



Fasteners

Product Guide



ABOUT US

Central Engineering (Pte) Ltd in Singapore has been in the industry since 1967. The company now services the growing needs for fasteners across the region. With its extensive range of fasteners and distribution network, the company has continually been able to gain the confidence and support of many companies across a wide range of industries



Central Engineering aim to become your Solutions Provider; by understanding the needs of customers and provide them with the best solutions. With the Solutions Provider mindset, we embark on numerous programs to understand the needs of various industries and through key findings, we customize initiatives to provide value added services to our customers.

We help customers realize their full potential through our customer oriented approach and proactively work with them to understand their needs. We pride ourselves with our service promise, where we offer products and services of the highest quality. Our passion for service, strong distribution network and dedicated support team help customers in providing solutions and reaching their goals.





















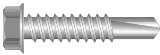
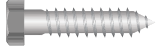


















INDUSTRIES

With a combination of decades of experience, Central Engineering have gained the technical expertise in delivering fastener products and solutions. We specialize in industries such as civil and structure, oil and gas, industrial water tank, high tension cable tower and (underground) water piping. Our extensive knowledge in these specialized industries allows us to design and deliver solutions tailored to our customers need.



DESCRIPTIONS	ITEMS	GRADES AVAILABLE	DIAMETER		LENGTH	
			INCH	MM	INCH	MM
HEX HEAD BOLT		SAE G5 / G8, G8.8 / G10.9 / G12.9, BRASS, SS304, SS316	1/4 - 3	M3 - M72	1/2 - 24	16 - 600
HEX HEAD BOLT		SAE G5 / G8, G8.8 / G10.9 / G12.9, BRASS, SS304, SS316	1/4 - 3	M3 - M72	1/2 - 24	16 - 600
HEAVY HEX BOLT		A193 B7/7M, A193 B8/B8M, A325/325M, F10T	1/2 - 3	M12 - M36	1 - 24	25 - 500
TORSHEAR TYPE HIGH STRENGTH BOLT SET		S10T		M16 - M30		40 - 210
HEX FLANGE BOLT		G4.8 / G8.8		M5 - M20		10 - 200
SOCKET CAP SCREW		A574 / G8.8 / G10.9 / G12.9, SS304, SS316	1/4 - 1-1/2	M3 - M48	1/2 - 16	6 - 400
LOW HEAD SOCKET CAP SCREW		G10.9, SS304		M5 - M20		10 - 100
SOCKET SHOULDER SCREW		G12.9		M6 - M20		12 - 150
FLAT / CSK SOCKET CAP SCREW		G10.9, SS304, SS316	1/4 - 1	M3 - M24	1/2 - 8	6 - 150
SOCKET SET SCREW		G10.9, G12.9, SS304, SS316	1/2 - 3/4	M3 - M20	1/2 - 4	6 - 100
BUTTON SOCKET CAP SCREW		G10.9, SS304, SS316	1/4 - 1/2	M3 - M12	1/2 - 4	6 - 100
ROUND HEAD SQUARE NECK / CARRIAGE BOLT		G4.8 / G8.8, SS304, SS316	5/16 - 3/4	M6 - M16	1 - 8	16 - 350
SLOTTED CHEESE HEAD SCREW		G4.8, SS304, SS316, BRASS		M3 - M12	1 - 8	6 - 80
SLOTTED TRUSS (RAISED) HEAD SCREW		G4.8, SS304, SS316		M3 - M8		6 - 50
CROSS RECESSED FLAT / CSK HEAD MACHINE SCREW		G4.8, SS304, SS316, BRASS		M3 - M12		6 - 80
CROSS RECESSED PAN HEAD MACHINE SCREW		G4.8, SS304, SS316		M3 - M12		6 - 80
CROSS RECESSED PAN HEAD SELF TAPPING SCREW		STEEL, SS410, SS304, SS316	#4 - #14		1/2 - 3	
CROSS RECESSED FLAT / CSK HEAD SELF TAPPING SCREW		STEEL, SS410, SS304, SS316	#4 - #14		1/2 - 3	

