



**DICKOW  
PUMPEN**



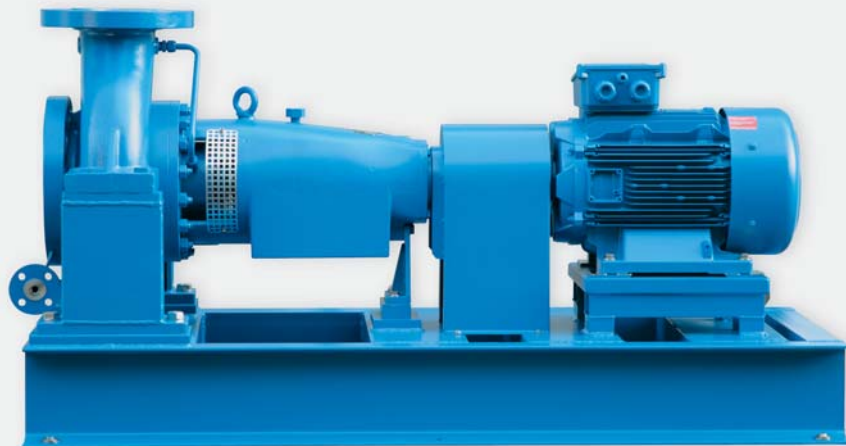
*Made in  
Germany*

*Solving your Problem is our Goal*

# Production Range



Type HZSMAR for liquid Butan,  
design pressure 40 bar,  
with magnetic coupling.



Type NCR for seawater desalination, design pressure 70 bar,  
with single mechanical seal.





## Growths of a Company



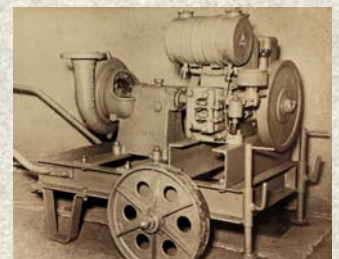
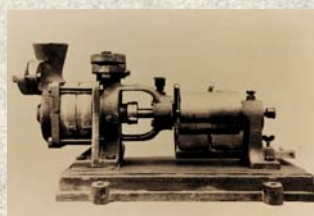
### Historical Sketch of Dickow Pumpen until 1946

**1910** DICKOW was founded in Gablonz in the former Eastern area of Germany, as a company for the manufacture of water pipes and heating plants.

**1920** After World War I, the enterprise was moved from Gablonz (now part of the Czech Republic) to the city of Görlitz in the former East Germany, where the manufacture of automatic cattle water basins and self-priming centrifugal pumps (under the designation "Dickow Patent") began.

**1930** The founder Karl Dickow died. The enterprise was carried on by his widow Anna Dickow and their three sons Carl, Walter, and Wilhelm.

**1945** The end of World War II also put an end to the Görlitz factories. The company was expropriated, most of the machinery was removed, except for a small portion which had been saved by relocating it once again.





## Starting anew in Waldkraiburg

**1946** Carl Dickow started reconstruction and pump manufacture with some of his former employees and the relocated equipment from the Görlitz factories. They settled in a then state-owned area in Kraiburg later re-named Waldkraiburg. Carl Dickow died in November 1946. In December 1946, Wilhelm Dickow escaped from French captivity and took over management.

**1948** After the German currency reform, Wilhelm Dickow acquired land with existing buildings, today's business premises, and once again restarted pump production.

**1959** Wilhelm Dickow died with the business being carried on by his wife Anneliese. With the help of Oskar Lehnert, General Manager, and Ing. F. Wilhelm Schmid, Plant Manager, the Company continued making solid progress. New production equipment was acquired and new buildings were erected.

**1968** Ulrich Dickow took over executive management. The responsibility for manufacture was under the control of Andreas Dickow, Ing. Harry Schommer is in charge of Engineering, Development, and Sales management.

**2003** After the death of Ulrich Dickow and Andreas Dickow, Michaela Dickow is the new CEO.



# Selbstansaugende DICKOW-PUMPEN

D. R. P. D. R. P. ANGEM.





*Neue Konstruktion!*

*Stopfbüchslös!*

Keine wassergeschmierte Lagerung  
Keine Stopfbüchse  
Kein Rosten der Welle  
Kein seitliches Anlaufen der Räder  
Höhere Druckwirkung  
Größere Wasserleistung  
Saughöhe bis 8 m und darüber  
Luftkompression höher als der Einschleddruck  
Leistungen von 10 bis 700 l/min.  
Förderhöhen von 0 — 180 m



*Besser - billiger*

*von längerer*

*Lebensdauer!*







## DICKOW

PUMPEN- U. MASCHINEN-FABRIK G.m.b.H. KRAIBURG/INN 2, Obb.



