

KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers

AN ISO 9000 : 2015 CERTIFIED CO.



**Manufacturers & Exporters of
M.S. High Tensile & Stainless Steel Bolts,
Nuts, Studs & Washers**

www.kirtifastner.com



KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers



Welcome to **Kirti Fastners!**

With an exceptional dedication towards quality and the commitment to clientele satisfaction, Kirti Fastners has come a long way to have a well established name as the leading manufacturers and exporters of fasteners in India. With an experience of over 45 years, our CEO has mentored the company to reach new heights at every step throughout the journey. Today, Kirti Fastners is widely recognized as a complete solution for not only fasteners of All GRADES including Stainless steel, High Tensile, Mild Steel, Aluminium, Copper and other alloy steel, but also specialises in critical and custom made fasteners. With an extensive production capacity and a well equipped in-house laboratory with comprehensive testing facilities, we are ready to cater any and every need of our clients with utmost efficiency.



Our Strength

Equipped with a state-of-the-art infrastructure comprising various production and packaging facilities, our unit is spread over an ample space having a total area of 3 acre and is well-equipped with latest machines and equipment based on latest technology. Moreover, highly efficient human resources, positive work environment and healthy personnel relationships are the major pillars of our company.

Our Mission

We at Kirti Fastners constantly work to live upto the expectations of our clients and maintain market leadership. We believe in evolving as an institution that serves the best interests of all stakeholders. We aim to pursue excellence through total quality management & ensure the highest standards of ethics and integrity in all our work culture.

Our Team

We have an experienced team of professionals, which enables us to fabricate our products. Owing to their expertise and understanding, we are able to provide our clients with such products and services per their specific requirements. Our team comprises of 2 Managing Directors, 3 Managers, 6 Engineers and 200 Workers.



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Our Infrastructure

We have constructed a well-developed infrastructure that is equipped with all the state-of-art machines and equipment. Our infrastructure is segregated into various departments like advanced production facility, testing laboratory, Research, and Development unit, and a spacious warehouse, which enables us to manufacture a high-grade range of these products. We have equipped our manufacturing unit with the latest machines, testing laboratory and R & D unit improved contemporary machinery, robust construction and these machines are operated by our most efficient and skilled professionals. We have a modern infrastructure set up. And, our unit is well connected with shipment modes that enable us to timely delivery of our heavy-duty products at the customer's end.

Our set up also has the large warehouse that enables our persons to store the bulk quantity of products and though meets the needs of the customers. Our sections are :

Manufacturing

- Quality controlling
- Warehousing & packaging
- Logistic
- Administrative

Quality Assurance

Our R&D department mainly ensures the quality of the product which is a very important factor when producing fasteners, scaffolding no matter if it is relating to the Automotive, Industrial, Fencing, or Nautical industries. Quality is of vital importance. Our Quality Assurance Department was set up by way of preventing mistakes or defeats in our own manufacturing process, and also to provide effective solutions if problems were to arise. **KIRTI FASTENERS** adopts the working practices "Fit for purpose", which signifies our components are suitable for the intended purpose and have been approved by our customers, and "Right first time", which means mistakes must be eliminated so only high-quality components are manufactured from the onset of production.



Our Infrastructure



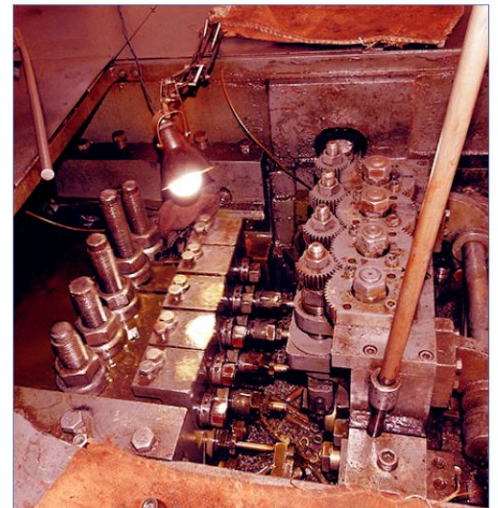
Power Press



Raw Material



Bolt Header Machine



Nut Former



Heat Treatment Plant



Hot Dip



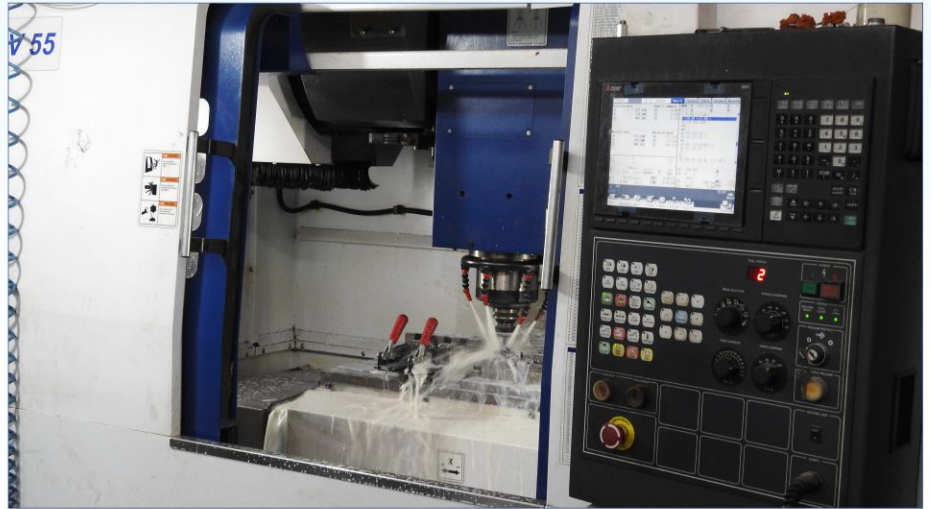
KIRTI FASTNER

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Our Infrastructure

VMC Machine



CNC Machine



Packing





Lab Testing



UTM 60 Ton



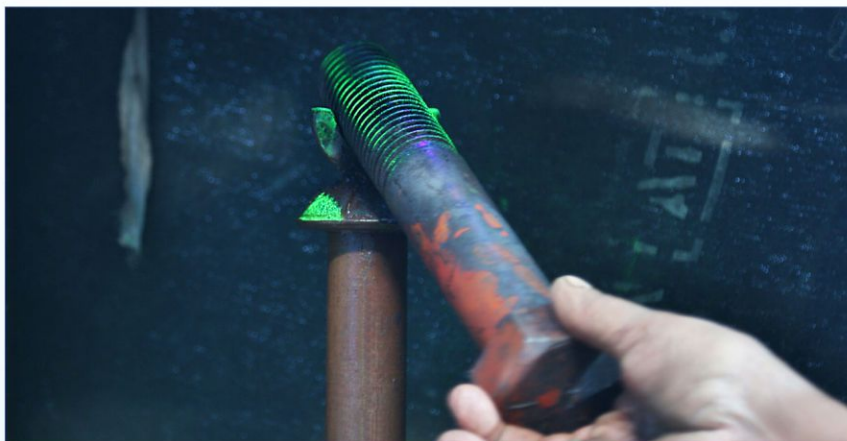
Profile Projector



Rockwell Hardness



Impact Testing



Magnetic Particle Inspection



Spectrometer



Our Products



Anti Theft With Key



U Bolt



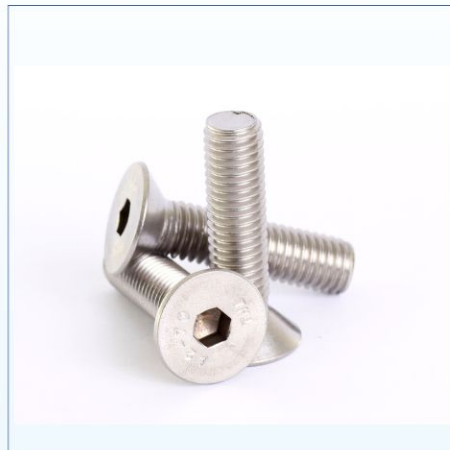
V Bolt



Foundation Bolt



Anti Theft Nut



Allen CSK Screw



Allen Bolt



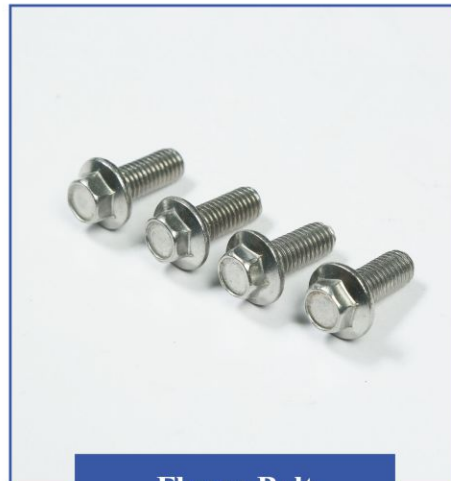
Hex Bolt



Hex Nut



Serrated Washer



Flange Bolt



Slotted Round Head Bolts



Flange Nut



Nails



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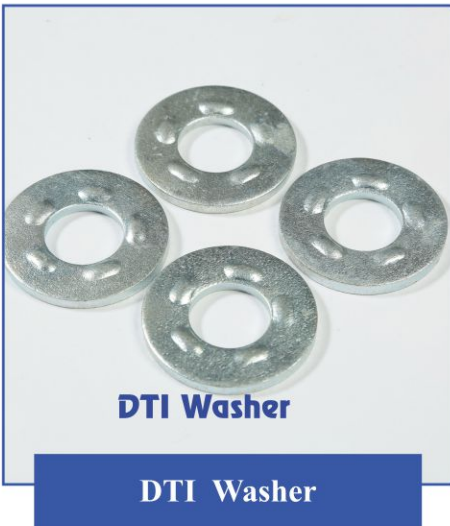
Plain Washer



Carriage Bolt



Anti Theft Bolt With Nuts



DTI Washer

DTI Washer



HSFG Bolts and Nuts



Wire Rope Clump



Machined Component & Forged Component



Machines & Equipments

To ensure state of the art production of nuts bolts has installed latest machinery and plant, capable of producing high quality even production KIRTI FASTNERS has its own workshop equipped with best machinery and skilled staff.

Quality control is of highest standards. Each and every piece undergoes strict checking by quality control department before despatch.

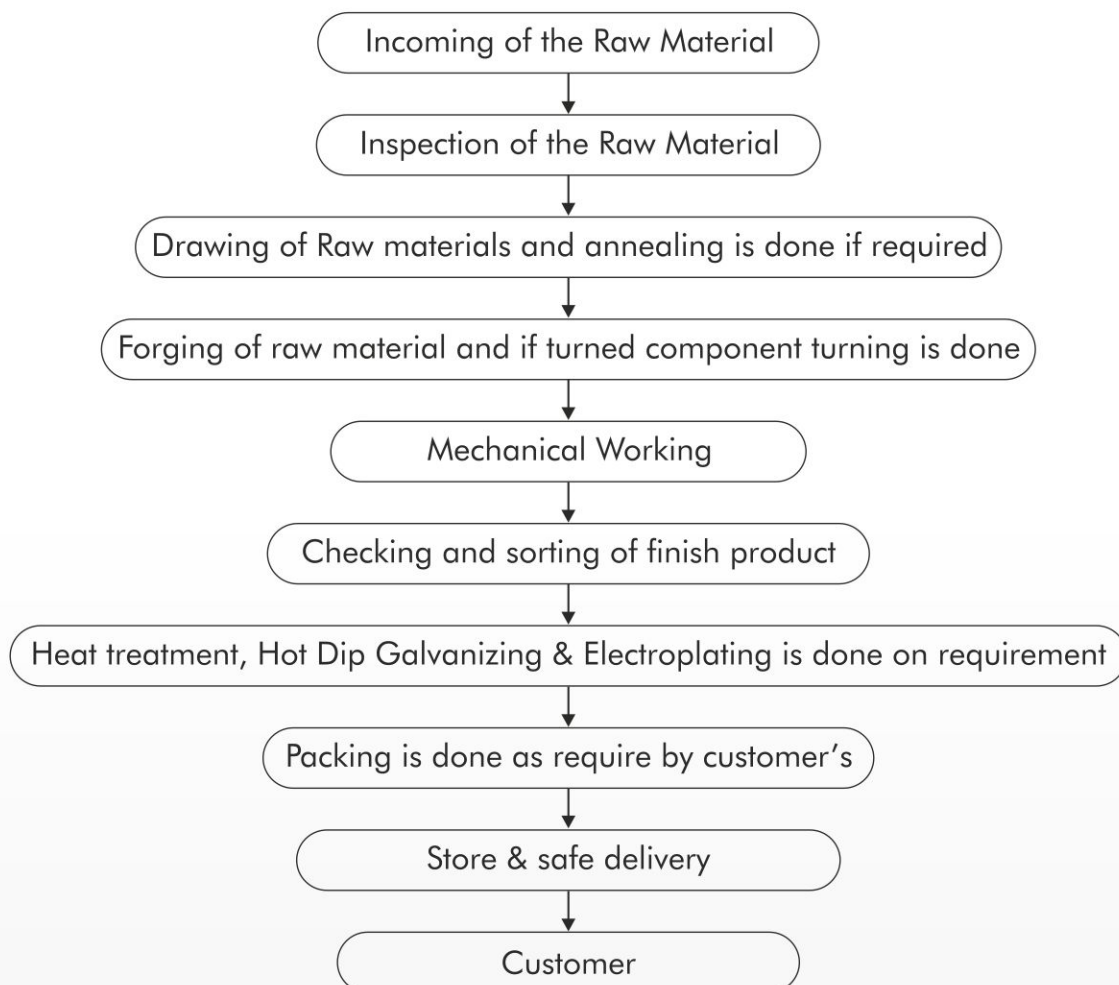
- Automatic Nuts Former
- Heat Treatment plant
- Automatic Tapping Machines
- In House Tools & Equipments Making Machines
- Hydraulic Power Press
- CNC Turning Machine
- Automatic Bolt Mather
- In House Die Making
- Turned Component Machines

Merely quality straightening production is not the sole aim at KIRTI FASTNERS Delivers well before the committed dates, first class packing as specifically required by the clients and appropriate transportation is what has brought commendation and credibility to KIRTI FASTNERS

Processing Working Systems

Our Company Iso 9001 : 2008 Certified company

We have adopted and maximising systems for manufacturing best quality under timely delivery.



•Dome Nuts • Flange Nuts • Lock/Jam • Nuts Square • Weld Nuts • Hex Weld Nuts • Hex Nuts • Nylon Insert Lock Nuts • Round Nuts • Self Locking Hex Nuts • Slotting Hex Nuts • Wing Nuts • Castle Nuts • Cap Nuts • Cage Nuts SCREWS • Self Tapping Screws • Philips Head Screws • Hex Head Screw • Pan Head Screw • Spring Washers • Plain Washers • Hex Bolts • Carriage Bolts Eye Bolts • Hex Flange Bolts • Round Head Square Neck Bolts • T-Head Bolts • U-Bolts • Wheel Bolts • Rivets • Threaded Rods Studs



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Packing & Forwarding

Best quality materials are used for packing the materials to ensure smooth transport the materials to ensure smooth transport till its destination.

