



PRECISION STAMPING DIE MATERIALS

Cemented Carbide for Precision Stamping Dies

Grades • Properties • Selection Guide — cemented carbide for high-speed stamping, motor cores, connectors, EDM blocks and cold heading.

If Carbide, Consider Yatech. With Yatech, Carbide Becomes Easy.

With more than 20 years in the cemented carbide industry, YATECH specializes in ultra-fine-grain and corrosion-resistant grades. Using virgin tungsten carbide powder and advanced powder-metallurgy processes, we supply high-stability, long-life carbide materials to precision stamping die makers worldwide.

From stress-free EDM blocks to progressive-die punches and die inserts, YATECH works alongside its customers to extend die life and reduce cost per part through better materials.

20+

Years in Carbide

300–2000

SPM High-Speed Stamping

24 h

Grade Recommendation

Factory-Direct

No Middlemen

Custom & OEM

Made to Your Drawings

Fast Sampling

Test Before Volume



YATECH carbide product family — blanks, blocks, punches, dies and wear components.

Six Advantages, One Process Discipline

Ultra-High Hardness & Wear Resistance

WC+Co+complex carbides handle high loads and extended runs — longer die life, lower cost per part.

Outstanding Corrosion Resistance

Corrosion-resistant binder grades optimized for WEDM suppress electrolytic corrosion in high-speed EDM.

Low-Stress Characteristics

Double-face grinding plus deep-cold treatment (−196 °C) minimize stress, deformation and cracking.

Dual-Grain (Bimodal) Structure

A unique bimodal microstructure balances strength and toughness for durable, reliable dies.

Exceptional Impact Resistance

A tough matrix absorbs stamping impact loads, preventing chipping and die damage in harsh duty.

Full-Traceability Quality

ISO 9001:2015 • RoHS • material traceability reports; every batch ships with certified properties.

From Virgin Powder to Precision Blocks

01

Weighing

WC + Co/Ni + carbides

02

Wet Milling /
Spray Drying

03

CIP
Compaction

04

HIP Sintering
1450 °C

05

Grinding /
EDM

06

Subzero
−196 °C

1450 °C

HIP SINTERING

−196 °C

DEEP-COLD TREATMENT

300–2000 SPM

STAMPING RANGE

ISO 9001:2015

TRACEABLE QUALITY

LIFECYCLE COST

Cost per 100k strokes = (block price ÷ total strokes)
× 100,000.

YATECH carbide EDM blocks: \$0.18 vs industry
average **\$0.27** — material life drives die economics.

Cr/Ta complex carbides reinforce the bimodal structure for wear and impact.

Double-face grinding removes sintered micro-cracks before wire EDM.

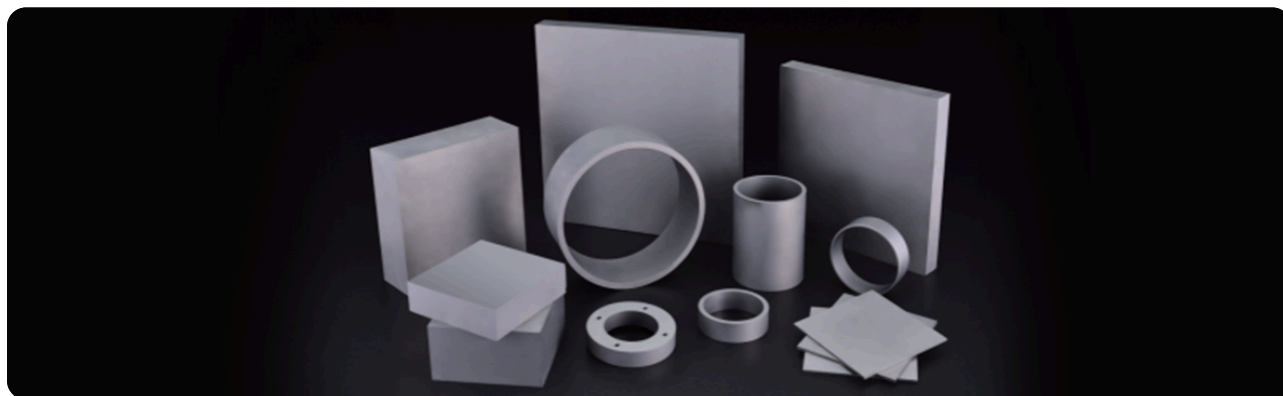
Silicon Steel High-Speed Stamping

The YF series uses 10–16.5% cobalt binder with submicron and blended grain structures, engineered for heavy-duty stamping. Medium cobalt content and mixed WC grain sizes deliver higher impact and vibration resistance with corrosion-resistant behavior — the classic material family for motor-core progressive dies.