DESCRIPTIONS	ITEMS	GRADES AVAILABLE	DIAMETER		LENGTH	
			INCH	MM	INCH	MM
HEX FLANGE HEAD SELF DRILLING SCREW		STEEL, SS410, SS304, SS316	#4 - #14		1/2 - 3	
HEX HEAD WOOD SCREW / LAG SCREW		STEEL, SS304	1/4 - 1/2		1 - 6	
WING SCREW		STEEL, SS304, SS316	1/4 - 1/2	M5 - M12	1/2 - 4	12 - 50
LIFTING EYE BOLT		STEEL, SS304, SS316		M6 - M64		
FULLY THREADED ROD / STUD		SAE G2 / G5, G4.8 / G8.8 / G10.9 / SS304, SS316, BRASS, A193 B7/7M, A193 B8/B8M	1/2 - 3	M4 - M64		
HEX NUT		SAE G2 / G5 / G8, CL8 / 10 / 12, SS304, SS316, BRASS	1/4 - 3	M3 - M100		
HEAVY HEX NUT		A194 2H / 2HM, A194 GR8 / 8M	1/2 - 3	M12 - M48		
HEX JAM / THIN NUT		STEEL, SS304, SS316	1/4 - 3	M3 - M100		
DOME / CAP NUT		G4.8, SS304, SS316, BRASS	1/4 - 1	M6 - M24		
NYLON LOCK NUT		G4.8, SS304, SS316	1/4 - 2	M3 - M64		
WING NUT		G4.8, SS304, SS316, BRASS	1/4 - 1/2	M5 - M24		
ANCO LOCK NUT		A194 2H	3/8 - 2	M12 - M48		
FLAT WASHER		MILD STEEL, HARDENED, SS304, SS316, BRASS	3/16 - 3	M3 - M76		
SPRING WASHER		SPRING STEEL, SS304, SS316, COPPER	1/8 - 3	M2 - M56		
SERRATED WASHER		STEEL, SS304, SS316		M3 - M30		
COTTER PIN		STEEL, SS304, SS316	1/16 - 3/4		1/2 - 12	
SPRING PIN		STEEL, SS304, SS316		M2 - M18		6 - 100
NORD LOCK WASHER		STEEL, SS316		M6 - M48		

MATERIAL			FINISHING		STANDARDS	
G4.8	G2	SS304	PLAIN	HDG	DIN	JIS
G8.8	G5	SS316	BLACK	MECH. GALVANIZED	ISO	IFI
G10.9	G8	A2	ZINC PLATED	FLUOROCARBON	ASME	BS
G12.9	BRASS	A4	YELLOW ZINC	NICKEL	ASTM	



HEX BOLT - PARTIAL THREAD	
DIN 931	ISO 4014
BS 4190	ASME B18.2.1
BS 916	BS 1083

HEX BOLT - FULL THREAD	
DIN 933	ISO 4017
BS 4190	ASME B18.2.1
BS 916	BS 1083

SOCKET CAP SCREW	
DIN 912	ISO 4762
ASME B18.3	



FLAT / CSK SOCKET CAP SCREW	
DIN 7991	ISO 10642
BS 2470	ASME B18.3

BUTTON SOCKET CAP SCREW	
ISO 7380	ASME B18.3

LOW HEAD SOCKET CAP SCREW	
DIN 7984	



SOCKET SET SCREW	
DIN 916	ISO 4029
ASME B18.3	

FULLY THREADED ROD / STUD	
DIN 976	IFI 136

U-BOLT WITH 2 HEX NUTS	
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ROUND HEAD SQ NECK / CARRIAGE BOLT	
DIN 603	ISO 8677
ASME B18.5	



HEX FLANGE BOLT	
DIN 6921	



HEX NUT	
DIN 934	ISO 4032
BS 916	ASME B18.2.2
BS 4190	BS 1083



NYLON LOCK NUT	
DIN 985	ASME B18.16.6



FLANGE HEX NUT	
DIN 6923	ISO 4161
ASME B18.2.2	



HEAVY HEX NUT (2H)	
ASME B18.2.4.6M	
ASME B18.2.2	



DOME / CAP NUT	
DIN 1587	JIS B1183



HEX CASTLE NUT	
DIN 935	



HEX JAM / THIN NUT	
DIN 439	ISO 4035
ASME B18.2.2	



PAL NUT	
DIN 7967	



WING NUT	
DIN 315	ANSI B18.17



COUPLING / LONG HEX NUT	
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EYE NUT
DIN 582



ANCO LOCK NUT



TAPER JAM NUT



SPRING NUT



FLAT WASHER	
ASTM F436	ASTM F436M
DIN 125	ISO 7089
ISO 7090	ISO 7091



SPRING WASHER	
DIN 127B	BS 4464
ASME B18.21.1	



TAPER WASHER
DIN 434



INTERNAL RETAINING RING /
B-CIRCLIP
DIN 472



EXTERNAL RETAINING RING /
A-CIRCLIP
DIN 471



PJ ANCHOR WITH FLANGE NUT



PJ ANCHOR



SLEEVE / SET ANCHOR



WEDGE ANCHOR



DROP-IN ANCHOR



L-BRACKET



SELF DRILLING SCREW -
HEX FLANGE HEAD

DIN 7504



SELF TAPPING SCREW
(+) FLAT / CSK HEAD

DIN 7982

JIS B1122



SELF DRILLING SCREW
(+) FLAT / CSK HEAD

DIN 7504



FLAT / CSK HEAD MACHINE SCREW

DIN 965

JIS B1111



PAN HEAD MACHINE SCREW

DIN 7985

JIS B1111



LAG / COACH SCREW

DIN 571

ASME B18.2.1



SPLICE BOLT AND RECESS NUT



LIFTING EYE BOLT

DIN 580



DOG BOLT WITH WING NUT



SHEAR WELDING STUD

ISO 13918

AWS D1.1



TORSHEAR TYPE HIGH STRENGTH
BOLT SET / T.C.BOLT (S10T)

