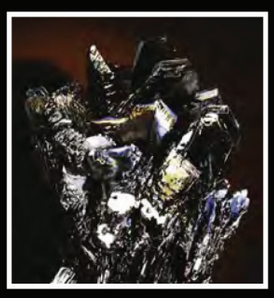
Carl Hamm

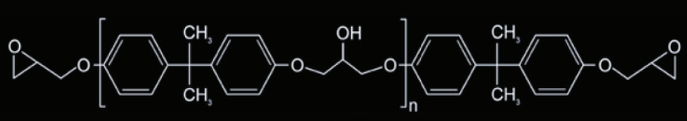
Pipes | Pumps | Solutions

SICcast®



Silicon carbide

+



Epoxy resin

=

Polished section scale 500:1

SICcast®

1. Bonding Agent
2. Bonding Agent that has penetrated into a SiC grain
3. ground, polished SiC grain

SICcast® the Company

Established in the mid-nineties, SICcast® **is growing together with our customers.**

Started with the casting of several pump parts for the MC series and afterwards for the MCC series of affiliated company **DÜCHTING** pumps.

The important key feature of the material is the simultaneous resistance against corrosion and abrasion. **SIC**cast® materials are designed for this phenomenon of erosive corrosion. On the basis of the hardness of silicon carbide, 9.7 on the Mohs' scale (hardness close to diamond) and the high filling grade of the components, it has very good results in casting new pump parts and also in coating worn spare parts.

Mineral cast **SIC**cast®

Hard as a Diamond.

Silicon carbide (SiC) in a special mixture with Epoxy resin cast into precision moulds under vacuum. Fittings are machined with diamond tools. Thanks to the temperature-controlled casting process, parts of up to 8 tons can be cast.

This material is extremely wear resistant, temperature insensitive and shockproof. It is mainly used in heavy conditions such as in flue gas desulfurization of coal-fired power plants, incineration plants, fertilizer production, titanium dioxide and iron oxide production.

Operational Experience

Pictures of a Duplex Stainless Steel impeller which has been replaced by a SICcast impeller.

Advantages

- **Highly wear resistant**
- **Fully corrosion resistant**
- **Easy quality control of castings**
- **Lower noise & vibrations compared to metal**

Impeller made of Duplex Stainless Steel

Heavy wear after 11,000 operating hours

Impeller made of SICcast®

No wear after 24,000 operating hours

Comparison with Metal

In regards of resistance, metals are only a compromise between conflicting requirements.

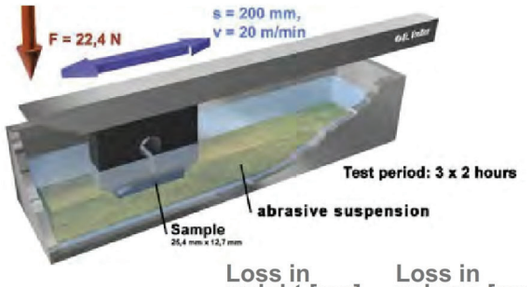
Having only corrosion and no abrasion, it will be also possible to use hastelloy. It's the same with abrasion only. Abrasion in a neutral medium can be done by using Ni-hard or similar.

The mineral cast from **SIC**cast® covers both corrosion and abrasion perfectly.
SICcast® materials will be very advantageous if you have solid in combination with a non-neutral medium, a leach or an acid (pH-value 0-12).

