



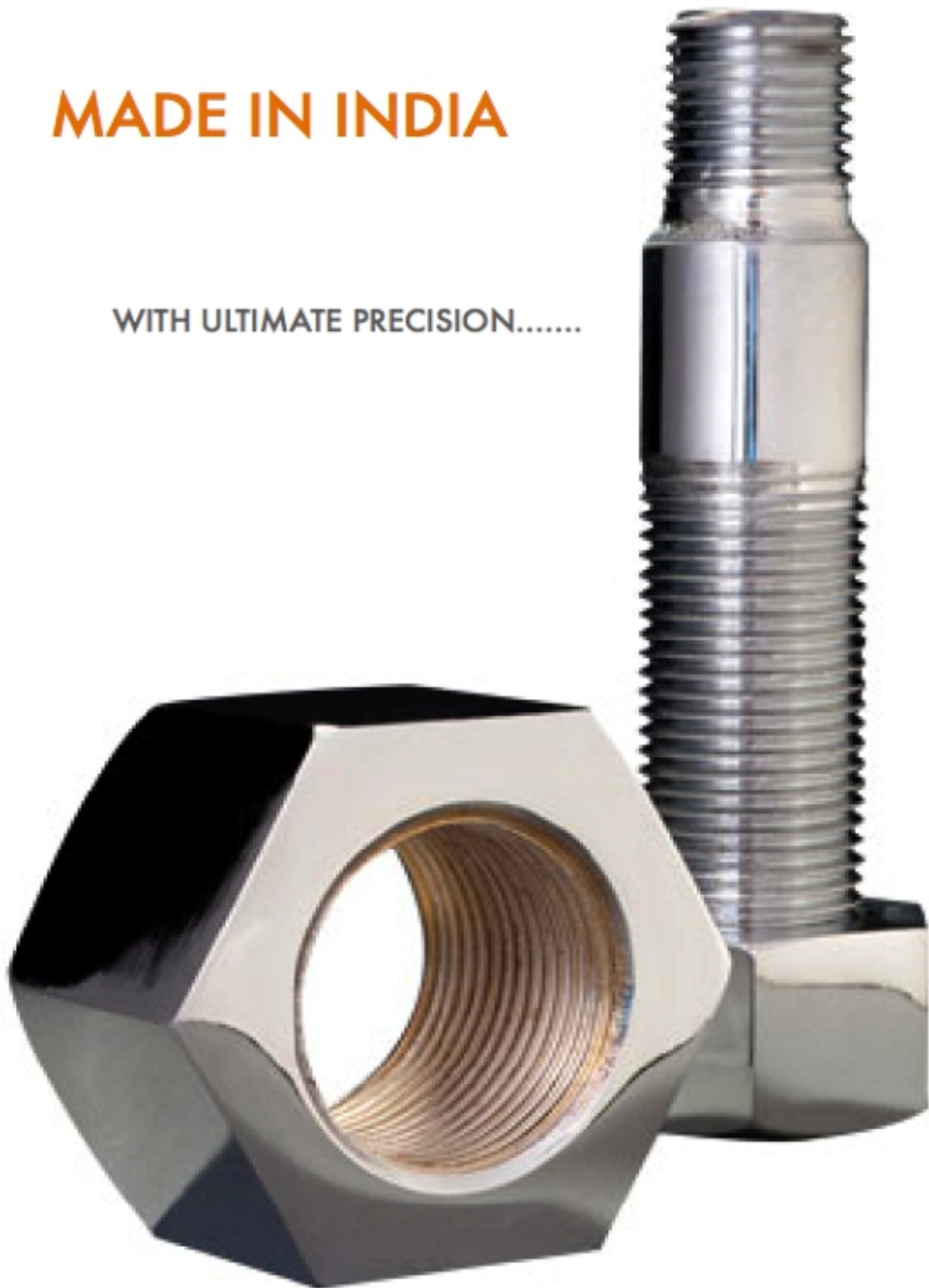
TÜVRheinland®

EXOTIC ALLOY FASTENERS

TorqBolt Inc.

MADE IN INDIA

WITH ULTIMATE PRECISION.....





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CORPORATE NAME

TorqBolt Inc.

ESTABLISHED IN

1991

ADDRESS

Mfg Unit:Plot No.1/54 ; R k Industrial Park ,Off NH8 Highway
Rajkot- 363435 INDIA
Corporate Office : #4/215 , R.R.Roy Road Bhatawdekar Lane
Mumbai- 400004 INDIA
Branch Office : #501/5th fl, Gurukrupa Towers , Limda Chowk
Rajkot- 360002 INDIA

PRODUCTION CAPACITY

1200 tons / year

AREA

Total Area - 5500 m²
Covered Area - 2800m²
Offices - 300m²

CERTIFICATIONS

ISO 9001- 2008
PED 97/23/EC & MERKBLATT AD-2000

BOLTS

Hex Head Bolts, Socket Head, Eye Bolt, U Bolt, T Bolt, J bolt, Heavy Hex Washer Head, Pan Head, Flat Head, Round Head, Square Head, Phillips Washer Head, Flat Head Countersunk, Square Shoulder Head, Carriage type.

STUDS

Full Thread Stud, Half Thread Tap End Stud, Double End Stud, Single End Stud & Customised Stud

NUTS

Hex, Heavy Hex, Heavy Hex Washer Faced, Lock, Jam, Nylock, Nylock Jam, Square Nut, Octagon Nut, Wing Nut, Dome Nut, Weld Nut, Serrated Nut, T Slot Nut, Acorn Nut, Allen Nut, Castle Nut, Coupling Nut, Flange Nut. .

WASHERS

Plain Washer, Flat Washer, Spring Washer, Dome Washer, Belleville Washer, Bushing Washer, Disc Lock Washer, Dock Washer, Fender Washer, Hi Collar Washer, Lock Washer, Ogee Washer, Gland Washer, Square Spring Washer, Square Washer.

RINGS

Forged Seamless Rings, Bearing Rings, Gasket Rings, Machined Rings & Customised Rings.





Step 1 : Raw Material Selection

Raw material is selected from bonded storage racks. Blanks are cut to size and lubricated before hot forging.

Step 2 : Forging



Into the induction heater



After heating, the blank is removed



Bolt fastener part is placed in press



Heading press is engaged and punches down & forms Head



The headed component is now ready for the next process

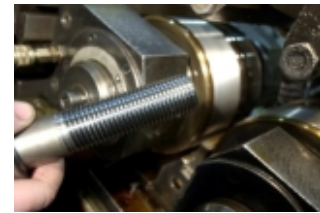
Step 3 : Heat Treatment

Normalising
Annealing
Relieving
Ageing
Nitriding

Quenching & tempering
Over-hardening
Case hardening
Surface Hardening
Precp. Hardening

Step 4 : Roll Threading / Tapping

Exotic material require hot rolled thread via induction heating in insure defect free threads and grain flow for safety critical applications.



Step 5 : Surface Treatments

Pickling
Passivation
Phospatng
Anodising
BlackOxide
Dacrotized
Hot dip Galvanized
Ptfе/Teflon/Xylan Coating

Electroplating
Shot-peening
Shot-Blasting
Sand Blasting
Nickel Plating
Gold/Silver Plating
Hot dip Galvanized
Zinc/chrome Plating



Step 6 : Quality Assurance

After the secondary operations are completed, destructive and non-destructive testing is performed per blueprint specification. Testing is extensive and includes the following processes; tensile strength, fatigue, grain flow and size, full metallurgical examination, stress rapture, micro hardness, penetrant and magnetic particle inspection along with hydrogen determination for titanium alloys.



CHEMICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM F 568 FOR HIGH TENSILE SERVICE

ALLOY	C	Mn max	P max	S max	Si max	Cr	Ni	Mo	V	Cu
4.6	0.55	-	0.048	0.058	-	-	-	-	-	-
4.8	0.55	-	0.048	0.058	-	-	-	-	-	-
5.8	0.13-0.55	-	0.048	0.058	-	-	-	-	-	-
8.8	0.25-0.55	-	0.048	0.058	-	-	-	-	-	-
8.8.3A	0.31-0.42	0.86-1.24	0.045	0.055	0.13-0.37	0.42-0.68	0.22-0.48	-	-	0.22-0.48
8.8.3B	0.36-0.50	0.67-0.93	0.06-0.125	0.055	0.25-0.55	0.47-0.83	0.47-0.83	0.07	-	0.17-0.43
8.8.3C	0.14-0.26	0.76-1.39	0.040	0.045	0.13-0.37	0.27-0.53	0.22-0.53	-	0.010	0.17-0.53
8.8.3D	0.14-0.26	0.36-1.24	0.045	0.055	0.20-0.55	0.45-1.05	0.47-0.83	0.11	-	0.27-0.53
8.8.3E	0.18-0.27	0.56-1.04	0.045	0.045	0.13-0.37	0.55-0.95	0.27-0.63	-	-	0.27-0.63
8.8.3F	0.19-0.26	0.86-1.24	0.045	0.045	0.13-0.37	0.42-0.68	0.17-0.43	-	-	0.17-0.43
9.8	0.25-0.55	-	0.048	0.058	-	-	-	-	-	-
10.9	0.25-0.55	-	0.048	0.058	-	-	-	-	-	-
10.9.3A	0.31-0.42	0.86-1.24	0.045	0.055	0.13-0.37	0.42-0.68	0.22-0.48	-	-	0.22-0.48
10.9.3B	0.36-0.50	0.67-0.93	0.06-0.125	0.055	0.25-0.55	0.47-0.83	0.47-0.83	0.07	-	0.17-0.43
10.9.3C	0.14-0.26	0.76-1.39	0.040	0.045	0.13-0.37	0.27-0.53	0.22-0.53	-	0.010	0.17-0.53
10.9.3D	0.14-0.26	0.36-1.24	0.045	0.055	0.20-0.55	0.45-1.05	0.47-0.83	0.11	-	0.27-0.53
10.9.3E	0.18-0.27	0.56-1.04	0.045	0.045	0.13-0.37	0.55-0.95	0.27-0.63	-	-	0.27-0.63
10.9.3F	0.19-0.26	0.86-1.24	0.045	0.045	0.13-0.37	0.42-0.68	0.17-0.43	-	-	0.17-0.43
12.9	0.31-0.65	-	0.045	0.045	-	-	-	-	-	-

MECHANICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM F 568 FOR HIGH TENSILE SERVICE

ALLOY	UNS	W.Nr	ASTM	AISI	Tensile Strength min. Mpa	Yield Strength min,0.2% Mpa	Elong'n in 4 D, min %	Red'n of area min %	Hardness HB
4.6	-	-	-	-	400	240	22	35	67-95
4.8	-	-	-	-	420	340	14	35	71-95
5.8	-	-	-	-	520	420	10	35	82-95
8.8	-	-	-	-	830	660	12	35	23-34
8.8.3A	-	-	-	-	830	660	12	35	23-34
8.8.3B	-	-	-	-	830	660	12	35	23-34
8.8.3C	-	-	-	-	830	660	12	35	23-34
8.8.3D	-	-	-	-	830	660	12	35	23-34
8.8.3E	-	-	-	-	830	660	12	35	23-34
8.8.3F	-	-	-	-	830	660	12	35	23-34
9.8	-	-	-	-	900	720	10	35	27-36
10.9	-	-	-	-	1040	940	9	35	33-39
10.9.3A	-	-	-	-	1040	940	9	35	33-39
10.9.3B	-	-	-	-	1040	940	9	35	33-39
10.9.3C	-	-	-	-	1040	940	9	35	33-39
10.9.3D	-	-	-	-	1040	940	9	35	33-39
10.9.3E	-	-	-	-	1040	940	9	35	33-39
10.9.3F	-	-	-	-	1040	940	9	35	33-39
12.9	-	-	-	-	1220	1100	8	35	38-44

MECHANICAL REQUIREMENTS										
ALLOY AND STAINLESS STEEL ASTM A193 FOR HIGH TEMPERATURE SERVICE										
ALLOY	UNS	W.Nr	ASTM	AISI	DIA	Tensile Strength min. Mpa	Yield Strength min,0,2% Mpa	Elongation in 4 D, MIN %	Reduction of area min %	Hardness HB
B5	S50100	17362	A193	51	up to 4.incl	690	550	16	50	-
B6	S41000	14006	A193	410	up to 4.incl	760	585	15	50	-
B7	G41400	17225	A193	4140	21/2 and under	860	720	16	50	<321
					over 21/2 to 4	795	655	16	50	<320
					over 4 to 7	690	515	18	50	<277
B7M	G41400	17225	A193	4140	21/2 and under	690	550	18	50	<235
					over 21/2 to 4	690	550	18	50	<235
					over 4 to 7	690	515	18	50	<235
B16	K14072	17711	A193	-	21/2 and under	860	725	18	50	<321
					over 21/2 to 4	760	655	17	45	<302
					over 4 to 7	690	585	16	45	<277
B8	S30400	14301	A193	304	all size	515	205	30	50	<223
B8A	S30400	14301	A193	304	all size	515	205	30	50	<192
B8T	S32100	14541	A193	321	all size	515	205	30	50	<223
B8TA	S32100	14541	A193	321	all size	515	205	30	50	<192
B8C	S34700	14550	A193	347	all size	515	205	30	50	<223
B8CA	S34700	14550	A193	347	all size	515	205	30	50	<192
B8M	S31600	14401	A193	316	all size	515	205	30	50	<223
B8MA	S31600	14401	A193	316	all size	515	205	30	50	<192
B8Cl2	S30400	14301	A193	304	3/4 and under	860	690	12	35	<321
B8Tcl2	S32100	14541	A193	321	over 3/4 to 1	795	550	15	35	<321
B8Ccl2	S34700	14550	A193	347	over 1 to 11/4	725	450	20	35	<321
					over 11/4 to 11/2	690	345	28	45	<321
B8Mci2	S31600	14401	A193	316	3/4 and under	760	665	15	45	<321
					over 3/4 to 1	690	550	20	45	<321
					over 1 to 11/4	655	450	25	45	<321
					over 11/4 to 11/2	620	345	30	45	<321
B8Mcl2B	S31600	14401 14401		316	2 and under	655	616	25	40	<321
					over 2 to 21/2	620	450	30	40	<321
					over 21/2 to 3	550	380	30	40	<321
B8Mcl2C	S31600			316	2 and under	585	450	30	60	
					over 2	585	415	30	60	

MECHANICAL REQUIREMENTS										
ALLOY AND STAINLESS STEEL ASTM A320 FOR LOW TEMPERATURE SERVICE										
ALLOY	UNS	W.Nr	ASTM	AISI	DIA	Tensile Strength min. Mpa	Yield Strength min,0,2% Mpa	Elongation in 4 D, MIN %	Reduction of area min %	Hardness HB
L7*	G41400	1.7225	A320	4140	21/2 and under	860	725	16	50	
L7M**	G41400	1.7225	A320	4140	all size	690	550	18	50	<235
L43*	G43400	1.6565	A320	4340	4 and under	860	725	16	50	
B8	S30400	1.4301	A320	304	all size	515	205	35	50	<223
B8A	S30400	1.4301	A320	304	all size	515	205	35	50	<192
B8T	S32100	1.4541	A320	321	all size	515	205	35	50	<223
B8TA	S32100	1.4541	A320	321	all size	515	205	35	50	<192
B8C	S34700	1.455	A320	347	all size	515	205	35	50	<223
B8A CA	S34700	1.455	A320	347	all size	515	205	35	50	<192
B8M	S31600	1.4401	A320	316	all size	515	205	35	50	<223
B8MA	S31600	1.4401	A320	316	all size	515	205	35	50	<192
B8Cl2	S30400	1.4301	A320	304	3/4 and under	860	690	12	35	<321
B8Tcl2	S32100	1.4541	A320	321	over 3/4 to 1	725	450	20	35	<321
B8Ccl2	S34700	1.455	A320	347	over 1 to 11/4	795	550	15	35	<321
					over 11/4 to 11/2	690	345	28	45	<321
B8Mcl2	S31600	1.4401	A320	316	3/4 and under	760	655	15	45	<321
					over 3/4 to 1	690	550	20	45	<321
					over 1 to 11/4	655	450	25	45	<321
					over 11/4 to 11/2	620	345	30	45	<321

*L7/L43 IMPACT TEST -101°C MIN AVG 27(20) JOULES

**L7M IMPACT TEST -73°C MIN AVG 27(20) JOULES

CHEMICAL REQUIREMENTS												
ALLOY AND STAINLESS STEEL ASTM A193 FOR HIGH TEMPERATURE SERVICE												
ALLOY	C	Mn max	P max	S max	Si max	Cr	Ni	Mo	V	Ti	Al max	Cb+Ta
B5	0.10 min	1.00	0.04	0.03	1.00	4.00-6.00	-	0.40-0.65	-	-	-	-
B6	0.15 min	1.00	0.04	0.03	1.00	11.5-13.5	-	-	-	-	-	-
B7	0.37-0.49	0.65-1.10	0.04	0.04	0.15-0.35	0.75-1.20	-	0.15-0.25	-	-	-	-
B7M	0.37-0.49	0.65-1.10	0.04	0.04	0.15-0.35	0.75-1.20	-	0.15-0.25	-	-	-	-
B16	0.36-0.47	0.45-0.70	0.04	0.04	0.15-0.35	0.80-1.15	-	0.50-0.65	0.50-0.65	-	0.015	-
B8	0.08 max	2.00	0.05	0.03	1.00	18.0-20.0	8.0-11.0	-	-	-	-	-
B8A	0.08 max	2.00	0.05	0.03	1.00	18.0-20.0	8.0-11.0	-	-	-	-	-
B8C	0.08 max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	-	-	10xC min
B8CA	0.08 max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	-	-	10xC min
B8M	0.08 max	2.00	0.05	0.03	1.00	16.0-18.0	10.0-14.0	2.0-3.0	-	-	-	-
B8MA	0.08 max	2.00	0.05	0.03	1.00	16.0-18.0	10.0-14.0	2.0-3.0	-	-	-	-
B8T	0.08 max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	5XC min	-	-
B8TA	0.08 max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	5XC min	-	-
B8cI2	0.08 max	2.00	0.05	0.03	1.00	18.0-20.0	8.0-11.0	-	-	-	-	-
B8Ccl2	0.08 max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	-	-	10xCmin
B8Mcl2	0.08 max	2.00	0.05	0.03	1.00	16.0-18.0	10.0-14.0	2.0-3.0	-	-	-	-
B8Tcl2	0.08 max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	5XC min	-	-
L7	0.38-0.48	0.75-1.00	0.04	0.04	0.15-0.35	0.80-1.10	-	0.15-0.25	-	-	-	-
L7M	0.38-0.48	0.75-1.00	0.04	0.04	0.15-0.35	0.80-1.10	-	0.15-0.25	-	-	-	-
L43	0.38-0.43	0.6-0.85	0.04	0.04	0.15-0.35	0.70-0.90	1.65-2.00	2.0-3.0	-	-	-	-

CHEMICAL REQUIREMENTS												
CARBON, ALLOY AND STAINLESS STEEL NUTS ASTM A 194												
ALLOY	C	Mn max	P max	S max	Si max	Cr	Ni	Mo	V	Ti	Al max	Cb+Ta
2-2H	0.40min	1.00	0.04	0.05	0.40	-	-	-	-	-	-	-
2HM	0.40min	1.00	0.04	0.05	0.40	-	-	-	-	-	-	-
3	0.10min	1.00	0.04	0.03	1.00	4.0-6.0	-	0.40-0.65	-	-	-	-
4	0.40-0.50	0.70-0.90	0.035	0.04	0.15-0.35	-	-	0.20-0.30	-	-	-	-
6	0.15max	1.00	0.04	0.03	1.00	11.5-13.5	-	-	-	-	-	-
6F		1.25	0.06	0.15	1.00	12.0-14.0	-	-	-	-	-	-
7-7M	0.37-0.49	0.65-1.10	0.04	0.04	0.15-0.35	0.75-1.20	0.15-0.25	-	-	-	-	-
16	0.36-0.47	0.45-0.70	0.04	0.04	0.15-0.35	0.80-1.15	0.50-0.65	0.25-0.35	-	0.015	-	-
8-8A	0.08max	2.00	0.05	0.03	1.00	18.0-20.0	8.0-10.50	-	-	-	-	-
8CA	0.08max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	-	-	10xcmin
8MA	0.08max	2.00	0.05	0.03	1.00	16.0-18.0	10.0-14.0	2.0-3.0	-	-	-	-
8TA	0.08max	2.00	0.05	0.03	1.00	17.0-19.0	9.0-12.0	-	-	5xcmin	-	-

MECHANICAL REQUIREMENTS								
CARBON, ALLOY AND STAINLESS STEEL NUTS ASTM A 194								
ALLOY	UNS	W.-Nr.	ASTM	AISI	Dia	HB	HRC	HRB
2	K04002	1.1191	A194	1040	all size	159 to 327	-	-
2H	K04002	1.1191	A194	1040	11/2 and under over 11/2	248 to 327 212 to 327	24 to 28 38max	- 95min
2HM	K04002	1.1191	A194	1040	all size	159 to 237	22max	-
4L	K14510	-	A194	-	all size	248 to 327	24 to 38	-
3	S50100	1.7362	A194	501	all size	248 to 327	24 TO 38	-
6-6F	S41000	1.4006	A194	410	all size	228 TO 271	20 TO 28	-
7L	G41400	1.7225	A194	4140	all size	248 to 327	24 TO 38	-
7M	G41400	1.7225	A194	4140	all size	159 TO 237	22 max	-
8	S30400	1.4301	A194	304	all size	126 TO 300	-	60 TO 105
8C	S34700	1.455	A194	347	all size	126 TO 300	-	60 TO 105
8M	S31600	1.4401	A194	316	all size	126 TO 300	-	60 TO 105
8T	S32100	1.4541	A194	321	all size	126 TO 300	-	60 TO 105
8A	S30400	1.4301	A194	304	all size	126 TO 192	-	60 TO 90
8CA	S34700	1.455	A194	347	all size	126 TO 192	-	60 TO 90
8MA	S31600	1.4401	A194	316	all size	126 TO 192	-	60 TO 90
8TA	S32100	1.4541	A194	321	all size	126 TO 192	-	60 TO 90

HIGH TEMPERATURE RESISTANT NICKEL ALLOYS

MECHANICAL REQUIREMENTS

ALLOY	UNS	W.-Nr.	ASTM	Heat Treatment	Dia	Tensile Strength min. Mpa	Yield Strength min,0.2% Mpa	Elongation in 4 D, min %	Reduction of area min %	Hardness Hrc
600	N0600	2.4816	B166	Solution Annealed	under 1/2	655	310	20	-	-
				Solution Annealed	1/2 to 3	620	275	25	-	-
				Solution Annealed	over 3	585	240	30	-	-
660**	S66286	14980	A453	solution ann+prec hard.	all size	895	585	15	18	248-341
662A**	S66220	-	A453	solution ann+prec hard.	all size	895	585	15	18	255-321
665B**	S66545	14943	A453	solution ann+prec hard.	all size	860	550	15	18	248-321
**Stress Rupture Test : temperature 650degree c. stres >485 Mpa: time to rupture >100 hours: elong. >5%										
718	N07718	2.4668	B637	solution ann+precision hard.	all size	1275	1034	12	15	>331
X-750	N07750	2.4669	B637	Solution Annealed	all size	965	620	8	>30	-
800H	N08810	1.4876	B408	Solution Annealed	all size	450	170	30	-	-
80A	N07080	2.4952	B637	Solution Annealed	all size	930	620	20	-	-

