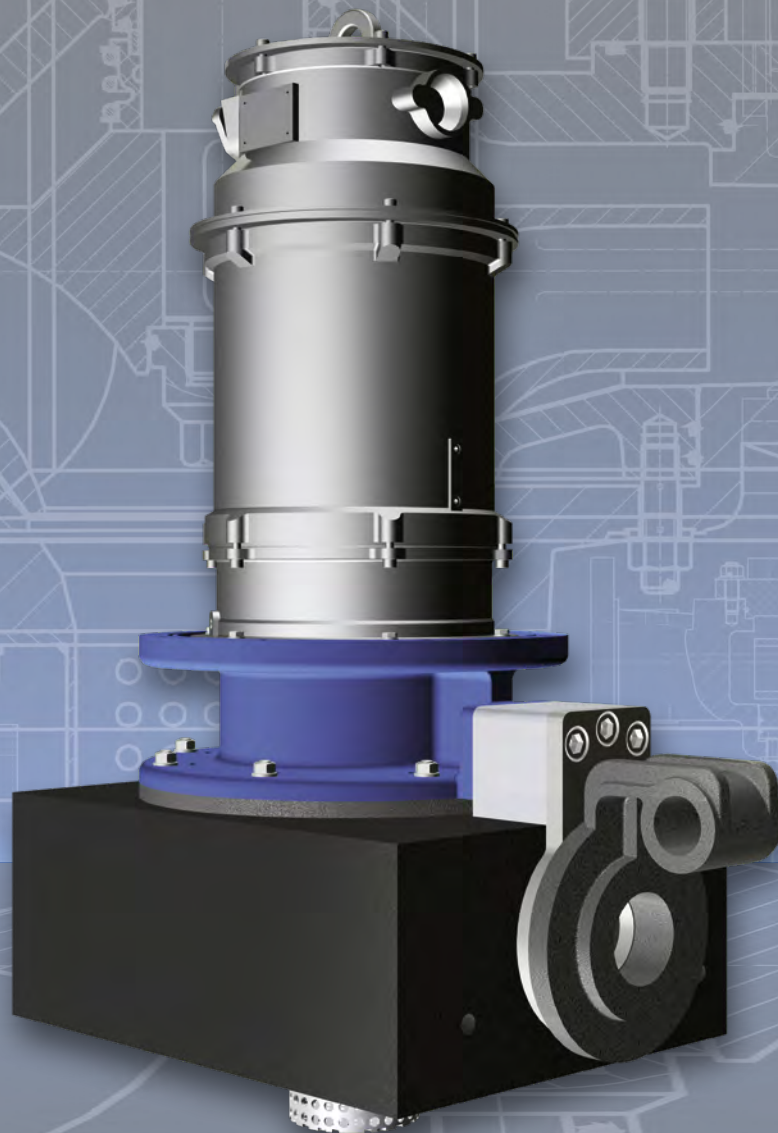




DÜCHTING
PUMPEN

Product Overview **TYPE MCS**



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.





Submersible mineral cast pump

TYPE MCS

Extremely high abrasion and corrosion resistant.

