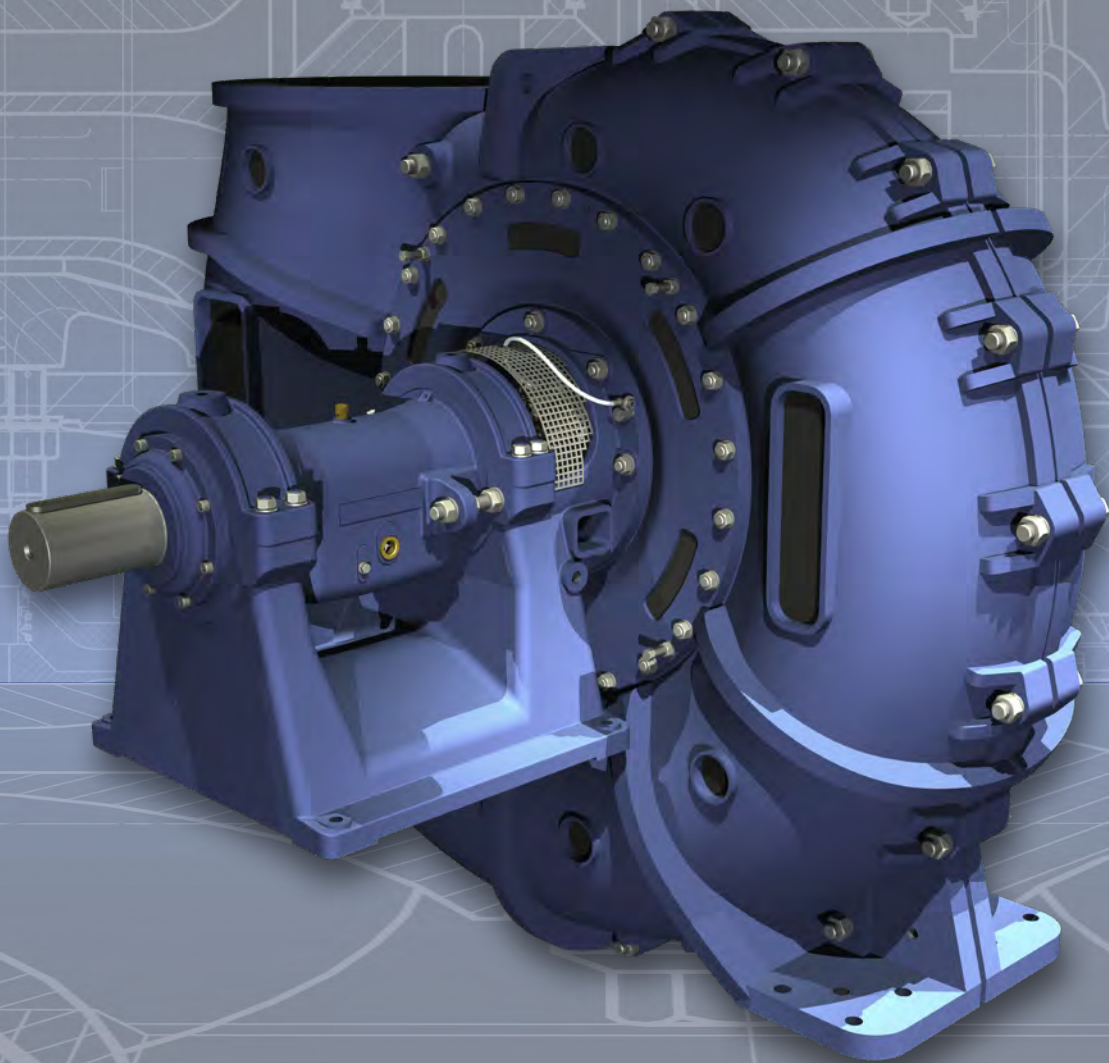




DÜCHTING
PUMPEN

Product Overview
TYPE MCC

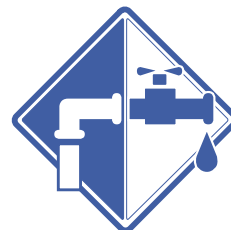


FLUE GAS DESULFURIZATION



The flue gas cleaning in Germany started with the adoption of the „Großfeuerungsverordnung“ - a regulation for open fire - in 1982. From the very beginning DÜCHTING PUMPEN took part in this business and today has one of the largest populations in European power stations. With the development of the material **SICcast**[®] now almost every FGD pump is built completely in **SICcast**[®]. Through this unique and innovative technology our products are increasingly favored beyond the borders of Europe.

