RR HYDRAULIC
Precision Fasteners

HEX BOLT & NUT
WEIGHT CHART

Weight per piece (kg) · Weight per 100 pieces (kg)

Carbon Steel · Stainless Steel SS 304 · Stainless Steel SS 316

M3 to M100 · All Standard Lengths · DIN 931/933/934 · ISO 4014/4017/4032

2025 – 2026 EDITION

Bolt Standards
DIN 931 (Part Thread) · DIN 933 (Full Thread)
ISO 4014 · ISO 4017 · ASME B18.2.1

Nut Standard
DIN 934 · ISO 4032 · ASME B18.2.2
Hex Nut — Standard (Style 1)

Washer Standard
DIN 125 A · ISO 7089 · ASME B18.22.1
Flat Washer — Grade A

Size Range
M3 to M100
All standard bolt lengths (20mm – 300mm)

Materials
Carbon Steel — 7.85 g/cc
SS 304 — 7.93 g/cc · SS 316 — 7.98 g/cc

Method
ISO geometric calculation ± 3–5%
Based on DIN/ISO nominal dimensions

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Hex Bolt & Nut — Standard Dimensions (M3 – M100)

DIN 931/933 Bolts · DIN 934 Nut · DIN 125 Washer · All dimensions in millimetres (mm)

Size	Pitch (mm)	AF s (mm)	Head Ht k (mm)	Nut Ht m (mm)	Washer ID (mm)	Washer OD (mm)	Washer Thk (mm)	Minor Dia d■ (mm)
M3	0.50	5.5	2.0	2.4	3.4	7	0.5	2.387
M4	0.70	7.0	2.8	3.2	4.5	9	0.8	3.141
M5	0.80	8.0	3.5	4.0	5.5	10	1.0	4.018
M6	1.00	10.0	4.0	5.0	6.6	12	1.6	4.773
M8	1.25	13.0	5.3	6.5	9.0	16	1.6	6.466
M10	1.50	17.0	6.4	8.0	11.0	20	2.0	8.160
M12	1.75	19.0	7.5	10.0	13.5	24	2.5	9.853
M14	2.00	22.0	8.8	11.0	15.5	28	2.5	11.546
M16	2.00	24.0	10.0	13.0	17.5	30	3.0	13.546
M18	2.50	27.0	11.5	15.0	20.0	34	3.0	14.933
M20	2.50	30.0	12.5	16.0	22.0	37	3.0	16.933
M22	2.50	32.0	14.0	18.0	24.0	39	3.0	18.933
M24	3.00	36.0	15.0	19.0	26.0	44	4.0	20.319
M27	3.00	41.0	17.0	22.0	30.0	50	4.0	23.319
M30	3.50	46.0	18.7	24.0	33.0	56	4.0	25.706
M33	3.50	50.0	21.0	26.0	36.0	60	5.0	28.706
M36	4.00	55.0	22.5	29.0	39.0	66	5.0	31.092
M39	4.00	60.0	25.0	31.0	42.0	72	5.0	34.092
M42	4.50	65.0	26.0	34.0	45.0	78	6.0	36.479
M45	4.50	70.0	28.0	36.0	48.0	85	6.0	39.479
M48	5.00	75.0	30.0	38.0	52.0	92	6.0	41.865
M52	5.00	80.0	33.0	42.0	56.0	98	6.0	45.865
M56	5.50	85.0	35.0	45.0	60.0	105	6.0	49.252
M60	5.50	90.0	38.0	48.0	64.0	110	8.0	53.252
M64	6.00	95.0	40.0	51.0	68.0	115	8.0	56.639
M68	6.00	100.0	43.0	54.0	72.0	120	8.0	60.639
M72	6.00	105.0	45.0	58.0	76.0	125	8.0	64.639
M76	6.00	110.0	48.0	61.0	80.0	130	8.0	68.639
M80	6.00	115.0	50.0	64.0	84.0	140	8.0	72.639
M90	6.00	130.0	56.0	72.0	94.0	155	10.0	82.639
M100	6.00	145.0	63.0	80.0	104.0	175	10.0	92.639

Hex Bolt Weight per Piece (kg) — M3 to M20 · Carbon

DIN 931 Part Thread · DIN 933 Full Thread · ISO 4014 / ISO 4017 · '—' = length shorter than head height