Material is also available in small packing.

Good quality card board packing is used as specific requirements of the procurement agencies

Raw Material

KIRTI FASTNERS believes in the principle Quality Production out of Quality Raw Materials to achieve this, we procure total quality Raw Materials.

About Customers

Client's Ultimate satisfaction is a motto at KIRTI FASTNERS and we believe in total quality in total quality.

So, our company & dealing with more than 600 customers in indian and international Marketing including OEM, importers & importers Domestic Market.

To Provide Quality Fastners

- As per Din, ASTM, SAFE & JIS standard.
- Mechanical & Chemical Analysis
- Load Testing, Microstructure Analysis etc.
- Salt Spray testing if Required.
- Third party independent inspection upon request.
- Automation for Mass Production.
- Rates at per with the global market.

Hot dip & Electro Galvanized Fastners From 2 mm to 44 mm and high tensile fastners (grade 4.6, 8.8, 10.9, 12.9) is a specialization at KIRTI FASTNERS and is followed up with constant and development by committed technicians.

KIRTI FASTNERS Work is equipped with best available fully automated machines, equipments by and professionals to ensure highest standards in manufacturing. KIRTI FASTNERS has its own tool house and all the jobs are accomplished indigenously



THREAD SIZE COMPARISON

Size	METRIC PRODUCTS						Size	T.P.I		Major Dia Inch	Size	T.P.I		Major Dia Inch	T.P.I BA	Major Dia Inch
	COARSE		FINE		Metric Dia			UNC	UNF			BSW	BSF			
	Pitch mm	T.P.I	Pitch mm	T.P.I	mm	Inch										
M3	0.50	51	-	-	3.00	0.118	#5	40	44	0.125	1/8	40	-	0.125		
			-	-			#6	32	40	0.138	5BA			43.1	0.126	
			-	-							4BA			38.5	0.142	
M4	0.70	36	-	-	4.00	0.157	#8	32	36	0.164	3BA			34.8	0.161	
M5	0.80	32	-	-	5.00	0.197	#10	24	32	0.190	3/16	24	32	0.187		
			-	-							2BA			31.3	0.185	
			-	-							1BA			28.2	0.209	
M6	1.0	25	-	-	6.00	0.236	1/4	20	28	0.250	1/4	20	26	0.250		
			1.00	25							0BA			25.4	0.236	
M8	1.25	20	1.25	20	8.00	0.315	5/16	18	24	0.313	5/16	18	22	0.313		
M10	1.50	17			10.00	0.394	3/8	16	24	0.375	3/8	16	20	0.375		
			1.25	20							7/16	14	18	0.438		
M12	1.75	14.50	1.50	17	12.00	0.472	1/2	13	20	0.500	1/2	12	16	0.500		
(M14)	2.00	12.50	1.50	17	14.00	0.551										
M16	2.00	12.50	1.50	17	16.00	0.630	5/8	11	18	0.625	5/8	11	14	0.625		
(M18)	2.50	10	1.50	17	18.00	0.709										
M20	2.50	10	1.50	17	20.00	0.787	3/4	10	16	0.750	3/4	10	12	0.750		
(M22)	2.50	10	2.00	13	22.00	0.866	7/8	9	14	0.875	7/8	9	11	0.875		
M24	3.00	8.5			24.00	0.945	1	8	12	1.000	1	8	10	1.000		
			2.00	13			1.1/8	7	12	1.125	1.1/8	7	9	1.125		
(M27)	3.00	8.50	2.00	13	27.00	1.063										
M30	3.50	7.25	2.00	13	30.00	1.181	1.1/4	7	12	1.250	1.1/4	7	9	1.250		
(M33)	3.50	7.25	3.00	8.5	33.00	1.299										
M36	4.00	6.40	3.00	8.5	36.00	1.417	1.1/2	6	12	1.500	1.1/2	6	8	1.500		
(M39)	4.00	6.40	3.00	8.5	39.00	1.417										
M42	4.50	5.60			42.00	1.653										



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M.S HEX BOLTS F.T.(NOS.PER 50 KGS.)

L \ D	M1.6	M1.7	M2	M2.3	M2.5	M2.6	M3	M3.5	M4	M5	M6	M7	M8	M10	M12
2	526315	400000													
3	476190	370370	248756	172413	135135	130548									
4	434782	344827	236966	161290	125000	121065	105263								
5	400000	322580	216450	147058	116279	112866	95238	59523	39682						
6	370370	285714	199203	138888	108695	105708	88495	55555	37593	22935	14705	9208			
7	344827	270270	184501	128205	102040	97465	81300	52083	35460	22123	14005	8802			
8	322580	256410	171821	121951	96153	92081	76335	49019	33557	21008	13368	8431	5847	2906	
9	303030	232558	160771	113636	90909	81260	71942	46942	32051	19920	12787	8090	5649	2824	
10	285714	222222	151057	106382	86206	82918	67114	43859	30487	19011	12254	7776	5494	2747	1937
12	256410	196078	138504	96153	78125	74294	59880	39682	27777	17421	11312	7225	5102	2604	1824
14		175438	127877	87719	71428	67567	54347	36231	25641	16025	10482	6765	4807	2475	1736
16		158730	118764	80645	65789	62034	50000	33333	23809	14836	9784	6361	4504	2358	1655
18				74626	60975	57273	45871	31055	22123	13812	9157	5945	4273	2252	1587
20				69444	56818	53590	42372	28901	20746	12919	8620	5611	4065	2155	1515
22					53191	50000	39370	27027	19455	12135	8143	5313	3875	2066	1453
25					49019	45871	35714	24630	17857	11135	7518	4950	3597	1945	1366
28							32679	22624	17006	10288	6983	4629	3378	1838	1291
30									15673	9784	6657	4385	3225	1773	1243
35									14005	8726	5973	3968	2923	1628	1141
40									12626	7874	5417	3597	2673	1506	1054
45									11520	7153	4950	3311	2463	1400	980
50									10570	6587	4545	3048	2293	1308	917
55									9765	6090	4201	2840	2136	1228	860
60									9090	5662	3937	2659	2000	1154	810
65									8488	5291	3676	2487	1879	1091	765
70									7961	4950	3472	2347	1773	1035	725
75										4672	3267	2212	1677	984	689
80										4424	3086	2100	1592	938	659
85											2941	1992	1515	896	627
90											2793	1901	1445	857	600
90												1811	1385	822	575
100													1736	1326	789
110														1222	730
120															681
130															637
140															599
150															565



M.S HEX BOLTS F.T.(Nos.per 50 Kgs.)

L \ D	M14	M16	M18	M20	M22	M24	M37	M30	M33	M36	M39	M42	M45	M48	M52
10	1315														
12	1250	945													
14	1190	899													
16	1136	857	604	467	375	289	203								
18	1086	821	584	446	364	280	197								
20	1041	787	563	431	349	271	191								
22	1000	755	538	416	337	263	185								
25	943	712	518	396	322	251	178								
28	894	673	495	378	310	240	171								
30	863	650	476	367	297	233	161								
35	794	598	442	340	276	218	156	117	92	73	57				
40	736	554	416	318	259	204	147	111	87	69	54	45	37	31	
45	685	514	387	299	242	193	139	105	83	65	52	44	36	30	
50	641	485	364	280	228	182	132	100	79	63	50	42	34	29	23
55	603	454	342	265	215	173	125	96	75	60	48	40	33	28	23
60	569	427	324	251	204	164	120	92	72	58	46	39	32	27	22
65	538	406	308	239	194	156	114	88	69	55	45	38	31	26	21
70	511	384	294	228	185	149	110	84	67	53	43	36	30	25	20
75	490	364	280	218	177	143	105	81	64	51	41	35	29	24	20
80	467	347	264	208	169	137	101	78	62	50	40	34	28	24	19
85	446	333	256	200	162	132	97	75	59	48	39	33	27	236	19
90	427	318	246	192	155	127	94	72	57	46	37	32	26	22	18
95	409	304	236	184	150	122	90	70	56	45	36	31	26	22	18
100	393	294	228	177	144	118	87	68	54	43	35	30	25	21	17
110	364	271	211	165	134	110	82	64	51	41	33	28	23	20	16
120	340	253	198	155	125	103	77	60	48	39	32	27	22	19	16
130	318	238	185	145	118	97	72	57	45	37	30	25	21	18	15
140	299	223	175	137	111	92	69	54	43	35	28	24	20	17	14
150	282	210	166	130	105	87	65	51	41	33	27	23	19	17	14
160			157	123	100	83	62	49	39	32	26	22	19	16	13
170			150	117	95	79	59	47	37	30	25	21	18	15	12
180			143	112	91	75	57	45	35	29	24	20	17	15	12
190			136	107	87	72	54	43	34	28	23	20	16	14	12
200			131	103	83	69	52	41	33	27	22	19	16	14	11



M.S. HEX BOLTS ONLY HALF THREAD, (STD. THREAD) TO BS : 916/53

DIMENSIONS IN INCHES

APPROX. COUNT PER 50 KG.

Length	D I A M E T E R												
	6	8	10	12	14	16	18	20	22	24	27	30	33
25	7000												
30	6080	3150											
35	5350	2810	1590										
40	4830	2530	1455	1013									
45	4350	2310	1335	940		506							
50	4000	2120	1235	875		470							
55	3700	1960	1145	820	588	437		360					
60	3420	1825	1075	770	550	408	312	244	200				
65	3170	1700	1010	725	500	384	296	230	188	154			
70	2990	1650	955	687	471	361	276	218	179	146	109		
80	2650	1425	853	620	425	325	254	197	162	132	100	76	
90	2400	1300	780	568	408	296	227	180	148	121	92	71	57
100	2200	1190	715	522	367	271	208	166	136	112	85	66	53
120	1800	972	617	400	305	232	185	143	115	97	74	58	47
140	1585	880	540	345	264	203	150	125	103	85	65	52	42
160	1400		478	310		180		111	92	76	58	46	37
180			434	295		162		100	83	68	53	41	33
200			380	365		148		91	75	62	49	38	30
225						132		83	68	57	43	35	28
250						120		75	62	51	39	32	25
275						109		69	57	47	37	30	24
300						101		63	52	43	34	27	23



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NUTS AS PER IS : 1363/67 & IS : 3138/66 AND DIN - 555

Weight in kgs per 100 Nos.		No. of pcs. per 50 kgs		Weight in kgs per 100 Nos.		No. of pcs. per 50 kgs	
2 mm	0.011	454,550		33 mm	27.100	184	
3 mm	0.033	151,500		36 mm	36.900	135	
4 mm	0.067	74,075		39 mm	47.200	105	
5 mm	0.111	45,045		42 mm	57.400	87	
6 mm	0.232	21,551		45 mm	73.000	68	
7 mm	0.294	17,000		48 mm	92.400	54	
8 mm	0.482	10,373		52 mm	108.000	46	
10 mm	1.090	4,587		56 mm	132.000	38	
12 mm	1.590	3,144		60 mm	160.000	31	
14 mm	2.400	2,083		64 mm	184.000	27	
16 mm	3.080	1,623		72 mm	239.000	21	
18 mm	4.450	1,124		80 mm	331.000	15	
20 mm	6.030	829		90 mm	455.000	11	
22 mm	7.150	700		100 mm	634.000	8	
24 mm	10.300	485		0BA	0.270	18,5000	
27 mm	15.400	324		2BA	0.126	39,7000	
30 mm	21.600	231					

OTHER FASTENER ITEMS - WEIGHT IN KGS. PER 100 NOS.

M5	M6	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52
PLAIN WASHER IS : 2016																
0.04	0.11	0.20	0.39	0.58	1.06	1.64	3.11	3.94	5.05	7.10	8.73	12.60	17.50	21.20	28.40	31.90
TAPER WASHER IS : 5372																
		0.95	0.88	1.83	3.14	5.70	12.80	11.90	15.20	19.00	24.30	28.30				
TAPER WASHER IS : 5374																
		1.02	0.94	2.01	3.56	6.70	14.30	13.30	17.40	22.10	28.40	33.90				
HEAVY WASHER IS : 6610																
			0.60	1.90	2.90	4.40	6.30	8.00	10.00	12.00	14.60	16.70	20.10	22.20	26.00	
HEX LOCK NUT IS : 1364 - 84																
0.08	0.16	0.32	0.72	1.90	2.05	4.02	6.95	10.10	13.90	18.30	24.40	31.60	40.30	50.00	61.70	75.50
MACHINED WASHER																
0.04	0.11	0.21	0.40	0.62	1.13	1.72	3.30	4.23	5.36	7.54	9.20	13.30	18.30	22.00	29.40	33.00
SPRING WASHER IS : 3063																
0.03	0.08	0.16	0.25	0.38	0.89	1.52	2.62	2.87	4.43	6.30	6.73	6.73	11.10	11.70	12.30	18.20



M.S. HEX BOLTS FULL THREAD TO BS : 916/53

DIMENSIONS IN INCHES

APPROX. COUNT PER 50 KG.

Length	D I A M E T E R								
	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"
1/2"	9000	5500							
5/8"	8000	5000	3250						
3/4"	7300	4470	2950	1785	1240				
1"	6124	3868	2423	1537	1120	640			
1.1/4"	5351	3382	2137	1389	1009	582	365	276	
1.1/2"	4752	3004	1910	1260	917	533	337	253	176
1.3/4"	4272	2702	1727	1143	841	492	312	234	164
2"	3882	2455	1577	1053	776	458	291	218	154
2.1/4"	3556	2251	1451	975	720	427	273	204	145
2.1/2"	3280	2076	1342	909	672	401	257	191	136
2.3/4"	3045	1928	1250	851	630	377	242	180	129
3"	2841	1798	1169	800	592	356	229	170	122
3.1/4"	2662	1686	1098	755	560	338	218	161	116
3.1/2"	2505	1587	1035	715	530	320	207	154	111
3.3/4"	2365	1498	979	678	504	305	198	146	106
4"	2240	1418	929	646	479	291	189	140	101
4.1/4"	2128	1347	883	616	458	279	181	133	97
4.1/2"	2026	1284	842	589	438	267	173	128	94
5"	1852	1174	771	541	403	246	160	118	87
5.1/2"	1704	1081	710	501	373	228	150	109	81
6"	1580	1001	658	466	347	214	140	102	76



KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers



M.S. HEX BOLTS ONLY TO BS : 916/53

DIMENSIONS IN INCHES

APPROX. COUNT PER 50 KG.