WATER TREATMENT



DÜCHTING PUMPEN has worked in desalination with high-pressure centrifugal pumps in reverse osmosis now since the early 90s. While the demand for higher quantities and pressures has risen over the past years DP has kept up with the development and can now offer high-pressure pumps, including energy recovery units. The materials used for these pumps have been proven in numerous applications and the performance data has been adjusted to market demands by means of CFX programs.

MINING



Since the early 50s DÜCHTING has supplied pumps to the mining industry, especially German hard coal mining - at first only as maintenance and primarily with respect to underground mining. In the following years new pumps and wear-resistant centrifugal pumps for the processing of coal were added. Today DÜCHTING PUMPEN covers the entire market for centrifugal pumps in mining including high-pressure cooling centrifugal pumps.

INDUSTRY / OIL & GAS



The chemical industry profits from the **SICcast**[®] - material of DÜCHTING PUMPEN.

As far as this field of application is concerned the high chemical resistance of **SICcast**[®] is of primary importance: its corrosion resistance with respect to acids will even exceed that of Ni-alloys.

These pumps are entirely metal free in all wetted areas - even the single- or double-acting mechanical seals.



Quality through experience

DÜCHTING PUMPEN is a privately owned German company with more than 77 years of experience in the field of advanced centrifugal pumps for use in many different industries.

Our motto “Quality Through Experience” forms the basis of our sophisticated product range. The capabilities of our company in the construction, manufacturing, testing and commissioning of our products is highly respected in the industries we serve.

Our reputation is based on a sustainable company policy, focusing on efficiency, reliability, innovation and thorough customer after-sales service which is provided by partners in the countries where our products are installed.

In order to meet the current demand for highly efficient and reliable products in seawater desalination, DÜCHTING PUMPEN offers optimized high-pressure pumps and energy recovery turbine units. To minimize total energy costs in high pressure seawater desalination plants, we are at your service during both design and operation.





Mineral cast pump

TYPE MCC

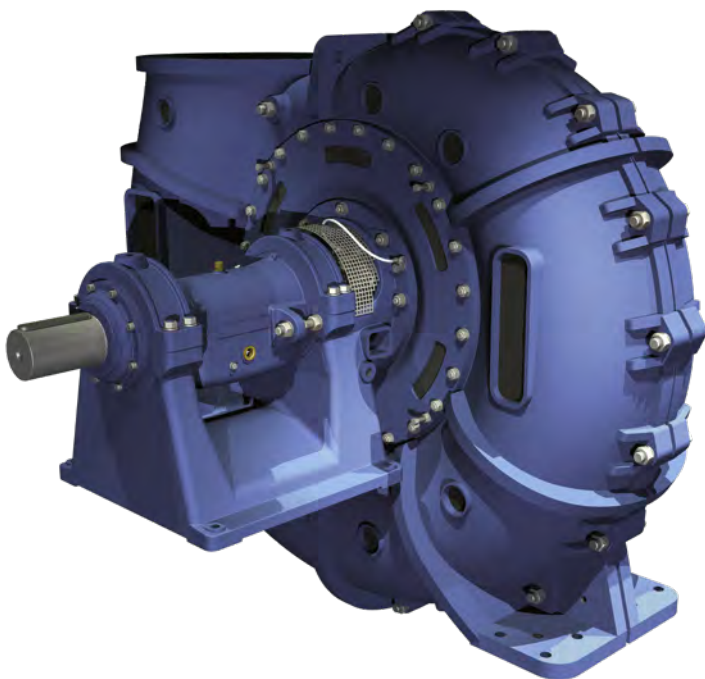
Extremely high abrasion and corrosion resistant.

