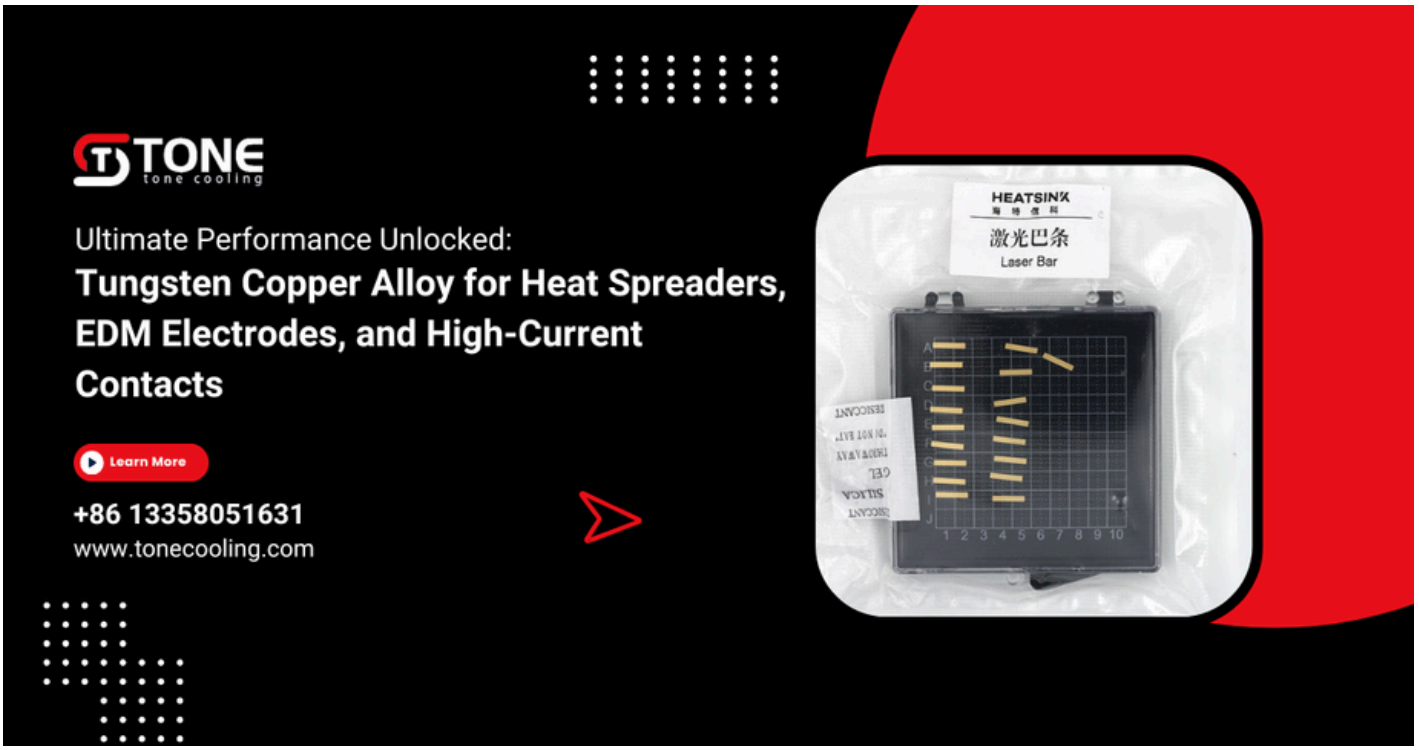
Ultimate Performance Unlocked: Tungsten Copper Alloy for Heat Spreaders, EDM Electrodes [News]

Dongguan, Guangdong, China - Tone Cooling Technology co., ltd. today, announced the commercial launch of its advanced **Tungsten copper Alloy** portfolio, a precision-engineered material solution that unites exceptional thermal conductivity, arc-erosion resistance, and controlled thermal expansion in one robust platform. Designed for demanding applications in electronics thermal management, precision machining, and power distribution, the new **Tungsten copper Alloy** offering delivers repeatable, production-grade performance with tight dimensional control and downstream-ready finishes.



“With this launch, we’re giving engineers a reliable, high-performance material that simply works where conventional metals reach their limits,” said Luke, spokesperson at **Tone Cooling Technology Co., Ltd.** “Our **Tungsten copper Alloy** enables cooler, more stable electronics, cleaner EDM edges, and longer-lasting power contacts. Just as importantly, we’re pairing material science with application-savvy support so our customers can move from prototype to volume with confidence.”

As markets push power density higher and tolerances tighter, designers are increasingly forced to balance thermal, electrical, and mechanical constraints. Consequently, the unique

property set of **Tungsten copper Alloy**—high melting resilience from tungsten and excellent conductivity from copper—has become a go-to choice for:

- Heat spreaders and baseplates under next-generation chips and power modules
- EDM electrodes for tool and die, aerospace, medical, and moldmaking
- High-current contacts in EVs, grid equipment, and industrial switching

What is Tungsten Copper Alloy, and why does it matter

Tungsten copper Alloy is a two-phase, metal-matrix composite produced primarily by powder metallurgy. A porous tungsten “skeleton” is sintered and then infiltrated with copper to create a dense, interpenetrating microstructure. As a result, the material combines:

- High temperature stability and wear resistance from tungsten
- Strong thermal and electrical conductivity from copper
- A tunable coefficient of thermal expansion (CTE) that can be matched to semiconductors and ceramics

