MATERIAL PROPERTIES (NONFERROUS METALS)

As for the materials (workpieces) to be processed by the turret punch press, this time, we summarized non-ferrous metals, following the previous steel.

ALUMINIUM AND ALUMINUM ALLOY

Aluminum and aluminum alloy is lightweight and resistant to rust, so it is used for various purposes in various fields such as lighting fixtures, electric appliances, building materials, various containers, accessories and aircraft materials.

A 5052 P - H12

- H12 — Temper designation (F : Original Condition O : Annealing H : Hardening etc.)
- P — Shape designation (P : Plate BD : Bar(Drawn) BE : Bar(Extruded) W : Wire etc.)
- 5052 — Alloy number
- A — A symbol which indicates aluminum and aluminum alloy

THE MECHANICAL PROPERTIES OF ALUMINUM AND ALUMINUM ALLOY (Excerpt from JIS H4000:1988)

Symbol	Temper	Tensile Strength N/mm^2	Elongation %	Character and application example
A 1050 P	O	60 - 100	Over 15 - 30	Low strength because of pure aluminum, but good for forming and corrosion resistance. Reflector, Lightning equipment, Ornaments and so on.
	H12	80 - 120	Over 2 - 9	
A 1100 P	O	75 - 110	Over 15 - 30	Low strength, but good for forming, corrosion resistance and welding. Building materials, electrical appliances, containers and so on.
	H12	95 - 125	Over 2 - 9	
A 2014 P	O	Under 215	Over 10 - 16	Heat treated alloy with high strength. Aircraft materials, various structural materials, etc.
	T4	Over 410	Over 14	
A 2017 P	O	Under 215	Over 12	Heat treated alloy with high strength. Aircraft materials, various structural materials, etc.
	T4	Over 355	Over 12 - 17	
A 3003 P	O	95 - 125	Over 18 - 25	A little bit higher in strength than 1100 and good in formability, weldability and corrosion resistance.
	H12	120 - 155	Over 2 - 9	
A 5052 P	O	175 - 215	Over 14 - 20	Typical alloy with moderate strength.
	H12	215 - 265	Over 3 - 11	
A 6061 P	O	Under 145	Over 14 - 18	It has good corrosion resistance and is mainly used as structural material for bolt and rivet connection.
	T6	Over 295	Over 8 - 10	
A 7075 P	O	Under 275	Over 10	One of the alloys with the highest strength in aluminum alloy. It is also used as a mold material for injection tooling.
	T6	Over 530	Over 7 - 8	

[NOTE] 1N/mm^2 ≒ 0.102kgf/mm^2 (The tensile strength of SPCC 270N/mm^2 or more)

ADVICE ON ONE POINT

Aluminum is a material with relatively good workability, but because of its softness, marks like a guide may stick to the workpiece or burrs may occur during punching. Adjustment such as weakening the force holding the work (spring strength) or reducing the clearance may be necessary. (Please refer to Technical Information Vol. 22)

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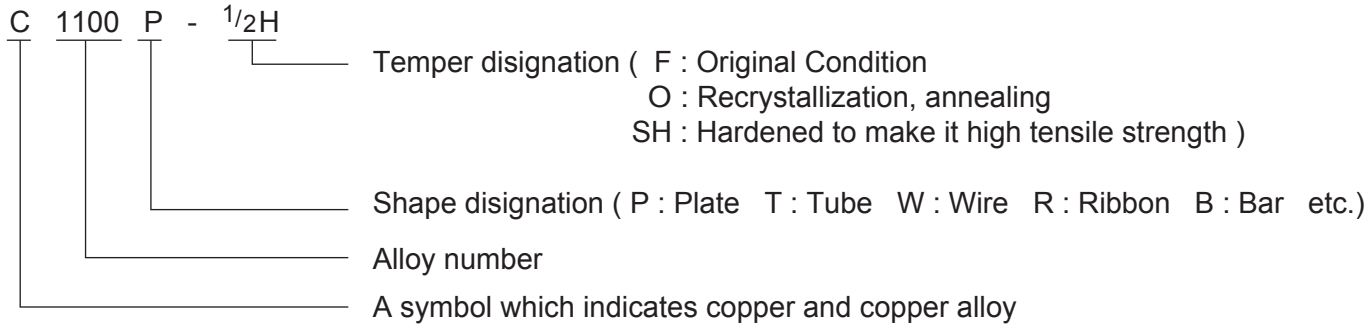
MATERIAL PROPERTIES (NONFERROUS METALS)

COPPER AND COPPER ALLOY

Copper and copper alloys have good electrical and thermal conductivity and are beautiful in gloss, so they are used for electrical appliances, wiring equipment, building tools, accessories, etc.



THE MECHANICAL PROPERTIES OF COPPER AND COPPER ALLOY (Excerpt from JIS H3100 H3110 H3130:1992)

Name	Symbol	Temper	Tensile Strength N/mm^2	Elongation %	Character and application example
Tough Pitch copper	C 1100 P	O	Over 195	Over 35	It has excellent electrical and thermal conductivity, good ductility, drawing workability and corrosion resistance.
		1/2H	245 - 315	Over 15	
Tombac	C 2200 P	O	Over 225	Over 35	The color is beautiful, ductility; drawing workability and corrosion resistance are good.
		1/2H	285 - 365	Over 20	
Brass	C 2600 P	O	Over 275	Over 40 - 50	It has excellent in ductility and deep drawing processability and good in plating properties.
		1/2H	355 - 440	Over 28	
	C 2680 P	O	Over 275	Over 40 - 50	Good ductility, drawability, and plating properties.
		1/2H	335 - 440	Over 28	
Free Cutting Brass	C 3560 P	1/4H	345 - 430	Over 18	Especially excellent in machinability and good punching property. Clock parts, gears etc.
		H	Over 420	—	
	C 3710 P	1/4H	375 - 460	Over 20	Especially excellent punching property and good machinability. Clock parts, gears etc.
		H	Over 470	—	
Phosphor bronze	C 5111 P	O	Over 295	Over 38	Good spreadability, fatigue resistance and corrosion resistance. Switch, lead frame, connector, etc.
		1/2H	410 - 510	Over 12	
Cupronickel	C 7060 P	F	Over 275	Over 30	Corrosion resistance, especially sea water resistance is good; it is suitable for use at relatively high temperature.
Nickel Silver	C 7351 P	O	Over 325	Over 20	Luster is beautiful, ductility, fatigue resistance, corrosion resistance are good.
		1/2H	390 - 510	Over 5	
Copper beryllium alloy for springs	C 1720 P	O	410 - 540	Over 35	Good corrosion resistance. High performance springs, springs for electric appliances, etc.
		1/2H	590 - 695	Over 5	
Phosphor bronze for springs	C 5210 P	1/2H	470 - 610	Over 27	Good ductility, fatigue resistance and corrosion resistance.
		EH	685 - 785	Over 11	

[NOTE] 1N/mm^2 ≒ 0.102kgf/mm^2 (The tensile strength of SPCC 270N/mm^2 or more)

Reference from JIS Handbook (Nonferrous metals) : Japanese Standard Association

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