JSS II 09



HIGH STRENGTH FRICTION GRIP
BOLT SET (F10T)

DIN 6914 HEX
BOLT

DIN 6916
WASHER

DIN 6915 HEX
NUT

JIS B1186



B7 / B7M STUD

ASTM A193

ASTM A193M



BOTH END THREADED ROD /
STUD



ANCHOR BOLT



ANCHOR BOLT



L-BOLT



J-BOLT



V-BOLT / SQUARE BOLT



CUSTOM EYE BOLT



QUARRY BOLT



QUARRY BOLT



TURNBUCKLE



HARDENED DOWEL PIN



SPRING PIN

DIN 1481

ISO 8752



R-PIN



COTTER PIN

DIN 94

ISO 1234

ASME B18.8.1



WIRE THREAD INSERT

DIN 8140





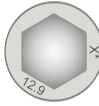


THREAD REPAIR KIT






TORQUE WRENCH

Common Bolts Identification & Mechanical Properties

	Metric Steel Bolts				
Standards	ISO 898 Part 1				
Identification Mark					
Product Specifications	Grade 4.8	Grade 5.8	Grade 8.8 ≤ M16 (> M16)	Grade 10.9	Grade 12.9 Socket Head Cap Screws
Material	Low/Medium Carbon Steel	Low/Medium Carbon Steel	Medium Carbon Steel Heat Treated	Alloy Steel Heat Treated	Alloy Steel Heat Treated
Min. Tensile Strength (MPa)	420	520	800 (830)	1040	1220
Min. Yield Strength (MPa)	340	420	640 (660)	940	1100
Proof Load (MPa)	310	380	580 (600)	830	970
Hardness (Min-Max)	HV130-220	HV 160-220	HRC 22-32 (HRC 23-34)	HRC 32-39	HRC 39-44
Compatible Nut	Class 4	Class 5	Class 8	Class 10	-

	Metric Steel Bolts				
Standards	BS 4190				
Product Specifications	Grade 4.6	Grade 4.8	Grade 6.8	Grade 8.8	Grade 10.9
Material	Low/Medium Carbon Steel	Low/Medium Carbon Steel Heat Treated	Low/Medium Carbon Steel Heat Treated	Medium Carbon Steel Heat Treated	Alloy Steel Heat Treated
Min. Tensile Strength (N/mm ²)	400	400	600	800	1000
Min. Yield Strength (N/mm ²)	240	320	480	640	900
Hardness (Min-Max)	HV 120-220	HV 160-220	HV 190-250	HRC 22-32	HRC 32-39
Compatible Nut	Class 4	Class 4	Class 6	Class 8	Class 10

Note : When a thick protective coating is applied to a bolt of grade 8.8 or 10.9, which requires the nut thread to be overtapped, the next higher grade of nut should be used.

	Inch Steel Bolts		
Standards	SAE J429		
Identification Mark			
Product Specifications	Grade 2	Grade 5	Grade 8
Nominal Size Range	1/4 - 3/4 (>3/4 - 1-1/2)	1/4 - 1 (>1 - 1-1/2)	1/4 - 1-1/2
Material	Low/Medium Carbon Steel	Medium Carbon Steel Heat Treated	Medium Carbon Steel Heat Treated
Min. Tensile Strength (psi)	74000 (60000)	120000 (105000)	150000
Min. Yield Strength (psi)	57000 (36000)	92000 (81000)	130000
Proof Load (psi)	55000 (33000)	85000 (74000)	120000
Core Hardness (Min-Max)	HRB 80-100 (HRB 70-100)	HRC 25-34 (HRC 19-30)	HRC 33-39
Compatible Nut	Grade 2	Grade 5	Grade 8

For detailed information, please refer to complete governing standards.

The ISO 898 Part 1 specifies mechanical and physical properties of bolts, screws and studs made of carbon steel and alloy steel when tested at the temperature range of 10 °C to 35 °C.

