

Competency and Service from a Casting



MKB Metallguss GmbH

Allowing visions - Starting changes Mastering the future

MKB PRINCIPLE

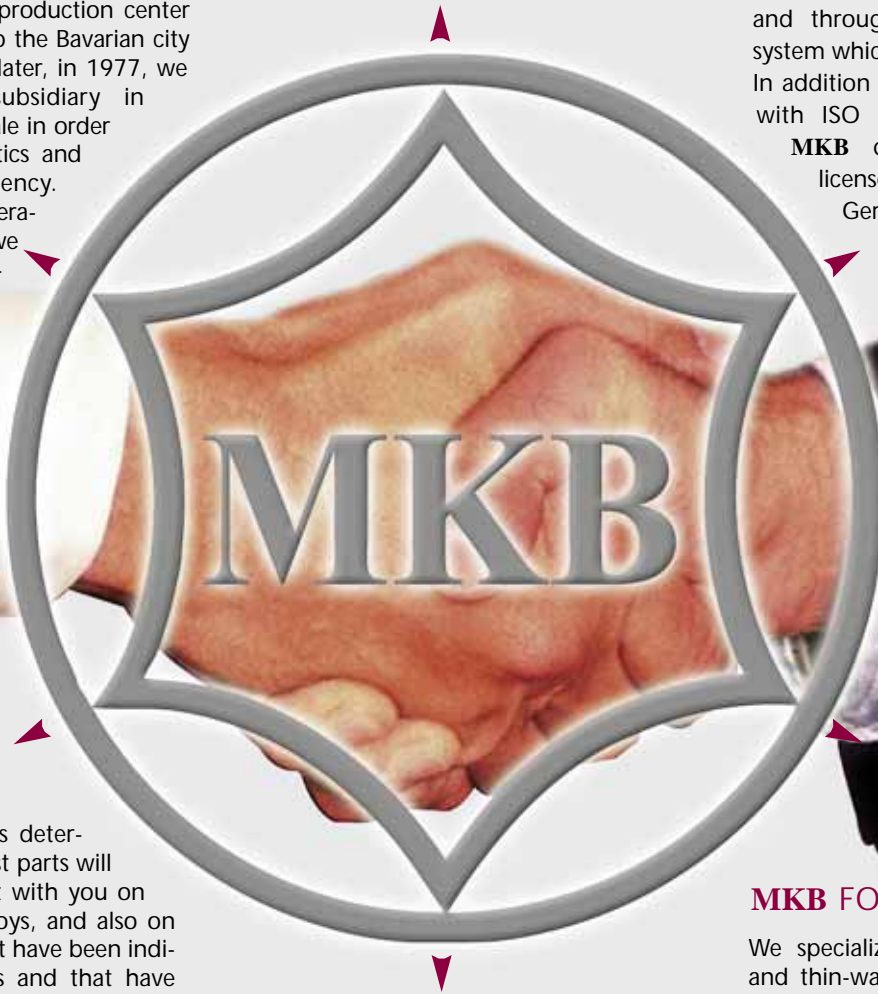
Our most important principle is to provide unrestricted customer information through competent and motivated employees in everyday business. This means processing batch orders, as well as individual customer wishes, with equal efficiency and simultaneously satisfying current environmental protection guidelines.

MKB TRADITION

Within the short time since being established in 1965 by the foundry engineer Willi Dehnhard, we have already done business with all of the renowned electric companies in Germany. The expansion that became necessary due to this success was taken into account with a modern production center with the move in 1970 to the Bavarian city of Eichstätt. A few years later, in 1977, we established a **MKB** subsidiary in Wülfershausen an der Saale in order to further improve logistics and our operational efficiency. Today, in the second generation of management, we are already one of the leaders in the international market for permanent mold casting of copper alloys and we are accepted throughout Europe as a recognized partner for quality cast parts with the most modern solution for services in the field of permanent mold casting.

MKB QUALITY

We account for the always complex, technical requirements through continual refinement of our processes and products, and through our quality management system which has proven itself since 1994. In addition to certification, in compliance with ISO 9001:2000, the recognized **MKB** quality is documented by licenses with Deutsche Bahn and German Lloyd.



