

1. Product Overview

C27000 is Yellow Brass - a wrought copper-zinc alloy containing nominally 65% copper and 35% zinc. The 65/35 Cu/Zn ratio sits near the high-zinc edge of the alpha-brass field: the alloy is a single-phase alpha (f.c.c.) solid solution at room temperature, but the elevated beta-phase field begins to appear during hot working, which gives C27000 excellent hot formability alongside good (though not best-in-class) cold formability. The extra zinc relative to C26000 (70/30) raises strength modestly and deepens the golden-yellow colour, while slightly lowering ductility, conductivity and cost.

C27000 is the general-purpose wrought brass for hardware, cold-headed parts, drawn and stamped components, springs, rivets, screws, fittings and decorative trim. It is not the cartridge-case grade (that is C26000, which has superior deep-drawing ductility), but for most hardware and general-fabrication work C27000 offers an attractive balance of strength, formability, corrosion resistance and economy. It solders and brazes readily, takes a bright polish or plated finish, and machines to a Type I continuous chip. Its corrosion resistance is good in most rural, urban and industrial atmospheres, but - like all plain (non-inhibited) brasses - it is susceptible to dezincification in aggressive waters. It should not be used for potable-water or marine tube service; for inhibited (arsenic-bearing) brass use C44300 or C68700 instead.

C27000 is supplied in the full range of wrought product forms - sheet, strip, plate, rod, bar, wire, tube and custom profiles - in soft (annealed) and cold-worked tempers from quarter-hard to spring. It conforms to ASTM B36 (sheet / plate / strip), B134 (wire), B16 (free-cutting rod variant), B135 (tube), and related EN and JIS specifications, and is traceable by heat lot with EN 10204 mill test certificates.

1.1 Key Features

- 65/35 Cu-Zn brass - single-phase alpha at room temperature, beta assists hot working.
- General-purpose wrought brass for hardware, cold-headed parts, springs, rivets and drawn components.
- Good cold formability (deep drawing, stamping, cold heading) - slightly below C26000 but adequate for most hardware.
- Excellent hot formability - hot rolls, forges and extrudes readily due to beta-phase assistance.
- Deeper golden-yellow colour than C26000 - attractive for decorative and architectural trim.
- Moderate strength: annealed ~330-380 MPa UTS; cold-worked to spring temper ~540-640 MPa.
- Good soldering, brazing and gas-shield welding behaviour.
- Fair machining (Type I chip, ~30% machinability rating); free-cutting C36000 preferred for high-speed turning.
- Good corrosion resistance in most atmospheres; susceptible to dezincification in aggressive waters.
- Full heat-lot traceability with EN 10204 3.1 mill test certificates.

1.2 Typical Applications

Application	Description
Hardware & fasteners	Rivets, screws, pins, hinges, locks, keys, cold-headed parts, fittings
Cold-headed parts	Rivets, screws, bolts, nails, eyelets, grommets, fastener blanks
Springs & clips	Flat springs, retaining clips, contact springs, spring washers (H02-H04 temper)
Drawn & stamped components	Cups, shells, cans, badges, tags, brackets, drawn tubes
Electrical & electronic	Connectors, terminals, contacts, lead frames, EMC gaskets, shielding cans
Plumbing fittings	Ferrules, flare nuts, compression sleeves (non-potable / non-water-side service)
Decorative & architectural	Trim, nameplates, emblems, jewelry, handbag frames, watch cases, furniture trim
Heat-exchanger fins	Finned tube, radiator cores, air-cooler fins (non-marine, non-aggressive service)
General fabrication	Stampings, coined parts, brackets, formed sections, ornamental work