GRADE	CO %	GRAIN MM	DENSITY G/CM ³	HRA	KIC MN/M ^{3/2}	TRS MPA	COMP. MPA	E GPA	TYPICAL APPLICATION
YF22H	10.0	2.0–5.0	14.35	89.0	14.5	3400	4500	550	Rotor / stator laminations
YF30P	12.0	1.0–2.0	14.15	90.0	12.5	3600	4900	580	General stamping
YF40H	12.5	1.0–2.0	14.20	89.5	13.5	3700	4700	570	Silicon steel high-speed
YF50H	14.0	1.5–3.0	14.00	88.5	14.5	3800	4600	550	Complex iron cores
YF55HH	16.5	1.0–4.0	13.80	87.4	15.5	3500	4200	540	Heavy-duty, thick stock

YF40H — the workhorse for high-speed silicon steel stamping; high wear resistance, high hardness and high toughness. Mainly used for conventional Y-series motor rotor cores.

YF50H — better toughness and shock resistance for complex cores of brushless and servo motor rotors, and mini-size rotor cores.



Stress-free carbide blanks, rings and plates for lamination and motor-core tooling.

KEY FEATURE

First choice for motor-core progressive dies

Auto stacked tools • skewed rotor tools • stator stamping tools • blanking & forming

Silicon steel

SPCC

Iron strip

Spring steel

Coining

Typical as-sintered values • HRA Rockwell A • TRS MPa • KIC MPa • m^{1/2} | Related: YA (p. 05) • YU (p. 06)

Lead Frames • Connectors • LED Brackets

The YA series pairs a 12–15% corrosion-resistant binder with 0.4–1.5 µm submicron grains. Well established in the lead-frame and connector industries, it is the recommended family for PG (profile grinding) components: high wear resistance, excellent chipping resistance and good electrical machinability for high-speed stamping of stainless steel, nickel-alloy and copper-alloy strips as thin as 0.2 mm.

GRADE	CO %	GRAIN MM	DENSITY G/CM ³	HRA	KIC	TRS MPA	COMP. MPA	E GPA	TYPICAL APPLICATION
YA50	15.0	0.6–0.8	13.95	90.5	17.0	4000	4800	580	High-speed copper alloy
YA47S	12.0	0.6–0.8	14.20	91.3	14.2	3800	4600	550	Precision connectors
YA40S	10.0	0.6–0.8	14.45	91.8	12.6	4000	4800	580	Lead frames
YA30	12.0	0.4–0.8	14.15	91.2	10.5	3600	5400	590	High-speed precision
YA20	13.5	0.5–1.5	14.05	90.0	12.0	3700	5300	560	Stainless / copper, general
YA18	12.0	1.0–2.0	14.17	89.2	13.5	3600	5500	570	Thick stock
YA10H	6.0	0.5–5.0	14.85	90.5	13.0	3000	5200	620	High-hardness duty

YA30 is the benchmark for thin-gauge high-speed stamping: medium cobalt, fine grain, high wear resistance with chipping resistance and excellent WEDM behavior — ideal for ≤0.2 mm stainless, nickel and copper-alloy strips at 400–1500 SPM.



Lead-frame and connector inserts machined from YA-series submicron blocks.

RECOMMENDED

Recommended for PG precision-ground components — widely adopted by OPG shops

Typical Applications

Lead frames • Connectors
LED brackets • EI cores
304 SS electronic parts
Beryllium copper strip

Case Stretching & Ultrafine Grades

The YU series combines a 10–12% corrosion-resistant binder with 0.4–0.8 µm submicron grains for outstanding wear resistance and sharp edges — the dedicated material for EV battery-case stretching dies and a proven solution for high-end cutting and PCB tooling.

