Blade Metallurgy — HCS, Cr-V, Bi-Metal M42, Carbide, Diamond, Cobalt, Stainless, EVA

Technical Reference Guide for Professional Buyers

Oscillating · Reciprocating · Jigsaw Blades

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This guide provides a comprehensive comparison of blade materials available from DURASAWS, enabling distributors, OEM partners, and professional buyers to select the optimal material for each cutting application. Material choice directly determines blade life, cut quality, cutting speed, and total cost of ownership.

DURASAWS manufactures blades in 8 distinct material grades across oscillating, reciprocating, and jigsaw lines. Each material is engineered for specific material classes and cutting conditions.

Metallurgy Fundamentals

Blade performance depends on the interplay of hardness (wear resistance), toughness (impact resistance), and heat resistance. No single material maximizes all three — selection requires balancing these properties for the target application.

Heat Treatment & Coatings

DURASAWS uses vacuum hardening and tempering for optimal hardness/toughness balance. Optional PVD coatings (TiN, TiCN, AlTiN) increase surface hardness 20–30%, reduce friction, and improve heat dissipation. Coated Bi-Metal M42 (Ti-coated) extends life 30–50% in stainless steel.

Grit Edge Technology

Carbide and Diamond grit blades use brazed or electroplated abrasive particles. Grit size (mesh) determines aggressiveness: 60–80 mesh for fast stock removal, 100–150 mesh for finer finish. Diamond grit (synthetic industrial diamond) provides ultimate wear resistance for tile, stone, glass.

Comprehensive Properties Table

The table below compares all 9 DURASAWS blade materials across key performance metrics. Values represent typical ranges; exact specifications vary by blade geometry and heat treatment.

Property	HCS (High Carbon Steel)	Cr-V (Chrome Vanadium)	Bi-Metal M42 (8% Cobalt)	Carbide Tipped / Grit	Diamond Grit	Cobalt Steel	Stainless Steel	EVA
Hardness (HRC)	50–55	52–58	65–68 (teeth)	70–75 (teeth)	70+ (grit)	62–66	55–60	N/A (foam)
Heat Resistance	Low (~200°C)	Medium (~300°C)	High (~600°C)	Very High (~800°C)	Extreme (~1000°C)	High (~650°C)	Medium (~400°C)	Low (<150°C)
Wear Resistance	Fair	Good	Excellent	Superior	Ultimate	Excellent	Good	N/A
Toughness / Flexibility	High	High	Very High	Low (brittle)	Low (brittle)	High	Medium	Very High
Cost Level	Low ($)	Low–Medium ()	Medium–Hig h ($)	High ()	Premium ($)	High ()	Medium ($)	Low ($)
Primary Use	Wood, plastics, soft materials	Wood, plywood, fast cutting	Metal, nail-wood, demolition, stainless	Abrasives: tile, fiberglass, cement board	Hardest: stone, glass, ceramics	Steel, alloys, heat-resistant cuts	Food, medical, corrosive env.	Polishing, sanding, EVA foam
DURASAWS Examples	DS-OS-HCS-34-W01 DS-JS-HCS-100-J02	DS-OS-CRV-44-W02 DS-RC-CRV-300-R01	DS-OS-BIM-68-W04 DS-RC-BIM-230-R03	DS-OS-CARB-34-W05 DS-RC-CARB-228-R08	DS-JS-DIA-100-J03 DS-RC-DIA-228-9C	DS-JS-COB-150-J06 DS-JS-COB-150-J08	DS-OS-SS-52-W08 DS-RC-SS-300-R05	DS-OS-EVA-93-W07

Table 1: DURASAWS Blade Material Properties Comparison

Material Selection by Application

Use this table to quickly identify the best and alternative materials for common professional applications. Always verify TPI selection using the TPI Selection Guide.

Application	Best Material	Alternative	TPI Range	Key Consideration
Clean Wood Cutting	HCS / Cr-V	Bi-Metal M42	6–10 TPI	Low cost, high speed
Nail-Embedded Wood / Demolition	Bi-Metal M42	Carbide Tipped	6–10 TPI (var.)	Impact resistance critical
Thin Sheet Metal < 3 mm	Bi-Metal M42	Cobalt Steel	18–24 TPI	Fine tooth, use coolant
Stainless Steel	Bi-Metal M42 / Cobalt	Carbide Tipped	14–18 TPI	Low feed, coolant mandatory
Tile / Porcelain / Glass	Diamond Grit	Carbide Grit	Grit (80–120 mesh)	Slow speed, water cooling
Fiberglass / Cement Board / Abrasives	Carbide Grit	Diamond Grit	Grit (60–100 mesh)	Dust extraction required
Cast Iron / Hard Metals	Carbide Tipped	Diamond Grit	6–10 TPI	Rigid setup, low vibration

