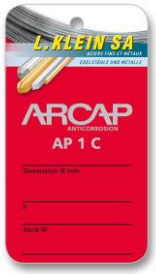

ARCAP AP1C

CuNi25Zn16 – Nickel silver alloy for general uses

Features and Particularities

The ARCAP AP1C spring material is available as strips, bars and wires for general industrial applications. This nickel silver alloy has a good corrosion resistance and is non-magnetic. The strips are especially well adapted to precision stamping with superior tool life.

Uses

This ARCAP AP1C nickel silver alloy is very well adapted for deep drawing and high precision stamping. It can be used for numerous diverse applications in many industrial branches. It is especially indicated for making precision springs.

Standards

Material number	ARCAP AP1C
EN	CuNi25Zn17
	This alloy is not covered by a standard

Chemical composition ($\%_{wt.}$)

Ni	Zn	Mn	Sn	Fe	Pb	Cu
24	15	max.	max.	max.	max.	balance
26	16	0.50	0.20	0.30	0.03	

Executions and Delivery conditions

- Strips:
  semi-finished strips
  finished strips
  cut to width
  straightened or as coils
- Wires:
  on spools or coils
  and 3 m bars

Mechanical properties

Table 1 Strips

Condition	Symbol*	Hv	Rm (MPa)	$R_{0.2}$ (MPa)	A_{100} (%)
soft	0	≤ 130	≤ 450	≤ 300	≥ 30
1/4 hard	H11	130–165	450–550	> 300	≥ 15
1/2 hard	H12	160–190	520–620	> 400	≥ 5
4/4 hard	H13	190–220	620–730	> 550	≥1
Spring hard	H15	≥ 220	≥ 730	> 700	

Strips: 0.25 – 1.0 mm thick; Probes measured in the rolling direction

Table 2 Wires

Condition	Symbol*	Diameter	Rm (MPa)	$R_{0.2}$ (MPa)	A_{100} (%)
soft	0	≤10	≤550	≤450	≥30
1/4 hard	H11	≤10	550-650	450-550	≥5
1/2 hard	H12	≤10	650-750	500-550	≥2
3/4 hard	H13	≤10	700-800	550-600	≥1
4/4 hard	H14	≤9	800-820	550-700	
Spring hard	H15		≥820	≥700	

Wires min. 0.2 mm *Symbol designation taken from AFNOR NFA 02-008

Availability

Standard dimensions on stock, see: Delivery program

Machining

Classical machining:

Cutting speed:	approx. 60 m/min
Lubricant-coolant:	individual choice

- The optimal cutting conditions depend on the machine tool, the cutting tools, the chip dimensions, the lubricant-cooling fluid, as well as the tolerances and surface the roughness to be achieved.
- Precision machining with diamond tools performs outstandingly.

Modifications will not be adjusted automatically.
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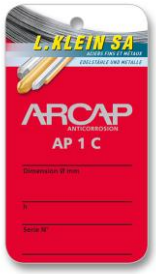

ARCAP AP1C

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Machining
- The chip breaking increases with the strength oft he material becoming better from H13-H14 on.

Burr formation
- The general tendency to burr formation decreases from H13-H14 and higher.
- The tendency to form burr by drilling decreases from H14 and higher.

Hardening
- The ARCAP AP1C nickel silver alloy cannot be thermally hardened.

Strengthening
- The ARCAP AP1C nickel silver alloy as strips as well as wires can be cold deformed to very rate of deformation.

Annealing

Soft:	600-650°C/15-60 min, recommended 650°C
Stress relieving:	max. 300°C/minimum 1h, recommended 250°C

Microstructure
- The ARCAP AP1C nickel silver alloy is single phase in all working and use conditions.

Marking

Laser marking:	well amenable

Löten
- Brazing: well amenable
- Soldering: well amenable

Gluing

Generally well amenable

Welding

Gas:	average
Arc:	average
Laser:	very good
Electron beam:	very good
TIG:	good
Resistance:	good

- The welding heat can cause Zink losses by evaporation of the melted pool. This dezincification can negatively influence the mechanical properties as well as the corrosion resistance of the welded joints.
- A stress relieving treatment after welding is recommended in many cases in order to obviate potentially geometrical distortions.

Pickling

10% sulfuric acid
2-3% nitric acid
Temperature: 80°C
Holding time: according to needs and of the dilution of the pickling solution.

Polishing
- Mechanical: amenable
- Electrolytic: amenable

Color
- non oxidized surfaces: Silber-blue

Electroplating

Non-oxidized surfaces of are well amenable to electroplating.

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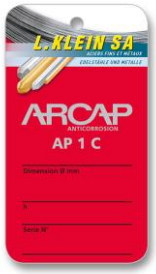

ARCAP AP1C

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Table 3
Corrosion resistance

Atmosphere	Resistance	Medium	Resistance
Countryside	Resistant *	Non-oxidant acids	Resistant
Industrial	Resistant *	Dry gases O_2, Cl, Chlorinated water	Resistant
Marine atmosphere	Resistant *	Water	Resistant
Humidity	Resistant *	Sweat	Not resistant
High concentration halogen gases	Not resistant	Cyanide	Not resistant
Hydrogen sulfide and sulfides	Not resistant	Halogens	Not resistant
Ammoniac	Not resistant	Oxidant acids	Not resistant
		Ammoniac solutions	Not resistant
Stress corrosion	Not sensitive		

*can developed a self adhering protective layer

Physical properties

Properties	Unit	Temperature (°C)			
		20	100	200	300
Density	$g.cm^{-3}$	8.80			
Young modulus E	GPa	163-170			
Electrical resistance	$\mu\Omega.cm^{-1}$	35-40			
Specific electrical conductivity	% IACS	4.3-4.9			
Temperature coefficient Electrical conductivity	K^{-1}	$2.5.10^{-4}$			
Thermal expansion	$m.m^{-1}.K^{-1}$ 10^{-6}		0–00°C 16	20–200°C	0–600°C 17
Thermal conductivity	$W.m^{-1}.K^{-1}$	22		25	
Magnetism	Oe	10^{-6}			
Optical reflexion Ag = 100%	%	70			
Melting range	°C	1150-1170			
Color	silver-blue				

Disclaimer: The information and data of this informative “Data sheet“ are indicative only. They are not use instructions. The users must define and endorse them in each case.

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