(M33)	M36	(M39)	M42						
Lengths ≤125mm	54	60	66	72	78	84	90						
Lengths >125mm≤200mm	60	66	72	78	84	90	96						
Lengths >200 mm	73	79	85	91	97	103	109						
ANSI B18.2.3.1M	M24	(M27)	M30	(M33)	M36	(M39)	M42						
Lengths ≤125mm	54		66										
Lengths >125mm≤200mm	60		72		84		96						
Lengths >200 mm	73		85		97		109						

Width Across Flats (s)	(M45)		M48		(M52)		M56		(M60)		M64		M72	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	68.1	70.0	73.1	75.0	78.1	80.0	82.8	85.0	87.8	90.0	92.8	95.0	102.8	105.0
ISO 4014/4017 (1988)	68.1	70.0	73.1	75.0	78.1	80.0	82.8	85.0	87.8	90.0	92.8	95.0		

Head Height (k)	(M45)		M48		(M52)		M56		(M60)		M64		M72	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 931/933 (1987)	27.58	28.42	29.58	30.42	32.5	33.5	34.5	35.5	37.5	38.5	39.5	40.5	44.5	45.5
ISO 4014/4017 (1988)	27.58	28.42	29.58	30.42	32.5	33.5	34.5	35.5	37.5	38.5	39.5	40.5		

Comparable Thread Lengths For DIN - ISO - JIS - ANSI													
DIN 931	(M45)	M48	(M52)	M56	(M60)	M64	M72						
Lengths ≤125mm	96	102											
Lengths >125mm≤200mm	102	108	116	124	132	140	156						
Lengths >200 mm	115	121	129	137	145	153	169						
ISO 4014	(M45)	M48	(M52)	M56	(M60)	M64	M72						
Lengths ≤125mm													
Lengths >125mm≤200mm	102	108	116										
Lengths >200 mm	115	121	129	137	145	153							
ANSI B18.2.3.1M	(M45)	M48	(M52)	M56	(M60)	M64	M72						
Lengths ≤125mm													
Lengths >125mm≤200mm		108											
Lengths >200 mm		121		137		153	169						

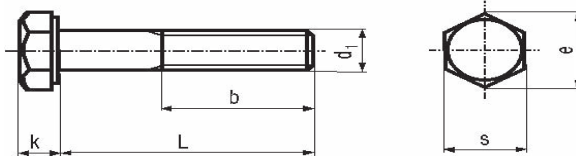
Property Class	8.8sd 16mm		8.8zd 16mm		10.9		A2 /A4-50		A2 /A4-70		A2 /A4-80	
Tensile Strength	116000 psi		120350 psi		150800 psi		72500 psi		101500 psi		116000 psi	
Yield Strength	92800 psi		95700 psi		136300 psi		30450 psi		65250 psi		87000 psi	
Rockwell Hardness (HRC)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	22	32	23	34	32	39	NA	NA	NA	NA	NA	NA

Property Class	Steel	Stainless Steel
	8.8 & 10.9	A2 & A4
Finish	Furnace Black	Plain
Thread Tolerance	6g	

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.

DIN 931/933 (1987) / ISO 4014/4017 (1988) / JIS B1180 (1977) / ANSI B 18.2.3.1M (1979) - LFG 01/01/09 Revised

See Next Page For Additional Information



DIN 931 / ISO 4014 Partial Thread
DIN 933 / ISO 4017 Full Thread

JIS B 1180 Length Tolerance is the same as ISO 4014 / 4017 Product Grade A through 120 mm long.

Please contact your Lindstrom or Mega Service Center For ANSI Length Tolerance.

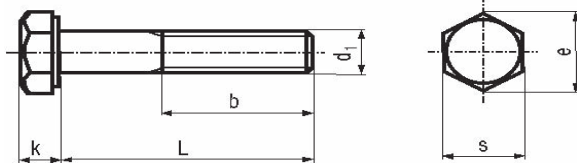
For Reference Point Only	
Diameter	Coarse Thread Pitch
M2	0.4
M3	0.5
M4	0.7
M5	0.8
M6	1
M7	1
M8	1.25
M10	1.5
M12	1.75
M14	2
M16	2
M18	2.5
M20	2.5
M22	2.5
M24	3
M27	3
M30	3.5
M33	3.5
M36	4
M39	4
M42	4.5
M45	4.5
M48	5
M52	5
M56	5.5
M60	5.5
M64	6
M72	6

In Metric language, you should not show the thread pitch if you are using coarse thread pitch.

Product Grade	A		B		A		B	
	min	max	min	max	min	max	min	max
Nominal Length L								
6	5.76	6.24			5.76	6.24		
8	7.71	8.29			7.71	8.29		
10	9.71	10.29			9.71	10.29		
12	11.65	12.35			11.65	12.35		
(14)	13.65	14.35						
16	15.65	16.35			15.65	16.35		
(18)	17.65	18.35						
20	19.58	20.42			19.58	20.42		
(22)	21.58	22.42						
25	24.58	25.42			24.58	25.42		
(28)	27.58	28.42						
30	29.58	30.42			29.58	30.42		
35	34.5	35.5			34.5	35.5		
40	39.5	40.5			39.5	40.5		
45	44.5	45.5			44.5	45.5		
50	49.5	50.5			49.5	50.5		
55	54.4	55.6			54.4	55.6		
60	59.4	60.6			59.4	60.6		
65	64.4	65.6			64.4	65.6		
70	69.4	70.6			69.4	70.6		
(75)	74.4	75.6						
80	79.4	80.6			79.4	80.6		
(85)	84.3	85.7						
90	89.3	90.7	88.25	91.75	89.3	90.7		
(95)	94.3	95.7	93.25	96.75				
100	99.3	100.7	98.25	101.75	99.3	100.7	98.25	100.75
110	109.3	110.7	108.25	111.75	109.3	110.7	108.25	111.75
120	119.3	120.7	118.25	121.75	119.3	120.7	118.25	121.75
130	129.2	130.8	128	132	129.2	130.8	128	132
140	139.2	140.8	138	142	139.2	140.8	138	142
150	149.2	150.8	148	152	149.2	150.8	148	152
160	159.2	160.8	158	162			158	162
(170)	169.2	170.8	168	172				
180	179.2	180.8	178	182			178	182
(190)	189.08	190.92	187.7	192.3				
200	199.08	200.92	197.7	202.3			197.7	202.3
220			217.7	222.3			217.7	222.3
240			237.7	242.3			237.7	242.3
260			257.4	262.6			257.4	262.6
280			277.4	282.6			277.4	282.6
300			297.4	302.6			297.4	302.6
320			317.15	322.85			317.15	322.85
340			337.15	342.85			337.15	342.85
360			357.15	362.85			357.15	362.85
380			377.15	382.85			377.15	382.85
400			397.15	402.85			397.15	402.85
420			416.85	423.15			416.85	423.15
440			436.85	443.15			436.85	443.15
460			456.85	463.15			456.85	463.15
480			476.85	483.15			476.85	483.15
500			496.85	503.15			496.85	503.15

Diameters & Lengths Shown in () are Not recommended for new design.
 The major difference between DIN, ISO, JIS and ANSI is the smaller WAF.
 The JIS standard for hex heads is only available in M8, M10, and M12.
 With the exception of M8, M10, M12, 14 and M22 WAF, all standards are basically functional and interchangeable.
 Width across corners (e) is relative to Width Across Flats.
 The DIN standard is still the most widely accepted standard worldwide except for the US Automotive Industry.

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.



DIN 960 / ISO 8765 Partial Thread
DIN 961 / ISO 8675 Full Thread

Width Across Flats (s)	M8		M10		M12		(M14)		M16		(M18)		M20	
Fine Pitch	1		1.25		1.5		1.5		1.5		2		2	
Extra Fine Pitch			1		1.25		1.25		1		1.5		1.5	
Extra Extra Fine Pitch			0.75		1		1				1		1	
Standard	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 960/961 (1987)	12.73	13.00	16.73	17.00	18.67	19.00	21.67	22.00	23.67	24.00	26.67	27.00	29.67	30.00
ISO 8676/8765 (1988)	12.73	13.00	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00	26.67	27.00	29.67	30.00
JIS B 1180 (1977)	11.75	12.00	13.75	14.00	16.65	17.00								
Head Height (k)	M8		M10		M12		(M14)		M16		(M18)		M20	
DIN 960/961 (1987)	5.15	5.45	6.22	6.58	7.32	7.68	8.62	8.98	9.82	10.18	11.28	11.72	12.28	12.72
ISO 8676/8765 (1988)	5.15	5.45	6.22	6.58	7.32	7.68	8.62	8.98	9.82	10.18	11.285	11.715	12.285	12.715
JIS B 1180 (1977)	5.35	5.65	6.8	7.2	7.8	8.2								

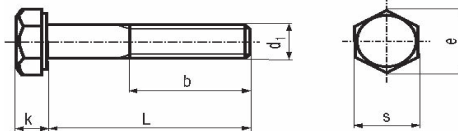
Comparable Thread Lengths For DIN - ISO - JIS - ANSI b							
DIN 960 (1987)	M8	M10	M12	(M14)	M16	(M18)	M20
Lengths ≤125mm	22	26	30	34	38	42	46
Lengths >125mm≤200mm	28	32	36	40	44	48	52
Lengths >200 mm	41	45	49	53	57	61	65
ISO 8765	M8	M10	M12	(M14)	M16	(M18)	M20
Lengths ≤125mm	22	26	30	34	38	42	46
Lengths >125mm≤200mm				40	44	48	52
Lengths >200 mm							
JIS 1180	M8	M10	M12	(M14)	M16	(M18)	M20
Lengths ≤125mm	22	26	30				
Lengths >125mm≤200mm							
Lengths >200 mm							

Width Across Flats (s)	(M22)		M24		(M27)		M30		(M33)		M36		(M39)	
Fine Pitch	2		2		2		3		3		3		3	
Extra Fine Pitch	1.5		1.5		1.5		2		2		2		2	
Extra Extra Fine Pitch	1		1		1		1.5		1.5		1.5		1.5	
Standard	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 960/961 (1987)	31.61	32.00	35.38	36.00	40	41	45	46	49	50	53.8	55.0	58.8	60.0
ISO 8676/8765 (1988)	33.38	34.00	35.38	36.00	40	41	45	46	49	50	53.8	55.0	58.8	60.0
Head Height (k)	(M22)		M24		(M27)		M30		(M33)		M36		(M39)	
DIN 960/961 (1987)	13.78	14.22	14.78	15.22	17.35	18.65	18.28	19.12	20.58	21.42	22.08	22.92	24.58	25.42
ISO 8676/8765 (1988)	13.785	14.215	14.785	15.215	16.65	17.35	18.28	19.12	20.58	21.42	22.08	22.92	24.58	25.42

Comparable Thread Lengths For DIN - ISO - JIS - ANSI b							
DIN 960 (1987)	(M22)	M24	(M27)	M30	(M33)	M36	(M39)
Lengths ≤125mm	50	54	60	66	72	78	84
Lengths >125mm≤200mm	56	60	66	72	78	84	90
Lengths >200 mm	69	73	79	85	91	97	103
ISO 8765	(M22)	M24	(M27)	M30	(M33)	M36	(M39)
Lengths ≤125mm	50	54	60	66			
Lengths >125mm≤200mm	56	60	66	72	78	84	90
Lengths >200 mm	69	73	79	85	91	97	103

For More Detailed Information, Please Refer To Complete DIN, ISO, or JIS Standard, Which Are The Governing Standards.

DIN 960/961 / ISO 8765/8676 / JIS B1180



DIN 960 / ISO 8765 Partial Thread
DIN 961 / ISO 8675 Full Thread

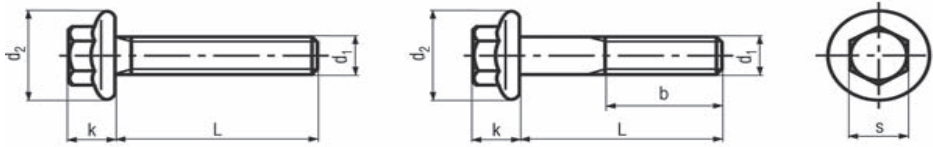
Width Across Flats (s)	M42		(M45)		M48		(M52)		M56		(M60)		M64	
Fine Pitch	4		4		4		4		4		4		4	
Extra Fine Pitch	3		3		3		3		3		3		3	
Extra Extra Fine Pitch	2		2		2		2		2		2		2	
Standard	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
DIN 960/961 (1987)	63.1	65.0	68.1	70.0	73.1	75.0	78.1	80.0	82.8	85.0	87.8	90.0	92.8	95.0
ISO 8676/8765 (1988)	63.1	65.0	68.1	70.0	73.1	75.0	78.1	80.0	82.8	85.0	87.8	90.0	92.8	95.0
Head Height (k)	M42		(M45)		M48		(M52)		M56		(M60)		M64	
DIN 960/961 (1987)	25.58	26.42	27.58	28.42	29.58	30.42	32.5	33.5	34.5	35.5	37.5	38.5	39.5	40.5
ISO 8676/8765 (1988)	25.58	26.42	27.58	28.42	29.58	30.42	32.5	33.5	34.5	35.5	37.5	38.5	39.5	40.5

Comparable Thread Lengths For DIN - ISO - JIS - ANSI b														
DIN 960 (1987)	M42		(M45)		M48		(M52)		M56		(M60)		M64	
Lengths ≤125mm	90		96		102		116		124		132		140	
Lengths >125mm≤200mm	96		102		108		129		137		145		153	
Lengths >200 mm	109		115		121		129		137		145		153	
ISO 8765	M42		(M45)		M48		(M52)		M56		(M60)		M64	
Lengths ≤125mm	90		96		102		116		124		132		140	
Lengths >125mm≤200mm	96		102		108		129		137		145		153	
Lengths >200 mm	109		115		121		129		137		145		153	
Property Class	8.8≤d 16mm		8.8≥d 16mm		10.9		Property Class		Steel					
Tensile Strength	116000 psi		120350 psi		150800 psi		Property Class		8.8 & 10.9					
Yield Strength	92800 psi		95700 psi		136300 psi		Finish		Furnace Black					
Rockwell Hardness (HRC)	min.	max.	min.	max.	min.	max.	Thread Tolerance		6g					
	22	32	23	34	32	39								

Length Tolerance	DIN 960 / 961				ISO 8765 / 8675				Product Grade
	A		B		A		B		
Nominal Length L	min	max	min	max	min	max	min	max	JIS B 1180 Length Tolerance is the same as ISO 4014 / 4017 Product Grade A through 120 mm long. Diameters & Lengths Shown in () Not recommended for new design. The major difference between DIN, ISO and JIS is the smaller WAF. The JIS standard for hex heads is only available in M8, M10, and M12. With the exception of M8, M10, M12, M14 and M22, all standards are basically functional and interchangeable. Width across corners (e) is relative to Width Across Flats. Thread tolerance for all standards is 6g before plating. The DIN standard is still the most widely accepted standard worldwide except for the US Automotive Industry. Some pitch / diameter combinations are only available in production quantities.
35	34.5	35.5			34.5	35.5			
40	39.5	40.5			39.5	40.5			
45	44.5	45.5			44.5	45.5			
50	49.5	50.5			49.5	50.5			
55	54.4	55.6			54.4	55.6			
60	59.4	60.6			59.4	60.6			
65	64.4	65.6			64.4	65.6			
70	69.4	70.6			69.4	70.6			
(75)	74.4	75.6							
80	79.4	80.6			79.4	80.6			
(85)	84.3	85.7	83.25	86.75					
90	89.3	90.7	88.25	91.75	89.3	90.7	88.25	91.75	
(95)	94.3	95.7	93.25	96.75					
100	99.3	100.7	98.25	101.75	99.3	100.7	98.25	100.75	
110	109.3	110.7	108.25	111.75	109.3	110.7	108.25	111.75	
120	119.3	120.7	118.25	121.75	119.3	120.7	118.25	121.75	
130	129.2	130.8	128	132	129.2	130.8	128	132	
140	139.2	140.8	138	142	139.2	140.8	138	142	
150	149.2	150.8	148	152	149.2	150.8	148	152	
160	159.2	160.8	158	162	159.2	160.8	158	162	
(170)	169.2	170.8	168	172					
180	179.2	180.8	178	182	179.2	180.8	178	182	
(190)	189.075	190.925	187.7	192.3					
200	199.075	200.925	197.7	202.3	199.08	200.92	197.7	202.3	
220			217.7	222.3			217.7	222.3	
240			237.7	242.3			237.7	242.3	
260			257.4	262.6			257.4	262.6	
280			277.4	282.6			277.4	282.6	
300			297.4	302.6			297.4	302.6	
320			317.15	322.85			317.15	322.85	
340			337.15	342.85			337.15	342.85	
360			357.15	362.85			357.15	362.85	
380			377.15	382.85			377.15	382.85	
400			397.15	402.85			397.15	402.85	
420			416.85	423.15			416.85	423.15	
440			436.85	443.15			436.85	443.15	
460			456.85	463.15			456.85	463.15	
480			476.85	483.15			476.85	483.15	
500			496.85	503.15			496.85	503.15	

For More Detailed Information, Please Refer To Complete DIN, ISO, or JIS Standard, Which Are The Governing Standards.

HEX FLANGE SCREWS DIN 6921 / JIS B 1189 / ISO 4162 / ASME-ANSI B18.2.3.4M



Thread Size d1		M5	M6	M8	M10	M12	(M14)	M16	M20
Thread Pitch		0.8	1	1.25	1.5	1.75	2	2	2.5
Fine Pitch				1	1.25	1.5	1.5	1.5	1.5
Extra Fine Pitch					1	1.25			
DIN 6921 Thread Length b	For Lengths ≤ 125 mm	16	18	22	26	30	34	38	46
	For Lengths > 125 mm ≤ 200 mm			28	32	36	40	44	52
	For Lengths > 200 mm							57	65
DIN 6921 WAF s	min.	7.78	9.78	12.73	14.73	15.73	17.73	20.67	26.67
	max. = nominal	8.00	10.00	13.00	15.00	16.00	18.00	21.00	27.00
DIN 6921 Head Height To Include Flange k	max.	5.4	6.6	8.1	9.2	11.5	12.8	14.4	17.1
DIN 6921 Flange Diameter d2	max.	11.8	14.2	18.0	22.3	26.6	30.5	35.0	43.0

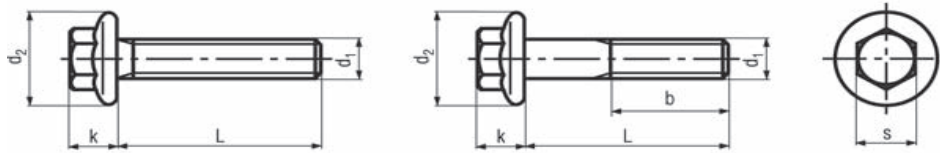
Thread Size d1		M6	M8	M10	JIS B1189 Availability Is Limited To The Diameters & Thread Pitches Shown Here.
Thread Pitch		1	1.25		
Fine Pitch				1.25	
JIS B1189 Thread Length b	For Lengths ≤ 125 mm	18	22	26	
	For Lengths > 125 mm ≤ 200 mm		28	32	
JIS B 1189 WAF s	min.	9.80	11.75	13.75	
	max. = nominal	10.00	12.00	14.00	
JIS B 1189 Head Height To Include Flange k	max.	6.0	8.0	10.0	
JIS B 1189 Flange Diameter d2	max.	14.0	17.5	21.0	

Thread Size d1		M5	M6	M8	M10	M12	(M14)	M16	
Thread Pitch		0.8	1	1.25	1.5	1.75	2	2	
Fine Pitch		ISO 4162 Does Not Recognize Fine Pitch Flange Screws							
ISO 4162 Thread Length b	For Lengths ≤ 125 mm	16	18	22	26	30	34	38	
	For Lengths > 125 mm ≤ 200 mm			28	32	36	40	44	
	For Lengths > 200 mm							57	
ISO 4162 WAF s	min.	6.64	7.64	9.64	12.57	14.57	17.57	20.16	
	max. = nominal	7.00	8.00	10.00	13.00	15.00	18.00	21.00	
ISO 4162 Head Height To Include Flange k	max.	5.6	6.8	8.5	9.7	11.9	12.9	15.1	
ISO 4162 Flange Diameter d2	max.	11.4	13.6	17.0	20.8	24.7	28.6	32.8	

For More Detailed Information, Please Refer To Complete DIN, JIS, ISO or ASME-ANSI Standard, Which Are The Governing Standards.

HEX FLANGE SCREWS DIN 6921 / JIS B 1189 / ISO 4162 / ASME-ANSI B18.2.3.4M

*****This Product Replaces IFI 536*****

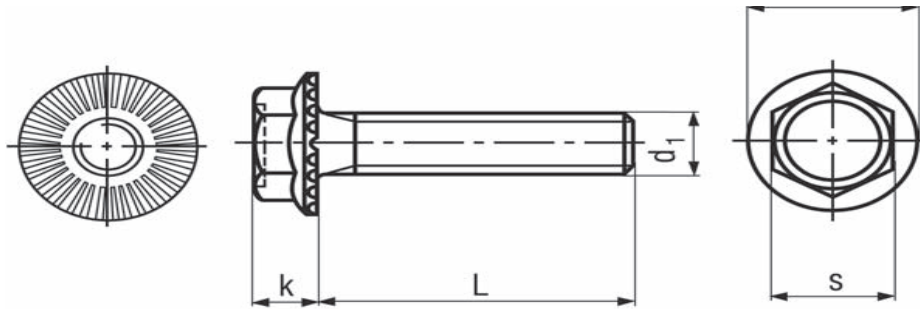


Thread Size d1		M5	M6	M8	M10	M12	(M14)	M16
Thread Pitch		0.8	1	1.25	1.5	1.75	2	2
Fine Pitch	ASME-ANSI B18.2.3.4M Does Not Recognize Fine Pitch Flange Screws							
ASME-ANSI B18.2.3.4M Thread Length b	ASME-ANSI B18.2.3.4M uses a shank length / grip length formula to determine thread length. - Refer ASME- ANSI standard for more details.							
ASME-ANSI B18.2.3.4M WAF s	min.	6.64	7.64	9.64	12.57	14.57	17.57	20.16
	max. = nominal	7.00	8.00	10.00	13.00	15.00	18.00	21.00
ASME-ANSI B18.2.3.4M Head Height To Include Flange k	max.	5.6	6.9	8.5	9.7	12.1	12.9	15.2
ASME-ANSI B18.2.3.4M Flange Diameter d2	max.	11.4	13.6	17.0	20.8	24.7	28.6	32.8

Length Tolerance	DIN 6921		Length Tolerance						
	min.	max.	ISO 4162 / ASME-ANSI B18.2.3.4M Length Tolerance same as DIN 6921 through 160mm long.						
Nominal Length									
10	9.71	10.29							
12	11.65	12.35							
16	15.65	16.35							
20	19.58	20.42	JIS B 1189 Length Tolerance same as DIN 6921 through 120mm long.						
25	24.58	25.42							
30	29.58	30.42							
35	34.5	35.5	Diameters & Lengths With () are not recommended for new design.						
40	39.5	40.5							
45	44.5	45.5	Thread Tolerance Plain 6g						
50	49.5	50.5	Thread Tolerance Plated 6h						
(55)	54.4	55.6	Thread Tolerance Stainless 6g						
60	59.4	60.6	Material	8.8 ≤16mm	8.8 >16mm	10.9	A2/A4-50	A2/A4-70	A2/A4-80
(65)	64.4	65.6							
70	69.4	70.6	Finish	Furnace Black or Plated			Plain		
80	79.4	80.6	Tensile Strength	116000	120350	150800	72500	101500	116000
90	89.3	90.7	Yield Strength	92800	95700	136300	30450	65250	87000
100	99.3	100.7	Hardness	HRC22-32	HRC23-34	HRC32-39	NA		
110	109.3	110.7							
120	119.3	120.7							
130	129.2	130.8							
140	139.2	140.8							
150	149.2	150.8							
160	159.2	160.8							
180	179.2	180.8							
200	199	201							

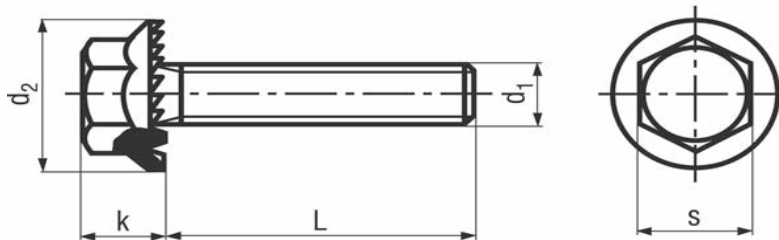
For More Detailed Information, Please Refer To Complete DIN, JIS, ISO or ASME-ANSI Standard, Which Are The Governing Standards.