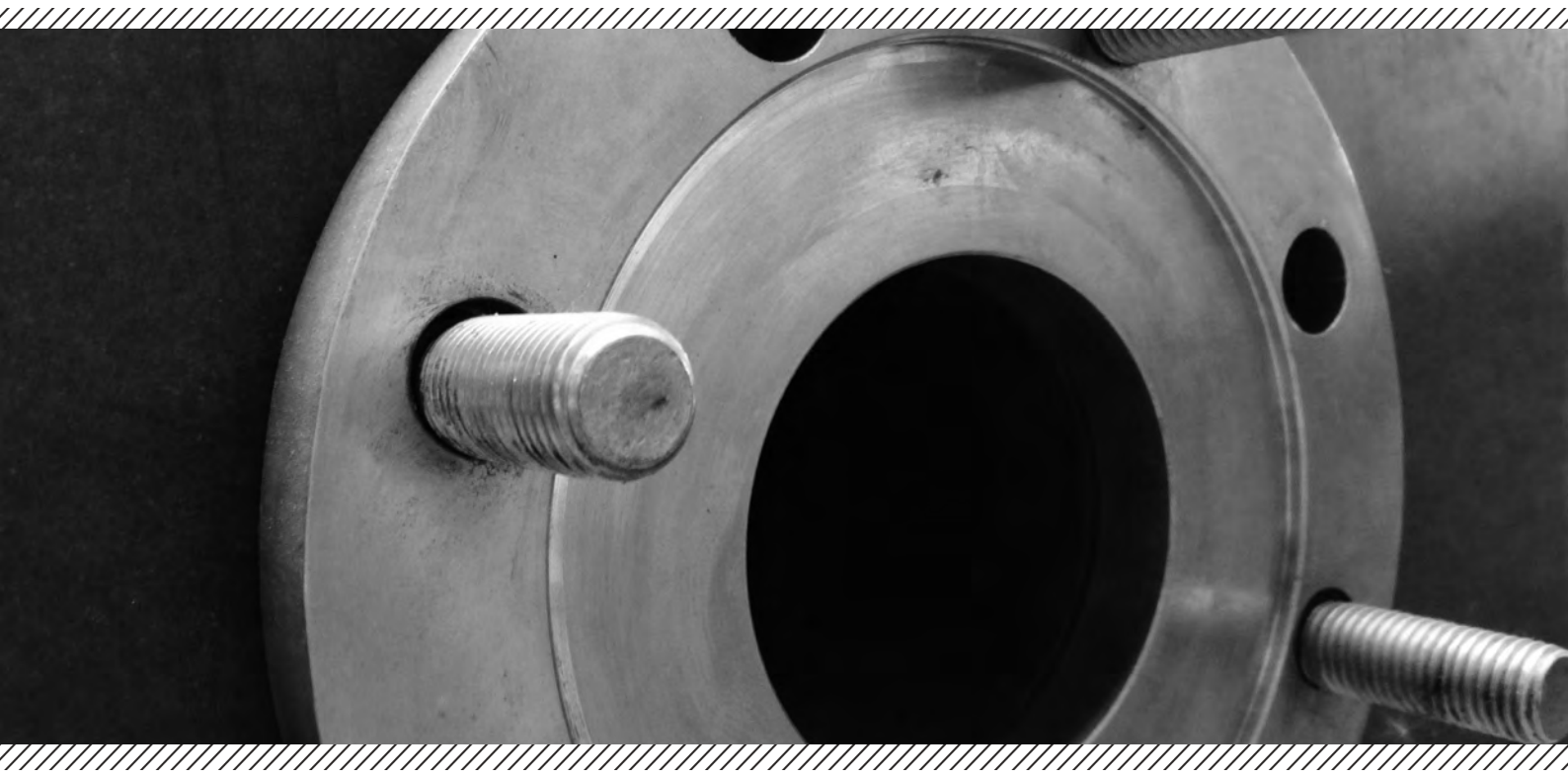


MCS Design

Submersible single-stage centrifugal pump.

- Pumping of abrasive and corrosive liquids
- All hydraulic components which are in contact with the liquid are made of **SICcast**®
- Suction flange: Vertical (including suction strainer)
- Discharge flange: Radial
- Open or closed impeller spatially curved vanes
- Dual mechanical seal arrangement with a pump side bellow seal.
- Moisture sensor in an oil reservoir between pump and motor
- Stainless steel submersible three-phase motor (IP68)
- Optimized design ensures easy maintenance and long service life even under difficult conditions





Fields of Application

Handling of abrasive and corrosive liquids.

- Flue gas desulfurization
- Chemical industry
- Water treatment
- Seawater desalination
- Fertilizer industry / potash industry

Materials

Volute casing:	SICcast®
Impeller:	SICcast®
Shaft:	1.4462
Mechanical seal:	Silicon carbide (SiC)

Technical Data

Pump Size:	DN 32 to DN 150 (1 ¼" to 6")
max. Pressure:	10 bar (150 PSI)
max. Flow:	320 m³/h (1400 gpm)
Total head:	up to 90 m (295 ft)
Rotating Speed:	up to 3600 rpm