MKB MATERIALS

The selection of materials determines if the use of the cast parts will be successful. We consult with you on the use of DIN or EN alloys, and also on the use of **MKB** alloys that have been individually developed by us and that have been optimized for extreme mechanical loads.

MKB FOUNDRY PROCESSES

We specialize in dimensionally accurate and thin-walled parts with close tolerances, high surface quality and the best contour reproduction. Here, our flexible permanent mold casting processes offer you the possibility of cost-effectively managing recurring batch sizes of small and medium batch quantities.

MKB CONSTRUCTION

During the creation of a new design, today's designer determines the effectiveness and quality of use. Here, the knowledge of production variants plays a deciding role. Use our competency and experience for the construction of foundry-ready molded parts.

MKB All-in-one-solution

1 CONSULTATION

We convert technical details for you into foundry-ready constructions and we present you with ways for an economical series production in the development phase.



2 MATERIALS

The mechanical requirements essentially determine the selection of materials. Through the use of standardized alloys and **MKB** alloys, many different technical details can be satisfied.



3 DIE CONSTRUCTION

Our efficient die construction takes the CAD data and determines the subsequent quality of the cast parts through the construction of tools.



4 RAW CASTINGS

For nearly all branches of industry, **MKB** permanent mold casting is a highly interesting alternative to the production of precision components. High surface quality, many different materials for widely diverse fields of application, and also extremely variable batch sizes are the advantages through which you profit.



5 PROCESSING

MKB cast parts are precision parts. Performing our own preparation and mechanical in-house processing gives us the necessary flexibility to produce small and medium batches economically.



6 SURFACE TREATMENT

We perform for you the subsequent surface treatment (finishing, galvanization, powder coating, or abrasive blasting process) of your components and thus your logistics path is optimized for time and cost.



7 ASSEMBLY

The reliable parts assembly and the packaging of your individual pieces in our factory complete our all-in-one solution for **MKB** permanent mold casting.



MKB cast parts - carrying power worldwide



Copper

carries electrical current with extremely low resistance, thus, for decades the electric industry has used the good properties of the highly conductive, pure copper material CuL50, also silver-plated, in a wide spectrum of applications.

Application examples: contact carriers, short-circuit rings, ground contacts, contact jaws, separation contacts, input contacts, rotary contacts, contact fingers, primary conductors

Copper-chrome alloys:

For additional requirements of hardness and strength, the age-hardened material alloyed with chrome, CuCr1-C or CuCrF35, is suitable for many uses. The resistance to wear and abrasion of the alloy is improved by a factor of 10 relative to pure copper due to the higher hardness. In addition, its resistance to deformation is significantly greater.

Application examples: support bodies, high-voltage switching parts, connection caps, counter contacts, electrode arms, impact contacts

Copper-Nickel-Silicon alloys or Copper-Zinc alloys:

If there are special requirements for the wear properties and the hardness in addition to the previously mentioned properties, then, for example, the alloy CuNi2Si can be used. The electrical conductivity for the application in question remains sufficient. Another material that is an economical variant is conductive brass.

Application examples: graphite brush holders, contact pins, terminal contacts, contact carriers

Further uses of permanent mold casting in electrical engineering include control elements in switch construction. Here, we can offer you special alloys with high mechanical load capacity.

Selection of significant materials for electrical engineering and power supply

MKB-designation	Material	Tensile strength R_m N/mm ² min.	Yield strength $R_{p0.2}$ N/mm ² min.	Elongation at break A_5 % min.	electrical conductivity m/Ω mm ² min.	special properties
C 100	GM-Cu-C *GK-Cu L50	150	40	25	55	high conductivity, good galvanic properties for silver-plating
C 250	GM-CuCr1-C *GK-CuCr F35	300	200	10	45	hardness, min. 95 HB good wear properties
C 300	*GK-CuNi2Si	460	360	12	20	hardness, min. 150 HB, good wear properties
SM 1730	conductive brass	440	130	20	18	hardness, min. 90 HB, economical variant

*earlier DIN designation

MKB cast parts - right at the top on the tracks

Extensive fields in railroad engineering, in particular in overhead-line technology, have been changing from traditional sand casting to permanent mold casting in recent years. The advantages relative to dimensional accuracy and surface quality speak for themselves and they permit an economical production, because mechanical processing can often be minimized.