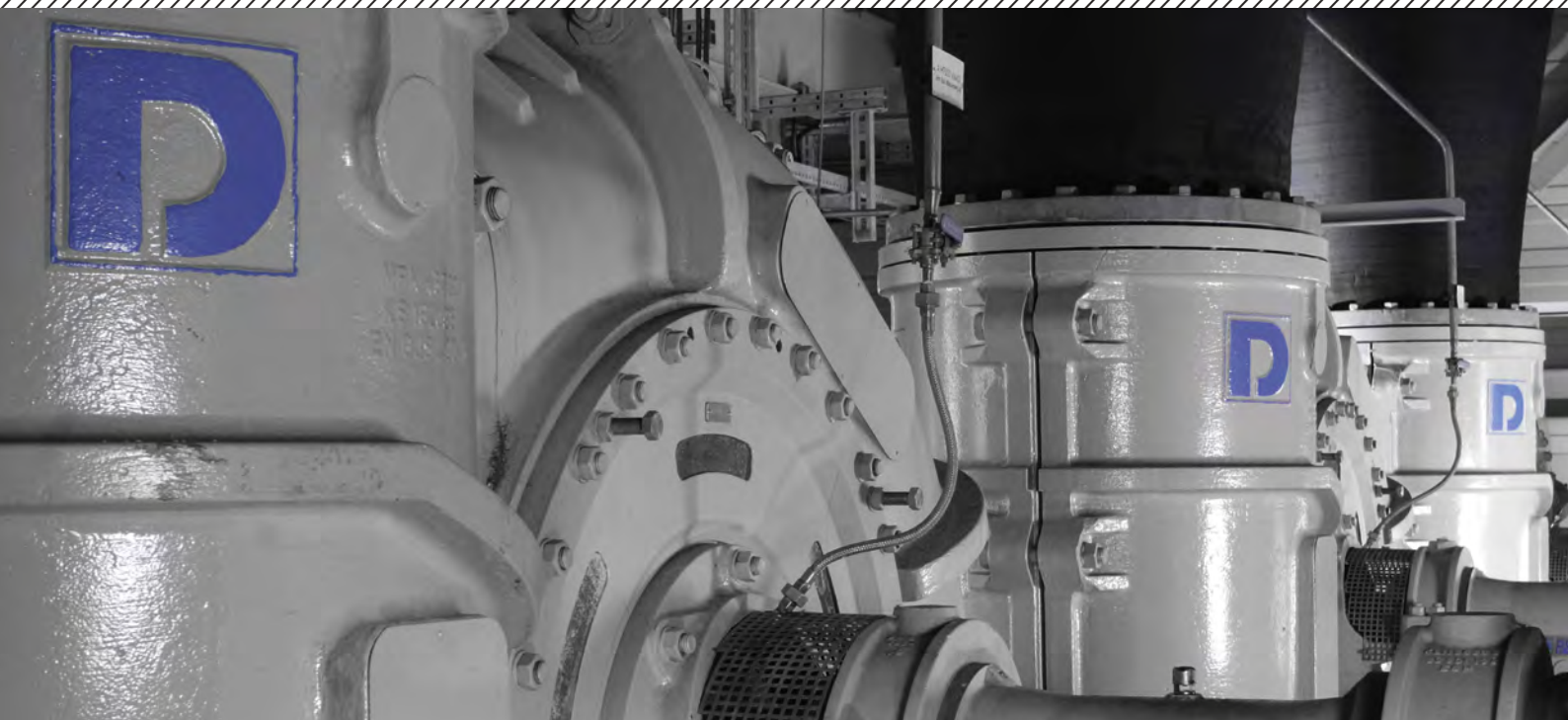


MCC Design

Horizontal single-stage centrifugal pump in back pullout design.

- Pumping of abrasive and corrosive liquids
- All components which are in contact with the liquid are made of **SICcast**[®]
- Suction flange: Axial
- Discharge flange: Top (Tangential)
- Closed impeller with spatially curved vanes
- Impeller is key driven; reverse rotation (e.g. back-flushing) is possible
- Re-adjustable inclined gap between impeller and wear plate to optimize the efficiency and differential pressure after longer operation
- Single acting, metal free cartridge mechanical seal **DÜTEC**[®]-C with springs located outside of the liquid
- Durable, oil-lubricated roller bearings
- Back pullout design (the complete rotating assembly can be removed while the casing remains on its position)
- In many applications the wear life of **SICcast**[®] greatly exceeds conventional materials
- The patented design allows the production of extremely large pumps at low costs
- Currently, the most advanced and most durable technology for FGD absorber recirculation pumps





Fields of Application

Pumping abrasive and / or corrosive liquids.