Length	D I A M E T E R											
	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	
3/4"	6835											
7/8"	6290	3570										
1"	5760	3380	2520									
1.1/4"	4670	2920	2155	1200	965	568						
1.1/2"	4310	2570	1880	1090	862	510	324					
1.3/4"	3825	2290	1665	1000	780	463	303	222				
2"	3430	2075	1495	928	713	423	279	204	148			
2.1/4"	3120	1890	1360	863	65	390	258	189	137			
2.1/2"	2855	1740	1245	807	607	362	240	176	128	97		
2.3/4"	2630	1660	1148	757	565	337	225	165	120	91		
3"	2450	1495	1065	713	530	316	211	155	115	86	69	
3.1/2"	2140	1310	930	640	470	281	188	138	101	77	62	
4"	1900	1170	825	580	420	251	170	124	92	70	57	
4.1/2"	1710	1052	743	530	380	236	160	115	85	66	52	
5"	1560	960	675	488	362	216	147	106	78	61	49	
5.1/2"	1430	880	620	453	347	199	136	98	72	57	45	
6"	1310	813	572	422	335	185	126	91	67	53	42	
7"							110	80	59	45	37	
8"							98	72	53	41	33	
9"							89	65	50	39	30	
10"							81	59	45	36	28	
11"							74	54	41	33	26	
12"							68	50	38	31	24	



WEIGHT COUNT CHART

M.S. HEX BOLTS WITH NUTS FULL THREAD TO BS : 916/53

DIMENSIONS IN INCHES

APPROX. COUNT PER 50 KG.

Length	D I A M E T E R											
	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	1.1/2"
3/4"	4500											
1"	3994	2450	1601	1010								
1.1/4"	3568	2192	1446	928	650	358						
1.1/2"	3213	1982	1317	851	602	335	210	167				
1.3/4"	2932	1810	1210	790	562	314	198	157	108			
2"	2682	1665	1119	736	526	295	186	149	102			
2.1/4"	2494	1541	1036	690	494	279	177	141	97	68		
2.1/2"	2316	1435	972	649	467	265	168	133	93	65	49	30
2.3/4"	2165	1342	912	612	442	251	160	127	89	63	47	29
3"	2033	1261	860	580	419	239	154	121	86	60	45	28
3.1/2"	1810	1125	771	524	381	219	140	111	79	56	42	26
4"	1626	1015	699	478	349	201	130	102	73	52	40	25
4.1/2"	1485	925	640	440	322	186	122	95	68	47	37	24
5"	1368	847	590	407	298	173	114	88	64	46	35	22
5.1/2"	1267	783	547	380	279	162	106	83	60	43	32	21
6"	1180	728	510	355	261	153	99	78	57	41	31	20
7"					232	136	91	70	51	37	29	19
8"					209	123	82	63	46	34	26	17
9"					189	112	75	58	42	31	24	16
10"					173	102	69	53	39	29	22	15
11"					160	94	64	49	36	27	21	14
12"					149	89	60	45	33	25	19	13



KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers



M.S. HEX NUTS

DIMENSIONS IN INCHES

APPROX. COUNT PER 50 KG.

$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
1,22,000	94,300	37,600	15,500	9800	6121	3600	2250	1150	696
$\frac{7}{8}$	1	$\frac{1.1}{8}$	$\frac{1.1}{4}$	$\frac{1.3}{8}$	$\frac{1.3}{8}$	$\frac{1.3}{4}$	2	$\frac{2.1}{4}$	$\frac{2.1}{2}$
580	385	275	192	132	112	70	61	45	30

M.S. SQUARE NUTS BS 916

DIMENSIONS IN INCHES

APPROX. COUNT PER 50 KG.

$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$\frac{1.1}{8}$	$\frac{1.1}{4}$
14700	7650	5175	2971	1868	992	567	458	324	214	156

M.S. ROUND HEAD SQUARE NECK CARRIAGE BOLTS & NUTS

Length	D I A M E T E R				
	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{7}{16}$ "	$\frac{1}{2}$ "
1"	4672	2689	1758	1157	811
1.1/4"	4023	2439	1600	1062	750
1.1/2"	3579	2141	1432	980	698
1.3/4"	3223	1937	1300	888	643
2"	2930	1770	1191	818	593
2.1/4"	2682	1628	1098	759	552
2.1/2"	2471	1508	1019	707	517
2.3/4"	2291	1404	951	661	485
3"	2137	1314	891	622	457
3.1/2"	1885	1164	797	556	409
4"	1683	1045	712	502	371
4.1/2"	1521	948	647	458	340
5"	1387	867	592	420	313
5.1/2"	1275	799	546	389	290
6"	1179	741	507	362	270
7"				319	239
8"				284	214



ASTM A325M HEAVY HEX STRUCTURAL BOLTS (Metric)

A325M Bolt Dimensions

Thread size <i>d</i>	M16	M20	M22	M24	M27	M30	M36
<i>P</i> pitch of thread	2	2.5	2.5	3	3	3.5	4
<i>b</i>	31	36	38	41	44	49	56
	38	43	45	48	51	56	63
<i>ds</i>							
min.	15.30	19.16	21.16	23.16	26.16	29.16	35.00
max.	16.70	20.84	22.84	24.84	27.84	30.84	37.00
<i>s</i>							
min.	26.16	33.00	35.00	40.00	45.00	49.00	58.80
max.	27.00	34.00	36.00	41.00	46.00	50.00	60.00
<i>e</i>							
min.	29.56	37.29	39.55	45.20	50.85	55.37	66.44
max.	31.18	39.26	41.57	47.34	53.12	57.74	69.28
<i>k</i>							
min.	9.25	11.60	13.10	14.10	16.10	17.65	21.45
max.	10.75	13.40	14.90	15.90	17.90	19.75	23.55
<i>k'</i>							
min.	6.5	8.1	9.2	9.9	11.3	12.4	15.0
max.	24.9	31.4	33.3	38.0	42.8	46.5	55.9
<i>dw'</i>							
min.	0.4	0.4	0.4	0.4	0.4	0.4	0.4
max.	0.8	0.8	0.8	0.8	0.8	0.8	0.8
<i>da</i>							
min.	18.2	22.4	24.4	26.4	30.4	33.4	39.4
<i>r</i>							
max.	0.6	0.8	0.8	1.0	1.2	1.2	1.5

1) The maximum value of *dw* shall not exceed the actual width across flats

Materials

Medium carbon, carbon boron, medium carbon alloy or alloy boron steel in accordance with ASTM A325M

Characteristic

Materials & Manufacture	Standard
Finish / Self Colour / Black	ASTM A325M
Coatings / Hot Dip Galvanized	ASTM A325M
Mechanical Properties	ASTM A153 / A153M Class C
Dimensions & Tolerances	ASTM A325M
Threads	ASME B18.2.3.7M
Workmanship	ASME B1.13M tolerance class 6g
Product Making	ASTM F788 / F788M
	ASTM A325

A325M Bolt Length Tolerances for Bolt Diameters M16-M36 inc.

Nominal Length	Length Tolerance
Up to and including 50	± 1.2
Over 50 up to and including 80	± 1.5
Over 80 up to and including 120	± 1.8
Over 120 up to and including 150	± 2.0
Over 150	± 4.0



HEAVY HEX STRUCTURAL BOLTS (Metric)

ASTM A325M

A325M Tensile Load and Proof Load Requirements for Full-Size Bolts

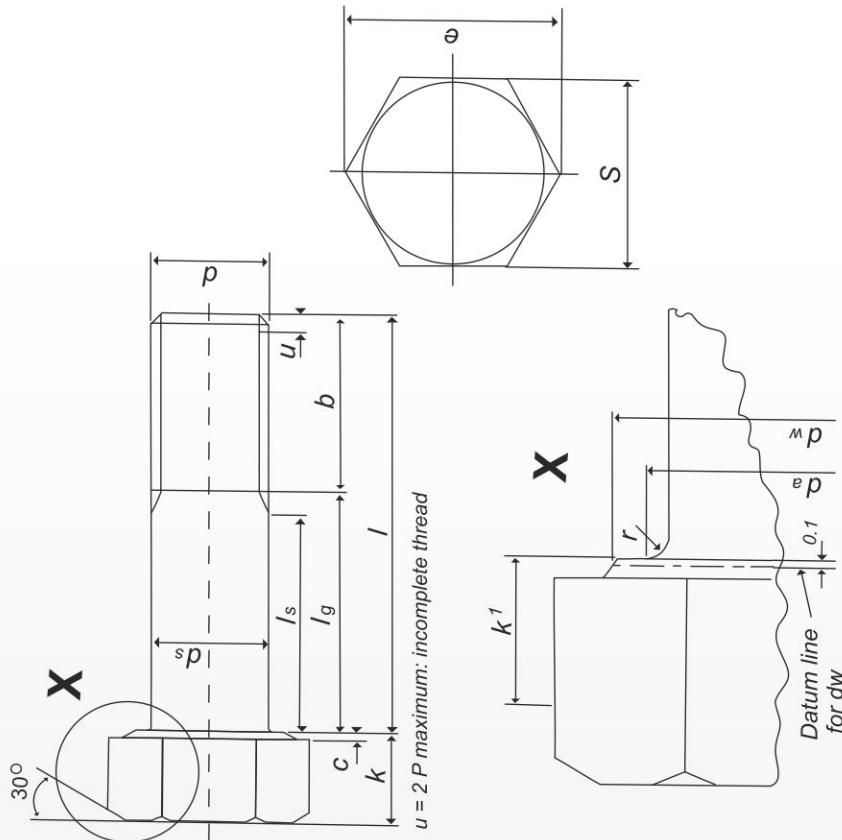
Nominal Dia. & Thread Pitch	Stress Area mm ²	Tensile Load min. kN	Proof Load # kN	Alternative Proof Load* kN	Hardness Rockwell HRC	
					min	max
M16 x 2	157	130	94.2	104	25	34
M20 x 2.5	245	203	147	162	25	34
M22 x 2.5	303	251	182	200	25	34
M24 x 3	353	293	212	233	25	34
M27 x 3	459	381	275	303	19	30
M30 x 3.5	561	466	337	370	19	30
M36 x 4	817	678	490	539	19	30

Proof load determined by length measurement method

* Alternative Proof load determined by yield strength method

A325M Tensile Strength Requirements for Specimens Machined from Bolts

Nominal Dia.	Tensile Strength min MPa	Yield Strength min MPa	Elongation in 4D min %	Reduction of Area min %



$u = 2 P$ maximum: incomplete thread



ASTM A325M Bolt Finish Weight - Kilos/100

Bolt Length	Bolt Dia		M12	M16	M20	M22	M24	M27	M30	M36
45			5.80	10.71	17.60	23.04	29.41	39.44	46.78	96.54
50			6.24	11.38	18.85	24.31	30.86	41.68	49.56	100.53
55			6.69	12.04	20.10	25.58	32.31	43.92	52.33	104.53
60			7.13	12.70	21.40	26.85	33.76	46.16	55.11	108.52
65			7.58	13.36	22.60	28.12	35.21	48.40	57.88	112.52
70			8.02	14.02	23.87	29.39	36.66	50.64	60.66	116.51
75			8.46	14.68	25.13	30.44	38.11	52.88	63.43	120.51
80			8.91	15.34	26.40	31.93	39.56	55.12	66.21	124.50
85			9.35	16.00	27.69	33.20	41.01	57.36	68.98	128.50
90			9.80	16.66	28.90	34.47	42.46	59.60	71.76	132.50
95			10.24	17.32	30.15	35.74	43.91	61.84	74.53	135.40
100			10.68	17.98	31.50	37.01	45.36	64.08	77.30	141.30
110			11.56	19.55	34.00	39.99	48.91	68.57	82.84	149.29
120			12.45	21.13	36.44	42.97	52.46	73.06	88.39	157.28
130			13.34	22.71	38.95	45.96	56.01	77.56	93.94	165.27
140			14.23	24.29	41.50	48.94	59.56	82.05	99.49	173.26
150			15.11	25.87	44.00	51.93	63.11	86.55	105.04	181.25
160			16.00	27.44	46.50	54.91	66.66	91.04	110.59	189.24
170			16.89	29.02	49.02	57.89	70.21	95.54	116.15	197.23
180			17.78	30.60	51.53	60.88	73.77	100.03	121.69	205.22
190			18.67	32.18	54.40	63.86	77.32	104.53	127.23	213.21
200			19.55	33.76	56.60	66.85	80.87	109.02	132.78	221.20
210			20.44	35.34	59.10	69.83	84.42	113.52	138.32	229.19
220			21.37	36.91	61.70	72.81	87.97	118.01	143.87	237.18
230			22.22	38.49	64.11	75.80	91.52	122.50	149.42	245.17
240			23.10	40.07	66.65	78.78	95.07	127.00	154.97	253.16
250			23.99	41.65	69.20	81.77	98.62	131.49	160.52	261.15
260			24.88	43.23	71.70	84.75	102.18	135.99	166.07	269.14
270			25.77	44.81	74.20	87.73	105.73	140.48	171.62	277.13
280			26.66	46.38	76.70	90.72	109.28	144.98	177.17	285.12
290			27.54	47.96	79.25	93.70	112.83	149.47	182.71	293.11
300			28.43	49.54	81.90	96.69	116.38	153.97	188.26	301.10

Weights are for guidance only and may vary in line with product tolerances

ASTM A325M

Heavy Hex
Structural Bolts
(Metric)

All dimensions are in millimetres



Heavy Hex Nuts (Metric) for use with ASTM A325M Bolts

ASTM A563M

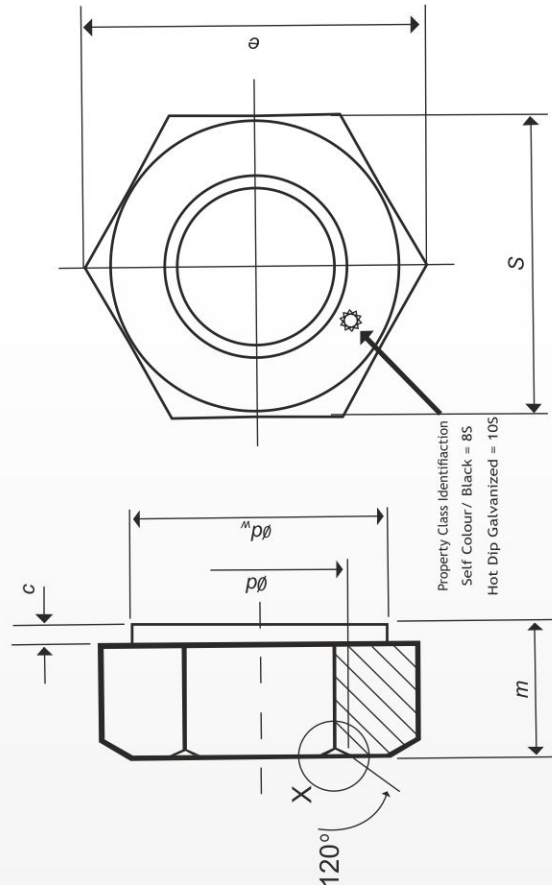
A563M Nut Proof Loads & Nut Hardness

Nominal size and thread pitch	Proof Loads		Hardness			
	8S	10S	8S		10S	
	Self Colour / Black (6H fit)	Hot Dip Galvanised Overlapped	Self Colour / Black (6H fit)	Hot Dip Galvanised Overlapped	min	max
M16 x 2	kN	kN	HRB	HRC	HRC	HRC
M20 x 2.5	169	183	89	26	26	38
M22 x 2.5	263	285	89	26	26	38
M24 x 3	326	353	89	26	26	38
M27 x 3	379	411	89	26	26	38
M30 x 3.5	493	535	89	26	26	38
M36 x 4	603	654	89	26	26	38
	878	952	89	26	26	38

A563M Nut Dimension Classes 8S & 10S

Nominal size and thread pitch d	s		e		m		dw ¹⁾		c		Total runoff of bearing surface	
	max	min	max	min	max	min	min	max	max	min	max	max
M16 x 2	27.00	26.16	31.18	29.56	17.1	16.4	24.9	0.8	0.4	0.4	0.47	
M20 x 2.5	34.00	33.00	39.26	37.29	20.7	19.4	31.4	0.8	0.4	0.4	0.58	
M22 x 2.5	36.00	35.00	41.57	39.55	23.6	22.3	33.3	0.8	0.4	0.4	0.63	
M24 x 3	41.00	40.00	47.34	45.20	24.2	22.9	38.0	0.8	0.4	0.4	0.72	
M27 x 3	46.00	45.00	53.12	50.85	27.6	26.3	42.8	0.8	0.4	0.4	0.80	
M30 x 3.5	50.00	49.00	57.74	55.37	30.7	29.1	46.6	0.8	0.4	0.4	0.87	
M36 x 4	60.00	58.80	69.28	66.44	36.6	35.0	55.9	0.8	0.4	0.4	1.05	

1) The maximum dw shall not exceed the actual width across flats.



