

**DIEHL**  
Brass Solutions

# THE NEW STANDARD

**.ecological**  
**.zero lead**

**.easy to machine**  
**.economical**

# THE NEW STANDARD

**eZeebrass** – the innovative lead-free standard brass sets new standards and meets tomorrow's regulatory requirements today!

Thanks to its optimized composition, **eZeebrass** meets the most stringent demands in terms of machinability and processing, even with its low copper content. And it's lead-free, too.

**It's eZee!**

A newly developed chip-breaking mechanism means that **eZeebrass** produces short chips that can be handled in an automated manner in machining and processing operations. As a result, **eZeebrass** delivers top quality results, not only ecologically but also economically.

**eZeebrass – THE NEW STANDARD.**

**On the way to a lead-free future!**

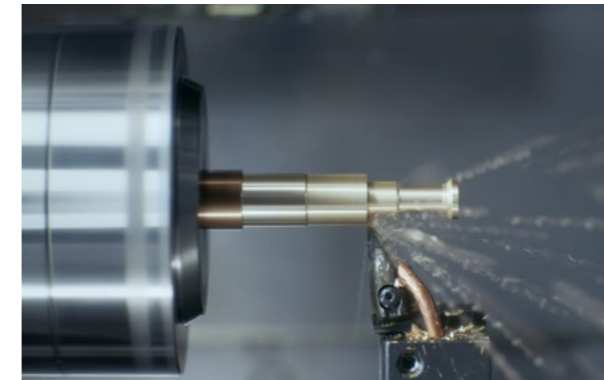
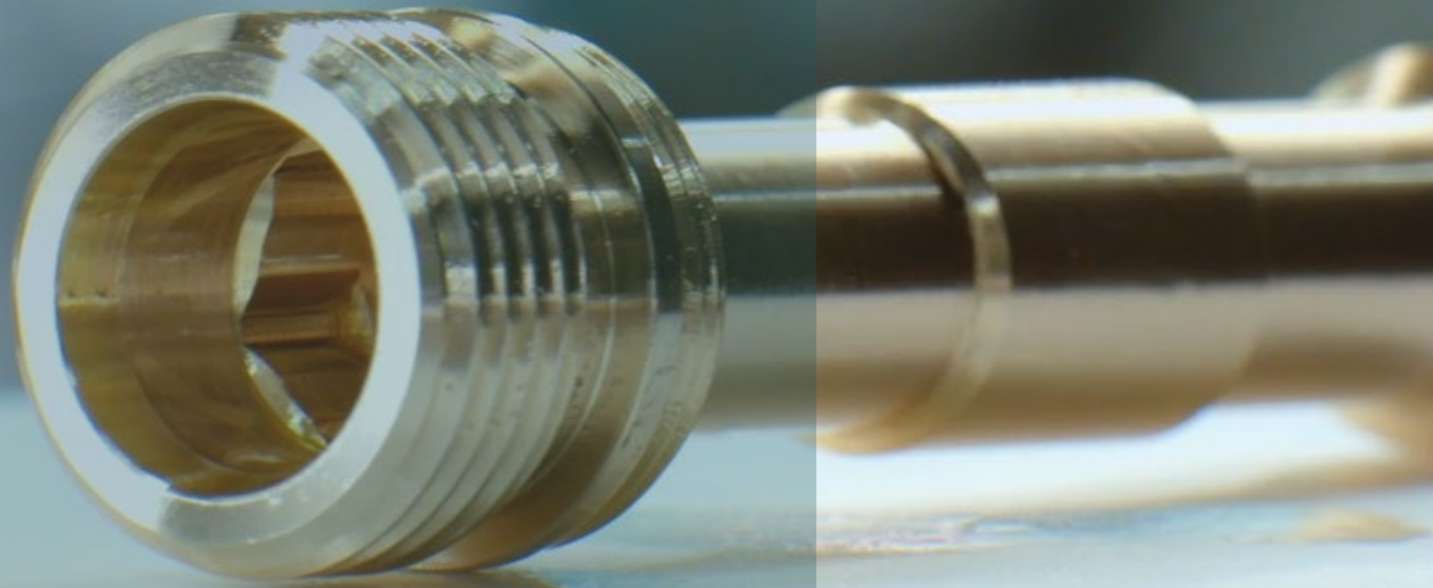


