

KOLBENSCHMIDT PIERBURG GROUP



KS X20

High-load Capacity, Lead-free
Steel/Brass Composite for
Conrod Bushes



GLEITLAGER

Brief description of the sliding material

KS X20 is a running surface material for conrod bushes in engines subject to high load. This lead-free steel/brass composite features excellent load capacity, high resistance to wear and good resistance to corrosion.

The material does not contain lead and complies with the requirements of EU Directive 2000/53/EC on End-of-Life Vehicles.

Bearing structure

The plain bearing composite consists of a steel back and a brass layer cast on as bearing material.

Grade DC04 is used for the steel back. The steel back hardness is between 140HB and 220 HB, depending on the rolling reduction degree. Typical steel thicknesses range from 0.7 mm and 2.5 mm, the steel thickness of 0.7 mm being accomplished by means of several rolling and heat treatment steps.

The brass alloy used as bearing metal has a layer thickness of between 0.2 mm and 0.5 mm in the finished bearing. The bearing metal coat reaches a hardness of between 120HB and 180HB.

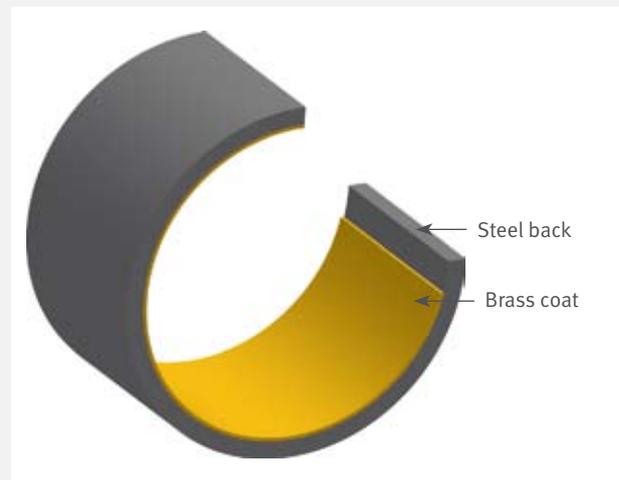
Load capacity

KS X20 has been designed as a material for conrod bushes. Load in the small-end conrod eye of a combustion engine is extremely high and may reach values of up to 160 MPa and even more. The admissible specific load of the material must meet these requirements.

The diagram below shows the specific load capacity in comparison with other materials.



Micrograph of the composite

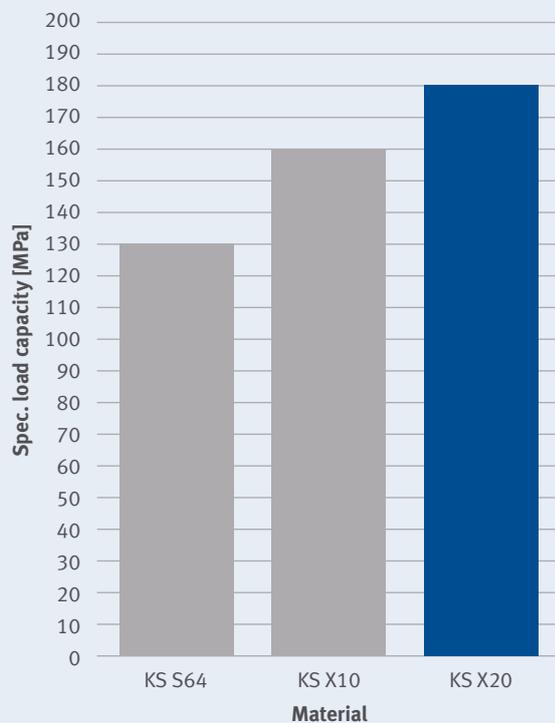


Layer system: steel / brass

Chemical composition of the brass layer

mass-%		
	Cu	rest
	Al	1.7 to 2.3 %
	Mn	1.7 to 2.3 %
	Fe	0.7 to 2.3 %
	Ni	1.7 to 2.3 %
	Zn	18 to 22 %
	others combined	max. 0.50 %

Comparison of the specific load capacity



■ **KS S64:** St/CuPb10Sn10

■ **KS X10:** St/CuZn31Si

■ **KS X20:** St/CuZn20Al2Mn2Ni2Fe

Manufacture of the sliding material

First of all, brass alloy is cast onto a steel carrier. Next, the casting scale is removed by milling. Then the required material characteristics are adjusted by applying selective thermo-mechanical treatment measures.

Bushing manufacture

Bearing bushes are produced from KS X20 strip by cutting, punching, rolling and calibration. The bearing bushes can be manufactured with straight butt joint and smooth-rolled steel back as well as with clinched joint and ground steel back.

Corrosion-proofing

The typical corrosion protection consists of a 1 µm–3 µm thick Sn coat. As an alternative, the steel back can also be oiled.

Application

Conrod bushes of KS X20 excel by extremely high load bearing capacity combined with high resistance to wear. The corrosion resistance to hot engine oils is likewise good. These materials are therefore well suited for application in combustion engines subject to high load.

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