ASTM A563M Nut finish weight - Kilos/100

	M12	M16	M20	M22	M24	M27	M30	M36
2.80	5.20	9.99	10.64	17.65	22.90	29.39	49.90	

Weights are for guidance only and may vary in line with product tolerance



ASTM F436M Hardened Steel Washers (Metric) for use with ASTM A325M Bolts

F436M Washer Dimensions

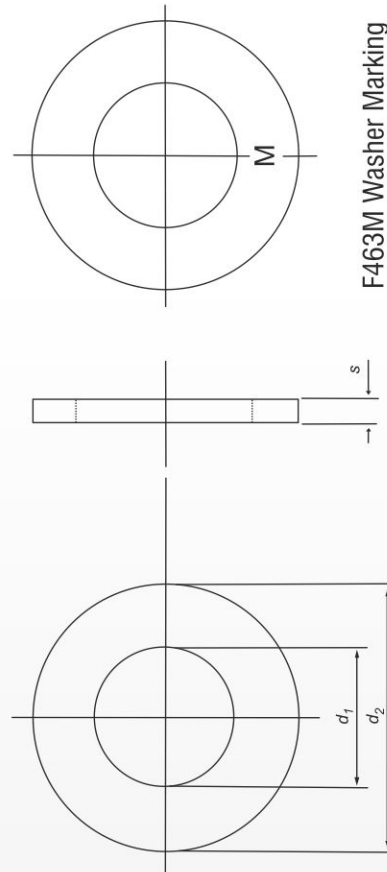
Nominal Washer Size	M16	M20	M22	M24	M27	M30	M36
d_1	max	18.4	22.5	26.5	30.5	33.6	39.6
	min	18.0	22.0	26.0	30.0	33.0	39.0
d_2	max	34.0	42.0	44.0	56.0	60.0	72.0
	min	32.4	40.0	42.4	48.4	54.1	70.1
h	max	4.6	4.6	4.6	4.6	4.6	4.6
	min	3.1	3.1	3.4	3.4	3.4	3.4

Materials

Carbon steel in accordance with ASTM F436M

Characteristic

Materials & Manufacture	ASTM F436M
Finish / Self Colour / Black	ASTM A436M
Coatings / Hot Dip Galvanized	ASTM A153 / A153M Class C
Mechanical Properties	ASTM F436M
Dimensions & Tolerances	ASME F436M
Workmanship	ASTM F436M
Product Making	ASTM F436M



F436M Washer Marking

ASTM F436M Washer finish weight - Kilos/100

	M12	M16	M20	M22	M24	M27	M30	M36
	1.20	2.15	3.20	4.55	5.90	6.60	7.55	13.30

Weights are for guidance only and may vary in line with product tolerance

F436M Washer Mechanical Properties

Nominal Washer Size	Hardness (HRC)	
	Self Colour / Black	Hot Dip Galvanized
M16 to M36 inclusive	min	min
	max	max
	38	26
	45	45

All dimensions are in millimetres



KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers



COUNT CHART FOR HEAVY HEX BOLTS AND HEAVY HEX NUTS - DIMENSIONS BASED ON BS : 1769 - UNC SERIES

SIZE	1/2"	5/8"	3/4"	7/8"	1"	1-1/8"	1-1/4"	1-3/8"	1-1/2"	1-3/4"	2"
LENGTH	HEAVY HEX BOLTS										
1"	990	574									
1-1/4"	897	525	335								
1-1/2"	820	484	310	212	151						
1-3/4"	744	447	288	198	141						
2"	677	410	269	185	133						
2-1/4"	625	379	250	175	126	96	72	60	48	32	23
2-1/2"	577	352	233	163	119	91	69	57	46	31	22
2-3/4"	538	329	218	154	112	87	66	55	44	30	22
3"	505	309	205	145	106	82	63	52	42	29	21
3-1/4"	473	292	194	137	101	78	60	50	40	27	20
3-1/2"	445	276	184	130	95	74	57	47	38	27	19
3-3/4"	422	261	175	124	91	71	55	45	37	26	19
4"	401	248	166	118	87	68	52	43	35	25	18
4-1/2"	363	226	152	107	80	62	48	37	32	23	17
5"	332	207	140	99	74	58	45	35	30	21	16
5-1/2"	306	191	129	92	69	54	42	33	28	20	15
6"	284	178	120	86	64	50	39	32	26	19	14
6-1/2"	266	167	113	81	61	47	37	30	25	18	13
7"	249	156	106	76	57	45	35	29	23	17	12
7-1/2"	234	147	100	72	54	42	33	27	22	16	12
8"	221	139	95	68	51	40	32	26	21	15	11
8-1/2"	209	132	90	64	49	38	30	24	20	14	11
9"	198	125	85	61	46	36	29	23	19	14	10
9-1/2"	189	119	81	59	44	35	27	22	18	13	10
10"	180	114	78	56	42	33	26	21	18	13	9
10-1/2"	172	109	74	54	41	32	25	20	17	12	9
11"	165	105	71	51	39	31	24	20	16	12	9
11-1/2"	158	100	68	50	37	29	23	19	16	11	8
12"	152	96	66	47	36	28	22	18	15	11	8
H.H. NUT	1667	852	516	430	285	204	142	98	83	52	45



WEIGHT COUNT CHART FOR B7/STUDS WITH NUTS

COUNT CHART FOR FULLY THREADED STUDS AND HEAVY HEX NUTS - DIMENSIONS BASED ON
ASTM - A193/A194 - UNC SERIES

APPROX. QUANTITY IN NOS. PER 50 Kg.

SIZE	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1-1/8"	1-1/4"	1-3/8"	1-1/2"	1-3/4"	2"	2-1/4"	2-1/2"	2-3/4"	3"
LENGTH	STUDS															
2"	2274															
2-1/4"	2022	1087	678													
2-1/2"	1820	978	610													
2-3/4"	1654	889	555													
3"	1516	815	509	357	258											
3-1/4"	1400	752	469	350	238											
3-1/2"	1300	699	436	306	221	167	133	107	89	73	54	41	32	26	21	18
3-3/4"	1213	652	407	286	206	156	124	100	83	68	51	39	30	24	20	16
4"	1137	611	381	268	193	146	117	94	78	64	48	36	28	23	19	15
4-1/4"	1070	575	359	252	182	138	110	88	73	60	45	34	26	21	18	15
4-1/2"	1011	543	339	238	172	130	104	83	69	57	42	32	25	20	17	14
4-3/4"	958	515	321	225	163	123	98	79	66	54	40	30	23	19	16	13
5"	910	489	305	214	155	117	93	75	62	51	38	29	22	18	15	12
5-1/4"	866	466	291	204	147	112	89	71	59	49	36	28	21	17	14	12
5-1/2"	827	445	277	195	141	106	85	68	57	47	35	26	20	17	14	11
5-3/4"	791	425	265	186	135	102	81	65	54	45	33	25	19	16	13	11
6"	758	408	254	179	129	98	78	62	52	43	32	24	19	15	12	10
6-1/4"	728	391	244	171	124	94	75	60	50	41	30	23	18	15	12	10
6-1/2"	700	376	235	165	119	90	72	58	48	39	29	22	17	14	11	10
6-3/4"	674	362	226	159	115	87	69	55	46	38	28	21	17	14	11	9
7"	650	349	218	153	111	84	67	53	45	37	27	21	16	13	11	9
7-1/2"	607	326	203	143	103	78	62	50	42	34	25	19	15	12	10	8
8"	569	306	191	134	97	73	58	47	39	32	24	18	14	11	9	8
8-1/2"	535	288	179	126	91	69	55	44	37	30	22	17	13	11	9	7
9"	505	272	170	119	86	65	52	42	35	28	21	16	12	10	8	7
9-1/2"	479	257	161	113	81	62	49	39	33	27	20	15	12	10	8	7
10"	455	245	153	107	77	59	47	37	31	26	19	14	11	9	7	6
10-1/2"	433	233	145	102	74	56	44	36	30	24	18	14	11	9	7	6
11"	414	222	139	97	70	53	42	34	28	23	17	13	10	8	7	6
11-1/2"	396	213	133	93	67	51	41	33	27	22	17	13	10	8	6	5
12"	379	204	127	89	64	49	39	31	26	21	16	12	9	8	6	5
H.H. NUT	4534	1667	852	516	430	285	204	142	98	83	52	45	37	26	15	11



KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers



DIMENSIONS FOR HEX BOLTS, NUTS & LOCK NUTS

Sr. No	Basic Dia	Equivalent Inch Metric	Thread	Specification	SHANK			A/F of Bolts & Nut			Bolts Head Thickness			Std. Nut Thickness			Lock Nut Thickness		
					Metric	Inch		Metric	Inch		Metric	Inch		Metric	Inch		Metric	Inch	
1	1.6 mm	0.063 1.600	Metric	IS : 2389-68	1.600 1.460	0.063 0.057	3.200 3.0800	0.125 0.121	1230 0.980	0.048 0.038	1.300 1.050	0.051 0.041	1.000 0.750	0.039 0.029					
2	10 BA	0.067 1.700	BA	BS : 57-51	- -	- -	2.972 2.896	0.117 0.114	1270 1.168	0.050 0.046	1.626 1.448	0.064 0.057	- -	- -					
3	2 mm	0.079 2.000	Metric	IS : 2389-68	2.000 1.860	0.079 0.073	4.000 3.880	0.157 0.153	1530 1.280	0.060 0.050	1.600 1.350	0.063 0.053	1200 0.950	0.047 0.037					
4	2.2 mm	0.087 2.200	Metric	IS : 2389-68	2.200 2.060	0.087 0.081	4.500 4.380	0.177 0.172	1630 1.380	0.064 0.054	1.800 1.550	0.071 0.061	1200 0.950	20.047 0.037					
5	8 BA	0.087 2.200	BA	BS : 57-51	- -	- -	3.861 3.785	0.152 0.149	651 1.549	0.065 0.061	2.083 1.905	0.082 0.075	1.473 1.295	0.058 0.051					
6	2.5 mm	0.098 2.500	Metric	IS : 2389-68	2.500 2.360	0.098 0.093	5.000 4.880	0.197 0.192	1830 1.580	0.072 0.062	2.000 1.750	0.079 0.069	1.600 1.350	0.063 0.053					
7	6 BA	0.110 2.800	BA	BS : 57-51	- -	- -	4.902 4.801	0.193 0.189	2108 1.981	0.083 0.078	2.667 2.413	0.105 0.095	1.854 1.600	0.073 0.063					
8	3 mm	0.118 3.000	Metric	IS : 2389-68	3.000 2.850	0.118 0.112	5.500 5.380	0.216 0.212	2130 1.880	0.084 0.074	2.400 2.150	0.094 0.085	1.600 1.350	0.063 0.053					
9				IS : 1364-83	3.000 2.860	0.118 0.112	5.500 5.320	0.216 0.209	2120 1.880	0.083 0.074	2.400 2.150	0.094 0.085	1.800 1.550	0.071 0.061					
10	3.5 mm	0.138 3.500	Metric	IS : 2389-68	3.500 3.320	0.138 0.131	6.000 5.880	0.236 0.231	2630 2.380	0.103 0.094	2.800 2.550	0.110 0.100	1.800 1.550	0.071 0.061					
11	4 BA	0.142 3.600	BA	BS : 57-51	- -	- -	6.299 6.172	0.248 0.243	2692 2.540	0.106 0.100	3.429 3.175	0.135 0.125	2.388 2.134	0.094 0.084					
12	4 mm	0.157 4.000	Metric	IS : 2389-68	4.000 3.820	0.157 0.150	7.000 6.850	0.275 0.270	2930 2.680	0.115 0.105	3.200 2.900	0.126 0.114	2.000 1.750	0.079 0.069					
13				IS : 1364-83	4.000 3.820	0.157 0.150	7.000 6.780	0.275 0.267	2920 2.680	0.115 0.105	3.200 2.900	0.126 0.114	2.200 1.950	0.087 0.077					
14	4.5 mm	0.177 4.500	Metric	IS : 2389	4.500 4.320	0.177 0.170	8.000 7.850	0.315 0.309	3150 2.880	0.124 0.113	3.600 3.300	0.142 0.130	2.300 2.050	0.090 0.081					
15	2 BA	0.185 4.700	BA	BS : 57-51	- -	- -	8.230 8.103	0.324 0.319	3531 3.353	0.139 0.13	4.242 3.988	0.167 0.157	3.124 2.870	0.123 0.113					
16	5 mm	0.197 5.000	Metric	IS : 2389-68	5.000 4.820	0.197 0.190	8.000 7.850	0.315 0.309	3650 3.350	0.144 0.132	4.000 3.700	0.157 0.146	2.500 2.250	0.098 0.088					
17				IS : 1364-83	5.000 4.820	0.197 0.190	8.000 7.780	0.315 0.306	3650 3.350	0.144 0.132	4.700 4.400	0.185 0.173	2.700 2.450	0.106 0.096					
18	0 BA	0.236 6.000	BA	BS : 57-51	- -	- -	10.490 10.363	0.413 0.408	4496 4.293	0.177 0.169	5.410 5.156	0.213 0.203	3.988 3.794	0.157 0.147					
19	6 MM	0.236 6.000	Metric	IS : 1363-67	6.480 5.700	0.255 0.224	10.000 9.640	0.394 0.379	4380 3.620	0.172 0.142	5.380 4.620	0.212 0.182	3.300 2.700	0.130 0.106					
20				IS : 1363-84	6.480 5.520	0.255 0.217	10.000 9.640	0.394 0.379	4380 3.620	0.172 0.142	6.100 4.900	0.240 0.193	- -	- -					
21				IS : 1364-67	6.000 5.820	0.236 0.229	10.000 9.780	0.394 0.385	4150 3.850	0.163 0.151	5.000 4.700	0.197 0.185	3.000 2.750	0.118 0.108					
22				IS : 1364-83	6.000 5.820	0.236 0.229	10.000 9.780	0.394 0.385	4150 3.850	0.163 0.151	5.200 4.900	0.205 0.193	3.200 2.900	0.216 0.114					
23	1/4"	0.250 6.350	BSW-BSF	BS : 916-57	7.112 ...	0.280 ...	11.303 11.049	0.445 0.435	4724 4.216	0.186 0.166	5.588 5.080	0.220 0.200	4.700 4.57	0.185 0.180					
24				BS : 1083-65	6.350 6.248	0.250 0.246	11.303 11.125	0.445 0.438	4470 4.216	0.176 0.166	5.080 4.826	0.200 0.190	4.089 3.835	0.161 0.151					
25				BS : 1768-63	6.350 6.248	0.250 0.246	11.100 10.922	0.437 0.430	4140 3.886	0.163 0.153	5.690 5.436	0.224 0.214	4.089 3.835	0.161 0.151					
26				ANSI	6.604 0.260	0.298 0.261	11.125 10.795	0.438 0.425	4775 3.810	0.186 0.150	5.740 5.385	0.226 0.212	0.164 0.150	- -					
27	7 mm	0.275 7.000	Metric	IS : 1363-67	7.580 6.640	0.298 0.261	11.000 10.570	0.433 0.416	5380 4.620	0.212 0.182	5.880 5.120	0.231 0.201	3.300 2.700	0.130 0.106					
28				IS : 1364-67	7.000 6.780	0.275 0.267	11.000 10.730	0.433 0.422	5150 4.850	0.203 0.191	6.500 6.200	0.256 0.244	3.000 2.750	0.118 0.108					
29				BS : 916-57	8.687	0.342	13.335 13.081	0.525 0.515	5791 5.283	0.228 0.208	6.858 6.350	0.270 0.250	5.334 5.080	0.210 0.200					
30	5/16"	0.312 7.940	BSW-BSF	BS : 1083-65	7.925 7.849	0.312 0.309	13.335 13.157	0.525 0.518	5597 5.283	0.218 0.208	6.350 6.096	0.250 0.240	4.877 4.623	0.192 0.182					
31				BS : 1768-63	7.925 7.849	0.312 0.309	12.700 12.522	0.500 0.493	5359 5.105	0.211 0.201	6.883 6.629	0.271 0.261	4.877 4.623	0.192 0.182					
32				ANSI	8.230	0.324 0.294	12.700 12.924	0.500 0.484	5969 4.963	0.235 0.196	6.934 6.553	0.273 0.258	4.953 4.572	0.195 0.180					