CORROSION RESISTANT NICKEL ALLOYS

MECHANICAL REQUIREMENTS

ALLOY	UNS	W.-Nr.	ASTM	Heat Treatment	Dia	Tensile Strength min. Mpa	Yield Strength min,0.2% Mpa	Elongation in 4 D, min %	Reduction of area min %	Hardness Hrc
400	N0400	2.436	F468	Solution Annealed	1/4 to 7/8	550	275	20	-	75-103HRB
				Solution Annealed	1 to 1 1/2	480	205	20	-	60-103HRB
500	N05500	2.4375	F468	solution ann+prec hard.	1/4 to 7/8	900	620	20	-	24-37
				solution ann+prec hard.	1 to 1 1/2	900	590	20	-	24-37
600	N06600	2.4816	B166	Solution Annealed	under 1/2	655	310	20	-	-
				Solution Annealed	1/2 to 3	620	275	25	-	-
				Solution Annealed	over 3	585	240	30	-	-
625 G1	N06625	2.4856	B446	Solution Annealed	up to 4	825	415	30	-	-
625 G2	N06625	2.4856	B446	Solution Annealed	all size	690	275	30	-	-
660**	S66286	1.498	A453	solution ann+prec hard.	all size	895	585	15	18	248-341HB
662A**	S66220	-	A453	solution ann+prec hard.	all size	895	585	15	18	255-321HB
665B**	S66545	1.4943	A453	solution ann+prec hard.	all size	860	550	15	18	248-321HB
**Stress Rupture Test : temperature 650degree c. stres >485 Mpa: time to rupture >100 hours: elong. >5%										
276	N10276	2.4819	F468	Solution Annealed	all size	760	310	25	-	20-32
B2	N10665	2.4617	B335	Solution Annealed	all size	760	350	40	-	-
C22	N06022	2.4602	B574	Solution Annealed	all size	690	310	45	-	-
718	N07718	2.4668	B637	solution ann+prec hard.	all size	1275	1034	12	15	-

NICKEL ALLOYS

CHEMICAL REQUIREMENTS

ALLOY	C	Mn max	P max	S max	Si max	Cr	Ni	Mo	Ti	OTHERS				
600	0.15	1.00	-	0.02	0.50	14.0-17.0	>72.00	-	-	Cu 0.50	-	Fe 6.0-10.0	-	-
660	0.08	2.00	0.04	0.03	1.00	13.5-16.0	24.0-27.0	1.00-1.50	1.90-2.35	V 0.1-0.5	Al 0.35max	-	B 0.001-0.01	-
662A	0.08	0.4-1.0	0.04	0.03	0.4-1.0	12.0-15.0	24.0-28.0	2.00-3.50	1.80-2.10	Cu 0.50	Al 0.35max	-	B 0.001-0.01	-
665B	0.08	1.25-2.0	0.04	0.03	0.1-0.8	12.0-15.0	24.0-28.0	1.25-2.25	2.70-3.30	Cu 0.25	Al 0.25 max	-	B 0.01-0.07	-
718	0.08	0.35	0.02	0.02	0.35	17.0-21.0	50.0-55.0	2.80-3.30	0.65-1.15	Cu 0.30	Al 0.20-0.8	cb+Ta4.75-5.5	B 0.006 max	Co 1.00A
X-750	0.08	1.00	-	0.001	0.05	14.0-17.0	>70.00	-	2.25-2.75	Cu 0.50	Al 0.40-1.0	cb+Ta0.70-1.2	Fe 5.0-9.0	Co 1.00A
800H	0.10	1.50	-	0.02	1.00	19.0-23.0	30.0-35.0	-	0.15-0.60	Cu 0.75	Al 0.15-0.6	-	Fe > 39.5	-
80A	0.10	1.00	-	0.02	1.00	18.0-21.0	balance	-	1.80-2.70	-	Al 0.50-1.8	-	Fe 3.00 max	-
400	0.30	2.00	-	0.02	0.50	-	63.0-70.0	-	-	Cu balance	-	-	Fe 2.50 max	B
500	0.25	1.50	-	0.01	0.50	-	63.0-70.0	-	0.35-0.85	Cu balance	Al 2.30-3.15	-	Fe 2.00 max	B
625	0.10	0.50	0.02	0.02	0.20	20.0-23.0	>58.00	8.0-10.0	0.40 max	-	Al 0.4 max	Cb+Ta3.15-4.15	Fe 5.00max	Co 1.00A
276	0.01	1.00	0.04	0.03	0.08	14.5-16.5	balance	15.0-17.0	-	-	W 3.0-4.5	W 3.0-4.5	Fe 4.0-7.0	Co 2.5
B2	0.02	1.00	0.04	0.03	0.10	1.00max	balance	26.0-30.0	-	-	-	-	Fe 2.00 max	Co 1.00A
C22	0.02	0.50	0.02	0.02	0.08	20.0-22.5	balance	12.5-14.5	-	-	W 2.5-3.5	W 2.5-3.5	Fe 2.0-6.0	Co 2.5

DUPLEX ALLOYS

MECHANICAL REQUIREMENTS

CORROSION RESISTANT ALLOYS WITH HIGH YIELD LIMITS

ALLOY	UNS	W.-Nr.	ASTM	Trade Name	Heat Treatment	Dia	Tensile Strength min. Mpa	Yield Strength min,0.2% Mpa	Elongation in 4 D, min %	Reduction of area min %	Hardness HB
F51	S31803	1.1162	A182	Duplex	sol'n annealed	all size	620	450	25	50	
F44	S31254	1.4529	A182	Super Duplex	sol'n annealed	all size	650	300	35	50	<290
F53	S32750	1.4468	A182	Super Duplex	sol'n annealed	all size	800	550	15		<310
F55	S32760	1.4496	A182	Super Duplex	sol'n annealed	all size	7501-895	550	25	45	<300
F61	S32550	1.4515	A479	Super Duplex	sol'n annealed	all size	760	550	15		<297
500	N05500	2.4375	F467		sol+pre.harden	1/4 to 7/8	900	620	20		24-37 HRC
					sol+pre.harden	1 to 1 1/2	900	590	20		24-37 HRC
660**	S66286	1.498	A453			all size	895	585	15	18	248- 341

**Stress Rupture Test : temperature 650degree c, stres >385 Mpa: time to rupture >100 hours: elong. >5%

CHEMICAL REQUIREMENTS

CORROSION RESISTANT ALLOYS WITH HIGH YIELD LIMITS

ALLOY	UNS	C	Mn max	P max	S max	Si max	Cr max	Ni	Mo	Ti	W	OTHERS	
F51	S31803	0.03	2.00	0.03	0.02	1.00	21.0-23.0	4.50-6.50	2.5-3.5		-	-	N 0.08-0.20
F44	S31254	0.02	1.00	0.03	0.01	0.80	19.5-20.5	17.5-18.5	6.0-6.5		-	Cu 0.50-1.0	N 0.18-0.22
F53	S32750	0.03	1.20	0.04	0.02	0.80	24.0-26.0	6.0-8.0	3.0-5.0		-	Cu 0.50	N 0.24-0.32
F55	S32760	0.03	1.00	0.03	0.01	1.00	24.0-26.0	6.0-8.0	3.0-4.0		0.5-1.0	Cu 0.50-1.0	N0.20-0.30
F61	S32550	0.04	1.50	0.04	0.03	1.00	24.0-27.0	4.50-6.50	2.9-3.9		-	Cu 1.50-2.5	N0.10-0.25
660	S66286	0.08	2.00	0.04	0.03	1.00	13.5-16.0	24.0-27.0	1.0-1.50	1.90-2.35	0.1-0.5	B 0.001-0.01	Al 0.35 max
500	N05500	0.25	1.50	-	0.01	0.50	-	63.0-70.0	1.00-1.50	0.35-0.85		Al 2.3-3.15 ; Cu bal	Fe 2.00 max

TITANIUM ALLOYS

MECHANICAL REQUIREMENTS

CORROSION RESISTANT ALLOYS WITH LOW DENSITY

ALLOY	UNS	W.-Nr.	ASTM	Tensile Strength min. Mpa	Yield Strength min,0.2% Mpa	Elongation in 4 D, min %	Reduction of area min %
Ti gr. 1	R50250	3.7025	B348	240	170	24	30
Ti gr. 2	R50400	3.7035	B348	345	275	20	30
Ti gr. 3	R50400	3.7055	B348	450	380	18	30
Ti gr. 4	R50400	3.7065	B348	550	483	15	25
Ti gr. 5	R56400	37165	B348	895	828	10	25
Ti gr. 6	R54520	-	B348	828	795	10	25
Ti gr. 7	R52400	37235	B348	345	275	20	30
Ti gr. 9	R58030	-	B348	620	483	15	25
Ti gr. 11	R52250	37225	B348	240	170	24	30
Ti gr. 12	R53400	-	B348	483	345	18	25

CHEMICAL REQUIREMENTS

CORROSION RESISTANT ALLOYS WITH LOW DENSITY

ALLOY	C max	Ni	Mo	V	Ti max	Al max	Fe	O max	H max	N max	Sn	Pd	Residual each max	Residual total max
Ti gr. 1	0.08	-	-	-	balance	-	0.20 max	0.18	0.02	0.03	-	-	0.10	0.40
Ti gr. 2	0.08	-	-	-	balance	-	0.30 max	0.25	0.02	0.03	-	-	0.10	0.40
Ti gr. 3	0.08	-	-	-	balance	-	0.30 max	0.35	0.02	0.05	-	-	0.10	0.40
Ti gr. 4	0.08	-	-	-	balance	-	0.50 max	0.40	0.02	0.05	-	-	0.10	0.40
Ti gr. 5	0.08	-	-	3.50-4.5	balance	5.5-6.75	0.40max	0.20	0.02	0.05	-	-	0.10	0.40
Ti gr. 6	0.08	-	-	-	balance	4.00-6.0	0.50max	0.20	0.02	0.03	2.0-3.0	-	0.10	0.40
Ti gr. 7	0.08	-	-	-	balance	-	0.30max	0.25	0.02	0.03	-	0.12-0.25	0.10	0.40
Ti gr. 9	0.08	-	-	2.00-3.0	balance	2.50-3.5	0.25max	0.15	0.02	0.03	-	-	0.10	0.40
Ti gr. 11	0.08	-	-	-	balance	-	0.20max	0.18	0.02	0.03	-	0.12-0.25	0.10	0.40
Ti gr. 12	0.08	0.6-0.9	0.2-0.4	-	balance	-	0.30max	0.25	0.02	0.03	-	-	0.10	0.40

CHEMICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM A490 FOR STRUCTURAL SERVICE

ALLOY	C	Mn max	P max	S max	Cu	Cr	Ni	B	V	Si
TYPE1	0.28-0.50		0.045	0.045	-	-	-	-	-	-
TYPE2	0.13-0.37	0.67	0.048	0.058	-	-	-	0.0005	-	-
TYPE3	0.19-0.55	0.37	0.045	0.055	0.17-0.63	0.42	0.17	-	-	-

CHEMICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM A449 FOR STRUCTURAL SERVICE

ALLOY	C	Mn min	P max	S max	Si max	B max	Cr	Ni	Mo	V max
TYPE1	0.25-0.58	0.57	0.048	0.058	-	-	-	-	-	-
TYPE2	0.13-0.41	0.67	0.048	0.058	-	0.0005	-	-	-	-

CHEMICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM A325 FOR STRUCTURAL SERVICE

ALLOY	C	Mn	P max	S max	Si max	Cr	Ni	Mo	V	Cu
TYPE1	0.28-0.55	0.57	0.048	0.058	0.13-0.32	-	-	-	-	-
TYPE 3A	0.31-0.42	0.86-1.24	0.045	0.055	0.13-0.37	0.42-0.68	0.22-0.48	-	-	0.22-0.48
TYPE 3B	0.36-0.50	0.67-0.93	0.06-0.125	0.055	0.25-0.55	0.47-0.83	0.47-0.83	0.07	-	0.17-0.53
TYPE 3C	0.14-0.26	0.76-1.39	0.040	0.045	0.13-0.37	0.27-0.53	0.22-0.53	-	0.010	0.17-0.53
TYPE 3D	0.14-0.26	0.36-1.24	0.045	0.055	0.20-0.55	0.45-1.05	0.47-0.83	0.11	-	0.27-0.53
TYPE 3E	0.18-0.27	0.56-1.04	0.045	0.045	0.13-0.37	0.55-0.95	0.27-0.63	-	-	0.27-0.63
TYPE 3F	0.19-0.26	0.86-1.24	0.045	0.045	0.13-0.37	0.55-0.95	0.17-0.43	-	-	0.17-0.43

ALLOY AND CARBON STEEL ASTM A307 FOR STRUCTURAL SERVICE

ALLOY	C	Mn	P max	S max	Si max	Cr	Ni	Mo	V	Cu
GRADE A	0.29	0.90	0.04	0.15	-	-	-	-	-	-
GRADE B	0.29	0.90	0.04	0.05	-	-	-	-	-	-
GRADE C	0.29	0.90	0.04	0.15	-	-	-	-	-	-

CHEMICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM A563 FOR STRUCTURAL SERVICE

ALLOY	C	Mn min	P max	S max	Si max	Cr Min	Ni Min	Mo Min	V	Cu Min
GRADE O	0.58	-	0.13	-	-	-	-	-	-	-
GRADE 1	0.58	-	0.13	-	-	-	-	-	-	-
GRADE B	0.58	-	0.13	-	-	-	-	-	-	-
GRADE C	0.58	-	0.13	-	-	-	-	-	-	-
GRADE D('C')	0.58	0.27	0.048	0.058	-	-	-	-	-	-
GRADE DH('D')	0.18-0.58	0.57	0.048	0.058	-	-	-	-	-	-
GRADE C3 N	-	-	0.07-0.155	0.055	0.15-0.95	0.25-1.30	1.03	-	-	0.22-0.58
GRADE C3 A	0.31-0.42	0.86-1.24	0.045	0.055	0.13-0.37	0.42-0.68	0.22-0.48	-	-	0.22-0.48
GRADE C3 B	0.36-0.50	0.67-0.93	0.06-0.125	0.053	0.25-0.55	0.47-0.83	0.47-0.83	0.07	-	0.17-0.43
GRADE C3 C	0.14-0.26	0.76-1.39	0.040	0.045	0.23-0.37	0.27-0.53	0.22-0.53	-	0.010	0.17-0.53
GRADE C3 D	0.14-0.26	0.36-1.24	0.045	0.055	0.20-0.55	0.45-1.05	0.47-0.83	0.11	-	0.27-0.53
GRADE C3 E	0.18-0.27	0.56-1.04	0.045	0.045	0.13-0.37	0.55-0.95	0.27-0.63	-	-	0.27-0.63
GRADE C3 F	0.19-0.26	0.86-1.24	0.045	0.045	0.13-0.37	0.42-0.68	0.17-0.43	-	-	0.17-0.43
GRADE DH3	0.19-0.55	0.37	0.052	0.055	-	0.42	0.17	0.14	-	0.17

CHEMICAL REQUIREMENTS

ALLOY AND CARBON STEEL ASTM F436 FOR STRUCTURAL SERVICE

ALLOY	C	Mn max	P max	S max	Si max	Cr	Ni	Cu	V	B
TYPE1	-	-	0.050 Max	0.060 Max	-	-	-	-	-	-
TYPE3	-	-	0.045 Max	0.055 Max	0.13-0.37	0.42-0.68	0.22-0.48	0.22-0.48	-	-

CHEMICAL REQUIREMENTS					
ALLOY AND CARBON STEEL ASTM A490 FOR STRUCTURAL SERVICE					
ALLOY	Tensile Min Mpa	Yeild Strength Min 0.2% Mpa	Elongation Min %	Reduction Min %	Hardness HB
TYPE1	1035 - 1170	895	14	40	311-352
TYPE2	1035 - 1170	895	14	40	311-352
TYPE3	1035 - 1170	895	14	40	311-352

CHEMICAL REQUIREMENTS						
ALLOY AND CARBON STEEL ASTM A449 FOR STRUCTURAL SERVICE						
ALLOY	Dia	Tensile Min Mpa	Yeild Strength Min 0.2% Mpa	Elongation Min %	Reduction Min %	Hardness HB
TYPE1	1/4 to 1"	825	635	14	35	255-321
	1 to 1 1/2	725	560	14	35	223-285
	1 1/2 to 3"	400	620	14	35	183-235
TYPE2	1/4 to 1"	825	635	14	35	255-321
	1 to 1 1/2	725	560	14	35	223-285
	1 1/2 to 3"	400	620	14	35	183-235

CHEMICAL REQUIREMENTS					
ALLOY AND CARBON STEEL ASTM A325 FOR STRUCTURAL SERVICE					
ALLOY	Dia	Tensile Strength min	Proof Load	Yield Strength Method	Hardness HB
TYPE1 TYPE 3A TYPE 3B TYPE 3C	1/2" - 1"	827	586	635	253-319
TYPE 3D TYPE 3E TYPE 3F	1 1/8" - 1 1/2"	724	510	560	223-286

CHEMICAL REQUIREMENTS					
ALLOY AND CARBON STEEL ASTM A307 FOR STRUCTURAL SERVICE					
ALLOY	Tensile Min Mpa	Yeild Strength Min 0.2% Mpa	Elongation Min %	Reduction Min %	Hardness HB
GRADE A	415	-	18	-	121-241
GRADE B	415-690	-	18	-	121-212
GRADE C	400-550	50	23	-	-

METALLIC COATINGS

NICKEL/ZINC/CHROMIUM/GOLD/SILVER

TorqBolt Offers a wide range of metallic coatings. **Hot-dip galvanized** coatings are known to provide two types of corrosion protection for steel: barrier and galvanic (cathodic). First, almost like paint, protects steel by means of a semi-impermeable barrier to environment elements that cause corrosion. In addition, presence of zinc in HDG coatings activates cathodic shielding mechanism. In an attempt to address aforementioned concerns a process of mechanical galvanizing had been developed. **Mechanical galvanizing** (MG) is similar to hot-dip galvanizing in that it also applies a coating of zinc on top of bare steel. The matter of selecting the correct material for fasteners is an important one. The design engineer or engine development specialist has to be sure that the material is strong enough to resist the applied loads and have the fatigue resistance to continue in its role between engine rebuilds. **Silver-plated** fasteners are widely used in industry where lubricant cannot be used or where fasteners are assembled into materials where galling is a serious risk. Silver plating is very soft and has very low shear strength, and so acts as a solid lubricant, lowering the coefficient of friction where it is used dry.

VARIOUS METALLIC COATINGS

Electro Zinc Plating (with optional Hydrogen De-Embrittlement)
UNI 4721 – ASTM B633 – BS 1706(White – Yellow – Black – Green)

Hot-Dip Galvanizing
ASTM A153 – ISO 1461- UNI 3740 – BS 729

Aluminizing
ISO 2063

Nickel Plating
ASTM B689

Silver Plating
ASTM B254 – B700

Chromium / Zinc Coating (Dacromet 320 / 500)
ASTM F1136

Electro Cadmium Plating
ASTM B766

Electro less Nickel Plating
ASTM B733

Zinc Phosphate Coating / Manganese Phosphate Coating
ASTM F1137(with optional Hydrogen De-Embrittlement)

Electro Zinc/Nickel Plating
ASTM B841

Mechanical Zinc Coating
ASTM B695

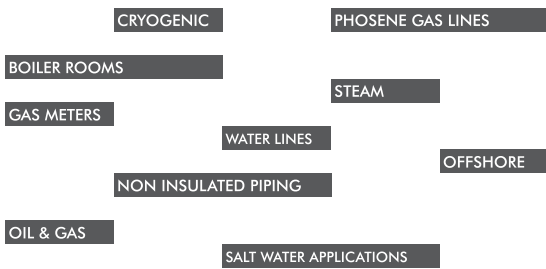


PTFE COATINGS

XYLAN/TEFLON/FLOUROCARBON

Over seventy years ago a DuPont scientist, discovered polytetrafluoroethylene. (PTFE) — a fluoropolymer that is corrosive chemical and heat resistance, and the world's most slippery surface. PTFE Coated Bolts have a Low Coefficient of Friction – The coefficient of friction of PTFE is generally in the range of 0.05 to 0.20, depending on the load, sliding speed, and particular PTFE coating used. PTFE Coated Bolts are Nonwetting – Since surfaces coated with PTFE are both oleophobic and hydrophobic, they are not readily wetted. Cleanup is easier and more thorough—in many cases, surfaces are self-cleaning. PTFE Coated Bolts are Heat Resistance – PTFE industrial coatings can operate continuously at temperatures up to 260°C/500°F. PTFE Coated Bolts have Cryogenic Stability – Many PTFE industrial coatings withstand severe temperature extremes without loss of physical properties. PTFE industrial coatings may be used at temperatures as low as -270°C/-454°F. PTFE Coated Bolts are Chemical Resistance – PTFE is normally unaffected by chemical environments. The only chemicals known to affect all PTFE industrial coatings are molten alkali metals and highly reactive fluorinating agents.

APPLICATIONS



PTFE/XYLAN/TEFLON coating properties:

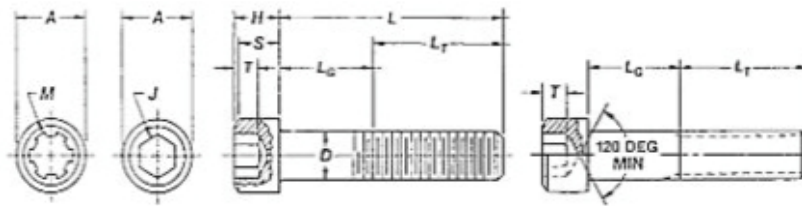
- * Low friction (as low as 0.055)
- * Remarkable adhesion
- * Unusual resistance to wear and abrasion
- * Excellent resistance to corrosion
- * Resistance to chipping
- * Resistance to the elements: weather, sunlight, salt water
- * Working temperature range from: -190 to + 260° C
- * Available in a wide range of colors



CORROSION RESISTANCE

ASTM TEST	TEST	DURATION	RESULTS
D1308	Muriatic Acid 31% HCL	24 Hours	No Effect
D1308	Sulfuric Acid 93% H2SO4	24 Hours	No Effect
D1308	Caustic Soda 100% NaOH	24 Hours	No Effect
D1308	Methyl Ethyl Ketone MEK	24 Hours	No Effect
D1308	Toluene	24 Hours	No Effect
B117	Salt Fog	1000 Hours	No Effect

IMPERIAL & METRIC SIZES



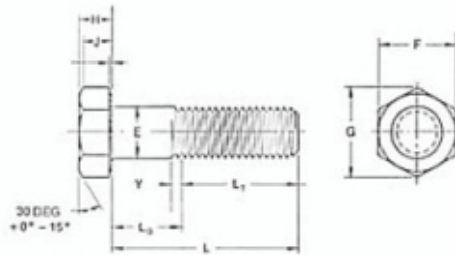
DIMENSIONS OF SOCKET HEAD CAP SCREWS in mm
ANSI/ASME B 18.3

Nom. Size	D Body Diameter		A Head Diameter		H Head Height		S Head Side Height	J Hexagon Socket Size	T Key Engagement	Lt Thread Length
	max	min	max	min	max	min	min	Nom	min	min
3/8"	9.50	9.10	14.30	14.00	9.50	9.30	8.60	7.90	4.60	31.80
7/16"	11.10	10.70	16.70	16.30	11.10	10.90	10.00	9.50	5.40	35.10
1/2"	12.70	12.20	19.10	18.70	12.70	12.50	11.40	9.50	6.20	38.10
5/8"	15.90	15.40	23.80	23.40	15.90	15.60	14.30	12.70	7.80	44.50
3/4"	19.10	18.50	28.60	28.10	19.10	18.80	17.10	15.90	9.40	50.80
7/8"	22.20	21.60	33.30	32.80	22.20	21.90	20.00	19.10	11.00	57.20
1"	25.40	24.80	38.10	37.60	25.40	25.10	22.90	19.10	12.60	63.50
1 1/8"	28.60	27.90	42.90	42.30	28.60	28.20	25.70	22.20	14.10	71.40
1 1/4"	31.80	31.30	47.60	47.00	31.80	31.40	28.60	22.20	15.70	79.20
1 3/8"	34.90	34.20	52.40	51.80	34.90	34.50	31.40	25.40	17.30	87.40
1 1/2"	38.10	37.30	57.20	56.50	38.10	37.70	34.30	25.40	18.90	95.30
1 3/4"	44.50	43.60	66.70	66.00	44.50	44.00	40.00	31.80	22.10	111.30
2"	50.80	49.90	76.20	75.40	50.80	50.40	45.70	38.10	25.30	127.00
2 1/4"	57.20	56.20	85.70	84.90	57.20	56.70	51.40	44.50	28.40	142.70
2 1/2"	63.50	62.50	95.30	94.40	63.50	63.00	57.20	44.50	31.60	158.80
2 3/4"	69.90	68.90	104.80	103.90	69.90	69.30	62.90	50.80	34.80	174.80
3"	76.20	72.20	114.30	113.40	76.20	75.70	68.60	57.20	38.00	190.50

