MATERIAL DATA SHEET
C42400

Alloy Designation /

EN

DIN CEN/TS 13388

UNS C42400

This alloy is in accordance with RoHS 2002/96/CE for electric and electronic equipments and 2002/53/CE for automotive industry.

Main Application

Automotive:
Switches and relays, contact, connectors, terminals

Electrical:
Switches and relays, contact, connectors, terminals, components for the electrical industry, stamped parts

Key Characteristics

- Excellent cold forming
- Good corrosion resistance
- Good conductivity combined with high strength & hardness
- Low stress corrosion craking
- Good spring poperties

Preferred Application

Connectors	Switches and Relays	Current Carrying Capacity	Spring Contact
xx	x	x	xx

x = well suited xx = particularly suited

Chemical Composition

Chemical Composition	Weight percentage		Chemical Composition	Weight percentage	
Cu	87-91	%	Si	0.1-0.3	%
Sn	0.05-0.5	%	Cr	0.1-0.5	%
Zn	Rest	%	Zr	0.05-0.2	%
Ni	0.5-1.5	%			%

Physical Properties

Property Typical values in annealed temper at 20°C	Value	Unit
Density	8.7	g/cm^3
Thermal Expansion coefficent 20 .. 100°C	17.5	$10^{-6}/K$
20 .. 300°C	17.7	$10^{-6}/K$
Specific Heat Capacity	0.384	J/(g-K)
Thermal conductivity	134	W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm^2))	19	MS/m
Electrical conductivity (IACS)	33	%
Thermal coefficient of electrical resistance (0.. 100°C)	/	$10^{-3}/K$
Modulus of elasticity (1 GPa = 1 kN/mm^2)	115	GPa
cold formed annealed	130	GPa

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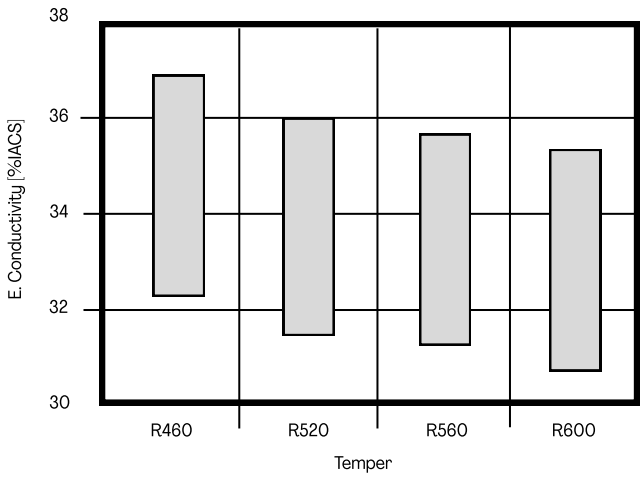
Mechanical Properties (EN 1652)

Temper	Tensile Strength Rm	Yield Strength Minimum $Rp_{0.2}$	Elongation Minimum A_{50mm}	Hardness HV*
	MPa	MPa	%	HV
R460 (TM00)	460-540	430*	10	140-180
R520 (TM01)	520-600	500*	5	150-190
R560 (TM02)	560-640	550*	2	170-210
R600 (TM03)	600-680	590*	1	180-220

*Only for information

Electrical Conductivity



Electrical conductivity is strongly influenced by cemical composition A high level cold deformation and small grain size decrease the electrical conductivity moderately. Minimum conductivity level can be specified.

Corrosion Resistance*

- Resistant to: Good resistance to atmospheric corrosion due to formation of protective patina. C42400 has a good resistance in natural and industrial atmosphere (maritime air too). Corrosion resistance, especially against seawater and industrial atmosphere is good and C42400 is resistant to industrial and drinking water, aqueous and alkaline solutions (not oxidizing), pure water vapour (steam), non oxidizing acids (without oxygen in solution) and salts, neutral saline solutions.
- Stress corrosion cracking susceptibility is low.
- Not resistant to: oxidising acids, solutions containing cyanides, ammonia or halogens, hydrous ammonia and halogenated gases, hydrogen sulfide.

*For more details call our technical service

Fabrication Properties*

Cold forming properties Max. 90% between annealings	Excellent
Hot forming properties at 790...840°C	Excellent
Machinability (rating 30)	Good
Electroplating properties	Good
Hot tinning properties	Excellent
Soft soldering brazing	Excellent
Resistance welding	Less suitable
Gas shielded arc welding	Good
Laser welding	Excellent
Soft annealing	425-700°C, 1-3h
Stress relieving annealing	200-300°C, 1-3h

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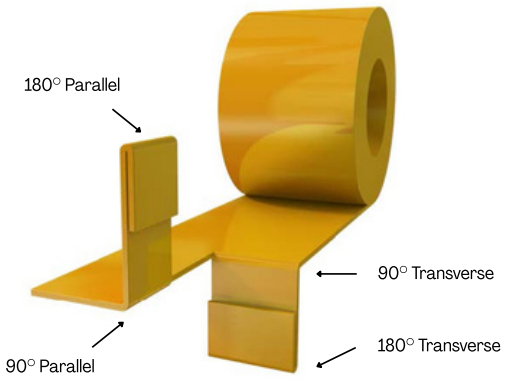
Bending Definition