1.3 At-a-Glance Specification

Attribute	Value
UNS designation	C27000 (Yellow Brass, 65/35 Brass)
Also known as	Yellow Brass 270, 65/35 Brass, Cartridge Brass (sheet, broad sense)
Alloy system	Cu-Zn, single-phase alpha (f.c.c.) solid solution at room temperature
Cu content	63.0 - 68.5% (nominal 65%)
Zn content	Balance (nominal 35%)
Density	8.47 g/cm ³ (0.306 lb/in ³)
Conductivity	≈ 27% IACS (15.2 MS/m at 20 °C)
Melting range	915 - 955 °C (1 679 - 1 751 °F)
Thermal conductivity	≈ 115 W/(m·K)
Max service temp.	200 °C continuous (pressure); higher for non-pressure
Product forms	Sheet, strip, plate, rod, bar, wire, tube, profiles
Certificates	MTC EN 10204 3.1 / 3.2, SGS, BV, TUV
MOQ	500 kg per specification

Composition and property limits conform to ASTM B36 / B134 / B16 specifications for the C27000 UNS designation. Verify all values against the MTC for each heat lot.

1.4 When to Choose C27000

C27000 is the right choice for general-purpose hardware and fabrication where you want brass strength, golden colour, good corrosion resistance and reasonable cost - without paying for the superior deep-drawing ductility of C26000. For cartridge cases and severe deep-drawn thin-wall parts, C26000 (70/30) is the correct grade. For high-speed machined parts, free-cutting C36000 (leaded) machines far better. For marine or potable-water tube service, an inhibited brass (C44300 Admiralty, C68700 Aluminum Brass) or cupronickel (C70600 / C71500) should be used instead. For high-conductivity electrical busbar, pure copper (C11000 / C10200) is required. C27000 is the right answer when you need a workable, golden, moderately strong and economical brass for hardware, springs, cold-headed parts, stampings and decorative fabrication.

2. Chemical Composition & Standards

C27000 is a binary Cu-Zn alloy. The 35% nominal zinc content places it near the high-zinc edge of the single-phase alpha field of the Cu-Zn phase diagram: at room temperature the microstructure is a homogeneous face-centred-cubic solid solution, but at hot-working temperatures the beta (ordered B2) phase begins to appear. This dual-phase behaviour at elevated temperature is what gives C27000 its excellent hot formability - the beta phase is ductile and low-flow-stress at forging and extrusion temperatures, allowing hot rolling, hot forging and hot extrusion without the tearing that limits some lower-zinc grades. At room temperature the alloy is single-phase alpha, so cold workability remains good, though the higher zinc content slightly lowers ductility relative to C26000 (70/30). Zinc dissolves substitutionally in copper and provides solid-solution strengthening: C27000 is roughly twice as strong as pure copper while retaining most of copper's ductility and corrosion resistance, and its deeper golden-yellow colour makes it attractive for decorative applications.

2.1 Chemical Composition (wt%)

Element	Symbol	Content (% mass)	Note
Copper	Cu	63.0 - 68.5	Matrix; nominal 65%
Zinc	Zn	Balance (nominal 35%)	Solid-solution strengthener
Lead	Pb	≤ 0.07	Trace; not a free-machining grade
Iron	Fe	≤ 0.05	Trace impurity
Tin	Sn	□ 0.10	Trace; improves corrosion resistance if present
Nickel	Ni	□ 0.10	Trace; whitening element
Phosphorus	P	□ 0.005	Trace only; not deoxidised
Aluminium	Al	□ 0.05	Trace; would impair hot work if high
Antimony	Sb	□ 0.005	Trace; dezincification promoter
Arsenic	As	□ 0.005	Absent - C27000 is NOT inhibited
Bismuth	Bi	□ 0.002	Trace; embrittling
Other (total)	—	≤ 0.50	Sum of other named elements

Composition limits per ASTM B36 / B134 / B16 for the C27000 UNS designation. Note that C27000 is a plain brass and does NOT contain arsenic or antimony as dezincification inhibitors - for inhibited brass, specify C44300 / C68700. Verify composition on the MTC for each heat lot.