DIMENSIONS OF SOCKET HEAD CAP SCREWS in mm
ISO 4762 / DIN 912 - UNI 5931

Nom. Size	D Body Diameter		A Head Diameter		H Head Height		J Hex Socket Size		T Key Engagement	Lt Thread Length
	max	min	max	min	max	min	max	min	min	min
M8	8.00	7.78	13.27	12.73	8.00	7.64	6.14	6.02	4.00	28.00
M10	10.00	9.78	16.27	15.73	10.00	9.64	8.18	8.03	5.00	32.00
M12	12.00	11.73	18.27	17.73	12.00	11.57	10.18	10.03	6.00	36.00
M14	14.00	13.73	21.33	20.67	14.00	13.57	12.21	12.03	7.00	40.00
M16	16.00	15.73	24.33	23.67	16.00	15.57	14.21	14.03	8.00	44.00
M18	18.00	17.73	27.33	26.67	18.00	17.57	14.21	14.03	9.00	48.00
M20	20.00	19.67	30.33	29.67	20.00	19.48	17.23	17.05	10.00	52.00
M22	22.00	21.67	33.39	32.61	22.00	21.48	17.23	17.05	11.00	56.00
M24	24.00	23.67	36.39	35.61	24.00	23.48	19.28	19.70	12.00	60.00
M27	27.00	26.67	40.39	39.61	27.00	26.48	19.28	19.70	13.50	66.00
M30	30.00	29.67	45.39	44.61	30.00	29.48	22.28	22.07	15.50	72.00
M33	33.00	32.61	50.39	49.61	33.00	32.38	24.28	24.07	18.00	78.00
M36	36.00	35.61	54.46	53.54	36.00	35.38	27.28	27.07	19.00	84.00
M39	39.00	38.61	58.46	57.54	39.00	38.38	27.28	27.07	21.00	90.00
M42	42.00	41.61	63.46	62.54	42.00	41.38	32.33	32.08	24.00	96.00
M45	45.00	44.61	67.46	66.54	45.00	44.38	32.33	32.08	26.00	102.00
M48	48.00	47.61	72.46	71.54	48.00	47.38	36.33	36.08	28.00	108.00
M52	52.00	51.54	78.54	77.48	52.00	51.26	36.33	36.08	31.00	115.00

IMPERIAL & METRIC SIZES



DIMENSION OF HEX CAP SCREWS (FINISHED HEX BOLTS) - ANSI/ASME B 18.2.1 in mm

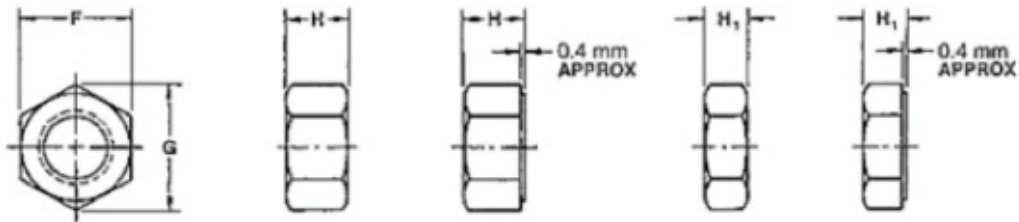
Nom Size	E Body Diameter		F Width Across Flat		G Width Across Corners		H Height		J Wrenching Height	LT Thread Length for screw		Y Transition Thread Length
	max	min	max	min	max	min	max	min		6" & shorter basic	Over 6" basic	
3/8"	9.50	9.40	14.30	14.00	16.50	16.00	6.20	5.70	4.10	25.40	31.80	7.90
7/16"	11.10	10.90	15.90	15.50	18.30	17.70	7.40	6.90	5.00	28.60	34.90	9.10
1/2"	13.10	12.20	22.20	21.60	25.70	24.60	9.20	7.70	5.50	31.80	38.10	9.80
5/8"	16.30	15.40	27.00	26.20	31.20	29.80	11.30	9.30	6.80	38.10	44.65	11.60
3/4"	19.50	18.50	31.80	30.80	36.70	35.10	13.30	11.60	8.20	44.50	50.80	12.70
7/8"	22.70	21.60	36.50	35.40	42.20	40.40	15.30	13.50	9.60	50.80	57.20	14.10
1"	26.00	24.80	41.30	40.00	47.70	45.60	17.80	15.00	10.60	57.20	63.50	15.90
1 1/8"	29.20	27.90	46.00	44.60	53.20	50.90	19.80	16.70	11.70	63.50	69.90	18.10
1 1/4"	32.40	31.10	50.80	49.20	58.60	56.10	22.30	19.00	13.50	69.90	76.20	18.10
1 3/8"	35.70	34.20	55.60	53.80	64.20	61.40	23.90	20.60	14.50	76.20	82.60	21.20
1 1/2"	38.90	37.30	60.30	58.40	69.60	66.60	26.30	22.90	16.30	82.60	88.90	21.20
1 3/4"	45.30	43.60	69.90	67.60	80.40	77.10	30.40	26.80	19.00	95.30	101.60	25.40
2"	51.80	49.90	79.40	76.80	91.60	87.60	35.30	29.80	21.00	108.00	114.30	28.20
2 1/4"	58.50	56.20	88.90	86.10	102.60	98.10	39.30	33.70	23.70	120.70	127.00	28.20
2 1/2"	65.00	62.50	98.40	95.30	113.60	108.30	43.40	37.60	26.50	133.40	139.70	31.80
2 3/4"	71.80	68.90	108.00	104.40	124.60	119.10	47.50	41.50	29.20	146.10	152.40	31.80
3"	78.30	75.20	117.50	113.70	135.60	129.60	52.30	46.10	32.80	158.80	165.10	31.80

DIMENSIONAL OF HEXAGONAL BOLTS

ISO 4014 - DIN 931-ex UNI 5737 / ISO 4017 - DIN 933-ex UNI 5739

Nom Size	E Body Diameter		F Width Across Flat		G Width Across Corner	H Height		LT thread length		
	max	min	max	min	min	max	min	up to 120	up to 200	over 200
M8	8	7.64	13.00	12.57	14.20	5.54	5.06	22	28	
M10	10	9.64	16.00	15.57	17.59	6.69	6.11	26	32	45
M12	12	11.57	18.00	17.57	19.85	7.79	7.21	30	36	49
M14	14	13.57	22.00	21.16	23.91	9.09	8.51	34	40	53
M16	16	15.57	24.00	23.16	26.17	10.29	9.71	38	44	57
M18	18	17.57	27.00	26.16	29.56	11.85	11.15	42	48	61
M20	20	19.48	30.00	29.16	32.95	12.85	12.15	46	52	65
M22	22	21.48	32.00	31.00	35.03	14.35	13.65	50	56	69
M24	24	23.48	36.00	35.00	39.55	15.35	14.65	54	60	73
M27	27	26.48	41.00	40.00	45.20	17.35	16.65	60	66	79
M30	30	29.48	46.00	45.00	50.85	19.12	18.28	66	72	85
M33	33	32.38	50.00	49.00	55.37	21.42	20.58	72	78	91
M36	36	35.38	55.00	53.80	60.79	22.92	22.08	78	84	97
M39	39	38.38	60.00	58.80	66.44	25.42	24.58	84	90	103
M42	42	41.38	65.00	63.10	71.30	26.42	25.58	90	96	109
M45	45	44.38	70.00	66.10	76.95	28.42	27.58	96	102	115
M48	48	47.38	75.00	73.10	82.60	30.42	29.58	102	108	121
M52	52	51.26	80.00	78.10	88.25	33.50	32.50	-	116	129

IMPERIAL SIZES

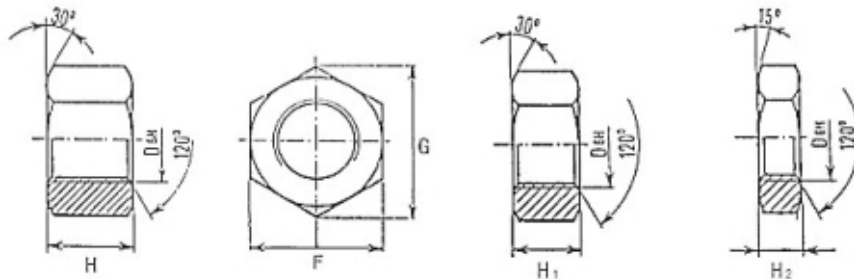


HEX NUTS

**DIMENSIONS OF HEAVY HEX NUTS and HEAVY HEX JAM NUTS in mm.
ASME B 18.2.2**

Nom. Size	F Width Across Flats		G Width Across Corners		H Thickness Heavy Hex Nuts		H1 Thickness Heavy Hex Jam Nuts		Weight Hex Nut	Weight Hex Jam
	max	min	max	min	max	min	max	min		
3/8"	17.48	16.99	20.17	19.38	9.58	8.66	6.40	5.49	0.0149	0.011
7/16"	19.05	18.49	22.00	21.08	11.20	10.24	7.24	6.27	0.02	0.0156
1/2"	22.23	21.59	25.65	24.61	12.80	11.79	8.05	7.04	0.0314	0.0218
9/16"	23.83	23.09	27.51	26.34	14.43	13.36	8.86	7.80	0.0393	0.0281
5/8"	26.97	26.19	31.17	29.85	16.03	14.91	9.68	8.56	0.0503	0.0427
3/4"	31.75	30.78	36.65	35.10	19.25	18.03	11.33	10.11	0.088	0.0797
7/8"	36.53	35.41	42.16	40.36	22.48	21.16	12.95	11.63	0.129	0.103
1"	41.28	40.01	47.65	45.62	25.70	24.28	14.61	13.18	0.184	0.162
1 1/8"	46.02	44.60	53.16	50.88	28.93	27.41	16.23	14.71	0.254	0.225
1 1/4"	50.80	49.23	58.65	56.11	31.78	30.15	19.08	17.45	0.3303	0.264
1 3/8"	55.58	53.82	64.16	61.37	35.00	33.27	20.70	18.97	0.4313	0.322
1 1/2"	60.33	58.42	69.65	66.60	38.23	36.40	22.35	20.35	0.55	0.417
1 5/8"	65.07	63.02	75.16	71.83	41.45	39.52	23.98	22.05	0.7134	0.546
1 3/4"	69.85	67.61	80.65	77.09	44.68	42.65	25.63	23.60	0.8589	0.675
1 7/8"	74.63	72.24	86.16	82.35	47.90	45.77	27.25	25.12	1.0523	0.639
2"	79.38	76.84	91.64	87.60	51.13	48.91	28.91	26.67	1.29	0.989
2 1/4"	88.90	86.06	102.64	98.09	57.18	54.74	31.78	29.34	1.8182	1.088
2 1/2"	98.43	95.25	113.64	108.59	63.63	60.99	38.23	35.59	2.497	1.575
2 3/4"	107.96	104.44	124.64	119.08	70.08	67.23	41.50	38.66	3.175	2.019
3"	117.48	113.67	135.64	129.59	76.53	73.48	44.78	41.73	3.92	2.57
3 1/4"	17.00	122.89	146.66	140.08	82.60	79.35	47.65	44.40	4.86	3.19
3 1/2"	136.53	132.08	157.66	150.57	89.05	85.69	50.95	47.50	6.42	4.005
3 3/4"	146.05	141.27	168.66	161.06	95.50	91.85	54.20	50.55	7.80	4.802
4"	155.58	150.50	179.65	171.58	101.96	98.09	57.51	53.64	9.77	5.722

METRIC SIZES

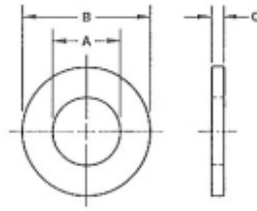


HEX NUTS

DIMENSIONS OF HEX NUTS WITH METRIC COARSE AND FINE PITCH THREAD in mm

Nom. Size	F Width Across Flats		G Width Across Corners		H ISO 4033-ex UNI 5587		H1 ISO 4032-ex DIN 934 UNI 5588		H2 ISO 4035-ex DIN 936 UNI 5589		Weight ISO 4033	Weight ISO 4032	Weight ISO 4035
	max	min	max	min	max	min	max	min	max	min			
M8	13	12.730	15.000	14.380	8	7.64	6.5	6.14	5	4.70	0.0057	0.0046	0.0035
M10	17	16.730	19.600	18.900	10	9.64	8	7.64	6	5.70	0.0126	0.0100	0.0077
M12	19	18.670	21.900	21.100	12	11.57	10	9.64	7	6.64	0.0181	0.0151	0.0116
M14	22	21.670	25.400	24.490	14	13.57	11	10.36	8	7.64	0.030	0.0235	0.0176
M16	24	23.670	27.700	26.750	16	15.57	13	12.30	8	7.64	0.0374	0.0304	0.023
M18	27	26.670	31.100	30.140	18	17.57	15	14.30	9	8.64	0.0522	0.0435	0.0332
M20	30	29.670	34.600	33.530	20	19.48	16	14.90	9	8.64	0.0734	0.0587	0.0438
M22	32	31.610	36.900	35.720	22	21.48	18	16.90	10	9.64	0.088	0.072	0.0541
M24	36	35.380	41.500	39.980	24	23.48	19	17.70	10	9.64	0.1242	0.0983	0.0733
M27	41	40.380	47.300	45.630	27	26.48	22	20.70	12	11.57	0.177	0.1442	0.1086
M30	46	45.380	53.100	51.280	30	29.48	24	22.70	12	11.57	0.2528	0.2022	0.1530
M33	50	49.260	57.700	55.800	33	32.38	26	24.77	14	13.57	0.328	0.2584	0.1964
M36	55	54.260	63.500	61.310	36	35.38	29	27.40	14	13.57	0.4452	0.3586	0.2711
M39	60	59.256	69.300	66.960	39	38.38	31	29.40	16	15.57	0.5885	0.4678	0.3549
M42	65	64.260	75.000	72.610	42	41.38	34	32.40	16	15.57	0.7298	0.5908	0.4500
M45	70	69.260	80.800	78.260	45	44.38	36	34.40	18	17.57	0.941	0.7528	0.5751
M48	75	85.260	86.500	83.910	48	47.38	38	36.40	18	17.57	1.1354	0.8989	0.6883
M52	80	79.260	92.400	89.560	52	51.38	42	40.40	20	19.48	1.393	--	0.5953
M56	85	84.150	98.100	95.070	56	55.26	45	43.40	22	21.48	1.646	--	--
M60	90	89.130	103.900	100.720	60	59.26	48	46.40	24	23.48	1.9688	--	--
M64	95	94.130	109.700	106.370	64	63.26	51	49.10	26	25.48	2.2827	--	--
M68	100	99.130	115.500	112.020	68	67.26	54	52.10	26	25.48	2.710	--	--
M72	105	104.130	121.250	117.670	72	71.26	58	56.10	28	27.48	3.217	--	--
M76	110	109.130	127.000	123.320	76	75.26	61	59.10	30	29.48	3.700	--	--
M80	115	114.130	132.800	128.970	80	79.26	64	62.10	32	31.38	4.028	--	--
M85	120	119.130	138.600	134.620	85	84.13	68	66.10	34	33.38	4.5373	--	--
M90	130	129.000	150.100	145.770	90	89.13	72	70.10	36	35.38	5.8464	--	--
M95	135	134.000	155.900	151.420	95	94.13	76	74.10	38	37.38	6.300	--	--
M100	145	144.000	167.400	162.720	100	99.13	80	78.10	40	39.38	8.060	--	--

IMPERIAL & METRIC SIZES



DIMENSION OF PLAIN WASHERS in mm.													
ISO 7089-DIN 125-ex UNI 6592 ASME B18.22.1						Heavy washers as per F436							
Nom.	Size	A	B	C	Weight	A	B	THICK 'C		Extra Thick 'C		Weight	
								Min	Max	Min	Max	Thick	Extra Thick
M6	1/4"	6.4	12.5	1.6	0.0011	7.14	15.88	1.30	2.03	-	-	0.0025	-
M7	-	7.4	14	1.6	0.0014	-	-	-	-	-	-	-	-
M8	5/16"	8.4	17	1.6	0.0022	8.74	17.48	1.30	2.03	-	-	0.0029	-
M10	3/8"	10.5	21	2	0.0041	10.31	20.65	1.30	2.03	-	-	0.0040	-
M12	7/16"	13	24	2.5	0.0063	11.91	23.42	1.30	2.03	-	-	0.0051	-
M14	1/2"	15	28	2.5	0.0086	13.49	27.00	2.46	4.50	7.75	9.53	0.0152	0.0323
M16	9/16"	17	30	3	0.0113	15.88	30.18	2.79	4.50	7.75	9.53	0.0184	0.0389
M16	5/8"	17	30	3	0.0113	17.48	33.35	3.10	4.50	7.75	9.53	0.0225	0.0476
M18	-	19	34	3	0.0147	-	-	-	-	-	-	-	-
M20	3/4"	21	37	3	0.0172	20.65	37.29	3.10	4.50	7.75	9.53	0.0269	0.0569
M22	7/8"	23	39	3	0.0183	23.83	44.45	3.45	4.50	7.75	9.53	0.0393	0.0832
M24	-	25	44	4	0.0323	-	-	-	-	-	-	-	-
M27	1"	28	50	4	0.0423	27.00	50.80	3.45	4.50	7.75	9.53	0.0516	0.1093
M30	1 1/8"	31	56	4	0.0536	30.18	57.15	3.45	4.50	7.75	9.53	0.0657	0.1391
M33	1 1/4"	34	60	5	0.0753	34.93	63.50	3.45	4.50	7.75	9.53	0.0784	0.1661
M36	1 3/8"	37	66	5	0.0921	38.10	69.85	3.45	4.50	7.75	9.53	0.0955	0.2024
M39	1 1/2"	40	72	6	0.133	41.28	76.20	3.45	4.50	7.75	9.53	0.1144	0.2423
M42	1 5/8"	43	78	7	0.183	-	-	-	-	-	-	-	-
M45	1 3/4"	46	85	7	0.220	47.63	85.73	4.52	7.11	7.75	9.53	0.2240	0.3000
M48	1 7/8"	50	92	8	0.294	-	-	-	-	-	-	-	-
M52	2	54	98	8	0.330	53.98	95.25	4.52	7.11	7.75	9.53	0.2716	0.3637
M56	2 1/4"	58	105	9	0.425	60.33	101.60	6.10	8.64	7.75	9.53	0.3579	0.3947
M60	-	62	110	9	0.458	-	-	-	-	-	-	-	-
M64	2 1/2"	66	115	9	0.492	66.68	114.30	6.10	8.64	7.95	9.53	0.4615	0.5090
M68	-	70	120	10	0.586	-	-	-	-	-	-	-	-
M72	2 3/4"	74	125	10	0.626	73.03	127.00	6.10	8.64	7.95	9.53	0.5781	0.6376
M76	3"	78	135	10	0.749	79.38	139.70	6.10	8.64	7.95	9.53	0.7076	0.7805
M80	-	82	140	12	0.953	-	-	-	-	-	-	-	-
M85	3 1/4"	88	140	12	0.983	85.73	152.40	6.10	8.64	7.95	9.53	0.8501	0.9376
M90	3 1/2"	93	160	12	1.250	92.08	165.10	6.10	8.64	7.95	9.53	1.0056	1.1091
M95	3 3/4"	99	165	12	1.290	98.43	177.80	6.10	8.64	7.95	9.53	1.1740	1.2948
M100	4"	104	175	14	1.710	104.78	190.50	6.10	8.64	7.95	9.53	1.3553	1.4948

BUNC THREAD SERIES ASME B 1.1 CLASS 2A & 2B

Nom Size	Threads	EXTERNAL mm				INTERNAL mm						Weight x 1mm
		Major Diameter Max	Major Diameter Min	Pitch Diameter Max	Pitch Diameter Min	Minor Diameter Max	Minor Diameter Min	Major Diameter Min	Minor Diameter Max	Pitch Diameter Min	Pitch Diameter Max	
1 1/8"	8	28.522	28.141	26.459	26.284	24.625	28.575	25.781	25.146	26.741	26.513	0.004313
1 1/4"	8	31.697	31.316	29.634	29.456	27.800	31.750	28.956	28.321	29.921	29.688	0.005410
1 3/8"	8	34.869	34.488	32.807	32.624	30.973	34.925	32.131	31.496	33.099	32.863	0.006630
1 1/2"	8	38.044	37.663	35.982	35.796	34.148	38.100	35.306	34.671	36.279	36.038	0.007975
1 5/8"	8	41.219	40.838	39.157	38.969	37.323	41.275	38.481	37.846	39.459	39.213	0.009445
1 3/4"	8	44.392	44.011	42.329	42.139	40.495	44.450	41.656	41.021	42.636	42.388	0.011037
1 7/8"	8	47.567	47.186	45.504	45.309	43.670	47.625	44.831	44.196	45.817	45.563	0.012755
2"	8	50.742	50.361	48.679	48.481	46.845	50.800	48.006	47.371	48.994	48.738	0.014597
2 1/4"	8	57.089	56.708	55.027	54.823	53.193	57.150	54.356	53.721	55.352	55.088	0.018652
2 1/2"	8	63.439	63.058	61.377	61.168	59.543	63.500	60.706	60.071	61.707	61.438	0.023205
2 3/4"	8	69.787	69.406	67.724	67.513	65.890	69.850	67.056	66.421	68.062	67.788	0.028253
3"	8	76.134	74.229	74.071	73.856	72.238	76.200	73.406	72.771	74.419	74.138	0.033797
3 1/4"	8	82.484	82.103	80.421	80.201	78.704	82.550	79.121	79.756	80.488	80.775	0.039841
3 1/2"	8	88.834	88.453	86.771	86.548	85.054	88.900	85.471	86.106	86.838	86.130	0.046380
3 3/4"	8	95.181	94.800	93.119	92.890	91.402	95.250	91.821	92.456	93.118	93.485	0.053414
4"	8	101.531	101.150	99.469	99.238	97.752	101.600	98.171	98.806	99.538	99.840	0.060948
4 1/4"	8	107.879	107.498	105.816	105.580	104.099	107.950	104.521	105.156	105.888	106.192	0.071689
4 1/2"	8	114.229	113.848	112.166	111.928	110.449	114.300	110.871	111.506	112.238	112.547	0.080377
4 3/4"	8	120.576	120.195	118.514	118.273	116.797	120.650	117.221	117.856	118.588	118.902	0.094337
5"	8	126.926	126.545	124.864	124.617	123.147	127.000	123.571	124.206	124.938	125.258	0.099239