HEX RIBBED FLANGE SCREWS (VERBUS RIPP®)



Thread Size d1		M5	M6	M8	M10	M12	M16
Thread Pitch		0.8	1	1.25	1.5	1.75	2
WAF s	min.	7.78	9.78	12.73	14.73	16.73	21.67
	max. = nominal	8.00	10.00	13.00	15.00	17.00	22.00
Head Height To Include Flange k	max.	4.3	5.5	7.0	8.5	10.0	14.0
Flange Diameter d2	max.	11.2	14.2	18.2	21.0	24.0	31.0
Normal Thread Length		16	18	22	26	30	38
Mechanical Properties							
Similar to	10.9						
Property Class	100						
Tensile Strength	150800-174000 psi						
Hardness	32-38 HRC						
Finish	Furnace Black						

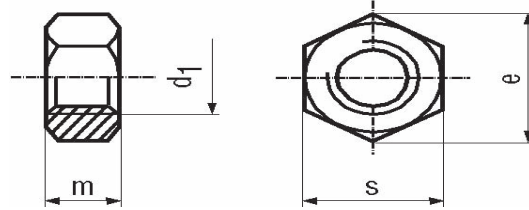
HEX SERRATED FLANGE SCREWS



Thread Size d1		M5	M6	M8	M10	M12	M16
Thread Pitch		0.8	1	1.25	1.5	1.75	2
WAF s	min.	7.78	9.78	12.73	14.73	16.73	21.67
	max. = nominal	8.00	10.00	13.00	15.00	17.00	22.00
Head Height To Include Flange k	max.	4.3	5.5	7.0	7.9	8.7	11.2
Flange Diameter d2	max.	11.2	14.2	18.2	21.0	24.0	31.0
Normal Thread Length		16	18	22	26	30	38
Mechanical Properties		M5 Through M10				M12 & Up	
Similar to		9.8				10.9	
Property Class		90				100	
Tensile Strength		130500-159500 psi				150800-174000 psi	
Hardness		27-34 HRC				32-38 HRC	
Finish		Furnace Black				Furnace Black	

For More Detailed Information, Please Refer To Bauer & Schaurte Karcher Sicherungsschrauben, Which Is The Governing Standard.

Full Hex Nuts DIN 934 / ISO 4032, Style 1 / JIS B 1181 / ANSI B 18.2.4.1M, Style 1



e = WAC (Width Across Corners)

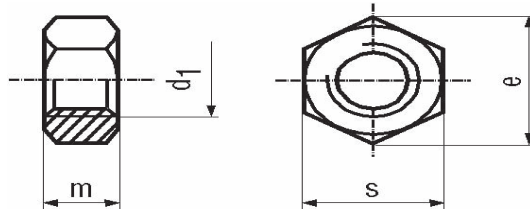
Thread Size d1	1		1.2		1.4		1.6		2		2.5		3	
Coarse Pitch	0.25		0.25		0.3		0.35		0.4		0.45		0.5	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	2.4	2.5	2.9	3.0	2.9	3.0	3.02	3.20	3.82	4.00	4.82	5.00	5.32	5.50
ISO 4032 (1986)							3.02	3.20	3.82	4.00	4.82	5.00	5.32	5.50
ANSI B 18.2.4.1M (1999)							3.02	3.20	3.82	4.00	4.82	5.00	5.32	5.50
Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	0.55	0.80	0.75	1.00	0.95	1.20	1.05	1.30	1.35	1.60	1.75	2.00	2.15	2.40
ISO 4032 (1986)							1.05	1.30	1.35	1.60	1.75	2.00	2.15	2.40
ANSI B 18.2.4.1M (1999)							1.05	1.30	1.35	1.60	1.75	2.00	2.15	2.40
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 934 (1987)	2.71		3.28		3.28		3.41		4.32		5.45		6.01	
ISO 4032 (1986)							3.41		4.32		5.45		6.01	
ANSI B 18.2.4.1M (1999)							min.	max.	min.	max.	min.	max.	min.	max.
							3.41	3.70	4.32	4.62	5.45	5.77	6.01	6.35
Thread Size d1	(3.5)		4		5		6		(7)		8		10	
Coarse Pitch	0.6		0.7		0.8		1		1		1.25		1.5	
Fine Pitch											1		1.25	
Extra Fine Pitch													1	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	5.82	6.00	6.78	7.00	7.78	8.00	9.78	10.00	10.73	11.00	12.73	13.00	16.73	17.00
ISO 4032 (1986)	5.82	6.00	6.78	7.00	7.78	8.00	9.78	10.00			12.73	13.00	15.73	16.00
JIS 1181 (1985)											11.75	12.00	13.75	14.00
ANSI B 18.2.4.1M (1999)	5.82	6.00	6.78	7.00	7.78	8.00	9.78	10.00			12.73	13.00	15.73	16.00
Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	2.55	2.80	2.9	3.2	3.7	4.0	4.7	5.0	5.2	5.5	6.14	6.50	7.64	8.00
ISO 4032 (1986)	2.55	2.80	2.9	3.2	4.4	4.7	4.9	5.2			6.44	6.80	8.04	8.40
JIS 1181 (1985)											6.14	6.50	7.64	8.00
ANSI B 18.2.4.1M (1999)	2.55	2.80	2.9	3.2	4.4	4.7	4.9	5.2			6.44	6.80	8.04	8.40
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 934 (1987)	6.58		7.66		8.79		11.05		12.12		14.38		18.90	
ISO 4032 (1986)	6.58		7.66		8.79		11.05				14.38		17.77	
JIS 1181 (1985)											13.20		15.50	
ANSI B 18.2.4.1M (1999)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	6.58	6.93	7.66	8.08	8.79	9.24	11.05	11.55			14.38	15.01	17.77	18.45

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS, or ANSI Standard, Which Are The Governing Standards.

DIN 934 (1987) / ISO 4032 Style 1 (1986) / JIS B 1181 (1985) / ANSI B 18.2.4.1M Style 1 (1999) - LFG 05/01/08

See Next Page For Additional Information

Full Hex Nuts DIN 934 / ISO 4032, Style 1 / JIS B 1181 / ANSI B 18.2.4.1M, Style 1



e = WAC (Width Across Corners)

Thread Size d1	12		14		16		(18)		20		(22)		24	
Coarse Pitch	1.75		2		2		2.5		2.5		2.5		3	
Fine Pitch	1.5		1.5		1.5		2		2		2		2	
Extra Fine Pitch	1.25						1.5		1.5		1.5		1.5	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	18.67	19.00	21.67	22.00	23.67	24.00	26.16	27.00	29.16	30.00	31	32	35	36
ISO 4032 (1986)	17.73	18.00	20.67	21.00	23.67	24.00	26.16	27.00	29.16	30.00	33	34	35	36
JIS 1181 (1985)	16.65	17.00												
ANSI B 18.2.4.1M (1999)	17.73	18.00	20.67	21.00	23.67	24.00			29.16	30.00			35	36

Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	9.64	10.00	10.3	11.0	12.3	13.0	14.3	15.0	14.9	16.0	16.9	18.0	17.7	19.0
ISO 4032 (1986)	10.37	10.80	12.1	12.8	14.1	14.8	15.1	15.8	16.9	18.0	18.1	19.4	20.2	21.5
JIS 1181 (1985)	9.64	10.00												
ANSI B 18.2.4.1M (1999)	10.37	10.80	12.1	12.8	14.1	14.8			16.9	18.0			20.2	21.5

WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 934 (1987)	21.10		24.49		26.75		29.56		32.95		35.03		39.55	
ISO 4032 (1986)	20.03		23.35		26.75		29.56		32.95		37.29		39.55	
JIS 1181 (1985)	18.80													
ANSI B 18.2.4.1M (1999)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	20.03	20.78	23.35	24.25	26.75	27.71			32.95	34.64			39.55	41.57

Thread Size d1	(27)		30		(33)		36		(39)		42		(45)	
Coarse Pitch	3		3.5		3.5		4		4		4.5		4.5	
Fine Pitch	2		2		2		3		3		3		3	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	40	41	45	46	49	50	53.8	55.0	58.8	60.0	63.1	65.0	68.1	70.0
ISO 4032 (1986)	40	41	45	46	49	50	53.8	55.0	58.8	60.0	63.1	65.0	68.1	70.0
ANSI B 18.2.4.1M (1999)			45	46			53.8	55						

Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	20.7	22.0	22.7	24.0	24.7	26.0	27.4	29.0	29.4	31.0	32.4	34.0	34.4	36.0
ISO 4032 (1986)	22.5	23.8	24.3	25.6	27.4	28.7	29.4	31.0	31.8	33.4	32.4	34.0	34.4	36.0
ANSI B 18.2.4.1M (1999)			24.3	25.6			29.4	31.0						

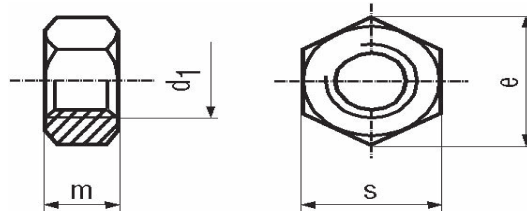
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 934 (1987)	45.2		50.85		55.37		60.79		66.44		71.3		76.95	
ISO 4032 (1986)	45.2		50.85		55.37		60.79		66.44		71.3		76.95	
ANSI B 18.2.4.1M (1999)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
			50.85	53.12			60.79	63.51						

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS, or ANSI Standard, Which Are The Governing Standards.

DIN 934 (1987) / ISO 4032 Style 1 (1986) / JIS B 1181 (1985) / ANSI B 18.2.4.1M Style 1 (1999) - LGF 01/01/09 Revised

See Next Page For Additional Information

Full Hex Nuts DIN 934 / ISO 4032, Style 1 / JIS B 1181 / ANSI B 18.2.4.1M, Style 1



e = WAC (Width Across Corners)

Thread Size d1	48		(52)		56		(60)		64		(68)		72	
Coarse Pitch	5		5		5.5		5.5		6		6		6	
Fine Pitch	3		3		4		4		4		4		4	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	73.1	75.0	78.1	80.0	82.8	85.0	87.8	90.0	92.8	95.0	97.8	100.0	102.8	105.0
ISO 4032 (1986)	73.1	75.0	78.1	80.0	82.8	85.0	87.8	90.0	92.8	95.0				

Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 934 (1987)	36.4	38.0	40.4	42.0	43.4	45.0	46.4	48.0	49.1	51.0	52.1	54.0	56.1	58.0
ISO 4032 (1986)	36.4	38.0	40.4	42.0	43.4	45.0	46.4	48.0	49.1	51.0				

WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 934 (1987)	82.6		88.25		93.56		99.21		104.86		110.51		116.16	
ISO 4032 (1986)	82.6		88.25		93.56		99.21		104.86					

Thread Size d1	(76)		80		90		100		*****Notice*****					
Coarse Pitch	6		6		6		6		JIS 1181 Hex Nuts Only Available In Property Class 8, And In Sizes M8x1.25, M10x1.25, And M12x1.25, Except On Special Order.					
Fine Pitch	4		4		4		4							
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal						
DIN 934 (1987)	107.8	110.0	112.8	115.0	127.5	130.0	142.5	145.0						

Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	The Strength Class Of The Nut Should Always Be Equal Or Greater Than The Strength Class Of The Screw					
DIN 934 (1987)	59.1	61.0	62.1	64.0	70.1	72.0	78.1	80.0	*****Notice*****					

WAC e	min.		min.		min.		min.		Diameters with () & Fine Pitch Should Not Be Use For New Design.					
DIN 934 (1987)	121.81		127.46		144.08		161.02							

Material	Steel - Property Class									
Proof Load (psi)	6		8		10		12			
up to M4	87000		116000		150800		166750			
M4 to M7	97150		117450		150800		166750			
M7 TO M10	98600		120350		150800		168200			
M10 TO M16	101500		121800		152250		172550			
M16 TO M39	104400		133400		153700		174000			
M39 TO M100	-		-		-		-			
Vickers Hardness HV	min.	max.	min.	max.	min.	max.	min.	max.		
up to M4			170							
M4 to M7	150	302			272	353	295	353		
M7 TO M10			188						302	
M10 TO M16										
M16 TO M39	170		233		353					
M39 TO M100	142		207							
Finish	Plain or Plated									
Thread Tolerance	6H Plain or Plated									

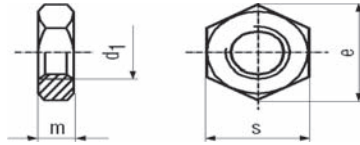
Stainless Steel A2 & A4		
Proof Load (psi)	Property Class 50	72500
	Property Class 70	101500
	Property Class 80	116000
Hardness is not a measurable attribute of Stainless Steel		
Finish	Plain	
Thread Tolerance	6H	

Brass		
Proof Load (psi)	Ms58	53650-65250
	Ms63	55100-69600
Finish	Plain or Nickel Plated	
Thread Tolerance	6H	

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS, or ANSI Standard, Which Are The Governing Standards.

DIN 934 (1987) / ISO 4032 Style 1 (1986) / JIS B 1181 (1985) / ANSI B 18.2.4.1M Style 1 (1999) - LFG 05/01/08 See Previous Page For Additional Information

Hex Jam Nuts DIN 439B / ISO 4035 / ISO 8675 / ANSI B 18.2.4.5M



e = WAC (Width Across Corners)

Thread Size d1	1.6		2		2.5		3		(3.5)		4		5	
Coarse Pitch	0.35		0.4		0.45		0.5		0.6		0.7		0.8	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	3.02	3.20	3.82	4.00	4.82	5.00	5.32	5.50	5.82	6.00	6.78	7.00	7.78	8.00
ISO 4035 (1986) / ISO 8675 (1988)	3.02	3.20	3.82	4.00	4.82	5.00	5.32	5.50	5.82	6.00	6.78	7.00	7.78	8.00
ANSI B 18.2.4.5M (1990)													7.78	8.00

Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	0.75	1.00	0.95	1.20	1.35	1.60	1.55	1.80	1.75	2.00	1.95	2.20	2.45	2.70
ISO 4035 (1986) / ISO 8675 (1988)	0.75	1.00	0.95	1.20	1.35	1.60	1.55	1.80	1.75	2.00	1.95	2.20	2.45	2.70
ANSI B 18.2.4.5M (1990)													2.45	2.70

WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 439B (1987)	3.41		4.32		5.45		6.01		6.58		7.66		8.79	
ISO 4035 (1986) / ISO 8675 (1988)	3.41		4.32		5.45		6.01		6.58		7.66		8.79	
ANSI B 18.2.4.5M (1990)													min.	max.
													8.79	9.24

Thread Size d1	6		8		10		12		14		16		(18)	
Coarse Pitch	1		1.25		1.5		1.75		2		2		2.5	
Fine Pitch			1		1.25		1.5		1.5		1.5		2	
Extra Fine Pitch					1		1.25						1.5	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	9.78	10.00	12.73	13.00	16.73	17.00	18.67	19.00	21.67	22.00	23.67	24.00	26.16	27.00
ISO 4035 (1986) / ISO 8675 (1988)	9.78	10.00	12.73	13.00	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00	26.16	27.00
ANSI B 18.2.4.5M (1990)	9.78	10.00	12.73	13.00	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00		

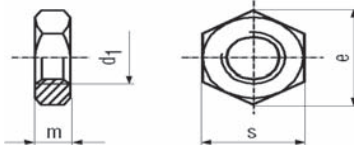
Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	2.9	3.2	3.7	4.0	4.7	5.0	5.7	6.0	6.42	7.00	7.42	8.00	8.42	9.00
ISO 4035 (1986) / ISO 8675 (1988)	2.9	3.2	3.7	4.0	4.7	5.0	5.7	6.0	6.42	7.00	7.42	8.00	8.42	9.00
ANSI B 18.2.4.5M (1990)	2.9	3.2	3.7	4.0	4.7	5.0	5.7	6.0	6.64	7.00	7.64	8.00		

WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 439B (1987)	11.05		14.38		18.90		21.10		24.49		26.75		29.56	
ISO 4035 (1986) / ISO 8675 (1988)	11.05		14.38		17.77		20.03		23.35		26.75		29.56	
ANSI B 18.2.4.5M (1990)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	11.05	11.55	14.38	15.01	17.77	18.48	20.03	20.78	23.35	24.25	26.75	27.71		

DIN 439B Applies To Both Coarse & Fine Pitch Hex Jam Nuts	Diameters with () & Fine Pitch Should Not Be Use For New Design.
ISO 4035 Applies To Coarse Pitch Hex Jam Nuts	
ISO 8675 Applies To Fine Pitch Hex Jam Nuts	
ANSI B18.2.4.5M Does Not Recognize Fine Pitch Hex Jam Nuts	

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.	
DIN 439B (1987) / ISO 4035 (1986) / ISO 8675 (1988) / ANSI B 18.2.4.5M (1990) - LFG 05/01/08	See Next Page For Additional Information

Hex Jam Nuts DIN 439B / ISO 4035 / ISO 8675 / ANSI B 18.2.4.5M



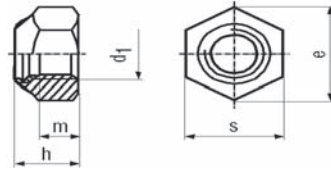
e = WAC (Width Across Corners)

Thread Size d1	20		(22)		24		(27)		30		(33)		36	
Coarse Pitch	2.5		2.5		3		3		3.5		3.5		4	
Fine Pitch	2		2		2		2		2		2		3	
Extra Fine Pitch	1.5		1.5		1.5		1.5		1.5		1.5		2	
Extra Extra Fine Pitch													1.5	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	29.16	30.00	31	32	35	36	40	41	45	46	49	50	53.8	55.0
ISO 4035 (1986) / ISO 8675 (1988)	29.16	30.00	33	34	35	36	40	41	45	46	49	50	53.8	55.0
ANSI B 18.2.4.5M (1990)	29.16	30.00			35	36			45	46			53.8	55.0
Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	9.1	10.0	9.9	11.0	10.9	12.0	12.4	13.5	13.9	15.0	15.4	16.5	16.9	18.0
ISO 4035 (1986) / ISO 8675 (1988)	9.1	10.0	9.9	11.0	10.9	12.0	12.4	13.5	13.9	15.0	15.4	16.5	16.9	18.0
ANSI B 18.2.4.5M (1990)	9.42	10.0			11.3	12.0			14.3	15.0			17.3	18.0
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 439B (1987)	32.95		35.03		39.55		45.2		50.85		55.37		60.79	
ISO 4035 (1986) / ISO 8675 (1988)	32.95		37.29		39.55		45.2		50.85		55.37		60.79	
ANSI B 18.2.4.5M (1990)	min.	max.			min.	max.			min.	max.			min.	max.
	32.95	34.64			39.55	41.57			50.85	53.12			60.79	63.51
Thread Size d1	(39)		42		(45)		48		(52)		56		64	
Coarse Pitch	4		4.5		4.5		5		5		5.5		6	
Fine Pitch	3		3		3		3		3		4		4	
Extra Fine Pitch	2		2		2		2		2					
Extra Extra Fine Pitch	1.5		1.5		1.5		1.5		1.5					
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	58.8	60.0	63.1	65.0	68.1	70.0	73.1	75.0	78.1	80.0				
ISO 4035 (1986) / ISO 8675 (1988)	58.8	60.0	63.1	65.0	68.1	70.0	73.1	75.0	78.1	80.0	82.8	85.0	92.8	95.0
Thickness m	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 439B (1987)	18.2	19.5	19.7	21.0	21.2	22.5	22.7	24.0	24.7	26.0				
ISO 4035 (1986) / ISO 8675 (1988)	18.2	19.5	19.7	21.0	21.2	22.5	22.7	24.0	24.7	26.0	26.7	28.0	30.4	32.0
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 439B (1987)	66.44		71.3		76.95		82.6		88.25					
ISO 4035 (1986) / ISO 8675 (1988)	66.44		71.3		76.95		82.6		88.25		93.56		104.86	
Mechanical Properties														
Material	Steel - Property Class 04				Stainless Steel A2 & A4				Proof Load		Brass			
Diameter	Proof Load (psi)	Vickers Hardness HV		Proof Load (psi)	Property Class 50		72500		Proof Load (psi)	Ms58		53650-65250		
		min.	max.		Property Class 70		101500			Ms63		55100-69600		
up to M4	55100	188	302	Proof Load (psi)	Property Class 80		116000		Hardness is not a measurable attribute of Brass					
M4 to M7					Hardness is not a measurable attribute of Stainless Steel				Finish		Plain or Nickel Plated			
M7 TO M10					Finish				Plain					
M10 TO M16														
M16 TO M39														
M39 TO M100														
Finish	Plain or Plated				Thread Tolerance For All Jam Nuts, Steel Plain Or Plated, Stainless Steel, And Brass Is 6H									
For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.														

DIN 439B (1987) / ISO 4035 (1986) / ISO 8675 (1988) / ANSI B 18.2.4.5M (1990) - LGF 01/01/09 Revised

See Previous Page For Additional Information

Nylon Insert Hex Nuts DIN 985 / ISO 7040 / ANSI B 18.16.3M



e = WAC (Width Across Corners)

Thread Size d1	(2)**		(2.5)**		(2.6)**		3		(3.5)**		4		5	
Coarse Pitch	0.4		0.45		0.45		0.5		0.6		0.7		0.8	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	3.82	4.00	4.82	5.00	4.82	5.00	5.32	5.50	5.82	6.00	6.78	7.00	7.78	8.00
ISO 7040 (1997)							5.32	5.50			6.78	7.00	7.78	8.00
ANSI B 18.16.3M (1998)							5.32	5.50	5.82	6.00	6.78	7.00	7.78	8.00
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	2.25	2.50	3.55	3.80	3.55	3.80	3.7	4.0	4.2	4.5	4.7	5.0	4.7	5.0
ISO 7040 (1997)							4.02	4.50			5.52	6.00	6.22	6.80
ANSI B 18.16.3M (1998)							3.9	4.5	4.3	5.0	5.3	6.0	6.0	6.8
Wrenching Height m	min.		min.		min.		min.		min.		min.		min.	
DIN 985 (1987)	1.6		2		2		2.4		2.6		2.9		3.2	
ISO 7040 (1997)							1.72				2.32		3.52	
ANSI B 18.16.3M (1998)							1.4		1.7		1.9		2.7	
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 985 (1987)	4.32		5.45		5.45		6.01		6.58		7.66		8.79	
ISO 7040 (1997)							6.01				7.66		8.79	
ANSI B 18.16.3M (1998)							min.	max.	min.	max.	min.	max.	min.	max.
							6.01	6.35	6.58	6.93	7.66	8.08	8.79	9.24
Thread Size d1	6		(7)		8		10		12		14		16	
Coarse Pitch	1		1		1.25		1.5		1.75		2		2	
Fine Pitch					1		1.25		1.5		1.5		1.5	
Extra Fine Pitch							1		1.25					
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	9.78	10.00	10.73	11.00	12.73	13.00	16.73	17.00	18.67	19.00	21.67	22.00	23.67	24.00
ISO 7040 (1997)	9.78	10.00			12.73	13.00	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00
ANSI B 18.16.3M (1998)	9.78	10.00			12.73	13.00	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	5.7	6.0	7.14	7.50	7.64	8.00	9.64	10.00	11.57	12.00	13.3	14.0	15.3	16.0
ISO 7040 (1997)	7.42	8.00			8.92	9.50	11.2	11.9	14.2	14.9	15.9	17.0	17.8	19.1
ANSI B 18.16.3M (1998)	7.2	8.0			8.5	9.5	10.9	11.9	13.9	14.9	15.8	17.0	17.9	19.1
Wrenching Height m	min.		min.		min.		min.		min.		min.		min.	
DIN 985 (1987)	4		4.7		5.5		6.5		8		9.5		10.5	
ISO 7040 (1997)	3.92				5.15		6.43		8.3		9.68		11.28	
ANSI B 18.16.3M (1998)	3.0				3.7		4.8		6.7		7.8		9.1	
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 985 (1987)	11.05		12.12		14.38		18.90		21.10		24.49		26.75	
ISO 7040 (1997)	11.05				14.38		17.77		20.03		23.36		26.75	
ANSI B 18.16.3M (1998)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	11.05	11.55			14.38	15.01	17.77	18.48	20.03	20.78	23.35	24.25	26.75	27.71

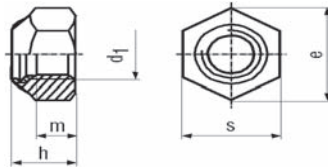
M2, M2.5, M2.6, And M3.5 Not in DIN 985 Standard, But Dimensions As Shown. These Sizes Along With Other Sizes With () Should Not Be Used In New Designs.