- Flue gas desulfurization
- Incinerators
- Water treatment
- Seawater desalination

Materials

Volute casing: SICcast[®] / EN-GJS-400-15 (GGG40)

Impeller: SICcast[®]

Wear plate: SICcast[®]

Shaft: 1.0503 (C45)

Shaft sleeve: 1.4301 (1.4462)

Mechanical seal: Silicon carbide (SiC)

Technical Data

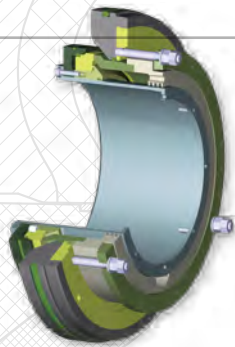
Pump Size:	DN 400 to DN 1000 (16" to 40")
max. Pressure:	6 bar (90 PSI)
max. Flow:	20000 m³/h (88000 gpm)
Total head:	up to 40 m (130 ft)
Rotating Speed:	up to 1200 rpm



DÜTEC® - C

The cartridge mechanical seal **DÜTEC®-C** consists of a rotating and a stationary unit which are assembled separately.

This derivative of the established **DÜTEC®** mechanical seal was especially geared towards this pump series and for the conveyance of corrosive and abrasive liquids.

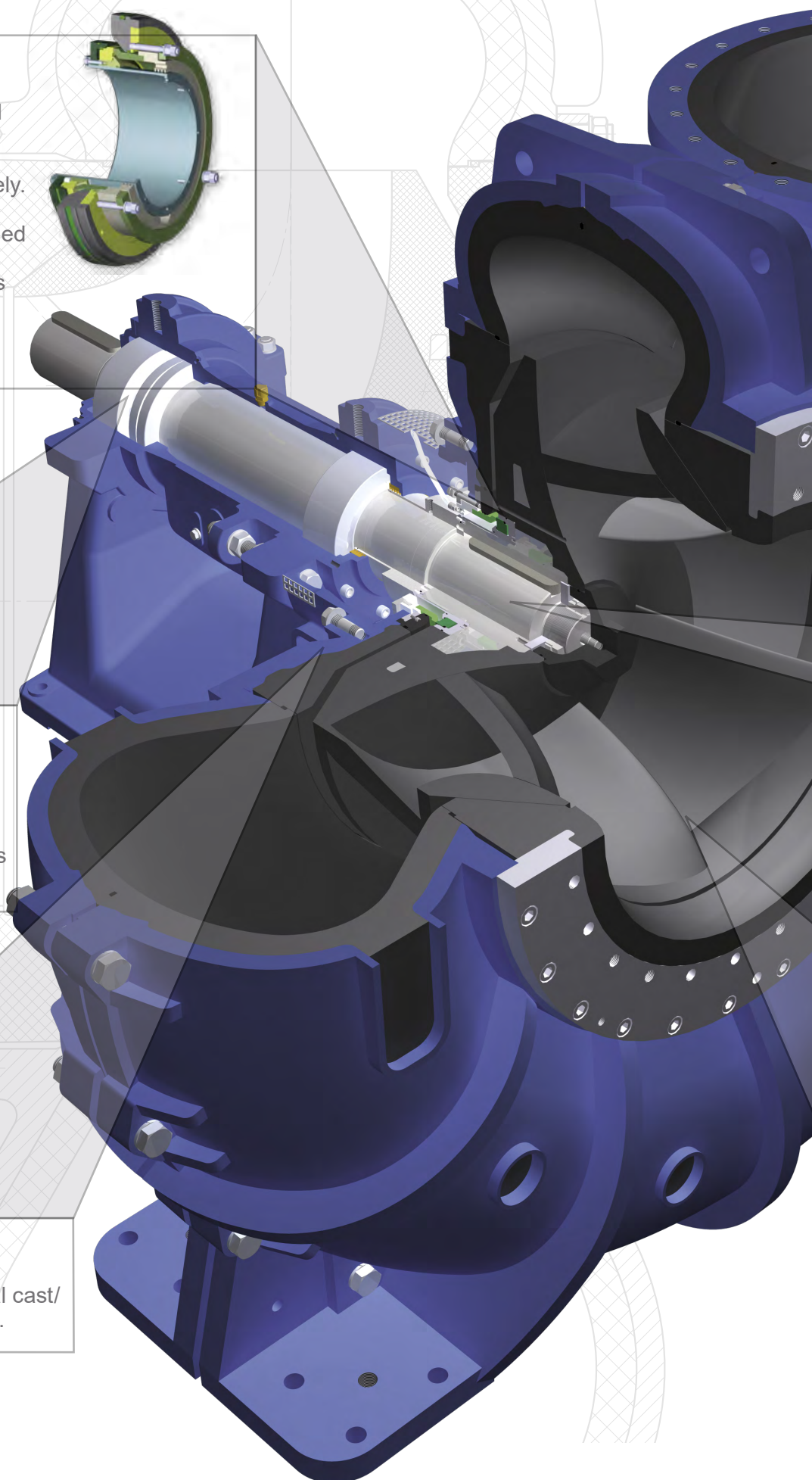


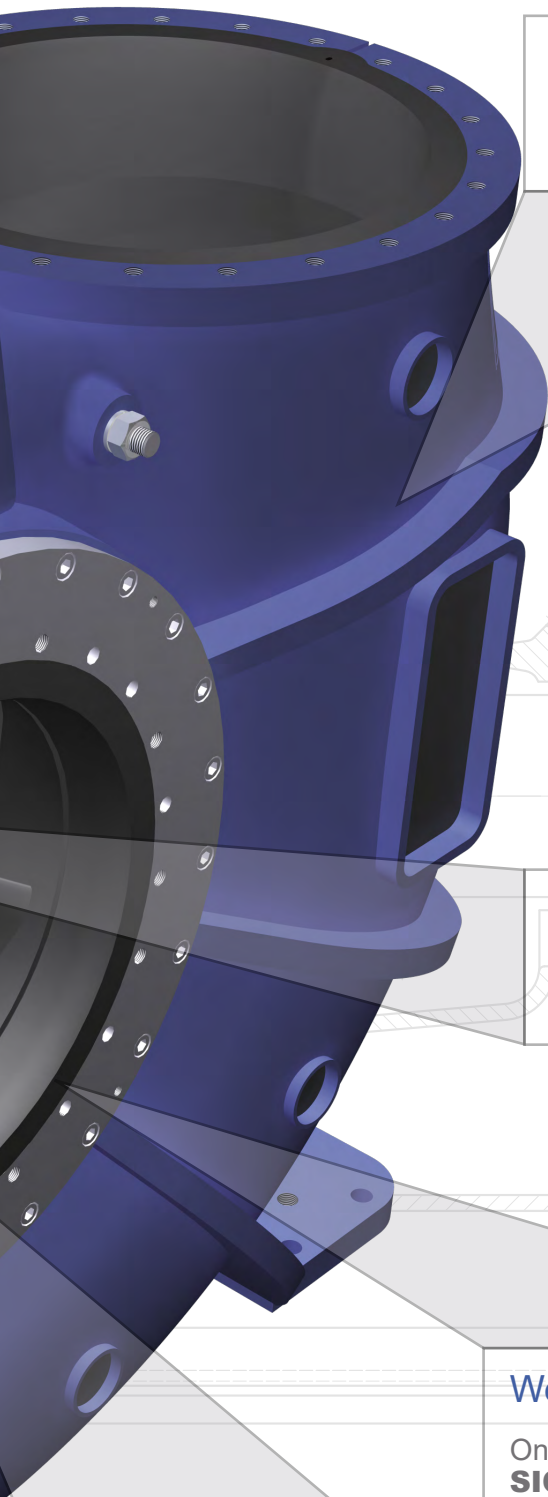
Bearings

Oil lubricated antifriction bearings. Cast iron bearing housing provided with maintenance free labyrinth seals to avoid oil leakages.

Casing Cover

Made of **SICcast®** mineral cast/ EN-GJS-400-15 (GGG40).





Volute Casing

Made of **SICcast**[®] mineral cast/ EN-GJS-400-15 (GGG40).

Rotor

Back pullout design to expedite the maintenance work.

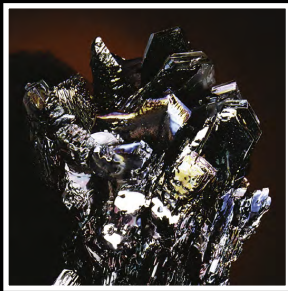
Wear Plate

On suction side made of **SICcast**[®] mineral cast with an inclined gap adjustable in axial direction.