Motor

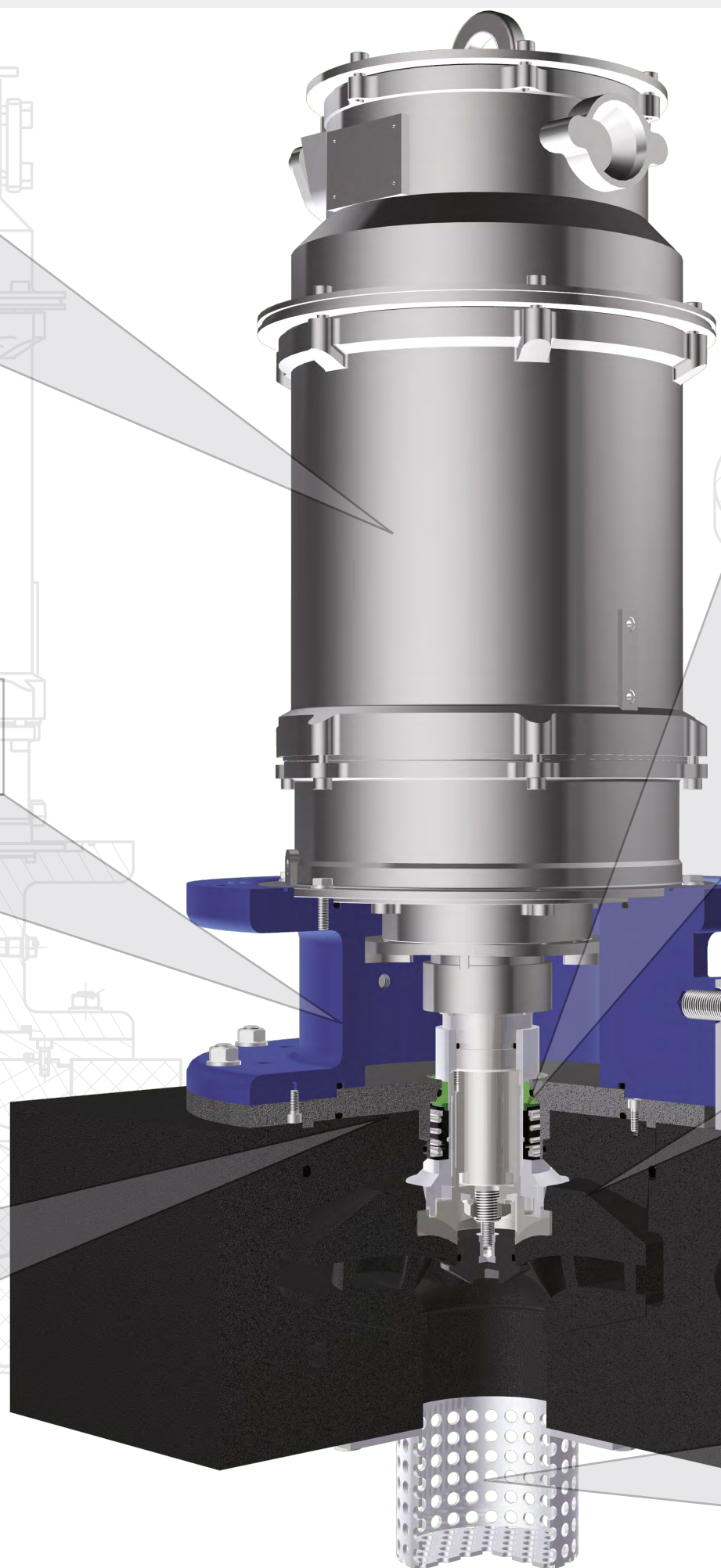
Submersible three-phase motor
(IP68).

Motor Adaptor

Stainless steel.

Casing Cover

SICcast® mineral cast.

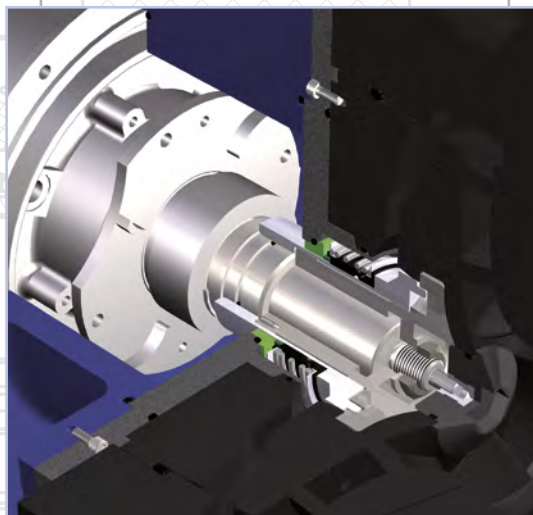


Double acting mechanical seal

Double acting mechanical seal arrangement with a pump side bellow seal.

Impeller

Open or closed impeller with spatially curved vanes made of **SICcast®** mineral cast.