The Strength Class Of The Nut Should Always Be Equal Or Greater Than The Strength Class Of The Screw.

Thread Tolerance For All Lock Nuts, Steel Plain Or Plated, Stainless Steel, Is 6H

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.

Nylon Insert Hex Nuts DIN 985 / ISO 7040 / ANSI B 18.16.3M



e = WAC (Width Across Corners)

Thread Size d1	(18)		20		(22)		24		(27)		30		(33)	
Coarse Pitch	2.5		2.5		2.5		3		3		3.5		3.5	
Fine Pitch	2		2		2		2		2		2		2	
Extra Fine Pitch	1.5		1.5		1.5									
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	26.16	27.00	29.16	30.00	31	32	35	36	40	41	45	46	49	50
ISO 7040 (1997)			29.16	30.00			35	36			45	46		
ANSI B 18.16.3M (1998)			29.16	30.00			35	36			45	46		
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	17.66	18.50	18.7	20.0	20.7	22.0	22.7	24.0	25.7	27.0	28.7	30.0	31.4	33.0
ISO 7040 (1997)			20.7	22.8			25.0	27.1			30.1	32.6		
ANSI B 18.16.3M (1998)			21.5	22.8			25.6	27.1			30.6	32.6		
Wrenching Height m	min.		min.		min.		min.		min.		min.		min.	
DIN 985 (1987)	13		14		15		15		17		19		22	
ISO 7040 (1997)			13.52				16.16				19.44			
ANSI B 18.16.3M (1998)			10.9				13.0				15.7			
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 985 (1987)	29.56		32.95		35.03		39.55		45.2		50.85		55.37	
ISO 7040 (1997)			32.95				39.55				50.85			
ANSI B 18.16.3M (1998)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
			32.95	34.64			39.55	41.57			50.85	53.12		

Thread Size d1	36		(39)		42		(45)		48	
Coarse Pitch	4		4		4.5		4.5		5	
Fine Pitch	3		3		3		3		3	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	53.8	55.0	58.8	60.0	63.8	65.0	68.1	70.0	73.1	75.0
ISO 7040 (1997)	53.8	55.0								
ANSI B 18.16.3M (1998)	53.8	55.0								
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 985 (1987)	34.4	36.0	37.4	39.0	40.4	42.0	43.4	45.0	46.4	48.0
ISO 7040 (1997)	36.4	38.9								
ANSI B 18.16.3M (1998)	36.9	38.9								

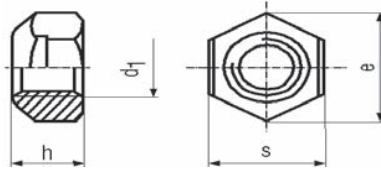
Wrenching Height m	min.		min.		min.		min.		min.	
DIN 985 (1987)	25		27		29		32		36	
ISO 7040 (1997)	23.52									
ANSI B 18.16.3M (1998)	19									
WAC e	min.		min.		min.		min.		min.	
DIN 985 (1987)	60.79		66.44		72.09		76.95		82.6	
ISO 7040 (1997)	60.79									
ANSI B 18.16.3M (1998)	min.	max.								
	60.79	63.51								

Stainless Steel A2 & A4		
Proof Load (psi)	Property Class 50	72500
	Property Class 70	101500
	Property Class 80	116000
Hardness is not a measurable attribute of Stainless Steel		
Finish	Plain	

Material	Steel - Property Class					
	6		8		10	
Proof Load (psi)	6		8		10	
	min.	max.	min.	max.	min.	max.
up to M4	87000		116000		150800	
M4 to M7	97150		117450		150800	
M7 TO M10	98600		120350		150800	
M10 TO M16	101500		121800		152250	
M16 TO M39	104400		133400		153700	
M39 TO M100	-		-		-	
Finish	Plain or Plated					
Thread Tolerance	6H					

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.

All Metal Hex Lock Nuts DIN 980 / ISO 7719 / ANSI B 18.16.3M



e = WAC (Width Across Corners)

Thread Size d1	3		3.5**		4		5		6		(7)		8	
Coarse Pitch	0.5		0.7		0.7		0.8		1		1		1.25	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 980 (1987)	5.32	5.50			6.78	7.00	7.78	8.00	9.78	10.00	10.73	11.00	12.73	13.00
ISO 7719 (1997)							7.78	8.00	9.78	10.00			12.73	13.00
ANSI B 18.16.3M (1998)	5.32	5.50	5.82	6.00	6.78	7.00	7.78	8.00	9.78	10.00			12.73	13.00
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 980 (1987)	3.4	3.7			3.9	4.2	4.8	5.1	5.7	6.0	6.5	7.00	7.5	8.00
ISO 7719 (1997)							4.8	5.3	5.4	5.9			6.44	7.10
ANSI B 18.16.3M (1998)	2.65	3.10	3.0	3.5	3.5	4.0	4.8	5.3	5.4	5.9			6.44	7.10
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 980 (1987)	6.01				7.66		8.79		11.05		12.12		14.38	
ISO 7719 (1997)							8.79		11.05				14.38	
ANSI B 18.16.3M (1998)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	6.01	6.35	6.58	6.93	7.66	8.08	8.79	9.24	11.05	11.55			14.38	15.01
Thread Size d1	10		12		14		16		(18)		20		(22)	
Coarse Pitch	1.5		1.75		2		2		2.5		2.5		2.5	
Fine Pitch	1.25		1.5		1.5		1.5		2		2		2	
Extra Fine Pitch	1		1.25						1.5		1.5		1.5	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 980 (1987)	16.73	17.00	18.67	19.00	21.67	22.00	23.67	24.00	26.16	27.00	29.16	30.00	31	32
ISO 7719 (1997)	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00	26.16	27.00	29.16	30.00	33	34
ANSI B 18.16.3M (1998)	15.73	16.00	17.73	18.00	20.67	21.00	23.67	24.00			29.16	30.00		
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 980 (1987)	9	10	11	12	12	14	14	16	16	18	18	20	20	22
ISO 7719 (1997)	8.04	9.00	10.37	11.60	12.1	13.2	14.1	15.2	15.01	17.00	16.9	19.0	18.1	21.0
ANSI B 18.16.3M (1998)	8.04	9.00	10.37	11.60	12.1	13.2	14.1	15.2			16.9	19.0		
WAC e	min.		min.		min.		min.		min.		min.		min.	
DIN 980 (1987)	18.90		21.10		24.49		26.75		29.56		32.95		35.03	
ISO 7719 (1997)	17.77		20.03		23.36		26.75		29.56		32.95		37.29	
ANSI B 18.16.3M (1998)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
	17.77	18.48	20.03	20.78	23.35	24.25	26.75	27.71			32.95	34.64		

M3.5 Is Not Listed In DIN Standard, and that Size Along With Sizes With () Should Not Be Used In New Designs.

The Strength Class Of The Nut Should Always Be Equal Or Greater Than The Strength Class Of The Screw.

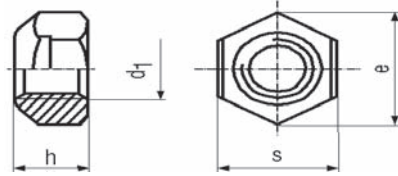
Mechanical Properties	Steel - Property Class												
	6		8		10		Vickers Hardness HV	6		8		10	
	min.	max.	min.	max.	min.	max.		min.	max.	min.	max.	min.	max.
Proof Load (psi)	87000		116000		150800		up to M4	150		170		272	
up to M4	87000		116000		150800		up to M4	150		170		272	
M4 to M7	97150		117450		150800		M4 to M7	150		188		353	
M7 TO M10	98600		120350		150800		M7 TO M10	150		188		353	
M10 TO M16	101500		121800		152250		M10 TO M16	170		233		353	
M16 TO M39	104400		133400		153700		M16 TO M39	170		233		353	
M39 TO M100	-		-		-		M39 TO M100	142		207		-	
Finish	Plain or Plated												
Thread Tolerance	Plain or Plated 6H												

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.

DIN 980 (1987) / ISO 7719 (1997) / ANSI B 18.16.3M(1998) - LFG 05/01/08

See Next Page For Additional Information

All Metal Hex Lock Nuts DIN 980 / ISO 7719 / ANSI B 18.16.3M



e = WAC (Width Across Corners)

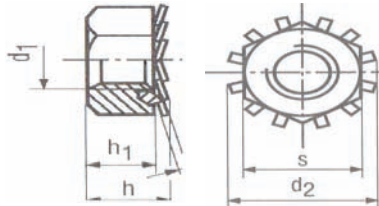
Thread Size d1	24		(27)		30		(33)		36		(39)	
Coarse Pitch	3		3		3.5		3.5		4		4	
Fine Pitch	2		2		2		2		3		3	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 980 (1987)	35	36	40	41	45	46	49	50	53.8	55.0	58.8	60.0
ISO 7719 (1997)	35	36			45	46			53.8	55.0		
ANSI B 18.16.3M (1998)	35	36			45	46			53.8	55.0		
Overall Height h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 980 (1987)	22	24	25	27	28	30	31	33	34	36	37	39
ISO 7719 (1997)	20.2	23.0			24.3	26.9			29.4	32.5		
ANSI B 18.16.3M (1998)	20.2	23.0			24.3	26.9			29.4	32.5		
WAC e	min.		min.		min.		min.		min.		min.	
DIN 980 (1987)	39.55		45.2		50.85		55.37		60.79		66.44	
ISO 7719 (1997)	39.55				50.85				60.79			
ANSI B 18.16.3M (1998)	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.		
	39.55	41.57			50.85	53.12			60.79	63.51		

For More Detailed Information, Please Refer To Complete DIN, ISO, or ANSI Standard, Which Are The Governing Standards.

DIN 980 (1987) / ISO 7719 (1997) / ANSI B 18.16.3M(1998) - LGF 05/01/08

[See Previous Page For Additional Information](#)

Hex Nuts With External Tooth Lock Washers Attached



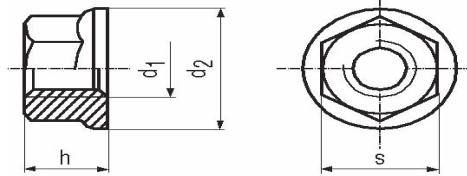
There Is No DIN, ISO, Or ANSI Standard Covering This Product, But Here Are The Dimensions To Which We Supply This Product.

Thread Size d1	3		4		5		6		8		10	
Coarse Pitch	0.5		0.7		0.8		1		1.25		1.5	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
Hex Nuts With External Tooth Lock Washers Attached	5.32	5.50	6.78	7.00	7.78	8.00	9.78	10.00	12.73	13.00	16.73	17.00
Nut Only Height h1	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
Hex Nuts With External Tooth Lock Washers Attached	2.15	2.40	2.9	3.2	3.7	4.0	4.7	5.0	6.14	6.50	7.64	8.00
Overall Height To Include Washer h	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
Hex Nuts With External Tooth Lock Washers Attached	max.		max.		max.		max.		max.		max.	
	3.2		4		5		6		8.2		9.6	
Washer OD d2												
Hex Nuts With External Tooth Lock Washers Attached	max.		max.		max.		max.		max.		max.	
	7.1		8.5		9.5		12		15.5		20.1	

Nut Material	Property Class 6	A2 Stainless Steel	Thread Tolerance For Steel & Stainless Steel Is 6H.
Washer Material	Spring Steel	A2 Stainless Steel	
Proof Load (psi)	87000	72500	
Rockwell Hardness	HRB78-HRC30	Not An Attribute Of Stainless Steel	
Finish	Zinc Plated	Plain	

LFG 01/01/09 Revised

Hex Flange Nuts DIN 6923 / JIS B 1190 / ISO 4161 / ANSI B 18.2.4.4M

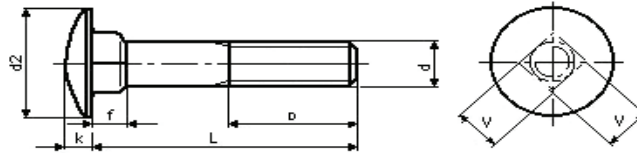


Thread Size d1	5		6		8		10	
Coarse Pitch	0.8		1		1.25		1.5	
					1		1.25	
							1	
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 6923 (1983)	7.78	8.00	9.78	10.00	12.73	13.00	14.73	15.00
ISO 4161 (1983)	7.78	8.00	9.78	10.00	12.73	13.00	14.73	15.00
JIS B 1190 (1977)			9.80	10.00	11.75	12.00	13.75	14.00
ANSI B 18.2.4.4M (1993)	7.78	8.00	9.78	10.00	12.73	13.00	14.73	15.00
Overall Height h	min.	max.	min.	max.	min.	max.	min.	max.
DIN 6923 (1983)	4.7	5.0	5.7	6.0	7.6	8.0	9.6	10.0
ISO 4161 (1983)	4.7	5.0	5.7	6.0	7.6	8.0	9.6	10.0
JIS B 1190 (1977)			5.25	6.00	7.1	8.0	9.1	10.0
ANSI B 18.2.4.4M (1993)	4.7	5.0	5.7	6.0	7.6	8.0	9.6	10.0
Flange Diameter d2	max.		max.		max.		max.	
DIN 6923 (1983)	11.8		14.2		17.9		21.8	
ISO 4161 (1983)	11.8		14.2		17.9		21.8	
JIS B 1190 (1977)			14		17.5		21	
ANSI B 18.2.4.4M (1993)	11.8		14.2		17.9		21.8	
Thread Size d1	12		14		16		20	
Coarse Pitch	1.75		2		2		2.5	
Fine Pitch	1.5		1.5		1.5		1.5	
Extra Fine Pitch	1.25							
WAF s	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal	min.	max.= nominal
DIN 6923 (1983)	17.73	18.00	20.67	21.00	23.67	24.00	29.67	30.00
ISO 4161 (1983)	17.73	18.00	20.67	21.00	23.67	24.00	29.16	30.00
ANSI B 18.2.4.4M (1993)	17.73	18.00	20.67	21.00	23.67	24.00	29.16	30.00
Overall Height h	min.	max.	min.	max.	min.	max.	min.	max.
DIN 6923 (1983)	11.6	12.0	13.3	14.0	15.3	16.0	18.9	20.0
ISO 4161 (1983)	11.6	12.0	13.3	14.0	15.3	16.0	18.9	20.0
ANSI B 18.2.4.4M (1993)	11.6	12.0	13.3	14.0	15.3	16.0	18.9	20.0
Flange Diameter d2	max.		max.		max.		max.	
DIN 6923 (1983)	26		29.9		34.5		42.8	
ISO 4161 (1983)	26		29.9		34.5		42.8	
ANSI B 18.2.4.4M (1993)	26		29.9		34.5		42.8	

Material	Steel - Property Class				Proof Load (psi)	Stainless Steel A2	
Proof Load (psi)	8		10			Property Class 50	72500
M5 to M6	117450		150800		Property Class 70	101500	
M8 TO M10	120350		150800		Property Class 80	116000	
M10 TO M16	121800		152250		Hardness is not a measurable attribute of Stainless Steel		
M20	133400		153700		Finish	Plain	
Vickers Hardness HV	min.	max.	min.	max.	Thread Tolerance	6H	
M5 to M6	188	302	272	353	JIS Only Available In M6 x 1, M8 x 1.25, And M10 x 1.25, Except On Special Order.		
M8 TO M10							
M10 TO M16							
M20	233	353	The Strength Class Of The Nut Should Always Be Equal Or Greater Than The Strength Class Of The Screw.				
Finish	Plain or Plated						
Thread Tolerance	6H Plain or Plated						

For More Detailed Information, Please Refer To Complete DIN, JIS, ISO, or ANSI Standard, Which Are The Governing Standards.

CARRIAGE BOLTS DIN 603 / ISO 8677 / ISO 8678 / ASME B18.5.2.1M



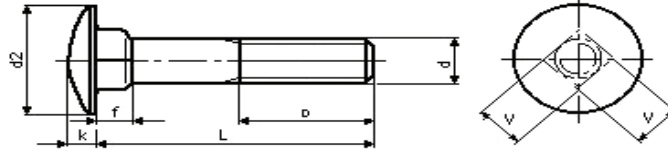
Thread Size d1	DIN 603	M5	M6	M8	M10	M12	M16	M20
Thread Pitch		0.8	1	1.25	1.5	1.75	2	2.5
Thread Length b1	For Lengths ≤125mm	16	18	22	26	30	38	46
	For Lengths >125mm≤200mm	22	24	28	32	36	44	52
	For Lengths >200 mm		37	41	45	49	57	65
Head Dia. d2	min.	12.45	15.45	19.35	23.35	29.35	37.20	45.20
	max.	13.55	16.55	20.65	24.65	30.65	38.80	46.80
Head Height k	min.	2.70	3.12	4.12	4.62	6.05	8.05	9.95
	max.	3.30	3.88	4.88	5.38	6.95	8.95	11.05
Square Depth f	min.	2.90	3.40	4.40	5.40	7.25	11.1	14.10
	max.	4.10	4.60	5.60	6.60	8.75	12.9	15.90
Square AF v	min.	4.52	5.52	7.42	9.42	11.3	15.3	19.16
	max.	5.48	6.48	8.58	10.58	12.7	16.7	20.84

Thread Size d1	ISO 8677 (Large Head)	M5	M6	M8	M10	M12	M16	M20
Thread Pitch		0.8	1	1.25	1.5	1.75	2	2.5
Thread Length b1	For Lengths ≤125mm	16	18	22	26	30	38	46
	For Lengths >125mm≤200mm	22	24	28	32	36	44	52
	For Lengths >200 mm		37	41	45	49	57	65
Head Dia. d2	min.	11.9	14.9	18.7	22.7	28.7	36.4	44.4
	max. = nom.	13.0	16.0	20.0	24.0	30.0	38.0	46.0
Head Height k	min.	2.5	3.0	4.0	5.0	6.0	8.0	10.0
	max.	3.1	3.6	4.8	5.8	6.8	8.9	10.9
Square Depth f	min.	2.9	3.4	4.4	5.4	7.2	11.1	14.1
	max.	4.1	4.6	5.6	6.6	8.8	12.9	15.9
Square AF v	min.	4.52	5.52	7.42	9.42	11.3	15.3	19.16
	max.	5.48	6.48	8.58	10.58	12.7	16.7	20.84

Thread Size d1	ISO 8678 & ASME B18.5.2.1M Small Head/Short Neck	M6	M8	M10	M12	(M14) ASME Only	M16	M20
Thread Pitch		1	1.25	1.5	1.75	2	2	2.5
Thread Length b1	For Lengths ≤125mm	18	22	26	30	34	38	46
	For Lengths >125mm≤200mm	24	28	32	36	40	44	52
	For Lengths >200 mm	37	41	45	49	53	57	65
Head Dia. d2	min.	No Head Diameter minimum specified in ISO 8678 and or ASME B18.5.2.1M						
	max.	14.2	18	22.3	26.6	30.5	35	43
Head Height k	min.	3.0	4.0	5.0	6.0	7.0	8.0	10.0
	max.	3.6	4.8	5.8	6.8	7.9	8.9	10.9
Square Depth f (Short Neck)	min.	2.4	2.4	3.2	3.2	3.2	4.2	4.2
	max.	3.0	3.0	4.0	4.0	4.0	5.0	5.0
Square AF v	min.	5.88	7.85	9.85	11.82	13.82	15.82	19.79
	max.	6.48	8.58	10.58	12.70	14.70	16.70	20.84

For More Detailed Information, Please Refer To Complete DIN, ISO or ASME Standard, Which Are The Governing Standards.

CARRIAGE BOLTS DIN 603 / ISO 8677 / ISO 8678 / ASME B18.5.2.1M

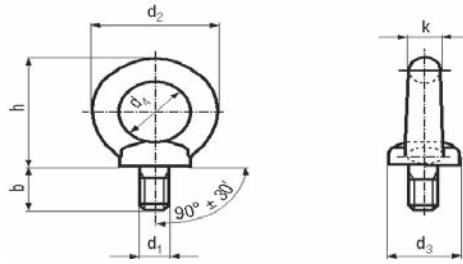


Nominal Length	Length Tolerance By Standard											
	DIN 603			ISO 8677			ISO 8678			ASME B18.5.2.1M		
	min.	max.	+/-	min.	max.	+/-	min.	max.	+/-	min.	max.	+/-
12							11.1	12.9	+/-0.90	11.1	12.9	+/-0.90
(14)							13.1	14.9	+/-0.90			
16	15.1	16.9	+/-0.90				15.1	16.9	+/-0.90	15.1	16.9	+/-0.90
20	18.95	21.05	+/-1.05	19	21	+/-1.00	18.95	21.05	+/-1.05	18.95	21.05	+/-1.05
25	23.95	26.05	+/-1.05	24	26	+/-1.00	23.95	26.05	+/-1.05	23.95	26.05	+/-1.05
30	28.95	31.05	+/-1.05	29	31	+/-1.00	28.95	31.05	+/-1.05	28.95	31.05	+/-1.05
35	33.75	36.25	+/-1.25	33.7	36.3	+/-1.03	33.75	36.25	+/-1.25	33.75	36.25	+/-1.25
40	38.75	41.25	+/-1.25	38.7	41.3	+/-1.03	38.75	41.25	+/-1.25	38.75	41.25	+/-1.25
45	43.75	46.25	+/-1.25	43.7	46.3	+/-1.03	43.75	46.25	+/-1.25	43.75	46.25	+/-1.25
50	48.75	51.25	+/-1.25	48.7	51.3	+/-1.03	48.75	51.25	+/-1.25	48.75	51.25	+/-1.25
(55)	53.5	56.5	+/-1.50	53.5	56.5	+/-1.05	53.5	56.5	+/-1.50	53.5	56.5	+/-1.50
60	58.5	61.5	+/-1.50	58.5	61.5	+/-1.05	58.5	61.5	+/-1.50	58.5	61.5	+/-1.50
(65)	63.5	66.5	+/-1.50	63.5	66.5	+/-1.05	63.5	66.5	+/-1.50	63.5	66.5	+/-1.50
70	68.5	71.5	+/-1.50	68.5	71.5	+/-1.05	68.5	71.5	+/-1.50	68.5	71.5	+/-1.50
(75)	73.5	76.5	+/-1.50	73.5	76.5	+/-1.05						
80	78.5	81.5	+/-1.50	78.5	81.5	+/-1.05	78.5	81.5	+/-1.50	78.5	81.5	+/-1.50
90	88.25	91.75	+/-1.75	88.3	91.7	+/-1.7	88.25	91.75	+/-1.75	88.25	91.75	+/-1.75
100	98.25	101.8	+/-1.75	98.3	101.7	+/-1.7	98.25	101.75	+/-1.75	98.25	101.75	+/-1.75
110	108.3	111.8	+/-1.75	108.3	111.7	+/-1.7	108.25	111.75	+/-1.75	108.25	111.75	+/-1.75
120	118.3	121.8	+/-1.75	118.3	121.7	+/-1.7	118.25	121.75	+/-1.75	118.25	121.75	+/-1.75
130	128	132	+/-2.00	128	132	+/-2.00	128	132	+/-2.00	128	132	+/-2.00
140	138	142	+/-2.00	138	142	+/-2.00	138	142	+/-2.00	138	142	+/-2.00
150	148	152	+/-2.00	148	152	+/-2.00	148	152	+/-2.00	148	152	+/-2.00
160	156	164	+/-4.00	156	164	+/-4.00	158	162	+/-2.00	158	162	+/-2.00
180	176	184	+/-4.00	176	184	+/-4.00	177.7	182.3	+/-2.30	177.7	182.3	+/-2.30
200	195.4	204.6	+/-4.60	195.4	204.6	+/-4.60	197.7	202.3	+/-2.30	197.7	202.3	+/-2.30

Mechanical Properties	Diameters & Lengths With () are not recommended for new design.					
	3.6	4.6	8.8 ≤16mm	8.8 >16mm	10.9	A2 Stainless
Material						
Finish	Plain or Plated					Plain
Tensile Strength	47850 psi	58000 psi	116000 psi	120350 psi	150800 psi	72500-116000 psi
Yield Strength	28710	34800 psi	92800 psi	95700 psi	136300 psi	30450-87000 psi
Hardness	52-99.5 HRB		22-32 HRC	23-34 HRC	32-39 HRC	NA
Thread Tolerance	Plain 6g			Plated 6h		6g

For More Detailed Information, Please Refer To Complete DIN, ISO or ASME Standard, Which Are The Governing Standards.

