

DIEHL 470 HT & 474 HT – HIGH-PERFORMANCE BRASS

BRASS WITH HIGH-PERFORMANCE PROPERTIES

> WEAR RESISTANCE - WITHOUT EXPENSIVE COATINGS

- DRY-RUNNING PROPERTIES RELIABLE FUNCTIONALITY
- HIGH TEMPERATURE RESISTANCE

Diehl 470 HT and **Diehl 474 HT** are specially developed high-performance brasses for use in engine and engineering applications.

Both of these special alloys are characterized by outstanding wear resistance and, under insufficient lubrication conditions, even exceed the good dry-running properties that standard brass is known for.

The high-temperature strength and softening behavior of **Diehl 470 HT** and **Diehl 474 HT** are far superior to those of standard brass alloys. At the same time, the proven advantages typical of brass are still retained, i.e.:

- good workability
- good machinability

The ever-increasing requirements of the automotive and engineering industry can be fulfilled using **Diehl 470 HT** and **Diehl 474 HT**, both in terms of design as well as production technology.

Future regulations and provisions of environmental legislation may render it necessary to use lead-free materials in components. Our lead-free alloy **Diehl 474 HT** already meets the requirements of the EU regulations for end-of-life vehicles and electrical scrap without recourse to exemptions.

MATERIAL AND PROPERTIES

Chemical Composition

Composition (mass percentage, reference values)				
	Diehl 470 HT	Diehl 474 HT		
Cu	70.0	70.1		
Mn	8.0	8.0		
Al	5.0	5.2		
Si	2.0	1.8		
Fe	1.0	1.1		
Pb	0.8	< 0.1		
Zn	remainder	remainder		



Valve guide Diehl 470 HT

Mechanical Reference Values

Mechanical Properties: (reference values for Diehl 470 HT and Diehl 474 HT, drawn and stress-relieved, 13.3 mm)				
Tensile strength $R_{_m}$	up to 620 MPa			
Yield strength $R_{_{p02}}$	up to 420 MPa			
Elongation A5	13%			
Brinell hardness	180 HB			

Physical Properties

Physical Properties		
Density	g/cm ³	7.7
Electrical conductivity	m/($\Omega \cdot mm^2$)	5.4
Thermal conductivity RT 200°C	W/(m ⋅ K) W/(m ⋅ K)	40.0 56.1
Young's modulus	GPa	126.0

Microstructure

The microstructure comprises a solid solution matrix of alpha and beta phases. The alpha phase can account for up to 80%. The hard intermetallic phases (Fe-Mn silicides) are the reason for the excellent wear resistance of **Diehl 470 HT** and **Diehl 474 HT**.

Diehl 474 HT



Wear Resistance

Some special brasses, such as CuZn37Mn3Al2PbSi, already meet stringent wear resistance requirements. **Diehl 470 HT** and **Diehl 474 HT** surpass this alloy not only under lubricated, but also under non-lubricated conditions.

Mechanical Properties

Diehl **470 HT** and **Diehl 474 HT** are special brass alloys with high-strength properties that are superior to those of standard brasses. They can thus potentially contribute to component weight reduction.



Softening

The increased temperatures in highly efficient engine concepts place enormous demands on the materials used. **Diehl 470 HT** and **Diehl 474 HT** do not show any signs of softening up to 400 °C due to minimal precipitation hardening effects and have a significantly improved high-temperature strength compared to other brass materials.



Bearing component



Wear resistance without lubrication



Our lead-free group of alloys, known as **TEC.PURE**, has been specially developed to meet the ever-increasing requirements of the automotive, mechanical engineering and electronics industries. These alloys are particularly suitable for applications that place very high demands on the wear resistance of materials.







PROCESSING PROPERTIES

Machinability (CuZn39Pb3 = 100%)	moderate machinability (index: 50)	
Cold workability		adequate
Hot workability		good
Surface treatment	Polishing properties	good
	Coating	good
Heat treatment	Thermal stress relieving	200 – 400 °C
	Soft annealing	550 – 700 °C

FORMS OF DELIVERY

Rods, round	10 bis 85 mm
Profile (diameter of the circumscribed circle)	6 bis 70 mm
Rods, hollow (diameter x wall thickness)	30 – 120 x 5 – 15 mm

Other delivery forms available upon request

TECHNICAL SUPPORT

Diehl 470 HT and **Diehl 474 HT** can be used in a wide range of applications. We know from experience that a number of questions can arise in this context. Our experts would be happy to provide advice and support regarding suitable materials for the task at hand.



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

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