DIMENSIONS FOR HEX BOLTS, NUTS & LOCK NUTS

Sr. No	Basic Dia	Equivalent Inch Metric	Thread	Specification	SHANK			A/F of Bolts & Nut			Bolts Head Thickness			Std. Nut Thickness			Lock Nut Thickness		
					Metric	Inch		Metric	Inch		Metric	Inch		Metric	Inch		Metric	Inch	
33	8mm	0.315 8.000	Metric	IS : 1363/67	8.900 7.640	0.350 0.301	13.000 12.570	0.512 0.495	5.880 5.120	0.231 0.201	6.950 6.050	0.274 0.238	4.380 3.620	0.172 0.142					
34			Metric	IS : 1363/84	8.580 7.420	0.338 0.292	13.000 12.570	0.512 0.495	5.680 4.920	0.224 0.194	7.900 6.400	0.311 0.252							
35			Metric	IS : 1364/67	8.000 7.780	0.315 0.306	13.000 12.730	0.512 0.501	5.650 5.350	0.222 0.211	6.500 6.140	0.256 0.242	4.000 3.700	0.157 0.146					
36			Metric	IS : 1364/83	8.000 7.780	0.315 0.306	13.000 12.730	0.512 0.501	5.450 5.150	0.214 0.203	6.800 6.440	0.268 0.253	4.000 3.700	0.157 0.146					
37	3/8"	0.375 9.525	BSW-BSF	BS : 916/67	10.287 9.405	15.240 14.859	0.600 0.585	6.858 6.350	0.270 0.250	8.433 7.925	0.332 0.312	0.260 0.250	0.260 0.250						
38			BSW-BSF	BS : 1083/65	9.525 9.423	0.375 0.371	15.240 15.037	0.600 0.592	6.604 6.350	0.260 0.250	7.925 7.671	0.312 0.302	5.690 5.436	0.224 0.214					
39			UNC-UNF	BS : 1768/63	9.525 9.423	0.375 0.371	14.275 14.072	0.562 0.544	6.172 5.918	0.243 0.233	8.048 8.204	0.333 0.323	5.690 5.436	0.224 0.214					
40			UNC-UNF	ANSI	9.855	0.388	14.275 13.818	0.552 0.544	6.807 5.700	0.268 0.226	8.560 8.128	0.337 0.320	5.786 5.334	0.227 0.210					
41	10mm	0.394 10.00	Metric	IS : 1363/67	10.900 9.640	0.429 0.379	17.000 16.570	0.669 0.652	7.450 6.550	0.293 0.258	8.450 7.550	0.333 0.297	5.380 4.620	0.212 0.182					
42			Metric	IS : 1363/84	10.580 9.420	0.416 0.371	16.000 15.570	0.630 0.613	6.850 5.950	0.270 0.234	9.500 8.000	0.374 0.315							
43			Metric	IS : 1364/67	10.000 9.780	0.394 0.385	17.000 16.730	0.669 0.659	7.180 6.820	0.283 0.268	8.000 7.640	0.315 0.301	5.000 4.700	0.197 0.185					
44			Metric	IS : 1364/83	10.000 9.780	0.394 0.385	16.000 15.730	0.630 0.619	6.580 6.220	0.259 0.245	8.400 8.040	0.331 0.316	5.000 4.700	0.197 0.185					
45	7/16"	0.437 11.112	BSW-BSF	BS : 916/67	11.887	0.468 0.433	18.034 17.653	0.710 0.695	7.925 7.417	0.312 0.292	9.395 9.525	0.395 0.375	6.985 6.731	0.275 0.265					
46			BSW-BSF	BS : 1083/65	11.00 10.998	0.437 0.433	18.034 17.831	0.710 0.702	7.671 7.417	0.302 0.292	9.525 9.271	0.375 0.365	6.350 6.096	0.250 0.240					
47			UNC-UNF	BS : 1768/63	11.100 10.98	0.437 0.433	15.875 15.672	0.625 0.617	7.391 7.137	0.291 0.281	9.652 9.398	0.380 0.370	6.477 6.223	0.255 0.245					
48			UNC-UNF	ANSI	11.481	0.452	15.875 15.46	0.625 0.603	8.026 6.901	0.316 0.272	9.779 9.271	0.385 0.365	6.604 6.096	0.260 0.240					
49	12mm	0.472 12.00	Metric	IS : 1363-67	13.100 11.570	0.516 0.455	19.000 18.480	0.748 0.727	8.450 7.550	0.333 0.297	10.450 9.550	0.411 0.376	7.450 6.550	0.293 0.258					
50			Metric	IS : 1363-84	12.700 11.300	0.500 0.445	18.000 17.570	0.709 0.692	7.950 7.050	0.313 0.277	12.200 10.400	0.480 0.409							
51			Metric	IS : 1364-67	12.000 11.730	0.472 0.462	19.000 18.670	0.748 0.735	8.180 7.820	0.322 0.308	10.000 9.640	0.394 0.379	7.000 6.640	0.275 0.261					
52			Metric	IS : 1364-83	12.000 11.730	0.472 0.462	18.000 17.730	0.709 0.698	7.680 7.320	0.302 0.288	10.800 10.370	0.425 0.408	6.000 5.700	0.236 0.224					
53	1/2"	0.500 12.70	BSW-BSF	BS : 916/67	13.462	0.530 ...	20.828 20.320	0.820 0.800	9.220 8.458	0.363 0.333	11.862 11.100	0.467 0.437	7.620 7.366	0.300 0.290					
54			BSW-BSF	BS : 1083/65	12.700 12.598	0.500 0.496	20.828 20.630	0.820 0.812	8.712 8.458	0.343 0.333	11.100 10.846	0.437 0.427	7.391 7.137	0.291 0.281					
55			UNC-UNF	BS : 1768/63	12.700 12.598	0.500 0.496	0.950 18.847	0.750 0.742	8.204 7.950	0.323 0.313	11.227 10.973	0.442 0.432	8.052 7.798	0.317 0.307					
56			UNC-UNF	ANSI	13.081	0.515 ...	19.050 18.415	0.750 0.725	9.246 7.671	0.364 0.302	11.379 10.846	0.448 0.427	8.204 7.671	0.323 0.302					
57	14mm	0.551 14.000	Metric	IS : 1363-67	15.100 13.570	0.594 0.534	22.000 21.160	0.866 0.833	9.450 8.550	0.372 0.337	11.550 10.450	0.455 0.411	8.450 7.560	0.333 0.297					
59	9/16"	0.562 14.290	BSW-BSF	BS : 916-67	15.037	0.592	23.368 22.860	0.920 0.900	10.287 9.525	0.405 0.375	13.462 12.700	0.230 0.500	8.458 8.204	0.333 0.323					
60			BSW-BSF	BS : 1083-65	14.275 14.173	0.562 0.558	23.368 23.165	0.920 0.912	9.525 9.271	0.375 0.365	12.700 12.446	0.500 0.490	8.458 8.204	0.333 0.323					
61			UNC-UNF	BS : 1768-63	14.275 14.173	0.562 0.558	20.625 20.422	0.812 0.804	9.423 9.169	0.371 0.361	12.421 12.167	0.489 0.479	8.865 8.611	0.349 0.339					
62			UNC-UNF	ANSI	-	-	-	-	-	-	-	-	-	-					
63	5/8"	0.625 15.875	BSW-BSF	BS : 916-67	16.891	0.665	25.654 25.019	1.010 0.985	11.354 10.592	0.447 0.417	15.291 14.275	0.602 0.562	10.414 9.525	0.410 0.375					
64			BSW-BSF	BS : 1083-65	15.875 15.723	0.625 0.619	25.654 25.400	1.010 1.000	10.592 10.338	0.417 0.407	15.291 14.275	0.582 0.552	9.525 9.271	0.375 0.365					
65			UNC-UNF	BS : 1768-63	15.875 15.723	0.625 0.619	23.800 23.597	0.937 0.929	10.236 9.982	0.403 0.393	14.275 14.021	0.582 0.542	9.625 9.398	0.375 0.365					



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					Metric	Inch		Metric	Inch		Metric	Inch		Max	Min		Max	Min		Max	Min		
66			UNC-UNF	ANSI	16.307	0.624	23.800	23597	0.938	0.906	11.278	9.601	0.444	0.378	14.199	13.589	0.559	0.535	9.830	9.220	0.387	0.363	
67	16 mm	0.629	Metric	IS : 1363/67	17.100	0.673	23825	23012	0.945	0.912	10.450	9.550	0.411	0.376	13.550	12.450	0.533	0.490	8.450	7.550	0.333	0.297	
68			Metric	IS : 1363/84	16.700	0.657	24.000	23160	0.945	0.912	10.750	9.250	0.423	0.364	15.900	14.100	0.626	0.555	-	-	-	-	
69			Metric	IS : 1364/67	16.000	0.630	24.000	23670	0.945	0.932	10.180	9.820	0.401	0.387	13.000	12.570	0.512	0.495	7.640	0.315	0.315	0.301	
70			Metric	IS : 1364/83	16.000	0.630	24.000	23670	0.945	0.932	10.180	9.820	0.401	0.387	14.800	14.100	0.583	0.555	8.000	7.420	0.315	0.292	
71	18 mm	0.709	Metric	IS : 1363/67	19.100	0.752	27.000	26160	1.063	1.030	12.550	11.450	0.494	0.451	15.500	14.450	0.612	0.569	9.450	8.550	0.372	0.337	
72			Metric	IS : 1364/67	18.000	0.709	27.000	26670	1.063	1.050	12.220	11.780	0.481	0.464	15.000	14.570	0.590	0.574	9.000	8.640	0.354	0.340	
73	3/4"	0.750	BSW-BSF	BS : 916-57	20.066	0.790	30.480	29.845	1.200	1.175	13.462	12.700	0.530	0.500	18.491	17.450	0.728	0.587	12.446	11.633	0.490	0.458	
74			BSW-BSF	BS : 1080-65	19.050	0.750	30.480	30.226	1.200	1.190	12.700	12.192	0.500	0.480	17.450	17.196	0.687	0.677	11.633	11.379	0.458	0.448	
75			UNC-UNF	BS : 1768-63	19.050	0.750	28.575	28.321	1.125	1.115	12.268	11.760	0.483	0.463	16.535	16.027	0.651	0.631	10.973	10.465	0.432	0.412	
76			UNC-UNF	ANSI	19.507	0.768	28.575	27.635	1.125	1.088	13.310	11.557	0.524	0.455	16.891	15.672	0.665	0.617	11.328	10.109	0.446	0.398	
77	20 mm	0.787	Metric	IS : 1363/67	21.300	0.838	30.000	29160	1.181	1.148	13.550	12.450	0.533	0.490	16.550	15.450	0.651	0.608	9.450	8.550	0.372	0.337	
78			Metric	IS : 1363/84	20.840	0.820	30.000	29160	1.181	1.148	13.400	11.600	0.527	0.457	18.700	16.600	0.736	0.653	-	-	-	-	
79			Metric	IS : 1364/67	20.000	0.787	30.000	29160	1.181	1.148	13.350	12.650	0.525	0.498	16.000	14.900	0.630	0.587	9.000	8.100	0.345	0.319	
80			Metric	IS : 1364/84	20.000	0.787	30.000	29.670	1.181	1.148	12.720	12.280	0.501	0.483	18.000	16.900	0.709	0.665	10.000	9.100	0.394	0.358	
81	22 mm	0.866	Metric	IS : 1363/67	23.300	0.917	32.000	31.000	1.260	1.220	14.550	13.450	0.573	0.529	18.550	18.550	17.450	0.687	10.450	9.550	0.411	0.376	
82			Metric	IS : 1364/67	22.000	0.866	32.000	31.000	1.260	1.220	14.350	13.650	0.565	0.537	18.000	18.000	16.900	0.665	10.000	9.100	0.394	0.358	
83	7/8"	0.866	BSW-BSF	BS : 916-57	23.241	0.915	33.020	32.258	1.300	1.270	15.825	14.808	0.623	0.583	20.574	20.574	19.050	0.750	13.970	12.700	0.550	0.500	
84			BSW-BSF	BS : 1083-65	22.225	0.875	33.020	32.715	1.300	1.288	14.808	14.300	0.583	0.563	19.050	19.050	18.796	0.740	12.700	12.446	0.500	0.490	
85			UNC-UNF	BS : 1768-63	22.225	0.875	33.325	33.020	1.312	1.300	14.300	14.792	0.563	0.543	19.304	19.304	18.796	0.740	12.548	12.040	0.494	0.474	
86			UNC-UNF	ANSI	22.733	0.895	33.325	32.233	1.312	1.269	15.342	13.487	0.604	0.531	19.710	19.710	18.390	0.724	12.954	11.633	0.510	0.458	
87	24mm	0.945	Metric	IS : 1363-67	25.300	0.996	36.000	35.000	1.417	1.378	15.550	14.450	0.612	0.569	19.650	18.350	0.774	0.722	10.450	0.411	0.376	0.376	
88			Metric	IS : 1363-84	24.840	0.978	36.000	35.000	1.417	1.378	15.000	14.100	0.590	0.555	22.300	20.200	0.878	0.795	.....	.....	.....	.....
89			Metric	IS : 1364-67	24.000	0.945	36.000	35.000	1.417	1.378	15.350	14.650	0.604	0.577	19.000	17.700	0.878	0.697	10.000	0.394	0.358	0.358	
90			Metric	IS : 1364-83	24.000	0.945	36.000	35.380	1.417	1.393	15.220	14.780	0.599	0.582	21.500	20.200	0.846	0.795	12.000	0.472	0.429	0.429	
91	1"	1.000	BSW-BSF	BS : 916-57	26.416	1.040	...	37.592	36.830	1.480	1.450	17.932	16.916	0.706	0.666	22.225	21.971	22.225	0.935	0.878	14.808	0.583	
92			BSW-BSF	BS : 1083-65	25.400	1.000	37.592	37.287	1.480	1.468	16.916	16.154	0.666	0.636	22.225	21.971	0.875	0.865	14.808	0.583	0.573	0.573	
93			UNC-UNF	BS : 1768-63	25.400	1.000	38.100	37.795	1.500	1.488	15.926	15.764	0.627	0.597	22.200	21.438	0.874	0.844	14.275	0.562	0.532	0.532	
94			UNC-UNF	ANSI	29.959	1.022	38.100	36.830	1.500	1.450	17.780	15.011	0.700	0.591	22.530	21.107	0.887	0.831	14.605	0.575	0.519	0.519	
95	27mm	1.063	Metric	IS : 1363-67	28.300	1.114	41.000	40.000	1.611	1.574	17.550	16.450	0.69	0.648	22.650	21.350	0.892	0.840	12.550	0.494	0.451	0.451	
96			Metric	IS : 1364-67	27.000	1.063	41.000	40.000	1.611	1.574	15.74	17.350	16.650	0.683	0.655	22.650	21.350	0.892	0.840	12.550	0.494	0.451	0.451
97	1.18"	1.125	BSW-BSF	BS : 916-57	29.845	1.175	42.418	41.656	1.670	1.640	20.066	19.050	0.790	0.750	26.924	25.400	1.060	1.000	18.288	0.720	0.666	0.666	