LIFTING EYE BOLTS DIN 580



Standard	Thread Size d1											
	(M6)	M8	M10	M12	(M14)	M16	M20	(M22)	M24	(M27)	M30	(M33)
DIN 580	(M6)	M8	M10	M12	(M14)	M16	M20	(M22)	M24	(M27)	M30	(M33)
Thread Pitch	1	1.25	1.5	1.75	2	2	2.5	2.5	3	3	3.5	3.5
Fine Pitch				1.5		1.5	2		2		2	
Ring OD d2	36	36	45	54	63	63	72	90	90	108	108	126
Ring ID d4	20	20	25	30	35	35	40	50	50	60	60	70
Ring Height to Include shoulder h	36	36	45	53	62	62	71	90	90	109	109	128
Ring Width k	8	8	10	12	14	14	16	20	20	24	24	28
Shoulder Diameter d3	20	20	25	30	35	35	40	50	50	65	65	75
Thread Length b	13	13	17	20.5	27	27	30	36	36	45	45	54
Bolts Must Be Stamped C 15	Maximum Permissible Load In Pounds With (1) One Or (2) Bolts Firmly Tightened C15 Steel Only											
With (1) One Bolt	154	308	506	748	1078	1540	2640	3300	3960	5500	7920	9460
With (2) Two Bolts @ 45°	110	209	374	528	748	1100	1826	2310	2794	3630	5720	7040

Standard	Thread Size d1										
	M36	(M39)	M42	(M45)	M48	(M52)	M56	M64	M72	M80	M100
DIN 580	M36	(M39)	M42	(M45)	M48	(M52)	M56	M64	M72	M80	M100
Thread Pitch	4	4	4.5	4.5	5	5	5.5	6	6	6	6
Fine Pitch	3		3		3		4	4	4	4	4
Ring OD d2	126	126	144	166	166	184	184	206	260	296	330
Ring ID d4	70	70	80	90	90	100	100	110	140	160	180
Ring Height to Include shoulder h	128	128	147	168	168	187	187	208	260	298	330
Ring Width k	28	28	32	38	38	42	42	48	60	68	75
Shoulder Diameter d3	75	75	85	100	100	110	110	120	150	170	190
Thread Length b	54	54	63	68	68	78	78	90	100	112	130
Bolts Must Be Stamped C 15	Maximum Permissible Load In Pounds With (1) One Or (2) Bolts Firmly Tightened C15 Steel Only										
With (1) One Bolt	11220	13420	15400	17600	18920	21780	25300	35200	46200	61600	83600
With (2) Two Bolts @ 45°	8140	9460	11000	12100	13420	16060	18260	24200	33000	44000	59400

M6, M14, M22, M27, M33, M39, M45 & M52 Are Not Included In DIN 580, And Should Not Be Considered For New Designs. Also The Dimensions Could Vary From What Is Shown Above.

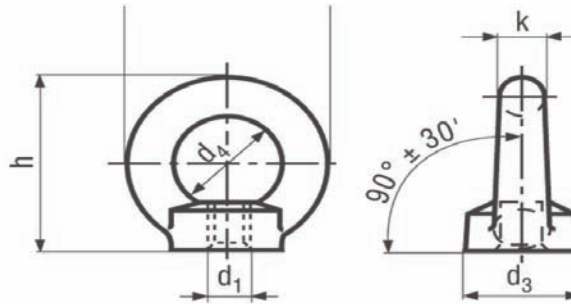
Fine Pitch DIN 580 Eye Bolts Only Available Upon Special Request.

If DIN 580 Eye Bolts Are Not Stamped C 15 Refer To Complete DIN Standard For Correct Load Information.

DIN 580 Does Not Reference Any Material Other Than C 15 Steel (Plain Or Zinc Plated), But Some Sizes Are Available In A2 And Or A4 Stainless Steel, But No Maximum Load Data Is Available For Either A2 Or A4 Stainless Steel.

For More Detailed Information, Please Refer To Complete DIN Standard, Which Is The Governing Standard.

LIFTING EYE NUTS DIN 582



Standard	Thread Size d1										
DIN 582	(M6)	M8	M10	M12	(M14)	M16	M20	(M22)	M24	(M27)	M30
Thread Pitch	1	1.25	1.5	1.75	2	2	2.5	2.5	3	3	3.5
Fine Pitch							2		2		2
Ring OD d2	36	36	45	54	63	63	72	81	90	90	108
Ring ID d4	20	20	25	30	35	35	40	45	50	50	60
Ring Height to Include shoulder h	36	36	45	53	62	62	71	90	90	90	109
Ring Width k	7	8	10	12	14	14	16	18	20	20	24
Shoulder Diameter d3	20	20	25	30	35	35	40	45	50	50	65
Internal Thread Length	8.5	8.5	10	11	13	13	16	18	20	20	25
Nuts Must Be Stamped C 15	Maximum Permissible Load In Pounds With (1) One Or (2) Nuts Firmly Tightened C15 Steel Only										
With (1) One Nut	154	308	506	748	1078	1540	2640	3300	3960	5500	7920
With (2) Two Nuts @ 45°	110	209	374	528	748	1100	1826	2310	2794	3630	5720

Standard	Thread Size d1										
DIN 582	(M33)	M36	(M39)	M42	(M45)	M48	M56	M64	M72	M80	M100
Thread Pitch	3.5	4	4	4.5	4.5	5	5.5	6	6	6	6
Fine Pitch		3		3		3	4	4	4	4	4
Ring OD d2	108	126	126	144	144	166	184	206	260	296	330
Ring ID d4	60	70	70	80	80	90	100	110	140	160	180
Ring Height to Include shoulder h	109	128	128	147	147	168	187	208	260	298	330
Ring Width k	24	28	28	32	32	38	42	48	60	68	75
Shoulder Diameter d3	65	75	75	85	85	100	110	120	150	170	190
Internal Thread Length	25	30	30	35	35	40	45	50	60	70	80
Nuts Must Be Stamped C 15	Maximum Permissible Load In Pounds With (1) One Or (2) Nuts Firmly Tightened C15 Steel Only										
With (1) One Nut	9460	11220	13420	15400	17600	18920	25300	35200	46200	61600	83600
With (2) Two Nuts @ 45°	7040	8140	9460	11000	12100	13420	18260	24200	33000	44000	59400

M6, M14, M22, M27, M33, M39, & M45 Are Not Included In DIN 582, And Should Not Be Considered For New Designs. Also The Dimensions Could Vary From What Is Shown Above.

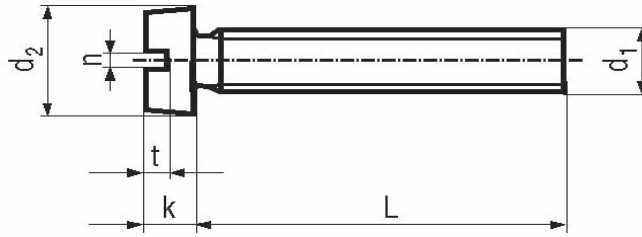
Fine Pitch DIN 582 Eye Nuts Only Available Upon Special Request.

If DIN 582 Eye Nuts Are Not Stamped C 15 Refer To Complete DIN Standard For Correct Load Information.

DIN 582 Does Not Reference Any Material Other Than C 15 Steel (Plain Or Zinc Plated), But Some Sizes Are Available In A2 And Or A4 Stainless Steel, But No Maximum Load Data Is Available For Either A2 Or A4 Stainless Steel.

For More Detailed Information, Please Refer To Complete DIN Standard, Which Is The Governing Standard.

CHEESE HEAD SLOTTED MACHINE SCREWS DIN 84 / ISO 1207



Head Diameter (d2)	Size d1	M1.6		M2		M2.5		(M2.6)		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 84 (1990)		2.86	3.00	3.62	3.80	4.32	4.50	4.82	5.00	5.32	5.50	5.82	6.00	6.78	7.00	8.28	8.50	9.78	10.00	12.73	13.00	15.73	16.00
ISO 1207 (1992)		2.86	3.00	3.62	3.80	4.32	4.50			5.32	5.50	5.82	6.00	6.78	7.00	8.28	8.50	9.78	10.00	12.73	13.00	15.73	16.00

Head Height (k)	Size d1	M1.6		M2		M2.5		(M2.6)		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 84 (1990)		0.86	1.0	1.16	1.3	1.46	1.6	1.56	1.70	1.86	2.00	2.26	2.40	2.46	2.60	3.12	3.30	3.60	3.90	4.70	5.00	5.70	6.00
ISO 1207 (1992)		0.96	1.1	1.26	1.4	1.66	1.8			1.86	2.00	2.26	2.40	2.46	2.60	3.12	3.30	3.60	3.90	4.70	5.00	5.70	6.00

Slot Width (n)	Size d1	M1.6		M2		M2.5		(M2.6)		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 84 (1990)		0.46	0.60	0.56	0.70	0.66	0.80	0.66	0.80	0.86	1.00	1.06	1.20	1.26	1.51	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81
ISO 1207 (1992)		0.46	0.60	0.56	0.70	0.66	0.80			0.86	1.00	1.06	1.20	1.26	1.51	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81

Slot Depth (t)	Size d1	M1.6		M2		M2.5		(M2.6)		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 84 (1990)		0.45	0.60	0.60	0.80	0.70	0.9	0.8	1.0	0.9	1.15	1.10	1.40	1.20	1.50	1.50	1.80	1.80	2.20	2.10	2.60	2.40	3.00
ISO 1207 (1992)		0.45		0.60		0.70				0.85				1.10		1.30		1.60		2.00		2.40	

Length Tolerance	DIN 84/ISO1207	
Nominal Length	min	max
2	1.8	2.2
2.5	2.3	2.7
3	2.8	3.2
4	3.76	4.24
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.5	35.5
40	39.5	40.5
45	44.5	45.5
50	49.5	50.5
(55)	54.05	55.95
60	59.05	60.95
(65)	64.05	65.95
70	69.05	70.95
(75)	74.05	75.95
80	79.05	80.95
90	88.9	91.1

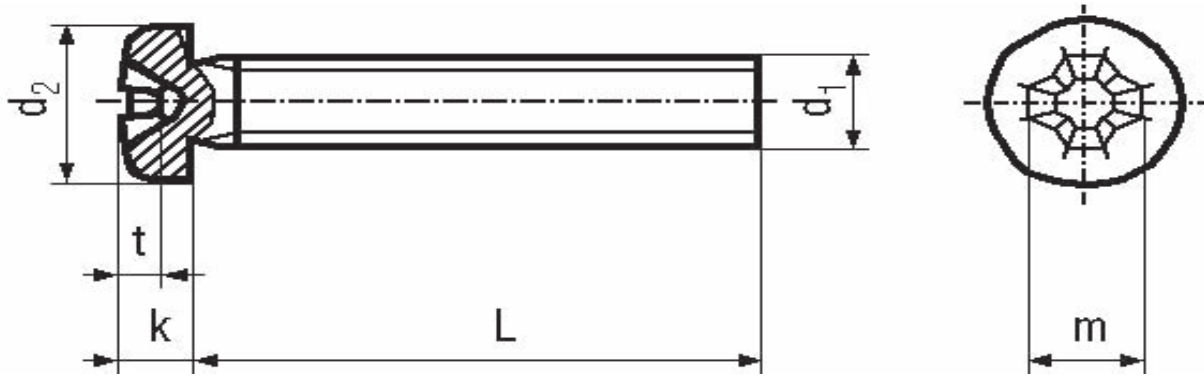
Diameters & Lengths With () are not recommended for new design.

Thread Pitch		Thread Tolerance Plain 6g	
Dia.	Pitch	Thread Tolerance Plated 6h	
M1.6	0.35	Thread Tolerance Stainless 6g	
M2	0.4		
M2.5	0.45	Material	4.8 A2 - A4
(M2.6)	0.45	Tensile Strength	60900 72500-101500
M3	0.5		
(M3.5)	0.6	Yield Strength	49300 30450-65250
M4	0.7		
M5	0.8	Hardness	HRB NA
M6	1		
(M8)	1.25		
(M10)	1.5	Steel	Stainless Steel
Property Class		4.8	A2 - A4
Finish		Plain /Plated	Plain

For Machine Screws, The Letter A After The DIN Number Indicates Full Thread. Unless Requested, All Machine Screws Are Supplied As Full Thread, Therefore We Omit The A.

For More Detailed Information, Please Refer To Complete DIN or ISO Standard, Which Are The Governing Standards.

CHEESE HEAD PHILLIPS MACHINE SCREWS ISO 7048 / ~SN 213307



Head Diameter (d2)	Size d1	(M1.6)		(M2)		M2.5		M3		(M3.5)		M4		M5		M6		M8	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
ISO 7048 (1998)						4.32	4.50	5.32	5.50	5.82	6.00	6.78	7.00	8.28	8.50	9.78	10.00	12.73	13.00
SN 213307		2.86	3.00	3.62	3.80	4.32	4.50	5.32	5.50	5.82	6.00	6.78	7.00	8.28	8.50	9.78	10.00	12.73	13.00

Head Height (k)	Size d1	(M1.6)		(M2)		M2.5		M3		(M3.5)		M4		M5		M6		M8	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
ISO 7048 (1998)						1.66	1.8	1.86	2.00	2.26	2.40	2.46	2.60	3.12	3.30	3.60	3.90	4.70	5.00
SN 213307		0.96	1.1	1.26	1.4	1.66	1.8	1.86	2.00	2.26	2.40	2.46	2.60	3.12	3.30	3.60	3.90	4.70	5.00

Cross Recess Size (m)	Size d1	(M1.6)		(M2)		M2.5		M3		(M3.5)		M4		M5		M6		M8	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
ISO 7048 (1998)							1				2								3
SN 213307			0				1				2								3

Cross Recess Penetration (t)	Size d1	(M1.6)		(M2)		M2.5		M3		(M3.5)		M4		M5		M6		M8	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
ISO 7048 (1998)						1.20	1.62	0.86	1.43	1.15	1.73	1.45	2.03	2.14	2.73	2.25	2.86	3.73	4.36
SN 213307		0.70	0.90	0.90	1.10	1.20	1.62	0.86	1.43	1.15	1.73	1.45	2.03	2.14	2.73	2.25	2.86	3.73	4.36

Length Tolerance	ISO 7048		SN	
	213307			
Nominal Length	min	max		
2	1.8	2.2		
(2.5)	2.3	2.7		
3	2.8	3.2		
4	3.76	4.24		
5	4.76	5.24		
6	5.76	6.24		
8	7.71	8.29		
10	9.71	10.29		
12	11.65	12.35		
(14)	13.65	14.35		
16	15.65	16.35		
(18)	17.65	18.35		
20	19.58	20.42		
(22)	21.58	22.42		
25	24.58	25.42		
(28)	27.58	28.42		
30	29.58	30.42		
35	34.5	35.5		
40	39.5	40.5		
45	44.5	45.5		
50	49.5	50.5		
(55)	54.05	55.95		
60	59.05	60.95		
(65)	64.05	65.95		
70	69.05	70.95		
(75)	74.05	75.95		
80	79.05	80.95		
90	88.9	91.1		

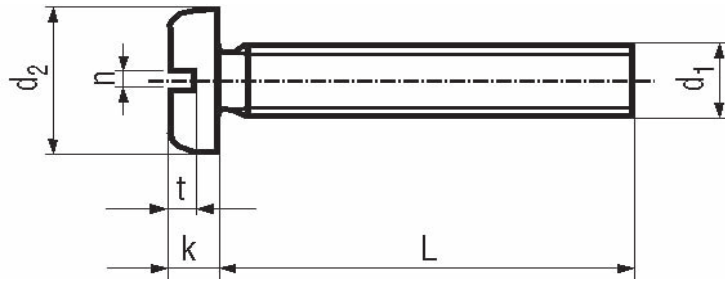
Diameters & Lengths With () are not recommended for new design.

Thread Pitch		Thread Tolerance Plain 6g	
Di.	Pitch	Thread Tolerance Plated 6h	
M1.6	0.35	Thread Tolerance Stainless 6g	
M2	0.4	Material	4.8 A2 - A4
M2.5	0.45	Tensile Strength	60900 72500-101500
M3	0.5	Yield Strength	49300 30450-65250
(M3.5)	0.6		
M4	0.7	Hardness	HRB 71-99.5 NA
M5	0.8		
M6	1		
M8	1.25	Steel	Stainless Steel
Property Class		4.8	A2 - A4
Finish		Plain /Plated	Plain

M1.6 & M2 are not listed in ISO 7048

For More Detailed Information, Please Refer To Complete ISO Or SN Standard, Which Are The Governing Standards.

PAN HEAD SLOTTED MACHINE SCREWS DIN 85 / ISO 1580 / JIS B 1101 / ANSI B.18.16.7M



Head Diameter (d2)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 85 (1990)								5.7	6	6.64	7	7.64	8	9.64	10	11.57	12	15.57	16	19.48	20
ISO 1580 (1994)		2.9	3.2	3.7	4	4.7	5	5.3	5.6	6.64	7	7.64	8	9.14	9.5	11.57	12	15.57	16	19.48	20
JIS B 1101 (1977)		2.6	3	3.1	3.5	4.1	4.5	5	5.5	5.5	6	6.5	7	8.4	9	9.8	10.5	13.2	14		
ANSI B 18.16.7 M (1985)				3.7	4	4.7	5	5.3	5.6	6.6	7	7.6	8	9.1	9.5	11.5	12	15.5	16	19.4	20

Head Height (k)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 85 (1990)								1.66	1.8	1.96	2.1	2.26	2.4	2.86	3	3.3	3.6	4.5	4.8	5.7	6
ISO 1580 (1994)		0.86	1.0	1.16	1.3	1.36	1.5	1.66	1.8	1.96	2.1	2.26	2.4	2.86	3	3.3	3.6	4.5	4.8	5.7	6
JIS B 1101 (1977)		0.9	1.1	1.2	1.4	1.6	1.8	1.85	2.15	2.15	2.45	2.45	2.75	3.15	3.45	3.7	4.1	5	5.4		
ANSI B 18.16.7 M (1985)				1.1	1.3	1.3	1.5	1.6	1.8	1.9	2.1	2.2	2.4	2.7	3	3.3	3.6	4.5	4.8	5.7	6

Slot Width (n)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 85 (1990)								0.86	1	1.06	1.2	1.26	1.51	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81
ISO 1580 (1994)		0.46	0.6	0.56	0.7	0.66	0.8	0.86	1	1.06	1.2	1.26	1.51	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81
JIS B 1101 (1977)		0.4	0.55	0.6	0.75	0.8	0.95	0.8	0.95	1	1.15	1	1.15	1.2	1.4	1.2	1.4	1.6	1.8		
ANSI B 18.16.7 M (1985)				0.5	0.7	0.6	0.8	0.8	1	1	1.2	1.2	1.5	1.2	1.5	1.6	1.9	2	2.3	2.5	2.8

Slot Depth (t)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 85 (1990)								0.7		0.8		1		1.2		1.4		1.9		2.4	
ISO 1580 (1994)		0.35		0.5		0.60		0.7		0.8		1		1.2		1.4		1.9		2.4	
JIS B 1101 (1977)		0.45	0.65	0.6	0.8	0.75	1.05	0.95	1.25	1.05	1.45	1.2	1.6	1.5	2.1	1.8	2.4	2.3	3.3		
ANSI B 18.16.7 M (1985)				0.5		0.60		0.7		0.8		1		1.2		1.4		1.9		2.4	

Length Tolerance	DIN 85/ISO 1580	
	min	max
Nominal Length		
2		
(2.5)		
3	2.8	3.2
4	3.76	4.24
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.5	35.5
40	39.5	40.5
45	44.5	45.5
50	49.5	50.5
(55)	54.05	55.95
60	59.05	60.95
(65)	64.05	65.95
70	69.05	70.95
(75)	74.05	75.95
80	79.05	80.95
90	88.9	91.1

JIS B 1101					
Over M2.6 To M4.5		Over M4.5 To M8		M10 & Above	
min	max	min	max	min	max
				1.7	2
				2.7	3
				3.7	4
4.4	5	4.2	5	4.6	5
5.4	6	5.2	6	5.6	6
7.4	8	7.2	8	7.6	8
9.4	10	9.2	10	9.6	10
11.4	12	11	12	11.4	12
15.4	16	15	16	15.4	16
19.4	20	19	20	19.4	20
24.2	25	24	25	24.2	25
29.2	30	29	30	29.2	30
34.2	35	34	35	34.2	35
39.2	40	39	40	39.2	40
44	45	44	45		
49	50	49	50		
54	55	54	55		
		59	60		
		69	70		
		79	80		
		89	90		

ANSI B 18.16.7 M	
min	max
2.3	2.7
2.8	3.2
3.7	4.3
4.7	5.3
5.7	6.3
7.7	8.3
9.7	10.3
12.6	13.4
15.6	16.4
19.5	20.5
24.5	25.5
29.5	30.5
34.5	35.5
39.5	40.5
44.5	45.5
49.5	50.5
54	56
59	61
64	66
69	71
79	81
89	91

Diameters & Lengths With () are not recommended for new design.

Thread Pitch		Thread Tolerance Plain 6g	
Dia.	Pitch	Thread Tolerance Plated 6h	
M1.6	0.35	Thread Tolerance Stainless 6g	
M2	0.4		
M2.5	0.45	Material	4.8 A2 - A4
(M2.6)	0.45	Tensile Strength	60900 72500-101500
M3	0.5	Yield Strength	49300 30450-65250
(M3.5)	0.6	Hardness	HRB 71-99.5 NA
M4	0.7		
M5	0.8		
M6	1		
(M8)	1.25		
(M10)	1.5	Steel	Stainless Steel
Property Class		4.8	A2 - A4
Finish		Plain /Plated	Plain

For Machine Screws, The Letter A After The DIN Number Indicates Full Thread. Unless Requested, All Machine Screws Are Supplied As Full Thread, Therefore We Omit The A.

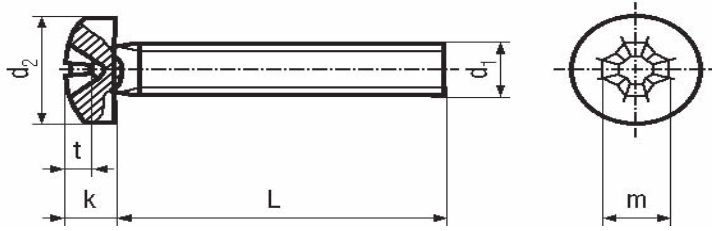
Refer To ISO 1580 For M2, M2.5, and M10, As these Three Diameters Are Not Available In DIN 85 A

M2.6 Is Not Available In DIN 85 A Or ISO 1580. Use M2.5 ISO 1580 For Dimensional Information.

Neither DIN, ISO, Or ANSI Specify A Maximum Slot Depth.

For More Detailed Information, Please Refer To Complete DIN or ISO Standard, Which Are The Governing Standards.