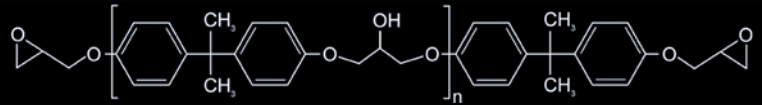
Impeller

Closed impeller with spatially curved vanes constructed in **SICcast**[®] mineral cast.





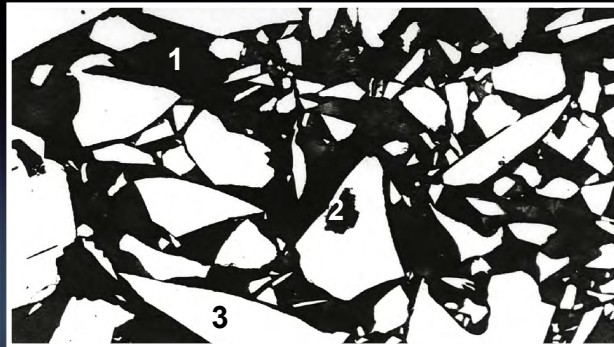
Silicon carbide



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. **SICcast**[®] 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 **SICcast**[®]

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.



Impeller made of Duplex Stainless Steel
Heavy wear after 11,000 operating hours

Advantages

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

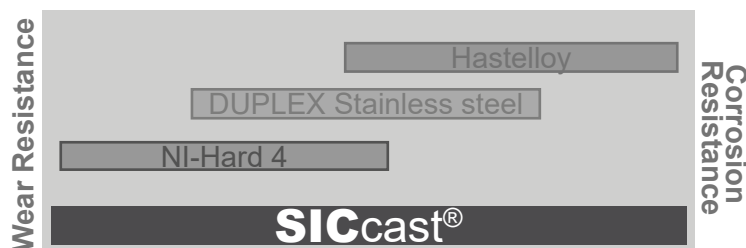


Impeller made of SICcast®
No wear after 24,000 operating hours

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.



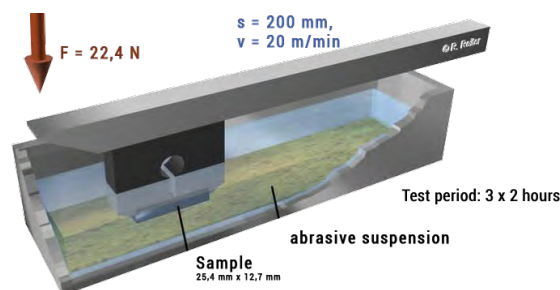
The mineral cast from SICcast® covers both corrosion and abrasion perfectly.

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).