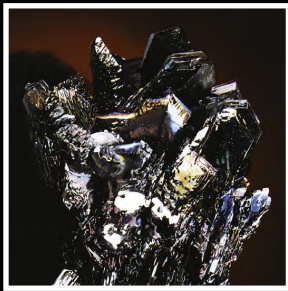


Volute Casing

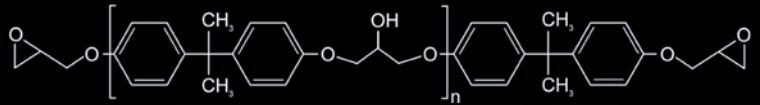
SICcast® mineral cast.

Strainer

Suction side strainer protect the pump from entry of large particles.



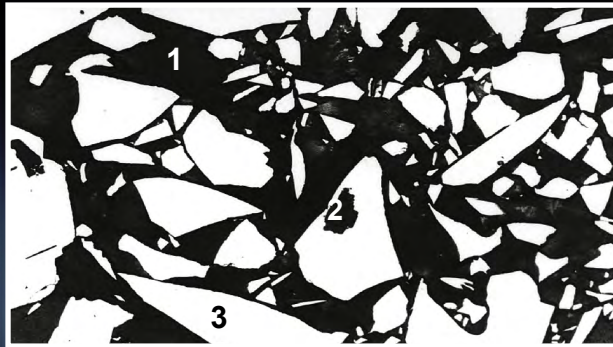
Silicon carbide



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.

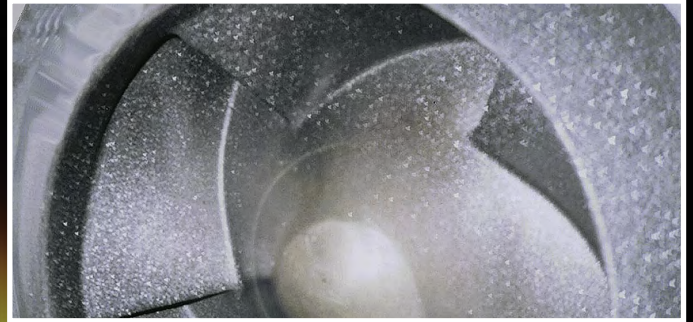


Impeller made of Duplex Stainless Steel

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**



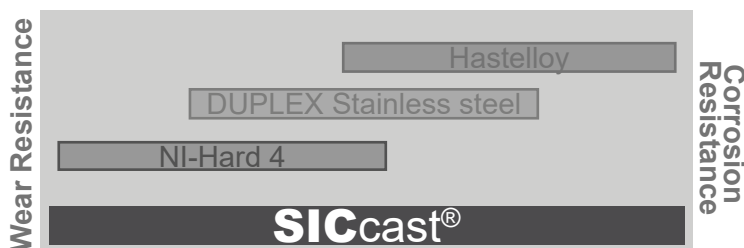
Impeller made of SICcast®

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.



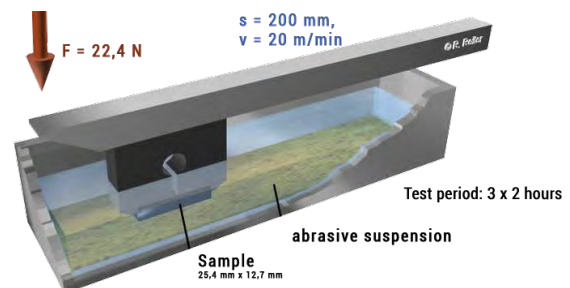
The mineral cast from **SICcast®** covers both corrosion and abrasion perfectly.

