



**DIEHL**  
Brass Solutions

**CUPHIN – THE LEAD-FREE  
MATERIAL**

# CUPHIN FOR DRINKING WATER INSTALLATIONS

- GOOD FLUIDITY AND MOLD-FILLING PROPERTIES
- CORROSION RESISTANCE
- PLANNING RELIABILITY – LEAD-FREE FOR SAFE USE WORLDWIDE

With **CUPHIN-432**, Diehl Brass Solutions offers a lead-free alloy for casting applications.

**CUPHIN-432** is suitable for both sand casting as well as for permanent mold and pressure die casting. In addition to its remarkable mechanical properties, this alloy also demonstrates good casting properties. At the same time, the advantages typical of brass are retained:

- **Good machinability**
- **Problem-free surface treatment and coating**

**CUPHIN-432** has good castability due to the addition of a grain refiner. The homogenous component properties result from the fine-grained microstructure and facilitate further processing of the casting.

**CUPHIN-432** is not only characterized by good castability. The silicon-rich k-phase also produces short breaking chips. This has a positive effect on further processing and eliminates the need for lead. As a result, **CUPHIN-432** complies with the requirements of the Directive on End-of-Life Vehicles and RoHS as well as those of the German Drinking Water Ordinance.

With our comprehensive **CUPHIN** portfolio of forging, machining and casting alloys, it is possible to manufacture entire assemblies from lead-free brass.



# MATERIAL AND PROPERTIES

## Chemical Composition

Chemical Composition (mass percentage, nominal)		
Cu		76.0
Si		3.0
P		0.05
Zn		remainder

## Physical Properties

Physical Properties (reference values)		
Density	g/cm <sup>3</sup>	8.3
Electrical conductivity	m/(Ω · mm <sup>2</sup> )	5.3
Thermal conductivity	RT	W/(m · K) 28.0
	200 °C	W/(m · K) 44.4
Young's modulus	GPa	106.0

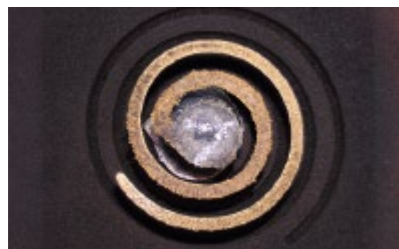
## Mechanical Properties

Mechanical Properties (sand casting) (reference values)	
Tensile strength R <sub>m</sub>	up to 400 N/mm <sup>2</sup>
Yield strength R <sub>0.2</sub>	up to 190 N/mm <sup>2</sup>
Elongation A5	> 10%
Brinell hardness	< 120 HB

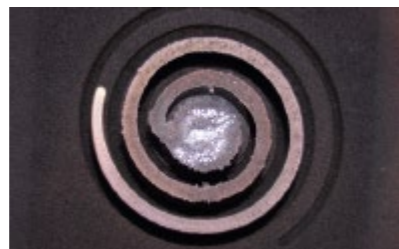
Mechanical Properties (permanent mold casting): (reference values)	
Tensile strength R <sub>m</sub>	540 N/mm <sup>2</sup>
Yield strength R <sub>0.2</sub>	240 N/mm <sup>2</sup>
Elongation A5	25%
Brinell hardness	135 HB