Minimum Ultimate Tensile Loads - ISO Metric Coarse Pitch Thread

Thread, d	Nominal stress area, mm ²	Minimum ultimate tensile load, N				
		4.8	6.8	8.8	10.9	12.9
M3	5.03	2,110	3,020	4,020	5,230	6,140
M4	8.78	3,690	5,270	7,020	9,130	10,700
M5	14.2	5,960	8,520	11,350	14,800	17,300
M6	20.1	8,440	12,100	16,100	20,900	24,500
M8	36.6	15,400	22,000	29200**	38100**	44,600
M10	58	24,400	34,800	46400**	60300**	70,800
M12	84.3	35,400	50,600	67,400	87,700	103,000
M14	115	48,300	69,000	92,000	120,000	140,000
M16	157	65,900	94,000	125,000	163,000	192,000
M18	192	80,600	115,000	159,000	200,000	234,000
M20	245	103,000	147,000	203,000	255,000	299,000
M22	303	127,000	182,000	252,000	315,000	370,000
M24	353	148,000	212,000	293,000	367,000	431,000
M27	459	193,000	275,000	381,000	477,000	560,000
M30	561	236,000	337,000	466,000	583,000	684,000
M33	694	292,000	416,000	576,000	722,000	847,000
M36	817	343,000	490,000	678,000	850,000	997,000
M39	976	410,000	586,000	810,000	1,020,000	1,200,000

** For fasteners with thread tolerance 6az according to ISO 965-4 subject to hot dip galvanizing, reduced values in accordance with ISO 10684:2004, Annex A, apply.

Proof Loads for Hexagon Bolts - ISO Metric Coarse Pitch Thread

Thread, d	Nominal stress area, mm ²	Proof Load, N				
		4.8	6.8	8.8	10.9	12.9
M3	5.03	1,560	2,210	2,920	4,180	4,880
M4	8.78	2,720	3,860	5,100	7,290	8,520
M5	14.2	4,400	6,250	8,230	11,800	13,800
M6	20.1	6,230	8,840	11,600	16,700	19,500
M8	36.6	11,400	16,100	21200**	30400**	35,500
M10	58	18,000	25,500	33700**	48100**	56,300
M12	84.3	26,100	37,100	48,900	70,000	81,800
M14	115	35,600	50,600	66,700	95,500	112,000
M16	157	48,700	69,100	91,000	130,000	152,000
M18	192	59,500	84,500	115,000	159,000	186,000
M20	245	76,000	108,000	147,000	203,000	238,000
M22	303	93,900	133,000	182,000	252,000	294,000
M24	353	109,000	155,000	212,000	293,000	342,000
M27	459	142,000	202,000	275,000	381,000	445,000
M30	561	174,000	247,000	337,000	466,000	544,000
M33	694	215,000	305,000	416,000	576,000	673,000
M36	817	253,000	359,000	490,000	678,000	792,000
M39	976	303,000	429,000	586,000	810,000	947,000

** For fasteners with thread tolerance 6az according to ISO 965-4 subject to hot dip galvanizing, reduced values in accordance with ISO 10684:2004, Annex A, apply.

For detailed information, please refer to complete governing standards.

Proof Load Values for Hex Nuts (N)

Thread, d	Pitch, P	Proof Load as per ISO898-2			Proof Load as per DIN267-4			Proof Load as per BS4190		
		Class 8	Class 10	Class 12	Class 8	Class 10	Class 12	Class 8	Class 10	Class 12
M5	0.8	12,140	14,800	16,300	11,400	14,200	17,000	11,400	14,800	17,000
M6	1.0	17,200	20,900	23,100	16,000	20,000	24,000	16,000	20,000	24,000
M8	1.25	31,800	38,100	42,500	29,000	36,500	43,000	29,000	36,500	43,000
M10	1.5	50,500	60,300	67,300	46,000	58,000	69,500	46,000	58,000	69,500
M12	1.75	74,200	88,500	100,300	67,000	84,000	100,000	67,000	84,000	100,000
M14	2.0	101,200	120,800	136,900	92,000	115,000	138,000	--	--	--
M16	2.0	138,200	164,900	186,800	126,000	157,000	188,000	125,000	157,000	188,000
M18	2.5	176,600	203,500	230,400	154,000	192,000	230,000	--	--	--
M20	2.5	225,400	259,700	294,000	196,000	245,000	294,000	196,000	245,000	294,000
M22	2.5	278,800	321,200	363,600	242,000	303,000	364,000	242,000	303,000	364,000
M24	3.0	324,800	374,200	423,600	282,000	353,000	423,000	282,000	353,000	423,000
M27	3.0	422,300	486,500	550,800	367,000	459,000	550,000	367,000	459,000	550,000
M30	3.5	516,100	594,700	673,200	448,000	561,000	673,000	448,000	561,000	673,000
M33	3.5	638,500	735,600	832,800	555,000	694,000	833,000	555,000	694,000	833,000
M36	4.0	751,600	866,000	980,400	653,000	817,000	980,000	653,000	817,000	980,000
M39	4.0	897,900	1,035,000	1,171,000	780,000	976,000	1,170,000	780,000	976,000	1,170,000
M42	4.5	--	--	--	--	--	--	896,000	1,120,000	1,340,000
M45	4.5	--	--	--	--	--	--	1,400,000	1,300,000	1,560,000
M48	5.0	--	--	--	--	--	--	1,180,000	1,470,000	1,760,000
M52	5.0	--	--	--	--	--	--	1,410,000	1,760,000	2,110,000
M56	5.5	--	--	--	--	--	--	1,620,000	2,030,000	2,440,000
M60	5.5	--	--	--	--	--	--	1,890,000	2,360,000	2,830,000
M64	6.0	--	--	--	--	--	--	2,140,000	2,680,000	3,220,000
M68	6.0	--	--	--	--	--	--	2,450,000	3,060,000	3,670,000

