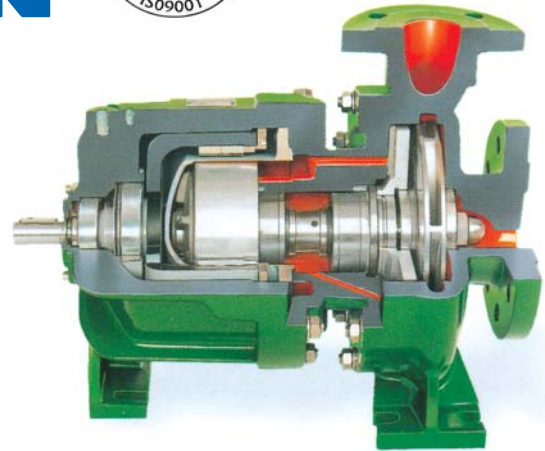




**DICKOW
PUMPEN**



**Sealless magnetic coupled
centrifugal pumps acc. to EN 22858**

Type NML / NMB

*our
contribution
for
environmental
protection*

General

Magnetic coupled DICKOW-pumps of the series NM are sealless pumps. The static containment shell forms a closed system with hermetically sealed liquid end.

Applications

Magnetic driven NM-pumps are designed to improve plant and personnel safety, especially when handling toxic, explosive or other dangerous liquids which react on contact with the atmosphere. For all these services the containment shell replaces the double acting mechanical seal with external fluid reservoirs and the necessary control equipment. NM-pumps therefore offer exceptional benefits to the chemical, petrochemical and allied industries, and protect the environment.

Max. capacity and differential head:
50 Hz – appr. 400 m³/h and appr. 150 m
60 Hz – appr. 480 m³/h and appr. 220 m
(appr. 2100 gpm and 720 ft)

The maximum operating temperature is 200°C (390°F) for NML-series and 240°C (464°F) for NMB-series. Higher temperatures are possible with the pump types NMR / NMWR.

Hazardous area

Together with the required Ex-drive motors, the NML/NMB-pumps can be applied in hazardous area Group II, Category 2. The pumps meet the basic safety and health requirements of Explosion-proof Directive 94/9 EC and are suitable for plants with increased safety requirement.

For close coupled pumps (NMB) the containment shell temperature is limited when using ex-motors. The values are available on request.

Design / Casing

NML-pumps are single stage volute casing pumps with closed impellers, back-pull-out design, with end suction and top discharge flange. Sturdy feet are provided as standard for mounting on the base plate.

Capacity and outer dimensions comply with DIN EN 22858.

Containment shell

The containment shell is designed as a pressurized vessel to separate the pumpage from the atmosphere.

The containment shell is not used as an additional bearing holder. No dynamic stress occurs.

The containment shell is bolted to the bearing housing in a manner that allows removal of the bearing bracket (NML-pumps) respectively of the drive motor (NMB-pumps) together with the drive rotor without draining the pump.

Magnetic coupling

The single elements of the multipolar magnetic coupling are manufactured of permanent magnet material "Cobalt Samarium" with unlimited lifetime. The magnets in the driven rotor are completely encapsulated, not in contact with liquid. Power is transmitted to the hermetically sealed liquid end by a bank of external magnets. Inner and outer magnet rings are locked together by magnetic forces and work as a synchronous coupling. The inner magnet ring transmits the required torque direct to the impeller. Overload of the magnetic coupling and slipping will not cause demagnetization if temperature monitoring is available. The magnetic drives are designed for electric motors, direct on line starting. Should a subsequent increase of motor power be required, i.e. when installing a larger impeller, the nominal power of coupling can be increased with additional magnets.

The maximum drive power at NML/NMB-pumps is approximately 84 kW at 2900 rpm (137 HP at 3500 rpm).

Internal clearances

The internal clearance between rotor and containment shell is appr. 1,0 mm for standard containment shells.

