

A futuristic, sleek car is shown from a low angle, driving on a winding asphalt road that stretches into the distance. The scene is set at sunset or sunrise, with a warm, golden glow from the low sun on the horizon. The sky is a mix of soft pinks, oranges, and yellows. The landscape is arid, with several saguaro cacti and small, dark shrubs scattered along the roadside. The car's design is modern and aerodynamic, with a prominent wheel visible in the foreground. The overall mood is one of advanced technology and exploration in a vast, open environment.

DIEHL
Brass Solutions

**BRASS – DEVELOPED
FOR MOBILITY**

HIGH-PERFORMANCE BRASSES FOR THE AUTOMOTIVE INDUSTRY

As a material, brass offers outstanding properties in terms of strength and electrical conductivity, thus forming the basis for many applications in the automotive industry.

To meet the requirements of the automotive industry, we offer a dedicated range of special brasses under the alloy group **BMOTION**. These include our lead-free materials of the alloy group **TEC.PURE** such as **Diehl 474 HT**, **Diehl 475 HT**, **Diehl 468** as well as **Diehl 459**. These alloys meet the requirements of the EU directives for end-of-life vehicles and electronic scrap.

TEC.PURE

Swash plate

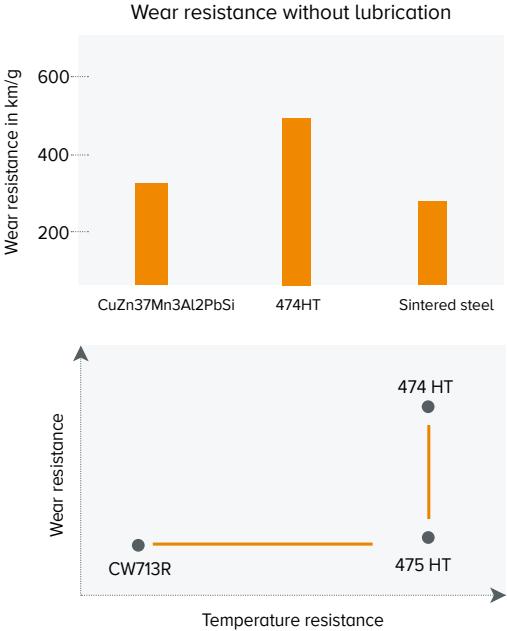
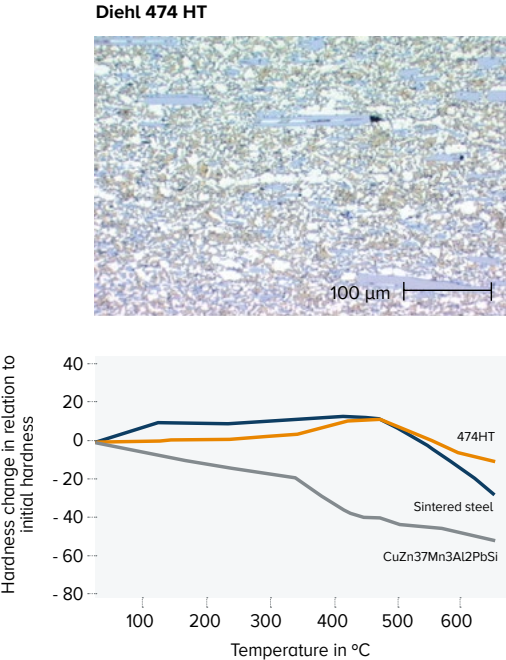


Wear Resistance

By adding appropriate elements such as aluminum, manganese, iron, silicon, nickel or tin, the material properties of brass can be modified effectively. These additions affect the microstructure of our special brasses, enabling an increase in the strength or hardness of the alloy, for instance. Furthermore, they form intermetallic phases which are embedded into the material matrix as hard microstructural constituents and which increase wear resistance.



Valve guide



Strength

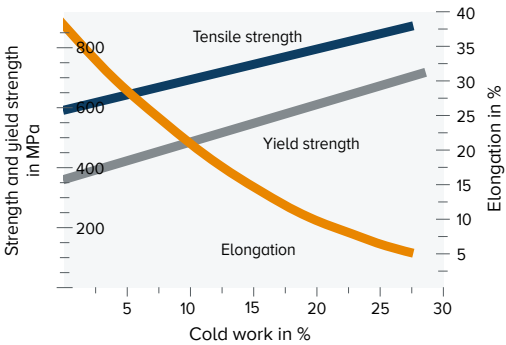
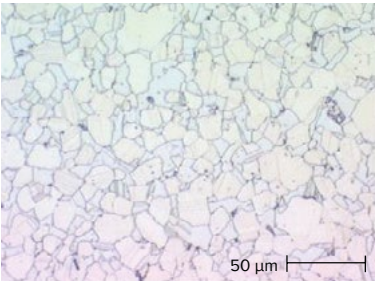
Our lead-free special brass **Diehl 430 PbF** is characterized by exceptional properties. The high strength combined with high elongation is otherwise only known from some steel grades. Besides its remarkable strength, this alloy is also characterized by excellent corrosion resistance.