Hardness Properties for Hex Nuts - Style 1 (Vickers Hardness, HV)

Thread, d		Hardness as per ISO898-2			Hardness as per DIN267-4			Hardness as per BS4190		
		Class 8	Class 10	Class 12	Class 8	Class 10	Class 12	Class 8	Class 10	Class 12
M5 - M16	min.	200	272	272	-	-	-	-	-	-
	max.	302	353	353	302	353	353	310	370	395
M18 - M39	min.	233	272	272	-	-	-	-	-	-
	max.	353	353	353	302	353	353	310	370	395

For detailed information, please refer to complete governing standards.

DIN267-Part 10 specifies the technical delivery conditions for hot-dip galvanized bolts and nuts, diameter size M6 to M36, coarse thread.

Minimum Failure Loads for Hot-Dip Galvanized Bolts and Proof Loads for Hot-dip Galvanized Nuts with oversize thread.

Thread size	Pitch, (P)	Stress area, (mm ²)	Property class bolt/nut	
			8.8/8	10.9/10
			Minimum failure load of bolt or proof load for nut, (N)	
M6	1.0	16.4	13,100	17,100
M8	1.25	31.3	25,000	32,600
M10	1.5	50.9	40,700	52,900
M12	1.75	75.1	60,100	78,100
M14	2.0	104	83,200	108,000
M16	2.0	144	115,000	150,000
M18	2.5	177	147,000	184,000
M20	2.5	227	188,000	236,000
M22	2.5	284	236,000	295,000
M24	3.0	329	273,000	342,000
M27	3.0	433	359,000	450,000
M30	3.5	530	440,000	551,000
M33	3.5	659	547,000	685,000
M36	4.0	777	645,000	808,000

Proof Load for Hot-dip Galvanized Nuts

Thread size	Pitch, (P)	Stress area, (mm ²)	Class 8 Class 10 Proof load, (N)	
			M6	1.0
M8	1.25	31.3	18,150	25,980
M10	1.5	50.9	29,500	42,200
M12	1.75	75.1	43,600	62,300
M14	2.0	104	60,300	86,300
M16	2.0	144	83,500	119,000
M18	2.5	177	106,000	147,000
M20	2.5	227	136,000	188,000
M22	2.5	284	170,000	236,000
M24	3.0	329	197,000	273,000
M27	3.0	433	260,000	359,000
M30	3.5	530	318,000	440,000
M33	3.5	659	395,000	547,000
M36	4.0	777	466,000	645,000

For detailed information, please refer to complete governing standards.

SAE J429 specifies the requirements for high tensile and alloy steel inch-series bolts, screws and studs. Sizes covered range from 1/4" to 1-1/2" diameter.

Minimum Tensile Load and Proof Load for ANSI B18.2.1 Hex Bolt (UNC Thread)

Size	Stress Area (in ²)	Min Tensile Load (lbf)		Min Proof Load (lbf)	
		Grade 5	Grade 8	Grade 5	Grade 8
1/4" - 20	0.0318	3,800	4,750	2,700	3,800
5/16" - 18	0.0524	6,300	7,850	4,450	6,300
3/8" - 16	0.0775	9,300	11,600	6,600	9,300
7/16" - 14	0.1063	12,800	15,900	9,050	12,800
1/2" - 13	0.1419	17,000	21,300	12,100	17,000
9/16" - 12	0.182	21,800	27,300	15,500	21,800
5/8" - 11	0.226	27,100	33,900	19,200	27,100
3/4" - 10	0.334	40,100	50,100	28,400	40,100
7/8" - 9	0.462	55,400	69,300	39,300	55,400
1" - 8	0.606	72,700	90,900	51,500	72,700
1-1/8" - 7	0.763	80,100	114,400	56,500	91,600
1-1/4" - 7	0.969	101,700	145,400	71,700	116,300
1-3/8" - 6	1.155	121,300	173,200	85,500	138,600
1-1/2" - 6	1.405	147,500	210,800	104,000	168,600