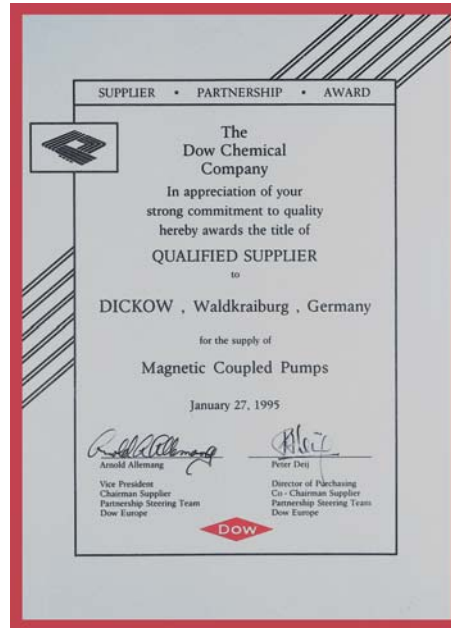




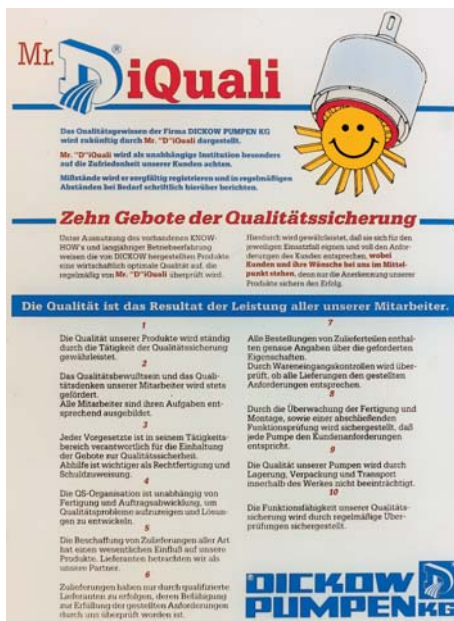
## Approved Quality System



All company business and manufacturing processes comply with the requirements of DIN/ISO 9001:2000 / EN 29001. The quality system, originally approved by LLOYDS REGISTER QUALITY ASSURANCE LTD., is subject to bi-annual reviews and recertification. The original Certificate of Approval was issued on May 3, 1994 and has international validity.



