

# SigmaChip B2 DATA SHEET

## TYPICAL APPLICATIONS

Repetition and engineering components including:

Gears	Valve blocks	Spindles
Shafts	Nozzles	Cable glands
Pipe unions	Threaded items	Studding
Turned parts	Plumbing	Pneumatics
Hydraulics	Pins	Decorative
Bearings	Bolts	Washers
Nuts	Bushings	

## PRODUCT ATTRIBUTES

Excellent free machining properties, especially on automatics

Unrivalled machinability index of 150 (>6mm)

Very high uniformity of diameter, concentricity, surface finish and straightness

Superior production techniques to allow higher machinability (4 Pb) composition with excellent uniformity and consistency

Product UK sourced from mills with ISO 9000 quality systems

Very high scrap value

Good strength, excellent corrosion resistance and ability to accept wide selection of surface treatments

## CUSTOMER BENEFITS

Greatly reduced machining times, superior component performance and reduced tool wear

Guarantee of highest quality giving increased component confidence

Recycle value of process scrap

Cost benefits at end of component life cycle

Very good balance of component performance and aesthetics

## PRODUCT DESCRIPTION

A UK sourced high speed free machining brass rod of the highest quality and consistency designed to minimise production costs, particularly in repetition components on automatic lathes. In diameters greater than 6.35mm, Smiths SigmaChip B2 is the high machinability CZ121 4Pb composition, which is very difficult to manufacture consistently unless the most stringent quality controls are maintained batch after batch. This premium product has a machinability rating of 150 (CDA figures) compared to 100 for CZ121 3Pb and can further reduce manufacturing costs for most components over the UK standard CZ121 3Pb.

## TYPICAL MECHANICAL PROPERTIES

Tensile Strength	N/mm <sup>2</sup> (Rm)	350-425
0.2% Proof Strength	N/mm <sup>2</sup> (Rp0.2)	250-350
Elongation	% (5.65√A)	15-25
Brinell/Vickers Hardness	HB/HV	130-170

## TYPICAL PHYSICAL PROPERTIES

Elastic Modulus	kN/mm <sup>2</sup>	98
Coefficient of Linear Thermal Expansion	1/K	20.9x10 <sup>-6</sup>
Thermal Conductivity	W/m.K	113
Annealing Temperature	°C	450-600
Stress Relieving Temperature	°C	250-350
Melting Range	°C	880-900
Electrical Conductivity	%IACS	26

## TOLERANCES (mm)

Diameter		Tolerance		Diameter		Tolerance	
		+	-			+	-
>1.6	≤3.0	0	0.04	>30.0	≤50.0	0	0.10
>3.0	≤6.0	0	0.05	>50.0	≤70.0	0	0.19
>6.0	≤10.0	0	0.06	>70.0	≤80.0	0.37	0.37
>10.0	≤18.0	0	0.07	>80.0	≤120.0	1.10	1.10
>18.0	≤30.0	0	0.08	>120.0		3.20	3.20

## TECHNICAL DESCRIPTION

Diameter <6.35mm: SigmaChip B2 is DEMCO alloy T2 CuZn39Pb3 – CZ121 high speed machining brass for general applications (machinability rating 100).

ISO CuZn39Pb3  
ASTM C38500  
CEN CW614N

Diameter ≥ 6.35mm: SigmaChip B2 is DEMCO alloy T12 CuZn38Pb4 – CZ121 extra high speed machining brass with maximum machinability composition (machinability rating 150).

ISO CuZn38 Pb4  
ASTM C38510  
CEN CW609N

## NOMINAL COMPOSITION %

Diameter	Cu	Pb	Zn
≥ 6.35mm	57.0	3.8	REM
<6.35mm	58.0	3.0	REM

## CUT TO SIZE CAPABILITY

Every Smiths Metal Centre has at least one automatic power bandsaw for immediate requirements and has access within the Smiths group to thirty power saws including a fully automated magazine feed CNC rod blanking line. We can economically cut from one off blanks to the largest production run – for immediate or JIT deliveries.

CUT TO SIZE BILLETS	mm
Tolerance	±0.3

## SURFACE TREATMENT

SigmaChip B2 readily accepts many surface treatments for aesthetic or further wear and corrosion resistance. The most frequently used treatments are listed.

Bright dipping	Use proprietary bright dip solution.
Polishing	Use conventional polishing techniques and compounds according to 130-170 VPN surface hardness.
Plating	Conventional nickel and chromium plating techniques can be used.
Lacquering	A variety of proprietary clear surface finishes can be applied to ensure SigmaChip B2 retains its lustre. For maximum longevity we strongly recommend the use of a specialist corrosion inhibiting brass coating appropriate to application.

## CORROSION RESISTANCE

SigmaChip B2 has very good natural corrosion resistance in air and many working and process fluids, making it ideal for general purpose use. For aggressive environments, especially marine, we recommend CZ112 naval brass or CZ114 high tensile brass. For the most arduous conditions we recommend aluminium bronze.

## FABRICATION

Soldering	Very good
Brazing	Good <6.35mm diameter Fair ≥6.35mm diameter
Welding	Not recommended
Bending	Poor

## MACHINING

SigmaChip B2 is one of the few alloys currently manufactured in the world with a machinability index of 150 (≥ 6.35mm diameter). This results in exceptional free machining qualities and metal removal rate, whilst the chips are very easily cleared from the tool and workpiece. For maximum performance always use the correct geometry cutting tools. The use and nature of cutting fluids varies with application, and we recommend discussion with cutting fluid manufacturers to find the ideal fluid for your application.

## TURNING

Tool:	HSS	
	ROUGHING	FINISHING
Cutting speed sm/m:	90-200	90-200
Feed mm/rev:	0.15-0.5	0.07-0.4
Cut mm:	1-3	0.4-0.75

Tool:	CARBIDE	
	ROUGHING	FINISHING
Cutting speed sm/m:	120-300	150-450
Feed mm/rev:	0.4-0.65	0.15-0.4
Cut mm:	1.1-3	0.4-0.75

## DRILLING

Tool:	HSS
Cutting speed sm/m:	60-150
Feed mm/rev:	0.005-0.075

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**SMITHS METAL CENTRES are the exclusive UK distributors for SigmaChip B2 high technology free machining brass – for further information on how SigmaChip B2 can reduce your through-cost contact your local metal centre. We have 16 strategically placed Metal Centres to guarantee the most competitive TOTAL service package in the UK.**

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SigmaChip Issue 2 AMBER 10K 12/03