ROLL THREAD SPECIFICATIONS

UNC THREAD SERIES ASME B 1.1 CLASS 2A & 2B

Nom Size	Threads	EXTERNAL mm					INTERNAL mm					Weight x 1mm
		Major Diameter		Pitch Diameter		Minor	Major	Minor Diameter		Pitch Diameter		
		Max	Min	Max	Min	Max	Min	Min	Max	Min	Max	
1/4"	20	6.322	6.116	5.497	5.403	4.765	6.350	4.978	5.258	5.525	5.646	0.000186
5/16"	18	7.907	7.686	6.990	6.888	6.175	7.938	6.401	6.731	7.021	7.155	0.000301
3/8"	16	9.492	9.253	8.461	8.349	7.544	9.548	7.798	8.153	8.494	8.639	0.000441
7/16"	14	11.077	10.815	9.898	9.779	8.852	11.113	9.144	9.550	9.934	10.089	0.000604
1/2"	13	12.662	12.385	11.392	11.265	10.264	12.700	10.592	11.024	11.430	11.595	0.000799
9/16"	12	14.247	13.957	12.873	12.741	11.651	14.288	11.989	12.446	12.130	13.086	0.001021
5/8"	11	15.834	15.527	14.336	14.196	13.002	15.875	13.386	13.868	14.376	14.559	0.001266
3/4"	10	19.004	18.677	17.356	17.203	15.888	19.050	16.307	16.840	17.399	17.595	0.001855
7/8"	9	22.177	21.824	20.343	20.183	18.715	22.225	19.177	19.761	20.391	20.599	0.002549
1"	8	25.349	24.968	23.287	23.114	21.453	25.400	21.971	22.606	23.338	23.561	0.003340
1 1/8"	7	28.512	28.103	26.162	25.979	24.067	28.575	24.638	25.349	26.218	26.457	0.004216
1 1/4"	7	31.694	31.278	29.337	29.149	27.242	31.750	27.813	28.524	29.393	29.637	0.005302
1 3/8"	6	34.864	34.402	32.113	31.910	29.670	34.925	28.435	31.115	32.174	32.438	0.006353
1 1/2"	6	38.039	37.577	35.288	35.082	32.845	38.100	33.528	34.290	35.349	35.616	0.007671
1 5/8"	6	41.212	40.749	38.461	38.252	36.185	41.275	36.703	37.465	38.524	38.796	0.009112
1 3/4"	6	44.387	43.924	41.636	41.425	39.347	44.450	39.878	40.640	41.699	41.974	0.010679
1 7/8"	6	47.562	47.099	44.811	44.597	42.522	47.625	43.053	43.815	44.874	45.154	0.012369
2"	5	50.726	50.168	47.061	46.820	43.802	50.800	44.679	45.593	47.135	47.450	0.013643
2 1/4"	5	57.076	56.518	53.411	53.165	50.152	57.150	51.029	51.943	53.485	53.805	0.017573
2 1/2"	4	63.421	62.817	59.296	59.032	55.631	63.500	56.617	57.582	59.375	59.718	0.021659
2 3/4"	4	69.769	69.164	65.644	65.377	61.979	69.850	62.967	63.932	65.725	66.073	0.026544
3"	4	76.119	75.514	71.994	71.722	68.329	76.200	69.317	70.282	72.075	72.428	0.031928
3 1/4"	4	82.466	81.862	78.341	78.064	74.676	82.550	75.667	76.632	78.425	78.783	0.037806
3 1/2"	4	88.816	88.212	84.691	84.412	81.026	88.900	82.017	82.982	84.775	85.138	0.044183
3 3/4"	4	95.164	94.559	91.039	90.754	87.373	95.250	88.367	89.332	91.125	91.493	0.051054
4"	4	101.514	100.909	97.389	97.102	93.723	101.600	94.717	95.682	97.475	93.605	0.058425
4 1/4"	4	107.864	107.259	103.739	103.447	100.302	107.950	101.067	102.032	103.825	104.204	0.066292
4 1/2"	4	114.211	113.607	110.086	109.792	106.650	114.300	109.792	110.086	110.175	110.559	0.074653
4 3/4"	4	120.561	119.957	116.436	116.139	113.000	120.650	113.767	114.732	116.525	116.914	0.083513
5"	4	126.909	126.304	122.784	122.481	119.347	127.000	120.117	121.082	122.875	123.266	0.092867

Nom Size	Threads	EXTERNAL mm					INTERNAL mm					Weight x 1mm
		Major Diameter		Pitch Diameter		Minor	Major	Minor Diameter		Pitch Diameter		
		Max	Min	Max	Min	Max	Min	Min	Max	Min	Max	
M6	1	5.974	5.794	5.324	5.212	4.783	6	5.35	5.5	4.917	5.153	0.000175
M8	1.25	7.972	7.76	7.16	7.042	6.619	8	7.188	7.348	6.647	6.912	0.000316
M10	1.5	9.968	9.732	8.994	8.892	8.344	10	9.026	9.206	8.376	8.676	0.000498
M12	1.75	11.966	11.701	10.829	10.7	10.072	12	10.863	11.063	10.106	10.441	0.000722
M14	2	13.962	13.682	12.663	12.53	11.797	14	12.701	12.913	11.835	12.21	0.000988
M16	2	15.962	15.682	14.663	14.53	13.797	16	14.701	14.913	13.835	14.21	0.001324
M18	2.5	17.958	17.623	16.334	16.23	15.252	18	16.376	16.6	15.294	15.744	0.001643
M20	2.5	19.958	19.623	18.334	18.216	17.252	20	18.376	18.6	17.294	17.744	0.002071
M22	2.5	21.958	21.623	20.334	20.196	19.252	22	20.376	20.6	19.294	19.744	0.002547
M24	3	23.952	23.577	22.003	21.866	20.704	24	22.051	22.316	20.752	21.252	0.002982
M27	3	26.952	26.577	25.003	24.866	23.704	27	25.051	25.316	23.752	24.252	0.003851
M30	3.5	29.947	29.522	27.674	27.516	26.158	30	27.727	28.007	26.211	26.771	0.004718
M33	3.5	32.947	32.522	30.674	30.5	29.158	33	30.727	31.007	29.211	29.771	0.005796
M36	3	35.952	35.577	34.003	33.83	31.61	36	33.402	33.702	31.67	32.27	0.007122
M39	3	38.952	38.577	37.003	36.8	34.61	39	36.402	36.7002	34.67	35.27	0.008434
M42	3	41.952	41.577	40.003	39.8	37.066	42	39.077	39.392	37.129	37.799	0.009857
M45	3	44.952	44.577	43.003	42.8	40.066	43	42.077	42.392	40.129	40.799	0.011391
M48	3	47.952	47.577	46.003	45.8	42.516	48	44.752	45.087	42.587	43.297	0.013036
M52	3	51.952	51.577	50.003	49.8	46.516	52	46.752	47.087	44.587	45.297	0.015402
M56	4	55.94	55.465	53.342	53.13	49.971	56	52.428	52.783	50.046	50.796	0.017527
M60	4	59.94	59.465	57.342	57.13	53.971	60	56.428	56.783	54.046	54.796	0.020255
M64	4	63.94	63.465	61.342	61.18	57.425	64	60.103	60.478	57.505	58.305	0.023179
M68	4	67.94	67.465	65.342	65.13	61.425	68	64.103	64.478	61.505	62.305	0.026301
M72	4	71.94	71.465	69.342	69.13	65.425	72	68.103	68.478	65.505	66.305	0.029619
M76	4	75.94	75.465	73.342	73.13	69.425	76	72.103	72.478	69.505	70.305	0.033135
M80	4	79.94	79.465	77.342	77.106	74.509	80	77.402	77.717	75.67	76.27	0.036848
M85	4	84.94	84.465	82.342	82.11	80.177	85	82.402	82.717	80.67	81.27	0.041766
M90	4	89.94	89.465	87.342	87.11	85.177	90	87.402	87.717	85.67	86.27	0.046992
M95	4	94.94	94.465	92.342	92.11	90.177	95	92.402	92.737	90.67	91.27	0.052527
M100	4	99.94	99.465	97.342	97.11	95.177	100	97.402	97.737	95.67	96.27	0.058369

WEIGHT CHART - HEX BOLTS METRIC RANGE - ISO 4014/DIN 931/UNI5737 (KG/Pc)

LENGTH	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52	M56	M60	M64
60	0.067	0.094	0.123	0.164	0.209	0.254	0.315	-	-	-	-	-	-	-	-	-	-	-	-
70	0.075	0.105	0.138	0.183	0.233	0.283	0.349	0.470	0.608	-	-	-	-	-	-	-	-	-	-
75	0.079	0.111	0.146	0.192	0.244	0.298	0.367	0.492	0.635	0.796	-	-	-	-	-	-	-	-	-
80	0.084	0.117	0.153	0.202	0.256	0.312	0.384	0.514	0.662	0.829	1.025	-	-	-	-	-	-	-	-
90	0.093	0.127	0.169	0.221	0.280	0.341	0.418	0.558	0.716	0.894	1.104	1.353	-	-	-	-	-	-	-
95	0.097	0.133	0.176	0.231	0.292	0.356	0.436	0.580	0.744	0.927	1.143	1.400	1.648	-	-	-	-	-	-
100	0.101	0.139	0.184	0.241	0.304	0.370	0.453	0.602	0.771	0.960	1.182	1.446	1.701	2.030	-	-	-	-	-
120	0.118	0.164	0.214	0.279	0.352	0.428	0.522	0.690	0.879	1.092	1.339	1.630	1.915	2.276	2.659	3.212	-	-	-
130	0.127	0.174	0.228	0.297	0.374	0.455	0.554	0.730	0.929	1.153	1.412	1.716	2.015	2.391	2.789	3.366	-	-	-
140	0.136	0.185	0.243	0.316	0.398	0.484	0.588	0.774	0.984	1.219	1.490	1.808	2.122	2.514	2.929	3.531	4.127	-	-
160	0.154	0.206	0.273	0.354	0.445	0.542	0.657	0.862	1.092	1.351	1.647	1.992	2.336	2.760	3.209	3.860	4.509	5.500	6.656
170	0.163	0.219	0.289	0.374	0.469	0.571	0.692	0.906	1.146	1.416	1.725	2.085	2.443	2.883	3.349	4.024	4.700	5.720	6.916
180	0.172	0.231	0.304	0.393	0.493	0.600	0.727	0.950	1.201	1.482	1.804	2.177	2.550	3.006	3.490	4.189	4.892	5.940	7.176
200	0.190	0.253	0.334	0.431	0.541	0.658	0.796	1.037	1.309	1.614	1.961	2.361	2.764	3.252	3.770	4.518	5.274	6.380	7.696
210	0.199	0.264	0.347	0.447	0.561	0.682	0.824	1.074	1.355	1.670	2.027	2.440	2.854	3.357	3.888	4.659	5.437	6.600	7.956
220	0.208	0.275	0.362	0.466	0.585	0.711	0.859	1.118	1.409	1.736	2.105	2.532	2.961	3.480	4.028	4.824	5.628	6.820	8.216
240	0.226	0.297	0.392	0.505	0.632	0.769	0.928	1.206	1.517	1.867	2.262	2.716	3.175	3.726	4.309	5.153	6.010	7.260	8.736
250	0.235	0.308	0.407	0.524	0.656	0.798	0.962	1.250	1.572	1.933	2.340	2.809	3.282	3.849	4.449	5.318	6.201	7.480	8.996
260	0.244	0.319	0.422	0.543	0.680	0.827	0.997	1.294	1.626	1.999	2.419	2.901	3.390	3.972	4.589	5.482	6.393	7.700	9.256
280	0.262	0.341	0.453	0.582	0.728	0.885	1.066	1.381	1.735	2.130	2.576	3.085	3.604	4.218	4.869	5.812	6.775	8.140	9.776
290	0.271	0.352	0.468	0.601	0.752	0.914	1.101	1.425	1.789	2.196	2.654	3.177	3.711	4.341	5.009	5.976	6.966	8.360	10.036
300	0.280	0.363	0.483	0.620	0.775	0.943	1.135	1.469	1.843	2.262	2.733	3.270	3.818	4.464	5.149	6.141	7.157	8.580	10.296
320	0.298	0.385	0.513	0.659	0.823	1.001	1.204	1.557	1.952	2.394	2.890	3.454	4.032	4.710	5.429	6.470	7.539	9.020	10.816
330	0.307	0.396	0.528	0.678	0.847	1.030	1.239	1.601	2.006	2.459	2.968	3.546	4.139	4.833	5.569	6.635	7.731	9.240	11.076
340	0.316	0.407	0.544	0.697	0.871	1.059	1.273	1.645	2.060	2.525	3.046	3.638	4.246	4.956	5.710	6.799	7.922	9.460	11.336
360	0.334	0.429	0.574	0.736	0.919	1.117	1.342	1.732	2.169	2.657	3.203	3.823	4.460	5.202	5.990	7.128	8.304	9.900	11.856
370	0.343	0.440	0.589	0.755	0.942	1.146	1.377	1.776	2.223	2.723	3.282	3.915	4.567	5.325	6.130	7.293	8.495	10.120	12.116
380	0.352	0.451	0.604	0.774	0.966	1.174	1.411	1.820	2.277	2.788	3.360	4.007	4.674	5.448	6.270	7.458	8.686	10.340	12.376
400	0.370	0.473	0.634	0.813	1.014	1.232	1.481	1.908	2.386	2.920	3.517	4.192	4.888	5.694	6.550	7.787	9.069	10.780	12.896
410	0.379	0.484	0.650	0.832	1.038	1.261	1.515	1.951	2.440	2.986	3.596	4.284	4.995	5.817	6.690	7.951	9.260	11.000	13.156
420	0.388	0.495	0.665	0.851	1.062	1.290	1.550	1.995	2.494	3.052	3.674	4.376	5.102	5.940	6.830	8.116	9.451	11.220	13.416
440	0.406	0.517	0.695	0.890	1.109	1.348	1.619	2.083	2.603	3.183	3.831	4.560	5.317	6.186	7.111	8.445	9.833	11.660	13.936
450	0.415	0.528	0.710	0.909	1.133	1.377	1.653	2.127	2.657	3.249	3.909	4.653	5.424	6.309	7.251	8.610	10.024	11.880	14.196
500	0.460	0.583	0.786	1.005	1.253	1.522	1.826	2.346	2.929	3.578	4.302	5.113	5.959	6.924	7.951	9.433	10.980	12.980	15.496
600	0.550	0.693	0.937	1.198	1.491	1.811	2.171	2.785	3.471	4.236	5.086	6.035	7.029	8.155	9.352	11.079	12.892	15.180	18.096
650	0.595	0.748	1.013	1.294	1.610	1.956	2.344	3.004	3.743	4.565	5.478	6.496	7.565	8.770	10.053	11.902	13.847	16.280	19.396
700	0.640	0.803	1.089	1.390	1.730	2.101	2.517	3.223	4.014	4.894	5.870	6.957	8.100	9.385	10.753	12.725	14.803	17.380	20.696
800	0.730	0.913	1.240	1.583	1.968	2.390	2.862	3.662	4.557	5.552	6.655	7.879	9.170	10.615	12.154	14.371	16.715	19.580	23.296

WEIGHT CHART - HEAVY HEX BOLTS IMPERIAL RANGE - ANSI/ASME B 18.2.1 (KG/1000Pcs)

LENGTH	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	1.3/8"	1.1/2"
10	4.80	-	-	-	-	-	-	-	-	-	-	-	-	-
13	5.40	9.00	13.30	-	-	-	-	-	-	-	-	-	-	-
16	5.90	10.00	14.70	-	-	-	-	-	-	-	-	-	-	-
19	6.50	10.90	16.10	23.00	36.70	-	-	-	-	-	-	-	-	-
22	7.10	11.90	17.50	24.90	39.30	-	-	-	-	-	-	-	-	-
25	7.90	12.80	18.90	26.90	41.80	51.20	68.80	111.00	167.00	233.00	319.00	428.00	553.00	712.00
32	9.40	15.30	22.00	30.70	46.90	57.70	76.80	123.00	183.00	254.00	346.00	461.00	593.00	760.00
38	11.00	17.70	25.60	35.50	52.60	64.10	84.80	135.00	199.00	276.00	373.00	495.00	634.00	809.00
44	12.60	20.20	29.10	40.30	58.80	72.10	93.70	146.00	215.00	297.00	400.00	529.00	674.00	858.00
51	14.20	22.60	32.60	45.10	65.10	80.00	104.00	159.00	232.00	318.00	426.00	562.00	714.00	906.00
57	15.70	25.00	36.20	49.90	70.90	88.00	113.00	173.00	249.00	339.00	453.00	596.00	755.00	955.00
64	17.30	27.50	39.60	54.70	77.60	95.90	123.00	188.00	268.00	363.00	480.00	630.00	795.00	1004.00
70	18.80	29.90	43.20	59.50	83.90	104.00	133.00	202.00	288.00	388.00	509.00	664.00	836.00	1052.00
76	20.40	32.40	46.70	64.30	90.10	112.00	143.00	216.00	307.00	413.00	541.00	700.00	876.00	1101.00
83	22.00	34.80	50.20	69.10	96.40	120.00	152.00	230.00	326.00	438.00	573.00	739.00	920.00	1155.00
89	23.50	37.20	53.80	73.90	103.00	128.00	162.00	244.00	345.00	463.00	605.00	779.00	968.00	1202.00
95	25.10	39.70	57.20	78.70	109.00	136.00	172.00	258.00	364.00	488.00	635.00	818.00	1015.00	1259.00
102	26.70	42.10	60.80	83.50	115.00	144.00	182.00	272.00	384.00	513.00	668.00	857.00	1062.00	1315.00
114	29.80	47.00	67.80	93.10	128.00	159.00	201.00	300.00	422.00	563.00	732.00	935.00	1158.00	1428.00
127	32.90	51.90	74.80	103.00	140.00	175.00	221.00	329.00	460.00	613.00	796.00	1014.00	1253.00	1542.00
140	36.10	56.80	81.90	112.00	153.00	191.00	240.00	357.00	499.00	663.00	859.00	1092.00	1348.00	1655.00
152	39.20	61.60	89.00	122.00	165.00	207.00	260.00	385.00	537.00	713.00	923.00	1171.00	1443.00	1768.00
165	42.30	66.50	96.00	132.00	178.00	223.00	279.00	413.00	575.00	763.00	986.00	1249.00	1538.00	1881.00
178	45.50	71.40	103.00	141.00	190.00	239.00	299.00	441.00	614.00	813.00	1050.00	1328.00	1633.00	1994.00
191	48.60	76.30	110.00	151.00	203.00	255.00	319.00	470.00	652.00	863.00	1113.00	1406.00	1729.00	2107.00
203	51.70	81.10	117.00	160.00	215.00	271.00	338.00	498.00	690.00	914.00	1177.00	1485.00	1824.00	2220.00
216	54.80	86.00	124.00	170.00	228.00	286.00	358.00	526.00	729.00	964.00	1240.00	1563.00	1919.00	2234.00
234	58.00	90.90	131.00	180.00	240.00	302.00	377.00	554.00	767.00	1014.00	1304.00	1642.00	2014.00	2447.00
241	61.10	95.80	138.00	189.00	253.00	318.00	397.00	583.0						

SOCKET HEAD CAP SCREWS- ANSI/ASME B 18.3 - THREADING ANSI B1.1 CL 2B Kg/1000Pcs.

L	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	-	-	-
12	4.90	10.50	18.00	-	-	-	-	-	-	-	-	-	-	-
15	5.40	11.80	19.40	24.40	-	-	-	-	-	-	-	-	-	-
20	6.20	12.40	21.20	25.90	-	-	-	-	-	-	-	-	-	-
25	6.80	13.50	23.00	28.00	39.0	-	-	-	-	-	-	-	-	-
30	7.50	14.80	26.30	30.80	43.0	84	-	-	-	-	-	-	-	-
35	9.00	17.00	30.20	36.90	47.0	91	171	225	-	-	-	-	-	-
40	10.00	19.80	33.20	40.60	51.0	99	182	239	-	-	-	-	-	-
45	11.60	22.70	36.00	44.00	55.0	106	194	253	311	-	-	-	-	-
50	12.70	24.40	38.70	47.30	59.0	114	206	267	328	581	752	-	-	-
55	13.70	27.00	44.00	53.90	63.0	121	218	281	345	607	784	-	-	-
60	15.00	30.00	46.80	57.20	67.0	129	230	295	362	633	816	-	-	-
65	17.00	32.40	49.50	60.50	71.0	136	241	309	379	659	848	-	-	-
70	18.00	44.40	52.20	63.80	75.0	144	253	323	395	685	880	-	-	-
75	19.50	46.40	57.60	70.40	79.0	151	265	337	413	711	912	-	-	-
80	23.60	49.50	63.00	77.00	83.0	159	277	351	430	737	944	-	-	-
85	-	55.50	68.80	84.10	87.0	166	289	365	447	763	976	-	-	-
90	-	-	76.50	92.00	91.0	174	300	379	464	789	1008	-	-	-
95	-	-	83.50	99.10	95.0	181	312	393	481	815	1040	-	-	-
100	-	-	90.00	106.60	99.0	189	324	407	498	841	1072	-	-	-
110	-	-	-	-	107	204	347	435	530	891	1132	-	-	-
120	-	-	-	-	115	219	370	463	562	941	1192	-	-	-
130	-	-	-	-	123	234	393	491	594	991	1252	-	-	-
140	-	-	-	-	131	249	416	519	626	1041	1312	-	-	-
150	-	-	-	-	139	264	439	547	658	1091	1372	-	-	-
160	-	-	-	-	147	279	462	575	690	1141	1432	-	-	-
170	-	-	-	-	155	294	485	603	722	1191	1492	-	-	-
180	-	-	-	-	163	308.500	508	631	754	1241	1552	-	-	-
190	-	-	-	-	-	-	-	659	786	1291	1612	-	-	-
200	-	-	-	-	-	-	-	687	818	1341	1672	-	-	-
210	-	-	-	-	-	-	-	715	850	1391	1732	-	-	-
220	-	-	-	-	-	-	-	743	882	1441	1792	-	-	-
230	-	-	-	-	-	-	-	771	914	1491	1852	-	-	-
240	-	-	-	-	-	-	-	799	946	1541	1912	-	-	-
250	-	-	-	-	-	-	-	827	978	1591	1972	-	-	-

SOCKET HEAD CAP SCREWS- ISO 4762 DIN 921 UNI 5931 Kg/1000Pcs

L	8	10	12	14	16	18	20	22	24	27	30	33	36	39
18	12.80	21.30	-	-	-	-	-	-	-	-	-	-	-	-
20	13.40	22.30	32.10	-	-	-	-	-	-	-	-	-	-	-
22	14.00	23.30	33.50	-	-	-	-	-	-	-	-	-	-	-
25	15.00	24.70	35.70	-	-	-	-	-	-	-	-	-	-	-
30	16.60	27.20	39.30	53	77.80	-	-	-	-	-	-	-	-	-
35	19.00	29.70	42.90	58	84.40	-	-	-	-	-	-	-	-	-
40	21.00	32.20	46.50	63	91	129	150	-	-	-	-	-	-	-
45	22.90	36.60	51.10	69	98	137	161	-	-	-	-	-	-	-
50	24.90	39.60	56.10	75	106	147	172	250	300	-	-	-	-	-
55	26.90	42.60	60.50	81	114	157	183	263	316	-	-	-	-	-
60	28.90	45.60	64.90	87	122	167	195	276	330	-	-	-	-	-
65	30.90	48.70	69.30	93	130	177	207	291	345	-	-	-	-	-
70	32.80	51.90	73.70	99	138	187	220	306	363	480	-	-	-	-
75	34.80	55.10	78.10	105	146	197	232	321	381	499	-	-	-	-
80	36.70	58.10	82.50	111	154	207	244	336	399	518	670	-	-	-
90	40.70	64.20	91.30	123	170	227	269	366	435	572	716	-	-	-
100	44.60	70.50	100	135	186	247	294	396	471	618	785	970	1230	-
110	48.20	76.60	109	147	202	267	319	426	507	664	841	1040	1310	-
120	-	82.70	118	159	218	287	344	456	543	754	897	1110	130	1690
130	-	88.90	127	171	234	307	369	486	579	799	953	1180	1470	1780
140	-	95.10	136	183	250	327	394	516	615	844	1010	1250	1550	1870
150	-	101.10	145	195	266	347	419	546	651	889	1066	1320	1630	1960
160	-	107.20	154	207	282	367	444	576	687	934	1122	1390	1710	2060
170	-	113.30	163	219	298	387	469	606	723	979	1178	1460	1790	2150
180	-	119.40	172	231	314	407	494	636	759	1025	1230	1530	1870	2290
190	-	-	-	243	330	427	519	666	795	1070	1286	1600	1950	2360
200	-	-	-	255	346	447	544	696	831	1105	1350	1670	2030	2430
210	-	-	-	-	-	467	569	726	867	1150	1406	1740	2110	2500
220	-	-	-	-	-	-	594	756	903	1195	1445	1810	2190	2600
230	-	-	-	-	-	-	619	786	936	1240	1501	1880	2270	2695
240	-	-	-	-	-	-	-	-	-	1285	1555	1950	2350	2790
250	-	-	-	-	-	-	-	-	-	1330	1609	2020	2430	2885
260	-	-	-	-	-	-	-	-	-	1375	1663	2090	2510	2980
270	-	-	-	-	-	-	-	-	-	1420	1717	2160	2590	3075
280	-	-	-	-	-	-	-	-	-	1465	1771	2230	2670	3170
290	-	-	-	-	-	-	-	-	-	1510	1825	2300	2750	3265
300	-	-	-	-	-	-	-	-	-	1555	1879	2370	2830	3360

WEIGHT CHART - STUBBOLTS WITHOUT NUTS METRIC RANGE (KG/Piece)