Minimum Tensile Load and Proof Load for ANSI B18.2.1 Hex Bolt (UNF Thread)

Size	Stress Area (in ²)	Min Tensile Load (lbf)		Min Proof Load (lbf)	
		Grade 5	Grade 8	Grade 5	Grade 8
1/4" - 28	0.0364	4,350	5,450	3,100	4,350
5/16" - 24	0.058	6,950	8,700	4,900	6,950
3/8" - 24	0.0878	10,500	13,200	7,450	10,500
7/16" - 20	0.1187	14,200	17,800	10,100	14,200
1/2" - 20	0.1599	19,200	24,000	13,600	19,200
9/16" - 18	0.203	24,400	30,400	17,300	24,400
5/8" - 18	0.256	30,700	38,400	21,800	30,700
3/4" - 16	0.373	44,800	56,000	31,700	44,800
7/8" - 14	0.509	61,100	76,400	43,300	61,100
1" - 12	0.663	79,600	99,400	56,400	79,600
1-1/8" - 12	0.856	89,900	128,400	63,300	102,700
1-1/4" - 12	1.073	112,700	161,000	79,400	128,800
1-3/8" - 12	1.315	138,100	197,200	97,300	157,800
1-1/2" - 12	1.581	166,000	237,200	117,000	189,700

For detailed information, please refer to complete governing standards.

SAE J995 specifies the requirements for high tensile and alloy steel inch-series nuts. Sizes covered range from ¼" to 1-½" diameter.

Proof Load for ANSI B18.2.2 Hex Nut

Size	Proof Load (lbf) for UNC Hex Nut		Size	Proof Load (lbf) for UNF Hex	
	Grade 5	Grade 8		Grade 5	Grade 8
1/4" - 20	3,800	4,750	1/4" - 28	4,000	5,460
5/16" - 18	6,300	7,850	5/16" - 24	6,300	8,700
3/8" - 16	9,300	11,600	3/8" - 24	9,550	13,150
7/16" - 14	12,800	15,900	7/16" - 20	13,000	17,800
1/2" - 13	17,000	21,300	1/2" - 20	17,450	24,000
9/16" - 12	21,800	27,300	9/16" - 18	22,150	30,450
5/8" - 11	27,100	33,900	5/8" - 18	27,900	38,400
3/4" - 10	40,100	50,100	3/4" - 16	40,650	55,950
7/8" - 9	55,400	69,300	7/8" - 14	55,500	76,350
1" - 8	72,700	90,900	1" - 12	72,300	99,450
1-1/8" - 7	80,100	114,000	1-1/8" - 12	80,450	128,400
1-1/4" - 7	102,000	145,000	1-1/4" - 12	100,850	160,950
1-3/8" - 6	121,000	173,000	1-3/8" - 12	123,800	197,250
1-1/2" - 6	148,000	211,000	1-1/2" - 12	148,600	237,150

Hardness Requirements for ANSI B18.2.2 Hex Nuts

Nut Grade	Size	Hardness
5	1/4" to 1-1/2"	32 HRC Max
8	1/4" to 5/8"	24–32 HRC
8	Over 5/8" to 1"	26–34 HRC
8	Over 1" to 1-1/2"	26–36 HRC

For detailed information, please refer to complete governing standards.

Spanner Selection Chart (Hex Head Bolt)

Metric			Inch		
Thread Size	Spanner Size A/F DIN (mm)	Spanner Size A/F ISO (mm)	Thread Size	Spanner Size A/F ASME (inch)	Spanner Size A/F BS (inch)
M1.6	3.2	3.2	1/4	0.438	0.445
M2	4	4	5/16	0.500	0.525
M2.5	5	5	3/8	0.562	0.600
M3	5.5	5.5	7/16	0.625	0.710
M3.5	6	6	1/2	0.750	0.820
M4	7	7	9/16	0.812	0.920
M5	8	8	5/8	0.938	1.010
M6	10	10	3/4	1.125	1.200
M7	11	-	7/8	1.312	1.300
M8	13	13	1	1.500	1.480
M10	17	16	1.1/8	1.688	1.670
M12	19	18	1.1/4	1.875	1.860
M14	22	21	1.3/8	2.062	2.050
M16	24	24	1.1/2	2.250	2.220
M18	27	27	1.3/4	2.625	2.580
M20	30	30	2	3.000	2.760
M22	32	34	2.1/4	3.375	-
M24	36	36	2.1/2	3.750	-
M27	41	41	2.3/4	4.125	-
M30	46	46	3	4.500	-
M33	50	50			
M36	55	55			
M39	60	60			
M42	65	65			
M45	70	70			
M48	75	75			
M52	80	80			
M56	85	85			
M60	90	90			
M64	95	95			
M68	100	-			
M72	105	-			
M76	110	-			
M80	115	-			
M90	130	-			
M100	145	-			
M110	155	-			
M125	180	-			
M140	200	-			
M160	230	-			

Note : 1 inch = 25.4 mm

For detailed information, please refer to complete governing standards.