Size ↓ L→	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	50 mm	55 mm	60 mm	65 mm	70 mm	75 mm	80 mm	90 mm	100 mm	110 mm	120 mm	130 mm	150 mm	180 mm	200 mm
M3	1.083	1.269	1.456	1.643	1.829	2.016	2.202	2.389	2.575	2.762	2.948	3.135	3.322	3.695	4.068	4.441	4.814	5.187	5.933	7.053	7.799
M4	2.074	2.405	2.737	3.069	3.400	3.732	4.063	4.395	4.727	5.058	5.390	5.722	6.053	6.717	7.380	8.043	8.707	9.370	10.70	12.69	14.01
M5	3.233	3.751	4.269	4.787	5.306	5.824	6.342	6.860	7.378	7.897	8.415	8.933	9.451	10.49	11.52	12.56	13.60	14.63	16.71	19.82	21.89
M6	5.107	5.853	6.600	7.346	8.092	8.838	9.584	10.33	11.08	11.82	12.57	13.32	14.06	15.55	17.05	18.54	20.03	21.52	24.51	28.99	31.97
M8	9.989	11.32	12.64	13.97	15.30	16.62	17.95	19.28	20.60	21.93	23.26	24.58	25.91	28.56	31.21	33.87	36.52	39.17	44.48	52.44	57.75
M10	18.31	20.41	22.52	24.63	26.73	28.84	30.95	33.06	35.16	37.27	39.38	41.49	43.59	47.81	52.02	56.24	60.45	64.66	73.09	85.74	94.17
M12	26.28	29.43	32.58	35.73	38.88	42.03	45.18	48.33	51.48	54.63	57.78	60.93	64.09	70.39	76.69	82.99	89.29	95.59	108.19	127.09	139.69
M14	38.82	43.22	47.62	52.02	56.43	60.83	65.23	69.63	74.03	78.44	82.84	87.24	91.64	100.45	109.25	118.06	126.86	135.67	153.28	179.69	197.30
M16	50.88	56.75	62.61	68.47	74.34	80.20	86.07	91.93	97.79	103.66	109.52	115.38	121.25	132.97	144.70	156.43	168.15	179.88	203.33	238.51	261.97
M18	69.80	77.33	84.87	92.40	99.93	107.47	115.00	122.53	130.07	137.60	145.13	152.67	160.20	175.27	190.34	205.40	220.47	235.54	265.67	310.87	341.00
M20	90.60	100.01	109.42	118.84	128.25	137.66	147.07	156.49	165.90	175.31	184.72	194.14	203.55	222.37	241.20	260.02	278.85	297.67	335.32	391.80	429.45

Hex Bolt Weight per Piece (kg) — M22 to M48 · Carbo

DIN 931 Part Thread · DIN 933 Full Thread · ISO 4014 / ISO 4017 · '—' = length shorter than head height

Size ↓ L→	40 mm	50 mm	60 mm	70 mm	80 mm	90 mm	100 mm	120 mm	140 mm	160 mm	180 mm	200 mm	220 mm	240 mm	260 mm	280 mm	300 mm
M22	157.26	180.26	203.27	226.27	249.27	272.27	295.27	341.27	387.27	433.28	479.28	525.28	571.28	617.29	663.29	709.29	755.29
M24	201.15	228.74	256.34	283.93	311.53	339.12	366.72	421.91	477.10	532.29	587.48	642.67	697.86	753.05	808.24	863.43	918.62
M27	275.40	310.67	345.94	381.21	416.48	451.75	487.02	557.56	628.10	698.64	769.18	839.72	910.26	980.80	1051.34	1121.88	1192.42
M30	362.48	406.37	450.25	494.14	538.02	581.91	625.80	713.57	801.34	889.11	976.88	1064.65	1152.43	1240.20	1327.97	1415.74	1503.51
M33	458.45	511.89	565.33	618.78	672.22	725.66	779.10	885.99	992.87	1099.75	1206.64	1313.52	1420.41	1527.29	1634.17	1741.06	1847.94
M36	574.60	638.54	702.48	766.42	830.36	894.29	958.23	1086.11	1213.99	1341.86	1469.74	1597.62	1725.50	1853.37	1981.25	2109.13	2237.00
M39	724.91	800.29	875.66	951.04	1026.41	1101.79	1177.16	1327.92	1478.67	1629.42	1780.17	1930.92	2081.67	2232.43	2383.18	2533.93	2684.68
M42	869.65	957.40	1045.15	1132.91	1220.66	1308.42	1396.17	1571.68	1747.18	1922.69	2098.20	2273.70	2449.21	2624.72	2800.22	2975.73	3151.24
M45	1054.01	1155.08	1256.16	1357.23	1458.30	1559.37	1660.44	1862.59	2064.73	2266.87	2469.02	2671.16	2873.30	3075.45	3277.59	3479.73	3681.88
M48	1262.54	1377.87	1493.20	1608.53	1723.87	1839.20	1954.53	2185.19	2415.85	2646.51	2877.17	3107.83	3338.49	3569.15	3799.81	4030.47	4261.13