Copper-Aluminum alloys:

In addition to high strength characteristics, which correspond to those of steels, this group of materials also exhibits outstanding resistance to corrosion, erosion, and cavitation. CuAl10Fe5Ni5-C or CuAl10Ni also possess good resistance to abrasion and good fatigue characteristics and thus they can be used for large static and dynamic loads.

Application examples: spacers, holding pistons, closing parts for doors, forked connections, contact line end terminals, locking plates, suspended-wire holders, clamping pieces

Copper-Zinc alloys or special brass:

As a unique silicon-containing copper-zinc alloy, which was already included in DIN 1709, the material CuZn16Si4-C (previously CuZn15Si4) is standardized in EN 1982. This material, which can be cast very well, exhibits outstanding resistance to corrosion in addition to favorable strength properties. This cost-effective variant is also often used because it has good machining and polishing characteristics.



Selection of significant materials for railroad engineering

MKB-designation	Material	Tensile strength R _m N/mm ² min.	Yield strength R _{p 0.2} N/mm ² min.	Elongation at break A ₅ % min.	Hardness HB min.	special properties
AMB 510	GM-CuAl10Fe5Ni5-C *GK-CuAl10Ni	650	280	7	150	good welding characteristics, good resistance to fatigue
AMB 1110	GM-CuAl10Fe2-C *GK-CuAl10Fe	600	250	20	130	good welding characteristics, good resistance to wear
SM 530	GM-CuZn34Mn3Al2Fe1-C *GK-CuZn34Al2	600	260	10	140	good wear properties
SM 1430	GM-CuZn16Si4-C *GK-CuZn15Si	500	300	8	130	good pressure tightness characteristics, extensive corrosion resistance

*earlier DIN designation



MKB cast parts - for the length of the machine life

Copper-Zinc alloys or special brass

Through targeted variation of the alloy elements and excellent casting technology, the desired mechanical properties for nearly every possible application can be achieved. The strength characteristics of some special brasses match and exceed the levels of typical steels. Also, to a large degree, these properties can be maintained up to high temperatures of approximately 300°C. Relative to many iron-cast materials, the nearly constant ductility of special brasses at low temperatures of up to 200°C has proven to be particularly advantageous. Here, the good slipping, bearing, and emergency-running properties of special brasses are also advantages.

Fields of use:

conveyance technology, general air engineering, machines for construction, textile machines, apparatus construction, elevators, machine tools, landscape engineering, power machines, compressed air/vacuum technology, paper technology, control technology, printing machines, robotics/automation, wood processing machines, mining machines

Application examples:

bevel gear segments, toothed gears and bevel gears, spiral rims, levers, spur gears, clutch members, switch housings, damping slots, insert borders, worms, drive wheels, mountings, closing levers, spring-force pieces



Selection of significant materials for machine and system construction

MKB-designation	Material	Tensile strength R_m N/mm ² min.	Yield strength $R_{p0.2}$ N/mm ² min.	Elongation at break A_5 % min.	Hardness HB min.	special properties
SM 530	GM-CuZn34Mn3Al2Fe1-C *GK-CuZn34Al2	600	260	10	140	good wear properties
SM 130	GM-CuZn37Al1-C *GK-CuZn37Al1	450	170	25	105	good polishing, coating and galvanizing characteristics
M 140	GM-CuZn38-C *GK-CuZn38Al	380	130	30	75	resistant to corrosion, relative to atmospheres, good welding properties
AMB 510	GM-CuAl10Fe5Ni5-C *GK-CuAl10Ni	650	280	7	150	good resistance to fatigue, good resistance to cavitation

*earlier DIN designation

MKB cast parts - providing gas and operating fluidly

Designers in pump construction and underwater technology prefer multi-component bronzes for their designs due to their extensive resistance to corrosion even in aggressive media, whether gas or fluid. In addition, designers know the value of high strength and resistance to fatigue. Special brasses are also used when other properties are important, such as, e.g., good machineability and possible galvanic coatings.