This allows – together with the wear resistant SiC sleeve bearings – handling of solid containing fluids.

Containment shell protection

The clearances between drive rotor and motor support lantern respectively between bearing bracket and containment shell are arranged such that rubbing of the magnets on the containment shell will be avoided, even in the case of worn out ball bearings.

Casing drain

Complete drainage of casing and magnet end is possible through casing drain. No additional drain required.

Outer ball bearings

The drive shaft of the NML-pumps is carried in generously dimensioned antifriction bearings, grease filled for lifetime and protected against the atmosphere by a lip seal.

The drive rotor of NMB-pumps is mounted on the motor shaft. That means, additional bearings, elastic coupling and coupling alignment are not required.

Double sleeve bearings

The pump shaft is carried by wetted sleeve bearings. Standard material is pure Silicon Carbide with diamond layer, providing limited dry-run capability. SiC is highly resistant to corrosion and wear and can be used for all kind of liquids, also for solid containing products. The SiC-components are shrinkfitted and therefore protected against shock and thermal stress. Both sleeve bearings are bolted in one common bearing housing to grant a correct alignment.

NPSH-conditions

Due to the internal circulation from discharge to discharge, there is no temperature elevation in the impeller eye. Handling of boiling liquids is therefore possible and there is no increase of NPSH-required.

Balanced thrust loads

The thrust loads of the closed impellers are hydraulically balanced by wear rings, balance holes, back vanes and / or auxiliary impeller. The pump shaft connected to the impeller is floating.

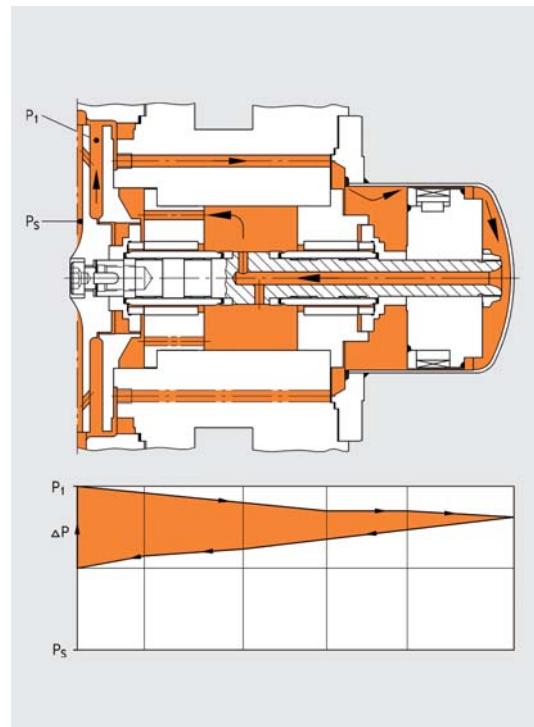
Monitoring

Connection for temperature detection element for containment shell surface temperature is available as standard. Dry running protection and monitoring of ball bearings and containment shell temperature with the patented "mag-safe" system is highly recommended.

Internal circulation, pressurized magnet end

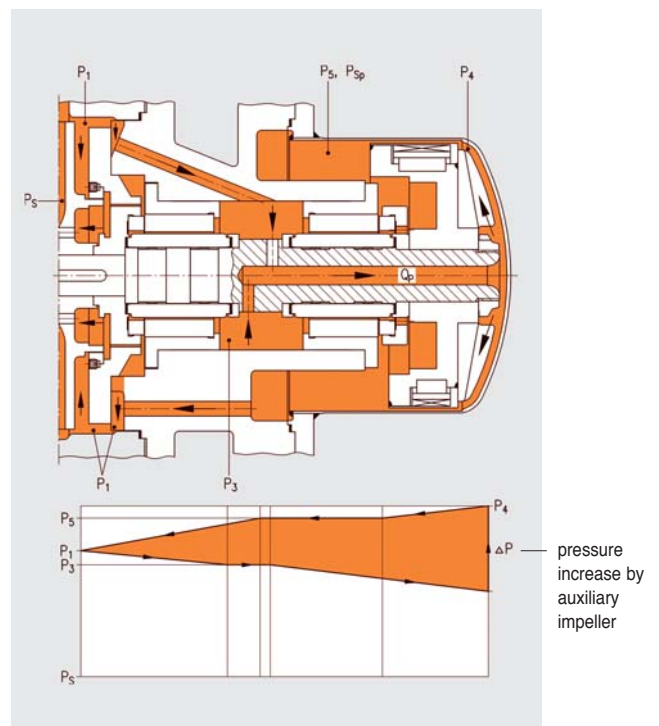
When pump is in operation it generates eddy currents which heat up the containment shell and the pumpage in the magnet area. This heat is dissipated by internal circulation. There are two different internal circulation systems available for different frame sizes.