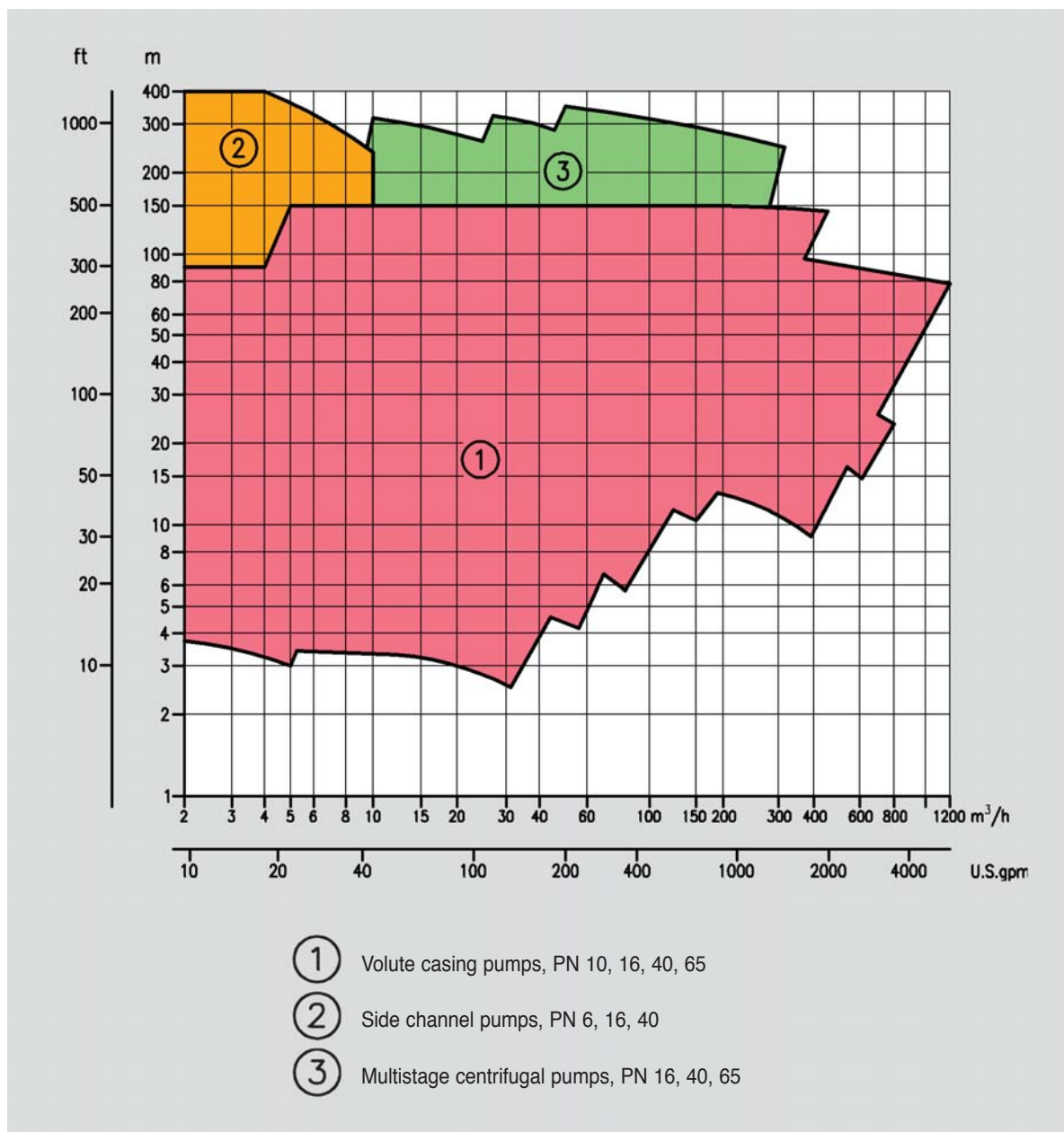
In January 1995 DICKOW Pumpen was awarded the highly coveted certification "Qualified Supplier for the Supply of Magnetic Coupled Pumps" by DOW CHEMICAL.



As part of our quality assurance and control, mandatory performance and hydrostatic tests are conducted on all pumps. The tests are performed according to the internationally accepted procedures of DIN 1944 or alternatively API 610. Additional testing of materials of construction, vibration, noise level, bearing temperature, etc, are performed as required. All test results are recorded and Certificates according to DIN EN 10204 are available on request.



## Performance range – Pump series



The individual performance curves of the available pump sizes provide detailed hydraulic data. Available on request.



## Materials - Suitability

### Available materials

Pumps are manufactured of metallic materials only. Based on the customer requirements, the following materials are available as standard: (similar USA grades)

#### Pressurised parts:

Ductile Iron grade GGG40.3 (ASTM A536 60-40-18),  
Carbon Steel grades GS-C25 (ASTM A216-75 WCB), 1.7706 (High temp), 1.1138 (Low temp)  
Alloyed Stainless Steel grades 1.4408 (ASTM A351 CF8M), 9.4306 (ASTM A276 304L+Si) 1.4581, 1.4539,  
Duplex Stainless Steel 1.4462/1.4515 (UNS S32550), Hastelloy C (ASTM A494 CW-12MW)

#### Internal parts:

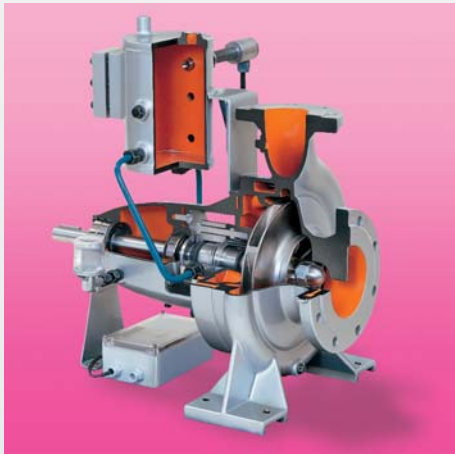
Cast Iron grade GG25 (ASTM A126-73) and Ductile Iron grade GGG40.3 (ASTM A536 60-40-18)  
Alloyed Stainless Steel grades 1.4408 (ASTM A351 CF8M), 1.4571, 1.4539  
Duplex Stainless Steel 1.4462 / 1.4515 (UNS S32550), Hastelloy C (ASTM A494 CW-12MW)

