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DIN 912 Complete Technical Specification

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1. Product Overview

DIN 912 hexagon socket head cap screws (also known as socket head caps, allen bolts) are precision-engineered fasteners featuring a cylindrical head with an internal hexagonal socket. These fasteners are designed for high-torque applications where a low profile and smooth aesthetic are required.

> **Equivalent Standards: ISO 4762, GB/T 70.1, JIS B 1176**

Key Features

- Internal hex drive for high torque transmission
- Cylindrical head for flush mounting
- Full thread standard (also available in partial thread)
- Available: M1.4 to M100 diameter range
- Lengths from 2mm to 400mm

2. Applications

DIN 912 screws are widely used across multiple industries due to their superior torque capabilities and compact design:

Industry	Application Examples
Automotive	Engine assemblies, transmission, chassis components
Machinery	Motor mounts, pump housings, gearboxes
Electronics	PCB mounting, enclosure assembly, precision equipment
Aerospace	Aircraft interiors, instrumentation panels
Medical	Surgical equipment, diagnostic devices
Robotics	Joint assemblies, actuator mounting, frame construction

Common DIN 912 Application Industries

3. Material & Property Classes

Material	Grade/Class	Tensile Strength	Surface Treatment Options
Carbon Steel	8.8	800 MPa	Zinc Plated, Black Oxide, Hot-Dip Galvanized
Carbon Steel	10.9	1000 MPa	Zinc Plated, Dacromet, Geomet
Carbon Steel	12.9	1200 MPa	Black Oxide, Zinc Nickel, Delta Tone
Stainless Steel	A2 (304)	700 MPa	Plain, Passivated
Stainless Steel	A4 (316)	700 MPa	Plain, Passivated, Marine Grade
Brass	CuZn	450 MPa	Plain, Nickel Plated
Titanium	Ti-6Al-4V	900 MPa	Plain, Anodized

DIN 912 Material Specifications

4. Theoretical Weight Table (Carbon Steel)

The following table provides theoretical weight data for DIN 912 hex socket head cap screws in carbon steel. Values are in kg per 1000 pieces.

L\mm	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36
10	0.72	1.48	2.50	-	-	-	-	-	-	-	-	-
15	1.00	1.97	3.13	5.45	-	-	-	-	-	-	-	-
20	1.25	2.45	3.80	5.35	10.5	-	-	-	-	-	-	-

25	1.52	2.93	4.52	6.45	12.5	20.6	-	-	-	-	-	-
30	1.78	3.42	5.25	7.55	14.5	24.8	-	-	-	-	-	-
35	-	3.90	6.00	8.65	16.5	27.5	41.0	-	-	-	-	-
40	-	4.39	6.70	9.75	18.2	30.5	43.2	-	-	-	-	-
45	-	4.85	7.45	10.9	20.1	33.5	47.5	-	-	-	-	-
50	-	-	8.15	11.9	22.1	36.5	52.1	102	-	-	-	-
55	-	-	8.90	12.8	24.1	39.5	56.8	110	-	-	-	-
60	-	-	-	14.1	26.0	42.5	60.5	118	205	-	-	-
70	-	-	-	16.2	30.0	48.5	69.5	135	230	-	-	-
80	-	-	-	-	33.8	54.5	78.5	151	245	385	-	-
90	-	-	-	-	37.5	60.5	87.5	168	275	425	-	-
100	-	-	-	-	-	66.5	96.5	185	305	455	745	-
120	-	-	-	-	-	-	115	218	355	530	880	-
150	-	-	-	-	-	-	-	268	445	650	1080	1520
180	-	-	-	-	-	-	-	-	515	755	1250	1950
200	-	-	-	-	-	-	-	-	585	860	1320	2350

DIN 912 Theoretical Weight (kg/1000 pcs) - Carbon Steel 7.85 g/cm³

Material Conversion Coefficients:
Carbon Steel (x1.00) |
Stainless Steel (x1.01) |
Brass (x1.08) |
Nylon PA66 (x0.15)