Both at room temperature as well as at elevated temperatures, **Diehl 430 PbF** is superior to the stainless steel 1.4305 in sodium chloride solution (NaCl), sodium hydroxide (NaOH), hydrochloric acid (HCl) and sulfuric acid (H2SO4). Due to fact that **Diehl 430 PbF** is easy to machine, efficiency advantages can be achieved in comparison to machining the free-cutting steel 1.4305.

Mechanical Properties

Mechanical Properties: (reference values apply to rods with a diameter of approx. 20 mm)		
	Diehl 430 PbF	1.4305 (stainless steel)
Tensile strength R _m	min. 580 – 670 MPa	min. 500 – 700 MPa
Yield strength R _{0.2}	min. 350 – 430 MPa	min. 190 MPa
Elongation A5	min. 10 – 8%	min. 35%
Young's modulus	106 GPa	200 GPa
Brinell hardness		min. 150 HB

Diehl 474 HT



Power Transmission

In addition to wear-resistant and high-strength alloys, lead-free connector materials offer another line of automotive applications. The trend toward electrified components and vehicles is increasing the need for specific solutions to transmit power. Our forward-looking answer: innovative materials based on CuZn38 and CuZn42 that are not only application-oriented, but also designed to meet production requirements.

By appropriately selecting from the alloys mentioned, lead-free materials can also be positioned effectively to meet application-specific requirements in the face of the following competing demands:

- **Machinability**
- **Workability**
- **Conductivity**
- **Strength**

In this way, it is possible to master even challenging requirement scenarios using established production processes such as crimping.

AUTOMOTIVE APPLICATIONS

Combustion Engines:

- Valve guides
- Bearing bushes

Turbochargers:

- Radial bearings
- Axial bearings

Braking Systems:

- ABS systems
- Connectors
- Mounts for hoses

E-Mobility and Electronics:

- Connectors
- Power supply
- Battery clamps

Transmissions:

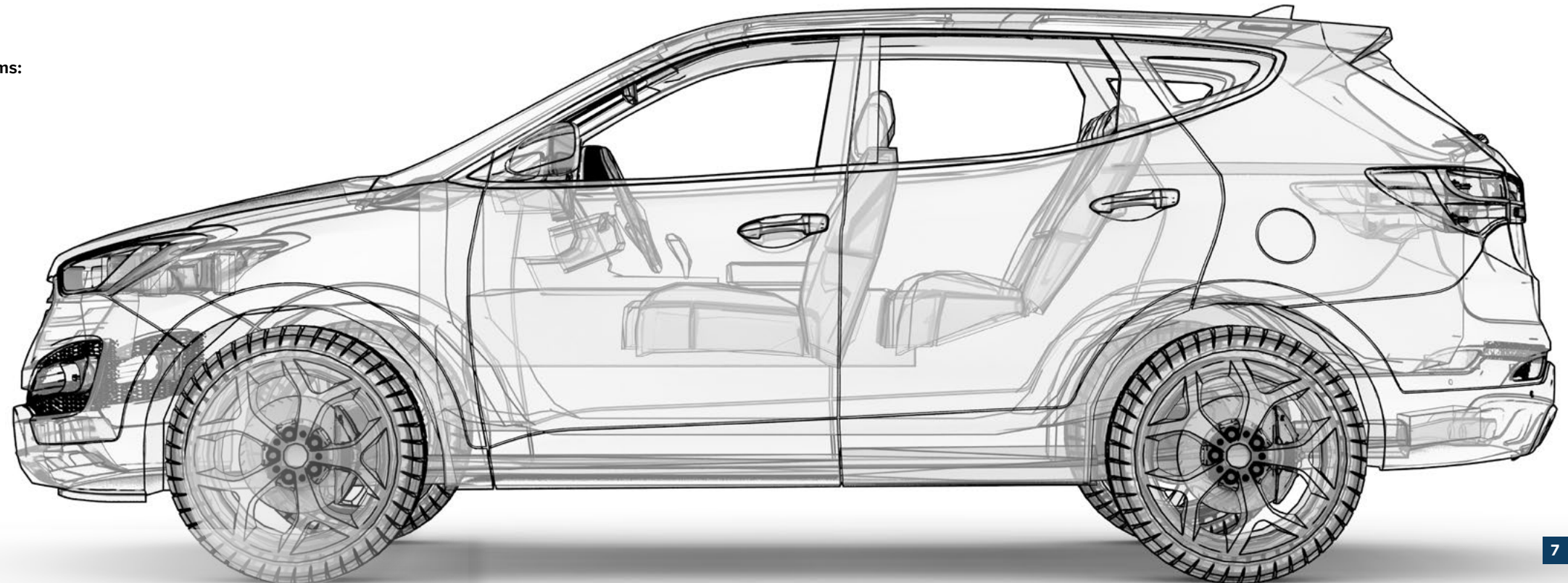
- Synchronizer rings
- Shift forks

Air Conditioning Systems:

- Swash plates

TECHNICAL SUPPORT

We see ourselves as a development partner and problem solver. Therefore, our material research center develops and optimizes alloys according to customer requirements. Particularly in the field of hybrid and electromobility, innovative applications often require specific material solutions. Our experts would be happy to provide advice and support regarding suitable materials for the task at hand.



BRASS ALLOYS

Selection

Diehl Alloys	Composition (mass percentage, reference values)										Standards and Material Abbreviations		
	Cu	Al	Mn	Si	Fe	Pb	Ni	Cr	Sn	P	Material	EN No.	CDA
356	58.5	2.0	2.5	1.1	0.2	-	-	-	-	-	CuZn36Mn3Al2Si1	-	C67400
357	59.4	1.7	2.3	0.7	-	0.5	-	-	-	-	CuZn36Mn3Al2SiPb	-	C67400
358	57.0	1.0	1.5	0.5	0.5	0.5	-	-	-	-	CuZn39Mn2Al1FePbSi	-	-
362	61.0	-	2.8	1.0	-	0.2	-	-	-	-	CuZn36Mn3Si1	-	C66800
430 PbF	76.0	-	-	3.0	-	-	-	-	-	0.05	CuZn21Si3P	CW724R	C69300
451	58.5	-	0.6	-	-	1.7	-	-	-	-	CuZn40Mn1Pb1	CW720R	-
452	58.5	1.6	2.0	0.8	0.5	0.4	-	-	0.3	-	CuZn37Mn3Al2PbSi	CW713R	-
454	59.0	1.5	1.8	0.4	-	0.5	-	-	-	-	CuZn37Mn3Al2PbSi	CW713R	-
455	58.0	1.5	1.6	0.6	0.7	0.5	-	-	0.4	-	CuZn36Mn2Al1FePbSiSn	-	-
458	57.9	1.7	2.0	0.6	0.4	0.6	≤ 0.5	-	-	-	CuZn37Mn3Al2PbSi	CW713R	-
459*	57.9	1.7	2.0	0.6	0.4	< 0.1	-	-	-	-	CuZn37Mn3Al2Si	-	-
460	58.5	1.0	2.0	-	-	0.7	2.5	-	-	-	CuZn35Ni3Mn2AlPb	CW710R	-
466	65.0	6.0	4.0	-	3.0	0.5	-	-	-	-	CuZn23Al6Mn4Fe3Pb	CW704R	C67000
468*	67.0	-	-	1.0	-	< 0.1	-	-	-	-	CuZn31Si1	CW708R	-
469	67.0	-	-	1.0	-	0.2	-	-	-	-	CuZn31Si1	CW708R	-
470 HT	70.0	5.0	8.0	2.0	1.0	0.8	-	-	-	-	CuZn13Mn8Al5Si2Fe1Pb	-	-
471	61.0	2.5	3.5	0.6	0.5	-	0.8	-	-	-	CuZn32Mn3Al2Ni1SiFe	-	-
474 HT*	70.5	5.2	8.0	1.8	1.1	< 0.1	-	-	-	-	CuZn14Mn8Al5Si2Fe1	-	-
475 HT*	63.5	1.6	3.0	1.0	0.5	< 0.1	0.6	-	-	-	CuZn30Mn3Al2SiNiFe	-	-
479	62.2	3.1	3.1	1.1	-	-	0.4	0.1	-	-	CuZn30Mn3Al3Si1NiCr	-	-
488	55.0	3.8	-	2.3	0.7	-	7.0	-	-	-	CuZn32Ni7Al4Si2Fe	-	-
489	66.0	5.0	8.0	2.0	1.0	0.5	-	-	-	-	CuZn18Mn8Al5Si2Fe1Pb	-	-
490	46.0	0.2	-	4.0	-	0.5	14.0	-	-	-	CuZn35Ni14Si4Pb	-	-





WE DRIVE METAL.

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

www.diehl.com/metall