### Operating limits:

- Capacities and differential heads according to performance range.
- Temperature range from -120 up to +400°C (752°F)
- Operating pressures up to 100 bar (special design)



## Pump Types



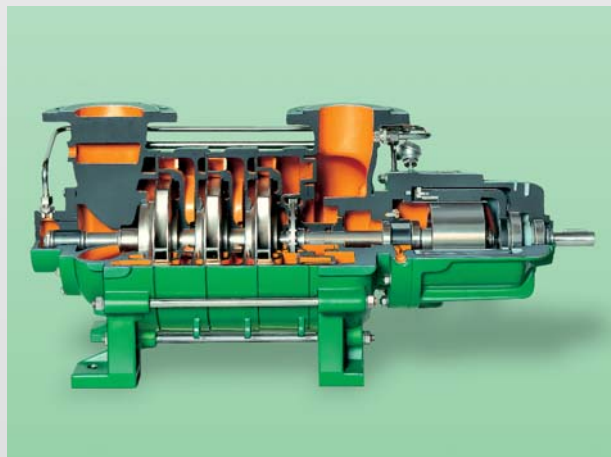
**Volute casing pumps  
type NCL (EN 22858), NCR (API 610)**  
with Tandem-mechanical seal N9.



**Volute casing pumps type NCLb**  
with heating chamber on suction and pressure side,  
and heated single mechanical seal N6b.



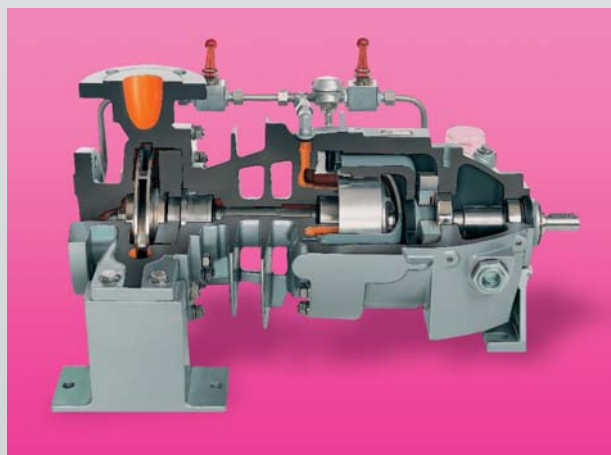
**Volute casing pumps – Hot oil design  
type NKLs**  
with single mechanical seal,  
and auxiliary stuffing box N10q.



**Self-priming centrifugal pumps  
type HZSM**  
with side channel vent stage and hermetically  
sealed magnetic coupling.