GRADE	BINDER %	GRAIN MM	DENSITY G/CM ³	HRA	KIC	TRS MPA	COMP. MPA	E GPA	TYPICAL APPLICATION
YU20	10.3	0.8	14.40	91.5	10.5	3800	5600	600	Case stretching dies
YU25UF	12.0	0.5	14.05	92.2	8.5	4400	6000	570	Ultra-high strength duty
YU092	9	0.2	14.44	94.0	—	4100	—	—	Finishing hardened steels
YU10UF	6	0.4	14.80	94.0	—	3800	—	—	PCB tools / gravers

Applications: 18650 / 21700 / 46800 EV battery cases (round or square) and micro-motor case stretching dies.

BINDERLESS WC — YC SERIES

0.1 µm nano-grain tungsten carbide with **no binder phase** — dimensionally stable up to 800 °C. After coating, molds achieve a mirror finish with surface roughness down to 10 nm. Ideal for aspheric glass lens pressing, germanium IR lenses, waterjet nozzles and highly wear-resistant bearings.

GRADE	BINDER %	GRAIN MM	DENSITY G/CM ³	HRA	TRS MPA	APPLICATION
YC55	0	0.1	15.22	93*	1500	Optics molds / nozzles
YC25	0	0.1	14.32	92	2000	Wear & corrosion parts

* As-coated sintered state; HIP densification delivers mirror-finish results. Other compositions available on request.



Case-stretching punches, dies and inserts in YU-series grades.

Recommended Grades for Stamping Dies

Validated by precision high-speed die makers and end users — send us your conditions, get a grade recommendation within 24 hours.

STAMPED MATERIAL	THICKNESS MM	SPEED SPM	PUNCH	DIES	RATING
Copper alloys	< 0.3	400–1500	YA30 / YA50	YA30 / YA50	★★★★ Best
	< 0.5	150–1500	YA50 / YA20	YA20	General
	0.5–1.0	100–300	YA18	YA18	Thick stock
Stainless steel	< 0.2	400–1200	YA30	YA20	★★★★ Best
	0.2–0.5	300–800	YA30 / YA18	YA18	Recommended
	0.5–1.2	100–500	YA18	YA18	Thick stock
Pure copper / iron	< 0.6	200–600	YA30 / YF22H	YA20	Recommended
Silicon steel	< 0.3	100–400	YF40H	YF50H	★★★★ Best
	< 0.5	100–300	YF50H	YF55HH	Recommended

Two Levers: Grain × Binder

Fine grains (0.2–1.0 μm) maximize hardness and edge sharpness; coarse grains (2.5–5 μm) absorb impact through thicker binder layers. Cobalt 3–8% favors hardness, 9–12% is balanced, 13–25% serves impact-heavy duty.

Match the Wear Mechanism

Abrasion → fine grain, low binder (hardness first). Impact → coarse grain, more cobalt (toughness first). Corrosion → Ni-binder or binderless YC grades. Read the worn surface: polished = abrasion, chipped = impact, flow grooves = erosion.

Three Mistakes That Shorten Die Life

- ① Specifying hardness without TRS.
- ② Over-adding cobalt as a safety margin — it often doubles wear rate.
- ③ Ignoring the sintering route — the same grade can differ by 2 HRA and 500 MPa between vacuum and HIP.

STEP 01

Send conditions

Material, strip thickness, stroke rate, die type.

STEP 02

Grade + sample

Recommendation with property data within 24 hours.

STEP 03

Test, then volume

Verify on your press before the first production run.