2.2 Applicable Standards by Product Form

Product form	Common standards
Sheet / plate / strip	ASTM B36 (plate / sheet / strip); ASTM B272 (flat products)
Wire	ASTM B134 (general wire); ASTM B135 (wire per specification)
Rod & bar (free-cutting)	ASTM B16 (free-cutting brass rod) - leaded variant
Rod & bar (plain)	ASTM B36 (flat); customer drawing
Tube (seamless / welded)	ASTM B135 (brass tube); B395 (seamless U-bend)
Foil / thin strip	ASTM B36; customer specification
Extruded / drawn profiles	Customer specification; precision shapes
Cast equivalent (ref)	UNS C83600 / C84400 (leaded red brass) - different grade

2.3 Brass Comparison - C27000 vs Common Brass Grades

Property	C27000	C26000	C28000	C36000
Common name	Yellow Brass	Cartridge Brass	Muntz Metal	Free-Cutting Brass
Cu (%)	63.0 - 68.5	68.5 - 71.5	59.0 - 63.0	60.0 - 63.0
Zn (%)	Balance (~35)	Balance (~30)	Balance (~40)	Balance (~37)
Other additions	None	None	None	Pb 2.5 - 3.7
Phase (room temp.)	Single alpha	Single alpha	Alpha + beta	Alpha + Pb
Hot formability	Excellent	Good	Excellent	Fair
Cold formability	Good	Excellent (best)	Poor	Poor
Machinability	Fair (30)	Fair (30)	Fair (40)	Excellent (100)
Dezincification	Susceptible	Susceptible	Susceptible	Susceptible
Primary use	Hardware, springs, drawn parts	Cartridge cases, deep-drawn parts	Hot-worked structural, sheet	High-speed machined parts

Machinability rating is relative to C36000 = 100 (ASTM / CDA convention). C26000 is the benchmark for cold formability; C36000 is the benchmark for machinability; C28000 (Muntz Metal, 60/40) is the benchmark for hot-worked structural brass. C27000 (65/35) sits between C26000 and C28000, offering good cold formability and excellent hot formability at moderate cost.

3. Physical, Thermal & Electrical Properties

C27000 exhibits the physical, thermal and electrical properties of a single-phase alpha brass. The 35% zinc content raises strength and resistivity relative to pure copper, and lowers density, melting point, and both electrical and thermal conductivity slightly more than C26000 (30% Zn). The alloy is non-magnetic and retains useful ductility down to cryogenic temperatures. Values below are typical for annealed material at room temperature; cold work slightly increases strength and resistivity and slightly lowers conductivity.

Property	Symbol	Value	Unit
Density	ρ	8.47	g/cm ³
Melting range (solidus - liquidus)	T_m	915 - 955	°C
Specific heat capacity	c_p	0.385	J/(g·K)
Thermal conductivity	λ	115	W/(m·K)
Thermal expansion coeff.	α	20.5	$\times 10^{-6} / K$ (20 – 300 °C)
Electrical conductivity	σ	≈ 27	% IACS
Electrical resistivity	ρ	0.064	$\mu\Omega \cdot m$ (at 20 °C)
Temp. coeff. of resistance	α_r	0.0017	/°C (0 – 100 °C)
Modulus of elasticity	E	110	GPa
Shear modulus	G	41	GPa
Poisson's ratio	ν	0.33	—
Magnetic permeability	μ	≈ 1.0	essentially non-magnetic
Max continuous service temp.	—	200	°C (pressure); higher for non-pressure

Sources: ASTM B36 / B134 / B16 property data; CDA alloy data sheet for C27000 (Yellow Brass). Values are typical for annealed material at 20 °C unless noted. Conductivity and resistivity vary slightly with temper and grain size.

4. Mechanical Properties by Temper

C27000 mechanical properties depend primarily on the degree of cold work, since the single-phase composition offers no precipitation or phase-transformation hardening. The annealed (soft) temper gives maximum ductility for drawing and cold-heading operations, while cold-worked tempers deliver higher strength, stiffness and spring properties for hardware, fasteners and electrical connectors. Because the alpha phase is homogeneous, C27000 work-hardens smoothly and predictably, and can be restored to full softness by a simple anneal. The higher zinc content gives slightly higher as-annealed strength than C26000, at the cost of marginally lower elongation. Typical values at room temperature are shown below.