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

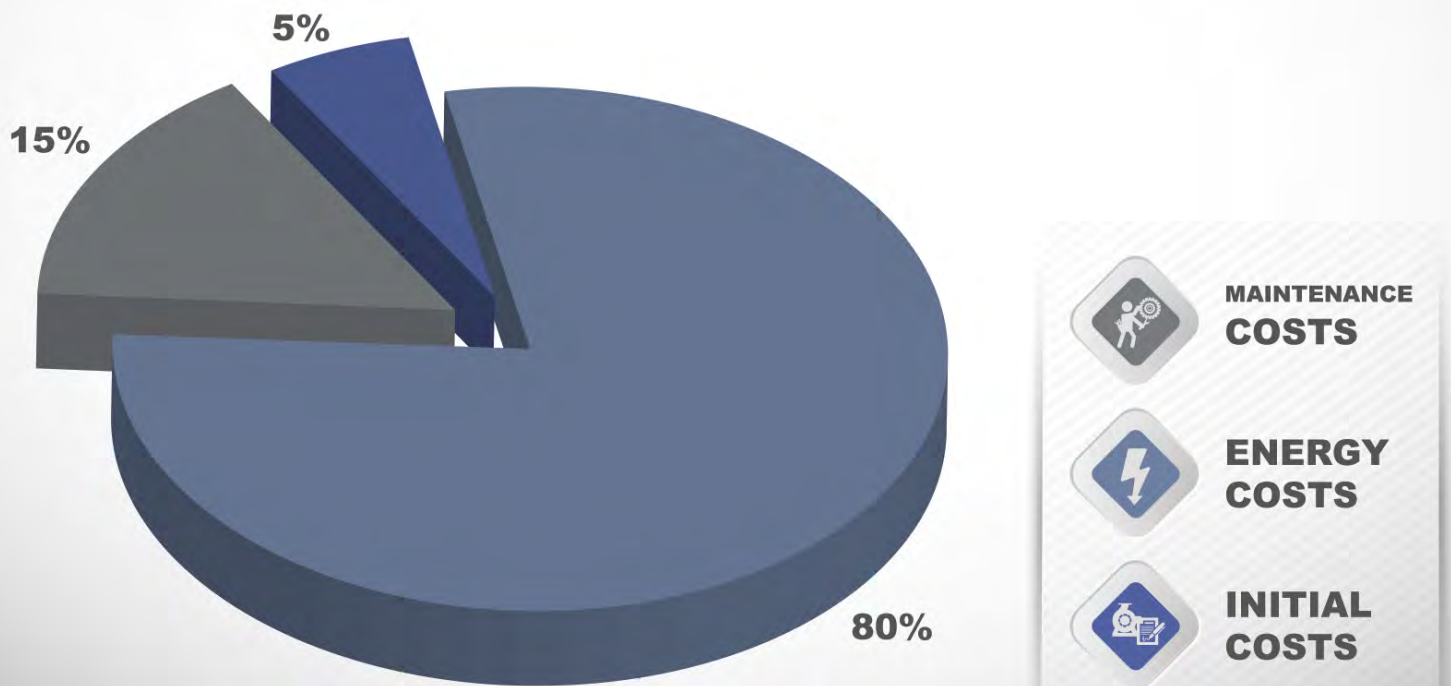
Standard test method for determination of slurry abrasivity.

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.



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



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





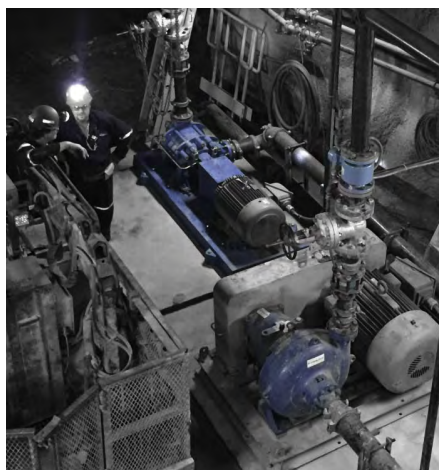
After-Sales-Service & Spare Parts

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

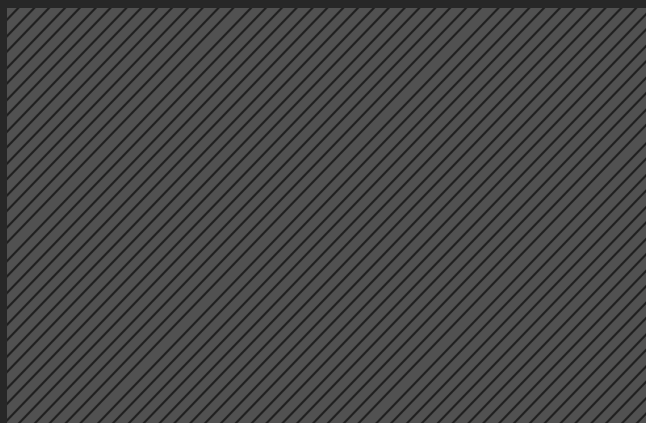
- start-ups
- commissioning assistance
- Revisions
- Repairs
- Troubleshooting
- laser alignment
- vibration & condition analysis
- flow rate measuring
- whole pump rebuild and repair
- mechanical seal exchange
- on-site training
- and much more



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