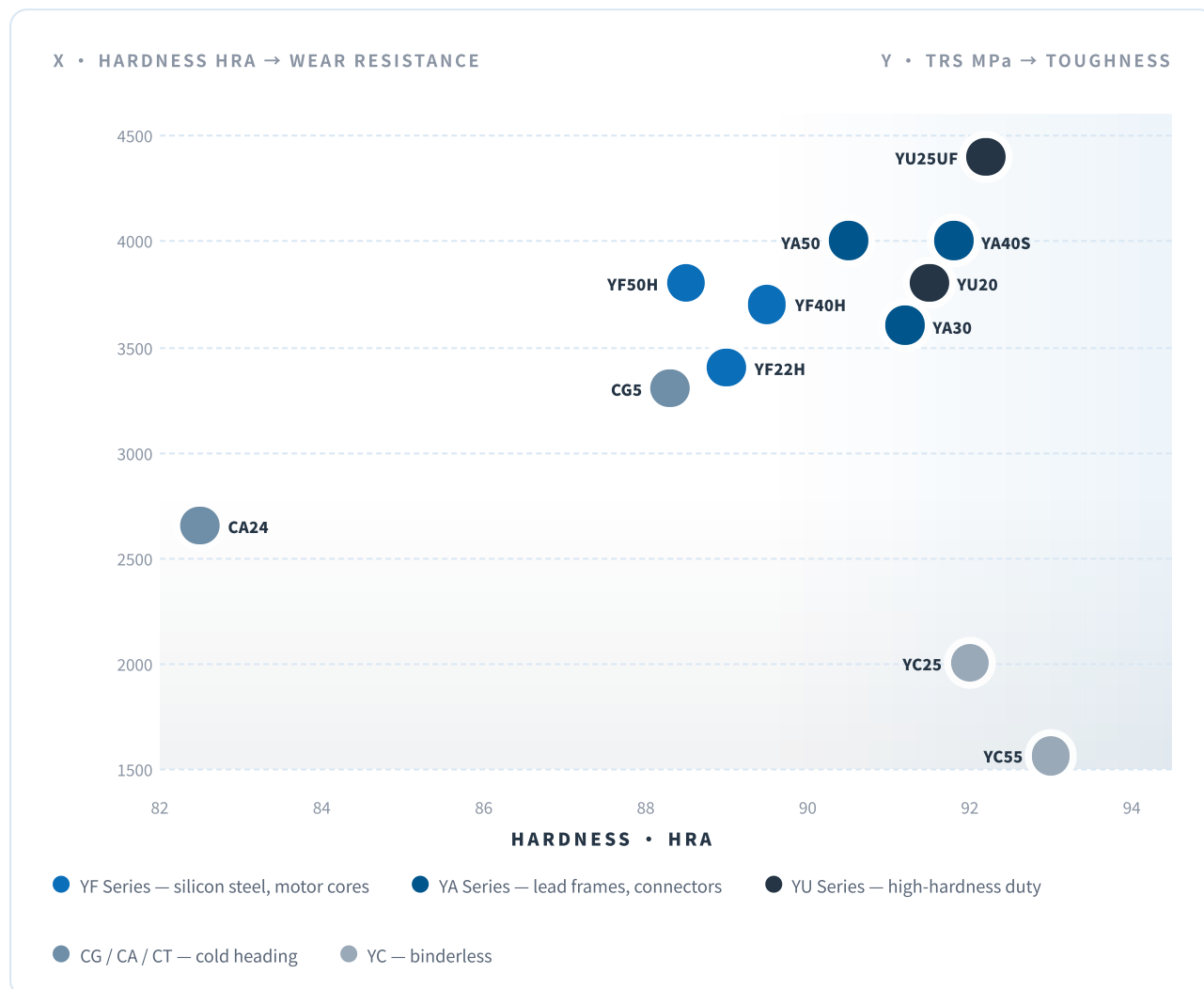
THREE ITEMS, ONE ANSWER

Material • Thickness • SPM

Grade recommendation + full property data
within 24 hours • www.yatechmaterials.com

Grade Map — Hardness vs Toughness

Hardness (HRA) and transverse rupture strength (TRS) are the two axes every die designer trades against. Plotted together, our series separate into clear working zones — use this map to shortlist grades before opening the individual series pages.



Upper-right zone

High hardness with high strength — submicron YA and YU grades for thin stock, high stroke rates and long runs.

Left-lower zone

Coarser grain and higher cobalt — CG / CA grades absorb impact in cold heading and heavy-duty blanking.

Below the band

Binderless YC grades sit on the hardness extreme — wear and corrosion resistance over impact strength.

Typical as-sintered values; HIP and UF variants can differ. Chinese/English datasheets with full property data are available on request.

Stress-Free EDM Blocks — In Stock

Carbide blocks are wire-cut by EDM into punches, inserts, buttons and blanking dies for precision progressive tooling. Optimized for high-speed stamping at **300–2000 SPM and above**, covering motor cores, EI laminations, LED brackets, lead frames and connector terminals.



Ground carbide blocks, rings and plates — ready for wire EDM.

Standard Blocks in Stock (mm)

L (TOL. +0.6–+2.0)	W (TOL. +0.6–+2.0)	H (TOL. +0.2–+0.5)
105	105	1.5 – 60
125	125	1.5 – 60
150	150	1.5 – 60
205	205	15 – 40
255	255	15 – 40
305	305	15 – 40

Popular stock: 125×112×1–17 • 105×105×18–65 in YA20 / YA30 / YA20N / YF40H.