Internal circulation frame 0:

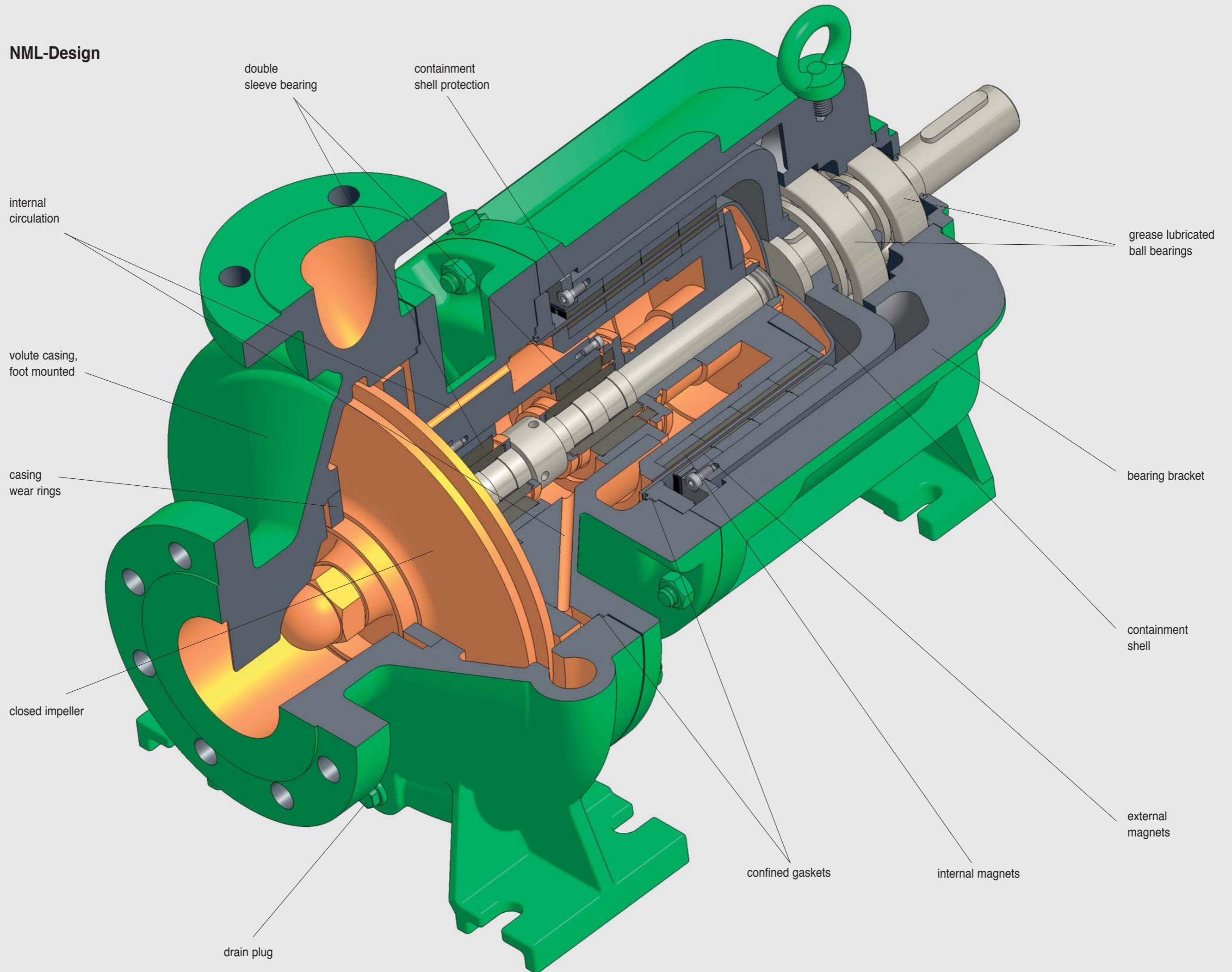


Frame 0 circulation is not recommended for applications with solids.