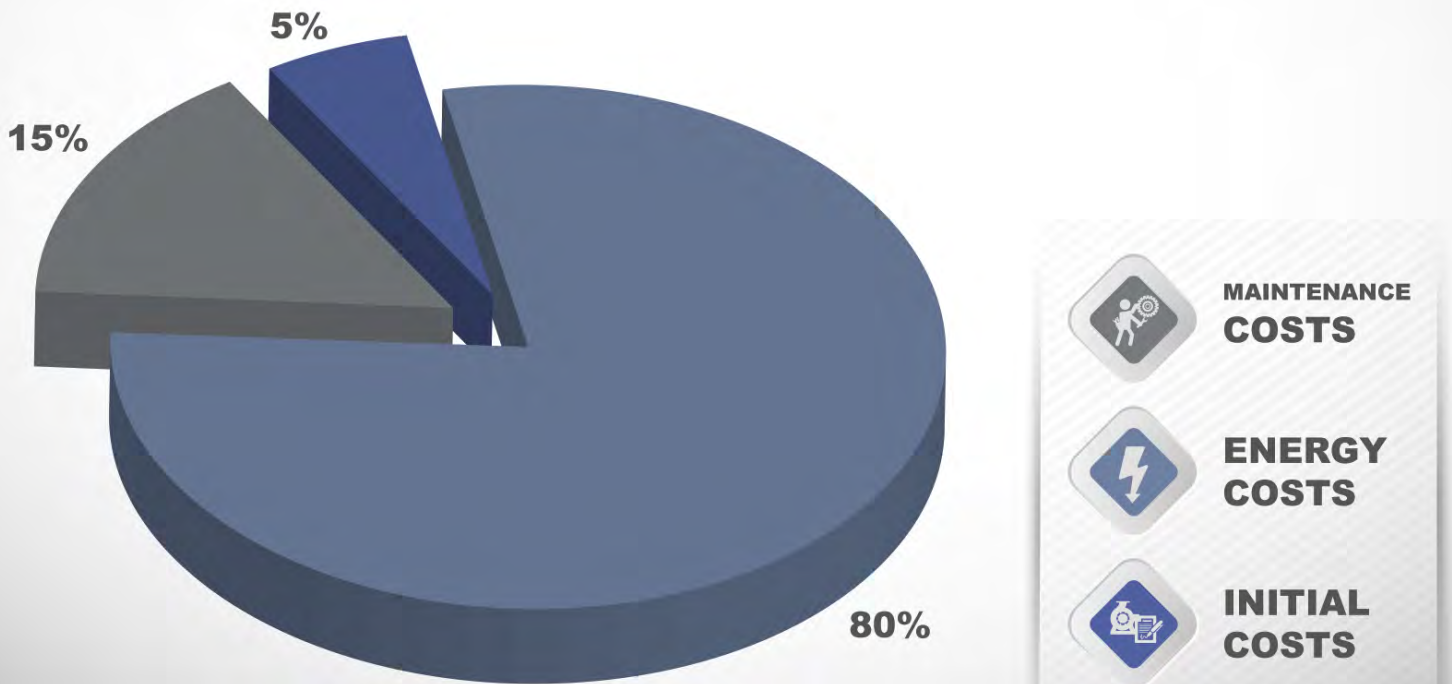
Miller Wear Test

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.



Material	Loss in weight [mg]	Loss in volume [mm ³]
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



Life-Cycle-Costs

Average life cycle costs for industrial pumps.

Evaluating the Life-Cycle-Costs will identify the most financially attractive alternative. The initial purchase price is a very small part of the life cycle cost for high usage pumps. Minimizing energy consumption and plant downtime have a big influence on the total Life-Cycle-Costs.

Energy costs

DÜCHTING PUMPEN offers a wide range of impeller sets for high efficiencies.

- ▶ high efficiency leads to low energy costs

Maintenance costs

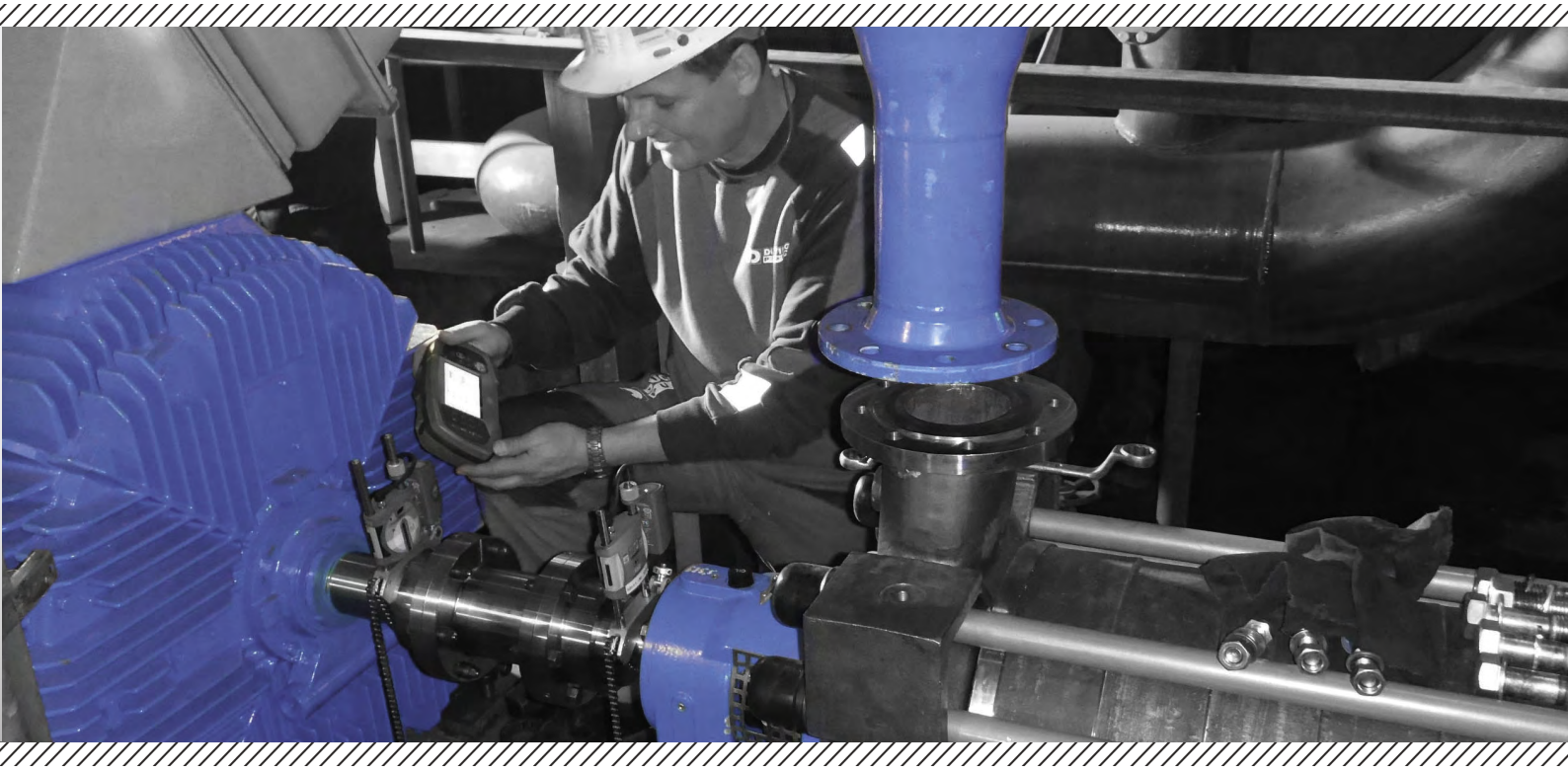
Robust design leads to long lifetime of the pump parts.