Miller Wear Test

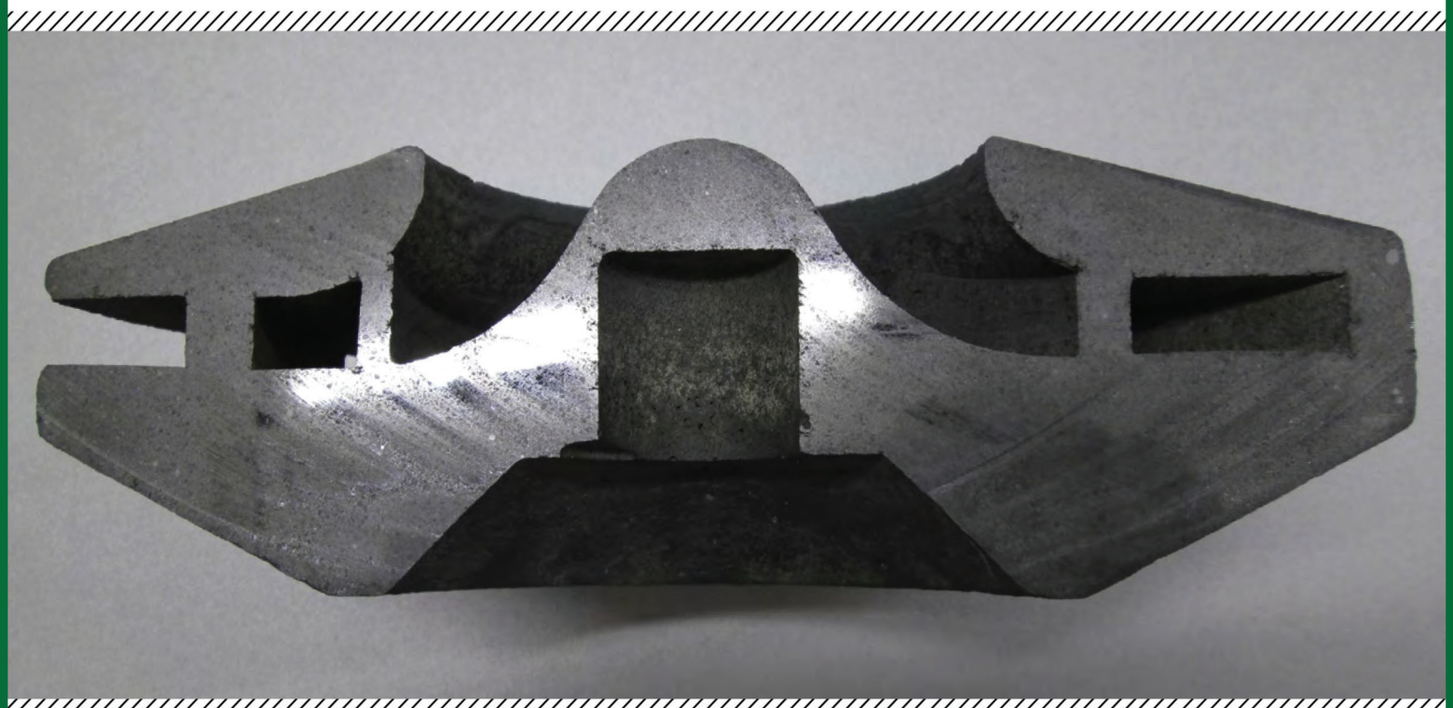
Standard test method for determination of slurry abrasivity.

The Miller Number is an index of the relative abrasivity of slurries. Its primary purpose is to rank the abrasivity of slurries in terms of the wear of a standard reference material. The wear damage on the standard wear block is worse as the Miller Number gets higher.



Grafik: TU Clausthal

	Loss in weight [mg]	Loss in volume [mm³]
SICcast EP 135	57,12	22,66
SIConit	75,13	33,10
1.4404	1.528,15	192,22
Alloy 625	1.297,16	152,66
1.4462	1.093,17	140,15
St52	1.023,48	130,38



SICcast® PLUS

SICcast®PLUS is a silicon carbide ceramic.

Silicon carbide ceramics are used where high wear is expected and can be recommended, where difficult operating conditions - for example, chemical attack or high temperatures - are expected. The innovation in the patented **SICcast®** PLUS method, is the combination of **SICcast®** casting with the production process of silicon infiltrated silicon carbide (SiSiC).

So it is possible to manufacture SiSiC-ceramic components that are subject to shrink by only one percent more than the production chain and therefore not technically difficult to construct than metal castings. In contrast to the conventional production methods can be produced economically from **SICcast®PLUS** very large and complex components.