DIMENSIONS FOR HEX BOLTS, NUTS & LOCK NUTS

Sr. No	Basic Dia	Equivalent Inch	Metric	Thread	Specification	SHANK		A/F of Bolts & Nut		Bolts Head Thickness		Std. Nut Thickness		Lock Nut Thickness	
						Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
98			28.575	BSW-BSF	BS : 1083-65	1.125	1.117	42.418	1.670	1.640	19.050	0.750	25.400	1.000	16.916
99			28.575	UNC-UNF	BS : 1768-63	1.125	1.117	42.850	1.687	1.657	18.237	0.718	25.121	0.989	15.977
100			28.185	UNC-UNF	ANSI	1.149	....	42.875	1.688	1.631	19.813	0.760	25.375	0.999	16.321
101	30mm	1.181	31.300	Metric	IS : 1363-67	1.232	1.161	46.000	1.811	1.772	19.650	0.774	24.650	0.970	12.550
102			30.840	Metric	IS : 1363-64	1.214	1.148	46.000	1.811	1.772	19.750	0.777	26.400	1.039	....
103			30.000	Metric	IS : 1364-67	1.181	1.168	46.000	1.811	1.772	19.420	0.764	24.000	0.945	12.000
104			30.000	Metric	IS : 1364-83	1.181	1.168	46.000	1.811	1.772	19.420	....	25.600	1.008	15.000
105	1.1/4"	1.250	31.750	Metric	IS : 916-57	1.300	....	47.224	1.860	1.815	22.006	0.890	28.575	1.125	19.050
106			31.750	BSW-BSF	BS : 1083-65	1.250	1.242	47.244	1.860	1.815	21.082	0.830	28.575	1.125	19.050
107			31.750	BSW-BSF	BS : 1768-63	1.250	1.242	47.625	1.875	1.830	20.250	0.813	27.610	1.087	18.898
108			32.436	UNC-UNF	BS : 1768-63	1.277	....	47.625	1.875	1.812	22.250	0.876	27.788	1.094	19.075
109	33mm	1.299	34.600	UNC-UNF	ANSI	1.362	1.275	50.000	1.968	1.929	21.650	0.852	26.650	1.049	14.550
110			33.000	Metric	IS : 1367-67	1.300	1.284	50.000	1.968	1.929	21.420	0.843	26.000	1.024	14.000
111	1.3/8"	1.375	34.925	Metric	IS : 1364-65	1.425	....	52.070	2.050	2.005	24.892	0.980	33.782	1.330	22.606
112			34.925	Metric	BS : 916-57	1.375	1.365	52.070	2.050	2.005	23.366	0.880	31.750	1.250	21.158
113			34.925	BSW-BSF	BS : 1083-65	1.375	1.365	52.375	2.062	2.017	22.301	0.838	30.404	1.197	20.472
114			36.600	BSW-BSF	BS : 1768-63	1.404	....	52.375	2.062	1.994	23.876	0.810	30.632	1.206	20.701
115	36mm	1.417	37.000	Metric	ANSI	1.480	1.393	55.000	2.165	2.118	23.650	0.931	29.650	1.167	14.550
116			37.000	Metric		1.457	1.378	55.000	2.165	2.118	23.550	0.927	31.500	1.240	....
117			36.000	Metric		1.417	1.402	55.000	2.165	2.118	23.420	0.922	29.000	1.142	14.000
118			36.000	Metric		1.417	1.402	55.000	2.165	2.118	22.920	0.902	31.000	1.220	18.000
119	1.1/2"	1.500	38.37	BSW-BSF		1.55	....	56.388	2.220	2.175	26.924	1.060	36.957	1.455	24.892
120			38.100	BSW-BSF		1.500	1.490	56.388	2.220	2.175	25.400	1.000	34.925	1.375	23.266
121			38.100	UNC-UNF		1.500	1.490	57.150	2.250	2.205	24.740	0.974	33.299	1.311	22.200
122			38.887	UNC-UNF		1.531	....	57.150	2.250	2.175	26.134	1.010	33.452	1.317	22.352
123	39mm	1.535	40.600	Metric		1.598	1.511	60.000	2.362	2.315	25.650	1.010	31.800	1.252	16.550
124			39.000	Metric		1.535	1.520	60.000	2.362	2.315	25.420	1.001	31.000	1.220	16.000
125	42mm	1.653	45.974	Metric		1.81	....	65.000	2.559	2.512	26.420	1.040	34.000	1.388	....
126	1.3/4"	1.750	44.450	BSW-BSF		1.750	1.740	65.532	2.580	2.520	32.258	1.270	43.815	1.725	29.464
127			44.450	BSW-BSF		1.750	1.740	65.532	2.580	2.520	29.718	1.170	41.275	1.625	27.508
128			44.450	UNC-UNF		1.750	1.740	66.675	2.625	2.565	28.804	1.134	38.862	1.530	25.375
129			45.339	UNC-UNF		1.785	....	66.675	2.625	2.538	30.378	1.196	40.767	1.625	27.000



DIMENSIONS FOR HEX BOLTS, NUTS & LOCK NUTS

Sr. No	Basic Dia	Equivalent Inch Metric	Thread	Specification	SHANK			A/F of Bolts & Nut			Bolts Head Thickness			Std. Nut Thickness			Lock Nut Thickness						
					Metric	Inch	Max	Min	Metric	Inch	Max	Min	Metric	Inch	Max	Min	Metric	Inch	Max	Min	Metric	Inch	Max	Min
130	45mm	1.771 45.000	Metric	IS : 1338-66	...	...	...	2756	2.709	70.000	68.800	28.420	27.580	1.196	1.086	36.000	35.000	...	...	...	...	...	...
131	48mm	1.889 48.000	Metric	IS : 3138-66	...	...	...	2.953	2.905	75.000	73.800	30.420	29.580	1.198	1.164	38.000	37.000	...	...	...	...	...	...
132	2"	2.000 50.800	BSW-BSF	BS : 916-57	52.324	2.06	2.000	2.760	2.700	70.104	68.580	36.322	33.782	1.430	1.330	46.990	44.450	31.750	29.616	1.250	1.166	1.250	1.166
133			BSW-BSF	BS : 108365	50.800	50.546	2.000	2.760	2.700	70.104	68.580	33.782	32.258	1.330	1.270	44.450	43.942	29.616	29.108	1.166	1.146	1.166	1.146
134			UNC-UNF	BS : 1768-63	50.800	50.547	2.000	3.000	2.940	76.200	74.676	32.080	30.556	1.263	1.203	44.562	42.774	28.677	26.899	1.129	1.059	1.129	1.059
135			UNC-UNF	ANSI	51.791	2.039	2.000	3.000	2.900	76.200	73.660	35.255	29.845	1.388	1.175	...	...	...	...	...	...	...	...
136	52mm	2.047 52.000	Metric	IS : 3138-66	...	...	...	3.150	3.102	80.00	78.800	33.500	32.500	1.319	1.279	42.000	41.000	...	...	...	...	...	...
137	56mm	2.204 56.000	Metric	IS : 3138-66	...	...	...	3.346	3.291	85.000	83.600	35.500	34.500	1.398	1.358	45.000	44.000	...	...	...	...	...	...
138	2.1/4"	2.250 57.150	BSW-BSF	BS : 916-57	...	...	...	3.150	3.090	80.100	78.486	40.640	38.100	1.600	1.500	50.165	47.625	36.322	31.750	1.430	1.250	1.430	1.250



CHEMICAL COMPOSITION REQUIREMENT OF BOLTS, SCREWS, STUDS ^A TABLE - SP-003T/1														
PROPERTY CLASS	NOMINAL PRODUCT DIAMETER, mm.	MATERIAL AND TREATMENT	PRODUCT ANALYSIS ELEMENT (% BY WEIGHT) ^B										RECOMMENDED GRADE	
			C	Mn	Si	P	S	B	Cr	Ni	Cu	TEMPERING TEMP°		
3.6	M5-M100	LOW CARBON STEEL	0.20	0.70	0.10	0.070	0.300	---	---	---	---	---	---	En-1A
4.6	M5-M100	LOW OR MEDIUM CARBON STEEL	0.25	0.90	0.35	0.048	0.058	---	---	---	---	---	---	En-3
4.8	M1.6-M100	LOW OR MEDIUM CARBON STEEL, PARTIALLY OR FULLY ANNEALED AS REQUIRED	0.15-0.25	0.60-0.90	0.10-0.35	0.048	0.058	---	---	---	---	---	---	En-3B
5.6	M5-M100	LOW OR MEDIUM CARBON STEEL	0.35	0.90	0.35	0.048	0.058	---	---	---	---	---	---	En-5
5.8	M5-M24	LOW OR MEDIUM CARBON STEEL, COLD WORKED	0.13-0.55	0.60-0.90	0.10-0.35	0.048	0.058	---	---	---	---	---	---	En-5D
6.8	M1.6-M100	MEDIUM CARBON STEEL, COLD DRAWN & NORMALISED	0.35-0.45	0.60-0.90	0.10-0.35	0.048	0.058	---	---	---	---	---	---	En-8,8D
8.8	M1.6-M16	LOW CARBON MARTENSITE STEEL, QUENCHED AND TEMPERED	0.15-0.40	0.70-1.00	0.15-0.35	0.048	0.058	0.0005 MIN.	---	---	---	---	---	15B21, 15B35
8.8	M18-M100	MEDIUM CARBON LOW ALLOY STEEL, QUENCHED AND TEMPERED	0.35-0.55	0.60-1.70	0.10-0.35	0.048	0.058	---	1.20	0.20	0.20	0.35 Mo	---	En-15,16 En-18,19
8.8.3	M1.6-M100	ATMOSPHERIC CORROSION RESISTANCE STEEL, QUENCHED AND TEMPERED	0.38-0.48	0.70-0.90	0.30-0.50	0.06-0.12	0.050	---	0.50-0.75	0.50-0.80	0.20-0.40	---	---	425
9.8	M1.6-M16	MEDIUM CARBON ALLOY STEEL, QUENCHED AND TEMPERED	0.35-0.55	0.60-1.70	0.10-0.35	0.048	0.058	---	1.20	0.20	0.20	0.35 Mo	---	En-16 En-18,19
9.8	M1.6-M16	LOW CARBON MARTENSITE STEEL, QUENCHED AND TEMPERED	0.15-0.40	0.70-1.00	0.15-0.35	0.048	0.058	0.0005 MIN.	---	---	---	---	---	15B21 15B35
10.9	M5-M20	MEDIUM CARBON ALLOY STEEL, QUENCHED AND TEMPERED	0.35-0.55	0.60-1.70	0.10-0.35	0.048	0.058	---	1.20	0.20	0.20	0.35 Mo	---	En-18,19
10.9	M5-M20	MEDIUM CARBON ALLOY STEEL, QUENCHED AND TEMPERED	0.35	0.70	0.10-0.35	0.048	0.058	---	1.20	0.20	0.20	0.80 Mo	---	En-19, En-20A
10.9	M5-M36	LOW CARBON MARTENSITE STEEL, QUENCHED AND TEMPERED	0.15-0.40	0.70-1.00	0.15-0.35	0.048	0.058	0.0005 MIN.	---	---	---	---	---	15B21, 15B35
10.9.3	M1.6-M36	ATMOSPHERIC CORROSION RESISTANCE STEEL, QUENCHED AND TEMPERED	0.15-0.25	0.40-1.20	0.25-0.50	0.040	0.050	---	0.50-1.00	0.50-0.80	0.30-0.50	---	---	425
12.9	M1.6-M100	ALLOY STEEL, QUENCHED AND TEMPERED	0.35-0.55	0.45-0.70	0.10-0.35	0.048	0.050	---	0.90-1.40	1.30-1.80	0.35 Mo	---	---	En-24 En-110

^Athe chemical composition limits are mandatory for only those fasteners which are not subject to testing.