**Volute casing pumps  
type NML (EN 22858)**  
with hermetically sealed magnetic coupling.



**Volute casing pumps – Hot oil design  
type NMW**  
with hermetically sealed magnetic coupling,  
centerline mounted.

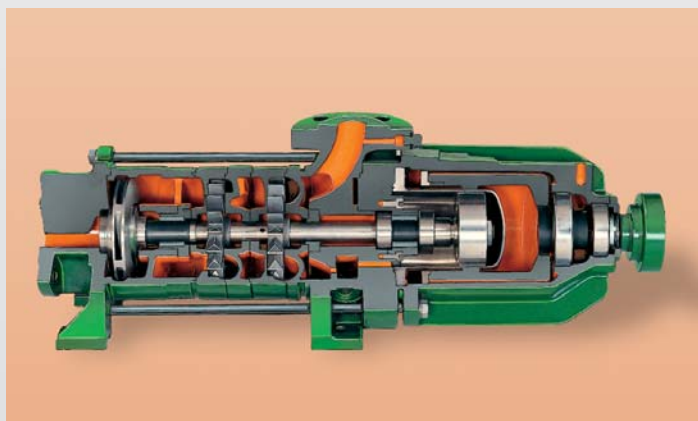




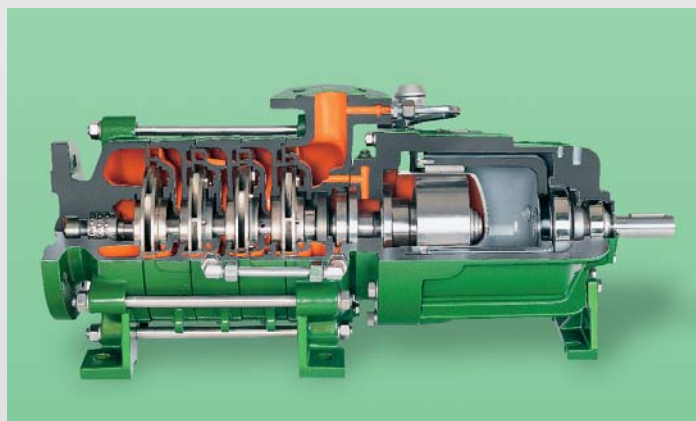
**Inline-volute casing pumps type KMV**  
with hermetically sealed magnetic coupling.  
Capacity up to 60 m<sup>3</sup>/h (300 USgpm),  
differential head up to 60 mLC (300 ft).



**Volute casing pumps type KMB**  
with hermetically sealed magnetic coupling.  
Capacity up to 60 m<sup>3</sup>/h (300 USgpm),  
differential head up to 60 mLC (300 ft).



**Multistage self-priming side channel pumps PN 40 type SCM**  
with hermetically sealed magnetic coupling,  
gas-retaining stage and NPSH-impeller for handling liquified gas.



**Multistage centrifugal pumps type HZSMA**  
with gas handling stage on pressure side and  
hermetically sealed magnetic coupling.



**Volute casing pumps type PRM**  
acc. to API 685,  
with hermetically sealed magnetic coupling,  
centerline mounted



**Multistage submersible pumps type HZV-Cat.1**  
(ATEX-type approved)  
with safety equipment for  
use in hazardous areas,  
also available as standard  
design without Cat.1  
accessories.



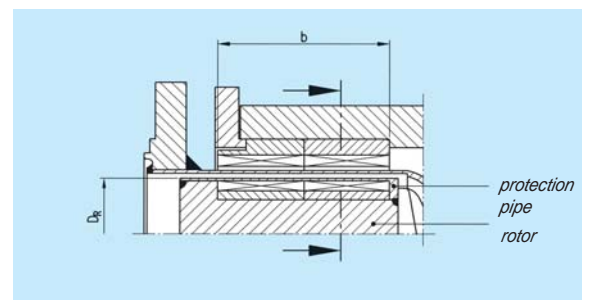
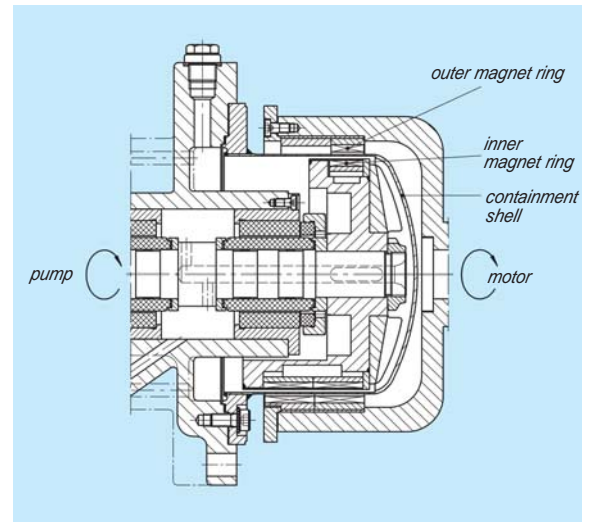
## Magnetic Coupling

The principle of a magnetic coupling is shown in the drawing. The pumped liquid is hermetically sealed from the atmosphere by the containment shell, that means no shaft duct to the atmosphere. Power is transmitted to the hermetically sealed liquid end by the outer drive magnets, passing motive force through the containment shell to the internal drive magnets. The inner magnet ring transmits the required torque directly to the impeller.

The magnetic field flux connects the outer and inner magnets. The coupling works synchronously without slip, the motor speed is equal to the pump speed.