PAN HEAD PHILLIPS MACHINE SCREWS DIN 7985 / ISO 7045 / JIS B 1111 / ANSI B 18.16.7 M



Head Diameter (d2)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 7985 (1990)		2.9	3.2	3.7	4	4.7	5	5.7	6	6.64	7	7.64	8	9.64	10	11.57	12	15.57	16	19.48	20
ISO 7045 (1994)		2.9	3.2	3.7	4	4.7	5	5.3	5.6	6.64	7	7.64	8	9.14	9.5	11.57	12	15.57	16	19.48	20
JIS B 1111 (1977)				3.1	3.5	4.1	4.5	5	5.5	5.5	6	6.5	7	8.4	9	9.8	10.5	13.2	14		
ANSI B 18.16.7 M (1985)				3.7	4	4.7	5	5.3	5.6	6.6	7	7.6	8	9.1	9.5	11.5	12	15.5	16	19.4	20

Head Height (k)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 7985 (1990)		1.18	1.42	1.48	1.72	1.88	2.12	2.28	2.52	2.58	2.82	2.95	3.25	3.65	3.95	4.45	4.75	5.85	6.15	7.32	7.68
ISO 7045 (1994)		1.16	1.3	1.46	1.6	1.96	2.1	2.26	2.4	2.46	2.6	2.92	3.1	3.52	3.7	4.3	4.6	5.7	6	7.14	7.5
JIS B 1111 (1977)				1.2	1.4	1.6	1.8	1.85	2.15	2.15	2.45	2.45	2.75	3.15	3.45	3.7	4.1	5	5.4		
ANSI B 18.16.7 M (1985)				1.4	1.6	1.9	2.1	2.2	2.4	2.3	2.6	2.8	3.1	3.4	3.7	4.3	4.6	5.6	6	7.1	7.5

Cross Recess Size (m)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard																					
DIN 7985 (1990)			0				1						2				3			4	
ISO 7045 (1994)			0				1					2				3			4		
JIS B 1111 (1977)					1						2					3					
ANSI B 18.16.7 M (1985)					0		1				2					3			4		

Cross Recess Penetration (t)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 7985 (1990)		0.72	1.02	1.1	1.4	1.3	1.6	1.7	2	1.74	2.24	2.04	2.54	2.77	3.27	3.03	3.53	4.18	4.68	5.38	5.88
ISO 7045 (1994)		0.70	0.95	0.9	1.2	1.15	1.55	1.4	1.8	1.4	1.9	1.9	2.4	2.4	2.9	3.1	3.6	4	4.6	5.2	5.8
JIS B 1111 (1977)				0.6	1.01	1	1.42	0.86	1.43	1.15	1.73	1.45	2.03	2.14	2.73	2.26	2.86	3.73	4.36		
ANSI B 18.16.7 M (1985)				0.95	1.2	1.15	1.55	1.4	1.8	1.4	1.9	1.9	2.4	2.4	2.9	3.1	3.6	4	4.6	5.2	5.8

Length Tolerance	DIN7985/ISO7045	
	min	max
Nominal Length		
2		
2.5		
3	2.8	3.2
4	3.76	4.24
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.5	35.5
40	39.5	40.5
45	44.5	45.5
50	49.5	50.5
(55)	54.05	55.95
60	59.05	60.95
(65)	64.05	65.95
70	69.05	70.95
(75)	74.05	75.95
80	79.05	80.95
90	88.9	91.1

JIS B 1111					
min	max	min	max	min	max
1.7	2				
2.7	3				
3.7	4				
4.6	5	4.4	5	4.2	5
5.6	6	5.4	6	5.2	6
7.6	8	7.4	8	7.2	8
9.6	10	9.4	10	9.2	10
11.4	12	11.4	12	11	12
15.4	16	15.4	16	15	16
19.4	20	19.4	20	19	20
24.2	25	24.2	25	24	25
29.2	30	29.2	30	29	30
34.2	35	34.2	35	34	35
39.2	40	39.2	40	39	40
		44	45	44	45
		49	50	49	50
		54	55	54	55
				59	60
				69	70
				79	80
				89	90

ANSI B 18.16.7 M	
min	max
2.3	2.7
2.8	3.2
3.7	4.3
4.7	5.3
5.7	6.3
7.7	8.3
9.7	10.3
12.7	13.3
15.7	16.3
19.5	20.5
24.5	25.5
29.5	30.5
34.5	35.5
39.5	40.5
44.5	45.5
49.5	50.5
54	56
59	61
64	66
69	71
79	81
89	91

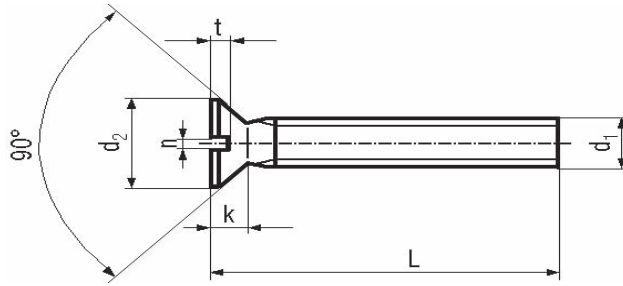
Diameters & Lengths With () are not recommended for new design.

Thread Pitch		Thread Tolerance Plain 6g			
Dia.	Pitch	Thread Tolerance Plated 6h			
M1.6	0.35	Thread Tolerance Stainless 6g			
M2	0.4				
M2.5	0.45	Material	4.8	A2 - A4	
(M2.6)	0.45				
M3	0.5	Tensile Strength	60900	72500-101500	
(M3.5)	0.6				
M4	0.7	Yield Strength	49300	30450-65250	
M5	0.8				
M6	1	Hardness	HRB 71-99.5	NA	
(M8)	1.25				
(M10)	1.5				
Property Class		Steel	Stainless Steel		
		4.8	A2 - A4		
Finish		Plain/Plated	Plain		

For Machine Screws, The Letter A After The DIN Number Indicates Full Thread. Unless Requested, All Machine Screws Are Supplied As Full Thread, Therefore We Omit The A.

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.

FLAT HEAD SLOTTED MACHINE SCREWS DIN 963 / ISO 2009 / JIS B 1101 / ANSI B 18.16.7 M



Head Diameter (d2)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 963 (1990)		2.86	3.00	3.50	3.80	4.40	4.70	5.30	5.60	6.14	6.50	7.14	7.50	8.84	9.20	10.57	11.00	14.07	14.50	17.57	18.00
ISO 2009 (1994)		2.70	3.00	3.50	3.80	4.40	4.70	5.20	5.50	6.94	7.30	8.04	8.40	8.94	9.30	10.87	11.30	15.37	15.80	17.78	18.30
JIS B 1101 (1977)		2.80	3.20	3.60	4.00	4.60	5.00	5.50	6.00	6.50	7.00	7.50	8.00	9.40	10.00	11.30	12.00	15.20	16.00		
ANSI B 18.16.7 M (1985)				3.50		4.40		5.20		6.90		8.00		8.90		10.90		15.40		17.80	

Head Height (k)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 963 (1990)			0.96		1.20		1.50		1.65		1.93		2.20		2.50		3.00		4.00		5.00
ISO 2009 (1994)			1.00		1.20		1.50		1.65		2.35		2.70		2.70		3.30		4.65		5.00
JIS B 1101 (1977)		0.85	0.95	1.00	1.20	1.25	1.45	1.45	1.75	1.70	2.00	2.00	2.30	2.50	2.80	3.00	3.40	4.00	4.40		
ANSI B 18.16.7 M (1985)					1.20		1.50		1.70		2.30		2.70		2.70		3.30		4.60		5.00

Slot Width (n)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 963 (1990)		0.46	0.60	0.56	0.70	0.66	0.80	0.86	1.00	0.86	1.00	1.06	1.20	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81
ISO 2009 (1994)		0.46	0.60	0.56	0.70	0.66	0.80	0.86	1.00	1.06	1.20	1.26	1.51	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81
JIS B 1101 (1977)		0.40	0.55	0.60	0.75	0.80	0.95	0.80	0.95	1.00	1.15	1.00	1.15	1.20	1.40	1.20	1.40	1.60	1.80		
ANSI B 18.16.7 M (1985)				0.50	0.70	0.60	0.80	0.80	1.00	1.00	1.20	1.20	1.50	1.20	1.50	1.60	1.90	2.00	2.30	2.50	2.80

Slot Depth (t)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 963 (1990)		0.32	0.45	0.40	0.60	0.50	0.70	0.60	0.85	0.70	1.00	0.80	1.10	1.00	1.30	1.20	1.60	1.60	2.10	2.00	2.60
ISO 2009 (1994)		0.32	0.50	0.40	0.60	0.50	0.75	0.60	0.85	0.90	1.20	1.00	1.30	1.10	1.40	1.20	1.60	1.80	2.30	2.00	2.60
JIS B 1101 (1977)		0.30	0.40	0.40	0.60	0.50	0.70	0.60	0.80	0.65	0.95	0.75	1.05	0.90	1.30	1.15	1.65	1.50	2.10		
ANSI B 18.16.7 M (1985)				0.40	0.60	0.50	0.70	0.60	0.90	0.90	1.20	1.00	1.30	1.10	1.40	1.20	1.60	1.80	2.30	2.00	2.60

Length Tolerance	DIN963/ISO2009	
	min	max
Nominal Length		
2		
2.5		
3	2.80	3.20
4	3.76	4.24
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.50	35.50
40	39.50	40.50
45	44.50	45.50
50	49.50	50.50
(55)	54.05	55.95
60	59.05	60.95
(65)	64.05	65.95
70	69.05	70.95
(75)	74.05	75.95
80	79.05	80.95
90	88.90	91.10

JIS B 1101					
min	max	min	max	min	max
1.7	2				
2.7	3				
3.7	4				
4.6	5	4.4	5	4.2	5
5.6	6	5.4	6	5.2	6
7.6	8	7.4	8	7.2	8
9.6	10	9.4	10	9.2	10
11.4	12	11.4	12	11	12
15.4	16	15.4	16	15	16
19.4	20	19.4	20	19	20
24.2	25	24.2	25	24	25
29.2	30	29.2	30	29	30
34.2	35	34.2	35	34	35
39.2	40	39.2	40	39	40
		44	45	44	45
		49	50	49	50
		54	55	54	55
				59	60
				69	70
				79	80
				89	90

ANSI B 18.16.7 M	
min	max
2.3	2.7
2.8	3.2
3.7	4.3
4.7	5.3
5.7	6.3
7.7	8.3
9.7	10.3
11.7	12.3
15.7	16.3
19.5	20.5
24.5	25.5
29.5	30.5
34.5	35.5
39.5	40.5
44.5	45.5
49.5	50.5
54	56
59	61
64	66
69	71
79	81
89	91

Diameters & Lengths With () are not recommended for new design.				
Thread Pitch	Thread Tolerance Plain 6g			
Dia.	Thread Tolerance Plated 6h			
M1.6	0.35	Thread Tolerance Stainless 6g		
M2	0.4			
M2.5	0.45	Material	4.8	A2 - A4
(M2.6)	0.45	Tensile Strength	60900	72500-101500
M3	0.5	Yield Strength	49300	30450-65250
(M3.5)	0.6	Hardness	HRB	NA
M4	0.7			
M5	0.8			
M6	1			
(M8)	1.25			
(M10)	1.5			
Property Class		Steel	4.8	Stainless Steel
Finish		Plain /Plated		Plain

DIN 963 (1990)
ISO 2009 (1994)
ANSI B 18.16.7 M (1985)

Do Not Specify A Minimum Head Height

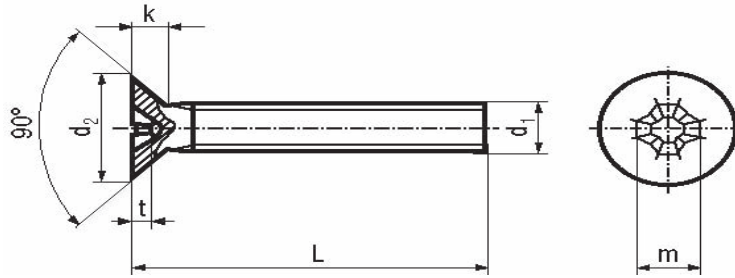
ANSI B 18.16.7 M (1985)

Does Not Specify A Maximum Head Diameter

For Machine Screws, The Letter A After The DIN Number Indicates Full Thread. Unless Requested, All Machine Screws Are Supplied As Full Thread, Therefore We Omit The A.

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.

FLAT HEAD PHILLIPS MACHINE SCREWS DIN 965 / ISO7046 / JIS B 1111 / ANSI B 18.16.7 M



Head Diameter (d2)	Size d1	M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 965 (1990)		3.50	3.80	4.40	4.70	5.30	5.60	6.14	6.50	7.14	7.50	8.84	9.20	10.57	11.00	14.07	14.50	17.57	18.00
ISO 7046 (1994)		3.50	3.80	4.40	4.70	5.20	5.50	6.94	7.30	8.04	8.40	8.94	9.30	10.87	11.30	15.37	15.80	17.78	18.30
JIS B 1111 (1977)			4.00	4.60	5.00	5.50	6.00	6.50	7.00	7.50	8.00	9.40	10.00	11.30	12.00	15.20	16.00		
ANSI B 18.16.7 M (1985)		3.50		4.40		5.20		6.90		8.00		8.90		10.90		15.40		17.80	

Head Height (k)	Size d1	M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 965 (1990)			1.20		1.50		1.65		1.93		2.20		2.50		3.00		4.00		5.00
ISO 7046 (1994)			1.20		1.50		1.65		2.35		2.70		2.70		3.30		4.65		5.00
JIS B 1111 (1977)		1.00	1.20	1.25	1.45	1.45	1.75	1.70	2.00	2.00	2.30	2.50	2.80	3.00	3.40	4.00	4.40		
ANSI B 18.16.7 M (1985)			1.20		1.50		1.70		2.30		2.70		2.70		3.30		4.60		5.00

Cross Recess Size (m)	Size d1	M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard																			
DIN 965 (1990)					1						2				3				4
ISO 7046 (1994)			0		1						2				3				4
JIS B 1111 (1977)					1						2				3				4
ANSI B 18.16.7 M (1985)			0		1						2				3				4

Cross Recess Penetration (t)	Size d1	M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
Standard		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DIN 965 (1990)		0.95	1.25	1.25	1.55	1.50	1.80	1.40	1.90	1.90	2.40	2.10	2.60	2.80	3.30	3.90	4.40	4.80	5.30
ISO 7046 (1994)		0.90	1.20	1.40	1.80	1.70	2.10	1.90	2.40	2.10	2.60	2.70	3.20	3.00	3.50	4.00	4.60	5.10	5.70
JIS B 1111 (1977)		0.65	1.01	1.05	1.42	0.91	1.43	1.40	1.93	1.79	2.33	2.38	2.93	2.70	3.26	4.36	4.96		
ANSI B 18.16.7 M (1985)		1.25	1.55	1.40	1.80	1.70	2.10	1.70	2.20	2.10	2.60	2.70	3.20	3.00	3.50	4.00	4.60	5.10	5.70

Length Tolerance	DIN965/ISO7046	
Nominal Length	min	max
2		
2.5		
3	2.80	3.20
4	3.76	4.24
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.50	35.50
40	39.50	40.50
45	44.50	45.50
50	49.50	50.50
(55)	54.05	55.95
60	59.05	60.95
(65)	64.05	65.95
70	69.05	70.95
(75)	74.05	75.95
80	79.05	80.95
90	88.90	91.10

JIS B 1111					
min	max	min	max	min	max
1.7	2				
2.7	3				
3.7	4				
4.6	5	4.4	5	4.2	5
5.6	6	5.4	6	5.2	6
7.6	8	7.4	8	7.2	8
9.6	10	9.4	10	9.2	10
11.4	12	11.4	12	11	12
15.4	16	15.4	16	15	16
19.4	20	19.4	20	19	20
24.2	25	24.2	25	24	25
29.2	30	29.2	30	29	30
34.2	35	34.2	35	34	35
39.2	40	39.2	40	39	40
		44	45	44	45
		49	50	49	50
		54	55	54	55
				59	60
				69	70
				79	80
				89	90

ANSI B 18.16.7 M	
min	max
2.3	2.7
2.8	3.2
3.7	4.3
4.7	5.3
5.7	6.3
7.7	8.3
9.7	10.3
11.7	12.3
15.7	16.3
19.5	20.5
24.5	25.5
29.5	30.5
34.5	35.5
39.5	40.5
44.5	45.5
49.5	50.5
54	56
59	61
64	66
69	71
79	81
89	91

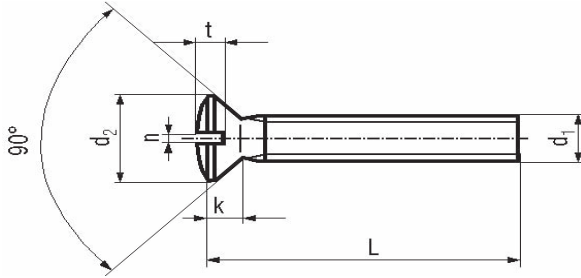
Diameters & Lengths With () are not recommended for new design.			
Thread Pitch		Thread Tolerance Plain 6g	
Dia. Pitch		Thread Tolerance Plated 6h	
M1.6 0.35		Thread Tolerance Stainless 6g	
M2	0.4		
M2.5 0.45	Material	4.8	A2 - A4
(M2.6) 0.45	Tensile Strength	60900	72500-101500
M3 0.5	Yield Strength	49300	30450-65250
(M3.5) 0.6			
M4 0.7	Hardness	HRB	NA
M5 0.8			
(M8) 1			
M6 1.25			
(M10) 1.5			
Property Class		Steel	Stainless Steel
Finish		4.8	A2 - A4
		Plain /Plated	Plain

DIN 965 (1990)	Do Not Specify A Minimum Head Height
ISO 7046 (1994)	
ANSI B 18.16.7 M (1985)	

For Machine Screws, The Letter A After The DIN Number Indicates Full Thread. Unless Requested, All Machine Screws Are Supplied As Full Thread, Therefore We Omit The A.

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.

OVAL HEAD SLOTTED MACHINE SCREWS DIN 964 / ISO 2010 / JIS B 1101 / ANSI B 18.16.7 M



Head Diameter (d2)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 964 (1990)		2.86	3.00	3.5	3.8	4.4	4.7	5.3	5.6	6.14	6.50	7.14	7.50	8.84	9.20	10.57	11.00	14.07	14.50	17.57	18.00
ISO 2010 (1994)		2.7	3.0	3.5	3.8	4.4	4.7	5.2	5.5	6.94	7.30	8.04	8.40	8.94	9.30	10.87	11.30	15.37	15.80	17.78	18.30
JIS B 1101 (1977)		2.8	3.2	3.6	4.0	4.6	5.0	5.5	6.0	6.5	7.0	7.5	8.0	9.4	10.0	11.3	12.0	15.2	16.0		
ANSI B 18.16.7 M (1985)				3.5		4.4		5.2		6.9		8		8.9		10.9		15.4		17.8	

Head Height (k)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 964 (1990)			0.96		1.2		1.5		1.65		1.93		2.2		2.5		3		4		5
ISO 2010 (1994)			1		1.2		1.5		1.65		2.35		2.7		2.7		3.3		4.65		5
JIS B 1101 (1977)		0.85	0.95	1.0	1.2	1.25	1.45	1.45	1.75	1.7	2.0	2.0	2.3	2.5	2.8	3.0	3.4	4.0	4.4		
ANSI B 18.16.7 M (1985)					1.2		1.5		1.7		2.3		2.7		2.7		3.3		4.6		5

Slot Width (n)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 964 (1990)		0.46	0.60	0.56	0.70	0.66	0.80	0.86	1.00	0.86	1.00	1.06	1.20	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81
ISO 2010 (1994)		0.46	0.60	0.56	0.70	0.66	0.80	0.86	1.00	1.06	1.20	1.26	1.51	1.66	1.91	2.06	2.31	2.56	2.81		
JIS B 1101 (1977)		0.40	0.55	0.60	0.75	0.80	0.95	0.80	0.95	1.00	1.15	1.00	1.15	1.2	1.4	1.2	1.4	1.6	1.8		
ANSI B 18.16.7 M (1985)				0.5	0.7	0.6	0.8	0.8	1.0	1.0	1.2	1.2	1.5	1.2	1.5	1.6	1.9	2.0	2.3	2.5	2.8

Slot Depth (t)	Size d1	M1.6		M2		M2.5		M3		(M3.5)		M4		M5		M6		M8		M10	
		min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Standard																					
DIN 964 (1990)		0.65	0.80	0.8	1.0	1.0	1.2	1.20	1.45	1.4	1.7	1.6	1.9	2.0	2.3	2.4	2.8	3.2	3.7	4.0	4.6
ISO 2010 (1994)		0.64	0.80	0.8	1.0	1.0	1.2	1.20	1.45	1.4	1.7	1.6	1.9	2.0	2.4	2.4	2.8	3.2	3.7	3.8	4.4
JIS B 1101 (1977)		0.45	0.65	0.55	0.85	0.75	1.05	0.9	1.3	1.0	1.4	1.15	1.65	1.4	2.0	1.7	2.5	2.0	3.2		
ANSI B 18.16.7 M (1985)				0.8	1.0	1.0	1.2	1.2	1.5	1.4	1.7	1.6	1.9	2.0	2.4	2.4	2.8	3.2	3.7	3.8	4.4

Length Tolerance	DIN964/ISO2010	
	min	max
Nominal Length		
2		
2.5		
3	2.80	3.20
4	3.76	4.24
5	4.76	5.24
6	5.76	6.24
8	7.71	8.29
10	9.71	10.29
12	11.65	12.35
(14)	13.65	14.35
16	15.65	16.35
(18)	17.65	18.35
20	19.58	20.42
(22)	21.58	22.42
25	24.58	25.42
(28)	27.58	28.42
30	29.58	30.42
35	34.50	35.50
40	39.50	40.50
45	44.50	45.50
50	49.50	50.50
(55)	54.05	55.95
60	59.05	60.95
(65)	64.05	65.95
70	69.05	70.95
(75)	74.05	75.95
80	79.05	80.95
90	88.90	91.10

JIS B 1101							
min	max	min	max	min	max	min	max
1.7	2						
2.7	3						
3.7	4						
4.6	5	4.4	5	4.2	5		
5.6	6	5.4	6	5.2	6		
7.6	8	7.4	8	7.2	8		
9.6	10	9.4	10	9.2	10		
11.4	12	11.4	12	11	12		
15.4	16	15.4	16	15	16		
19.4	20	19.4	20	19	20		
24.2	25	24.2	25	24	25		
29.2	30	29.2	30	29	30		
34.2	35	34.2	35	34	35		
39.2	40	39.2	40	39	40		
		44	45	44	45		
		49	50	49	50		
		54	55	54	55		
				59	60		
				69	70		
				79	80		
				89	90		

ANSI B 18.16.7 M	
min	max
2.3	2.7
2.8	3.2
3.7	4.3
4.7	5.3
5.7	6.3
7.7	8.3
9.7	10.3
11.7	12.3
15.7	16.3
19.5	20.5
24.5	25.5
29.5	30.5
34.5	35.5
39.5	40.5
44.5	45.5
49.5	50.5
54	56
59	61
64	66
69	71
79	81
89	91

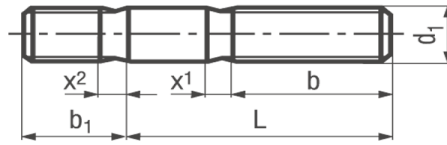
Diameters & Lengths With () are not recommended for new design.			
Thread Pitch	Thread Tolerance Plain 6g		
Dia.	Pitch	Thread Tolerance Plated 6h	
M1.6	0.35	Thread Tolerance Stainless 6g	
M2	0.4	Material	4.8 A2 - A4
M2.5	0.45	Tensile Strength	60900 72500-101500
(M2.6)	0.45		
M3	0.5	Yield Strength	49300 30450-65250
(M3.5)	0.6		
M4	0.7	Hardness	HRB 71-99.5 NA
M5	0.8		
M6	1		
(M8)	1.25		
(M10)	1.5	Steel	Stainless Steel
Property Class		4.8	A2 - A4
Finish		Plain /Plated	Plain
DIN 964 (1990)		Do Not Specify A	
ISO 2010 (1994)		Minimum Head Height	
ANSI B 18.16.7 M (1985)			

ANSI B 18.16.7 M (1985) Does Not Specify A Maximum Head Diameter

For Machine Screws, The Letter A After The DIN Number Indicates Full Thread. Unless Requested, All Machine Screws Are Supplied As Full Thread, Therefore We Omit The A.

For More Detailed Information, Please Refer To Complete DIN, ISO, JIS or ANSI Standard, Which Are The Governing Standards.

DOUBLE END STUDS DIN 939 Fo



DIN 939 (1995)	d1	M4	M5	M6	M7	M8	M10	M12	M14	M16	M18	M20
						M8X1	M10X1.25	M12X1.25	M14X1.5	M16X1.5	M18X1.5	M20X1.5
								M12X1.5				
For Lengths mm	b1	5	6.5	7.5	9	10	12	15	18	20	22	25
up to 125	b	14	16	18	20	22	26	30	34	38	42	46
over 125 to 200		20	22	24	26	28	32	36	40	44	48	52
over 200							45	49	53	57	61	65
	x1	1.75	2.00	2.50	2.50	3.20	3.80	4.30	5.00	5.00	6.30	6.30
	x2	0.90	1.00	1.25	1.25	1.60	1.90	2.20	2.50	2.50	3.20	3.20

DIN 939 (1995)	d1	M22	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52
		M22X1.5	M24X2	M27X2	M30X2	M33X2	M36X3	M39X3	M42X3	M45X3	M48X3	M52X3
For Lengths mm	b1	28	30	35	38	42	45	50	52	58	60	65
up to 125	b	50	54	60	66	72	78	84	90	96	102	110
over 125 to 200		56	60	66	72	78	84	90	96	102	108	116
over 200		69	73	79	85	91	97	103	109	115	121	129
	x1	6.30	7.50	7.50	9.00	9.00	10.00	10.00	11.00	11.00	12.50	12.50
	x2	3.20	3.80	3.80	4.50	4.50	5.00	5.00	5.50	5.50	6.30	6.30

Tap end length (b1) ~1.25 x d1

DIN 939 Studs require a Sk 6 Tolerance on the Tap End (B1) = Interference fit.

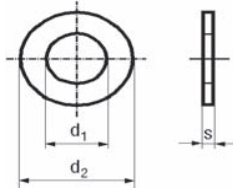
Examples of how to order Metric Studs - The Tap End (b1) length is not included in the OAL.

What size and type do you want? M8X30 OAL non interference fit DIN 939 Class 8.8 studs M12X115 OAL non interference fit DIN 939 Class 8.8 studs	How to call out order. M8X20 DIN 939-8.8 Fo Studs M12x100 DIN 939-8.8 Fo Studs
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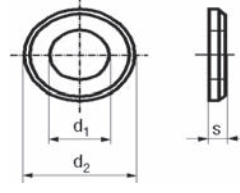
For More Detailed Information, Please Refer To Complete DIN Standard, Which Is The Governing Standard.

