

DIN 125

FLAT WASHER — COMPLETE SELECTION GUIDE

Complete Technical Specifications & Application Guide





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Industrial Fastener Platform

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1. Product Overview

Product Description

DIN 125 flat washers (Form A, unchamfered) are the essential load-distributing element in virtually every bolted joint. Proper washer selection prevents embedment into soft materials, distributes clamp force evenly, protects surface finishes, and provides a consistent friction interface for repeatable torque-tension relationships. The standard covers sizes from M1.6 to M39, with hardness classes 100HV (for bolts up to 6.8), 200HV (for 8.8/10.9), and 300HV (for 12.9).

Commercial Description

Shanghai Screwtool supplies DIN 125 washers in carbon steel (all hardness classes), stainless steel A2/A4, brass, aluminum, and nylon PA66. Precision-ground stainless washers ($R_a \leq 0.8 \mu\text{m}$, parallelism $< 10 \mu\text{m}$) are available for semiconductor metrology and optical bench applications. Standard sizes from M3 to M24 stocked for immediate shipment; larger diameters up to M39 available on request. Volume pricing, custom packaging, and full material traceability (3.1/3.2 certificates) offered. Request a quote at info@shscrewtool.com.

Equivalent Standards

ISO 7089 (normal series), ISO 7090 (chamfered), GB/T 95, GB/T 97.1. While functional interchangeability is high, chamfered washers provide better seating under bolt heads with radiused fillets. A correctly specified washer is an engineered component — underspecifying hardness class is a common root cause of bolted joint failure.

Equivalent Standards

ISO 7089 (normal), ISO 7090 (chamfered), GB/T 95, GB/T 97.1

Key Features

- Form A (unchamfered) for general industrial use — most economical
- Form B (chamfered) available per ISO 7090 for precision applications
- Wide range: M1.6 to M39+ in standard production
- Material options spanning carbon steel, stainless, brass, aluminum, and non-metallic
- Hardness class 100HV, 200HV, 300HV to match bolt grade
- Essential for all three target markets — used in virtually every bolted assembly

2. Target Market Applications

Home Appliance Assembly

Cost-efficient, RoHS compliant, aesthetic finish, high-volume automation

Washers are critical in appliance manufacturing to prevent surface damage during automated assembly and ensure consistent clamp load on painted/coated panels.

Application Example	Technical Rationale
Washing machine tub-to-outer drum bolting	SS washer prevents galvanic corrosion between SS bolt and aluminum tub flange
Refrigerator compressor mount vibration isolation	200HV washer + rubber isolator distributes load without crushing elastomer
Microwave oven magnetron mounting	Brass washer for non-magnetic requirement near microwave cavity
Dishwasher spray arm hub bearing surface	Nylon washer (PA66) for low-friction rotation + water-resistant bearing

Electric Vehicle

Lightweight materials, Zn-Ni plating 1000h+, ISO/TS 16949, thermal stability

In EV assembly, washers handle unique challenges: aluminum-to-steel interfaces, high-voltage isolation requirements, and thermal expansion compensation.

Application Example	Technical Rationale
Battery module busbar bolted connections	Belleville + flat washer combo maintains contact pressure through thermal cycling (40°C to 80°C)
Motor housing grounding strap connections	Serrated contact washer cuts through anodized aluminum for electrical continuity
Aluminum chassis to steel subframe joints	Large OD washer + isolating coating prevents galvanic corrosion at dissimilar metal interface
High-voltage contactor & fuse mounting	Insulating washer (Nomex/PET) for 400V/800V isolation creepage compliance

Semiconductor

Cleanroom Class 100, low outgassing, vacuum compatible, precision torque

Semiconductor equipment demands washers with ultra-clean surfaces, controlled outgassing, and compatibility with aggressive process chemicals.

Application Example	Technical Rationale
Vacuum chamber viewport & flange seals	OFHC copper washer for UHV metal-to-metal seals (10 ⁻¹⁰ mbar)
Gas delivery system VCR face seal fittings	Ni-plated 316L SS washer for corrosive gas compatibility (Cl ₂ , BCl ₃ , HBr)
Wafer stage granite base anchor points	Precision ground steel washer with parallelism < 10µm for metrology stability
Electrostatic chuck (ESC) mounting	Ceramic (Al ₂ O ₃) washer for electrical isolation + thermal uniformity at 60–120°C

3. Material & Property Classes

The correct material-grade selection determines joint performance, corrosion resistance, and total cost of ownership. Each grade is optimized for specific market requirements.

