

MATERIAL DATASHEET

**ALLOY 413 (AQUARIN)**



Designation	
Diehl Metall	413 (AQUARIN, machining alloy)
DIN EN symbol	CuZn33Pb1AlSiAs
DIN EN	CW725R
UNS	-

Composition (mass as %, reference values)			
Cu	65.7	Al	0.2
Pb	0.6	Si	0.2
As	0.06	Zn	remainder

**Application**

- Alloy 413 is an engineering material of medium strength and good toughness.
- The alloy is particularly suitable for use in aggressive tap water.
- The lead-reduced alloy 413 is suitable for automated machining and can be cold formed.
- The alloy is suitable for drinking water applications and is included in the positive list of the German Environment Agency (UBA).
- Following cold forming, it is advisable to carry out stress relief annealing at <300 °C with a dwell time of 1 - 2 hours. If processing operations are carried out at temperatures above 600 °C, the dezincification resistance is impaired. It can be restored by means of suitable heat treatment. The annealing temperature for this lies at between 500 °C and 550 °C over a period of 2 hours. For further information, please contact the manufacturer.

**Products and relevant standards**  
(conditions correspond to the alloy CuZn36Pb2As, composition is not standardized)

Rods (free machining purposes)	EN 12164
Hollow rods (free machining purposes)	EN 12168
Profiles (general purposes)	EN 12167

**Physical properties**

Density	g/cm <sup>3</sup>	8.47
Coefficient of linear thermal expansion: 20 – 200 °C	• 10 <sup>-6</sup> /K	19.71
Electrical conductivity	m/(Ω · mm <sup>2</sup> )	12.8

**Processing properties**

Machinability (CuZn39Pb3 = 100%)	good (Index 75)
Hot formability	good
Cold formability	moderate

**Mechanical properties and hardness**

- The strength properties and hardness values correspond to the alloy CuZn36Pb2As and are specified in the relevant product standards.
- The properties depend on the product, the condition and the dimensions.

**Heat treatment**

Soft annealing	450 – 550 °C
Stress relief annealing	200 – 250 °C

**Corrosion resistance**

- Generally good resistance to neutral, alkaline and organic aqueous solutions.
- Dezincification resistance according to relevant standards.

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