# MATERIAL AND PROPERTIES

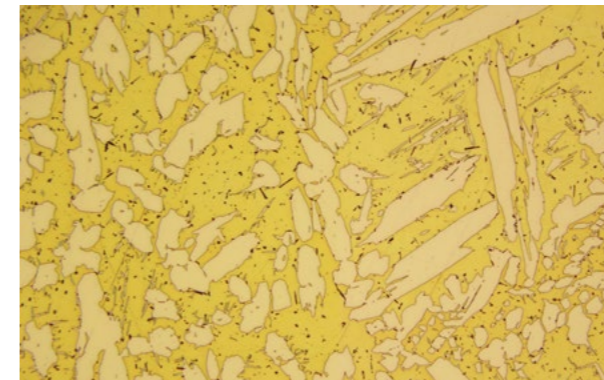
When developing the new material, the key premise was to transfer the proven properties of the existing brass alloys (e.g., CW614N and CW617N) to the lead-free world – both in terms of application-oriented material parameters as well as production-related processing properties. The result of these efforts is **eZeebrass**, the new standard for lead-free brass alloys. The alloy consists of around 58% copper, 41% zinc, and approx. 0.4% magnesium.

What's NEW with **eZeebrass**? The innovation here is the addition of **magnesium**, which although small in amount nevertheless has a great metallurgical impact, achieving the chip-breaking effect previously performed by lead in standard brasses. This combination of magnesium and copper produces a short-breaking chip even at the highest cutting speeds.

With a microstructure that corresponds to known (lead-containing) standard brasses, **eZeebrass** therefore represents **the new standard** for all common, fully automated machining processes.



Finishing



Typical microstructure of alpha and beta solid solution and homogeneously distributed  $\text{Cu}_2\text{Mg}$  precipitates



Roughing

## Chemical Properties

Composition (mass percentage, reference values)				
	Cu	Mg	Pb	Zn
<b>CW614N</b>	58	-	3.0	Remainder
<b>eZeebrass</b>	58	0.4	<0.1	Remainder



Drilling

# NEW MATERIAL – KNOWN PROPERTY PROFILE

As is customary for standard brass materials, the mechanical properties of eZeebrass are adjusted by the cold forming process of drawing. Compared to the CW614N / CW617N material group, **eZeebrass** demonstrates slightly higher strength and hardness.

However, both parameters can be adjusted to the specific application by adapting the degree of cold forming during the production of the semi-finished product and by means of suitable heat treatment within the range of the usual standard specifications.

The physical properties can be found in the table on the right. With its property profile, **eZeebrass** can cover the common application spectrum of the CW614N / CW617 N material group.

Magnesium is a very light element. In addition, eZeebrass also requires no lead. This results in the density advantage of **eZeebrass** over CW614N. This density advantage means that components with the same geometry weigh less when produced from **eZeebrass**. In addition, more components can be produced per ton of semi-finished product, resulting in greater material efficiency.

Also in terms of corrosion properties, **eZeebrass** is comparable to the CW614N / CW617N material group. **eZeebrass** is non-dezincification resistant according to ISO 6509; the stress corrosion cracking test according to ISO 6957 is passed if the material hardness is set accordingly.

## Mechanical Properties

**Mechanical Properties:**  
(reference values for rods of approx. 20 mm in diameter)

Tensile strength $R_m$ [in MPa]	600
Yield strength $R_{p0.2}$ [in MPa]	450
Elongation A5 [in %]	12
Brinell hardness	160

## Physical Properties

**Physical Properties**  
(reference values)

	CW614N	eZeebrass
Density [g/cm <sup>3</sup> ]	8.5	8.2
Electrical conductivity [MS/m]	15.70	14.60
Specific electrical resistance [Ω mm <sup>2</sup> ]	0.064	0.068
Thermal conductivity* [W/mK]	113.0	104.6