Hex Bolt Weight per Piece (kg) — M52 to M100 · Carb

Heavy-duty structural & flanged joint bolting · Oil & gas / EPC / Power generation applications

Size ↓ L→	80 mm	100 mm	120 mm	140 mm	160 mm	180 mm	200 mm	220 mm	240 mm	260 mm	280 mm	300 mm
M52	2074.08	2345.70	2617.31	2888.92	3160.53	3432.14	3703.75	3975.36	4246.97	4518.58	4790.19	5061.80
M56	2429.90	2745.81	3061.71	3377.62	3693.52	4009.42	4325.33	4641.23	4957.13	5273.04	5588.94	5904.85
M60	2855.95	3219.50	3583.04	3946.58	4310.12	4673.66	5037.20	5400.74	5764.29	6127.83	6491.37	6854.91
M64	3283.23	3697.76	4112.28	4526.80	4941.33	5355.85	5770.37	6184.90	6599.42	7013.94	7428.47	7842.99
M68	3790.64	4259.49	4728.34	5197.19	5666.04	6134.89	6603.74	7072.58	7541.43	8010.28	8479.13	8947.98
M72	4294.21	4820.73	5347.25	5873.77	6400.29	6926.81	7453.33	7979.85	8506.37	9032.89	9559.41	10085.93
M76	4888.51	5476.04	6063.57	6651.11	7238.64	7826.17	8413.71	9001.24	9588.77	10176.31	10763.84	11351.37
M80	5473.21	6125.10	6777.00	7428.89	8080.78	8732.67	9384.56	10036.45	10688.35	11340.24	11992.13	12644.02
M90	7426.81	8254.23	9081.65	9909.07	10736.48	11563.90	12391.32	13218.74	14046.15	14873.57	15700.99	16528.41
M100	9875.13	10898.97	11922.82	12946.66	13970.50	14994.35	16018.19	17042.04	18065.88	19089.73	20113.57	21137.42

Hex Nut & Flat Washer — Weight per Piece & per 100 P

DIN 934 Hex Nut · DIN 125A Flat Washer · Three material grades · All weights in kg

