



**METALLURGICA  
SAN MARCO**

# **Data Sheet: CW603N**

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**FREE MACHINING**

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Updated 06 / 23

# ALLOY: CW614N

Standard alloy for machining with chip removal. Included in the 4MS positive list

## ALLOY DESIGNATION

<b>UNIEN:</b> CW614N - CuZn39Pb3	<b>ASTM:</b> C38500	<b>DIN:</b> 2.0401	<b>BS:</b> CZ121	<b>GOST:</b> LS58-3
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## CHEMICAL COMPOSITION UNI EN 12164 ED.2016

Cu	Pb	Sn	Fe	Ni*	Al	Si*	Zn	Other elements
min.57.0% max 59.0%	2.5% 3.5%	≤0.3 %	≤0.3 %	≤0.3 %	≤0.05 %	≤0.03 %	difference	≤0.2 %

Restrictions according to 4MS. Each unnamed element must be less than 0.02%.

Restriction group of the surface in contact with drinking water according to the «common composition list»: C and D.

## HEAT TREATMENTS

### STRESS RELIEVING

It specifically allows redistribution of tension induced by machining or cold plastic deformation, reducing the risk of stress corrosion cracking.

TREATMENT: heating of parts at 200°C to 250°C for 2 hours and cooling within the furnace. Validation of stress relief treatment can be performed with the ISO 6957 test.

### ANNEALING

Recrystallization of the alloy reduces hardness and increases ductility. The treatment temperature ranges from 450°C to 550°C for a period of time relative to the intended result. The high temperature can cause variations in the surface appearance and tolerances of the finished part.

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## TECHNOLOGICAL PROPERTIES

Structure	Density	Electrical conductivity	Coeff. of thermal expansion	Thermal conductivity*	Specific heat	Elasticity module	Melting point
$\alpha+\beta$	8.40 g/cm <sup>2</sup>	28% IACS	20.9 10-6K	123 W/(m K)	380 J/(kg K)	105 N/mm <sup>2</sup>	870-890 °C

low ○○○○○○○○ excellent

Machinability: ●●●●●●●●

Weldability: ●●●●●●○

Hot forming: ●○○○○○○○

Cold Forming: ●●○○○○○

Corrosion resistance\*\*: ○○○○○○○○

\*at room temperature.

\*\*compatibility with chemical substances should be carefully checked.

## MECHANICAL PROPERTIES UNI EN 12164 ED.2016

Condition of material	Diameter in mm		Hardness HB*		Rm	Rp0,2.N/mm <sup>2</sup>		Elongation %
	from	to (included)	min.	max	min.	min.	max	min.
M	ALL		AS MANUFACTURED					
R360	6	80	-	-	360	-	350	20
H090	6	80	90	125	-	-	-	-
R430	2	60	-	-	430	220	-	10
H110	2	60	110	160	-	-	-	-
R500	2	14	-	-	500	350	-	5
H135	2	14	135	-	-	-	-	-

\*Hardness values are determined in the mid-range.

Values in brackets refer to the hexagonal section bar.

The standard condition produced by Metallurgica San Marco is M.

Other conditions must be requested at the time of order after a feasibility inquiry.

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## DIMENSIONS, TOLERANCES, AND STRAIGHTNESS UNI EN 12164 ED.2016

ROUND section bar					HEXAGONAL and SQUARE section bar		
Nominal diameter (mm)		TOLERANCES			Nominal key (mm)		Tolerance (mm)
from	to included	Class A	Class B	Class C	from	to included	
6	10	0 – 0.06	0 – 0.036	0 – 0.025	6	10	0 – 0.09
10	18	0 – 0.07	0 – 0.043		10	18	0 – 0.11
18	30	0 – 0.08	0 – 0.052		18	30	0 – 0.13
30	50	0 – 0.16			30	50	0 – 0.16
50	80	0 – 0.19			50	60	0 – 0.19

The standard tolerance for the round bar is Class A. Different tolerances must be defined when ordering. Supplies of semi-finished products from Ø63 to Ø80 mm with Class A tolerances are possible.

Diameter (mm)	Length of bar (mm)	Tolerance (mm)
2	30	3000 o 4000
30	50	3000 o 4000
50	80	3000

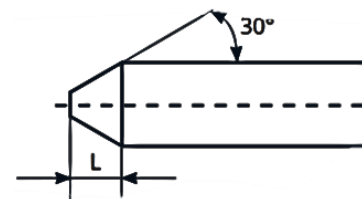
Diameter (mm)	Deviation from straightness in mm	
	Every 400 mm	Every m of length L ≥ 1
<b>Round section bar</b>		
10	50	0.4
<b>Hexagonal and square section bar</b>		
10	53	0.6

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## FINISHING AND PACKAGING

Diameter or Key (mm)		Diameter or Key (mm)		Tip Length L (mm)	
5	10	0.2	1.5	2	7
10	20	0.2	2	3	10
20	30	0.2	3	4	12



Unless otherwise specified by the buyer, the shape of the ends of products larger than 30 mm is at the discretion of the supplier.

<b>Ends of round bars</b>	finishing with chamfer and point up to and including Ø55 mm.
	finishing with saw cut greater than Ø55 mm.
<b>Ends of hexagonal bars</b>	Finishing with chamfer and cut. Other finishing available on request.
<b>Bar surface</b>	Pickled.
<b>Packaging</b>	1000 kg bundle - 3/5 metal straps. Different bundle packaging and quantities are possible on specific request.
<b>Identification</b>	Adhesive label on strap or bar ends.
<b>Stress relieving</b>	Polygonal bar undergoes the heat treatment of stress relief.

## TECHNICAL NOTES

This alloy arose from the need to push machining to the extreme. It has excellent chip removal properties whose dimensions are reduced due to its balanced chemical composition. It finds application in faucets, general components.