LENGTH	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	M39
50	0.015	0.024	0.035	0.049	0.066	0.082	0.103	0.128	0.149	0.193	0.233	0.287	0.353	0.419
55	0.017	0.027	0.039	0.054	0.072	0.090	0.113	0.141	0.164	0.212	0.256	0.315	0.388	0.460
60	0.019	0.029	0.042	0.059	0.079	0.098	0.124	0.154	0.179	0.231	0.280	0.344	0.424	0.502
65	0.020	0.032	0.046	0.064	0.085	0.106	0.134	0.166	0.194	0.250	0.303	0.373	0.459	0.544
70	0.022	0.034	0.049	0.068	0.092	0.115	0.144	0.179	0.209	0.270	0.326	0.401	0.494	0.586
75	0.023	0.037	0.053	0.073	0.099	0.123	0.155	0.192	0.224	0.289	0.350	0.430	0.530	0.628
80	0.025	0.039	0.056	0.078	0.105	0.131	0.165	0.205	0.238	0.308	0.373	0.459	0.565	0.670
85	0.026	0.042	0.060	0.083	0.112	0.139	0.175	0.218	0.253	0.327	0.396	0.487	0.600	0.711
90	0.028	0.044	0.063	0.088	0.118	0.147	0.185	0.230	0.268	0.347	0.420	0.516	0.635	0.753
95	0.029	0.046	0.067	0.093	0.125	0.156	0.196	0.243	0.283	0.366	0.443	0.545	0.671	0.795
100	0.031	0.049	0.071	0.098	0.131	0.164	0.206	0.256	0.298	0.385	0.466	0.573	0.706	0.837
105	0.032	0.051	0.074	0.103	0.138	0.172	0.216	0.269	0.313	0.404	0.490	0.602	0.741	0.879
110	0.034	0.054	0.078	0.108	0.145	0.180	0.227	0.282	0.328	0.424	0.513	0.631	0.777	0.921
115	0.035	0.056	0.081	0.112	0.151	0.188	0.237	0.294	0.343	0.443	0.536	0.659	0.812	0.963
120	0.037	0.059	0.085	0.117	0.158	0.196	0.247	0.307	0.358	0.462	0.559	0.688	0.847	1.004
125	0.039	0.061	0.088	0.122	0.164	0.205	0.258	0.320	0.373	0.481	0.583	0.717	0.883	1.046
130	0.040	0.064	0.092	0.127	0.171	0.213	0.268	0.333	0.387	0.501	0.606	0.745	0.918	1.088
135	0.042	0.066	0.095	0.132	0.177	0.221	0.278	0.346	0.402	0.520	0.629	0.774	0.953	1.130
140	0.043	0.068	0.099	0.137	0.184	0.229	0.288	0.358	0.417	0.539	0.653	0.803	0.988	1.172
145	0.045	0.071	0.102	0.142	0.191	0.237	0.299	0.371	0.432	0.558	0.676	0.831	1.024	1.214
150	0.046	0.073	0.106	0.147	0.197	0.246	0.309	0.384	0.447	0.578	0.699	0.860	1.059	1.256
155	0.048	0.076	0.109	0.152	0.204	0.254	0.319	0.397	0.462	0.597	0.723	0.889	1.094	1.297
160	0.049	0.078	0.113	0.156	0.210	0.262	0.330	0.410	0.477	0.616	0.746	0.917	1.130	1.339
165	0.051	0.081	0.116	0.161	0.217	0.270	0.340	0.422	0.492	0.635	0.769	0.946	1.165	1.381
170	0.052	0.083	0.120	0.166	0.223	0.278	0.350	0.435	0.507	0.655	0.793	0.975	1.200	1.423
175	0.054	0.086	0.123	0.171	0.230	0.286	0.361	0.448	0.522	0.674	0.816	1.003	1.236	1.465
180	0.056	0.088	0.127	0.176	0.237	0.295	0.371	0.461	0.536	0.693	0.839	1.032	1.271	1.507
185	0.057	0.090	0.130	0.181	0.243	0.303	0.381	0.474	0.551	0.712	0.862	1.061	1.306	1.548
190	0.059	0.093	0.134	0.186	0.250	0.311	0.391	0.486	0.566	0.732	0.886	1.089	1.341	1.590
195	0.060	0.095	0.137	0.191	0.256	0.319	0.402	0.499	0.581	0.751	0.909	1.118	1.377	1.632
200	0.062	0.098	0.141	0.196	0.263	0.327	0.412	0.512	0.596	0.770	0.932	1.147	1.412	1.674
205	0.063	0.100	0.145	0.200	0.269	0.336	0.422	0.525	0.611	0.789	0.956	1.175	1.447	1.716
210	0.065	0.103	0.148	0.205	0.276	0.344	0.433	0.538	0.626	0.809	0.979	1.204	1.483	1.758
215	0.066	0.105	0.152	0.210	0.283	0.352	0.443	0.550	0.641	0.828	1.002	1.233	1.518	1.800
220	0.068	0.108	0.155	0.215	0.289	0.360	0.453	0.563	0.656	0.847	1.026	1.261	1.553	1.841
225	0.069	0.110	0.159	0.220	0.296	0.368	0.464	0.576	0.671	0.866	1.049	1.290	1.589	1.883
230	0.071	0.112	0.162	0.225	0.302	0.377	0.474	0.589	0.685	0.886	1.072	1.319	1.624	1.925
235	0.073	0.115	0.166	0.230	0.309	0.385	0.484	0.602	0.700	0.905	1.096	1.347	1.659	1.967
240	0.074	0.117	0.169	0.235	0.315	0.393	0.494	0.614	0.715	0.924	1.119	1.376	1.694	2.009
245	0.076	0.120	0.173	0.240	0.322	0.401	0.505	0.627	0.730	0.943	1.142	1.405	1.730	2.051
250	0.077	0.122	0.176	0.245	0.329	0.409	0.515	0.640	0.745	0.963	1.166	1.434	1.765	2.093
255	0.079	0.125	0.180	0.249	0.335	0.417	0.525	0.653	0.760	0.982	1.189	1.462	1.800	2.134
260	0.080	0.127	0.183	0.254	0.342	0.426	0.536	0.666	0.775	1.001	1.212	1.491	1.836	2.176
265	0.082	0.130	0.187	0.259	0.348	0.434	0.546	0.678	0.790	1.020	1.235	1.520	1.871	2.218
270	0.083	0.132	0.190	0.264	0.355	0.442	0.556	0.691	0.805	1.040	1.259	1.548	1.906	2.260
275	0.085	0.134	0.194	0.269	0.361	0.450	0.567	0.704	0.820	1.059	1.282	1.577	1.942	2.302
280	0.086	0.137	0.197	0.274	0.368	0.458	0.577	0.717	0.834	1.078	1.305	1.606	1.977	2.344
285	0.088	0.139	0.201	0.279	0.374	0.467	0.587	0.730	0.849	1.097	1.329	1.634	2.012	2.385
290	0.089	0.142	0.204	0.284	0.381	0.475	0.597	0.742	0.864	1.117	1.352	1.663	2.047	2.427
295	0.091	0.144	0.208	0.289	0.388	0.483	0.608	0.755	0.879	1.136	1.375	1.692	2.083	2.469
300	0.093	0.147	0.212	0.293	0.394	0.491	0.618	0.768	0.894	1.155	1.399	1.720	2.118	2.511
305	0.094	0.149	0.215	0.298	0.401	0.499	0.628	0.781	0.909	1.174	1.422	1.749	2.153	2.553
310	0.096	0.152	0.219	0.303	0.407	0.507	0.639	0.794	0.924	1.194	1.445	1.778	2.189	2.595
315	0.097	0.154	0.222	0.308	0.414	0.516	0.649	0.806	0.939	1.213	1.469	1.806	2.224	2.637
320	0.099	0.156	0.226	0.313	0.420	0.524	0.659	0.819	0.954	1.232	1.492	1.835	2.259	2.678
325	0.100	0.159	0.229	0.318	0.427	0.532	0.670	0.832	0.969	1.251	1.515	1.864	2.295	2.720
330	0.102	0.161	0.233	0.323	0.434	0.540	0.680	0.845	0.983	1.271	1.538	1.892	2.330	2.762
335	0.103	0.164	0.236	0.328	0.440	0.548	0.690	0.858	0.998	1.290	1.562	1.921	2.365	2.804
340	0.105	0.166	0.240	0.333	0.447	0.557	0.700	0.870	1.013	1.309	1.585	1.950	2.400	2.846
345	0.106	0.169	0.243	0.337	0.453	0.565	0.711	0.883	1.028	1.328	1.608	1.978	2.436	2.888
350	0.108	0.171	0.247	0.342	0.460	0.573	0.721	0.896	1.043	1.348	1.632	2.007	2.471	2.930
355	0.110	0.174	0.250	0.347	0.466	0.581	0.731	0.909	1.058	1.367	1.655	2.036	2.506	2.971
360	0.111	0.176	0.254	0.352	0.473	0.589	0.742	0.922	1.073	1.386	1.678	2.064	2.542	3.013
365	0.113	0.178	0.257	0.357	0.480	0.598	0.752	0.934	1.088	1.405	1.702	2.093	2.577	3.055
370	0.114	0.181	0.261	0.362	0.486	0.606	0.762	0.947	1.103	1.425	1.725	2.122	2.612	3.097
375	0.116	0.183	0.264	0.367	0.493	0.614	0.773	0.960	1.118	1.444	1.748	2.150	2.648	3.139
380	0.117	0.186	0.268	0.372	0.499	0.622	0.783	0.973	1.132	1.463	1.772	2.179	2.683	3.181
385	0.119	0.188	0.271	0.377	0.506	0.630	0.793	0.986	1.147	1.482	1.795	2.208	2.718	3.222
390	0.120	0.191	0.275	0.381	0.512	0.638	0.803	0.998	1.162	1.502	1.818	2.236	2.753	3.264
395	0.122	0.193	0.278	0.386	0.519	0.647	0.814	1.011	1.177	1.521	1.841	2.265	2.789	3.306
400	0.123	0.196	0.282	0.391	0.526	0.655	0.824	1.024	1.192	1.540	1.865	2.294	2.824	3.348
405	0.125	0.198	0.286	0.396	0.532	0.663	0.834	1.037	1.207	1.559	1.888	2.322	2.859	3.390
410	0.127	0.200	0.289	0.401	0.539	0.671	0.845	1.050	1.222	1.579	1.911	2.351	2.895	3.432
415	0.128	0.203	0.293	0.406	0.545	0.679	0.855	1.062	1.237	1.598	1.935	2.380	2.930	3.474
420	0.130	0.205	0.296	0.411	0.552	0.688	0.865	1.075	1.252	1.617	1.958	2.408	2.965	3.515
425	0.131	0.208	0.300	0.416	0.558	0.696	0.876	1.088	1.267	1.636	1.981	2.437	3.001	3.557
430	0.133	0.210	0.303	0.421	0.565	0.704	0.886	1.101	1.281	1.656	2.005	2.466	3.036	3.599
435	0.134	0.213	0.307	0.425	0.572	0.712	0.896	1.114	1.296	1.675	2.028	2.494	3.071	3.641
440	0.136	0.215	0.310	0.430	0.578	0.720	0.906	1.126	1.311	1.694	2.051	2.523	3.106	3.683
445	0.137	0.218</												

WEIGHT CHART - STUBOLTS WITHOUT NUTS METRIC RANGE (KG/Piece)

LENGTH	M42	M45	M48	M52	M56	M60	M64	M68	M72	M76	M80	M85	M90	M95
50	0.493	0.570	0.647	0.770	0.874	1.001	1.156	1.318	1.475	1.674	1.804	2.044	2.300	2.571
55	0.542	0.626	0.711	0.847	0.961	1.101	1.272	1.449	1.623	1.841	1.984	2.249	2.530	2.829
60	0.592	0.683	0.776	0.924	1.049	1.201	1.387	1.581	1.770	2.008	2.164	2.453	2.760	3.086
65	0.641	0.740	0.840	1.001	1.136	1.301	1.503	1.713	1.918	2.176	2.345	2.658	2.990	3.343
70	0.690	0.797	0.905	1.078	1.224	1.401	1.618	1.845	2.065	2.343	2.525	2.862	3.220	3.600
75	0.740	0.854	0.970	1.155	1.311	1.502	1.734	1.976	2.213	2.510	2.705	3.067	3.451	3.857
80	0.789	0.911	1.034	1.232	1.398	1.602	1.850	2.108	2.360	2.678	2.886	3.271	3.681	4.114
85	0.838	0.968	1.099	1.309	1.486	1.702	1.965	2.240	2.508	2.845	3.066	3.475	3.911	4.371
90	0.887	1.025	1.164	1.386	1.573	1.802	2.081	2.372	2.655	3.012	3.246	3.680	4.141	4.629
95	0.937	1.082	1.228	1.463	1.661	1.902	2.196	2.503	2.803	3.180	3.427	3.884	4.371	4.886
100	0.986	1.139	1.293	1.540	1.748	2.002	2.312	2.635	2.950	3.347	3.607	4.089	4.601	5.143
105	1.035	1.196	1.358	1.617	1.835	2.102	2.428	2.767	3.098	3.514	3.787	4.293	4.831	5.400
110	1.085	1.253	1.422	1.694	1.923	2.202	2.543	2.899	3.245	3.682	3.968	4.498	5.061	5.657
115	1.134	1.310	1.487	1.771	2.010	2.302	2.659	3.030	3.393	3.849	4.148	4.702	5.291	5.914
120	1.183	1.367	1.552	1.848	2.098	2.402	2.774	3.162	3.540	4.016	4.328	4.907	5.521	6.171
125	1.233	1.424	1.616	1.925	2.185	2.503	2.890	3.294	3.688	4.184	4.509	5.111	5.751	6.428
130	1.282	1.481	1.681	2.002	2.272	2.603	3.006	3.426	3.835	4.351	4.689	5.315	5.981	6.686
135	1.331	1.538	1.746	2.079	2.360	2.703	3.121	3.557	3.983	4.518	4.870	5.520	6.211	6.943
140	1.380	1.595	1.810	2.156	2.447	2.803	3.237	3.689	4.130	4.686	5.050	5.724	6.441	7.200
145	1.430	1.652	1.875	2.233	2.535	2.903	3.352	3.821	4.278	4.853	5.230	5.929	6.671	7.457
150	1.479	1.709	1.940	2.310	2.622	3.003	3.468	3.953	4.425	5.021	5.411	6.133	6.901	7.714
155	1.528	1.765	2.004	2.387	2.709	3.103	3.584	4.084	4.573	5.188	5.591	6.338	7.131	7.971
160	1.578	1.822	2.069	2.464	2.797	3.203	3.699	4.216	4.720	5.355	5.771	6.542	7.361	8.228
165	1.627	1.879	2.133	2.541	2.884	3.303	3.815	4.348	4.868	5.523	5.952	6.747	7.591	8.486
170	1.676	1.936	2.198	2.618	2.972	3.403	3.930	4.480	5.015	5.690	6.132	6.951	7.821	8.743
175	1.726	1.993	2.263	2.695	3.059	3.504	4.046	4.611	5.163	5.857	6.312	7.155	8.051	9.000
180	1.775	2.050	2.327	2.772	3.146	3.604	4.162	4.743	5.310	6.025	6.493	7.360	8.281	9.257
185	1.824	2.107	2.392	2.849	3.234	3.704	4.277	4.875	5.458	6.192	6.673	7.564	8.511	9.514
190	1.873	2.164	2.457	2.926	3.321	3.804	4.393	5.007	5.605	6.359	6.853	7.769	8.741	9.771
195	1.923	2.221	2.521	3.003	3.409	3.904	4.508	5.138	5.753	6.527	7.034	7.973	8.971	10.028
200	1.972	2.278	2.586	3.080	3.496	4.004	4.624	5.270	5.900	6.694	7.214	8.178	9.201	10.286
205	2.021	2.335	2.651	3.157	3.583	4.104	4.740	5.402	6.048	6.861	7.395	8.382	9.431	10.543
210	2.071	2.392	2.715	3.234	3.671	4.204	4.855	5.534	6.195	7.029	7.575	8.586	9.661	10.800
215	2.120	2.449	2.780	3.311	3.758	4.304	4.971	5.665	6.343	7.196	7.755	8.791	9.892	11.057
220	2.169	2.506	2.845	3.388	3.846	4.404	5.086	5.797	6.490	7.363	7.936	8.995	10.122	11.314
225	2.219	2.563	2.909	3.465	3.933	4.505	5.202	5.929	6.638	7.531	8.116	9.200	10.352	11.571
230	2.268	2.620	2.974	3.542	4.020	4.605	5.318	6.061	6.785	7.698	8.296	9.404	10.582	11.828
235	2.317	2.677	3.039	3.619	4.108	4.705	5.433	6.192	6.933	7.865	8.477	9.609	10.812	12.086
240	2.366	2.734	3.103	3.696	4.195	4.805	5.549	6.324	7.080	8.033	8.657	9.813	11.042	12.343
245	2.416	2.791	3.168	3.773	4.283	4.905	5.664	6.456	7.228	8.200	8.837	10.018	11.272	12.600
250	2.465	2.848	3.233	3.850	4.370	5.005	5.780	6.588	7.375	8.368	9.018	10.222	11.502	12.857
255	2.514	2.904	3.297	3.927	4.457	5.105	5.896	6.719	7.523	8.535	9.198	10.426	11.732	13.114
260	2.564	2.961	3.362	4.004	4.545	5.205	6.011	6.851	7.670	8.702	9.378	10.631	11.962	13.371
265	2.613	3.018	3.426	4.081	4.632	5.305	6.127	6.983	7.818	8.870	9.559	10.835	12.192	13.628
270	2.662	3.075	3.491	4.158	4.720	5.405	6.242	7.115	7.965	9.037	9.739	11.040	12.422	13.886
275	2.712	3.132	3.556	4.235	4.807	5.506	6.358	7.246	8.113	9.204	9.919	11.244	12.652	14.143
280	2.761	3.189	3.620	4.312	4.894	5.606	6.474	7.378	8.260	9.372	10.100	11.449	12.882	14.400
285	2.810	3.246	3.685	4.389	4.982	5.706	6.589	7.510	8.408	9.539	10.280	11.653	13.112	14.657
290	2.859	3.303	3.750	4.466	5.069	5.806	6.705	7.642	8.555	9.706	10.461	11.858	13.342	14.914
295	2.909	3.360	3.814	4.543	5.157	5.906	6.820	7.773	8.703	9.874	10.641	12.062	13.572	15.171
300	2.958	3.417	3.879	4.620	5.244	6.006	6.936	7.905	8.850	10.041	10.821	12.266	13.802	15.428
305	3.007	3.474	3.944	4.697	5.331	6.106	7.052	8.037	8.998	10.208	11.002	12.471	14.032	15.686
310	3.057	3.531	4.008	4.774	5.419	6.206	7.167	8.169	9.145	10.376	11.182	12.675	14.262	15.943
315	3.106	3.588	4.073	4.851	5.506	6.306	7.283	8.300	9.293	10.543	11.362	12.880	14.492	16.200
320	3.155	3.645	4.138	4.928	5.594	6.406	7.398	8.432	9.440	10.710	11.543	13.084	14.722	16.457
325	3.205	3.702	4.202	5.005	5.681	6.507	7.514	8.564	9.588	10.878	11.723	13.289	14.952	16.714
330	3.254	3.759	4.267	5.082	5.768	6.607	7.630	8.696	9.735	11.045	11.903	13.493	15.182	16.971
335	3.303	3.816	4.332	5.159	5.856	6.707	7.745	8.827	9.883	11.212	12.084	13.697	15.412	17.228
340	3.352	3.873	4.396	5.236	5.943	6.807	7.861	8.959	10.030	11.380	12.264	13.902	15.642	17.486
345	3.402	3.930	4.461	5.313	6.031	6.907	7.976	9.091	10.178	11.547	12.444	14.106	15.872	17.743
350	3.451	3.987	4.526	5.390	6.118	7.007	8.092	9.223	10.325	11.715	12.625	14.311	16.102	18.000
355	3.500	4.043	4.590	5.467	6.205	7.107	8.208	9.354	10.473	11.882	12.805	14.515	16.333	18.257
360	3.550	4.100	4.655	5.544	6.293	7.207	8.323	9.486	10.620	12.049	12.985	14.720	16.563	18.514
365	3.599	4.157	4.719	5.621	6.380	7.307	8.439	9.618	10.768	12.217	13.166	14.924	16.793	18.771
370	3.648	4.214	4.784	5.698	6.468	7.407	8.554	9.750	10.915	12.384	13.346	15.129	17.023	19.028
375	3.698	4.271	4.849	5.775	6.555	7.508	8.670	9.881	11.063	12.551	13.527	15.333	17.253	19.285
380	3.747	4.328	4.913	5.852	6.642	7.608	8.786	10.013	11.210	12.719	13.707	15.537	17.483	19.543
385	3.796	4.385	4.978	5.929	6.730	7.708	8.901	10.145	11.358	12.886	13.887	15.742	17.713	19.800
390	3.845	4.442	5.043	6.006	6.817	7.808	9.017	10.277	11.505	13.053	14.068	15.946	17.943	20.057
395	3.895	4.499	5.107	6.083	6.905	7.908	9.132	10.408	11.653	13.221	14.248	16.151	18.173	20.314
400	3.944	4.556	5.172	6.160	6.992	8.008	9.248	10.540	11.800	13.388	14.428	16.355	18.403	20.571
405	3.993	4.613	5.237	6.237	7.079	8.108	9.364	10.672	11.948	13.555	14.609	16.560	18.633	20.828
410	4.043	4.670	5.301	6.314	7.167	8.208	9.479	10.804	12.095	13.723	14.789	16.764	18.863	21.085
415	4.092	4.727	5.366	6.391	7.254	8.308	9.595	10.935	12.243	13.890	14.969	16.969	19.093	21.343
420	4.141	4.784	5.431	6.468	7.342	8.408	9.710	11.067	12.390	14.057	15.150	17.173	19.323	21.600
425	4.191	4.841	5.495	6.545	7.429	8.509	9.826	11.199	12.538	14.225	15.330	17.377	19.553	21.857
430	4.240	4.898	5.560	6.622	7.516	8.609	9.942	11.331	12.685	14.392	15.510	17.582	19.783	22.114
435	4.289	4.955	5.625	6.699	7.604	8.709	10.057	11.462	12.833	14.559	1			

WEIGHT CHART - STUBBOLTS WITHOUT NUTS IMPERIAL RANGE (KG/Piece)

