

# PNA 219

Cu-DHP / C12200

Release 01\_2009\_E



PNA 219 is a deoxidised, non-arsenical, oxygen-free copper 99.9% pure, with limited residual phosphorus content.

It is used for semis with special requirements as to formability, weld-ability and brazability, for which electrical conductivity is only of secondary importance. The main areas of application are in the production of pipes, roofing, wall cladding and process equipment manufacture.

## Chemical Composition (wt. %)

Cu	Minimum 99.90
P	0.015 – 0.040

## Physical Properties

Density	g/cm <sup>3</sup>	8.94
Coefficient of Thermal Expansion	10 <sup>-6</sup> /K	17.6
Electrical Conductivity	MS/m	46
	%IACS	79
Thermal Conductivity	W/(mK)	340
Modulus of Elasticity	kN/mm <sup>2</sup>	132

## Material Designation

Aurubis	PNA 219
EN	CW024A
UNS*	C12200
ISO	Cu-DHP
BS	C106

\* Unified Numbering System

## Mechanical Properties

		R 220	R 240	R 290	R 360
		H 040	H 065	H 090	H 110
Tensile Strength <i>R<sub>m</sub></i>	N/mm <sup>2</sup>	220 – 260	240 – 300	290 – 360	> 360
Yield Strength <i>R<sub>p0.2</sub></i>	N/mm <sup>2</sup>	< 140	> 180	> 250	> 320
Elongation <i>A<sub>50</sub></i>	%	> 33	> 8	> 4	> 2
Hardness <i>H<sub>v</sub></i>	-	40 – 65	65 – 95	90 – 110	> 110

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## Bendability

	R 220	R 240	R 290	R 360
$r = x \cdot t$ ( $t \leq 0.5\text{mm}$ )	90° GW**	0	0	0
	90° BW	0	0	0.5

\*\* GW: bending edge  $\perp$  rolling direction, BW: bending edge  $\parallel$  rolling direction.

## Fabrication Properties

Cold Formability	Excellent
Hot Formability	Excellent
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Good
Gas Shield Arc Welding	Excellent
Resistance Welding	Poor

## Typical Applications

Architecture, Roofing & Guttering  
Electrical Engineering, Cladding  
Wire, Heat Exchangers, Transistors  
Air / Hydraulic / Oil Lines  
Heater Elements, Refrigeration  
Plumbing Pipe & Fittings

## Other Properties

Corrosion Resistance	Resistant to corrosion either good or excellent in most atmospheres and environments. Material corroded by oxidising acids, halogens, sulphides and ammonia based solutions.
Work Hardening	Work hardens during cold working and can be annealed in neutral or oxidising atmospheres. Annealing can be achieved by rapid cooling after heating (370°C to 650°C).

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