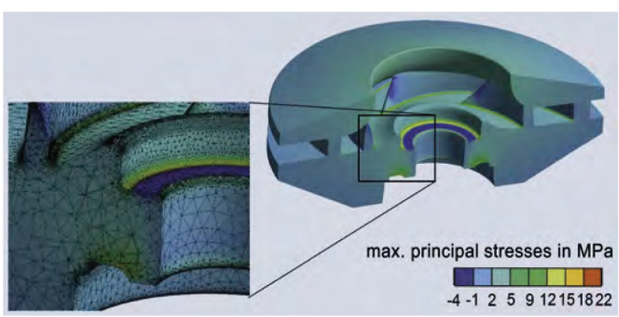
Since ceramics have different material properties than steel, for each desired component a feasibility study and a development process are required.

For repairing **SIC**onit®

A reparing kit with similar characteristics as SICcast®

SIConit® is a silicon carbide coating compound for the repair and protection of metallic surfaces exposed to abrasion, corrosion and acids **pH-value 0 - 12**.

SIConit® has a very high silicon carbide content for use in extremely abrasive operational conditions where complex and costly repairs are the norm. The compound can either be used to completely rebuild worn metal surfaces or be used as a preventative coating, often outperforming the original metal in terms of abrasive stability. **SIConit®** can be used in place of metal applications, tiling, rubber backing and other coatings.



Hart wie Diamant
Hard as a Diamond

The entire **SIC**cast® product spectrum

Beside the mineral cast SICcast - EP135, SICcast® is constantly developing new materials:

SIConit®
- **trowelable** wear protection for applications

SIConit® K
- **castable** wear protection

SIConit® M
- **trowelable** wear protection for areas such as pores and joints

SIConit® F
- **brushable** wear protection for smooth surfaces and for optimizing the efficiency

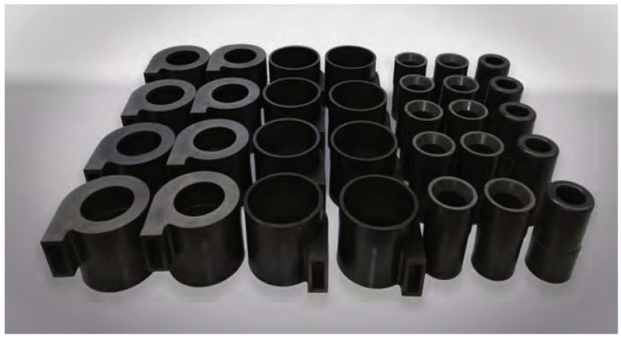
SIOSIC®
- an inorganic high-temperature wear and corrosion resitant material based on silicate technology

SICcast® PLUS
- silicon carbide ceramic

What can **SIC**cast® do for you?

You have a problem - SICcast® offers the solution.

Beside the products for **DÜCHTING PUMPEN**, **SIC**cast® is supplying **plug and play spare parts** for other manufactures



For example
- **all pump parts**
- **pump adapters**
- **nozzles**
- **hydrocyclones**
- **agitators**

For detailed information visit www.SICcast.com

Carl Hamm

Pipes | Pumps | Solutions

Competence, experience, innovative thinking, modern manufacturing plants and motivated employees form the basis of our services.

With the flexibility of a modern, medium-sized company and the experience of our over 90-year history, we are well equipped to meet the requirements of the future.

The numerous certifications and technical approvals of course ensure that we serve our customers with the highest quality standards through the complete project phases.

Our product range focuses on water, waste water and power industries, tunnel construction and well sinking as well as open-pit and underground mining.

We as a competent partner ensure an added value for the specific customer needs: from the conceptual planning to professional production and punctual delivery.

Headquarters of Carl Hamm in Essen, Germany

Röhrenwerk Kupferdreh Carl Hamm GmbH
Gasstraße 12
D-45257 Essen
Germany

dieter.schmitz@carl-hamm.com
www.carl-hamm.de
Tel.: +49 (021) 848 1723
Fax: +49 (201) 848 1770
Mobile: +49 (151) 503 12104

Carl Hamm PPS (Pty.) Ltd
2 Bickford rd, Founders Hill, Kempton Park, Gauteng
PO Box 1492, Boksburg, Germiston, 1460
South Africa

chris@carl-hamm.co.za
www.carl-hamm.co.za
Tel.: +27 (0)72 256 0926