- ▶ low wear leads to low maintenance work and costs

Easy accessible and changeable wear parts lead to short downtime for overhauls.

- ▶ short downtime leads to low maintenance costs





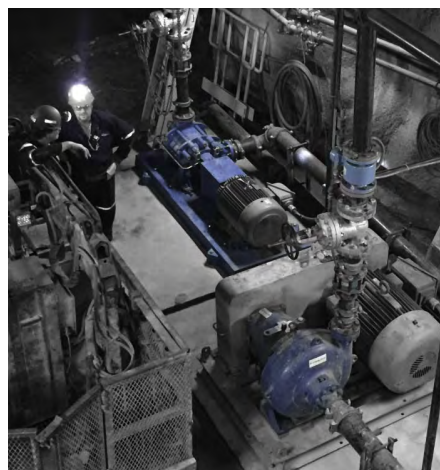
After-Sales-Service & Spare Parts

With its service and spare parts department DÜCHTING PUMPEN offers the full range of After-Sales-Service.

With its own service technicians and several service partners worldwide DÜCHTING Service is everywhere and always available.

Inhouse - Service

- Maintenance
- rebuild & repair
- damage analysis
- performance tests with vibration analysis
- site staff training
- and much more



Site - Service

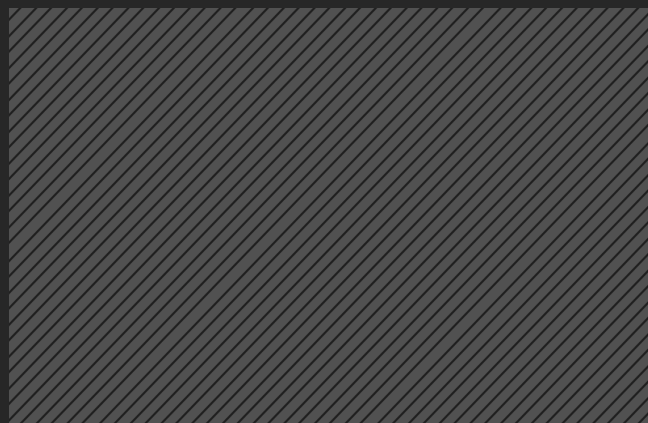
- start-ups
- commissioning assistance
- Revisions
- Repairs
- Troubleshooting
- laser alignment
- vibration & condition analysis
- flow rate measuring
- whole pump rebuild and repair
- mechanical seal exchange
- on-site training
- and much more



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