Temper	Tensile (typ.)	Yield 0.2% (typ.)	Elong. (min.)	Hardness (typ.)
Annealed (O61 / OS050)	330 - 380 MPa	90 - 130 MPa	$\geq 50\%$	55 - 65 HRF
Cold-worked 1/4 hard (H01)	380 - 440 MPa	230 - 290 MPa	$\geq 30\%$	55 - 65 HRB
Cold-worked 1/2 hard (H02)	440 - 500 MPa	290 - 360 MPa	$\geq 20\%$	65 - 75 HRB
Cold-worked 3/4 hard (H03)	490 - 550 MPa	360 - 430 MPa	$\geq 12\%$	75 - 82 HRB
Cold-worked full hard (H04)	≥ 520 MPa	≥ 430 MPa	$\geq 8\%$	82 - 88 HRB
Spring (H06 / H08)	≥ 540 MPa	≥ 490 MPa	$\geq 4\%$	≥ 90 HRB

Hardness shown in Rockwell F (soft) and Rockwell B (hard) scales. Values are indicative; verify against ASTM B36 / B134 specification limits and the MTC for each lot. Annealed grain size per ASTM B36 (typically 0.015 - 0.070 mm for OS050 deep-drawing temper).

5. Product Forms & Size Range

C27000 is supplied across the full range of wrought product forms. Sheet, strip and wire are the highest-volume forms, driven by hardware stamping, cold-heading and connector manufacturing; rod and bar are supplied in both plain (C27000) and free-cutting (lead) variants for machined hardware. Tube is available seamless or welded for fittings, decorative railings and heat-exchanger service.

Because yellow brass is most often specified for cold heading, stamping and moderate deep-drawing, grain size control and temper uniformity are the key quality parameters: fine, uniform annealed grain (typically 0.015 - 0.070 mm for ASTM OS050) is essential for cracking-free drawing and heading, while coarser grain raises the forming limit but increases orange-peel tendency. Surface finish, edge condition (for strip), and temper uniformity are controlled throughout production. Mill-annealed, cold-rolled, and precision-finished surfaces are offered per the applicable ASTM specification and customer requirements.

5.1 Standard Size Range by Product Form

Form	Typical size range	Notes
Sheet / plate	Thick. 0.3 - 50 mm; width $\leq$ 1 000 mm	ASTM B36; stamping, hardware, decorative
Strip / foil	Thick. 0.05 - 3 mm; width $\leq$ 600 mm	ASTM B36; connector, terminal, EMC gasket stock
Round rod / bar	Dia. 3 - 100 mm; length 1 - 6 m	ASTM B16 (lead) or B36 (plain); machined parts
Square / hex bar	5 - 60 mm across flats	For hardware, fittings, decorative sections
Wire	Dia. 0.2 - 8 mm	ASTM B134; spring, rivet, cold-heading stock
Tube (seamless)	OD 3 - 80 mm; wall 0.5 - 4 mm	ASTM B135; fittings, decorative, heat-exchanger
Tube (welded)	OD 6 - 60 mm; wall 0.5 - 3 mm	Decorative railings, handrails, furniture
Custom profiles	Per customer drawing	Extruded or drawn shapes; precision tolerances

5.2 Surface Finish & Special Processing

- Sheet / strip: mill-annealed, cold-rolled, precision-rolled or mirror-polish finish.
- Rod / bar: cold-drawn, centreless-ground or polished; plain or free-cutting (lead) variant.
- Wire: hard, medium-hard or annealed; bare, tinned or plated on request.
- Tube: bright-annealed inside and out; plain, polished or plated for decorative use.
- Edge condition for strip: round, square or deburred; rolled-edge for drawing stock.
- Grain size controlled and reported per ASTM B36 for drawing tempers (OS050 / OS025).
- Surface free from laminations, cracks and inclusions per ASTM acceptance criteria.
- Custom cutting, blanking, slitting and drawn profiles to customer drawing.

5.3 Packaging

- Sheet / plate: palletised with interleave paper, edge protectors and moisture barrier.
- Strip / foil: coil on cores, moisture-barrier wrapped, desiccant included.
- Rod / bar: bundled in wooden cases with separator strips and end protection.
- Wire: coils or spools, individually bagged, desiccant included.
- Tube: bundled or boxed, capped ends, desiccant for bright-annealed stock.
- Each bundle tagged with heat number, size, temper, grain size and quantity.
- Export seaworthy packing with moisture barrier and desiccant.