LENGTH	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	1.3/8"	1.1/2"
50	0.024	0.032	0.044	0.055	0.070	0.103	0.141	0.185	0.238	0.299	0.366	0.441
55	0.026	0.035	0.048	0.060	0.076	0.112	0.154	0.202	0.260	0.326	0.399	0.481
60	0.028	0.038	0.052	0.065	0.083	0.122	0.166	0.218	0.281	0.353	0.432	0.521
65	0.030	0.041	0.056	0.070	0.089	0.131	0.179	0.235	0.303	0.380	0.466	0.561
70	0.032	0.044	0.060	0.075	0.095	0.140	0.192	0.252	0.325	0.407	0.499	0.601
75	0.034	0.047	0.064	0.080	0.102	0.150	0.205	0.269	0.346	0.434	0.532	0.641
80	0.037	0.050	0.068	0.085	0.108	0.159	0.218	0.286	0.368	0.462	0.565	0.681
85	0.039	0.053	0.072	0.090	0.114	0.168	0.230	0.302	0.390	0.489	0.599	0.721
90	0.041	0.056	0.076	0.095	0.121	0.178	0.243	0.319	0.411	0.516	0.632	0.761
95	0.043	0.059	0.081	0.100	0.127	0.187	0.256	0.336	0.433	0.543	0.665	0.801
100	0.045	0.061	0.085	0.105	0.133	0.196	0.269	0.353	0.455	0.570	0.698	0.841
105	0.047	0.064	0.089	0.110	0.140	0.206	0.282	0.370	0.476	0.597	0.732	0.881
110	0.050	0.067	0.093	0.115	0.146	0.215	0.294	0.386	0.498	0.624	0.765	0.921
115	0.052	0.070	0.097	0.120	0.152	0.224	0.307	0.403	0.520	0.652	0.798	0.961
120	0.054	0.073	0.101	0.125	0.159	0.234	0.320	0.420	0.541	0.679	0.831	1.001
125	0.056	0.076	0.105	0.130	0.165	0.243	0.333	0.437	0.563	0.706	0.865	1.041
130	0.058	0.079	0.109	0.135	0.171	0.252	0.346	0.454	0.585	0.733	0.898	1.081
135	0.060	0.082	0.113	0.140	0.178	0.262	0.358	0.470	0.606	0.760	0.931	1.121
140	0.062	0.085	0.117	0.145	0.184	0.271	0.371	0.487	0.628	0.787	0.964	1.161
145	0.065	0.088	0.121	0.150	0.191	0.281	0.384	0.504	0.650	0.815	0.998	1.202
150	0.067	0.091	0.125	0.155	0.197	0.290	0.397	0.521	0.671	0.842	1.031	1.242
155	0.069	0.094	0.129	0.159	0.203	0.299	0.410	0.538	0.693	0.869	1.064	1.282
160	0.071	0.097	0.133	0.164	0.210	0.309	0.422	0.554	0.714	0.896	1.097	1.322
165	0.073	0.100	0.137	0.169	0.216	0.318	0.435	0.571	0.736	0.923	1.131	1.362
170	0.075	0.102	0.141	0.174	0.222	0.327	0.448	0.588	0.758	0.950	1.164	1.402
175	0.078	0.105	0.145	0.179	0.229	0.337	0.461	0.605	0.779	0.977	1.197	1.442
180	0.080	0.108	0.149	0.184	0.235	0.346	0.474	0.622	0.801	1.005	1.230	1.482
185	0.082	0.111	0.153	0.189	0.241	0.355	0.486	0.638	0.823	1.032	1.264	1.522
190	0.084	0.114	0.157	0.194	0.248	0.365	0.499	0.655	0.844	1.059	1.297	1.562
195	0.086	0.117	0.161	0.199	0.254	0.374	0.512	0.672	0.866	1.086	1.330	1.602
200	0.088	0.120	0.165	0.204	0.260	0.383	0.525	0.689	0.888	1.113	1.363	1.642
205	0.091	0.123	0.169	0.209	0.267	0.393	0.538	0.706	0.909	1.140	1.397	1.682
210	0.093	0.126	0.173	0.214	0.273	0.402	0.550	0.722	0.931	1.167	1.430	1.722
215	0.095	0.129	0.177	0.219	0.279	0.411	0.563	0.739	0.953	1.195	1.463	1.762
220	0.097	0.132	0.181	0.224	0.286	0.421	0.576	0.756	0.974	1.222	1.496	1.802
225	0.099	0.135	0.185	0.229	0.292	0.430	0.589	0.773	0.996	1.249	1.530	1.842
230	0.101	0.138	0.189	0.234	0.298	0.439	0.602	0.790	1.018	1.276	1.563	1.882
235	0.103	0.141	0.193	0.239	0.305	0.449	0.614	0.806	1.039	1.303	1.596	1.922
240	0.106	0.143	0.197	0.244	0.311	0.458	0.627	0.823	1.061	1.330	1.629	1.962
245	0.108	0.146	0.201	0.249	0.318	0.468	0.640	0.840	1.083	1.358	1.663	2.003
250	0.110	0.149	0.205	0.254	0.324	0.477	0.653	0.857	1.104	1.385	1.696	2.043
255	0.112	0.152	0.209	0.259	0.330	0.486	0.666	0.874	1.126	1.412	1.729	2.083
260	0.114	0.155	0.213	0.264	0.337	0.496	0.678	0.890	1.147	1.439	1.762	2.123
265	0.116	0.158	0.217	0.269	0.343	0.505	0.691	0.907	1.169	1.466	1.796	2.163
270	0.119	0.161	0.221	0.274	0.349	0.514	0.704	0.924	1.191	1.493	1.829	2.203
275	0.121	0.164	0.225	0.279	0.356	0.524	0.717	0.941	1.212	1.520	1.862	2.243
280	0.123	0.167	0.229	0.284	0.362	0.533	0.730	0.958	1.234	1.548	1.895	2.283
285	0.125	0.170	0.233	0.289	0.368	0.542	0.742	0.974	1.256	1.575	1.929	2.323
290	0.127	0.173	0.237	0.294	0.375	0.552	0.755	0.991	1.277	1.602	1.962	2.363
295	0.129	0.176	0.242	0.299	0.381	0.561	0.768	1.008	1.299	1.629	1.995	2.403
300	0.131	0.179	0.246	0.304	0.387	0.570	0.781	1.025	1.321	1.656	2.028	2.443
305	0.134	0.182	0.250	0.309	0.394	0.580	0.794	1.042	1.342	1.683	2.062	2.483
310	0.136	0.184	0.254	0.314	0.400	0.589	0.806	1.058	1.364	1.710	2.095	2.523
315	0.138	0.187	0.258	0.319	0.406	0.598	0.819	1.075	1.386	1.738	2.128	2.563
320	0.140	0.190	0.262	0.324	0.413	0.608	0.832	1.092	1.407	1.765	2.161	2.603
325	0.142	0.193	0.266	0.329	0.419	0.617	0.845	1.109	1.429	1.792	2.195	2.643
330	0.144	0.196	0.270	0.334	0.425	0.626	0.858	1.126	1.451	1.819	2.228	2.683
335	0.147	0.199	0.274	0.339	0.432	0.636	0.870	1.142	1.472	1.846	2.261	2.723
340	0.149	0.202	0.278	0.344	0.438	0.645	0.883	1.159	1.494	1.873	2.294	2.763
345	0.151	0.205	0.282	0.349	0.445	0.655	0.896	1.176	1.516	1.901	2.328	2.804
350	0.153	0.208	0.286	0.354	0.451	0.664	0.909	1.193	1.537	1.928	2.361	2.844
355	0.155	0.211	0.290	0.359	0.457	0.673	0.922	1.210	1.559	1.955	2.394	2.884
360	0.157	0.214	0.294	0.364	0.464	0.683	0.934	1.226	1.580	1.982	2.427	2.924
365	0.159	0.217	0.298	0.369	0.470	0.692	0.947	1.243	1.602	2.009	2.461	2.964
370	0.162	0.220	0.302	0.374	0.476	0.701	0.960	1.260	1.624	2.036	2.494	3.004
375	0.164	0.223	0.306	0.379	0.483	0.711	0.973	1.277	1.645	2.063	2.527	3.044
380	0.166	0.225	0.310	0.384	0.489	0.720	0.986	1.294	1.667	2.091	2.560	3.084
385	0.168	0.228	0.314	0.389	0.495	0.729	0.998	1.310	1.689	2.118	2.594	3.124
390	0.170	0.231	0.318	0.394	0.502	0.739	1.011	1.327	1.710	2.145	2.627	3.164
395	0.172	0.234	0.322	0.399	0.508	0.748	1.024	1.344	1.732	2.172	2.660	3.204
400	0.175	0.237	0.326	0.404	0.514	0.757	1.037	1.361	1.754	2.199	2.693	3.244
405	0.177	0.240	0.330	0.409	0.521	0.767	1.050	1.378	1.775	2.226	2.727	3.284
410	0.179	0.243	0.334	0.414	0.527	0.776	1.062	1.394	1.797	2.253	2.760	3.324
415	0.181	0.246	0.338	0.419	0.533	0.785	1.075	1.411	1.819	2.281	2.793	3.364
420	0.183	0.249	0.342	0.424	0.540	0.795	1.088	1.428	1.840	2.308	2.826	3.404
425	0.185	0.252	0.346	0.429	0.546	0.804	1.101	1.445	1.862	2.335	2.860	3.444
430	0.187	0.255	0.350	0.434	0.552	0.813	1.114	1.462	1.884	2.362	2.893	3.484
435	0.190	0.258	0.354	0.439	0.559	0.823	1.126	1.478	1.905	2.389	2.926	3.524
440	0.192	0.261	0.358	0.444	0.565	0.832	1.139	1.495	1.927	2.416	2.959	3.564
445	0.194	0.264	0.362	0.449	0.572	0.842	1.152	1.512	1.949	2.444	2.993	3.605
450	0.196	0.266	0.366	0.454	0.578	0.851	1.165	1.529	1.970	2.471	3.026	3.645
455	0.198	0.269	0.370	0.459	0.584	0.860	1.178	1.546	1.992	2.498	3.059	3.685
460	0.200	0.272	0.374	0.464	0.591	0.870	1.190	1.562	2.013	2.525	3.092	3.725
465	0.203	0.275	0.378	0.468	0.597	0.879	1.203	1.579	2.035	2.552	3.126	3.765
470	0.205	0.278	0.382	0.473	0.603	0.888	1.216	1.596	2.057	2.579	3.159	3.805
475	0.207	0.281	0.386	0.478	0.610	0.898	1.229	1.613	2.078	2.606	3.192	3.845
480	0.209	0.284	0.390	0.483	0.616	0.907	1.242	1.630	2.100	2.634	3.225	3.885
485	0.211	0.287	0.394	0.488	0.622	0.916	1.254	1.646	2.122	2.661	3.259	3.925
490	0.213	0.290	0.398	0.493	0.629	0.926	1.267	1.663	2.143	2.688	3.292	3.965
495	0.216	0.293	0.403	0.498	0.635	0.935	1.280	1.680	2.165	2.715	3.325	4.005
500	0.218	0.296	0.407	0.503	0.641	0.944	1.293	1.697	2.187	2.742	3.358	4.045

WEIGHT CHART - STUBBOLTS WITHOUT NUTS IMPERIAL RANGE (KG/Piece)

LENGTH	1.5/8"	1.3/4"	1.7/8"	2"	2.1/4"	2.1/2"	2.3/4"	3"	3.1/4"	3.1/2"	3.3/4"	4"
50	0.521	0.611	0.704	0.803	1.029	1.282	1.557	1.865	2.228	2.596	2.915	3.348
55	0.569	0.666	0.768	0.876	1.122	1.398	1.698	2.034	2.430	2.832	3.180	3.653
60	0.616	0.722	0.832	0.949	1.216	1.515	1.840	2.204	2.633	3.068	3.445	3.957
65	0.664	0.777	0.896	1.022	1.309	1.631	1.981	2.373	2.835	3.304	3.710	4.262
70	0.711	0.833	0.960	1.095	1.403	1.748	2.123	2.543	3.038	3.540	3.975	4.566
75	0.758	0.888	1.024	1.168	1.496	1.864	2.264	2.712	3.240	3.776	4.240	4.870
80	0.806	0.944	1.088	1.241	1.590	1.981	2.406	2.882	3.443	4.012	4.505	5.175
85	0.853	0.999	1.152	1.314	1.683	2.097	2.547	3.051	3.645	4.248	4.770	5.479
90	0.901	1.055	1.216	1.387	1.777	2.214	2.689	3.221	3.848	4.484	5.035	5.784
95	0.948	1.110	1.280	1.460	1.870	2.330	2.830	3.390	4.050	4.720	5.300	6.088
100	0.995	1.166	1.344	1.533	1.964	2.447	2.972	3.560	4.253	4.956	5.565	6.392
105	1.043	1.221	1.408	1.606	2.057	2.563	3.113	3.729	4.455	5.192	5.830	6.697
110	1.090	1.277	1.472	1.679	2.151	2.680	3.255	3.899	4.658	5.428	6.095	7.001
115	1.138	1.332	1.536	1.752	2.244	2.796	3.396	4.068	4.860	5.664	6.360	7.30
120	1.185	1.388	1.600	1.825	2.338	2.913	3.538	4.238	5.063	5.900	6.625	7.610
125	1.232	1.443	1.664	1.898	2.431	3.029	3.679	4.407	5.265	6.136	6.890	7.914
130	1.280	1.499	1.728	1.971	2.525	3.146	3.821	4.577	5.468	6.372	7.155	8.219
135	1.327	1.554	1.792	2.044	2.618	3.262	3.962	4.746	5.670	6.608	7.420	8.523
140	1.375	1.610	1.856	2.117	2.712	3.379	4.104	4.916	5.873	6.844	7.685	8.828
145	1.422	1.665	1.920	2.190	2.805	3.495	4.245	5.085	6.075	7.080	7.950	9.132
150	1.469	1.721	1.984	2.263	2.899	3.612	4.387	5.255	6.278	7.316	8.215	9.436
155	1.517	1.776	2.048	2.336	2.992	3.728	4.528	5.424	6.480	7.552	8.480	9.741
160	1.564	1.832	2.112	2.409	3.086	3.845	4.670	5.594	6.683	7.788	8.745	10.045
165	1.612	1.887	2.176	2.482	3.179	3.961	4.811	5.763	6.885	8.024	9.010	10.350
170	1.659	1.943	2.240	2.555	3.273	4.078	4.953	5.933	7.088	8.260	9.275	10.654
175	1.706	1.998	2.304	2.628	3.366	4.194	5.094	6.102	7.290	8.496	9.540	10.958
180	1.754	2.054	2.368	2.701	3.460	4.311	5.236	6.272	7.493	8.732	9.805	11.263
185	1.801	2.109	2.432	2.774	3.553	4.427	5.377	6.441	7.695	8.968	10.070	11.567
190	1.849	2.165	2.496	2.847	3.647	4.544	5.519	6.611	7.898	9.204	10.335	11.872
195	1.896	2.220	2.560	2.920	3.740	4.660	5.660	6.780	8.100	9.440	10.600	12.176
200	1.943	2.276	2.624	2.993	3.834	4.777	5.802	6.950	8.303	9.676	10.865	12.480
205	1.991	2.331	2.688	3.066	3.927	4.893	5.943	7.119	8.505	9.912	11.130	12.785
210	2.038	2.387	2.752	3.139	4.021	5.010	6.085	7.289	8.708	10.148	11.395	13.089
215	2.086	2.442	2.816	3.212	4.114	5.126	6.226	7.458	8.910	10.384	11.660	13.394
220	2.133	2.498	2.880	3.285	4.208	5.243	6.368	7.628	9.113	10.620	11.925	13.698
225	2.180	2.553	2.944	3.358	4.301	5.359	6.509	7.797	9.315	10.856	12.190	14.002
230	2.228	2.609	3.008	3.431	4.395	5.476	6.651	7.967	9.518	11.092	12.455	14.307
235	2.275	2.664	3.072	3.504	4.488	5.592	6.792	8.136	9.720	11.328	12.720	14.611
240	2.323	2.720	3.136	3.577	4.582	5.709	6.934	8.306	9.923	11.564	12.985	14.916
245	2.370	2.775	3.200	3.650	4.675	5.825	7.075	8.475	10.125	11.800	13.250	15.220
250	2.417	2.831	3.264	3.723	4.769	5.942	7.217	8.645	10.328	12.036	13.515	15.524
255	2.465	2.886	3.328	3.796	4.862	6.058	7.358	8.814	10.530	12.272	13.780	15.829
260	2.512	2.942	3.392	3.869	4.956	6.175	7.500	8.984	10.733	12.508	14.045	16.133
265	2.560	2.997	3.456	3.942	5.049	6.291	7.641	9.153	10.935	12.744	14.310	16.438
270	2.607	3.053	3.520	4.015	5.143	6.408	7.783	9.323	11.138	12.980	14.575	16.742
275	2.654	3.108	3.584	4.088	5.236	6.524	7.924	9.492	11.340	13.216	14.840	17.046
280	2.702	3.164	3.648	4.161	5.330	6.641	8.066	9.662	11.543	13.452	15.105	17.351
285	2.749	3.219	3.712	4.234	5.423	6.757	8.207	9.831	11.745	13.688	15.370	17.655
290	2.797	3.275	3.776	4.307	5.517	6.874	8.349	10.001	11.948	13.924	15.635	17.960
295	2.844	3.330	3.840	4.380	5.610	6.990	8.490	10.170	12.150	14.160	15.900	18.264
300	2.891	3.386	3.904	4.453	5.704	7.107	8.632	10.340	12.353	14.396	16.165	18.568
305	2.939	3.441	3.968	4.526	5.797	7.223	8.773	10.509	12.555	14.632	16.430	18.873
310	2.986	3.497	4.032	4.599	5.891	7.340	8.915	10.679	12.758	14.868	16.695	19.177
315	3.034	3.552	4.096	4.672	5.984	7.456	9.056	10.848	12.960	15.104	16.960	19.482
320	3.081	3.608	4.160	4.745	6.078	7.573	9.198	11.018	13.163	15.340	17.225	19.786
325	3.128	3.663	4.224	4.818	6.171	7.689	9.339	11.187	13.365	15.576	17.490	20.090
330	3.176	3.719	4.288	4.891	6.265	7.806	9.481	11.357	13.568	15.812	17.755	20.395
335	3.223	3.774	4.352	4.964	6.358	7.922	9.622	11.526	13.770	16.048	18.020	20.699
340	3.271	3.830	4.416	5.037	6.452	8.039	9.764	11.696	13.973	16.284	18.285	21.004
345	3.318	3.885	4.480	5.110	6.545	8.155	9.905	11.865	14.175	16.520	18.550	21.308
350	3.365	3.941	4.544	5.183	6.639	8.272	10.047	12.035	14.378	16.756	18.815	21.612
355	3.413	3.996	4.608	5.256	6.732	8.388	10.188	12.204	14.580	16.992	19.080	21.917
360	3.460	4.052	4.672	5.329	6.826	8.505	10.330	12.374	14.783	17.228	19.345	22.221
365	3.508	4.107	4.736	5.402	6.919	8.621	10.471	12.543	14.985	17.464	19.610	22.526
370	3.555	4.163	4.800	5.475	7.013	8.738	10.613	12.713	15.188	17.700	19.875	22.830
375	3.602	4.218	4.864	5.548	7.106	8.854	10.754	12.882	15.390	17.936	20.140	23.134
380	3.650	4.274	4.928	5.621	7.200	8.971	10.896	13.052	15.593	18.172	20.405	23.439
385	3.697	4.329	4.992	5.694	7.293	9.087	11.037	13.221	15.795	18.408	20.670	23.743
390	3.745	4.385	5.056	5.767	7.387	9.204	11.179	13.391	15.998	18.644	20.935	24.048
395	3.792	4.440	5.120	5.840	7.480	9.320	11.320	13.560	16.200	18.880	21.200	24.352
400	3.839	4.496	5.184	5.913	7.574	9.437	11.462	13.730	16.403	19.116	21.465	24.656
405	3.887	4.551	5.248	5.986	7.667	9.553	11.603	13.899	16.605	19.352	21.730	24.961
410	3.934	4.607	5.312	6.059	7.761	9.670	11.745	14.069	16.808	19.588	21.995	25.265
415	3.982	4.662	5.376	6.132	7.854	9.786	11.886	14.238	17.010	19.824	22.260	25.570
420	4.029	4.718	5.440	6.205	7.948	9.903	12.028	14.408	17.213	20.060	22.525	25.874
425	4.076	4.773	5.504	6.278	8.041	10.019	12.169	14.577	17.415	20.296	22.790	26.178
430	4.124	4.829	5.568	6.351	8.135	10.136	12.311	14.747	17.618	20.532	23.055	26.483
435	4.171	4.884	5.632	6.424	8.228	10.252	12.452	14.916	17.820	20.768	23.320	26.787
440	4.219	4.940	5.696	6.497	8.322	10.369	12.594	15.086	18.023	21.004	23.585	27.092
445	4.266	4.995	5.760	6.570	8.415	10.485	12.735	15.255	18.225	21.240	23.850	27.396
450	4.313	5.051	5.824	6.643	8.509	10.602	12.877	15.425	18.428	21.476	24.115	27.700
455	4.361	5.106	5.888	6.716	8.602	10.718	13.018	15.594	18.630	21.712	24.380	28.005
460	4.408	5.162	5.952	6.789	8.696	10.835	13.160	15.764	18.833	21.948	24.645	28.309
465	4.456	5.217	6.016	6.862	8.789	10.951	13.301	15.933	19.035	22.184	24.910	28.614
470	4.503	5.273	6.080	6.935	8.883	11.068	13.443	16.103	19.238	22.420	25.175	28.918
475	4.550	5.328	6.144	7.008	8.976	11.184	13.584	16.272	19.440	22.656	25.440	29.222
480	4.598	5.384	6.208	7.081	9.071	11.301	13.726	16.442	19.643	22.892	25.705	29.527
485	4.645	5.439	6.272	7.154	9.163	11.417	13.867	16.611	19.845	23.128	25.970	29.831
490	4.693	5.495	6.336	7.227	9.257	11.534	14.009	16.78				

WEIGHT CHART - STUBBOLTS WITH 2NUTS IMPERIAL RANGE (KG/Set)