5. Dimensional Specifications

5.1 Thread Data (Metric Coarse Thread)

d (mm)	Pitch P	dk max	dk min	k max	k min	s (Hex)	t min
M2	0.40	3.80	3.62	2.00	1.86	1.5	1.0
M2.5	0.45	4.50	4.32	2.50	2.36	2.0	1.1
M3	0.50	5.50	5.32	3.00	2.86	2.5	1.3
M4	0.70	7.00	6.78	4.00	3.82	3.0	2.0
M5	0.80	8.50	8.28	5.00	4.82	4.0	2.5
M6	1.00	10.00	9.78	6.00	5.82	5.0	3.0
M8	1.25	13.00	12.73	8.00	7.78	6.0	4.0
M10	1.50	16.00	15.73	10.00	9.78	8.0	5.0
M12	1.75	18.00	17.73	12.00	11.73	10.0	6.0
M14	2.00	21.00	20.67	14.00	13.73	12.0	7.0
M16	2.00	24.00	23.67	16.00	15.73	14.0	8.0
M18	2.50	27.00	26.67	18.00	17.73	14.0	9.0
M20	2.50	30.00	29.67	20.00	19.73	17.0	10.0
M24	3.00	36.00	35.61	24.00	23.67	19.0	12.0
M30	3.50	45.00	44.61	30.00	29.67	22.0	15.0
M36	4.00	54.00	53.54	36.00	35.38	27.0	18.0

DIN 912 Dimensions (Coarse Thread) - Units in mm

5.2 Fine Thread Options

Thread	Fine Pitch 1	Fine Pitch 2	Fine Pitch 3
M6	-	-	-
M8	1.0	-	-
M10	1.25	1.0	-
M12	1.5	1.25	-
M14	1.5	-	-
M16	1.5	1.0	-
M20	1.5	2.0	-
M24	2.0	1.5	-
M30	2.0	1.5	-
M36	2.0	1.5	-
M42	3.0	2.0	1.5
M48	3.0	2.0	1.5

DIN 912 Fine Thread Pitch Options (mm)

6. Technical Data

6.1 Tightening Torque Reference

> **Note: Torque values are reference only. Actual torque depends on material, lubrication, and application conditions. Always consult qualified engineering for critical applications.**

Size	8.8 Grade (Nm)	10.9 Grade (Nm)	12.9 Grade (Nm)

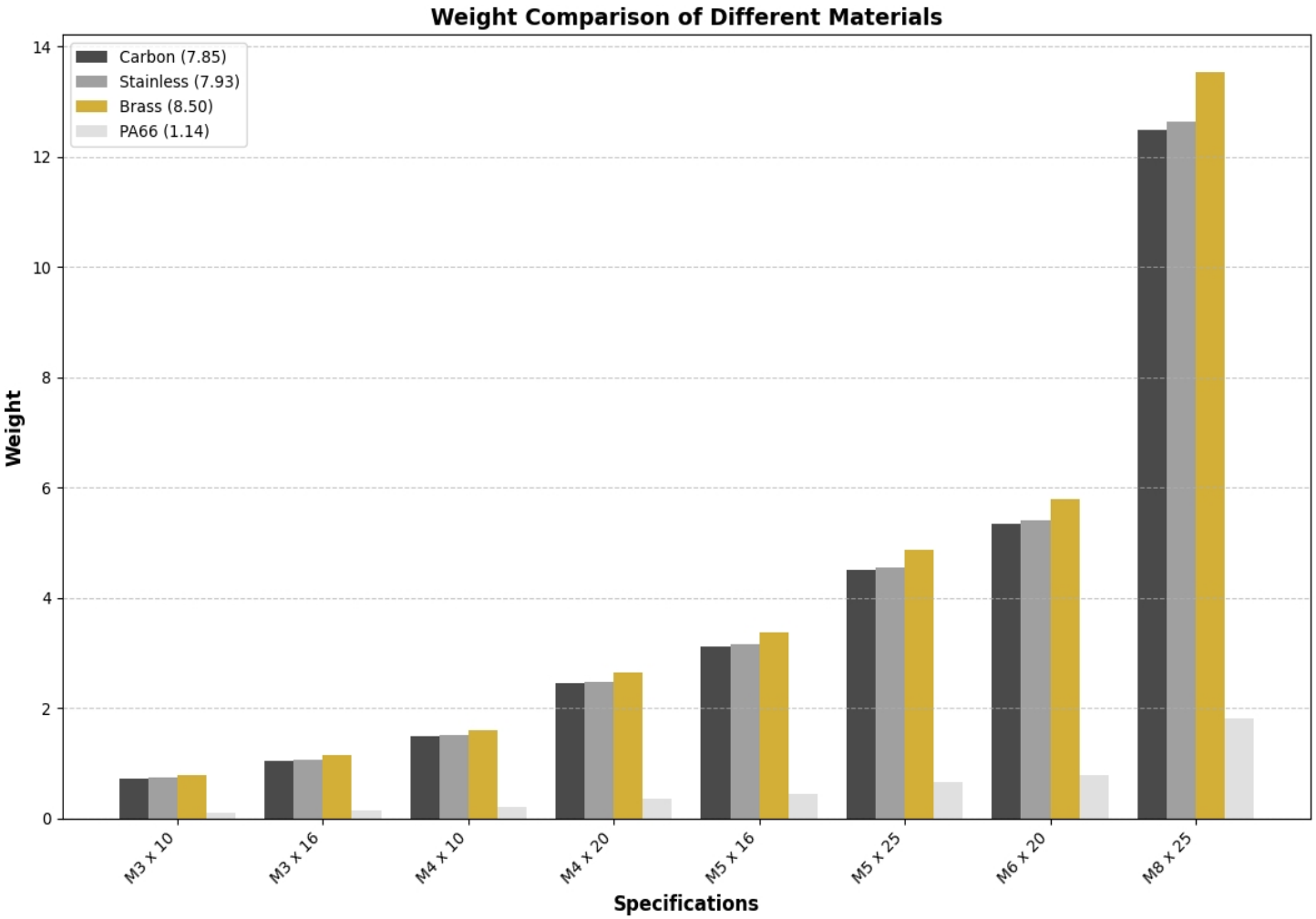
M4	3.2	4.8	5.7
M5	6.3	9.5	11.2
M6	10.8	16.5	19.5
M8	26.3	40.0	47.5
M10	52.0	79.0	94.0
M12	90.0	137.0	163.0
M14	143.0	218.0	260.0
M16	220.0	335.0	400.0
M20	430.0	655.0	780.0
M24	745.0	1130.0	1350.0