FLAT WASHERS DIN 125A-125B / ISO 7089-7090

DIN 125A / ISO 7089 Without Chamfer



DIN 125B / ISO 7090 With Chamfer Or Radius



DIN125A&B/ ISO 7089 & 7090 Except As Noted								Not In ISO 7089 Or 7090	200 HV
Screw Size	Hole Diameter d1		Outside Diameter d2		Thickness s			Except As Noted (No XXXX)	
	min.= nominal	max.	min.	max.= nominal	nominal	min.	max.		
1.6	1.7	1.84	3.7	4	0.3	0.25	0.35		
1.7	1.8	1.94	4.2	4.5	0.3	0.25	0.35	(No 7089)	
2	2.2	2.34	4.7	5	0.3	0.25	0.35		
2.3	2.5	2.64	5.7	6	0.5	0.45	0.55	(No 7089)	
2.5	2.7	2.84	5.7	6	0.5	0.45	0.55		
2.6	2.8	2.94	6.64	7	0.5	0.45	0.55	(No 7089)	
3	3.2	3.38	6.64	7	0.5	0.45	0.55		
3.5	3.7	3.88	7.64	8	0.5	0.45	0.55		
4	4.3	4.48	8.64	9	0.8	0.7	0.9		
5	5.3	5.48	9.64	10	1	0.9	1.1		200HV
6	6.4	6.62	11.57	12	1.6	1.4	1.8		200HV
7	7.4	7.62	13.57	14	1.6	1.4	1.8	(No 7089/7090)	
8	8.4	8.62	15.57	16	1.6	1.4	1.8		200HV
10	10.5	10.77	19.48	20	2	1.8	2.2		200HV
12	13	13.27	23.48	24	2.5	2.3	2.7		200HV
14	15	15.27	27.48	28	2.5	2.3	2.7		200HV
16	17	17.27	29.48	30	3	2.7	3.3		200HV
18	19	19.33	33.38	34	3	2.7	3.3	(No 7089/7090)	200HV
20	21	21.33	36.38	37	3	2.7	3.3		200HV
22	23	23.33	38.38	39	3	2.7	3.3	(No 7089/7090)	
24	25	25.33	43.38	44	4	3.7	4.3		
27	28	28.33	49.38	50	4	3.7	4.3	(No 7089/7090)	
30	31	31.39	55.26	56	4	3.7	4.3		
33	34	34.62	58.8	60	5	4.4	5.6	(No 7089/7090)	
36	37	37.62	64.8	66	5	4.4	5.6		
39	40	40.62	70.8	72	6	5.4	6.6	(No 7089/7090)	
42	43	43.62	76.8	78	7	6	8	(No 7089/7090)	
45	46	46.62	83.6	85	7	6	8	(No 7089/7090)	
48	50	50.62	90.6	92	8	7	9	(No 7089/7090)	
52	54	54.74	96.6	98	8	7	9	(No 7089/7090)	
56	58	58.74	103.6	105	9	8	10	(No 7089/7090)	
64	66	66.74	113.6	115	9	8	10	(No 7089/7090)	
72	74	74.74	123.4	125	10	9	11	(No 7089/7090)	
80	82	82.87	138.4	140	12	10.8	13.2	(No 7089/7090)	
90	93	93.87	158.4	160	12	10.8	13.2	(No 7089/7090)	
100	104	104.87	173.4	175	14	12.8	15.2	(No 7089/7090)	

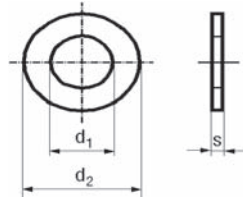
Material	Steel			A2/A4 Stainless Steel	Brass
Classes	140 HV	200 HV	300 HV (1)	140 HV	NA
Hardness HV	140 min.	200-300	300-400	140 min.	NA
Finish	Plain Or Plated			Plain	Plain Or Nickel Plated

Type A Are Standard In Sizes 1.6mm Through 36mm Screw Size.

Type B Are Standard In Sizes 5mm Through 100mm Screw Size, But Are Not Supplied Below 39mm Screw Size, Except On Special Order. Chamfer Or Radius At Manufacturer's Option.

For More Detailed Information, Please Refer To Complete DIN Or ISO Standard, Which Are The Governing Standards.

FLAT WASHERS (SMALL SERIES) DIN 433 / ISO 7092



DIN 433 / ISO 7092 Except As Noted								Not In ISO 7092
Screw Size	Hole Diameter d1		Outside Diameter d2		Thickness s			Except As Noted (No ISO 7092)
	min.= nominal	max.	min.	max.= nominal	nominal	min.	max.	
1	1.1	1.24	2.25	2.5	0.3	0.25	0.35	(No 7092)
1.2	1.3	1.44	2.75	3	0.3	0.25	0.35	(No 7092)
1.4	1.5	1.64	2.75	3	0.3	0.25	0.35	(No 7092)
1.6	1.7	1.84	3.2	3.5	0.3	0.25	0.35	
2	2.2	2.34	4.2	4.5	0.3	0.25	0.35	
2.5	2.7	2.84	4.7	5	0.5	0.45	0.55	
3	3.2	3.38	5.7	6	0.5	0.45	0.55	
3.5	3.7	3.88	6.64	7	0.5	0.45	0.55	
4	4.3	4.48	7.64	8	0.5	0.45	0.55	
5	5.3	5.48	8.64	9	1	0.9	1.1	
6	6.4	6.62	10.57	11	1.6	1.4	1.8	
8	8.4	8.62	14.57	15	1.6	1.4	1.8	
10	10.5	10.77	17.57	18	1.6	1.4	1.8	
12	13	13.27	19.48	20	2	1.8	2.2	
14	15	15.27	23.48	24	2.5	2.3	2.7	
16	17	17.27	27.48	28	2.5	2.3	2.7	
18	19	19.33	29.48	30	2.5	2.3	2.7	(No 7092)
20	21	21.33	33.38	34	3	2.7	3.3	
24	25	25.33	38.38	39	4	3.7	4.3	
30	31	31.39 (1)	49.38	50	4	3.7	4.3	
36	37	37.62	56.8 (2)	58 (3)	5	4.4	5.6	

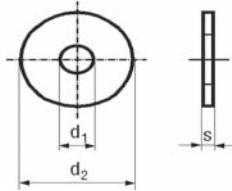
ISO 7092 Dimensions Identical To DIN 9021, Except As shown Below.			
30	31.33 (1)		
36		58.8 (2)	60 (3)

Material	Steel			A2/A4 Stainless Steel	Brass
Classes	140 HV	200 HV	300 HV (1)	140 HV	NA
Hardness HV	140 min.	200-300	300-400	140 min.	NA
Finish	Plain Or Plated			Plain	Plain Or Nickel Plated

(1) Chamfered Or Radius At Manufacturer's Option Available As Special Order Only.

For More Detailed Information, Please Refer To Complete DIN Or ISO Standard, Which Are The Governing Standards.

FLAT WASHERS DIN 9021 / ISO 7093



DIN 9021 / ISO 7093 Except As Noted								Not In ISO 7093
Screw Size	Hole Diameter d1		Outside Diameter d2		Thickness s			Except As Noted (No ISO 7093)
	min.= nominal	max.	min.	max.= nominal	nominal	min.	max.	
2.5	2.7	2.84	7.64	8	0.8	0.7	0.9	(No 7093)
3	3.2	3.38	8.64	9	0.8	0.7	0.9	
3.5	3.7	3.88	10.57	11	0.8	0.7	0.9	
4	4.3	4.48	11.57	12	1	0.9	1.1	
5	5.3	5.48	14.57	15	1.2	1	1.4	
6	6.4	6.62	17.57	18	1.6	1.4	1.8	
7	7.4	7.62	21.48	22	2	1.8	2.2	(No 7093)
8	8.4	8.62	23.48	24	2	1.8	2.2	
10	10.5	10.77	29.48	30	2.5	2.3	2.7	
12	13	13.27	36.38	37	3	2.7	3.3	
14	15	15.27	43.38	44	3	2.7	3.3	
16	17	17.27	49.38	50	3	2.7	3.3	
18	20	20.52	54.1	56	4	3.4	4.6	(No 7093)
20	22	22.52	58.1	60	4	3.4	4.6	
24	26	26.84	70.1	72	5	4	6	
30	33	34	89.8	92	6	5	7	
36	39	40	107.8	110	8	6.8	9.2	

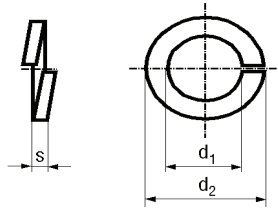
Material	Steel		A2/A4 Stainless Steel
	Sizes ≤16mm	Sizes >16mm	All Sizes
Classes	140 HV	100 HV	140 HV
Hardness HV	140-250	100-250	140-250
Finish	Plain Or Plated		Plain

These Washers Are Commonly Referred To As Fender Washers

OD Of These Washers Is ~ 3 X The Screw Size Diameter

For More Detailed Information, Please Refer To Complete DIN Or ISO Standard, Which Are The Governing Standards.

SPRING LOCK WASHERS DIN 127B / DIN 7980



Screw Size	DIN 127 Type B - With Square Ends					DIN 7980 - With Square Ends				
	Hole Diameter d1		Outside Diameter d2	Thickness s	Thickness Tolerance	Hole Diameter d1		Outside Diameter d2	Thickness s	Thickness Tolerance
	min.	max.				min.	max.			
2	2.1	2.4	4.4	0.5	+/-0.1					
2.2	2.3	2.6	4.8	0.6	+/-0.1					
2.5	2.6	2.9	5.1	0.6	+/-0.1					
3	3.1	3.4	6.2	0.8	+/-0.1	3.1	3.4	5.6	1	+/-0.1
(3.5)	3.6	3.9	6.7	0.8	+/-0.1	3.6	3.9	6.1	1	+/-0.1
4	4.1	4.4	7.6	0.9	+/-0.1	4.1	4.4	7	1.2	+/-0.1
5	5.1	5.4	9.2	1.2	+/-0.1	5.1	5.4	8.8	1.6	+/-0.1
6	6.1	6.5	11.8	1.6	+/-0.1	6.1	6.5	9.9	1.6	+/-0.1
7	7.1	7.5	12.8	1.6	+/-0.1					
8	8.1	8.5	14.8	2	+/-0.1	8.1	8.5	12.7	2	+/-0.1
10	10.2	10.7	18.1	2.2	+/-0.15	10.2	10.7	16	2.5	+/-0.15
12	12.2	12.7	21.1	2.5	+/-0.15	12.2	12.7	18	2.5	+/-0.15
14	14.2	14.7	24.1	3	+/-0.15	14.2	14.7	21.1	3	+/-0.2
16	16.2	17	27.4	3.5	+/-0.2	16.2	17	24.4	3.5	+/-0.2
(18)	18.2	19	29.4	3.5	+/-0.2	18.2	19	26.4	3.5	+/-0.2
20	20.2	21.2	33.6	4	+/-0.2	20.2	21.2	30.6	4.5	+/-0.2
(22)	22.5	23.5	35.9	4	+/-0.2	22.5	23.5	32.9	4.5	+/-0.2
24	24.5	25.5	40	5	+/-0.2	24.5	25.5	35.9	5	+/-0.2
(27)	27.5	28.5	43	5	+/-0.2	27.5	28.5	38.9	5	+/-0.2
30	30.5	31.7	48.2	6	+/-0.2	30.5	31.7	44.1	6	+/-0.2
(33)	33.5	34.7	55.2	6	+/-0.2	33.5	34.7	47.1	6	+/-0.2
36	36.5	37.7	58.2	6	+/-0.2	36.5	37.7	52.2	7	+/-0.25
(39)	39.5	40.7	61.2	6	+/-0.2					
42	42.5	43.7	68.2	7	+/-0.25	42.5	43.7	60.2	8	+/-0.25
(45)	45.5	46.7	71.2	7	+/-0.25					
48	49	50.5	75	7	+/-0.25	49	50.5	67	8	+/-0.25
52	53	54.5	83	8	+/-0.25					
56	57	58.5	87	8	+/-0.25					
(60)	61	62.5	91	8	+/-0.25					
64	65	66.5	95	8	+/-0.25					
68	69	70.5	99	8	+/-0.25					
72	73	74.5	103	8	+/-0.25					
80	81	82.5	111	8	+/-0.25					
90	91	92.5	121	8	+/-0.25					
100	101	102.5	131	8	+/-0.25					

DIN 7980 Lock Washers Are Designed For Use With Cheese Head Screws And Or Socket Head Cap Screws Because Of The Smaller OD max.

Sizes With () Should be Avoided For New Design.

Not All Diameters In DIN 127 B And DIN 7980 Available In All Materials.

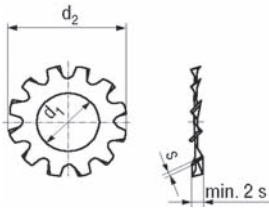
Material	Spring Steel	A2 Stainless	A4 Stainless	Phosphor Bronze	(1) Mechanical, Organic, Or Electro Zinc Plated At Manufacturer's Option.
Hardness	HRC 44-51	NA	NA	NA	
Finish	Plain / Plated (1)	Plain	Plain	Plain	

For More Detailed Information, Please Refer To Complete DIN Standard, Which Is The Governing Standard.

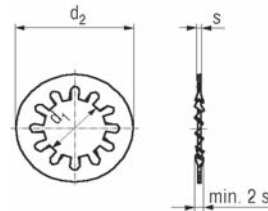
DIN 127 B (1987) / DIN 7980 (1987) - LFG 01/01/09 Revised

TOOTHED AND SERRATED LOCK WASHERS A (EXTERNAL) AND J (INTERNAL)

DIN 6797 Type A Externally Toothed

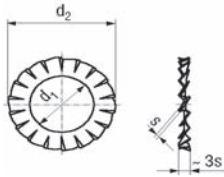


DIN 6797 Type J Internally Toothed

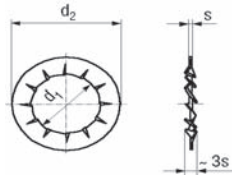


Screw Size	Hole Diameter d1		OD Diameter d2		Material Thickness s	Minimum # Of Teeth	Washer Thickness min.	Below Applies To Both DIN 6797 And DIN 6798			
	min.= nominal	max.	min.	max.= nominal							
1.6	1.7	1.84	3.3	3.6	0.3	6	0.6	Sizes With () Should be Avoided For New Design.			
2	2.2	2.34	4.2	4.5	0.3	6	0.6				
2.5	2.7	2.84	5.2	5.5	0.4	6	0.8				
3	3.2	3.38	5.7	6	0.4	6	0.8	(1) Mechanical, Organic, Or Electro Zinc Plated At Manufacturer's Option.			
(3.5)	3.7	3.88	6.64	7	0.5	6	1				
4	4.3	4.48	7.64	8	0.5	8	1				
5	5.3	5.48	9.64	10	0.6	8	1.2	Material	Spring Steel	A2 Stainless	A4 Stainless
6	6.4	6.62	10.57	11	0.7	8	1.4	Hardness	350-425 HV	NA	NA
7	7.4	7.62	12.07	12.5	0.8	8	1.6	Finish	Plain/Plated (1)	Plain	Plain
8	8.4	8.62	14.57	15	0.8	8	1.6	Not All Diameters In DIN 6797 And DIN 6798 Available In All Materials.			
10	10.5	10.77	17.57	18	0.9	9	1.8				
12	13	13.27	19.98	20.5	1	10	2				
14	15	15.27	23.48	24	1	10	2				
16	17	17.27	25.48	26	1.2	12	2.4				
(18)	19	19.33	29.48	30	1.4	12	2.8				
20	21	21.33	32.38	33	1.4	12	2.8				
(22)	23	23.33	35.38	36	1.5	14	3				
24	25	25.33	37.38	38	1.5	14	3				
(27)	28	28.33	43.38	44	1.6	14	3.2				
30	31	31.39	47.38	48	1.6	14	3.2				

DIN 6798 Type A Externally Toothed

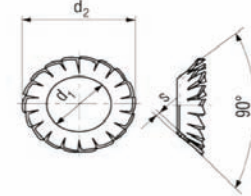


DIN 6798 Type J Internally Toothed



Hole ID For Type V Is The Same As For Type A & J

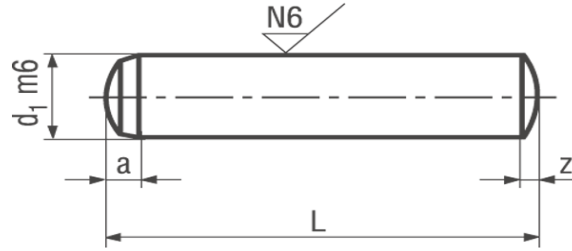
DIN 6798 Type V Externally Toothed



Screw Size	Hole Diameter d1		OD Diameter d2		Material Thickness s	Minimum # Of Teeth		Washer Thickness min.	Type V OD Diameter d2	Type V Material Thickness s
	min.= nominal	max.	min.	max.= nominal		Type A	Type J			
1.6	1.7	1.84	3.3	3.6	0.3	9	7	0.9		
2	2.2	2.34	4.2	4.5	0.3	9	7	0.9	~4.2	0.2
2.5	2.7	2.84	5.2	5.5	0.4	9	7	1.2	~5.1	0.2
3	3.2	3.38	5.7	6	0.4	9	7	1.2	~6	0.2
(3.5)	3.7	3.88	6.64	7	0.5	10	8	1.5	~7	0.25
4	4.3	4.48	7.64	8	0.5	11	8	1.5	~8	0.25
5	5.3	5.48	9.64	10	0.6	11	8	1.8	~9.8	0.3
6	6.4	6.62	10.57	11	0.7	12	9	2.1	~11.8	0.4
7	7.4	7.62	12.07	12.5	0.8	14	10	2.4		
8	8.4	8.62	14.57	15	0.8	14	10	2.4	~15.3	0.4
10	10.5	10.77	17.57	18	0.9	16	12	2.7	~19	0.5
12	13	13.27	19.98	20.5	1	16	12	3	~23	0.5
14	15	15.27	23.48	24	1	18	14	3	~26.2	0.6
16	17	17.27	25.48	26	1.2	18	14	3.6	~30.2	0.6
(18)	19	19.33	29.48	30	1.4	18	14	4.2		
20	21	21.33	32.38	33	1.4	20	16	4.2		
(22)	23	23.33	35.38	36	1.5	20	16	4.5		
24	25	25.33	37.38	38	1.5	20	16	4.5		
(27)	28	28.33	43.38	44	1.6	22	18	4.8		
30	31	31.39	47.38	48	1.6	22	18	4.8		

For More Detailed Information, Please Refer To Complete DIN Standard, Which Are The Governing Standards.

Hardened Ground Precision Dowel Pins DIN 6325m6 ~ ISO 8734A



Nominal Diameter d1	1	1.5	2	2.5	3	4	5	6
min. d1	1.002	1.502	2.002	2.502	3.002	4.004	5.004	6.004
max. d1	1.008	1.508	2.008	2.508	3.008	4.012	5.012	6.012
a~	0.4	0.5	0.6	0.7	0.8	1	1.2	1.5
z~	0.15	0.23	0.3	0.4	0.45	0.6	0.75	0.9
Hardened Steel, Single Shear Strength in lbs.	NA	418	742	1,158	1,664	2,968	4,631	6,677
Suggested Hole Size min.	0.987	1.487	1.987	2.487	2.987	3.987	4.987	5.987
Suggested Hole Size max.	1.000	1.500	2.000	2.500	3.000	4.000	5.000	6.000

Nominal Diameter d1	8	10	12	(14)	16	20	(24)
min. d1	8.006	10.006	12.007	14.007	16.007	20.008	24.008
max. d1	8.015	10.015	12.018	14.018	16.018	20.021	24.021
a~	1.8	2	2.5	2.5	3	4	
z~	1.2	1.5	1.8	2	2.5	3	
Hardened Steel, Single Shear Strength in lbs.	11,803	18,548	26,754	NA	47,437	74,191	NA
Suggested Hole Size min.	7.987	9.987	11.985	13.985	15.985	19.983	23.983
Suggested Hole Size max.	8	10.000	12.000	14.000	16.000	20.000	24.000

Length Tolerance			
	+/- 0.25mm	+/- 0.50mm	+/- 0.75mm
	Through 10mm	From 12mm Through 50mm	55mm and Longer

14mm, and 24mm diameters are not included in ISO 8734, and are not recommended for new design.

Shear Strength Data Is Not Published For 1mm, 14mm, And 24mm-So Would Only Be Available With Laboratory Test Reports.

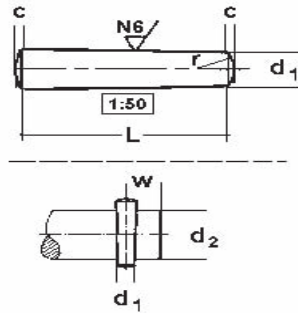
Rockwell Hardness	DIN 6325m6	ISO 8734A	To Eliminate Inspection Issues During Transition From DIN to ISO Suggest Accepting:	HRC 52-62
	HRC 60 +/-2	HRC 52-58		

DIN 6325 Dowel Pins Are Through Hardened.

For More Detailed Information, Please Refer To Complete DIN, ISO, or ASME Standard, Which Are The Governing Standards.

DIN 6325m (171) / SO 8734 (1997) / ASME B18.8.5M (1994) - LFG 01/01/09 Revised

Taper Pins DIN 1B / ISO 2339B



Dimensions For DIN 1B and ISO 2339 B Are The Same But The Measurement of the Pin Is Not The Same - See Below "How To Measure Taper Pin Length".

Diameter d1	0.6	0.8	1	1.5	2	(2.5)	3	4	5	6	8	10	12	16
Rounded end c	0.08	0.1	0.12	0.2	0.25	0.3	0.4	0.5	0.63	0.8	1	1.2	1.6	2
h10 Tolerance	+0 / -0.04						+0 / -0.048			+0 / -0.058		+0 / -0.07		
Hole Drill Size	0.6	0.8	1	1.5	2	(2.5)	3	4	5	6	8	10	12	16
Taper Pin Reamer Size	0.6	0.8	1	1.5	2	(2.5)	3	4	5	6	8	10	12	16
End of shaft to pin center (min.) w	2	2.5	3	3.5 ≥5 4	4.5	5	5	6	7.5	9	10 ≥38 11	11.5 ≥50 13	15	18

How To Measure Taper Pin Length	
<p>For DIN 1 B (Free Cutting Steel h10), the length is considered to be the length of the taper portion, not to include the rounded ends.</p>	<p>For ISO 2339 B (Free Cutting Steel h10), the length is considered to be the length of the taper portion including the rounded ends, or end to end.</p>

Length Tolerance	DIN 1 B Examples	Over All Length Will Be
Through 10mm long	+/- 0.25mm	2mm x 10mm +/-0.25mm + 2 x 0.25mm = 10.25mm min 10.75mm max.
From 12mm Through 50mm long	+/- 0.50mm	8mm x 50mm +/-0.50mm + 2 x 1mm= 51.50mm min. 52.50mm max.
55mm and Longer	+/- 0.75mm	12mm x 80mm +/-0.75mm + 2 x 1.6mm= 82.45mm min. 83.95mm max.

Large End Diameter
The diameter of the large end increases by 1mm for every 50mm in length

Examples:	6mm x 40 would have a large diameter of 6.8mm
	8mm x 50 would have a large diameter of 9mm
	12mm x 80 would have a large diameter of 13.6mm

(40mm/50mm=0.8, so 6mm plus 0.8mm = 6.8mm)
(50mm/50mm=1, so 8mm plus 1mm = 9mm)
(80mm/50mm=1.6, so 12mm plus 1.6mm = 13.6mm)

For More Detailed Information, Please Refer To Complete DIN or ISO, Standard, Which Are The Governing Standards.