Copper-Aluminum alloys

The high-strength copper-aluminum cast alloys are suitable not only for static loads, but also for oscillating loads and they are characterized by good resistance to corrosion. In addition to resistance to sea water, this group of materials includes good characteristics for fatigue resistance.

Application examples: pump housings, propellers, suction caps, segment supports, control disks, pressure caps, step housings

Special brass resistant to dezincification

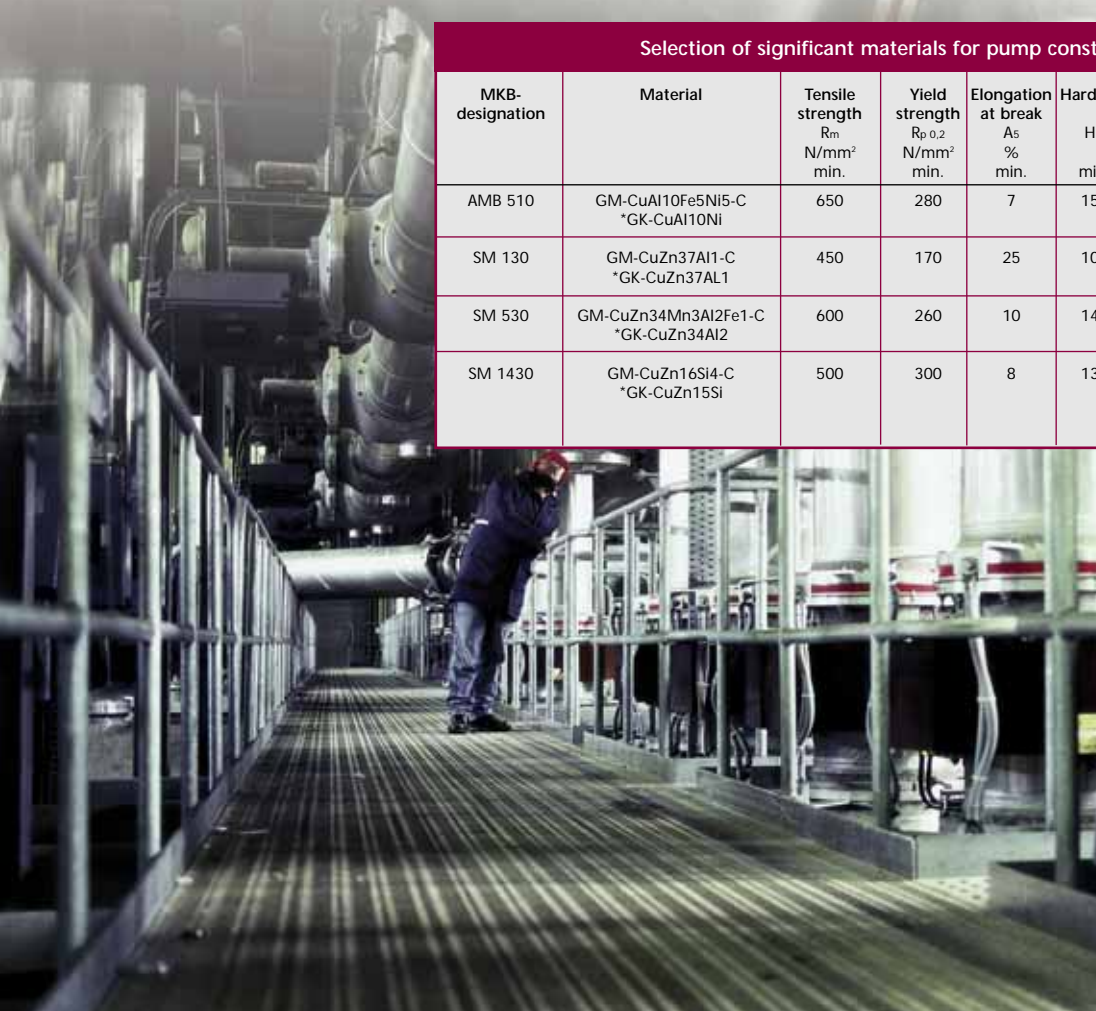
The silicon-containing copper-zinc alloy CuZn16Si4-C (previously CuZn15Si4) can be cast well and exhibits good resistance to corrosion and sea water. In addition, the resistance to dezincification ensures a long service life of the pump parts even in aggressive media.