Food / Medical Grade Cutting	Stainless Steel	N/A	14–18 TPI	Corrosion resistance, no contamination
EVA Foam / Polishing / Sanding	EVA	N/A	N/A (grit)	Non-aggressive, surface finish
Gypsum / Drywall Renovation	HCS / Cr-V	Bi-Metal M42	10–14 TPI	Low dust, clean cut
Plastic / PVC / Composites	Cr-V / Bi-Metal	Carbide Grit	10–14 TPI	Prevent melting, sharp teeth
Pruning / Green Wood	Cr-V	HCS	3–6 TPI	Aggressive, chip clearance

Table 2: Material Recommendations by Application

HCS (High Carbon Steel)

Standard carbon tool steel (e.g., 1.2510 / 100MnCrW4). Good toughness and flexibility for wood and plastics. Low heat resistance limits use in metal. Most economical for high-volume wood cutting.

Cr-V (Chrome Vanadium Steel)

Alloy steel with chromium and vanadium (e.g., 1.2235 / 50CrV4). Higher hardness and wear resistance than HCS. Excellent for fast wood cutting and general purpose. Good balance of cost and performance.

Bi-Metal M42 (8% Cobalt HSS)

Electron-beam welded: M42 high-speed steel teeth (8% Co) on spring steel back. Combines HSS wear resistance with flexible back. Industry standard for metal, nail-wood, and demolition. DURASAWS M42 uses premium cobalt grade.

Carbide Tipped / Grit

Tungsten carbide (WC/Co) teeth brazed or grit edge. Extreme hardness for abrasive materials: fiberglass, cement board, tile, cast iron. Brittle — requires rigid setup. Carbide grit for softer abrasives; Diamond grit for hardest.

Diamond Grit

Electroplated or sintered synthetic diamond. Ultimate wear resistance for stone, glass, ceramics, composites. Requires water cooling. Highest cost but lowest cost-per-cut in hard materials.

Cobalt Steel (M35 / M42 solid)

Solid cobalt-alloy HSS (not bi-metal). Higher heat resistance than Bi-Metal for continuous metal cutting. Used in jigsaw blades for steel/alloy. DURASAWS uses M35 (5% Co) and M42 (8% Co) grades.

Stainless Steel (Food/Medical Grade)

Austenitic stainless (e.g., 1.4301 / 304, 1.4404 / 316L). Corrosion resistance for food, pharma, marine. Lower hardness — not for structural metal. Precision ground for clean cuts.

EVA (Ethylene Vinyl Acetate)

Closed-cell foam for polishing, sanding, surface prep. Non-aggressive — no cutting teeth. Used with oscillating tools for finish work, adhesive removal, paint prep.

Decision Tree 1: Wood & Construction Materials

Is material primarily wood? → Yes: Clean finish needed? → Yes: HCS/Cr-V 10–14 TPI → No: Cr-V 6–8 TPI. → Nail-embedded? → Bi-Metal M42 6/10 TPI. → Heavy demolition? → Carbide 6 TPI.

Decision Tree 2: Metal Cutting

Is material ferrous? → Yes: Stainless? → Bi-Metal M42 / Cobalt 14–18 TPI + coolant. → Mild steel/thin sheet? → Bi-Metal M42 18–24 TPI. → Cast iron/hardened? → Carbide 6–10 TPI. → Non-ferrous (Al, Cu)? → Bi-Metal M42 14–18 TPI.

Decision Tree 3: Hard & Abrasive Materials

Tile/porcelain/glass? → Diamond Grit (water). → Fiberglass/cement board? → Carbide Grit (dust extraction). → Stone/concrete? → Diamond/Carbide Grit.

Decision Tree 4: Specialty Applications

Food/medical? → Stainless Steel. → EVA foam/polishing? → EVA pad. → Corrosive environment? → Stainless Steel / Coated Bi-Metal.

HCS

High Carbon Steel — plain carbon tool steel

Cr-V

Chrome Vanadium Steel — alloy tool steel

Bi-Metal M42

M42 HSS teeth (8% Co) on spring steel back

HSS

High Speed Steel — retains hardness at elevated temperature

PVD

Physical Vapor Deposition — thin film coating (TiN, TiCN, AlTiN)

WC/Co

Tungsten Carbide / Cobalt binder

Mesh

Grit size: particles per inch (higher = finer)

Standards:

- **DIN 6494 / ISO 1054 — Reciprocating saw blade dimensions**
- **DIN 1838 / ISO 5835 — Jigsaw blade dimensions**
- **EN 12413 — Safety requirements for abrasive products**
- **Bosch Professional / Fein Application Guides — Industry references**