Metric

NOMINAL DIAMETERS	PITCHES				
	Coarse	Fine			
M 1	0.25	0.2			
M 1.1	0.25	0.2			
M 1.2	0.25	0.2			
M 1.4	0.3	0.2			
M 1.6	0.35	0.2			
M 1.8	0.35	0.2			
M 2	0.4	0.25			
M 2.2	0.45	0.25			
M 2.5	0.45	0.35			
M 3	0.5	0.35			
M 3.5	0.6	0.35			
M 4	0.7	0.5			
M 4.5	0.75	0.5			
M 5	0.8	0.5			
M 5.5*		0.5			
M 6	1	0.75			
M 7	1	0.75			
M 8	1.25	1	0.75		
M 9*	1.25	1	0.75		
M 10	1.5	1.25	1	0.75	
M 11*	1.5	1	0.75		
M 12	1.75	1.5	1.25	1	
M 14	2	1.5	1.25	1	
M 15*		1.5	1		
M 16	2	1.5	1		
M 17*		1.5	1		
M 18	2.5	2	1.5	1	
M 20	2.5	2	1.5	1	
M 22	2.5	2	1.5	1	
M 24	3	2	1.5	1	
M 25*		2	1.5	1	
M 26*		1.5			
M 27	3	2	1.5	1	
M 28*		2	1.5	1	
M 30	3.5	3	2	1.5	1
M 32*			2	1.5	
M 33	3.5	3	2	1.5	
M 35*				1.5	
M 36	4	3	2	1.5	
M 38*				1.5	
M 39	4	3	2	1.5	
M 40*		3	2	1.5	
M 42	4.5	4	3	2	1.5
M 45	4.5	4	3	2	1.5
M 48	5	4	3	2	1.5
M 50*			3	2	1.5
M 52	5	4	3	2	1.5
M 55*		4	3	2	1.5
M 56	5.5	4	3	2	1.5
M 58*		4	3	2	1.5
M 60	5.5	4	3	2	1.5
M 62*		4	3	2	1.5
M 64	6	4	3	2	1.5

Metric

NOMINAL DIAMETERS	PITCHES				
	Coarse	Fine			
M 65*	6	4	3	2	1.5
M 68	6	4	3	2	1.5
M 70*	6	4	3	2	1.5
M 72	6	6	3	2	1.5
M 76	6	4	3	2	1.5
M 80	6	4	3	2	1.5
M 85	6	4	3	2	
M 90	6	4	3	2	
M 95	6	4	3	2	
M 100	6	4	3	2	
M 105	6	4	3	2	
M 110	6	4	3	2	
M 115	6	4	3	2	
M 120	6	4	3	2	
M 125	6	4	3	2	
M 130	6	4	3	2	
M 135*	6	4	3	2	
M 140	6	4	3	2	
M 145*	6	4	3	2	
M 150	6	4	3	2	
M 155*	6	4	3	2	
M 160	6	4	3	2	

*3rd Choice

Inch

NOMINAL DIAMETERS	NO. OF THREADS PER INCH			
	UNC	UNF	BSW	BSF
1/8	40	44	40	-
5/32	32	36	32	-
3/16	24	32	24	32
1/4	20	28	20	26
5/16	18	24	18	22
3/8	16	24	16	20
7/16	14	20	14	18
1/2	13	20	12	16
9/16	12	18	12	16
5/8	11	18	11	14
3/4	10	16	10	12
7/8	9	14	9	11
1	8	12	8	10
1.1/8	7	12	7	9
1.1/4	7	12	7	9
1.3/8	6	12	6	8
1.1/2	6	12	6	8
1.5/8	5	-	5	8
1.3/4	5	-	5	7
2	4.5	-	4.5	7
2.1/4	4.5	-	4	6
2.1/2	4	-	4	6
2.3/4	4	-	3.5	6
3	4	-	3.5	5

For detailed information, please refer to complete governing standards.