^BThe values are maximum, unless otherwise specified.

Alloy steel shall be used. Steel is considered to be alloy when the maximum of the range given for the content of alloying elements exceeds one or more of the following limits: Manganese - 1.65% ; Silicon - 0.60% ; Copper - 0.60% ; or in which a definite range or a definite minimum quantity of any of the following elements is specified or required within the limits of the recognised field of constructional steels : Aluminium, Chromium up to 3.99% ; Cobalt, Columbium, Molybdenum, Nickel, Titanium, tungsten, Vanadium, Zirconium, or any ^DThe minimum tempering temperatures are mandatory for property classes 8.8 to 12.9 in all cases.



MECHANICAL PROPERTIES OF BOLTS, SCREWS AND STUDS

TABLE - SP-003T/3

MECHANICAL TEST DETAILS	PROPERTY CLASS												
	3.6		4.6		4.8		5.6		5.8		6.8		
	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	
TENSILE STRENGTH ^{UT} , R _m	NOM.	300	30.59	400	40.79	400	40.79	500	50.99	500	50.99	600	61.18
	MIN.	300	30.59	400	40.79	400	40.79	500	50.99	500	50.99	600	61.18
VICKERS HARDNESS, HV	MIN.	95		120		130		155		160		190	
	MAX.	250		250		250		250		250		250	
BRINELL HARDNESS, HB	MIN.	90		114		124		147		152		181	
	MAX.	238		238		238		238		238		238	
ROCKWELL HARDNESS, HRB	MIN.	52		67		71		79		82		89	
	MAX.	100		100		100		100		100		100	
ROCKWELL HARDNESS, HRC	MIN.	***		***		***		***		***		***	
	MAX.	***		***		***		***		***		***	
SURFACE HARDNESS, HV	MIN.	***		***		***		***		***		***	
	MAX.	***		***		***		***		***		***	
LOWER YIELD STRESS ^{UT} , R _{eL}	NOM.	180	18.35	240	24.47	320	32.63	300	30.59	400	40.79	480	48.95
	MIN.	190	19.37	240	24.47	340	34.67	300	30.59	420	42.83	480	48.95
PROOF STRESS 0R _{0.2}	NOM.	***		***		***		***		***		***	
	MIN.	***		***		***		***		***		***	
STRESS UNDER PROOFING LOAD, S _p	S _p /R _{eL} or S _p /R _{0.2}	0.94		0.94		0.91		0.93		0.90		0.92	
	MIN.	180	18.35	225	22.94	310	31.61	280	28.55	380	38.75	440	44.87
ELONGATION AFTER FRACTURE, A	MIN.	25		22		14		20		10		8	
STRENGTH UNDER WEDGE LOADING	The values for full size Bolts and Screws (not Studs) shall not be smaller than the minimum values for tensile strength.												
IMPACT STRENGTH, J	MIN.	***		***		***		25		***		***	
HEAD SOUNDNESS	NO FRACTURE												
MIN. HEIGHT OF NON CARBURIZED THREAD ZONE, E	***												
MAX. DEPTH OF COMPLETE DECARBURIZATION, G	***												

- 1) Minimum tensile properties apply to products of nominal length $l \geq 2.5 d$. Minimum hardness applies to products of length $l < 2.5 d$ and other products which cannot be tensile tested (i.e. due to head configuration).
- 2) For testing of full size Bolts, Screws and Studs, the loads given in Table - SP-003T/4 shall be applied.
- 3) In cases where the lower yield stress R_{eL} cannot be determined, it is permissible to measure the Proof stress R_{0.2}

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MECHANICAL PROPERTIES OF BOLTS, SCREWS AND STUDS

TABLE - SP-003T/3 (Contd.)

MECHANICAL TEST DETAILS	PROPERTY CLASS												
	8.8 & 8.8.3 ≤ M16 ⁽⁴⁾		8.8 & 8.8.3 > M16 ⁽⁵⁾		9.8 ⁽⁶⁾		10.9		10.9.3		12.9		
	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	N/mm ²	Kgf/mm ²	
TENSILE STRENGTH ⁽²⁾ ,Rm	NOM.	800	81.58	800	81.58	900	91.77	1000	101.97	1000	101.97	1200	122.36
	MIN.	800	81.58	800	81.58	900	91.77	1000	101.97	1000	101.97	1200	122.36
VICKERS HARDNESS, HV	MIN.	250		255		290		320		320		385	
	MAX.	320		335		360		380		380		435	
BRINELL HARDNESS, HB	MIN.	238		242		276		304		304		366	
	MAX.	304		318		342		361		361		414	
ROCKWELL HARDNESS, HRB	MIN.	---		---		---		---		---		---	
	MAX.	---		---		---		---		---		---	
ROCKWELL HARDNESS, HRC	MIN.	22		23		28		32		32		39	
	MAX.	32		34		37		39		39		44	
SURFACE HARDNESS, HV	MIN.	---		---		---		---		---		---	
MIN.	---		---		---	---		---		---		---	
LOWER YIELD STRESS ⁽³⁾ ,ReL	NOM.	640	65.26	640	65.26	720	73.42	900	91.77	900	91.77	1080	110.13
	MIN.	640	65.26	660	67.30	720	73.42	940	95.85	940	95.85	1100	112.17
PROOF STRESS OR _{0.2}	MIN.	580	59.14	600	61.18	650	66.28	830	84.64	830	84.64	970	98.91
	MIN.	12		12		10		9		9		8	
STRESS UNDER PROOFING LOAD, S _p	MIN.	0.91		0.91		0.9		0.88		0.88		0.88	
	MIN.	12		12		10		9		9		8	
ELONGATION AFTER FRACTURE, A	MIN.	30		30		25		20		20		15	
STRENGTH UNDER WEDGE LOADING	The values for full size Bolts and Screws (not Studs) shall not be smaller than the minimum values for tensile strength.												
IMPACT STRENGTH, J	MIN.	30		30		25		20		20		15	
HEAD SOUNDNESS	NO FRACTURE												
MIN. HEIGHT OF NON CARBURIZED THREAD ZONE, E	1/2 H1												
MAX. DEPTH OF COMPLETE DECARBURIZATION, G	2/3 H1												

1) Minimum tensile properties apply to products of nominal length $l \geq 2.5 d$. Minimum hardness applies to products of length $l < 2.5 d$ and other products which cannot be tensile tested (i.e. due to head configuration).

2) For testing of full size Bolts, Screws and Studs, the loads given in Table - SP-003T/4 shall be applied.

3) In cases where the lower yield stress R_{eL} cannot be determined, it is permissible to measure the Proof stress $R_{p0.2}$.

4) For Bolts of property class 8.8 in diameter, $d \leq M16$, there is an increased risk of Nut stripping in the case of inadvertent overtightening a load in excess of Proofing load.

5) For Structural bolting, limit is M12

6) Applies only to nominal thread dia. $d \leq M16$



CHEMICAL COMPOSITION & HARDNESS REQUIREMENTS OF NUTS^A TABLE - SP-004T/3

PROPERTY CLASS	NOMINAL PRODUCT DIAMETER, mm.	PRODUCT ANALYSIS ELEMENT (% BY WEIGHT) ^B											HARDNESS		^H TEMPERING TEMP °C. MIN.	RECOMMENDED GRADE	
		C	Mn ^c	Si	P	S	B ^D	Cr	Ni	Cu	BRINELL, BHN	ROCKWELL HRC(C)/HRB(B)					
04	M5-M100	0.58	0.25	---	0.060	0.150	---	---	---	---	---	---	---	179-286	8C-30C	---	En-3A,5, C-20, C-30
05	M5-M100	0.58	0.30	---	0.048	0.058	---	---	---	---	---	---	---	258-336	26C-38C	525	En-5,8, C-30, C-40, C-45
4 ^F	M1.6-M100	0.50	---	---	0.060	0.150	---	---	---	---	---	---	---	111-286	65B-28C	---	En-3A,5, C-20, C-30
5 ^F	M1.6-M100	0.50	---	---	0.060	0.150	---	---	---	---	---	---	---	139-286	77B-28C	---	En-3A,5, C-20, C-30
6 ^F	M5-M100	0.50	---	---	0.060	0.150	---	---	---	---	---	---	---	165-286	85B-28C	---	En-5, 8, C-30, C-40
8	UPTO M4	0.58	0.25	---	0.060	0.150	---	---	---	---	---	---	---	171-286	6C-30C	---	15B25, En-8, 8D, C-40, C-45
	OVER M4 TO M16	0.58	0.25	---	0.060	0.150	0.0005 ^E	---	---	---	---	---	---	190-286	11C-30C	---	15B25, En-8, 8D, C-40, C-45
	OVER M16 TO M100	0.58	0.25	---	0.060	0.150	0.0005 ^E	---	---	---	---	---	---	222-336	19C-36C	425	15B25, En-8, 8D, C-40, C-45
8S	M12-M36	0.55	0.25	---	0.060	0.150	---	---	---	---	---	---	---	222-336	19C-36C	425	En-8, 8D, C-40, C-45
8S3	M12-M36	0.38-0.48	0.70-0.90	0.30-0.50	0.06-0.12	0.050	---	0.50-0.75	0.20-0.40	---	---	---	---	222-336	19C-36C	425	ATMOSPHERIC CORROSION RESISTANCE STEEL, H & T
9	M3-M100	0.58	0.25	---	0.060	0.150	---	---	---	---	---	---	---	179-286	8C-28C	---	En-8, 8D, C-40, C-45
10 ^G	M1.6-M100	0.58	0.30	---	0.048	0.058	---	---	---	---	---	---	---	258-336	26C-38C	425	En-8D, 15,16, 18, C-50, C-45 Cr.
10S ^G	M12-36	0.58	0.30	---	0.048	0.058	---	---	---	---	---	---	---	258-336	26C-38C	425	En-8D, 15,16, 18, C-50, C-45 Cr.
10S3	M12-M36	0.15-0.25	0.40-1.20	0.25-0.50	0.040	0.050	---	0.50-1.00	0.30-0.50	---	---	---	---	258-336	26C-38C	425	ATMOSPHERIC CORROSION RESISTANCE STEEL, H & T
12 ^G	M5-M100	0.58	0.45	---	0.048	0.058	---	---	---	---	---	---	---	280-336	29C-38C	425	En-18,19,24, C-45 Cr.

^A The chemical composition limits are mandatory for all types of nuts.

^B The values are maximum, unless otherwise specified.

^C The values are maximum, unless otherwise specified.

^D The values are maximum, unless otherwise specified.

^E The values are maximum and optional, applicable in case of Boron quality steels only.

^F Nuts of these property classes may be manufactured from free cutting steel, unless otherwise agreed between the purchaser and the manufacturer. In such cases, sulphur 0.34% max., phosphorus 0.11% max. and lead 0.35% max. are permissible.

^G Alloying elements like, Cr or Ni or Mo may be added, if necessary, to develop the mechanical properties of the nuts.

^H The minimum tempering temperatures are mandatory for property classes 05, 8, 10, 10S, 10S3, 12 in all cases.



PROOF LOAD STRESS (MPa) AND PROOF LOAD VALUES FOR NUTS, kN^A TABLE - SP-004T/4

NOMINAL PRODUCT DIA., D AN THREAD PITCH, P	STRESS AREA ^B mm ² , a	04		05		4		5		6		8		8S	
		PROOF LOAD STRESS MPa	PROOF LOAD kN	PROOF LOAD STRESS MPa	PROOF LOAD kN	PROOF LOAD STRESS MPa	PROOF LOAD kN	PROOF LOAD STRESS MPa	PROOF LOAD kN	PROOF LOAD STRESS MPa	PROOF LOAD kN	PROOF LOAD STRESS MPa	PROOF LOAD kN	PROOF LOAD STRESS MPa	PROOF LOAD kN
M1.6X0.35	1.27	380	0.48	500	0.64	510	0.65	520	0.6604	---	---	---	800	1.02	---
M2X0.4	2.07	380	0.79	500	1.04	510	1.06	520	1.08	---	---	---	800	1.66	---
M2.5X0.45	3.39	380	1.29	500	1.70	510	1.73	520	1.76	---	---	---	800	2.71	---
M3X0.5	5.03	380	1.91	500	2.52	510	2.57	520	2.62	---	---	---	800	4.02	---
M3.5X0.6	6.78	380	2.57	500	3.39	510	3.46	520	3.52	---	---	---	800	5.42	---
M4X0.7	8.78	380	3.34	500	4.39	510	4.48	520	4.56	---	---	---	800	7.02	---
M5X0.8	14.18	380	5.39	500	7.09	510	7.23	580	8.23	670	670	9.50	855	12.13	---
M6X1	20.12	380	7.65	500	10.06	510	10.26	580	11.67	670	670	13.48	855	17.21	---
M8X1.25	36.61	380	13.91	500	18.30	510	18.67	580	21.23	680	680	24.89	870	31.85	---
M10X1.5	57.99	380	22.04	500	28.99	510	29.57	580	33.63	680	680	39.43	870	50.45	---
M12X1.75	84.27	380	32.02	500	42.13	510	42.98	610	51.40	700	700	58.99	880	74.15	1075
M14X2	115.44	380	43.87	500	57.72	510	58.87	610	70.42	700	700	80.81	880	101.6	1075
M16X2	156.67	380	59.53	500	78.33	510	79.93	610	95.57	700	700	109.7	880	137.9	1075
M18X2.5	192.47	380	73.14	500	96.24	510	98.16	630	121.3	720	720	138.6	920	177.1	1075
M20X2.5	244.79	380	93.02	500	122.4	510	124.8	630	154.2	720	720	176.3	920	225.2	1075
M22X2.5	303.40	380	115.3	500	151.7	510	154.7	630	191.1	720	720	218.4	920	279.1	1075
M24X3	352.50	380	134.0	500	176.3	510	179.8	630	222.1	720	720	253.8	920	324.3	1075
M27X3	459.41	380	174.6	500	229.7	510	234.3	630	289.4	720	720	330.8	920	422.7	1075
M30X3.5	560.59	380	213.0	500	280.3	510	285.9	630	353.2	720	720	403.6	920	515.7	1075
M33X3.5	693.55	380	263.6	500	346.3	510	353.7	630	436.9	720	720	499.4	920	638.1	1075
M36X4	816.72	380	310.4	500	408.4	510	416.5	630	514.5	720	720	588.0	920	751.4	1075
M39X4	975.75	380	370.8	500	487.9	510	497.6	630	614.7	720	720	702.5	920	897.7	---
M42X4.5	1120.91	380	425.9	500	560.5	510	571.7	630	706.2	720	720	807.1	920	1031.2	---
M48X5	1473.15	380	559.8	500	736.6	510	751.3	630	928.1	720	720	1060.7	920	1355.3	---
M56X5.5	2030.02	380	771.4	500	1015.0	510	1035.3	630	1278.9	720	720	1461.6	920	1867.6	---
M64X6	2675.98	380	1016.9	500	1338.0	510	1364.7	630	1685.9	720	720	1926.7	920	2461.9	---
M72X6	3459.75	380	1314.7	500	1729.0	510	1764.5	630	2179.6	720	720	2491.0	920	3183.0	---
M80X6	4344.06	380	1650.7	500	2172.0	510	2215.5	630	2736.8	720	720	3127.7	920	3996.5	---
M90X6	5590.82	380	2124.5	500	2795.4	510	2851.3	630	3522.2	720	720	4025.4	920	5143.6	---
M100X6	6994.65	380	2658.0	500	3497.3	510	3567.3	630	4406.6	720	720	5036.2	920	6435.1	---

^APROOF LOADS ARE COMPUTED BY MULTIPLYING THE PROOF LOAD STRESS GIVEN IN THIS TABLE BY THE STRESS AREA OF THE THREAD.