Recommended Tightening Torque (Lubricated)

6.2 Material Density for Weight Calculation

Material	Density (g/cm3)	Typical Use
Carbon Steel	7.85	General purpose, cost-effective
Stainless Steel A2 (304)	7.93	Corrosion resistance, indoor use
Stainless Steel A4 (316)	8.00	Marine, chemical environments
Brass	8.50	Electrical, decorative
Nylon PA66	1.14	Lightweight, insulating

Material Density Reference



7. Surface Treatment Guide

Treatment	Thickness	Corrosion Resistance	Color	Best For
Zinc Plated	5-8 um	48-72h NSS	Clear/Blue	General indoor use
Hot-Dip Galvanized	40-60 um	500+ h NSS	Matte Gray	Outdoor, structural
Black Oxide	1-3 um	24-48h NSS	Black	Aesthetic, light protection
Dacromet	8-12 um	500+ h NSS	Silver/Gray	Automotive, offshore
Zinc-Nickel	8-15 um	1000+ h NSS	Clear	High corrosion demand
Geomet	5-10 um	500+ h NSS	Silver	Environmentally preferred

Surface Treatment Comparison

8. Quality Standards & Testing

- Dimensional compliance per DIN 912-1983 / ISO 4762
- Mechanical testing: tensile strength, yield strength, elongation
- Hardness testing: Vickers (HV), Rockwell (HRC)
- Salt spray testing (NSS) for corrosion resistance verification
- Head driving test: hex socket engagement and stripping resistance
- 3.1 / 3.2 material test certificates available upon request

9. Free Online Calculator

> **Stop searching multiple tables! Get INSTANT weight calculations for ALL DIN/ISO standards with our free online tool.**

This PDF provides reference data, but for real-time calculations with custom specifications, material grades, and instant results, use our FREE online calculator at shscrewtool.com

- Select standard: DIN 933, DIN912, DIN 931, DIN 6921, and 27+ more
- Choose material: Carbon Steel, Stainless A2/A4, Brass, Nylon PA66
- Get instant weight per 1000 pcs for logistics planning
- Request custom quotes directly from manufacturers

shscrewtool.com/fastener-weight-calculator

This document is provided for reference purposes. For critical applications, always verify specifications with current DIN/ISO standards and consult qualified engineering professionals. All data is subject to change without notice.

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