\*Calculated via the Wiedemann-Franz law

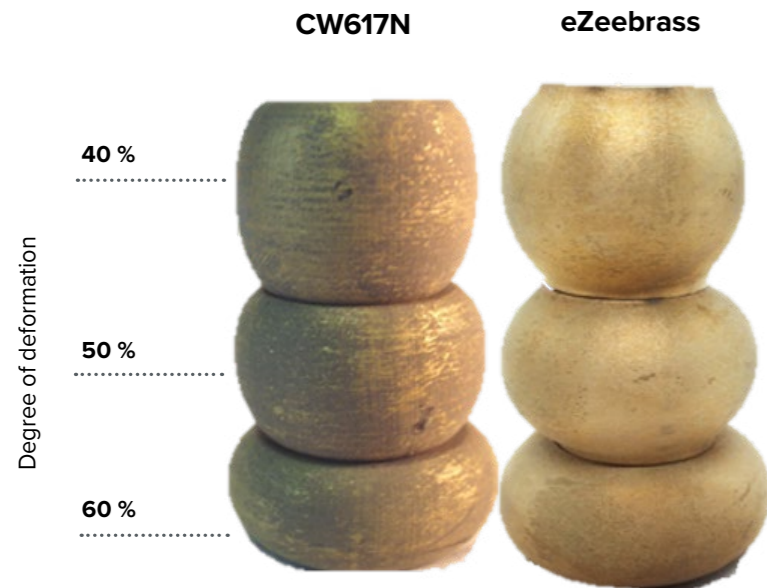
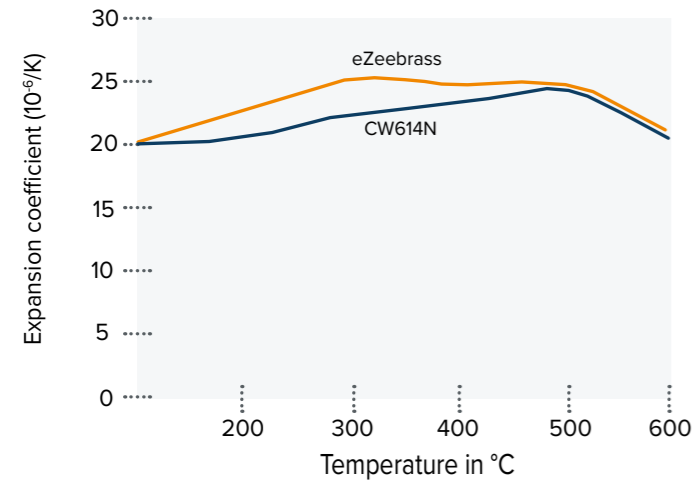
### Risk Disclosure

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.

You can also find the information [here](#) on our website.



# HOT FORMING

Another advantage of **eZeebrass**, in addition to its excellent machinability, is its very good hot formability. This means that **eZeebrass** can also be used in forging applications as a lead-free substitute for the established material CW617N.

The decisive factors here are the  $\beta$ -phase content in the microstructure, the very good die-filling properties, and the crack-free forming of flash at moderate forming forces. Depending on the component size and geometric complexity, suitable forging temperatures lie in the range of 700°C - 750°C.

If the forging billets produced are reworked by means of machining, component manufacturers benefit directly from the excellent machinability of **eZeebrass**.

The thermal expansion coefficient of **eZeebrass** is similar to that of CW614N in the application-relevant temperature range. Taking the thermal elongation of a component into account will only lead to minor adjustments in the component geometry.



# ECOLOGICAL ASPECTS

As a typical copper material, eZeebrass conserves our scarce resources. In addition, **eZeebrass** can be fully recycled, as an excellent recycling system already exists. Not only does recycling conserve raw materials, but it also helps to save energy. This is because recycling copper eliminates the energy input associated with ore mining, preparation, and transportation to the processing sites. For example, the energy required to melt down the scrap material is only a fraction of that required to extract the metal from ore.

As a result, eZeebrass has a favorable energy balance for copper materials.

## **Support us!**

Contribute to the positive energy balance of eZeebrass. Keep this material unmixed and separated at every stage of the recycling system (from extraction to raw material recovery).

## **For the sake of the environment!**

# OUR EXPERTS ARE THERE FOR YOU

You can download all specifications for the desired application from our website. In our material data sheets, you will find a list of the physical, thermal, mechanical, and resistance properties.

If you have any questions about the materials and the processing thereof, please call our experts or send us your inquiry directly.

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