ALLOYS CuBe2 :
Alloy 25
Alloy 190
Alloy 290
Strips

STAINLESS

High performance Alloys - Medical - Aerospace - Microtechnics - Motorsport - Industry

GENERAL INFORMATION

Copper-beryllium alloys *with about 2% beryllium cover a wide range of mechanical properties, from an unaged and ductile condition to aged conditions with high strengths in the range of hardened steels. Alloy 25, 190 and 290 strips have the same chemistry but differ in their cold working and heat treatment conditions. These alloys are manufactured and processed by Materion in the USA.*

Stainless has a range of sizes and grades in stock to suit your application needs. This product can also be custom made after slitting by our service centers.

APPLICATIONS

These copper alloys have very good corrosion resistance, low coefficients of friction and very high hardness for copper alloys. They are explosion-proof (no sparking) seizure-proof and can be heated up to about 250°C.

Connections: electrical contacts, relays.

STANDARDS AND DESIGNATIONS

Numerical designations:
Alloy CuBe2 – UBe2 - Alloy 25 – Alloy 190 – Alloy 290

Standards :
ASTM B 194 – NFL 14-721 -UNS C17200 - AMS 4530 - AMS 4532 - W. Nr 2.1247

Contact our Technical Support

TYPICAL CHEMICAL ANALYSIS (mass %)

Alloys 25, 190 and 290 have the same chemistry:

	Berylium	Cobalt + Nickel	Cobalt + Nickel + Iron	Lead	Copper
MIN	1.80	0.20	---	---	BALANCE
MAX	2.0	---	0.60	0.020	

METALLURGY

Alloy 25 is supplied in the annealed or annealed and tempered condition. The ageing heat treatment is carried out after forming. Alloys 190 and 290 are pre-treated at the factory and do not require heat treatment. Alloy 290 has a higher formability than alloy 190.

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PHYSICAL PROPERTIES AT 20°C

Density.....8.3 g.cm^{-3}
Coefficient of thermal expansion (between 20 and 200°C).....17 x 10^{-6}m/m.°C
Young's modulus......131 x 10^{3} MPa
Thermal conductivity.....105 W.m^{-1}K^{-1}
Electrical conductivity.....15 to 30% IACS depending on the state
Non-magnetic grade

MECHANICAL PROPERTIES OF THE STRIPS: ALLOY 25

Grade 25 is offered in the annealed (cond A), annealed and hardened (¼ H, ½ H, or H condition) and can be aged at 315°C/2h (AT, ¼ HT, ½ HT, or HT condition) with the following properties:

Conditions	Conditions according to ASTM / AFNOR	Thickness (mm)	UTS (Mpa)	YS 0.2% (Mpa)	E%	HV Hardness
A	TB 00 / TB	0.05 - 3.81	410 - 540	200 - 380	35 - 75	90 - 144
1/4 H	TD01 / TD1	0.045 - 3.81	510 - 610	410 - 560	20 - 45	121 - 185
1/2 H	TD02 / TD2	0.038 - 3.81	580 - 690	510 - 660	12 - 30	176 - 216
H	TD04 / TD4	0.0305 - 3.81	680 - 830	620 - 800	2 - 18	216 - 287
AT	TF00 / TF	---	1130 - 1350	960 - 1210	3 - 15	280 - 310
1/4 HT	TH01 / TH1	---	1200 - 1420	1030 - 1280	3 - 10	280 - 310
1/2 HT	TH02 / TH2	---	1270 - 1420	1100 - 1350	1 - 8	290 - 320
HT	TH 04 / TH4	---	1310 - 1520	1130 - 1420	1 - 6	310 - 340

MECHANICAL PROPERTIES OF THE STRIPS: ALLOY 190 AND 290

Grades 190 and 290 are pre-treated in the factory after different cold processing rates with the following properties:

	Conditions	Conditions according to ASTM	Thickness (mm)	UTS (Mpa)	YS 0.2% (Mpa)	E %	HV Hardness
ALLOY 190	AM	TM00	0.10 - 0.46	685 - 755	480 - 660	16 - 30	280 - 310
	1/4 HM	TM01	0.05 - 1.0	755 - 825	550 - 760	15 - 25	280 - 320
	1/2 HM	TM02	0.04 - 1.0	825 - 940	650 - 870	12 - 22	290 - 330
	HM	TM04	0.04 - 1.0	930 - 1035	750 - 940	9 - 20	310 - 360
	SHM	TM05	0.04 - 0.41	1035 - 1110	860 - 970	9 - 18	320 - 380
	XHM	TM06	0.03 - 0.81	1060 - 1205	930 - 1180	4 - 15	340 - 390
	XHMS	TM08	0.03 - 1.61	1205 - 1320	1030 - 1250	3 - 12	340 - 410
ALLOY 290	TM02	TF00	0.05 - 0.89	> 820	650 - 800	14 - 30	290 - 330
	TM03	TH01	0.05 - 0.89	> 930	760 - 860	12 - 30	295 - 335
	TM04	TH02	0.05 - 0.89	> 960	790 - 940	9 - 25	300 - 340
	TM06	TH03	0.03 - 0.89	> 1060	930 - 1070	6 - 13	320 - 390
	TM08	TH04	0.03 - 0.89	> 1200	1060 - 1210	3 - 15	340 - 410

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PROCESSES

Machinability Bars

Beryllium is a chemical element, which can present health risks when inhaled, especially in the form of fine dust. Special precautions must be taken during processing which leads to the production of dust. Grinding should be carried out under heavy watering and welding (not recommended) should be carried out under effective suction. Welding is not recommended.

Heat treatments

Products supplied in the solution treated condition (A condition) or in the solution treated then cold worked condition (1/4H, 1/2H, 3/4H, H condition) can be treated by ageing at 315°C +/-5°C for a minimum of 2 hours in order to obtain maximum hardness. Alloys 190 and 290 are already aged and can be used without additional heat treatment.

CORROSION RESISTANCE

Alloys 25, 190 and 290 are highly resistant to corrosion in marine environments. Hydrochloric and sulphuric acids can accelerate corrosion in the presence of oxidising impurities.

STANDARD SHAPE

- Strips: thicknesses and widths depending on available stock or on manufacture.

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