Key benefits at a glance

Engineered for real-world production environments, **Tone Cooling Technology Co., Ltd’s Tungsten copper Alloy** delivers:

- **High thermal conductivity:** Efficient heat spreading to tamp down hotspots and stabilize junction temperatures under pulsed or steady-state loads.
- **Controlled CTE:** Better expansion match to Si, GaN, GaAs, and SiC packages than pure copper or aluminum, reducing solder stress and improving long-term reliability.
- **Arc-erosion and wear resistance:** Superior performance for high-current contacts and EDM electrodes, minimizing pitting and edge rounding while preserving feature fidelity.
- **Mechanical stability:** High stiffness and creep resistance at elevated temperatures compared to soft copper-based solutions.
- **Machinability and finish options:** Precision machining, lapping, and polishing to tight tolerances, plus plating and braze-ready surfaces for assembly.
- **Vacuum compatibility:** Low outgassing and stable performance when processed and cleaned for vacuum or inert environments.

Tone Cooling Technology Co., Ltd. manufactures **Tungsten copper Alloy** primarily via powder metallurgy and copper infiltration:

- **Tungsten skeleton creation:** High-purity tungsten powders are pressed and sintered under controlled atmospheres to achieve the desired porosity and pore connectivity.
- **Copper infiltration:** Molten copper is wicked into the tungsten network under vacuum or inert gas, filling capillaries and producing a two-phase composite with minimal residual porosity.
- **Densification and stabilization:** Optional hot isostatic pressing (HIP) and thermal stabilization cycles can be applied to tighten microstructure and dimensional stability.
- **Finish machining:** Precision grinding, CNC machining, and lapping deliver tolerances and surface finishes suitable for direct assembly.

Because the microstructure is interpenetrating, heat and current can take parallel pathways through both phases. Meanwhile, the tungsten network imparts high stiffness and arc durability, while copper contributes conductivity and improved wetting during brazing.

Preliminary specifications and typical property windows

The values below are representative windows for common grades of **Tungsten copper Alloy** produced via infiltration. Actual results depend on part size, process route, and finish; certified test data is available on request.

Finishing, plating, and joining options

Because assembly choices often dictate long-term reliability, **Tone Cooling Technology Co., Ltd.** supports comprehensive finishing and joining options for **Tungsten copper Alloy**:

- **Surface finish:** Ground, lapped, or polished faces with controlled flatness and parallelism for minimal thermal interface thickness and uniform contact pressure.
- **Plating:** Nickel barrier, Ni/Au, and Ni/Pd/Au to control diffusion, enhance solderability, and protect surfaces before assembly.
- **Brazing:** Compatible filler systems include AuSn, AuGe, AgCu, and active AgCuTi for ceramic or refractory interfaces. Process windows and wetting behaviors can be provided

to accelerate NPI.
- **Soldering:** With appropriate metallization, the material can be soldered using Sn-based, Au-based, and Bi-based solders as the design requires.

Quality, consistency, and traceability

To help ensure repeatable performance across programs and sites, **Tone Cooling Technology Co., Ltd's. Tungsten copper Alloy** production incorporates:

- **Input control:** High-purity powders, controlled particle size distributions, and verified sintering parameters.
- **In-process checks:** Density, porosity, and microstructure assessments at critical steps.
- **Final inspection:** Dimensional verification, surface finish checks, and property sampling per customer specification.
- **Documentation:** Certificates of conformity and test data packages available; process change controls support long-term supply stability.

Moreover, the product line is aligned with common regulatory expectations, including RoHS and REACH compliance. Conflict minerals due diligence can be provided upon request.

Sustainability and resource stewardship

Although **Tungsten copper Alloy** is a high-performance specialty material, **Tone Cooling Technology Co., Ltd.** recognizes the importance of responsible sourcing and efficient manufacturing. Consequently, the company focuses on:

- **Material utilization:** Near-net shaping strategies and recoverable machining chips.
- **Energy efficiency:** Continuous improvement in furnace utilization and cycle optimization.
- **Lifecycle perspective:** Durable parts that help reduce field failures and rework.

Comparative perspective: choosing the right material

When selecting a baseplate, electrode, or contact material, it is useful to compare **Tungsten copper Alloy** with alternatives:

- **Pure copper:** Outstanding thermal and electrical conductivity, but high CTE and poor high-temperature strength. Suitable for many heat sinks, yet less ideal where CTE match or arc resistance matters.
- **Tungsten:** Very low CTE and high temperature capability, but relatively low thermal/electrical conductivity and difficult to machine and join.
- **Molybdenum copper (MoCu):** Lower density and generally higher thermal conductivity at equivalent CTE compared to WCu, but less arc-erosion resistance and lower stiffness at temperature.
- **CuCrZr and copper alloys:** Good conductivity and strength for general contacts, but less robust under severe arcing and limited CTE control.
- **Graphite (EDM):** Excellent machinability and high-speed EDM capability, but dust management is necessary and finest edges may not match metal electrodes in certain finishes.

Therefore, **Tungsten copper Alloy** occupies a unique middle ground ideal for high-reliability packaging, precise EDM finishing, and long-life arcing contacts.

About Tone Cooling Technology Co., Ltd.

Tone Cooling Technology Co., Ltd. focuses on practical, production-ready thermal and power materials for the electronics, industrial, and mobility sectors. The company's portfolio

includes advanced metal composites, precision-machined components, and application-specific finishes. By emphasizing repeatability, technical support, and responsive lead times, **Tone Cooling Technology Co., Ltd.** helps customers move from concept to scale with confidence.

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