Size	Nut CS (kg)	Nut SS304 (kg)	Nut SS316 (kg)	100 Nuts CS (kg)	Washer CS (kg)	Washer SS304 (kg)	100 Wshrs CS (kg)
M3	0.360	0.364	0.366	36.04	0.115	0.117	11.54
M4	0.750	0.758	0.763	75.03	0.300	0.303	29.96
M5	1.124	1.135	1.142	112.38	0.430	0.434	43.00
M6	2.289	2.313	2.327	228.94	0.991	1.001	99.08
M8	4.903	4.953	4.984	490.31	1.726	1.744	172.63
M10	10.79	10.90	10.96	1078.54	3.440	3.475	344.03
M12	15.66	15.82	15.92	1566.37	6.069	6.131	606.90
M14	22.90	23.13	23.28	2290.16	8.381	8.466	838.11
M16	30.39	30.70	30.89	3038.73	10.98	11.09	1098.21
M18	44.38	44.83	45.11	4437.57	13.98	14.13	1398.31
M20	58.44	59.03	59.40	5843.71	16.37	16.54	1636.91
M22	71.59	72.32	72.78	7159.35	17.48	17.66	1747.88
M24	99.93	100.95	101.58	9992.75	31.07	31.39	3107.35
M27	152.53	154.09	155.06	15253.44	39.46	39.86	3945.84
M30	212.07	214.23	215.58	21207.27	50.48	51.00	5048.21
M33	267.32	270.05	271.75	26732.30	71.03	71.75	7102.51
M36	364.66	368.38	370.70	36466.13	87.39	88.28	8739.42
M39	467.99	472.76	475.74	46798.66	105.43	106.50	10542.79
M42	606.80	612.99	616.85	60680.11	150.15	151.68	15015.16
M45	749.76	757.41	762.18	74976.41	182.04	183.89	18203.89
M48	913.35	922.65	928.47	91334.55	213.08	215.25	21307.54
M52	1127.19	1138.68	1145.86	112719.35	239.27	241.70	23926.59
M56	1340.24	1353.90	1362.43	134023.93	274.67	277.47	27466.75
M60	1577.80	1593.88	1603.93	157780.19	394.78	398.80	39478.13
M64	1841.16	1859.93	1871.66	184116.50	424.23	428.55	42422.72
M68	2131.61	2153.34	2166.91	213161.21	454.56	459.19	45456.08
M72	2493.42	2518.83	2534.71	249341.68	485.78	490.73	48578.23
M76	2845.54	2874.54	2892.66	284554.10	517.89	523.17	51789.15
M80	3228.74	3261.65	3282.21	322874.28	618.71	625.01	61870.78
M90	4676.52	4724.18	4753.97	467652.37	936.46	946.00	93645.89
M100	6502.44	6568.71	6610.12	650243.92	1221.30	1233.75	122129.92

Weight per 100 Bolts (kg) & Material Density Correctio

Carbon Steel base · Apply material factor to convert to SS / Brass / Titanium etc.

A · MATERIAL DENSITY & WEIGHT CORRECTION FACTORS

Material / Grade	Density (g/cc)	Factor vs CS	M10×60 Bolt (kg)	M20×100 Bolt (kg)	M30×150 Bolt (kg)	M48×200 Bolt (kg)
Carbon Steel (Grade 4.6 / 8.8 / 10.9	7.85	× 1.0000	35.16	241.20	845.22	3107.83
Alloy Steel (B7 · L7 · Gr.5 · Gr.8)	7.85	× 1.0000	35.16	241.20	845.22	3107.83
Stainless Steel 304 (A2-70)	7.93	× 1.0102	35.52	243.66	853.84	3139.50
Stainless Steel 316 (A4-70)	7.98	× 1.0166	35.75	245.19	859.22	3159.30
Stainless Steel 316L	7.98	× 1.0166	35.75	245.19	859.22	3159.30
Duplex 2205 (UNS S31803)	7.80	× 0.9936	34.94	239.66	839.84	3088.03
Super Duplex 2507 (UNS S32750)	7.81	× 0.9949	34.98	239.97	840.92	3091.99
Inconel 625 (UNS N06625)	8.44	× 1.0752	37.81	259.33	908.75	3341.41
Monel 400 (UNS N04400)	8.80	× 1.1210	39.42	270.39	947.51	3483.94
Brass (C360 Free-machining)	8.50	× 1.0828	38.08	261.17	915.21	3365.17
Copper (C110)	8.94	× 1.1389	40.05	274.69	962.59	3539.36
Titanium Grade 2 (UNS R50400)	4.51	× 0.5745	20.20	138.57	485.60	1785.52
Titanium Grade 5 Ti-6Al-4V	4.43	× 0.5643	19.84	136.12	476.99	1753.85
Aluminium 6061	2.70	× 0.3439	12.09	82.96	290.71	1068.94