COARSE and FINE PITCHES - METRIC PREFERENCE CLASSES

METRIC COARSE & FINE THREAD PITCHES						METRIC THREAD PREFERENCE CLASSES APPLY TO COARSE PITCH ONLY					FINE PITCH SHOULD NOT BE USED IN NEW DESIGN
Diameter	Coarse Pitch	Fine Pitch	Fine Pitch	Fine Pitch	Fine Pitch	Diameter	Class 1	Class 2	Class 3	Just Don't Use	
M1	0.25	0.2				M1	X				X
M1.2	0.25	0.2				M1.2	X				X
M1.4	0.3	0.2				M1.4		X			X
M1.6	0.35	0.2				M1.6	X				X
M1.7	0.35					M1.7				X	X
M1.8	0.35	0.2				M1.8				X	X
M2	0.4	0.25				M2	X				X
M2.2	0.45	0.25				M2.2		X			X
M2.3	0.4					M2.3				X	X
M2.5	0.45	0.35				M2.5	X				X
M2.6	0.45					M2.6			X		X
M3	0.5	0.35				M3	X				X
M3.5	0.6	0.35				M3.5		X			X
M4	0.7	0.5				M4	X				X
M5	0.8	0.5				M5	X				X
M6	1	0.75				M6	X				X
M7	1	0.75				M7			X		X
M8	1.25	1	0.75			M8	X				X
M9	1.25	1	0.75			M9				X	X
M10	1.5	1.25	1	0.75		M10	X				X
M11	1.5	1	0.75			M11				X	X
M12	1.75	1.5	1.25	1		M12	X				X
M14	2	1.5	1.25	1		M14	X	X			X
M16	2	1.5	1			M16	X				X
M18	2.5	2	1.5	1		M18		X			X
M20	2.5	2	1.5	1		M20	X				X
M22	2.5	2	1.5	1		M22		X			X
M24	3	2	1.5	1		M24	X				X
M27	3	2	1.5	1		M27		X			X
M30	3.5	3	2	1.5	1	M30	X				X
M33	3.5	3	2	1.5		M33		X			X
M36	4	3	2	1.5		M36	X				X
M39	4	3	2	1.5		M39			X		X
M42	4.5	4	3	2	1.5	M42	X				X
M45	4.5	4	3	2	1.5	M45				X	X
M48	5	4	3	2	1.5	M48	X				X
M52	5	4	3	2	1.5	M52			X		X
M56	5.5	4	3	2	1.5	M56	X				X
M60	5.5	4	3	2	1.5	M60			X		X
M64	6	4	3	2	1.5	M64	X				X
M68	6	4	3	2	1.5	M68			X		X
M72	6	4	3	2	1.5	M72	X				X
M80	6	4	3	2	1.5	M80	X				X
M90	6	4	3	2	1.5	M90	X				X
M100	6	4	3	2	1.5	M100	X				X

It Is The Practice In The Metric System To Not Show The Pitch When Dealing In Coarse Threads. EXAMPLE : If You Wanted To Indicate M12 With A Coarse Pitch (1.75) You Would Write or Say Just M12.

Screws With Any Fine Pitch Should Not Be Used In New Design - Also See Reference At Top Of Page.

MECHANICAL PROPERTIES FOR BOLTS AND SCREWS

Steel Property Class 3.6 Through 12.9	Tensile Strength min. (psi)	Yield Strength min. (psi)		Vickers Hardness (HV)	Brinell Hardness (HB)	Rockwell Hardness (HRB)	Rockwell Hardness (HRC)	Similar To
3.6	47850	28710	min.	95	90	52	NA	
			max.	250	238	99.5	NA	
4.6	58000	34800	min.	120	114	67	NA	
			max.	250	238	99.5	NA	
4.8	60900	49300	min.	130	124	71	NA	
			max.	250	238	99.5	NA	
5.6	72500	58000	min.	155	147	79	NA	
			max.	250	238	99.5	NA	
5.8	75400	60900	min.	160	152	82	NA	Grade 2
			max.	250	238	99.5	NA	
6.8	87000	69600	min.	190	181	89	NA	
			max.	250	238	99.5	NA	
8.8 ≤16mm	116000	92800	min.	250	238	NA	22	Grade 5
			max.	320	304	NA	32	
8.8 >16mm	120350	95700	min.	255	242	NA	23	
			max.	335	318	NA	34	
9.8	130500	104400	min.	290	276	NA	28	Above Grade 5
			max.	360	342	NA	37	
10.9	150800	136300	min.	320	304	NA	32	Grade 8
			max.	380	361	NA	39	
12.9	176900	159500	min.	385	366	NA	39	ASTM A574
			max.	435	414	NA	44	
Tensile Strength (psi)								
90	min.	max.						
	130500	159500	min.	280	268	NA	27	Above Grade 5
100	145000	174000	max.	340	323	NA	34	
			min.	320	304	NA	32	Grade 8
max.	370	352	NA	38				
Stainless Steel Grades A1 - A2 - A4	Tensile Strength min. (psi)	Yield Strength min. (psi)	Hardness					Similar To
Property Class 50	72500	30450	Vickers, Brinell or Rockwell Hardness Are Not Measureable Factors For Stainless Steel					A1 Stnl Steel ~ Free Cutting Stnl Steel
Property Class 70	101500	65250						A2 Stnl Steel ~ 18-8 Stnl Steel
Property Class 80	116000	87000						A4 Stnl Steel ~ 316 Stnl Steel
Brass	Tensile Strength min. (psi)	Yield Strength min. (psi)	Hardness					
Ms 63	53000		Vickers, Brinell or Rockwell Hardness Are Not Measureable Factors For Brass					
Ms 58	55000							

Mechanical Properties - LFG 01/01/09 Revised

By Diameter and Material (Torque Values In Ft. lbs.)

Property Class	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22
8.8	0.80	1.8	3.6	7	17	33	60	97	150	201	282	390
10.9	1.1	2.6	5.1	10	25	48	85	137	208	287	398	552
12.9	1.3	3.1	6.2	12	29	58	102	165	250	342	479	664
Property Class	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52	M56	M60
8.8	499	746	982	1331	1717	2220	2737	3390	4095	5250	6547	8175
10.9	750	1051	1383	1875	2407	3120	3840	4762	5775	7387	9225	11475
12.9	843	1266	1657	2250	2895	3750	4638	5722	6825	9000	11280	13800
Property Class	M64	M68	M72	M76	M80	M85	M90	M95	M100	Torque Factors To be Considered		
8.8	9900	12000	14250	16800	19725	24000	28350	33450	39000	Material - Property Class		
10.9	13950	16950	20100	23625	27600	33225	38925	46875	54750	Are Screws Plain, Zinc Plated, Cadmium Plated, or Lubricated		
12.9	17175	20100	24000	28350	33375	40125	47700	56250	66000			
<p>All shown values are estimates only, therefore Lindstrom Metric neither implies or guarantees these values. The only way to determine a true torque value is by actual application.</p>												

Torque Values LFG 01/01/09 Revised

ALL CALCULATIONS FOR TABLE OF WEIGHTS ARE BASED UPON VARIOUS DIN, ISO, OR ANSI PUBLICATIONS AND ARE APPROXIMATE, NOT EXACT - ALL METRIC TO INCH COMPARISONS ARE APPROXIMATE, NOT EXACT.

Socket Head Cap Screws																														
Diameter	M1.4	M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	M42	M48	M56	M64	M72	M80	M90	M100	
-inch	0.05	0.0625	0.075	0.09375	0.1125	0.140625	0.175	0.21875	0.28125	0.3541666666666667	0.4375	0.53125	0.635	0.75	0.875	1.0625	1.275	1.51875	1.7916666666666667	2.1041666666666667	2.45625	2.9475	3.575	4.34375	5.25	6.3	7.5	9.0	10.8	
Pitch	0.30	0.35	0.40	0.45	0.50	0.70	0.80	1.00	1.25	1.50	1.75	2.00	2.00	2.50	2.50	3.0	3.0	3.5	3.5	3.5	4.0	4.5	5.0	5.5	6.0	6.0	6.0	6.0	6.0	6.0
Length	-inch	Approximate Weight Per 100 Pieces in lbs.																												
2	5/64	0.12																												
2.5	3/32	0.13	0.19																											
3	1/8	0.14	0.20	0.03																										
4	5/32	0.02	0.02	0.04	0.08																									
5	3/16	0.02	0.02	0.04	0.08	0.15																								
6	1/4	0.02	0.03	0.05	0.09	0.16	0.33																							
8	5/16	0.03	0.03	0.06	0.10	0.18	0.36	0.54																						
10	3/8	0.03	0.04	0.06	0.12	0.19	0.40	0.59	1.03																					
12	1/2	0.03	0.04	0.08	0.13	0.21	0.43	0.65	1.12	2.40																				
16	5/8		0.05	0.09	0.16	0.26	0.50	0.76	1.27	2.66	4.60																			
20	3/4			0.11	0.18	0.30	0.58	0.88	1.44	2.95	5.04	7.06																		
25	1				0.21	0.35	0.69	1.05	1.67	3.30	5.59	7.85	10.56	15.69																
30	1-3/16					0.41	0.80	1.22	1.83	3.72	6.14	8.65	11.66	17.12	24.42	28.16														
35	1-3/8					0.91	1.39	2.18	4.16	6.69	9.44	12.76	18.57	26.40	30.58	46.42														
40	1-9/16					1.02	1.56	2.42	4.60	7.24	10.23	13.86	20.02	28.38	33.00	49.28	59.40													
45	1-3/4					1.73	2.66	5.04	7.94	11.02	14.96	21.47	30.36	35.42	52.14	62.70	72.60	110												
50	2					1.90	2.90	5.48	8.65	11.99	16.06	23.32	32.34	37.84	55.00	66.00	77.44	116	139											
55	2-3/16							3.15	5.92	9.35	12.96	17.16	25.08	34.32	40.26	57.86	69.52	82.28	122	146	191									
60	2-9/16							3.39	6.36	10.05	13.95	18.48	26.84	36.30	42.68	60.72	72.60	87.12	128	154	200	301								
65	2-3/8								6.82	10.76	14.92	19.80	28.60	38.28	45.10	64.02	75.90	91.96	134	162	209	312								
70	2-3/4								7.26	11.46	15.69	21.12	30.36	40.26	47.52	67.32	79.86	96.80	140	169	218	323	449							
75	3								7.70	12.28	17.18	23.27	32.16	43.45	51.14	70.71	83.90	102	146	177	227	334	464							
80	3-3/16								8.14	12.87	17.64	23.76	33.88	44.66	53.02	73.92	87.78	106	152	183	235	348	480							
90	3-1/2								14.28	19.60	26.40	37.40	49.06	58.52	80.52	95.70	116	164	198	253	370	510								
100	4								15.66	21.56	29.04	40.92	53.46	64.02	87.12	104	126	176	213	271	394	541								
110	4-3/8								23.54	31.68	44.44	57.86	69.52	93.72	112	136	188	229	288	416	572									
120	4-3/4								25.52	34.32	47.96	62.26	75.02	100	119	146	200	244	306	440	603									
130	5								36.96	51.48	66.66	80.52	107	127	156	212	260	323	462	590										
140	5-1/2								39.60	55.00	71.06	86.02	114	135	166	224	275	341	486	664										
150	6								58.52	75.46	91.52	120	143	176	238	290	359	510	695											
160	6-5/16								62.04	79.86	97.02	127	151	186	249	306	376	526	726	1,074										
180	7								88.66	108	140	167	205	273	337	411	581	790	1,159	1,595										
200	8									119	153	183	224	297	367	447	629	851	1,243	1,705	2,189									
220	8-1/4									166	199	244	321	398	482	578	793	1,074	1,412	1,815	2,332									
240	9-1/2									215	271	345	429	495	576	775	1,036	1,317	1,717	2,234	2,866									
260	10-1/4									295	370	449	530	774	1,036	1,498	1,817	2,618	3,322	4,378	5,654									
280	11									394	480	565	823	1,098	1,584	2,147	2,772	3,476	4,598	5,918	7,524									
300	12									418	510	601	871	1,159	1,668	2,266	2,926	3,652	4,618	5,924	7,524									

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Low Head Socket Cap Screws With Pin Recess													Low Head Socket Cap Screws																					
Diameter -inch	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	Diameter -inch	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24				
Pitch	0.70	0.80	1.00	1.25	1.50	1.75	2.00	2.00	2.50	2.50	2.50	3	3	3.5	3.5	4	Pitch	0.50	0.70	0.80	1.00	1.25	1.50	1.75	2.00	2.50	2.50	3/4	7/8					
Length -inch	10	3/8	0.29	0.48	0.79												Length -inch	5	3/16	0.11														
	12	1/2	0.33	0.55	0.86	1.69											6	1/4	0.11	0.21														
	16	5/8	0.42	0.68	0.99	1.94	3.41										8	5/16	0.13	0.25	0.50													
	20	3/4	0.51	0.81	1.14	2.24	3.94	5.61									10	3/8	0.15	0.28	0.55	0.79												
	25	1	0.59	0.97	1.36	2.75	4.44	6.49	9.35	12.43							12	1/2	0.17	0.32	0.60	0.87	1.77											
	30	1-3/16	0.70	1.12	1.61	3.08	4.84	7.15	10.56	13.86	18.61	23.76					14	9/16	0.19	0.35	0.66	0.94	1.90											
	35	1-3/8	0.75	1.28	1.83	3.45	5.61	8.03	11.66	15.33	20.53	25.96					16	5/8	0.21	0.39	0.71	1.02	2.04	3.17										
	40	1-9/16	0.92	1.45	2.09	3.85	6.27	8.80	12.76	17.31	22.44	28.16	40.70				18	11/16	0.24	0.43	0.76	1.10	2.17	3.39										
	50	2	1.14	1.61	2.53	4.73	7.66	10.56	15.29	20.13	26.18	33.00	47.30				20	3/4	0.26	0.47	0.83	1.17	2.31	3.61	5.30									
	60	2-9/16		1.98	2.99	5.57	8.87	12.54	18.04	23.54	30.36	37.84	53.90	57.86			25	1		0.58	1.00	1.42	2.64	4.18	6.09									
	70	2-3/4			3.45	6.40	10.12	14.30	20.35	26.84	34.54	43.12	60.50	65.56	97.90	110		30	1-3/16		1.17	1.66	3.08	4.75	6.89	10.23	13.66							
	80	3-1/2				7.22	11.55	15.84	22.88	30.80	39.16	48.84	67.10	73.26	108	121	174		35	1-3/8		1.91	3.52	5.43	7.68	11.31	15.14							
	90	3-1/2				12.72	17.60	25.52	33.88	43.12	53.90	73.70	81.18	118	134	189	220		40	1-9/16		2.15	3.96	6.12	8.65	12.39	16.61	21.78	28.60					
	100	4				19.36	27.94	37.18	47.30	59.18	80.30	89.54	128	146	204	238		45	1-3/4		4.40	6.80	9.61	13.71	18.08	23.54	30.80							
	110	4-3/8				30.58	40.26	51.70	64.24	86.90	96.58	138	158	219	255	311		50	2		4.84	7.48	10.58	15.03	19.71	25.30	33.00	41.36	49.06					
	120	4-3/4				33.22	43.56	56.10	69.52	93.50	104	147	170	233	273	339		55	2-3/16		5.28	8.16	11.55	16.35	21.34	27.50	35.20	44.22	52.36					
	130	5						46.64	60.50	75.24	100	112	157	182	249	290		60	2-9/16		5.72	8.84	12.52	17.67	22.88	29.70	37.84	47.08	56.66					
	140	5-1/2						49.72	64.90	80.96	107	120	167	194	262	308		70	2-3/4				10.21	14.48	20.33	26.18	34.10	43.34	53.68	63.36				
	150	6							69.30	86.68	113	128	177	207	275	323		80	3-3/16															
	160	6-5/16							92.84	120	136	187	218	290	341			90	3-1/2															
	170	6-3/4							98.56	127	143	197	231	304	359			100	4															
	180	7							104	133	151	207	242	319	376																			
	190	7-1/2							140	159	219	255	332	394																				
	200	8							146	167	227	266	348	411																				

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Flat Head Socket Cap Screws												Bulton Head Socket Cap Screws												Socket Head Shoulder (Stripper) Bolts																	
Diameter		M3	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24	Diameter		M3	M4	M5	M6	M8	M10	M12	M16	Thread Diameter		M5	M6	M8	M10	M12	M16	M20										
Pitch		4/40	5/32	10/24	1/4	5/16	3/8	1/2	9/16	5/8	3/4	1	Pitch		4/40	8/32	10/24	1/4	5/16	3/8	1/2	5/8	Pitch		10/24	1/4	5/16	3/8	1/2	5/8	3/4										
Length		Approximate Weight Per 100 Pieces In lbs.												Length		Approximate Weight Per 100 Pieces In lbs.												Shoulder Diameter		Approximate Per 100 Pieces In lbs.											
-inch														-inch														-inch													
2	5/64													2	5/64											8	5/16														
2.5	3/32													2.5	3/32											10	3/8														
3	1/8													3	1/8											10	3/8														
4	5/32													4	5/32											12	1/2														
5	3/16													5	3/16											16	5/8														
6	1/4													6	1/4											20	3/4														
8	5/16													8	5/16											25	1														
10	3/8													10	3/8											30	1-3/16														
12	1/2													12	1/2											35	1-3/8														
14	9/16													14	9/16											40	1-9/16														
16	5/8													16	5/8											45	1-3/4														
18	11/16													18	11/16											50	2														
20	3/4													20	3/4											55	2-3/16														
22	7/8													22	7/8											60	2-9/16														
25	1													25	1											65	2-3/8														
30	1-3/16													30	1-3/16											70	2-3/4														
35	1-3/8													35	1-3/8											75	3														
40	1-9/16													40	1-9/16											80	3-3/16														
45	1-3/4													45	1-3/4											90	3-1/2														
50	2													50	2											100	4														
55	2-3/16													55	2-3/16											110	4-3/8														
60	2-9/16													60	2-9/16											120	4-3/4														
65	2-3/8													65	2-3/8											140															
70	2-3/4													70	2-3/4											160															
75	3													75	3											180															
80	3-3/16													80	3-3/16											200															
90	3-1/2													90	3-1/2											240															
100	4													100	4											300															

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Socket Set Screws Flat Point															
Diameter	M1.4	M1.6	M1.8	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
-inch	0/80	1/72	2/26	3/48	4/40	8/32	10/24	1/4	5/16	3/8	1/2	5/8	3/4	1	
Pitch	0.30	0.35	0.40	0.45	0.50	0.70	0.80	1.00	1.00	1.25	1.50	1.75	2.00	2.50	3
Length	Approximate Weight Per 100 Pieces in lbs.														
2 5/64	0.01	0.01	0.01	0.01	0.01	0.01	0.01								
2.5 3/32	0.01	0.01	0.01	0.02	0.02	0.02									
3 1/8	0.01	0.01	0.01	0.02	0.02	0.03	0.04								
4 5/32	0.01	0.01	0.01	0.02	0.03	0.05	0.07	0.09							
5 3/16	0.01	0.01	0.02	0.03	0.04	0.07	0.10	0.13	0.21						
6 1/4	0.01	0.01	0.02	0.03	0.05	0.08	0.12	0.17	0.28	0.39					
8 5/16	0.02	0.03	0.04	0.07	0.12	0.18	0.24	0.42	0.61	0.88					
10 3/8	0.03	0.05	0.09	0.15	0.23	0.32	0.55	0.83	1.19	1.87					
12 1/2	0.07	0.11	0.18	0.28	0.40	0.69	1.05	1.50	2.44	3.48					
16 5/8	0.15	0.25	0.39	0.55	0.97	1.49	2.11	3.59	5.30	6.60					
20 3/4	0.19	0.31	0.49	0.71	1.25	1.93	2.73	4.73	7.08	9.24					
25 1	0.62	0.90	1.60	2.46	3.52	6.16	9.37	12.54							
30 1-3/16	1.09	1.95	3.01	4.31	7.61	11.64	15.84								
35 1-3/8	1.29	2.29	3.56	5.10	9.04	13.90	19.14								
40 1-9/16	2.64	4.11	5.90	10.49	16.17	22.44									
45 1-3/4	4.66	6.58	11.92	18.44	25.74										
50 2	5.21	7.35	13.36	20.70	29.04										
55 2-3/16	8.10	14.81	22.88	32.34											
60 2-9/16	8.87	16.21	25.30	35.64											

Socket Set Screws Cone Point															
Diameter	M1.4	M1.6	M1.8	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
-inch	0/80	1/72	2/26	3/48	4/40	8/32	10/24	1/4	5/16	3/8	1/2	5/8	3/4	1	
Pitch	0.30	0.35	0.40	0.45	0.50	0.70	0.80	1.00	1.00	1.25	1.50	1.75	2.00	2.50	3
Length	Approximate Weight Per 100 Pieces in lbs.														
2 5/64	0.01	0.01	0.01	0.01	0.01	0.01									
2.5 3/32	0.01	0.01	0.01	0.01	0.01	0.02									
3 1/8	0.01	0.01	0.01	0.02	0.02	0.02	0.02								
4 5/32	0.01	0.01	0.01	0.02	0.03	0.04	0.06								
5 3/16	0.01	0.01	0.01	0.02	0.03	0.04	0.06	0.08	0.11						
6 1/4	0.01	0.01	0.02	0.03	0.04	0.06	0.11	0.15	0.24						
8 5/16	0.02	0.03	0.04	0.06	0.10	0.16	0.22	0.38	0.53						
10 3/8	0.03	0.05	0.08	0.13	0.21	0.28	0.50	0.75	1.03						
12 1/2	0.07	0.10	0.16	0.26	0.36	0.59	0.97	1.34	2.13						
16 5/8	0.14	0.23	0.37	0.51	0.87	1.33	1.96	3.28	4.88						
20 3/4	0.18	0.29	0.47	0.67	1.14	1.76	2.42	4.42	6.69	8.73					
25 1	0.61	0.86	1.49	2.31	3.21	5.52	8.56	11.92							
30 1-3/16	1.06	1.84	2.86	4.00	7.02	10.01	14.89								
35 1-3/8	1.25	2.19	3.41	4.80	8.40	12.28	17.25								
40 1-9/16	2.55	3.96	5.59	9.88	14.54	20.55									
45 1-3/4	4.62	6.45	11.57	16.81	23.76										
50 2	5.17	7.22	13.00	19.07	27.06										
55 2-3/16	7.99	14.43	22.86	31.90											
60 2-9/16	8.76	15.88	24.86	33.66											

Socket Set Screws Dog Point															
Diameter	M1.4	M1.6	M1.8	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
-inch	0/80	1/72	2/26	3/48	4/40	8/32	10/24	1/4	5/16	3/8	1/2	5/8	3/4	1	
Pitch	0.30	0.35	0.40	0.45	0.50	0.70	0.80	1.00	1.00	1.25	1.50	1.75	2.00	2.50	3
Length	Approximate Weight Per 100 Pieces in lbs.														
2 5/64	0.01	0.01	0.01	0.01	0.01	0.01									
2.5 3/32	0.01	0.01	0.01	0.01	0.02	0.02									
3 1/8	0.01	0.01	0.01	0.02	0.02	0.03	0.05								
4 5/32	0.01	0.01	0.01	0.02	0.03	0.04	0.05								
5 3/16	0.01	0.01	0.02	0.03	0.04	0.06	0.12								
6 1/4	0.01	0.02	0.03	0.04	0.06	0.12	0.22	0.37							
8 5/16	0.02	0.03	0.04	0.06	0.10	0.16	0.22	0.37							
10 3/8	0.03	0.05	0.08	0.13	0.21	0.28	0.50	0.79							
12 1/2	0.07	0.10	0.16	0.26	0.36	0.59	0.97	1.33							
16 5/8	0.14	0.23	0.37	0.51	0.87	1.33	1.96	3.30							
20 3/4	0.18	0.29	0.47	0.67	1.14	1.76	2.42	4.42	6.23						
25 1	0.61	0.86	1.49	2.31	3.21	5.52	8.56	12.19							
30 1-3/16	1.06	1.84	2.86	4.00	7.02	10.01	14.89								
35 1-3/8	1.25	2.19	3.41	4.80	8.40	12.28	17.25								
40 1-9/16	2.55	3.96	5.59	9.88	14.54	20.55									
45 1-3/4	4.51	6.38	11.33	16.81	23.76										
50 2	5.06	7.17	12.78	19.07	27.06										
55 2-3/16	7.96	14.23	21.34	30.36											
60 2-9/16	8.76	15.69	23.54	33.66											