DIE TYPES

Auto stacked tools
Auto skewed rotor tools
Stator stamping tools
Wire-cut blanking & forming tools
Preform strippers • carbide rings

Supply & Service

- ✓ As-sintered or machined to drawing
- ✓ Mirror finishes available
- ✓ Six-face ground — less EDM prep
- ✓ Custom sizes from PDF / DWG / STEP, quoted within 24 h

Blocks shown are stock sizes • tolerance and finish options on request | Properties as pp. 04–06

Cold Heading & Forming Dies

The primary failure mode of fastener dies is cracking, so YATECH developed impact-resistant carbide grades: the high-toughness CG series and the coarse-grain CA/CT families — covering screw dies below $\Phi 20$ up to $\Phi 50$, stainless screw dies below and above $\Phi 2$, and warm/hot forging dies. They prevent cracking of cold heading dies, withstand harsher working conditions and improve cold-heading efficiency.

GRADE	CO %	GRAIN	DENSITY G/CM ³	HRA	TRS MPA	TYPICAL APPLICATION
CG5	12	Medium	14.38	88.3	3300	High-toughness cold heading dies
CG6	14	Medium	14.12	87.3	3140	High-toughness cold heading dies
CA18	18	Coarse	13.75	85.1	2940	Screw dies, bore < $\Phi 20$
CA24	24	Coarse	13.25	82.5	2650	Screw dies $\Phi 20 - \Phi 50$
CT15	15	Coarse	13.88	86.0	2700	Stainless screw dies, bore < $\Phi 2$
CT20	20	Coarse	13.60	84.5	2660	Stainless screw dies, bore > $\Phi 2$
CA20	20	Coarse	13.55	84.1	2740	Warm / hot forging dies

Nuts & battery shells

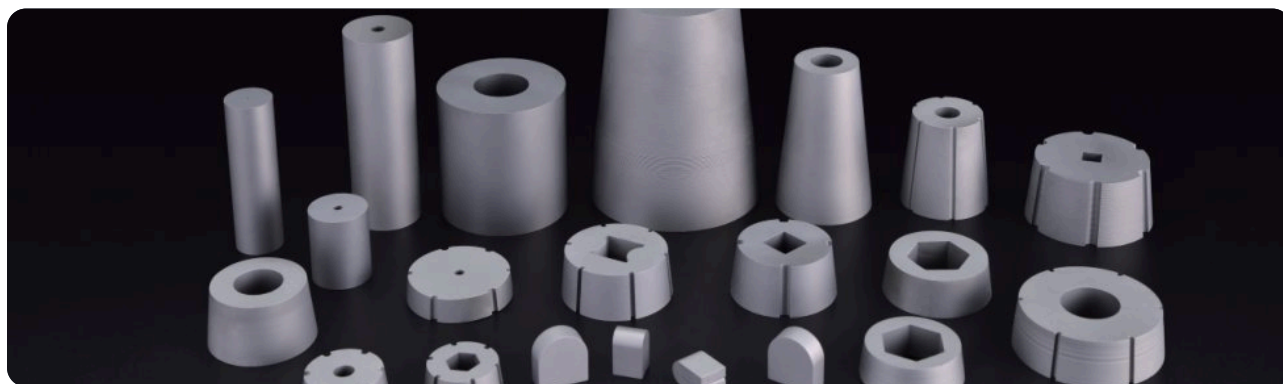
YG15 / YG20 offer good strength and impact toughness for stamping dies, battery-shell dies and nut cold heading dies.

Fastener industry

CG for balanced toughness, CA/CT graded by die bore — 3–5 days production, 7–15 days door to door for standard items.

Drawing

YU series case stretching dies plus PCD and carbide wire-drawing die solutions.



Cold heading dies, nuts and punches in CA / CT / CG grades.

No fixed MOQ. Sample orders welcome — verify quality before volume production.



TUNGSTEN CARBIDE SOLUTIONS

Not Sure Which Grade? Send Us Your Working Conditions.

Share your stamped material, strip thickness and stroke rate — our engineers reply with a grade recommendation and property data within 24 hours.

SAMPLES

Sample Orders Welcome

CUSTOM

OEM / Made to Drawings

STOCK

Standard Blocks In Stock

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