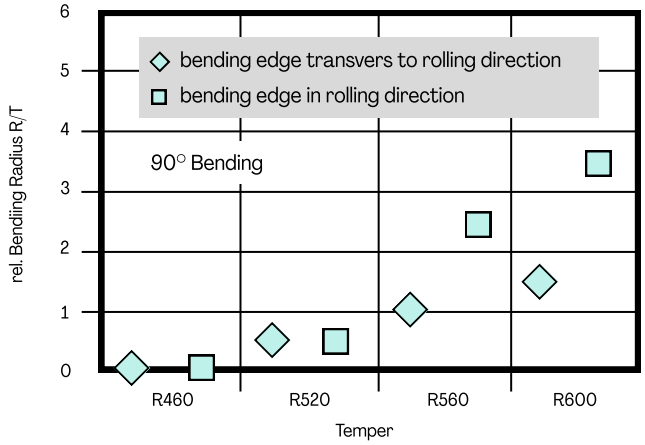
Transverse = good way
Parallel = bad way

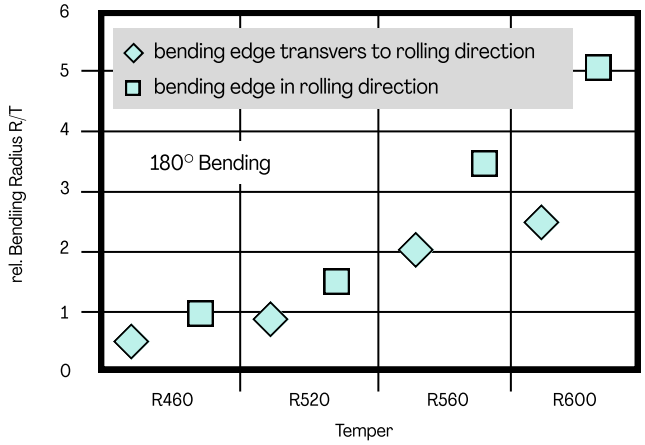


Minimum Bending Radius Calculation

To find out the minimum possible bending radius take the R/T value from the list
Example: R/T = 0.5 and thickness 0.3 mm
Minimum radius = (R/T) x thickness = 0.5 x 0.3 mm = 0.15 mm

Bending Properties Thickness:≤0.5mm





Tending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general - as well as lower thickness - allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.
Please take care when comparing with ASTM E290 results, there the bend definition direction is contradictory.

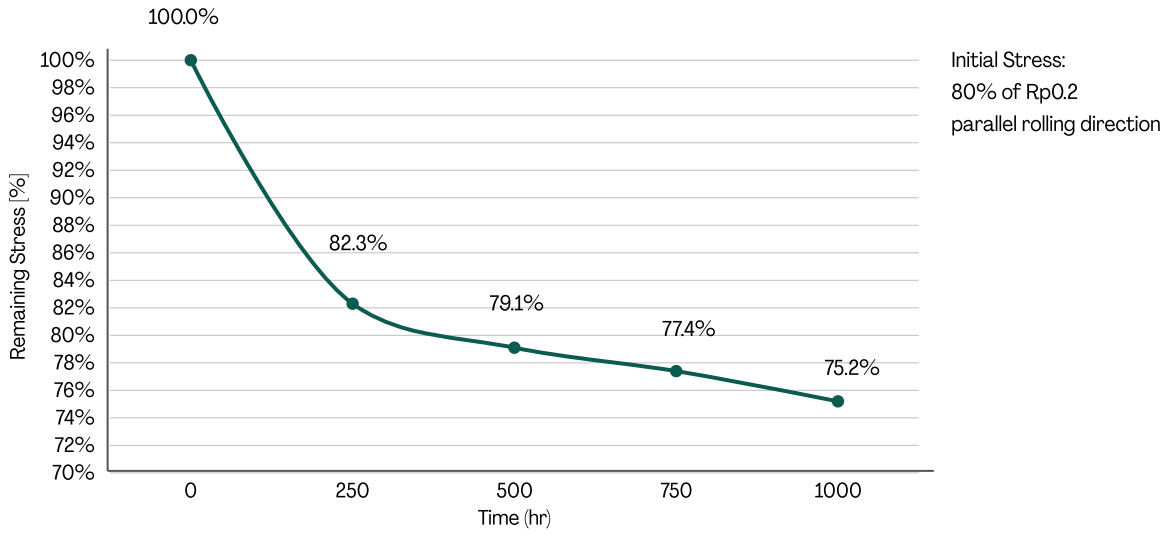
Bending Properties*

Temper	Thickness Range	Bending 90°		Bending 180°	
		Transvers	Parallel	Transvers	Parallel
	mm	R/T	R/T	R/T	R/T
R460 (TM00)	≤0.5	0	0	0.5	1
R520 (TM01)	≤0.5	0.5	0.5	1	1.5
R560 (TM02)	≤0.5	1	2.5	2	3.5
R600 (TM03)	≤0.5	1.5	3.5	2.5	5

*__Measured__ at sample width 10 mm according to EN 1654
Possible bending radius = (R/T) x thickness

Relaxation Properties

Thermal stress relieved



Stress relaxation is tested with cantilever bending test equipment. This method takes short time relaxation into account, so that the values achieved are very realistic, while other test methods like tube test pretend better properties from the achieved values. Relaxation values give an indication about stress relieve of strip under tension for a certain time and temperature, as it is measured on plain strip. The vehaviour of deformed parts may differ; nevertheless the ratio between the different tempers remains the same.

Typical tes sample thickness is 0.3-0.6 mm.