Material	Grade	Tensile Strength	Target Market Recommendation
Carbon Steel	100HV / 200HV	—	家电 (general purpose, cost-sensitive)
Carbon Steel	300HV	—	EV (high-strength bolted joints, 10.9/12.9 bolts)
Stainless A2 (304)	200HV	—	家电 (wet environment), 半导体 (cleanroom general)
Stainless A4 (316)	200HV	—	EV (battery area), 半导体 (process gas)
Brass	CuZn37	—	家电 (non-magnetic), 半导体 (vacuum)
Nylon PA66	—	—	家电 (insulating, low-friction bearing)

Material Density Reference

Material	Density (g/cm³)	Typical Application
Carbon Steel	7.85	General industrial, structural assemblies
Stainless A2 (304)	7.93	Indoor corrosion resistance, food grade, cleanroom
Stainless A4 (316)	8.00	Marine, chemical processing, EV battery enclosure
Brass CuZn37	8.50	Non-magnetic, electrical connectivity, decorative
Aluminum 7075	2.81	Lightweight, aerospace, EV sensor mounting brackets
Nylon PA66	1.14	Electrical insulation, low-friction bearing surfaces
Titanium Ti-6Al-4V	4.43	High strength-to-weight, medical devices, racing

4. Theoretical Weight Table

Values in kg per 1,000 pieces — Carbon Steel (density 7.85 g/cm³). For other materials, multiply by conversion coefficient:
Stainless ×1.01 | Brass ×1.08 | Aluminum ×0.36 | Nylon PA66 ×0.15.

Size	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24
kg/1000pcs	0.09	0.27	0.37	0.85	1.55	3.05	5.30	9.80	15.80	29.30

□ Quick Conversion: Find weight in table, multiply by material coefficient. Example: M8×40 in 316 SS weight = 18.2 × 1.01 = 18.4 kg/1000 pcs. Visit shscrewtool.com/fastener-weight-calculator for instant multi-material calculations.

5. Dimensional Specifications

All dimensions in mm / kg. Refer to DIN/ISO standard for full tolerance ranges.

Nominal (d)	ID d1 (mm)	OD d2 (mm)	Thickness h (mm)
M3	3.2	7.0	0.5
M4	4.3	9.0	0.8
M5	5.3	10.0	1.0
M6	6.4	12.0	1.6
M8	8.4	16.0	1.6
M10	10.5	20.0	2.0
M12	13.0	24.0	2.5
M14	15.0	28.0	2.5
M16	17.0	30.0	3.0
M18	19.0	34.0	3.0
M20	21.0	37.0	3.0
M22	23.0	39.0	3.0
M24	25.0	44.0	4.0
M27	28.0	50.0	4.0
M30	31.0	56.0	4.0
M33	34.0	60.0	5.0
M36	37.0	66.0	5.0
M39	40.0	72.0	6.0
M42	43.0	78.0	7.0
M45	46.0	85.0	7.0
M48	50.0	92.0	8.0

6. Tightening Torque Reference

Torque values are not applicable for this component type. Washers and other non-threaded components do not have tightening torque specifications. Refer to the bolt or nut standard paired with this component for torque values.

7. Surface Treatment Guide

Treatment	Thickness	Corrosion Resistance	Color	Best For
Zinc Plated	5–8 μm	48–72h NSS	Clear/Blue	General indoor use, cost-effective
Black Oxide	1–3 μm	24–48h NSS	Black	Aesthetic, light protection
Hot-Dip Galvanized	40–60 μm	500+ h NSS	Matte Gray	Outdoor, structural steel
Dacromet	8–12 μm	500+ h NSS	Silver/Gray	Automotive, offshore
Geomet	5–10 μm	500+ h NSS	Silver	Environmentally preferred, Cr(VI)-free
Zinc-Nickel	8–15 μm	1000+ h NSS	Clear	High corrosion demand, EV battery
Passivated (Stainless)	N/A	Excellent	Silver	Cleanroom, semiconductor, food grade

8. Quality Standards & Testing

- Dimensional compliance per DIN 125 / ISO 7089
- Hardness test per ISO 6507-1 (Vickers) — 100HV / 200HV / 300HV
- Surface roughness Ra ≤ 3.2μm for standard; ≤ 0.8μm for semiconductor cleanroom
- Burr-free edges verified by optical sorting (all production lots)
- Salt spray (NSS) per ISO 9227 for plated versions
- Ultrasonic cleaning + cleanroom packaging available for semiconductor (Class 100)
- Material certificates 3.1/3.2 per EN 10204; PPAP for automotive
- RoHS / REACH / IMDS compliance standard

9. Product Image References

Product Range

<https://www.fabory.com/en/flat-washer%2c-din-125-stainless-steel-a2/p/53010>

Application

<https://www.accu.co.uk/flat-washers/13838-HW-M6-A2>

Selection Guide

<https://www.bossard.com/global-en/assembly-technology/standard-parts/washers/flat-washer-din-125/>



shscrewtool.com

Fastener Weight Calculator

Instant weight calculation for 100+ DIN/ISO/ASME standards
Carbon Steel • Stainless A2/A4 • Brass • Aluminum • Nylon
Metric (M1.6–M100) and Inch (#0–4")

shscrewtool.com/fastener-weight-calculator

□ Instant results — no registration □ One-click Excel export □ 100% free

BOM Optimization Tool

Upload your Bill of Materials for AI-powered fastener optimization
Duplicate detection • SKU consolidation • Cross-standard equivalency
Material & surface treatment recommendations per target market

shscrewtool.com/bom-tool-fastener-list-optimization

□ Typically 15–30% SKU reduction □ DIN/ISO/GB/JIS/ASME cross-reference □ Export optimized BOM

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Generated: June 09, 2026 • shscrewtool.com • Shanghai Screwtool Industrial Co., Ltd.