6. Tolerances, Finish & Quality Control

C27000 products are produced and inspected to the applicable ASTM specification (B36, B134, B16, B135). Because the alloy is most often used in stamping, cold-heading and moderate deep-drawing, dimensional accuracy, surface integrity, grain-size control, and temper uniformity are controlled on every lot. Grain-size testing applies to annealed drawing tempers; tensile, elongation and hardness testing applies to every lot; hydrostatic or pneumatic testing applies to tube; and bend / formability testing applies to strip and drawing stock.

6.1 Dimensional Tolerances (typical)

Parameter	Typical tolerance
Sheet / plate thickness	± 0.03 - 0.40 mm (per thickness range, ASTM B36)
Strip thickness	± 0.005 - 0.05 mm (precision strip tighter)
Strip width	± 0.10 - 0.50 mm
Rod diameter (cold-drawn)	h8 - h9 (e.g. ± 0.02 - 0.07 mm)
Wire diameter	± 0.005 - 0.04 mm (per AWG / metric class)
Tube OD / wall	Per ASTM B135 class; OD ± 0.05 - 0.13 mm
Straightness (bar)	≤ 1.5 mm in any 1 m length
Flatness (sheet / plate)	Per ASTM B36 class; tighter for drawing stock

6.2 Surface Finish & Cleanliness

- Smooth, bright surface per ASTM acceptance standard; no laminations, cracks or inclusions.
- Drawing strip supplied with controlled surface roughness and edge condition.
- Surfaces cleaned of residual rolling lubricant for plating and joining service.
- Annealed grain size controlled and reported for OS050 / OS025 drawing tempers.
- Rod / bar edges and ends deburred; cold-drawn surfaces bright and uniform.
- Tube bright-annealed inside and out for decorative and fitting service.

6.3 Quality Control Test List

Test	Standard / method	Frequency
Chemical analysis (full)	ASTM E478 / E536 (Cu, Zn, Pb, Fe, Sn, all)	Each heat
Tensile / elongation	ASTM E8 / E8M	Each lot
Hardness (HRF / HRF / HV)	ASTM E18 / E92	Each lot
Grain size (annealed)	ASTM E112 (intercept method)	Each lot (O61 / OS050)
Dimensional inspection	Calipers / micrometers / laser	Each piece / sample
Bend / formability test	ASTM E290 / customer method (reverse-bend, cup draw)	Each lot (strip / drawing)
Cup / Erichsen draw test	Customer method; drawing qualification	Per specification
Hydrostatic / pneumatic test	ASTM B135 (tube)	Each tube
Surface / visual inspection	ASTM acceptance criteria; eddy-current (tube)	Each piece
Microstructure (alpha-only)	ASTM E3 / E407; confirm no beta phase at room temp.	Per specification

Grain-size testing is mandatory for annealed drawing tempers (OS050 / OS025) because grain size is the primary control on cracking-free draw depth. Bend and cup-draw tests qualify strip for drawing service. For tube, hydrostatic or pneumatic testing is mandatory per ASTM B135. Verify all values against the MTC.

7. Fabrication, Welding & Service Considerations

C27000 is a versatile, general-purpose brass. Its near-alpha-phase structure at room temperature gives good cold formability - adequate for most stamping, cold-heading and moderate drawing operations - while the beta phase that appears at hot-working temperatures gives excellent hot formability for hot rolling, forging and extrusion. It solders and brazes readily and can be gas-shield welded. Machining is fair - the alloy produces a Type I (continuous) chip - so for high-speed turning, free-machining C36000 (lead brass) is preferred. The guidance below covers the fabrication and service practices that exploit C27000's advantages and avoid its known limitations, particularly dezincification.