LENGTH	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"	1.1/8"	1.1/4"	1.3/8"	1.1/2"
50	0.054	0.073	0.108	0.135	0.172	0.279	0.400	0.554	0.747	0.960	1.229	1.543
55	0.056	0.076	0.113	0.140	0.178	0.289	0.413	0.571	0.768	0.988	1.263	1.583
60	0.058	0.079	0.117	0.145	0.184	0.298	0.425	0.587	0.790	1.015	1.296	1.623
65	0.061	0.082	0.121	0.150	0.191	0.307	0.438	0.604	0.812	1.042	1.329	1.663
70	0.063	0.085	0.125	0.155	0.197	0.317	0.451	0.621	0.833	1.069	1.362	1.703
75	0.065	0.087	0.129	0.160	0.203	0.326	0.464	0.638	0.855	1.096	1.396	1.743
80	0.067	0.090	0.133	0.165	0.210	0.335	0.477	0.655	0.876	1.123	1.429	1.783
85	0.069	0.093	0.137	0.170	0.216	0.345	0.489	0.671	0.898	1.151	1.462	1.823
90	0.071	0.096	0.141	0.174	0.222	0.354	0.502	0.688	0.920	1.178	1.495	1.863
95	0.074	0.099	0.145	0.179	0.229	0.363	0.515	0.705	0.941	1.205	1.529	1.903
100	0.076	0.102	0.149	0.184	0.235	0.373	0.528	0.722	0.963	1.232	1.562	1.943
105	0.078	0.105	0.153	0.189	0.242	0.382	0.541	0.739	0.985	1.259	1.595	1.983
110	0.080	0.108	0.157	0.194	0.248	0.391	0.553	0.755	1.006	1.286	1.628	2.023
115	0.082	0.111	0.161	0.199	0.254	0.401	0.566	0.772	1.028	1.313	1.662	2.063
120	0.084	0.114	0.165	0.204	0.261	0.410	0.579	0.789	1.050	1.341	1.695	2.103
125	0.086	0.117	0.169	0.209	0.267	0.420	0.592	0.806	1.071	1.368	1.728	2.143
130	0.089	0.120	0.173	0.214	0.273	0.429	0.605	0.823	1.093	1.395	1.761	2.183
135	0.091	0.123	0.177	0.219	0.280	0.438	0.617	0.839	1.115	1.422	1.795	2.223
140	0.093	0.126	0.181	0.224	0.286	0.448	0.630	0.856	1.136	1.449	1.828	2.263
145	0.095	0.128	0.185	0.229	0.292	0.457	0.643	0.873	1.158	1.476	1.861	2.304
150	0.097	0.131	0.189	0.234	0.299	0.466	0.656	0.890	1.180	1.503	1.894	2.344
155	0.099	0.134	0.193	0.239	0.305	0.476	0.669	0.907	1.201	1.531	1.928	2.384
160	0.102	0.137	0.197	0.244	0.311	0.485	0.681	0.923	1.223	1.558	1.961	2.424
165	0.104	0.140	0.201	0.249	0.318	0.494	0.694	0.940	1.245	1.585	1.994	2.464
170	0.106	0.143	0.205	0.254	0.324	0.504	0.707	0.957	1.266	1.612	2.027	2.504
175	0.108	0.146	0.209	0.259	0.330	0.513	0.720	0.974	1.288	1.639	2.061	2.544
180	0.110	0.149	0.213	0.264	0.337	0.522	0.733	0.991	1.309	1.666	2.094	2.584
185	0.112	0.152	0.217	0.269	0.343	0.532	0.745	1.007	1.331	1.694	2.127	2.624
190	0.114	0.155	0.221	0.274	0.349	0.541	0.758	1.024	1.353	1.721	2.160	2.664
195	0.117	0.158	0.225	0.279	0.356	0.550	0.771	1.041	1.374	1.748	2.194	2.704
200	0.119	0.161	0.229	0.284	0.362	0.560	0.784	1.058	1.396	1.775	2.227	2.744
205	0.121	0.164	0.233	0.289	0.369	0.569	0.797	1.075	1.418	1.802	2.260	2.784
210	0.123	0.167	0.237	0.294	0.375	0.578	0.809	1.091	1.439	1.829	2.293	2.824
215	0.125	0.169	0.241	0.299	0.381	0.588	0.822	1.108	1.461	1.856	2.327	2.864
220	0.127	0.172	0.245	0.304	0.388	0.597	0.835	1.125	1.483	1.884	2.360	2.904
225	0.130	0.175	0.249	0.309	0.394	0.607	0.848	1.142	1.504	1.911	2.393	2.944
230	0.132	0.178	0.253	0.314	0.400	0.616	0.861	1.159	1.526	1.938	2.426	2.984
235	0.134	0.181	0.257	0.319	0.407	0.625	0.873	1.175	1.548	1.965	2.460	3.024
240	0.136	0.184	0.261	0.324	0.413	0.635	0.886	1.192	1.569	1.992	2.493	3.064
245	0.138	0.187	0.265	0.329	0.419	0.644	0.899	1.209	1.591	2.019	2.526	3.105
250	0.140	0.190	0.269	0.334	0.426	0.653	0.912	1.226	1.613	2.046	2.559	3.145
255	0.142	0.193	0.274	0.339	0.432	0.663	0.925	1.243	1.634	2.074	2.593	3.185
260	0.145	0.196	0.278	0.344	0.438	0.672	0.937	1.259	1.656	2.101	2.626	3.225
265	0.147	0.199	0.282	0.349	0.445	0.681	0.950	1.276	1.678	2.128	2.659	3.265
270	0.149	0.202	0.286	0.354	0.451	0.691	0.963	1.293	1.699	2.155	2.692	3.305
275	0.151	0.205	0.290	0.359	0.457	0.700	0.976	1.310	1.721	2.182	2.726	3.345
280	0.153	0.208	0.294	0.364	0.464	0.709	0.989	1.327	1.742	2.209	2.759	3.385
285	0.155	0.210	0.298	0.369	0.470	0.719	1.001	1.343	1.764	2.237	2.792	3.425
290	0.158	0.213	0.302	0.374	0.476	0.728	1.014	1.360	1.786	2.264	2.825	3.465
295	0.160	0.216	0.306	0.379	0.483	0.737	1.027	1.377	1.807	2.291	2.859	3.505
300	0.162	0.219	0.310	0.384	0.489	0.747	1.040	1.394	1.829	2.318	2.892	3.545
305	0.164	0.222	0.314	0.389	0.496	0.756	1.053	1.411	1.851	2.345	2.925	3.585
310	0.166	0.225	0.318	0.394	0.502	0.765	1.065	1.427	1.872	2.372	2.958	3.625
315	0.168	0.228	0.322	0.399	0.508	0.775	1.078	1.444	1.894	2.399	2.992	3.665
320	0.170	0.231	0.326	0.404	0.515	0.784	1.091	1.461	1.916	2.427	3.025	3.705
325	0.173	0.234	0.330	0.409	0.521	0.794	1.104	1.478	1.937	2.454	3.058	3.745
330	0.175	0.237	0.334	0.414	0.527	0.803	1.117	1.495	1.959	2.481	3.091	3.785
335	0.177	0.240	0.338	0.419	0.534	0.812	1.129	1.511	1.981	2.508	3.125	3.825
340	0.179	0.243	0.342	0.424	0.540	0.822	1.142	1.528	2.002	2.535	3.158	3.865
345	0.181	0.246	0.346	0.429	0.546	0.831	1.155	1.545	2.024	2.562	3.191	3.906
350	0.183	0.249	0.350	0.434	0.553	0.840	1.168	1.562	2.046	2.589	3.224	3.946
355	0.186	0.251	0.354	0.439	0.559	0.850	1.181	1.579	2.067	2.617	3.258	3.986
360	0.188	0.254	0.358	0.444	0.565	0.859	1.193	1.595	2.089	2.644	3.291	4.026
365	0.190	0.257	0.362	0.449	0.572	0.868	1.206	1.612	2.111	2.671	3.324	4.066
370	0.192	0.260	0.366	0.454	0.578	0.878	1.219	1.629	2.132	2.698	3.357	4.106
375	0.194	0.263	0.370	0.459	0.584	0.887	1.232	1.646	2.154	2.725	3.391	4.146
380	0.196	0.266	0.374	0.464	0.591	0.896	1.245	1.663	2.175	2.752	3.424	4.186
385	0.199	0.269	0.378	0.469	0.597	0.906	1.257	1.679	2.197	2.780	3.457	4.226
390	0.201	0.272	0.382	0.474	0.603	0.915	1.270	1.696	2.219	2.807	3.490	4.266
395	0.203	0.275	0.386	0.479	0.610	0.924	1.283	1.713	2.240	2.834	3.524	4.306
400	0.205	0.278	0.390	0.483	0.616	0.934	1.296	1.730	2.262	2.861	3.557	4.346
405	0.207	0.281	0.394	0.488	0.623	0.943	1.309	1.747	2.284	2.888	3.590	4.386
410	0.209	0.284	0.398	0.493	0.629	0.952	1.321	1.763	2.305	2.915	3.623	4.426
415	0.211	0.287	0.402	0.498	0.635	0.962	1.334	1.780	2.327	2.942	3.657	4.466
420	0.214	0.290	0.406	0.503	0.642	0.971	1.347	1.797	2.349	2.970	3.690	4.506
425	0.216	0.292	0.410	0.508	0.648	0.981	1.360	1.814	2.370	2.997	3.723	4.546
430	0.218	0.295	0.414	0.513	0.654	0.990	1.373	1.831	2.392	3.024	3.756	4.586
435	0.220	0.298	0.418	0.518	0.661	0.999	1.385	1.847	2.414	3.051	3.790	4.626
440	0.222	0.301	0.422	0.523	0.667	1.009	1.398	1.864	2.435	3.078	3.823	4.666
445	0.224	0.304	0.426	0.528	0.673	1.018	1.411	1.881	2.457	3.105	3.856	4.707
450	0.227	0.307	0.430	0.533	0.680	1.027	1.424	1.898	2.479	3.132	3.889	4.747
455	0.229	0.310	0.435	0.538	0.686	1.037	1.437	1.915	2.500	3.160	3.923	4.787
460	0.231	0.313	0.439	0.543	0.692	1.046	1.449	1.931	2.522	3.187	3.956	4.827
465	0.233	0.316	0.443	0.548	0.699	1.055	1.462	1.948	2.544	3.214	3.989	4.867
470	0.235	0.319	0.447	0.553	0.705	1.065	1.475	1.965	2.565	3.241	4.022	4.907
475	0.237	0.322	0.451	0.558	0.711	1.074	1.488	1.982	2.587	3.268	4.056	4.947
480	0.239	0.325	0.455	0.563	0.718	1.083	1.501	1.999	2.608	3.295	4.089	4.987
485	0.242	0.328	0.459	0.568	0.724	1.093	1.513	2.015	2.630	3.323	4.122	5.027
490	0.244	0.331	0.463	0.573	0.730	1.102	1.526	2.032	2.652	3.350	4.155	5.067
495	0.246	0.333	0.467	0.578	0.737	1.111	1.539	2.049	2.673	3.377	4.189	5.107
500	0.248	0.336	0.471	0.583	0.743	1.121	1.552	2.066	2.695	3.404	4.222	5.147

WEIGHT CHART - STUBBOLTS WITH 2NUTS IMPERIAL RANGE (KG/Set)

LENGTH	1.5/8"	1.3/4"	1.7/8"	2"	2.1/4"	2.1/2"	2.3/4"	3"	3.1/4"	3.1/2"	3.3/4"	4"
50	1.950	2.333	2.830	3.394	4.667	6.282	7.953	9.769	11.970	15.499	18.579	22.948
55	1.997	2.389	2.894	3.467	4.761	6.398	8.094	9.938	12.173	15.735	18.844	23.253
60	2.045	2.444	2.958	3.540	4.854	6.515	8.236	10.108	12.375	15.971	19.109	23.557
65	2.092	2.500	3.022	3.613	4.948	6.631	8.377	10.277	12.578	16.207	19.374	23.862
70	2.139	2.555	3.086	3.686	5.041	6.748	8.519	10.447	12.780	16.443	19.639	24.166
75	2.187	2.611	3.150	3.759	5.135	6.864	8.660	10.616	12.983	16.679	19.904	24.470
80	2.234	2.666	3.214	3.832	5.228	6.981	8.802	10.786	13.185	16.915	20.169	24.775
85	2.282	2.722	3.278	3.905	5.322	7.097	8.943	10.955	13.388	17.151	20.434	25.079
90	2.329	2.777	3.342	3.978	5.415	7.214	9.085	11.125	13.590	17.387	20.699	25.384
95	2.376	2.833	3.406	4.051	5.509	7.330	9.226	11.294	13.793	17.623	20.964	25.688
100	2.424	2.888	3.470	4.124	5.602	7.447	9.368	11.464	13.995	17.859	21.229	25.992
105	2.471	2.944	3.534	4.197	5.696	7.563	9.509	11.633	14.198	18.095	21.494	26.297
110	2.519	2.999	3.598	4.270	5.789	7.680	9.651	11.803	14.400	18.331	21.759	26.601
115	2.566	3.055	3.662	4.343	5.883	7.796	9.792	11.972	14.603	18.567	22.024	26.906
120	2.613	3.110	3.726	4.416	5.976	7.913	9.934	12.142	14.805	18.803	22.289	27.210
125	2.661	3.166	3.790	4.489	6.070	8.029	10.075	12.311	15.008	19.039	22.554	27.514
130	2.708	3.221	3.854	4.562	6.163	8.146	10.217	12.481	15.210	19.275	22.819	27.819
135	2.756	3.277	3.918	4.635	6.257	8.262	10.358	12.650	15.413	19.511	23.084	28.123
140	2.803	3.330	3.982	4.708	6.350	8.379	10.500	12.820	15.615	19.747	23.349	28.428
145	2.850	3.388	4.046	4.781	6.444	8.495	10.641	12.989	15.818	19.983	23.614	28.732
150	2.898	3.443	4.110	4.854	6.537	8.612	10.783	13.159	16.020	20.219	23.879	29.036
155	2.945	3.499	4.174	4.927	6.631	8.728	10.924	13.328	16.223	20.455	24.144	29.341
160	2.993	3.554	4.238	5.000	6.724	8.845	11.066	13.498	16.425	20.691	24.409	29.645
165	3.040	3.610	4.302	5.073	6.818	8.961	11.207	13.667	16.628	20.927	24.674	29.950
170	3.087	3.665	4.366	5.146	6.911	9.078	11.349	13.837	16.830	21.163	24.939	30.254
175	3.135	3.721	4.430	5.219	7.005	9.194	11.490	14.006	17.033	21.399	25.204	30.558
180	3.182	3.776	4.494	5.292	7.098	9.311	11.632	14.176	17.235	21.635	25.469	30.863
185	3.230	3.832	4.558	5.365	7.192	9.427	11.773	14.345	17.438	21.871	25.734	31.167
190	3.277	3.887	4.622	5.438	7.285	9.544	11.915	14.515	17.640	22.107	25.999	31.472
195	3.324	3.943	4.686	5.511	7.379	9.660	12.056	14.684	17.843	22.343	26.264	31.776
200	3.372	3.998	4.750	5.584	7.472	9.777	12.198	14.854	18.045	22.579	26.529	32.080
205	3.419	4.054	4.814	5.657	7.566	9.893	12.339	15.023	18.248	22.815	26.794	32.385
210	3.467	4.109	4.878	5.730	7.659	10.010	12.480	15.193	18.450	23.051	27.059	32.689
215	3.514	4.165	4.942	5.803	7.753	10.126	12.620	15.362	18.653	23.287	27.324	32.994
220	3.561	4.220	5.006	5.876	7.846	10.243	12.760	15.532	18.855	23.523	27.589	33.298
225	3.609	4.276	5.070	5.949	7.940	10.359	12.900	15.701	19.058	23.759	27.854	33.602
230	3.656	4.331	5.134	6.022	8.033	10.476	13.040	15.871	19.260	23.995	28.119	33.907
235	3.704	4.387	5.198	6.095	8.127	10.592	13.180	16.040	19.463	24.231	28.384	34.211
240	3.751	4.442	5.262	6.168	8.220	10.709	13.320	16.210	19.665	24.467	28.649	34.516
245	3.798	4.498	5.326	6.241	8.314	10.825	13.470	16.379	19.868	24.703	28.914	34.820
250	3.846	4.553	5.390	6.314	8.407	10.942	13.610	16.549	20.070	24.939	29.179	35.124
255	3.893	4.609	5.454	6.387	8.501	11.058	13.750	16.718	20.273	25.175	29.444	35.429
260	3.941	4.664	5.518	6.460	8.594	11.175	13.890	16.888	20.475	25.411	29.709	35.733
265	3.988	4.720	5.582	6.533	8.688	11.291	14.030	17.057	20.678	25.647	29.974	36.038
270	4.035	4.775	5.646	6.606	8.781	11.408	14.170	17.227	20.880	25.883	30.239	36.342
275	4.083	4.831	5.710	6.679	8.875	11.524	14.320	17.396	21.080	26.119	30.504	36.646
280	4.130	4.886	5.774	6.752	8.968	11.641	14.462	17.566	21.285	26.355	30.769	36.951
285	4.178	4.942	5.838	6.825	9.062	11.757	14.603	17.735	21.488	26.591	31.034	37.255
290	4.225	4.997	5.902	6.898	9.155	11.874	14.745	17.905	21.690	26.827	31.299	37.560
295	4.272	5.053	5.966	6.971	9.249	11.990	14.886	18.074	21.893	27.063	31.564	37.864
300	4.320	5.108	6.030	7.044	9.342	12.107	15.028	18.244	22.095	27.299	31.829	38.168
305	4.367	5.164	6.094	7.117	9.436	12.223	15.169	18.413	22.298	27.535	32.094	38.473
310	4.415	5.219	6.158	7.190	9.529	12.340	15.311	18.583	22.500	27.771	32.359	38.777
315	4.462	5.275	6.222	7.263	9.623	12.456	15.452	18.752	22.703	28.007	32.624	39.082
320	4.509	5.330	6.286	7.336	9.716	12.573	15.594	18.922	22.905	28.243	32.889	39.386
325	4.557	5.386	6.350	7.409	9.810	12.689	15.735	19.091	23.108	28.479	33.154	39.690
330	4.604	5.441	6.414	7.482	9.903	12.806	15.877	19.261	23.310	28.715	33.419	39.995
335	4.652	5.497	6.478	7.555	9.997	12.922	16.018	19.430	23.513	28.951	33.684	40.299
340	4.699	5.552	6.542	7.628	10.090	13.039	16.160	19.600	23.715	29.187	33.949	40.604
345	4.746	5.608	6.606	7.701	10.184	13.155	16.301	19.769	23.918	29.423	34.214	40.908
350	4.794	5.663	6.670	7.774	10.277	13.272	16.443	19.939	24.120	29.659	34.479	41.212
355	4.841	5.719	6.734	7.847	10.371	13.388	16.584	20.108	24.323	29.895	34.744	41.517
360	4.889	5.774	6.798	7.920	10.464	13.505	16.726	20.278	24.525	30.131	35.009	41.821
365	4.936	5.830	6.862	7.993	10.558	13.621	16.867	20.447	24.728	30.367	35.274	42.126
370	4.983	5.885	6.926	8.066	10.651	13.738	17.009	20.617	24.930	30.603	35.539	42.430
375	5.031	5.941	6.990	8.139	10.745	13.854	17.150	20.786	25.133	30.839	35.804	42.734
380	5.078	5.996	7.054	8.212	10.838	13.971	17.292	20.956	25.335	31.075	36.069	43.039
385	5.126	6.052	7.118	8.285	10.932	14.087	17.433	21.125	25.538	31.311	36.334	43.343
390	5.173	6.107	7.182	8.358	11.025	14.204	17.575	21.295	25.740	31.547	36.599	43.648
395	5.220	6.163	7.246	8.431	11.119	14.320	17.716	21.464	25.943	31.783	36.864	43.952
400	5.268	6.218	7.310	8.504	11.212	14.437	17.858	21.634	26.145	32.019	37.129	44.256
405	5.315	6.274	7.374	8.577	11.306	14.553	17.999	21.803	26.348	32.255	37.394	44.561
410	5.363	6.329	7.438	8.650	11.399	14.670	18.141	21.973	26.550	32.491	37.659	44.865
415	5.410	6.385	7.502	8.723	11.493	14.786	18.282	22.142	26.753	32.727	37.924	45.170
420	5.457	6.440	7.566	8.796	11.586	14.903	18.424	22.312	26.955	32.963	38.189	45.474
425	5.505	6.496	7.630	8.869	11.680	15.019	18.565	22.481	27.158	33.199	38.454	45.778
430	5.552	6.551	7.694	8.942	11.773	15.136	18.707	22.651	27.360	33.435	38.719	46.083
435	5.600	6.607	7.758	9.015	11.867	15.252	18.848	22.820	27.563	33.671	38.984	46.387
440	5.647	6.662	7.822	9.088	11.960	15.369	18.990	22.990	27.765	33.907	39.249	46.692
445	5.694	6.718	7.886	9.161	12.054	15.485	19.131	23.159	27.968	34.143	39.514	46.996
450	5.742	6.773	7.950	9.234	12.147	15.602	19.273	23.329	28.170	34.379	39.779	47.300
455	5.789	6.829	8.014	9.307	12.241	15.718	19.414	23.498	28.373	34.615	40.044	47.605
460	5.837	6.884	8.078	9.380	12.334	15.835	19.556	23.668	28.575	34.851	40.309	47.909
465	5.884	6.940	8.142	9.453	12.428	15.951	19.697	23.837	28.778	35.087	40.574	48.214
470	5.931	6.995	8.206	9.526	12.521	16.068	19.839	24.007	28.980	35.323	40.839	48.518
475	5.979	7.051	8.270	9.599	12.615	16.184	19.980	24.176	29.183	35.559	41.104	48.822
480	6.026	7.106	8.334	9.672	12.708	16.301	20.122					

WEIGHT CHART - STUDBOLTS WITH 2NUTS METRIC RANGE (KG/Set)

LENGTH	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30	M33	M36	M39
50	0.028	0.053	0.076	0.112	0.147	0.198	0.261	0.318	0.423	0.593	0.801	1.009	1.319	1.665
55	0.030	0.055	0.079	0.117	0.153	0.206	0.272	0.331	0.438	0.612	0.824	1.037	1.354	1.706
60	0.032	0.058	0.083	0.121	0.160	0.215	0.282	0.343	0.453	0.631	0.848	1.066	1.390	1.748
65	0.033	0.060	0.086	0.126	0.166	0.223	0.292	0.356	0.468	0.650	0.871	1.095	1.425	1.790
70	0.035	0.063	0.090	0.131	0.173	0.231	0.302	0.369	0.483	0.670	0.894	1.123	1.460	1.832
75	0.036	0.065	0.093	0.136	0.180	0.239	0.313	0.382	0.498	0.689	0.918	1.152	1.496	1.874
80	0.038	0.068	0.097	0.141	0.186	0.247	0.323	0.395	0.512	0.708	0.941	1.181	1.531	1.916
85	0.039	0.070	0.101	0.146	0.193	0.256	0.333	0.407	0.527	0.727	0.964	1.209	1.566	1.957
90	0.041	0.073	0.104	0.151	0.199	0.264	0.344	0.420	0.542	0.747	0.988	1.238	1.601	1.999
95	0.042	0.075	0.108	0.156	0.206	0.272	0.354	0.433	0.557	0.766	1.011	1.267	1.637	2.041
100	0.044	0.077	0.111	0.161	0.212	0.280	0.364	0.446	0.572	0.785	1.034	1.295	1.672	2.083
105	0.045	0.080	0.115	0.165	0.219	0.288	0.375	0.459	0.587	0.804	1.058	1.324	1.707	2.125
110	0.047	0.082	0.118	0.170	0.226	0.296	0.385	0.471	0.602	0.824	1.081	1.353	1.743	2.167
115	0.048	0.085	0.122	0.175	0.232	0.305	0.395	0.484	0.617	0.843	1.104	1.381	1.778	2.209
120	0.050	0.087	0.125	0.180	0.239	0.313	0.405	0.497	0.632	0.862	1.127	1.410	1.813	2.250
125	0.052	0.090	0.129	0.185	0.245	0.321	0.416	0.510	0.647	0.881	1.151	1.439	1.849	2.292
130	0.053	0.092	0.132	0.190	0.252	0.329	0.426	0.523	0.661	0.901	1.174	1.467	1.884	2.334
135	0.055	0.095	0.136	0.195	0.258	0.337	0.436	0.535	0.676	0.920	1.197	1.496	1.919	2.376
140	0.056	0.097	0.139	0.200	0.265	0.346	0.447	0.548	0.691	0.939	1.221	1.525	1.954	2.418
145	0.058	0.100	0.143	0.205	0.272	0.354	0.457	0.561	0.706	0.958	1.244	1.553	1.990	2.460
150	0.059	0.102	0.146	0.210	0.278	0.362	0.467	0.574	0.721	0.978	1.267	1.582	2.025	2.502
155	0.061	0.104	0.150	0.214	0.285	0.370	0.478	0.587	0.736	0.997	1.291	1.611	2.060	2.543
160	0.062	0.107	0.153	0.219	0.291	0.378	0.488	0.599	0.751	1.016	1.314	1.639	2.096	2.585
165	0.064	0.109	0.157	0.224	0.298	0.387	0.498	0.612	0.766	1.035	1.337	1.668	2.131	2.627
170	0.065	0.112	0.160	0.229	0.304	0.395	0.508	0.625	0.781	1.055	1.361	1.697	2.166	2.669
175	0.067	0.114	0.164	0.234	0.311	0.403	0.519	0.638	0.796	1.074	1.384	1.725	2.202	2.711
180	0.069	0.117	0.168	0.239	0.318	0.411	0.529	0.651	0.810	1.093	1.407	1.754	2.237	2.753
185	0.070	0.119	0.171	0.244	0.324	0.419	0.539	0.663	0.825	1.112	1.430	1.783	2.272	2.794
190	0.072	0.122	0.175	0.249	0.331	0.427	0.550	0.676	0.840	1.132	1.454	1.811	2.307	2.836
195	0.073	0.124	0.178	0.254	0.337	0.436	0.560	0.689	0.855	1.151	1.477	1.840	2.343	2.878
200	0.075	0.126	0.182	0.258	0.344	0.444	0.570	0.702	0.870	1.170	1.500	1.869	2.378	2.920
205	0.076	0.129	0.185	0.263	0.350	0.452	0.581	0.715	0.885	1.189	1.524	1.897	2.413	2.962
210	0.078	0.131	0.189	0.268	0.357	0.460	0.591	0.727	0.900	1.209	1.547	1.926	2.449	3.004
215	0.079	0.134	0.192	0.273	0.364	0.468	0.601	0.740	0.915	1.228	1.570	1.955	2.484	3.046
220	0.081	0.136	0.196	0.278	0.370	0.477	0.611	0.753	0.930	1.247	1.594	1.983	2.519	3.087
225	0.082	0.139	0.199	0.283	0.377	0.485	0.622	0.766	0.945	1.266	1.617	2.012	2.555	3.129
230	0.084	0.141	0.203	0.288	0.383	0.493	0.632	0.779	0.959	1.286	1.640	2.041	2.590	3.171
235	0.086	0.144	0.206	0.293	0.390	0.501	0.642	0.791	0.974	1.305	1.664	2.069	2.625	3.213
240	0.087	0.146	0.210	0.298	0.396	0.509	0.653	0.804	0.989	1.324	1.687	2.098	2.660	3.255
245	0.089	0.148	0.213	0.302	0.403	0.517	0.663	0.817	1.004	1.343	1.710	2.127	2.696	3.297
250	0.090	0.151	0.217	0.307	0.410	0.526	0.673	0.830	1.019	1.363	1.734	2.156	2.731	3.339
255	0.092	0.153	0.220	0.312	0.416	0.534	0.684	0.843	1.034	1.382	1.757	2.184	2.766	3.380
260	0.093	0.156	0.224	0.317	0.423	0.542	0.694	0.855	1.049	1.401	1.780	2.213	2.802	3.422
265	0.095	0.158	0.227	0.322	0.429	0.550	0.704	0.868	1.064	1.420	1.803	2.242	2.837	3.464
270	0.096	0.161	0.231	0.327	0.436	0.558	0.714	0.881	1.079	1.440	1.827	2.270	2.872	3.506
275	0.098	0.163	0.234	0.332	0.442	0.567	0.725	0.894	1.094	1.459	1.850	2.299	2.908	3.548
280	0.099	0.166	0.238	0.337	0.449	0.575	0.735	0.907	1.108	1.478	1.873	2.328	2.943	3.590
285	0.101	0.168	0.242	0.342	0.455	0.583	0.745	0.919	1.123	1.497	1.897	2.356	2.978	3.631
290	0.102	0.170	0.245	0.346	0.462	0.591	0.756	0.932	1.138	1.517	1.920	2.385	3.013	3.673
295	0.104	0.173	0.249	0.351	0.469	0.599	0.766	0.945	1.153	1.536	1.943	2.414	3.049	3.715
300	0.106	0.175	0.252	0.356	0.475	0.608	0.776	0.958	1.168	1.555	1.967	2.442	3.084	3.757
305	0.107	0.178	0.256	0.361	0.482	0.616	0.787	0.971	1.183	1.574	1.990	2.471	3.119	3.799
310	0.109	0.180	0.259	0.366	0.488	0.624	0.797	0.983	1.198	1.594	2.013	2.500	3.155	3.841
315	0.110	0.183	0.263	0.371	0.495	0.632	0.807	0.996	1.213	1.613	2.037	2.528	3.190	3.883
320	0.112	0.185	0.266	0.376	0.501	0.640	0.817	1.009	1.228	1.632	2.060	2.557	3.225	3.924
325	0.113	0.188	0.270	0.381	0.508	0.648	0.828	1.022	1.243	1.651	2.083	2.586	3.261	3.966
330	0.115	0.190	0.273	0.386	0.515	0.657	0.838	1.035	1.257	1.671	2.106	2.614	3.296	4.008
335	0.116	0.192	0.277	0.390	0.521	0.665	0.848	1.047	1.272	1.690	2.130	2.643	3.331	4.050
340	0.118	0.195	0.280	0.395	0.528	0.673	0.859	1.060	1.287	1.709	2.153	2.672	3.366	4.092
345	0.119	0.197	0.284	0.400	0.534	0.681	0.869	1.073	1.302	1.728	2.176	2.700	3.402	4.134
350	0.121	0.200	0.287	0.405	0.541	0.689	0.879	1.086	1.317	1.748	2.200	2.729	3.437	4.176
355	0.123	0.202	0.291	0.410	0.547	0.698	0.890	1.099	1.332	1.767	2.223	2.758	3.472	4.217
360	0.124	0.205	0.294	0.415	0.554	0.706	0.900	1.111	1.347	1.786	2.246	2.786	3.508	4.259
365	0.126	0.207	0.298	0.420	0.561	0.714	0.910	1.124	1.362	1.805	2.270	2.815	3.543	4.301
370	0.127	0.210	0.301	0.425	0.567	0.722	0.920	1.137	1.377	1.825	2.293	2.844	3.578	4.343
375	0.129	0.212	0.305	0.430	0.574	0.730	0.931	1.150	1.392	1.844	2.316	2.872	3.614	4.385
380	0.130	0.214	0.309	0.434	0.580	0.738	0.941	1.163	1.406	1.863	2.340	2.901	3.649	4.427
385	0.132	0.217	0.312	0.439	0.587	0.747	0.951	1.175	1.421	1.882	2.363	2.930	3.684	4.468
390	0.133	0.219	0.316	0.444	0.593	0.755	0.962	1.188	1.436	1.902	2.386	2.958	3.719	4.510
395	0.135	0.222	0.319	0.449	0.600	0.763	0.972	1.201	1.451	1.921	2.409	2.987	3.755	4.552
400	0.136	0.224	0.323	0.454	0.607	0.771	0.982	1.214	1.466	1.940	2.433	3.016	3.790	4.594
405	0.138	0.227	0.326	0.459	0.613	0.779	0.993	1.227	1.481	1.959	2.456	3.044	3.825	4.636
410	0.140	0.229	0.330	0.464	0.620	0.788	1.003	1.239	1.496	1.979	2.479	3.073	3.861	4.678
415	0.141	0.232	0.333	0.469	0.626	0.796	1.013	1.252	1.511	1.998	2.503	3.102	3.896	4.720
420	0.143	0.234	0.337	0.474	0.633	0.804	1.023	1.265	1.526	2.017	2.526	3.130	3.931	4.761
425	0.144	0.236	0.340	0.478	0.639	0.812	1.034	1.278	1.541	2.036	2.549	3.159	3.967	4.803
430	0.146	0.239	0.344	0.483	0.646	0.820	1.044	1.291	1.555	2.056	2.573	3.188	4.002	4.845
435	0.147	0.241	0.347	0.488	0.653	0.828	1.054	1.303	1.570	2.075	2.596	3.216	4.037	4.887
440	0.149	0.244	0.351	0.493	0.659	0.837	1.065	1.316	1.585	2.094	2.619	3.245	4.072	4.929
445	0.150	0.24												