- b = axial magnet length
- $D_R$  = rotor diameter
- d = shell thickness
- s = gap

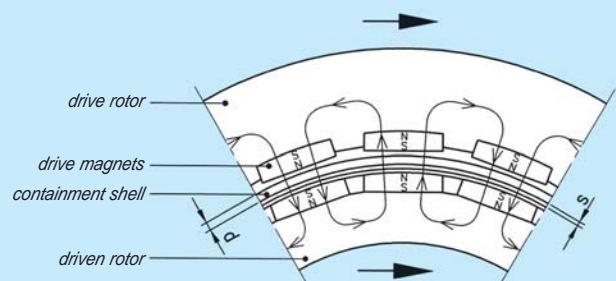
The inner magnets are sealed from the pumped liquid by a protective sleeve welded to the rotor. The magnetic couplings can be adjusted to the required drive power by appropriate selection of rotor diameter and magnet length. The maximum available nominal coupling power is currently 200 kW.



$$V_R = \frac{D_R \cdot \pi \cdot n}{60} \quad [\text{m/sec}]$$

$$D_R \quad [\text{m}]$$

$$n \quad [\text{min}^{-1}]$$



## SiC-Sleeve bearings

Only the application of pure sintered Silicone Carbide (SiC) led to the general usability of magnetic coupled pumps in the chemical industry, in areas where the highest demands are made on corrosive and abrasive wear resistance. The mechanical and chemical resistance of the sintered SiC enables positioning of the bearing in the pumped fluid. A common misconception is that SiC sleeve bearings require lubrication. This is not correct, as only a stable liquid film of the pumped fluid between the surfaces of the sleeve bearing is necessary to ensure proper functioning of the bearing.

SiC-bearing dry run capability has been greatly enhanced, even during longer dry running periods in empty pumps, with the recent development and application of Diamond Like Carbon coatings (DLC) on the bearing surfaces. Combined with generously dimensioned internal clearances, pumping of liquids containing solids is also possible with our magnetic coupled pump.





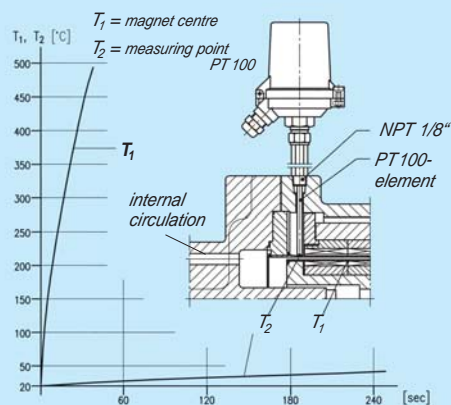
## "MAG-SAFE" – Monitoring

In sealless pumps with magnetic couplings and metallic containment shells, eddy currents are generated which cause heat and a subsequent temperature rise of the pumped liquid in the containment shell area. In order to prevent an inadmissible liquid temperature rise or possible flashing of the pumped liquid, this generated heat is dissipated through an internal cooling flow. The temperature of this cooling flow, respectively the temperature in the containment shell area, should be monitored during operation.

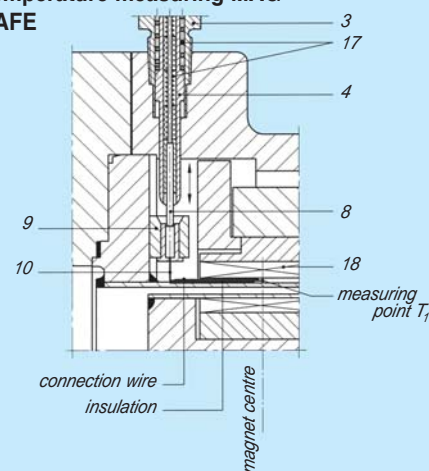
The most common monitoring systems are the PT100-elements located on the containment shell surface. The disadvantage of the PT100 element is that the temperature reading is outside the magnet area. The graph below shows the different temperature curves of measuring points  $T_1$  and  $T_2$ .