Socket Set Screws Cup Point															
Diameter	M1.4	M1.6	M1.8	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
-inch	0/80	1/72	2/26	3/48	4/40	8/32	10/24	1/4	5/16	3/8	1/2	5/8	3/4	1	
Pitch	0.30	0.35	0.40	0.45	0.50	0.70	0.80	1.00	1.00	1.25	1.50	1.75	2.00	2.50	3
Length	Approximate Weight Per 100 Pieces in lbs.														
2 5/64	0.01	0.01	0.01	0.01	0.01	0.01									
2.5 3/32	0.01	0.01	0.01	0.01	0.01	0.02									
3 1/8	0.01	0.01	0.01	0.02	0.02	0.02	0.03								
4 5/32	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.07							
5 3/16	0.01	0.01	0.01	0.02	0.03	0.04	0.06	0.09	0.12						
6 1/4	0.01	0.01	0.02	0.03	0.05	0.08	0.12	0.16	0.28						
8 5/16	0.02	0.03	0.04	0.07	0.12	0.17	0.24	0.41	0.60						
10 3/8	0.03	0.05	0.09	0.15	0.22	0.32	0.55	0.82	1.17						
12 1/2	0.07	0.11	0.18	0.28	0.39	0.69	1.04	1.47	2.31						
16 5/8	0.15	0.25	0.38	0.55	0.97	1.48	2.09	3.45	5.04						
20 3/4	0.19	0.31	0.47	0.70	1.25	1.92	2.71	4.60	6.84	8.84					
25 1	0.62	0.90	1.60	2.46	3.50	6.03	9.11	12.14							
30 1-3/16	1.09	1.94	3.01	4.29	7.48	11.37	15.47								
35 1-3/8	1.28	2.29	3.56	5.08	8.91	13.64	18.77								
40 1-9/16	2.64	4.11	5.87	10.36	15.91	22.00									
45 1-3/4	4.66	6.53	11.73	18.17	25.30										
50 2	5.19	7.30	13.16	20.44	28.60										
55 2-3/16	8.05	14.59	22.86	31.90											
60 2-9/16	8.82	16.02	25.08	33.66											

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Full Thread Hex Head Cap Screws																												
Diameter ~inch	M1.6	M2	M2.5	M3	M3.5	M4	M5	M6	M7	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52	
Pitch	0/80	2/56	3/48	4/40	6/32	8/32	10/24	1/4	1/4	5/16	3/8	1/2	9/16	5/8	3/4	7/8	1	1	1-1/16	1-3/16	1-5/16	1-7/16	1-9/16	1-5/8	1-3/4	1-7/8	2	
Length ~inch	0.35	0.4	0.45	0.5	0.6	0.7	0.8	1	1.00	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	3	3.5	3.5	4	4	4.5	4.5	5	5	
Approximate Weight Per 100 Pieces in lbs.																												
2	5/64	0.02																										
3	1/8	0.02	0.04	0.08																								
4	5/32	0.03	0.05	0.09	0.11																							
5	3/16	0.03	0.05	0.09	0.12	0.18	0.28																					
6	1/4	0.03	0.06	0.10	0.13	0.20	0.29	0.48	0.75																			
7	1/4	0.03	0.06	0.11	0.13	0.21	0.31	0.50	0.79	1.23																		
8	5/16	0.04	0.06	0.11	0.15	0.22	0.33	0.52	0.82	1.29	1.87	3.34																
10	3/8	0.04	0.07	0.13	0.17	0.25	0.36	0.58	0.90	1.40	2.00	3.56	5.13	8.36														
12	1/2	0.04	0.08	0.14	0.18	0.28	0.40	0.63	0.97	1.51	2.16	3.78	5.50	8.80	11.64													
14	9/16		0.09	0.15	0.20	0.30	0.43	0.69	1.05	1.62	2.31	4.00	5.81	9.24	12.23													
16	5/8		0.09	0.17	0.22	0.33	0.46	0.74	1.12	1.73	2.44	4.22	6.09	9.68	12.83	18.04	23.10	29.26	38.06									
18	11/16		0.18	0.24	0.35	0.50	0.80	1.20	1.84	2.57	4.44	6.40	10.12	13.40	18.68	24.20	30.14	39.16										
20	3/4		0.19	0.26	0.38	0.53	0.85	1.28	1.95	2.71	4.66	6.82	10.56	13.97	19.18	25.08	31.46	40.48										
22	7/8		0.21	0.28	0.41	0.56	0.91	1.35	2.06	2.84	4.88	7.26	11.00	14.56	20.28	26.18	32.56	41.80	59.18									
25	1		0.22	0.31	0.45	0.62	0.99	1.46	2.20	3.06	5.21	7.50	11.66	15.44	21.08	27.28	34.10	43.78	61.60									
28	1-1/8		0.33	0.49	0.67	1.07	1.57	2.35	3.28	5.54	7.96	12.30	16.32	22.00	28.38	35.42	44.00	64.24										
30	1-3/16		0.35	0.51	0.70	1.12	1.65	2.49	3.41	5.76	8.29	12.74	16.92	22.88	29.48	36.96	47.08	68.20										
35	1-3/8			0.58	0.79	1.26	1.84	2.75	3.76	6.31	9.09	13.84	18.37	24.64	31.90	39.82	50.38	70.18	93	119	147	191						
40	1-9/16			0.87	1.40	2.03	3.04	4.11	6.86	9.88	14.94	19.84	26.40	34.10	42.46	53.68	74.36	99	126	157	200	240	293	350				
45	1-3/4			0.95	1.54	2.22	3.30	4.47	7.41	10.67	16.04	21.36	28.16	36.30	45.32	56.98	78.76	104	132	165	209	249	304	363				
50	2			0.38	1.67	2.42	3.59	4.80	7.96	11.44	17.14	22.66	29.92	38.72	48.18	60.28	82.94	109	139	172	218	260	315	376	460			
55	2-3/16			1.13	1.81	2.62	3.85	5.15	8.51	12.23	18.22	24.20	31.90	40.92	51.04	63.58	87.34	114	145	180	227	271	328	389	477			
60	2-9/16			1.21	1.90	2.79	4.11	5.50	9.09	12.80	19.32	25.74	33.66	43.12	53.68	66.88	91.52	119	151	187	235	279	339	403	493			
65	2-3/8			1.30	2.08	2.99	4.40	5.85	9.64	13.82	20.42	27.06	35.42	45.54	56.54	70.18	95.70	125	158	195	244	288	352	416	508			
70	2-3/4			1.38	2.22	3.17	4.66	6.20	10.19	14.61	21.54	28.60	37.18	47.74	59.18	73.48	99.88	130	164	200	255	301	363	429	526			
75	3			2.35	3.37	4.95	6.56	10.74	15.40	22.44	30.14	38.94	49.94	62.04	76.56	104	135	171	209	264	310	376	442	541				
80	3-3/16			2.49	3.56	5.21	6.91	11.29	16.19	23.54	31.68	40.92	52.36	64.90	79.86	108	140	177	218	273	321	387	458	559				
85	3-3/8				5.50	7.26	11.84	16.98	24.64	33.00	42.68	54.34	67.76	83.16	113	145	184	224	282	330	398	471	574					
90	3-1/2				5.76	7.61	12.39	17.78	25.74	34.54	44.44	56.76	70.62	86.46	117	151	191	233	290	341	411	484	590					
95	3-3/4				6.05	7.74	13.16	18.57	26.84	36.08	46.20	58.96	73.26	89.76	121	156	196	242	299	352	422	497	605					
100	4				6.31	8.29	13.49	19.36	27.94	37.40	47.96	61.38	76.12	93.06	125	161	202	251	308	363	436	510	623					
110	4-3/8				9.00	14.61	20.94	30.14	40.48	51.70	66.00	81.62	99.66	134	171	215	264	326	383	460	539	653						
120	4-3/4				15.71	22.44	32.34	43.34	55.22	70.40	87.34	106	142	182	229	277	343	405	482	565	686							
130	5				16.81	23.98	34.54	46.20	58.96	74.80	92.62	113	151	192	240	293	363	425	506	592	717							
140	5-1/2				17.91	25.52	36.74	49.28	62.48	79.42	98.56	119	159	203	253	308	381	444	530	620	750							
150	6				19.01	27.06	38.94	52.14	66.00	83.82	104	126	168	213	266	323	398	466	554	647	781							
160	6-5/16								69.52	88.44	110	132	176	222	279	339	416	486	579	673	814							
170	6-11/16								73.04	92.84	115	139	185	233	293	354	433	506	603	700	847							
180	7								76.56	97.24	121	146	193	244	306	370	451	528	627	728	880							
190	7-1/2								80.08	102	126	152	200	255	317	383	471	550	651	755	913							
200	8								83.60	106	132	159	208	266	330	398	488	570	673	783	946							

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Partial Thread Hex Head Cap Screws																												
Diameter ~inch	M1.6	M2	M2.5	M3	M3.5	M4	M5	M6	M7	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52	
Pitch	0/80	0/80	0/45	0/5	0/6	0/7	0/8	1	1.00	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	3	3.5	3.5	4	4	4.5	4.5	5	5	
Length ~inch	Approximate Weight Per 100 Pieces In lbs.																											
12	1/2	0.05																										
14	9/16	0.06																										
16	5/8	0.07	0.11	0.19																								
18	11/16		0.12	0.20																								
20	3/4		0.13	0.22	0.28																							
22	7/8		0.24	0.31																								
25	1		0.26	0.35	0.50	0.69	1.07																					
28	1-1/8		0.38	0.55	0.73	1.16																						
30	1-3/16		0.41	0.59	0.79	1.24	1.33	2.79																				
35	1-3/8			0.64	0.89	1.41	2.01	2.99	3.56																			
40	1-9/16			1.00	1.58	2.24	3.32	4.47	7.70																			
45	1-3/4				1.76	2.49	3.65	4.88	8.36	11.79																		
50	2				1.93	2.71	3.98	5.32	9.04	12.78	18.04																	
55	2-3/16					2.95	4.29	5.68	9.64	13.77	19.38	25.30																
60	2-9/16					3.17	4.62	6.12	10.32	14.74	20.70	27.06																
65	2-3/8						4.95	6.51	11.00	15.47	21.74	28.82	37.62	48.18														
70	2-3/4						5.28	7.00	11.68	16.43	23.10	30.58	39.82	50.82	61.82													
75	3						7.41	12.36	17.40	24.42	32.34	42.02	53.46	65.12														
80	3-3/16						7.85	13.05	18.39	25.74	34.10	44.00	56.10	68.42	86.24													
85	3-3/8							13.73	19.38	27.06	35.86	46.20	58.74	71.72	90.20													
90	3-1/2							14.41	20.33	27.94	37.62	48.40	61.38	75.02	94.16	123	157											
95	3-3/4							15.09	21.30	29.26	39.38	50.60	64.02	78.32	98.12	128	163											
100	4							15.77	22.22	30.58	40.92	52.80	66.66	81.40	102	133	169	209										
110	4-3/8							23.98	33.22	44.44	57.20	71.94	88.00	110	143	181	224	273										
120	4-3/4							25.96	36.08	47.96	61.60	77.22	94.60	118	153	194	240	290	332									
130	5							38.28	50.60	65.12	82.28	99.00	123	158	202	253	306	348	365	460	546	629						
140	5-1/2							40.70	54.12	69.52	87.56	106	131	168	215	268	323	365	460	546	629							
150	6							57.64	73.92	92.84	112	139	178	227	284	341	383	484	572	662	794							
160	6-5/16							61.16	78.32	98.12	119	146	188	239	297	359	403	508	601	695	829							
170	6-11/16							82.72	103	125	154	198	251	310	376	422	530	627	726	865								
180	7							87.12	109	132	162	208	264	326	394	442	554	656	757	902								
190	7-1/2							114	139	169	218	275	339	411	462	579	682	788	939									
200	8							120	145	177	227	288	354	429	484	603	708	818	975									
220	8-1/4							158	191	249	312	385	464	530	651	763	882	1,047										
240	9-1/2							206	268	337	414	499	572	700	818	944	1,124											
260	10-1/4							288	361	444	554	616	748	876	1,005	1,199												
280	11							385	473	570	662	774	933	1,067	1,276													
300	12							409	504	605	706	801	990	1,129	1,351													

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Carriage Bolts No Nuts										
Diameter	M5	M6	M8	M10	M12	M16	M20			
~inch	10/24	1/4	5/16	3/8	1/2	5/8	3/4			
Pitch	0.8	1	1.25	1.5	1.75	2	2.5			
Length	~inch									
16	0.88	1.52	Approximate Weight Per 100 Pieces in lbs.							
20	0.99	1.67	3.04	4.99						
25	1.12	1.87	3.39	5.54						
30	1-3/16	1.30	2.11	3.74	6.09	10.05				
35	1-3/8	1.47	2.35	4.18	6.64	10.87				
40	1-9/16	1.65	2.60	4.62	7.19	11.68				
45	1-3/4	1.83	2.84	5.06	7.88	12.50				
50	2	2.00	3.08	5.50	8.56	13.46	26.18			
55	2-3/16	2.18	3.32	5.92	9.24	14.43	27.72			
60	2-9/16	2.35	3.56	6.36	9.92	15.40	29.26			
65	2-3/8	2.53	3.81	6.80	10.60	16.37	31.02			
70	2-3/4	2.71	4.05	7.24	11.29	17.34	32.78	54.34		
75	3	2.88	4.29	7.68	11.97	18.30	34.54	57.20		
80	3-3/16	3.06	4.53	8.10	12.65	19.14	36.30	59.84		
90	3-1/2		5.02	8.98	14.01	21.12	39.82	65.34		
100	4		5.50	9.86	15.38	23.10	43.34	70.84		
110	4-3/8		5.98	10.74	16.74	25.08	46.86	76.34		
120	4-3/4		6.47	11.62	18.11	27.06	50.38	81.84		
130	5		6.95	12.50	19.47	29.04	53.90	87.34		
140	5-1/2		7.22	13.38	20.90	31.02	57.42	92.84		
150	6		7.70	14.26	22.22	33.00	60.94	98.34		
160	6-5/16				23.54	34.98	64.46	109		
180	7				26.18	38.94	71.50	120		
200	8				28.82	42.90	78.54	131		

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Lifting Eye Bolts		Lifting Eye Nuts	
Diameter	~inch	Diameter	~inch
M6	1/4		
M8	5/16		
M10	3/8		
M12	1/2		
M14	9/16		
M16	5/8		
M20	3/4		
M22	7/8		
M24	1		
M27	1-1/16		
M30	1-3/16		
M33	1-5/16		
M36	1-7/16		
M42	1-5/8		
M45	1-3/4		
M48	1-7/8		
M52	2		
M64	2-9/16		
M72	2-7/8		
M80	3-3/16		
M100	4		

Lifting Eye Bolts		Lifting Eye Nuts		Threaded Rod	
Diameter	~inch	Diameter	~inch	Diameter	~inch
M2	5/64				
M2.5	3/32				
M3	1/8				
M4	5/32				
M5	3/16				
M6	1/4				
M7	1/4				
M8	5/16				
M10	3/8				
M12	1/2				
M14	9/16				
M16	5/8				
M18	11/16				
M20	3/4				
M22	7/8				
M24	1				
M27	1-1/16				
M30	1-3/16				
M33	1-5/16				
M36	1-7/16				
M39	1-9/16				
M42	1-5/8				
M45	1-3/4				
M48	1-7/8				
M52	2				

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Nut Style>>>	Diameter	Hex Nuts										Flat and Lock Washers									
		Approximate Weight Per 100 Pieces In lbs.					Approximate Weight per 100 pieces in lbs.					Approximate Weight per 100 pieces in lbs.					Approximate Weight per 100 pieces in lbs.				
		Full Hex Nuts	Hex Jam Nuts	Nylon Insert Hex Nuts	All Metal Hex Lock Nuts	Hex Nuts With Washers	Hex Flange Nuts	Washer Style>>>		Flat Washers Regular	Flat Washers Small	Fender Washers	Split Lock Washers	Split High Collar Lock Washers	External Tooth Washers	Internal Tooth Washers	External Internal Tooth Serrated Washers	External Tooth Countersunk Serrated Washers			
M1		0.01						1 mm													
M1.2		0.01						1.2 mm													
M1.4		0.01						1.4 mm													
M1.6	0/80	0.02	0.01					1.6 mm	0/80					0.01		0.01					
M1.7								1.7 mm													
M1.8	1/72	0.02	0.02					1.8 mm	1/72												
M2	2/56	0.03	0.02					2 mm	2/56					0.01		0.01		0.01			
M2.2		0.04	0.03					2.2 mm													
M2.3								2.3 mm						0.01							
M2.5	3/48	0.06	0.05					2.5 mm	3/48				0.06		0.01		0.01				
M2.6								2.6 mm													
M3	4/40	0.08	0.06	0.11				3 mm	4/40				0.08	0.02	0.01		0.01	0.01			
M3.5	6/32	0.11	0.08	0.02		1.01		3.5 mm	6/32				0.12	0.03	0.02		0.02	0.02			
M4	8/32	0.18	0.13	0.22	0.22	2.00		4 mm	8/32				0.17	0.04	0.02		0.03	0.02			
M5	10/24	0.27	0.18	0.31	0.28	3.01		5 mm	10/24				0.32	0.08	0.04		0.06	0.04			
M6	1/4	0.55	0.35	0.53	0.55	4.00		6 mm	1/4				0.61	0.18	0.09		0.08	0.07			
M7	1/4	0.89		0.66				7 mm	1/4				1.16	0.20	0.07		0.11				
M8	5/16	1.14	0.70	1.12	1.20	12.01		8 mm	5/16				1.37	0.35	0.23		0.18	0.11			
M10	3/8	2.55	1.58	2.33	2.73	16.02		10 mm	3/8				2.68	0.56	0.43		0.28	0.22			
M12	1/2	3.81	2.29	3.78	3.80	6.27		12 mm	1/2				4.88	0.80	0.50		0.35	0.33			
M14	9/16	5.50	3.50	5.72	6.08			14 mm	9/16				6.95	1.32	0.84		0.51	0.42			
M16	5/8	7.33	4.51	7.48	7.81	12.12		16 mm	5/8				9.00	1.96	1.31		0.64	0.51			
M18	11/16	10.87	6.51	9.90	10.72			18 mm	11/16				14.83	2.14	1.45		1.10				
M20	3/4	14.17	8.84	14.30	14.85	22.13		20 mm	3/4				16.90	3.34	2.71		1.32				
M22	7/8	17.38	10.63	16.50	17.97			22 mm	7/8				20.00	3.63	2.99		1.65				
M24	1	24.20	19.69	22.00	25.48	39.73		24 mm	1				30.58	5.76	3.98		1.76				
M27	1-1/16	36.30	22.22	35.64	35.04			27 mm	1-1/16				60.06	6.31	4.58		2.64				
M30	1-3/16	49.06	30.58	46.64	50.05			30 mm	1-3/16				115	9.75	7.04		3.08				
M33	1-5/16	63.36	40.26	63.74				33 mm	1-5/16				12.28	12.28	7.70						
M36	1-7/16	86.46	53.68	91.30	85.10			36 mm	1-7/16				14.81	14.81	11.55						
M39	1-9/16	110	69.52	110				39 mm	1-9/16				15.77	15.77	14.39						
M42	1-5/8	143	88.66	138				42 mm	1-5/8				24.42	24.42	17.60						
M45	1-3/4	176	110	170				45 mm	1-3/4				25.74	25.74	18.70						
M48	1-7/8	215	136	220				48 mm	1-7/8				27.06	27.06	19.80						
M52	2	268	166					52 mm	2				40.04	40.04							
M56	2-3/16	312						56 mm	2-3/16				42.46	42.46							
M60	2-3/8	372						60 mm	2-3/8				44.66	44.66							
M64	2-9/16	436						64 mm	2-9/16				47.96	47.96							
M72	2-7/8	587						72 mm	2-7/8				52.80	52.80							
M80	3-3/16	757						80 mm	3-3/16				57.64	57.64							
M90	3-9/16	1,085						90 mm	3-9/16				63.80	63.80							
M100	4	1,500						100 mm	4				69.96	69.96							

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Slotted Cheese Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.5	M2.6	M3	M3.5	M4	M5	M6	M8	M10
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5
Pitch																
Length	2	5/64	0.01	0.02	0.02											
Approximate Weight Per 100 Pieces In lbs.																
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
8	5/16															
10	3/8															
12	1/2															
14	9/16															
16	5/8															
18	11/16															
20	3/4															
22	7/8															
25	1															
28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Slotted Pan Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.5	M2.6	M3	M3.5	M4	M5	M6	M8	M10
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5
Pitch																
Length	2	5/64	0.01	0.02	0.02											
Approximate Weight Per 100 Pieces In lbs.																
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
8	5/16															
10	3/8															
12	1/2															
14	9/16															
16	5/8															
18	11/16															
20	3/4															
22	7/8															
25	1															
28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Slotted Flat Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.5	M2.6	M3	M3.5	M4	M5	M6	M8	M10
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5
Pitch																
Length	2	5/64	0.01	0.01	0.01											
Approximate Weight Per 100 Pieces In lbs.																
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
8	5/16															
10	3/8															
12	1/2															
14	9/16															
16	5/8															
18	11/16															
20	3/4															
22	7/8															
25	1															
28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Slotted Oval Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.5	M2.6	M3	M3.5	M4	M5	M6	M8	M10
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5
Pitch																
Length	2	5/64	0.01	0.01	0.01											
Approximate Weight Per 100 Pieces In lbs.																
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
8	5/16															
10	3/8															
12	1/2															
14	9/16															
16	5/8															
18	11/16															
20	3/4															
22	7/8															
25	1															
28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

LFG 01/01/09 Revised

ALL CALCULATIONS FOR TABLE OF WEIGHTS ARE BASED UPON VARIOUS DIN, ISO, OR ANSI PUBLICATIONS AND ARE APPROXIMATE, NOT EXACT - ALL METRIC TO INCH COMPARISONS ARE APPROXIMATE, NOT EXACT.

Phillips Pan Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.6	M3	M3.5	M4	M5	M6	M8	M10	
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Pitch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Length	Approximate Weight Per 100 Pieces in lbs.															
-inch	2	5/64														
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
8	5/16															
10	3/8															
12	1/2															
14	9/16															
16	5/8															
18	11/16															
20	3/4															
22	7/8															
25	1															
28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Phillips Flat Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.6	M3	M3.5	M4	M5	M6	M8	M10	
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Pitch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Length	Approximate Weight Per 100 Pieces in lbs.															
-inch	2	5/64														
2.5	3/48															
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35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Phillips Oval Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.6	M3	M3.5	M4	M5	M6	M8	M10	
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Pitch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Length	Approximate Weight Per 100 Pieces in lbs.															
-inch	2	5/64														
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
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28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Phillips Cheese Head Machine Screws																
Diameter	M1	M1.2	M1.4	M1.6	M1.8	M2	M2.3	M2.6	M3	M3.5	M4	M5	M6	M8	M10	
-inch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Pitch	0.25	0.25	0.3	0.35	0.4	0.45	0.45	0.45	0.5	0.6	0.7	0.8	1	1.25	1.5	
Length	Approximate Weight Per 100 Pieces in lbs.															
-inch	2	5/64														
2.5	3/48															
3	1/8															
4	5/32															
5	3/16															
6	1/4															
8	5/16															
10	3/8															
12	1/2															
14	9/16															
16	5/8															
18	11/16															
20	3/4															
22	7/8															
25	1															
28	1-1/8															
30	1-3/16															
35	1-3/8															
40	1-9/16															
45	1-3/4															
50	2															
55	2-3/16															
60	2-3/8															
65	2-9/16															
70	2-3/4															
75	3															
80	3-3/16															

Reference Notes





CONVERSION TABLE



MILLIMETER TO DECIMALS EQUIVALENTS

Metric	Equivalent Decimal
M1	0.0394
M1.2	0.0472
M1.4	0.0551
M1.6	0.0630
M1.7	0.0669
M1.8	0.0709
M2	0.0787
M2.2	0.0866
M2.3	0.0906
M2.5	0.0984
M2.6	0.1024
M3	0.1181
M3.5	0.1378
M4	0.1575
M5	0.1969
M6	0.2362
M7	0.2756
M8	0.3150
M9	0.3543
M10	0.3937
M11	0.4331
M12	0.4724
M14	0.5512
M16	0.6299
M18	0.7087
M20	0.7874
M22	0.8661
M24	0.9449
M27	1.0630
M30	1.1811
M33	1.2992
M36	1.4173
M39	1.5354
M42	1.6535
M45	1.7717
M48	1.8898
M52	2.0472
M56	2.2047
M60	2.3622

Metric	Equivalent Decimal
M64	2.5197
M68	2.6772
M72	2.8346
M80	3.1496
M90	3.5433
M100	3.9370
M120	4.7244
M140	5.5118
M160	6.2992
M180	7.0866
M200	7.8740
M220	8.6614
M240	9.4488
M260	10.2362
M280	11.0236
M300	11.8110
M320	12.5984
M340	13.3858
M360	14.1732
M380	14.9606
M400	15.7480
M420	16.5354
M440	17.3228
M460	18.1102
M480	18.8976
M500	19.6850

Soft Conversion Formulas

Metric To Inch

metric x .03937 = decimal

Inch To Metric

inch x 25.4 = metric

Applies To Both Diameter & Length

NOMINAL DIAMETER	MM	M 2.6	M 3	M 3.5	M 4	M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 18	M 20	M 22	M 24	M 27	M 30	M 33	M 36
	INCH	.102	.118	.138	.157	.197	.236	.315	.394	.472	.551	.630	.709	.787	.866	.945	1.0643	1.181	1.299	1.417
PITCH	MM	.45	.5	.6	.7	.7	1.	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	3	3.5	3.5	4



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