Selection of significant materials for pump construction

MKB-designation	Material	Tensile strength R _m N/mm ² min.	Yield strength R _{p 0.2} N/mm ² min.	Elongation at break A ₅ % min.	Hardness HB min.	special properties
AMB 510	GM-CuAl10Fe5Ni5-C *GK-CuAl10Ni	650	280	7	150	good welding characteristics, good resistance to fatigue
SM 130	GM-CuZn37Al1-C *GK-CuZn37Al1	450	170	25	105	good polishing, coating, and galvanizing characteristics
SM 530	GM-CuZn34Mn3Al2Fe1-C *GK-CuZn34Al2	600	260	10	140	good wear properties
SM 1430	GM-CuZn16Si4-C *GK-CuZn15Si	500	300	8	130	high pressure tightness characteristics, extensive corrosion resistance and dezincification resistance

*earlier DIN designation



MKB-material standards



	Material designation	DIN standard	DIN material number	EN designation	EN material number	Tensile strength R_m N/mm ² min.	Yield strength $R_p 0.2$ N/mm ² min.	Elongation at break A_5 % min.	Hardness HB min.	electrical conductivity m/Ω mm ² min.
C 100	GK-Cu L50	17655	2.0058.02	Cu-C	CC040A	150	40	25	40	55
C 200	similar to GK-CuCrF35					320	190	8	100	38
C 250	GK-CuCrF35	17655	2.1292.92	CuCr1-C	CC140C	300	200	10	95	45
C 300	CuNi2Si					460	360	12	150	20
AMB 110	Special bronze					450	180	20	80	
AMB 210	GK-CuAl9Ni	1714	2.0970.02	CuAl10Ni3Fe2-C	CC 332G	600	250	20	130	
AMB 310	similar to GK-CuAl10Fe					600	250	25	110	
AMB 410	similar to GK-CuAl9Ni					610	270	25	120	
AMB 510	GK-CuAl10Ni	1714	2.0975.02	CuAl10Fe5Ni5-C	CC 333G	650	280	7	150	
AMB 610	GK-CuAl11Ni	1714	2.0980.02	CuAl11Fe6Ni6-C	CC 334G	750	380	5	185	
AMB 910	Special bronze					670	470	3	225	
AMB 1110	GK-CuAl10Fe	1714	2.0940.02	CuAl10Fe2-C	CC 331G	600	250	20	130	
SM 130	GK-CuZn37Al1	1709	2.0595.02	CuZn37Al1-C	CC 766S	450	170	25	105	
SM 330	Special brass					550	240	24	100	
SM 430	GK-CuZn35Al1	1709	2.0592.02	CuZn35Mn2Al1Fe1-C	CC 765S	475	200	18	110	
SM 530	GK-CuZn34Al2	1709	2.0596.02	CuZn34Mn3Al2Fe1-C	CC 764S	600	260	10	140	
SM 830	Bearing brass					300	190	9	80	
SM 1430	GK-CuZn15Si4	1709	2.0492.02	CuZn16Si4-C	CC 761S	500	300	8	130	
SM 1730	Conductive brass					440	130	20	90	18
M 140	GK-CuZn38Al	1709	2.0591.02	CuZn38Al-C	CC 767S	380	130	30	75	
M 340	similar to GK-CuZn37Pb					350	120	40	70	

= MKB proprietary alloy

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