DIN to ISO & ISO to DIN Crossover Chart

DIN → ISO	DIN → ISO	ISO → DIN	ISO → DIN
1 → 2339	1472 → 8745	1207 → 84	7434 → 553
7 → 2338	1473 → 8740	1234 → 94	7435 → 417
84 → 1207	1474 → 8741	1479 → 7976	7436 → 438
85 → 1580	1475 → 8742	1481 → 7971	8673 → 971-1
94 → 1234	1476 → 8746	1482 → 7972	8674 → 971-2
125 → 7089	1477 → 8747	1483 → 7973	8675 → 439
125 → 7090	1481 → 8752	1580 → 85	8676 → 961
126 → 7091	6325 → 8734	2009 → 963	8734 → 6325
417 → 7435	6923 → 4161	2010 → 964	8736 → 7978
427 → 2342	6924 → 7040	2338 → 7	8737 → 7977
433 → 7092	6924 → 10512	2339 → 1	8738 → 1440
438 → 7436	6925 → 7042	2340 → 1443	8739 → 1470
439 → 4035	6925 → 10513	2341 → 1444	8740 → 1473
439 → 4036	6926 → 7043	2342 → 427	8741 → 1474
439 → 8675	6926 → 12125	2936 → 911	8742 → 1475
551 → 4766	6927 → 7044	4014 → 931	8744 → 1471
553 → 7434	6927 → 12126	4017 → 933	8745 → 1472
555 → 4034	7337 → 15977	4018 → 558	8746 → 1476
558 → 4018	7337 → 15978	4026 → 913	8747 → 1477
911 → 2936	7337 → 15979	4027 → 914	8748 → 7344
912 → 4762	7337 → 15980	4028 → 915	8750 → 7343
913 → 4026	7337 → 15981	4029 → 916	8752 → 1481
914 → 4027	7337 → 15982	4032 → 934	8752 → 7345
915 → 4028	7337 → 15983	4032 → 970	8752 → 7345
916 → 4029	7337 → 15984	4034 → 555	8765 → 960
931 → 4014	7337 → 16582	4034 → 972	10511 → 985
933 → 4017	7337 → 16583	4035 → 439	10512 → 980
934 → 4032	7337 → 16584	4036 → 439	10512 → 982
960 → 8765	7343 → 8750	4161 → 6923	10512 → 982
961 → 8676	7344 → 8748	4762 → 912	10513 → 980
963 → 2009	7345 → 8752	4766 → 551	10513 → 980
964 → 2010	7345 → 8752	7040 → 982	10642 → 7991
965 → 7046-1	7345 → 13337	7040 → 6924	12125 → 7991
965 → 7046-2	7346 → 13337	7042 → 980	12126 → 7991
966 → 7047	7504 → 15480	7042 → 980	13337 → 7991
970 → 4032	7504 → 15481	7042 → 6925	13337 → 7346
971-1 → 8673	7504 → 15482	7043 → 6926	15480 → 7504
971-2 → 8674	7504 → 15483	7044 → 6927	15481 → 7504
972 → 4034	7971 → 1481	7045 → 7985	15482 → 7504
980 → 7042	7972 → 1482	7046-1 → 965	15483 → 7504
980 → 7042	7973 → 1483	7046-2 → 965	15977 → 7337
980 → 10512	7976 → 1479	7047 → 966	15978 → 7337
980 → 10513	7977 → 8737	7049 → 7981	15979 → 7337
982 → 7040	7978 → 8736	7050 → 7982	15980 → 7337
982 → 10512	7981 → 7049	7051 → 7983	15981 → 7337
985 → 10511	7982 → 7050	7089 → 125	15982 → 7337
1440 → 8738	7983 → 7051	7090 → 125	15983 → 7337
1443 → 2340	7985 → 7045	7091 → 126	15984 → 7337
1444 → 2341	7991 → 10642	7092 → 433	16582 → 7337
1470 → 8739	9021 → 7093-1	7093-1 → 9021	16583 → 7337
1471 → 8744	9021 → 7093-2	7093-2 → 9021	16584 → 7337

For detailed information, please refer to complete governing standards.

Stainless Steel fasteners offers superior corrosion resistance as compared to other Carbon Steel and Alloy Steel fasteners. Stainless Steel fasteners usually have a chromium content of 15% - 20% and a nickel content of 5% - 19%. The presence of these chemicals help prevent oxidation and thus the fasteners are corrosion resistant.

Tensile strength of these fasteners varies from 500 MPa to 800 MPa. Common Stainless Steel fasteners are available in 304 and 316 grades.

Grade	Head Mark	
304	A2-70, A2, 304	Most frequently used Stainless Steel grade. A2 denotes SS304 Grade while 70 denotes property class 70, tensile strength min MPa 700
316	A4-70, A4, 316	Improved resistance to acid and corrosion when compared to Grade 304. A4 on head denotes SS316 Grade while 70 denotes property class 70, tensile strength min MPa 700
316	A4-80	Same chemical content as A4-70 but strain hardened to achieve higher tensile capabilities. A4 on head denotes SS316 Grade while 80 denotes property class 80, tensile strength min MPa 800

For detailed information, please refer to complete governing standards.



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