7.1 Forming & Joining

- Cold formability: good - suitable for stamping, cold heading, moderate drawing, spinning and coining (slightly below C26000).
- Hot formability: excellent - hot rolls, forges and extrudes readily; beta phase assists hot working.
- Annealed (OS050) temper gives maximum ductility for drawing and cold-heading operations.
- Cold-worked tempers (H02 - H04) give stiffness and spring properties for hardware and connectors.
- Annealing: 425 - 750 °C (800 - 1400 °F), air or water quench; restores full softness after cold work.
- Soldering: excellent; surfaces tin readily with tin-lead and lead-free solders after proper fluxing.
- Brazing: good with silver (BAG) and low-temperature copper-phosphorus (BCuP) alloys.
- Welding: gas-shield (GTAW / TIG, GMAW / MIG) acceptable; oxy-acetylene and resistance welding good.
- Machining: fair (Type I continuous chip, ~30% machinability rating); use free-cutting C36000 for high-speed turning.
- Polishing / plating: takes a bright polish and accepts nickel, chrome, tin and decorative plating readily.

7.2 Service Limits & Design Notes

C27000 can operate continuously up to about 200 °C for pressure-containing and structural code applications; for non-pressure decorative and electrical service, higher temperatures are acceptable for short periods. Softening of cold-worked tempers begins near 250 °C, so spring-temper parts should not see sustained service above this level without re-annealing consideration. Galvanically, C27000 is compatible with other copper alloys and with steel; it should be insulated from aluminium and from passive stainless steel in conductive media to avoid galvanic attack. The principal service limitation is dezincification - selective loss of zinc - in acidic, high-chloride or stagnant-water environments. For potable-water or marine tube service, specify an inhibited brass (C44300, C68700) or cupronickel (C70600 / C71500) instead. C27000 should also be avoided in ammonia-bearing or ammonia-producing environments, where plain brasses can suffer season cracking (stress-corrosion cracking); relieve internal stress by stress-relief anneal (250 - 300 °C) for parts carrying residual cold work in ammonia service.

7.3 Design Practices

- Specify annealed (OS050) fine-grain temper for moderate drawing and cold-heading; coarser grain raises draw depth but increases orange-peel tendency.
- For severe deep-drawn thin-wall parts (e.g. cartridge cases), use C26000 (70/30) instead - it has superior deep-drawing ductility.
- For hot-worked structural sheet or extruded sections, C28000 (Muntz Metal, 60/40) hot-works even more readily but has lower cold formability.
- For high-speed machined hardware, switch to free-cutting C36000 (lead brass) and accept lower formability and corrosion resistance.
- For potable-water or marine tube service, use inhibited brass (C44300, C68700) or cupronickel (C70600, C71500) - never plain C27000.
- For ammonia-bearing service, stress-relief anneal (250 - 300 °C) all cold-worked C27000 parts to prevent season cracking.
- For decorative plated finish, C27000 takes polish, nickel, chrome and tin plating readily; specify surface roughness per plating spec.
- Control annealed grain size (0.015 - 0.070 mm) and report on the MTC for drawing qualification.
- For springs and clips, use H02 - H04 temper; for formed stiff parts, H01 - H02.
- For EMC / RF shielding cans and gaskets, C27000 strip offers good formability and moderate conductivity (~27% IACS).

8. About Gnee Metal

Gnee Metal is a supplier of copper and copper-alloy products for export markets. Our ISO 9001 / 14001 / 45001 certified plants serve customers in North America, Europe, the Middle East and Southeast Asia with C27000 yellow brass sheet, strip, plate, rod, bar, wire, tube and custom profiles for hardware, cold-headed parts, springs, drawn and stamped components, electrical, decorative and general fabrication applications.

We provide project-specific mill test certificates (EN 10204 3.1 / 3.2) with certified composition, grain-size and mechanical data, third-party inspection by SGS / BV / TÜV, and value-added services including custom cutting, slitting, blanking, drawn profiles, precision grain-size control for drawing stock, and technical consultation to help you select the correct grade, temper and grain size for your application. Contact us for a quote or for assistance.

Item	Detail
Website	chinacopperalloys.com
Email	sales@gneemetal.com
Certificates	ISO 9001 / ISO 14001 / ISO 45001
Third-party	SGS, Bureau Veritas, TÜV