WEIGHT CHART - STUDBOLTS WITH 2NUTS METRIC RANGE (KG/Set)

LENGTH	M42	M45	M48	M52	M56	M60	M64	M68	M72	M76	M80	M85	M90	M95
50	2.083	2.546	3.087	3.710	4.414	5.161	6.056	6.998	8.015	9.154	10.304	11.704	14.420	16.171
55	2.132	2.602	3.151	3.787	4.501	5.261	6.172	7.129	8.163	9.321	10.484	11.909	14.650	16.429
60	2.182	2.659	3.216	3.864	4.589	5.361	6.287	7.261	8.310	9.488	10.664	12.113	14.880	16.686
65	2.231	2.716	3.280	3.941	4.676	5.461	6.403	7.393	8.458	9.656	10.845	12.318	15.110	16.943
70	2.280	2.773	3.345	4.018	4.764	5.561	6.518	7.525	8.605	9.823	11.025	12.522	15.340	17.200
75	2.330	2.830	3.410	4.095	4.851	5.662	6.634	7.656	8.753	9.990	11.205	12.727	15.571	17.457
80	2.379	2.887	3.474	4.172	4.938	5.762	6.750	7.788	8.900	10.158	11.386	12.931	15.801	17.714
85	2.428	2.944	3.539	4.249	5.026	5.862	6.865	7.920	9.048	10.325	11.566	13.135	16.031	17.971
90	2.477	3.001	3.604	4.326	5.113	5.962	6.981	8.052	9.195	10.492	11.746	13.340	16.261	18.229
95	2.527	3.058	3.668	4.403	5.201	6.062	7.096	8.183	9.343	10.660	11.927	13.544	16.491	18.486
100	2.576	3.115	3.733	4.480	5.288	6.162	7.212	8.315	9.490	10.827	12.107	13.749	16.721	18.743
105	2.625	3.172	3.798	4.557	5.375	6.262	7.328	8.447	9.638	10.994	12.287	13.953	16.951	19.000
110	2.675	3.229	3.862	4.634	5.463	6.362	7.443	8.579	9.785	11.162	12.468	14.158	17.181	19.257
115	2.724	3.286	3.927	4.711	5.550	6.462	7.559	8.710	9.933	11.329	12.648	14.362	17.411	19.514
120	2.773	3.343	3.992	4.788	5.638	6.562	7.674	8.842	10.080	11.496	12.828	14.567	17.641	19.771
125	2.823	3.400	4.056	4.865	5.725	6.663	7.790	8.974	10.228	11.664	13.009	14.771	17.871	20.028
130	2.872	3.457	4.121	4.942	5.812	6.763	7.906	9.106	10.375	11.831	13.189	14.975	18.101	20.286
135	2.921	3.514	4.186	5.019	5.900	6.863	8.021	9.237	10.523	11.998	13.370	15.180	18.331	20.543
140	2.970	3.571	4.250	5.096	5.987	6.963	8.137	9.369	10.670	12.166	13.550	15.384	18.561	20.800
145	3.020	3.628	4.315	5.173	6.075	7.063	8.252	9.501	10.818	12.333	13.730	15.589	18.791	21.057
150	3.069	3.685	4.380	5.250	6.162	7.163	8.368	9.633	10.965	12.501	13.911	15.793	19.021	21.314
155	3.118	3.741	4.444	5.327	6.249	7.263	8.484	9.764	11.113	12.668	14.091	15.998	19.251	21.571
160	3.168	3.798	4.509	5.404	6.337	7.363	8.599	9.896	11.260	12.835	14.271	16.202	19.481	21.828
165	3.217	3.855	4.573	5.481	6.424	7.463	8.715	10.028	11.408	13.003	14.452	16.407	19.711	22.086
170	3.266	3.912	4.638	5.558	6.512	7.563	8.830	10.160	11.555	13.170	14.632	16.611	19.941	22.343
175	3.316	3.969	4.703	5.635	6.599	7.664	8.946	10.291	11.703	13.337	14.812	16.815	20.171	22.600
180	3.365	4.026	4.767	5.712	6.686	7.764	9.062	10.423	11.850	13.505	14.993	17.020	20.401	22.857
185	3.414	4.083	4.832	5.789	6.774	7.864	9.177	10.555	11.998	13.672	15.173	17.224	20.631	23.114
190	3.463	4.140	4.897	5.866	6.861	7.964	9.293	10.687	12.145	13.839	15.353	17.429	20.861	23.371
195	3.513	4.197	4.961	5.943	6.949	8.064	9.408	10.818	12.293	14.007	15.534	17.633	21.091	23.628
200	3.562	4.254	5.026	6.020	7.036	8.164	9.524	10.950	12.440	14.174	15.714	17.838	21.321	23.886
205	3.611	4.311	5.091	6.097	7.123	8.264	9.640	11.082	12.588	14.341	15.895	18.042	21.551	24.143
210	3.661	4.368	5.155	6.174	7.211	8.364	9.755	11.214	12.735	14.509	16.075	18.246	21.781	24.400
215	3.710	4.425	5.220	6.251	7.298	8.464	9.871	11.345	12.883	14.676	16.255	18.451	22.012	24.657
220	3.759	4.482	5.285	6.328	7.386	8.564	9.986	11.477	13.030	14.843	16.436	18.655	22.242	24.914
225	3.809	4.539	5.349	6.405	7.473	8.665	10.120	11.609	13.178	15.011	16.616	18.860	22.472	25.171
230	3.858	4.596	5.414	6.482	7.560	8.765	10.218	11.741	13.325	15.178	16.796	19.064	22.702	25.428
235	3.907	4.653	5.479	6.559	7.648	8.865	10.333	11.872	13.473	15.345	16.977	19.269	22.932	25.686
240	3.956	4.710	5.543	6.636	7.735	8.965	10.449	12.004	13.620	15.513	17.157	19.473	23.162	25.943
245	4.006	4.767	5.608	6.713	7.823	9.065	10.564	12.136	13.768	15.680	17.337	19.678	23.392	26.200
250	4.055	4.824	5.673	6.790	7.910	9.165	10.680	12.268	13.915	15.848	17.518	19.882	23.622	26.457
255	4.104	4.880	5.737	6.867	7.997	9.265	10.796	12.399	14.063	16.015	17.698	20.086	23.852	26.714
260	4.154	4.937	5.802	6.944	8.085	9.365	10.911	12.531	14.210	16.182	17.878	20.291	24.082	26.971
265	4.203	4.994	5.866	7.021	8.172	9.465	11.027	12.663	14.358	16.350	18.059	20.495	24.312	27.228
270	4.252	5.051	5.931	7.098	8.260	9.565	11.142	12.795	14.505	16.517	18.239	20.700	24.542	27.486
275	4.302	5.108	5.996	7.175	8.347	9.666	11.258	12.926	14.653	16.684	18.419	20.904	24.772	27.743
280	4.351	5.165	6.060	7.252	8.434	9.766	11.374	13.058	14.800	16.852	18.600	21.109	25.002	28.000
285	4.400	5.222	6.125	7.329	8.522	9.866	11.489	13.190	14.948	17.019	18.780	21.313	25.232	28.257
290	4.449	5.279	6.190	7.406	8.609	9.966	11.605	13.322	15.095	17.186	18.961	21.518	25.462	28.514
295	4.499	5.336	6.254	7.483	8.697	10.066	11.720	13.453	15.243	17.354	19.141	21.722	25.692	28.771
300	4.548	5.393	6.319	7.560	8.784	10.166	11.836	13.585	15.390	17.521	19.321	21.926	25.922	29.028
305	4.597	5.450	6.384	7.637	8.871	10.266	11.952	13.717	15.538	17.688	19.502	22.131	26.152	29.286
310	4.647	5.507	6.448	7.714	8.959	10.366	12.067	13.849	15.685	17.856	19.682	22.335	26.382	29.543
315	4.696	5.564	6.513	7.791	9.046	10.466	12.183	13.980	15.833	18.023	19.862	22.540	26.612	29.800
320	4.745	5.621	6.578	7.868	9.134	10.566	12.298	14.112	15.980	18.190	20.043	22.744	26.842	30.057
325	4.795	5.678	6.642	7.945	9.221	10.667	12.414	14.244	16.128	18.358	20.223	22.949	27.072	30.314
330	4.844	5.735	6.707	8.022	9.308	10.767	12.530	14.376	16.275	18.525	20.403	23.153	27.302	30.571
335	4.893	5.792	6.772	8.099	9.396	10.867	12.645	14.507	16.423	18.692	20.584	23.357	27.532	30.828
340	4.942	5.849	6.836	8.176	9.483	10.967	12.761	14.639	16.570	18.860	20.764	23.562	27.762	31.086
345	4.992	5.906	6.901	8.253	9.571	11.067	12.876	14.771	16.718	19.027	20.944	23.766	27.992	31.343
350	5.041	5.963	6.966	8.330	9.658	11.167	12.992	14.903	16.865	19.195	21.125	23.971	28.222	31.600
355	5.090	6.019	7.030	8.407	9.745	11.267	13.108	15.034	17.013	19.362	21.305	24.175	28.453	31.857
360	5.140	6.076	7.095	8.484	9.833	11.367	13.223	15.166	17.160	19.529	21.485	24.380	28.683	32.114
365	5.189	6.133	7.159	8.561	9.920	11.467	13.339	15.298	17.308	19.697	21.666	24.584	28.913	32.371
370	5.238	6.190	7.224	8.638	10.008	11.567	13.454	15.430	17.455	19.864	21.846	24.789	29.143	32.628
375	5.288	6.247	7.289	8.715	10.095	11.668	13.570	15.561	17.603	20.031	22.027	24.993	29.373	32.885
380	5.337	6.304	7.353	8.792	10.182	11.768	13.686	15.693	17.750	20.199	22.207	25.197	29.603	33.143
385	5.386	6.361	7.418	8.869	10.270	11.868	13.801	15.825	17.898	20.366	22.387	25.402	29.833	33.400
390	5.435	6.418	7.483	8.946	10.357	11.968	13.917	15.957	18.045	20.533	22.568	25.606	30.063	33.657
395	5.485	6.475	7.547	9.023	10.445	12.068	14.032	16.088	18.193	20.701	22.748	25.811	30.293	33.914
400	5.534	6.532	7.612	9.100	10.532	12.168	14.148	16.220	18.340	20.868	22.928	26.015	30.523	34.171
405	5.583	6.589	7.677	9.177	10.619	12.268	14.264	16.352	18.488	21.035	23.109	26.220	30.753	34.428
410	5.633	6.646	7.741	9.254	10.707	12.368	14.379	16.484	18.635	21.203	23.289	26.424	30.983	34.685
415	5.682	6.703	7.806	9.331	10.794	12.468	14.495	16.615	18.783	21.370	23.469	26.629	31.213	34.943
420	5.731	6.760	7.871	9.408	10.882	12.568	14.610	16.747	18.930	21.537	23.650	26.833	31.443	35.200
425	5.781	6.817	7.935	9.485	10.969	12.669	14.7							

WEIGHT TABLE FOR ROUND AND HEXAGON BARS Kg./meter

Dim			Dim			Dim			Dim		
3	0.06	0.06	45	12.47	13.77	88	47.70	52.65	131	105.71	116.67
3.5	0.08	0.08	46	13.03	14.39	89	48.79	53.85	132	107.33	118.46
4	0.10	0.11	47	13.61	15.02	90	49.90	55.07	133	107.33	118.46
5	0.15	0.17	48	14.19	15.66	91	51.01	56.30	134	108.96	120.26
6	0.22	0.25	49	14.79	16.32	92	52.14	57.54	135	110.61	122.07
7	0.30	0.33	50	15.4	17.00	93	53.28	58.80	136	112.27	123.90
8	0.40	0.44	51	16.02	17.68	94	54.43	60.07	137	113.94	125.75
9	0.50	0.55	52	16.66	18.38	95	55.59	61.36	138	115.62	127.60
10	0.62	0.68	53	17.3	19.10	96	56.77	62.65	139	117.31	129.47
11	0.75	0.82	54	17.96	19.82	97	57.96	63.97	140	119.02	131.35
12	0.89	0.98	55	18.63	20.57	98	59.16	65.29	141	120.74	133.25
13	1.04	1.15	56	19.32	21.32	99	60.37	66.63	142	122.47	135.16
14	1.21	1.33	57	20.01	22.09	100	61.60	67.98	143	124.21	137.08
15	1.39	1.53	58	20.72	22.87	101	62.84	69.35	144	125.97	139.02
16	1.58	1.74	59	21.44	23.67	102	64.09	70.73	145	127.73	140.97
17	1.78	1.96	60	22.18	24.47	103	65.35	72.13	146	129.51	142.94
18	2.00	2.20	61	22.92	25.30	104	66.63	73.53	147	131.31	144.92
19	2.22	2.45	62	23.68	26.13	105	67.91	74.95	148	133.11	146.91
20	2.46	2.72	63	24.45	26.98	106	69.21	76.39	149	134.93	148.91
21	2.72	3.00	64	25.23	27.85	107	70.53	77.84	150	136.76	150.93
22	2.98	3.29	65	26.03	28.72	108	71.85	79.30	151	138.60	152.97
23	3.26	3.60	66	26.83	29.61	109	73.19	80.77	152	147.99	163.33
24	3.55	3.92	67	27.65	30.52	110	74.54	82.26	153	157.70	174.04
25	3.85	4.25	68	28.48	31.44	111	75.90	83.76	154	167.71	185.09
26	4.16	4.60	69	29.33	32.37	112	77.27	85.28	155	178.02	196.48
27	4.49	4.96	70	30.18	33.31	113	78.66	8.81	156	188.65	208.20
28	4.83	5.33	71	31.05	34.27	114	80.06	88.35	157	199.58	220.27
29	5.18	5.72	72	31.93	35.24	115	81.47	89.91	158	210.83	232.68
30	5.54	6.12	73	32.83	36.23	116	82.89	91.48	159	222.38	245.43
31	5.92	6.53	74	33.73	37.23	117	84.32	93.06	160	234.23	258.51
32	6.31	6.96	75	34.65	38.24	118	85.77	94.66	161	246.40	271.94
33	6.71	7.40	76	35.58	39.27	119	87.23	96.27	162	258.87	285.71
34	7.12	7.86	77	36.52	40.31	120	88.70	97.90	163	271.66	299.81
35	7.55	8.33	78	37.48	41.36	121	90.19	99.54	164	284.75	314.26
36	7.98	8.81	79	38.44	42.43	122	91.69	101.19	165	298.14	329.05
37	8.43	9.31	80	39.42	43.51	123	93.19	102.85	166	311.85	344.17
38	8.90	9.82	81	40.42	44.60	124	94.72	104.53	167	325.86	359.64
39	9.37	10.34	82	41.42	45.71	125	96.25	106.23	168	340.19	375.45
40	9.86	10.88	83	42.44	46.83	126	97.80	107.93	169	354.82	391.59
41	10.35	11.43	84	43.46	47.97	127	99.35	109.65	170	369.75	408.08
42	10.87	11.99	85	44.51	49.12	128	100.93	111.39	171	385.00	424.91
43	11.39	12.57	86	45.56	50.28	129	102.51	113.13	172	400.55	442.07
44	11.93	13.16	87	46.63	51.46	130	104.10	114.89	173	416.42	459.58

DENSITY

A276	A400	A500	A600	A625	A800	A825	A706	A715	A718	A750	C61400
8.89	8.83	8.47	8	8.44	8.1	8.14	8.90	8.89	8.22	8.38	7.46
C65500	B2	N80A	Ti2	Ti5	1.4923	A20	SA28	B7	Duplex	Sduplex	660
8.54	9.22	8.17	4.53	4.45	7.76	8.15	8.00	7.85	7.85	7.85	7.85

HARDNESS CONVERSION TABLE HB-HRC-Rm

HB	HV	HRC	HRB	Rm	HB	HV	HRC	HRB	Rm
124	-	-	71.00	420	232	244.8	21.10	100	765
126	-	-	72.00	430	236	249.0	21.90	-	770
128	-	-	73.00	-	240	253.2	22.60	101	780
130	-	-	-	440	244	257.4	23.40	102	800
132	-	-	74.00	450	248	261.6	24.00	-	810
134	-	-	75.00	-	252	265.9	24.70	103	820
136	-	-	76.00	460	256	270.1	25.40	-	830
138	-	-	-	-	260	274.3	26.10	104	850
140	-	-	77.00	470	264	278.5	26.80	-	860
142	-	-	78.00	480	268	282.7	27.40	105	880
144	-	-	-	-	272	287.0	27.90	-	890
146	-	-	79.00	490	276	291.2	28.60	106	900
148	-	-	80.00	500	280	295.4	29.10	-	910
150	-	-	81.00	-	284	299.6	29.60	107	930
152	-	-	-	510	288	303.8	30.20	-	940
154	-	-	82.00	520	292	308.1	30.70	-	950
156	-	-	-	-	296	312.3	31.30	108	970
158	-	-	83.00	530	300	316.5	31.80	-	980
160	-	-	-	540	304	320.7	32.30	-	990
162	-	-	84.00	-	308	324.9	32.80	109	1010
164	-	-	-	550	312	329.2	33.30	-	1020
166	-	-	85.00	560	316	333.4	33.80	-	1030
168	-	-	-	-	320	337.6	34.30	110	1050
170	-	-	86.00	570	324	341.8	34.70	-	1060
172	-	-	-	-	328	346.0	35.10	-	1070
174	-	-	87.00	580	332	350.3	35.60	-	1090
176	185.7	-	-	590	336	354.5	36.10	-	1100
178	187.8	-	88.00	-	340	358.7	35.50	-	1120
180	189.9	-	-	600	344	362.9	36.90	-	1130
182	192.0	-	89.00	610	348	367.1	37.30	- Text	1140
184	194.1	-	-	-	352	371.4	37.70	-	1160
186	196.2	-	90.00	620	356	375.6	38.10	-	1170
188	198.3	-	-	630	360	379.8	38.50	-	1190
190	200.5	-	91.00	-	364	384.0	38.90	-	1200
192	202.6	-	-	640	368	388.2	39.20	-	1210
194	204.7	-	92.00	650	372	392.5	39.60	-	1230
196	206.8	-	-	-	376	396.7	39.90	-	1240
198	208.9	-	93.00	660	380	400.9	40.40	-	1260
200	211.0	-	-	-	384	405.1	40.70	-	1270
202	213.1	-	94.00	670	388	409.3	41.10	-	1280
204	215.2	-	-	680	392	413.6	41.40	-	1290
206	217.3	15.00	-	-	396	417.8	41.80	-	1310
208	219.4	15.40	95.00	690	400	422.0	42.10	-	1320
210	221.6	15.90	-	700	404	426.2	42.50	-	1330
212	223.7	16.40	96.00	-	408	430.4	42.80	-	1350
214	225.8	16.90	-	710	412	434.7	43.20	-	1370
216	227.9	17.60	-	720	416	438.9	43.60	-	1380
218	230.0	18.10	97.00	-	420	443.1	43.90	-	1390
220	232.1	18.50	-	730	424	447.3	44.20	-	1410
222	234.2	19.00	98.00	-	428	451.5	44.50	-	1430
224	236.3	19.40	-	740	432	455.8	44.90	-	1440
226	238.4	19.80	-	750	436	460.0	45.20	-	1460
228	240.5	20.30	99.00	-	440	464.2	45.50	-	1470
230	242.7	20.70	-	760	444	468.4	45.80	-	1490



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CREDITS

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