^BSTRESS AREA, mm² = 0.7854 (D - 0.9382 P)², WHERE D = NOMINAL PRODUCT SIZE, mm, AND P = THREAD PITCH, mm.

CONTD.



KIRTI FASTNER

Manufacturers & Exporters of Nuts, Bolts & Washers



PROOF LOAD STRESS (MPa) AND PROOF LOAD VALUES FOR NUTS, KN^A TABLE - SP-004T/4

NOMINAL PRODUCT DIA., D AN THREAD PITCH, P	8S3		9		10		10S		10S3		12		FORMULAE STRESS AREA, mm ² , a = 0.7854(D-0.9382P) ² For Example For D = 20 ; Pitch = 2.5 a=0.7854(20-0.9382X 2.5) ² = 244.79 mm ² Proof Load of Nut, kN = STRESS UNDER PROOFING LOAD, SpXa DIVIDED BY 1000 For Example FOR NUT M20X2.5 AND P-10 Proof load of nut = 1245x244.79/1000 = 304.8 kN. 1 Mpa = 1N = 0.10197 kg/mm ²
	PROOF LOAD STRESS MPa	PROOF LOAD KN	PROOF LOAD STRESS MPa	PROOF LOAD KN	PROOF LOAD STRESS MPa	PROOF LOAD KN	PROOF LOAD STRESS MPa	PROOF LOAD KN	PROOF LOAD STRESS MPa	PROOF LOAD KN	PROOF LOAD STRESS MPa	PROOF LOAD KN	
M1.6X0.35	---	---	900	1.14	1040	1.32	---	---	---	---	1150	1.46	
M2X0.4	---	---	900	1.87	1040	2.16	---	---	---	---	1150	2.38	
M2.5X0.45	---	---	900	3.05	1040	3.53	---	---	---	---	1150	3.90	
M3X0.5	---	---	900	4.53	1040	5.23	---	---	---	---	1150	5.79	
M3.5X0.6	---	---	900	6.10	1040	7.05	---	---	---	---	1150	7.79	
M4X0.7	---	---	900	7.90	1040	9.13	---	---	---	---	1150	10.10	
M5X0.8	---	---	915	12.98	1040	14.75	---	---	---	---	1150	16.31	
M6X1	---	---	915	18.41	1040	20.93	---	---	---	---	1150	23.14	
M8X1.25	---	---	940	34.41	1040	38.07	---	---	---	---	1160	42.47	
M10X1.5	---	---	940	54.51	1040	60.31	---	---	---	---	1160	67.27	
M12X1.75	1075	90.6	950	80.05	1050	88.48	1245	104.9	1245	104.9	1190	100.3	
M14X2	1075	124.1	950	109.7	1050	121.2	1245	143.7	1245	143.7	1190	137.4	
M16X2	1075	168.4	950	148.8	1050	164.5	1245	195.1	1245	195.1	1190	186.4	
M18X2.5	1075	206.9	920	177.1	1060	204.0	1245	239.6	1245	239.6	1200	231.0	
M20X2.5	1075	263.2	920	225.2	1060	259.5	1245	304.8	1245	304.8	1200	293.8	
M22X2.5	1075	326.2	920	279.1	1060	321.6	1245	377.7	1245	377.7	1200	364.1	
M24X3	1075	378.9	920	324.3	1060	373.7	1245	438.9	1245	438.9	1200	423.0	
M27X3	1075	493.9	920	422.7	1060	487.0	1245	572.0	1245	572.0	1200	551.3	
M30X3.5	1075	602.6	920	515.7	1060	594.2	1245	697.9	1245	697.9	1200	672.7	
M33X3.5	1075	745.6	920	638.1	1060	735.2	1245	863.5	1245	863.5	1200	832.3	
M36X4	1075	878.0	920	751.4	1060	865.7	1245	1016.8	1245	1016.8	1200	980.1	
M39X4	---	---	920	897.7	1060	1034.3	---	---	---	---	1200	1170.9	
M42X4.5	---	---	920	1031.2	1060	1188.2	---	---	---	---	1200	1345.1	
M48X5	---	---	920	1355.3	1060	1561.5	---	---	---	---	1200	1767.8	
M56X5.5	---	---	920	1867.6	1060	2151.8	---	---	---	---	1200	2436.0	
M64X6	---	---	920	2461.9	1060	2836.5	---	---	---	---	1200	3211.2	
M72X6	---	---	920	3183.0	1060	3667.3	---	---	---	---	1200	4151.7	
M80X6	---	---	920	3996.5	1060	4604.7	---	---	---	---	1200	5212.9	
M90X6	---	---	920	5143.6	1060	5926.3	---	---	---	---	1200	6709.0	
M100X6	---	---	920	6435.1	1060	7414.3	---	---	---	---	1200	8393.6	

^APROOF LOADS ARE COMPUTED BY MULTIPLYING THE PROOF LOAD STRESS GIVEN IN THIS TABLE BY THE STRESS AREA OF THE THREAD.

^BSTRESS AREA, mm² = 0.7854 (D - 0.9382 P)², WHERE D = NOMINAL PRODUCT SIZE, mm, AND P = THREAD PITCH, mm.



CHEMICAL COMPOSITION OF EXTERNALLY (BOLTS/SCREWS/STUDS) THREADED FASTENERS (INCH THREAD SERIES)

PRODUCT STANDARD	GRADE OR TYPE	TYPE OF STEEL	CHEMICAL COMPOSITION % (MAXIMUM) EXCEPT AS SHOWN											SUGG. GRADE			
			C	Mn	Si	S	P	Cr	Ni	Mo	V	B	Cu				
ASTM A307-94	A	PLAIN CARBON STEEL				0.150	0.060										En-1A
	B					0.050	0.040										En-2
ASTM A325-94	1	PLAIN CARBON STEEL	0.28-0.55	0.57	0.15-0.35	0.050	0.040										En-5
	2	CARBON BORON STEEL	0.28-0.55	0.57		0.045	0.040						0.003-0.0005				15B35
	3	WEATHERING STEEL	0.31-0.42	0.86-1.24	0.15-0.35	0.055	0.045	0.42-0.68	0.22-0.48						0.22-0.48		Cu. BEARING STEEL
	0.14-0.26		0.36-1.14	0.25-0.50	0.055	0.045	0.45-1.05	0.47-0.83						0.27-0.63			
ASTM A325M-94	1	MEDIUM CARBON STEEL	0.25-0.55	0.60-0.90	0.15-0.35	0.058	0.048										En-5,8 En-9
ASTM A394M-93	0 & 1																
ASTM A325M-94	2	CARBON BORON STEEL	0.15-0.40	0.74 MIN.	0.15-0.35								0.0005 MIN.				15B21
ASTM A394M-93																	
ASTM A325M-94	3	WEATHERING STEEL	0.31-0.42	0.86-1.24	0.15-0.35	0.055	0.045	0.42-0.68	0.22-0.48								Cu. BEARING STEEL
ASTM A394M-93																	
ASTM A354-95	BC	MEDIUM CARBON STEEL	0.28-0.55	1.30-1.70	0.15-0.35	0.045	0.040										En-15, 37mn2
	BD	ALLOY STEEL	0.35-0.45	0.40-0.70	0.15-0.35	0.040	0.040	0.85-1.20		0.25-0.35							En-18, En-110
ASTM A449-93	1	MEDIUM CARBON STEEL	0.28-0.58	0.57 MIN.		0.058	0.048										En-8,9
	2	CARBON BORON STEEL	0.13-0.41	0.67 MIN.		0.050	0.040						0.0005 MIN.				15B21
ASTM A490-93	1	ALLOY STEEL	0.28-0.50	0.40-0.70	0.15-0.35	0.045	0.045	0.85-1.20		0.25-0.35							En-18, En-110
	2	CARBON BORON STEEL	0.13-0.37	0.67 MIN.	0.15-0.35	0.058	0.048						0.0005 MIN.				15B35
	3	ALLOY STEEL	0.19-0.55	0.37 MIN.	0.15-0.35	0.055	0.045	0.42 MIN.	0.17 MIN.	0.14 MIN.					0.42 MAX.		En-100 En-24
ASTM A490M-93	1	ALLOY STEEL	0.28-0.50	0.40-0.70	0.15-0.35	0.045	0.045	0.85-1.20									En-18, En-110
	2	CARBON BORON STEEL	0.13-0.37	0.67 MIN.	0.15-0.35	0.058	0.048						0.0005 MIN.				15B35
	3	ALLOY STEEL	0.19-0.55	0.37 MIN.	0.15-0.35	0.055	0.045	0.42 MIN.	0.17 MIN.	0.14 MIN.					0.42 MAX.		En-100 En-24

CHEMICAL AND MECHANICAL PROPERTIES OF INTERNALLY THREADED (NUTS) FASTENERS (INCH THREAD SERIES)

PRODUCT STANDARD	GRADE OR TYPE	CHEMICAL COMPOSITION % (MAX) UNLESS OTHERWISE SPECIFIED										MECHANICAL PROPERTIES			MARKING OF NUT	SUGG. GRADE OF STEEL
		C	Mn	Si	S	P	Cr	Ni	Mo	Cu	HARDNESS		PROOF LOAD STRESS, ksi			
											BRINELL	ROCKWELL				
ASTM A563-94	O,A,B	0.55			0.15	0.12						121-352	69B-38C	116	NIL	En-1,3,5,8
	C	0.55			0.15	0.12						121-352	69B-38C	116	3 MARK AT 120'	En-1,3,5,8
	D	0.55	0.30 MIN		0.05	0.04						159-352	84B-38C	150	D	En-3,5,8
	DH	0.20-0.55	0.6		0.05	0.04						248-352	24-38C	175	DH	En-8,9
	C3	0.38-0.48	0.70-0.90	0.30-0.50	0.05	0.06-0.12	0.50-0.75	0.50-0.80	0.06	0.20-0.40		143-352	78B-38C	144	MARK AT 120' &	Cu BEARING STEEL
	DH3	0.20-0.53	0.40 MIN		0.05	0.046	0.45 MIN	0.20 MIN	0.15 MIN	0.20 MIN		248-352	24-38C	175	DH3	



In applications where risk of intergranular corrosion is present, testing in accordance with ISO 3651-1 or ISO 3651-2 is recommended. In such cases, stabilized stainless steels A3 and A5 or stainless steels A2 or A4 with carbon content not exceeding 0.03% are recommended.

Table 1 - Stainless steel grades - Chemical composition

Group	Grade	Chemical composition % (m/m) ¹⁾									Notes
		C	Si	Mn	P	S	Cr	Mo	Ni	Cu	
Austenitic	A1	0,12	1	6,5	0,2	0,15 to 0,35	16 to 19	0,7	5 to 10	1,75 to 2,25	2)3)4)
	A2	0,1	1	2	0,05	0,03	15 to 20	- 5)	8 to 19	4	7)8)
	A3	0,08	1	2	0,045	0,03	17 to 19	- 5)	9 to 12	1	9)
	A4	0,08	1	2	0,045	0,03	16 to 18,5	2 to 3	10 to 15	1	8) 10)
	A5	0,08	1	2	0,045	0,03	16 to 18,5	2 to 3	10,5 to 14	1	9) 10)
Martensitic	C1	0,09 to 0,15	1	1	0,05	0,03	11,5 to 14		1		10)
	C3	0,17 to 0,25	1	1	0,04	0,03	16 to 18		1,5 to 2,5		
	C4	0,08 to 0,15	1	1,5	0,06	0,15 to 0,35	12 to 14	0,6	1		2) 10)
Ferritic	F1	0,12	1	1	0,04	0,03	15 to 18	- 6)	1		11 12)

- NOTES
- A description of the groups and grades of stainless steels also entering into their specific properties and application is given in annex B.
 - Examples for stainless steels which are standardized in ISO 683-13 and in ISO 4954 are given in annexes C and D respectively.
 - Certain materials for specific application are given in annex E.
- Values are maximum unless otherwise indicated.
 - Sulfur may be replaced by selenium.
 - If the nickel content is below 8 %, the minimum manganese content must be 5 %.
 - There is no minimum limit to the copper content provided that the nickel content is greater than 8 %.
 - Molybdenum may be present at the discretion of the manufacturer. However, if for some applications limiting of the molybdenum content is essential, this must be stated at the time of ordering by the purchaser.
 - Molybdenum may be present at the discretion of the manufacturer.
 - If the chromium content is below 17%, the minimum nickel content should be 12%.
 - For austenitic stainless steels having a maximum carbon content of 0.03%, nitrogen may be present to a maximum of 0.22%.
 - Must contain titanium $\geq 5 \times C$ upto 0,8% maximum for stabilization and be marked appropriately in accordance with this table, or must contain niobium (columbium) and/or tantalum $\geq 10 \times C$ upto 1,0% maximum for stabilization and be marked appropriately in accordance with this table.
 - At the discretion of the manufacturer the carbon content may be higher where required to obtain the specified mechanical properties at larger diameters, but shall not exceed 0,12 for austenitic steels.
 - May contain titanium $\geq 5 \times C$ up to 0,8% maximum.
 - May contain niobium (columbium) and/or tantalum $\geq 10 \times C$ upto 1% maximum.

Table 2 - Mechanical properties for bolts, screws and studs - Austenitic grades

Group	Grade	Property Class	Thread diameter range	Tensile strength $R_m^{(1)}$ min. N/mm ²	Stress at 0,2% permanent strain $R_{p0,2}^{(1)}$ min. N/mm ²	Elongation after fracture $A^{(2)}$ min. mm
Austenitic	A1, A2, A3, A4, A5	50	$\leq M39$	500	210	0,6 <i>d</i>
		70	$\leq M24^{(3)}$	700	450	0,4 <i>d</i>
		80	$\leq M24^{(3)}$	800	600	0,3 <i>d</i>

- The tensile stress is calculated on the stress area (see annex A).
- To be determined according to 6.2.4 on the actual screw length and not on a prepared test piece; *d* is the nominal thread diameter.
- For fasteners with nominal thread diameters *d* > 24 mm the mechanical properties shall be agreed upon between user and manufacturer and marked with grade and property class according to this table.



Notes

A series of horizontal dotted lines for taking notes.



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