



**CUPHIN 2.0:**  
A PROVEN SOLUTION NOW  
EVEN BETTER

## **.CUPHIN SUCCESS STORY**

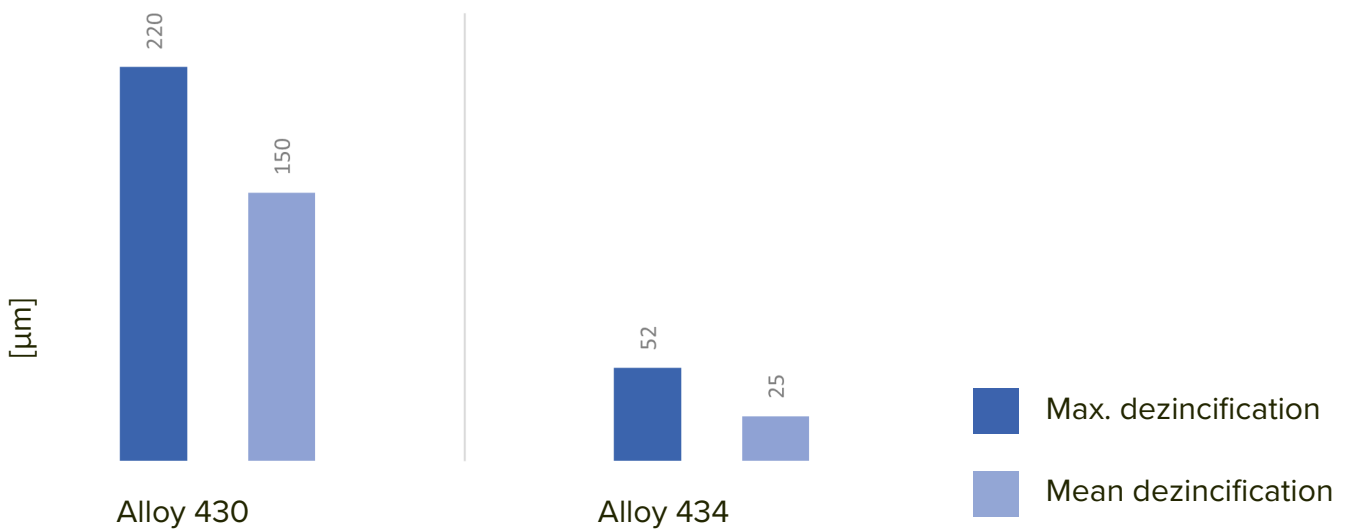
For more than 15 years now, Diehl Brass Solutions has been selling the special brass CW724R (Diehl alloy 430) under the brand name **CUPHIN**. Thanks to the use of phosphorous as an alloying element, the alloy consistently performs superbly in the standard ISO 6509 dezincification test. In addition, **CUPHIN** complies with the specifications of DIN 50916 regarding resistance to stress corrosion cracking.

Furthermore, the absence of lead means that it can be used in drinking water, also in terms of fulfilling hygienic requirements. Accordingly, CW724R has been on the 4MS Positive list of compositions for metallic materials in drinking water for many years. And even without lead, **CUPHIN** still manages to retain its excellent machining properties and increased strength thanks to the addition of silicon as an alloying element. Millions of installed fittings stand testimony to the **CUPHIN** success story.



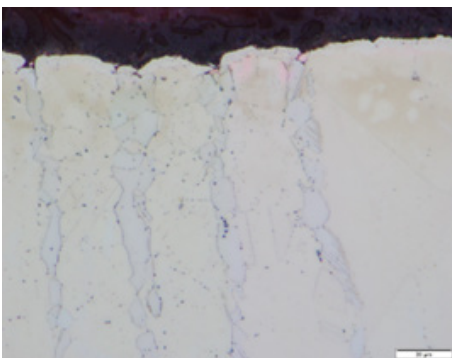
## CUPHIN 2.0

Within the framework of our continuous improvement process across the entire product portfolio and following extensive development work as well as aging, corrosion, and production tests at Diehl Brass Solutions, we can now present alloy 434, the new variant of the standardized material CW724R, with a patent pending under the number EP 3 985 136 A1. By reducing the silicon content and adding aluminum and tin, the strength is reduced and the corrosion properties are further improved under the very special conditions investigated. Figure 1 shows the results of an aging trial based on the standardized DIN EN 15664-1:2008 test, but under special conditions, namely at a temperature of 60°C, with continuous circulation, and with a water hardness of 15°dH:

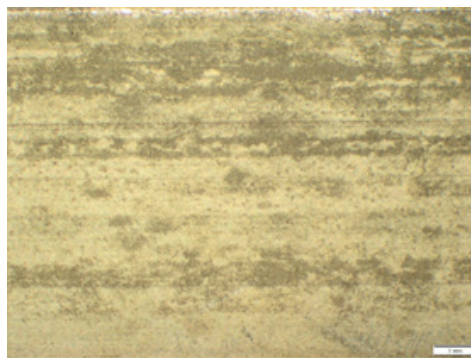


**Figure 1:** Aging trial based on the standardized DIN EN 15664-1:2008 test, but under special conditions, namely at a temperature of 60°C, with continuous circulation, and with a water hardness of 15°dH.

And, of course, the material also continues to pass the standard dezincification test according to ISO 6509 as well as the standard stress corrosion cracking test according to ISO 6957 at pH 10.5:



**Figure 2:** Standard dezincification test according to ISO 6509: maximum dezincification here lies at 14 µm



**Figure 3:** Standard stress corrosion cracking test according to ISO 6957 at pH 10.5: no cracks

Table 1 shows the reference values of the new chemical composition of alloy 434, which still falls within the standard of the alloy CW724R and therefore fully complies with the 4MS Positive List for use in drinking water.

Composition (mass percentage, reference values)					
Cu	Si	P	Sn	Al	Zn
76	2.8	0.05	0.2	0.04	remainder

Table 2 shows the mechanical properties of alloy 434 compared to alloy 430. A reduction in the basic strength was achieved by adjusting the chemical composition. The high strength values of alloy 430 are only required extremely rarely in sanitary installations.

Comparative Guidelines for Mechanical Properties		
	Alloy 430	Alloy 434
Tensile strength $R_m$ (MPa)	700	550
Yield strength $R_{p0.2}$ (MPa)	480	320
Elongation A (%)	20	40
Hardness $\frac{1}{2}$ radius HBW 62.5/2.5	180	150

External machining tests continue to show excellent machining behavior, good cold formability, and very good hot formability.

Processing properties	
Machinability [%] (CuZn39Pb3 = 100%)	80
Cold formability	good
Warm formability	very good (700-750 °C)
Annealing	550-700°C
Thermal relaxation	200-300°C

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#### RISK DISCLOSURE

The tests took place under the test conditions mentioned here. In these tests, selected properties of the alloy can be investigated. The test results are based on the test setup shown, which has specific laboratory conditions. Deviating conditions in the field may have significant effects. Aspects which play a decisive role include, in particular, but not exhaustively, the design of the components, the further processing of the alloy, the processing of the finished parts made with the alloy, transport and storage, the manner and location of use, the installation and the installation situation.

When it comes to properties, the corrosion resistance of the material is a key factor. The DIN standard DIN EN ISO 8044 (formerly DIN 50900) defines corrosion as a reaction of a metallic material with its environment that causes a measurable change in the material and can impair the function of a metal component or an entire system. From a technical point of view, corrosion is a reaction of a material with its environment that causes a measurable change in the material. Corrosion can impair the function of a component or system. Corrosion, as a complex system of interactions, depends on a large number of factors which, in their multifactoriality, cannot be fully reproduced under test conditions. The type of corrosion known as dezincification, which occurs with zinc-containing copper alloys that are in contact with drinking water, is familiar to the broad expert public.

The purchaser of the alloy is responsible for determining and testing the design, further processing, application areas of products made from the alloy, and any other relevant factors. This is also applicable when determining the dezincification depth that is considered reasonable for the selected area of application. Diehl cannot accept any liability for this, but solely for the information contained in the enclosed product data sheet.



## **.WHAT DOES THIS MEAN FOR YOU?**

From **March 1, 2024**, alloy 434 will take the place of alloy 430. Once the existing stocks have been exhausted, only alloy 434 will still be available. Of course, you can already order alloy 434 today on customer request.

This will involve no additional costs for you. A segregation of chips of alloy 430 and 434 is not needed in order to make it as easy as possible for you as our customer. However, we can only produce alloy 434 from mixed chips of alloy 430 and 434.

In addition, there are no changes in terms of drinking water approval, as the material continues to be manufactured in accordance with the standard for CW724R and is therefore on the 4MS Positive List. At the same time, you benefit from the enhanced corrosion properties.



**IF YOU HAVE QUESTIONS ABOUT THE MATERIALS AND THEIR PROCESSING, CALL OUR EXPERTS OR DIRECTLY SEND US YOUR INQUIRY:**

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