### Fluidity

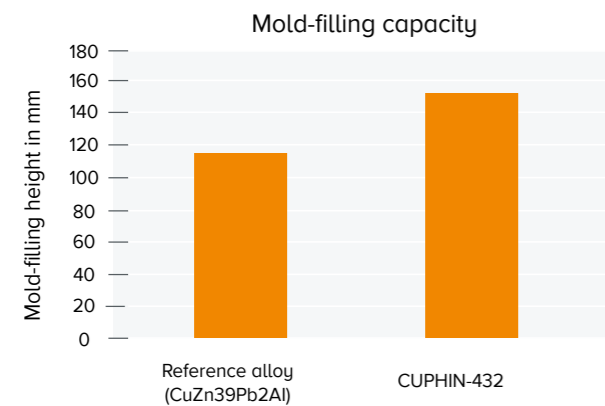


Reference Alloy (CuZn39Pb2Al)  
Fluidity length: 535 mm



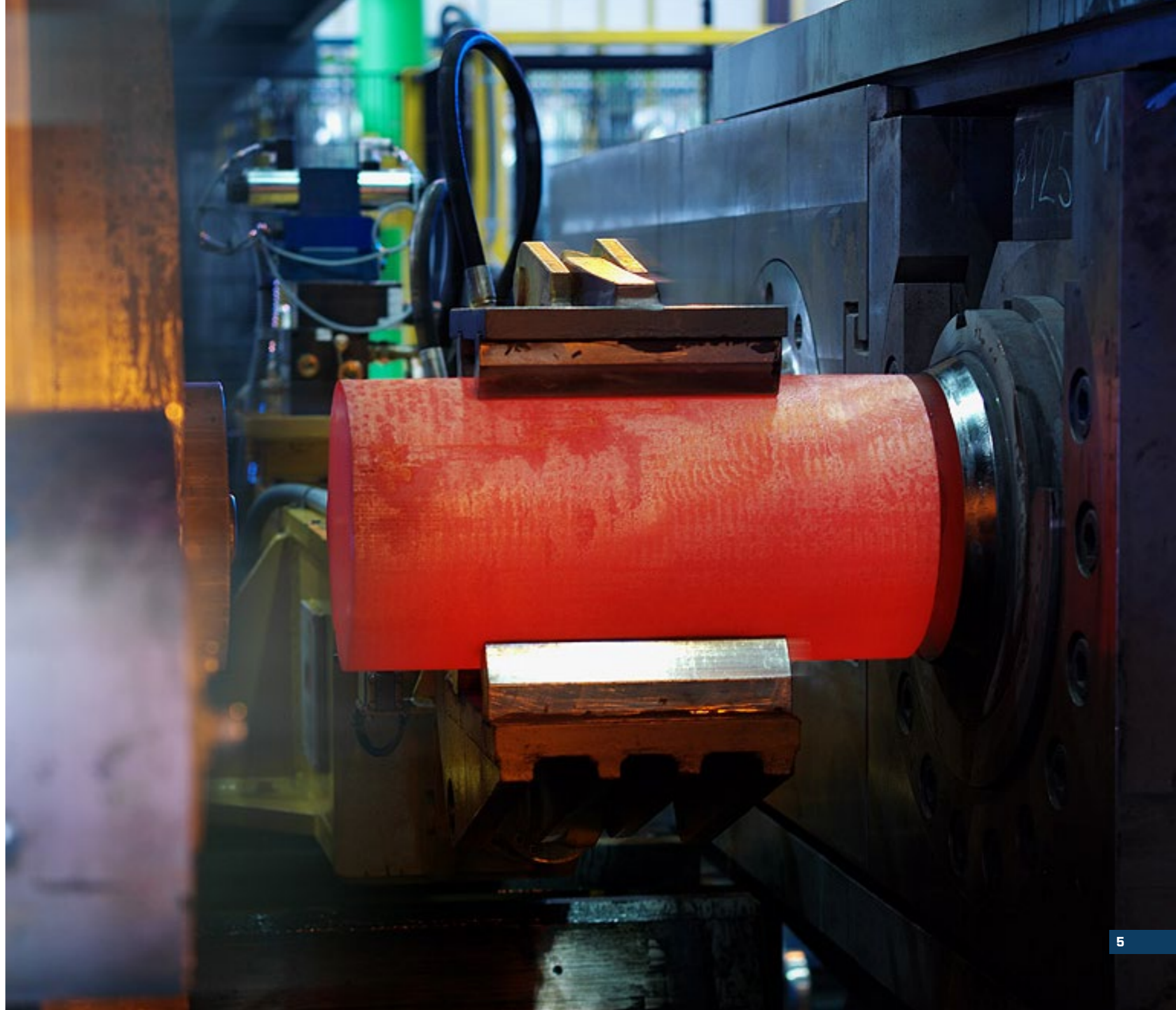
CUPHIN-432  
Fluidity length: 582 mm

### Mold-Filling Capacity



### Corrosion Properties

The addition of a small amount of phosphorus ensures dezincification resistance in accordance with relevant standards.





# PROCESSING PROPERTIES

Machinability	Drilling, turning, milling	very good
Surface treatment	Grinding + polishing	good
	Electroplating	good
Joining work	Inert gas / resistance welding / resistance welding	good
	Hard / soft soldering	very good
Heat treatment	Casting temperature	960 – 1050 °C
	Thermal stress relieving	200 – 300 °C
	Annealing treatment	550 °C / 2h

Based on the intended application, you can download all relevant specifications from our website. In our material specifications you will find a list of the physical, thermal, mechanical as well as resistance properties. If you have any questions on the materials and the processing thereof, please feel free to call our experts or send us your inquiry directly.

**Your Contact Partner:**

**Diehl Brass Solutions  
Stiftung & Co. KG**

Phone +49 911 5704-0  
Fax +49 911 5704-245  
Email: [dbs-sales@diehl.com](mailto:dbs-sales@diehl.com)

**[www.diehl.com/metall](http://www.diehl.com/metall)**