The Dickow "MAG SAFE" system is protected by patent No. 0610562. The Ni-connection wire of the MAG-SAFE is welded to the metallic containment shell (at measuring point  $T_1$ ) forming a thermocouple. The thermocouple 'reads' the temperature in the centre of the magnets. A transmitter converts this temperature into a linear output signal of 4 to 20 mA. This signal corresponds to a measuring range of  $-50^{\circ}\text{C}$  to  $+250^{\circ}\text{C}$  ( $-60$  to  $+480^{\circ}\text{F}$ ). An additional safety function of the MAG-SAFE prevents worn or eccentric running ball bearings to cause the outer drive rotor to damage the hermetically sealed containment shell. Any adverse movement of the outer drive rotor will cut the connection wire / thermocouple and thus, send a trip signal to the motor.

### Temperature measuring PT100

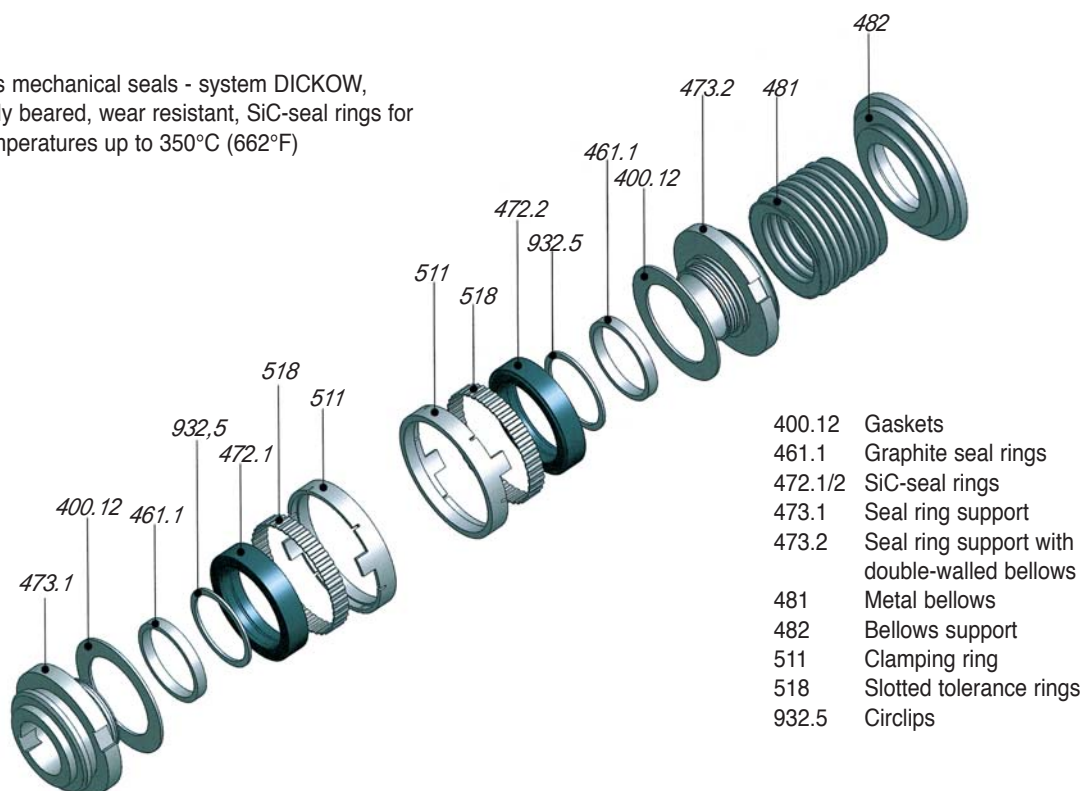


### Temperature measuring MAG SAFE



## Mechanical seals – System DICKOW

Metal bellows mechanical seals - system DICKOW, with elastically beared, wear resistant, SiC-seal rings for operating temperatures up to  $350^{\circ}\text{C}$  ( $662^{\circ}\text{F}$ )



Our leaflet "Metal bellows seals" gives more informations on applications and further technical details. Available on request.





## Applications - References

DICKOW Pumps, the result of more than 90 years experience, research and development, are the choice of engineering companies, cost analysts, and end users, due to high performance, safety, availability, and low cost of ownership in all kinds of applications. The following applications are part of our reference list. Further references on pumped liquids and operating conditions are available on request.