B · WEIGHT PER 100 BOLTS — CARBON STEEL (kg) · Selected sizes and lengths

Size ↓ L(mm) →	30 mm	40 mm	50 mm	60 mm	80 mm	100 mm	120 mm	150 mm	200 mm	250 mm	300 mm
M6	659.96	809.20	958.44	1107.68	1406.17	1704.65	2003.13	2450.86	3197.07	3943.27	4689.48
M8	1264.26	1529.58	1794.90	2060.21	2590.85	3121.49	3652.12	4448.08	5774.67	7101.26	8427.85
M10	2252.02	2673.46	3094.91	3516.35	4359.24	5202.13	6045.01	7309.34	9416.56	11523.78	13631.00
M12	3258.26	3888.31	4518.36	5148.41	6408.51	7668.61	8928.72	10818.87	13969.13	17119.38	20269.64
M16	6261.16	7433.83	8606.51	9779.18	12124.52	14469.86	16815.20	20333.22	26196.57	32059.93	37923.28
M20	10942.46	12824.95	14707.45	16589.95	20354.94	24119.93	27884.93	33532.42	42944.90	52357.39	61769.87
M24	17355.19	20114.72	22874.24	25633.77	31152.83	36671.89	42190.94	50469.53	64267.17	78064.81	91862.45
M30	31859.43	36248.02	40636.60	45025.19	53802.36	62579.54	71356.71	84522.47	106465.40	128408.34	150351.27
M36	51066.32	57460.18	63854.04	70247.89	83035.61	95823.33	108611.04	127792.62	159761.91	191731.20	223700.49
M48	—	126254.34	137787.38	149320.42	172386.50	195452.59	218518.67	253117.79	310782.99	368448.19	426113.39

Calculation Formulas, Technical Notes & Ordering Guid

How to calculate bolt weight · How to specify a fastener correctly · Accuracy notes

HEX BOLT WEIGHT

W (kg) = (V_head + V_shank) × ρ ÷ 10■
V_head = hex_area(s) × k [mm³]
hex_area(s) = (3√3 / 2) × (s / √3)²
V_shank = π × (d■/2)² × (L – k) [mm³]
d■ = d – 1.2269×p (ISO minor diameter)

HEX NUT WEIGHT

W (kg) = (A_hex – A_hole) × m × ρ ÷ 10■
A_hex = (3√3 / 2) × (s / √3)² [mm²]
A_hole = π × (d/2)² [mm²]
m = nut height (DIN 934) s = across flats
ρ = 7.85 (CS) 7.93 (SS304) 7.98 (SS316)

FLAT WASHER WEIGHT

W (kg) = π/4 × (D_o² – D_i²) × t × ρ ÷ 10■
D_o = washer outer diameter (DIN 125)
D_i = inner diameter ≈ nominal bolt size + 0.4mm
t = washer thickness (mm)
Convert result ÷ 1000 for kg per piece

MATERIAL CORRECTION

W_material = W_CS × (ρ_material ÷ 7.85)
SS 304 : × 1.0102 SS 316 : × 1.0166
Brass C360 : × 1.0828 Copper : × 1.1389
Titanium Gr.2 : × 0.5745 Gr.5 : × 0.5643
Duplex 2205 : × 0.9936 Aluminium : × 0.3439

ACCURACY NOTES & DISCLAIMER

All weights are calculated from nominal ISO/DIN geometric dimensions. Actual weights may vary ±3% to ±8% depending on manufacturer tolerances, lead-in chamfers, thread form and production method (hot-forged vs cold-forged).
Heavy hex nuts (ASTM A194 2H), high-strength nuts (Grade 10) and flange nuts weigh more than DIN 934 values shown.
For exact project weights on large procurement orders, always request a weight certificate from the manufacturer.
Fine thread (MF series) bolts are typically 1–3% lighter than coarse thread equivalents of the same nominal length.

HOW TO CORRECTLY SPECIFY A HEX BOLT — ORDERING EXAMPLES

Metric bolt — general
M16 × 80mm — Grade 8.8 — DIN 931 — Zinc Plated
Size × Total Length — Property Class — Standard — Surface Finish

Stainless bolt — fully threaded
M20 × 100mm — A4-70 — ISO 4017 — Natural / Passivated
Fully threaded (FT), SS 316, no coating required

Oil & gas stud bolt
1" × 120mm — ASTM A193 B7 — Plain
With A194 2H heavy hex nuts — Per ASME B16.5 — NACE MR0175 if sour service

High-strength structural
M24 × 75mm — Grade 10.9 — EN 14399-4 HV — Geomet 500
Structural preloading bolt set with hardened washer

Concrete anchor rod
M20 × 400mm — ASTM F1554 Grade 55 — Hot-Dip Galvanized
L-bolt or J-bolt, HDG per BS EN ISO 1461, for embedded concrete anchorage

REQUEST WEIGHT CERTIFICATES · CUSTOM CALCULATIONS · BULK PRICING

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