

GL21 – Corrosion/wear-resistant material for the pump industry

Kuhn Special Steel is a world-class supplier of high-quality products made of stainless steel.

Ever since 1960, the company has been producing centrifugal castings and rotationally-symmetric individual components, both in short production-runs and as ready-to-use end-products based on drawings (see fig. 1). The Kuhn Special Steel Company stands for top quality, maximum flexibility, outstanding reliability and the power of innovation.



Fig. 1: Schematic representation of the centrifugal-casting process.

Fig. 1 gives a schematic representation of the centrifugal-casting process. The molten metal is poured into the rotating mould. Centrifugal forces cause the lightweight elements of the molten metal (such as slag) to be driven inwards, while the heavier components are forced out towards the external perimeter of the mould. Once the resulting tube has solidified, further processing can begin.

Various different materials are currently used to produce pump-industry items such as rotating mechanical seals, shaft-end sleeves and bushings. Many of the components used in this area are subjected to a combination of corrosive and mechanical strain factors, along with normal wear and tear.

Numerous tests and trials have been carried out in an attempt to improve the load-bearing performance and wear-resistance of these materials, but with only moderate success to date. Any improvement in the wear characteristics of a material normally comes at the cost of degrading its performance in other areas, such as resistance to corrosion (and vice versa). Coated materials are often used, but their disadvantages can likewise come

to light under conditions of actual use: as soon as the coating starts to suffer local wear, the underlying material begins to corrode.

With this in mind, Kuhn Special Steel has created a special solution. We have developed, and are now marketing, **GL21** as part of an effort to lengthen the service life of these components. **GL21** is a material that manages to combine both toughness in the face of corrosion and excellent resistance to wear.



Fig. 3: Ferrite-carbide microstructure of GL21.

We are now receiving initial customer-feedback regarding the outstanding corrosion/wear-resistance of **GL21** in actual use (fig. 2). The chemical composition and typical hardness-readings of the materials **GL21**, **1.4138** and **1.4470** are summarised in table 1. Fig. 3 shows the ferrite-carbide microstructure of **GL21**, which is

Material	C	Cr	Ni	Mo	Hardness
1.4138	0.9–1.3	27.0–30.0	-	2.0–2.5	260–330 HB
GL21	1.8–2.3	33.0–35.0	Max. 0.5	2.0–2.5	37–44 HRC
1.4470	Max. 0.3	21.0–23.0	4.5–6.5	2.5–3.5	Max. 240 HB

Chemical analysis and hardness of materials 1.4138, GL21 and 1.4470.

the key to its outstanding wear- and corrosion-resistance.



Fig. 2: Shaft-protection sleeve; cast and manufactured by Kuhn Special Steel.