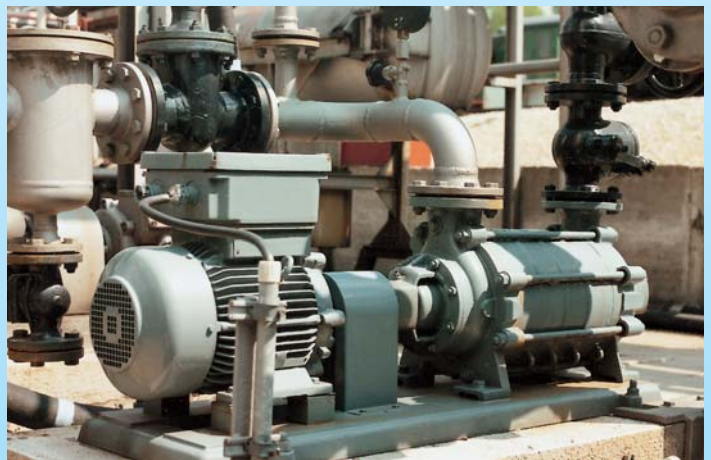
Type NML with magnetic coupling.  
Liquid: Methylene Chloride, 40°C (104°F).



Type HZSMA with magnetic coupling.  
Liquid: Propane/Butane, 20°C (68°F).



Type NCL with tandem bellows seal (N9).  
Liquid: Thermal oil, 330°C (626°F).



Type HZS with single mechanical seal.  
Liquid: Gasoline, Diesel 20°C (68°F).

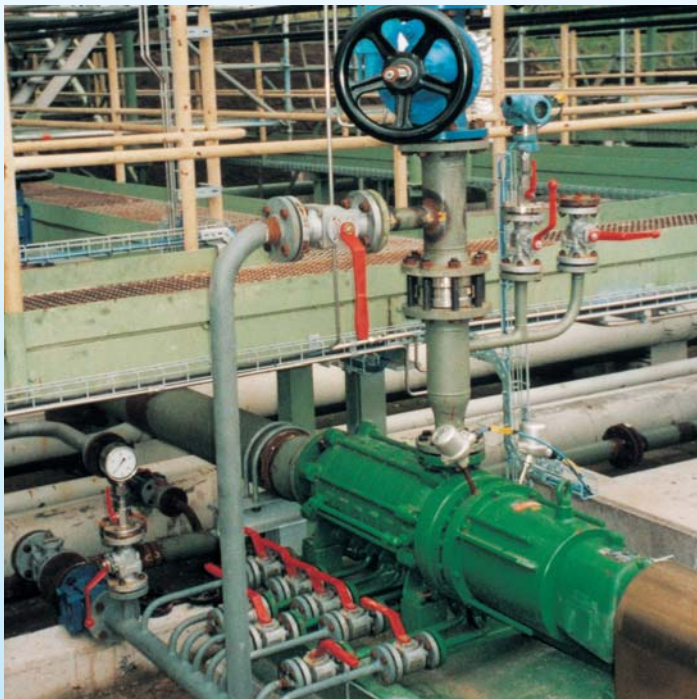


Type NML with magnetic coupling.  
Liquid: Acetic acid, 130°C (266°F).



Type SMV with magnetic coupling.  
Liquid:  
Chemical Waste Water.





Type HZMR with magnetic coupling.  
Liquid: Benzol mixture.



Type NCR – API 610 9th ed. with double seal system plan 53B + 31.  
Liquid: Aqueous Hydrocarbon (offshore application).



Type NMW with magnetic coupling.  
Liquid: DOWTHERM-A, 350°C (662°F).



Type NCR – API 610 7th ed. – with single mechanical seal.  
Liquid: Aviation fuel JP4.



Type SCM with magnetic coupling.  
Liquid: Methanol, 40°C (104°F).



Type HZSM with magnetic coupling.  
Liquid: Solvent, 20°C (68°F).





## Where We Are

The city of Waldkraiburg is located approximately 70 km (45 miles) East of the Bavarian capital München (Munich). The new "Franz Joseph Strauß Airport MUC" is approximately one hour away, by car.

Waldkraiburg, founded in 1945, is an industrial city and with 25000 inhabitants, the biggest city in the county of Mühldorf. Waldkraiburg is also favourably situated with easy access by public transport.

Located at the northern border of the Chiemsee area with its mountains and lakes, the surrounding area offers a great number of recreational and cultural activities. The cities of Munich and Salzburg are within easy reach by car or public transport.



Waldkraiburg



Manufacturing plant



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PUMPEN**



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