Internal circulation frame I / II / III with auxiliary impeller:

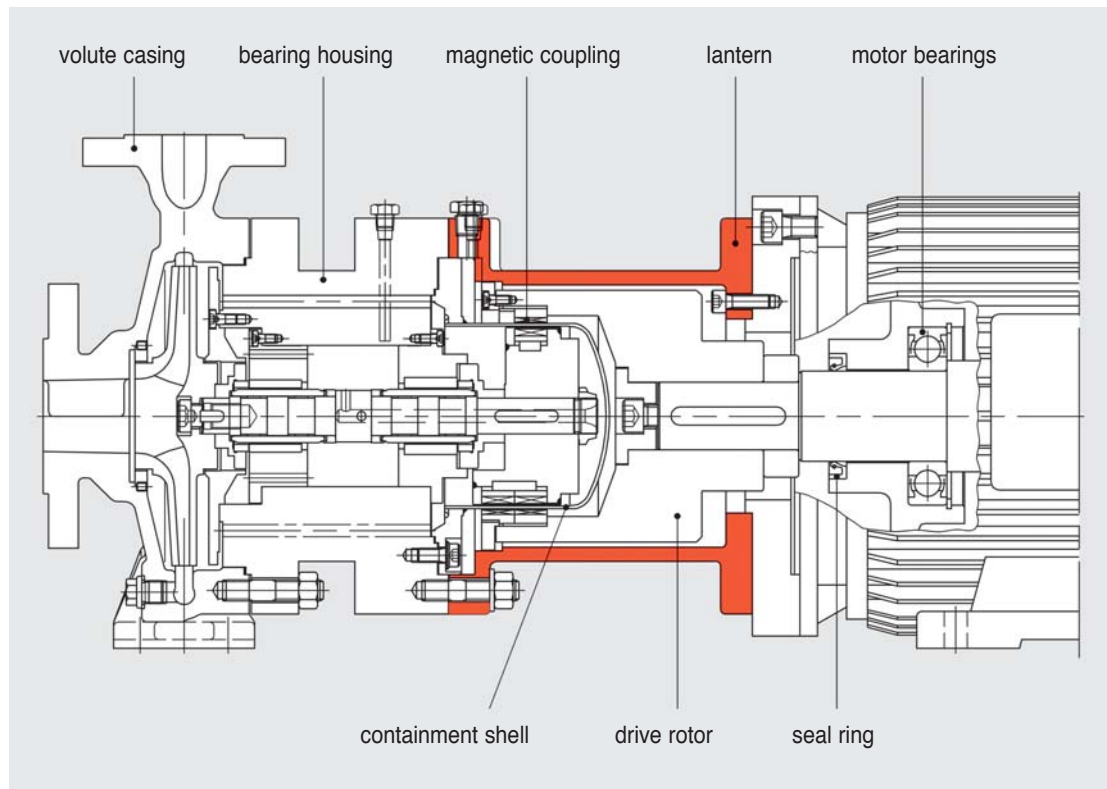


NML-Design

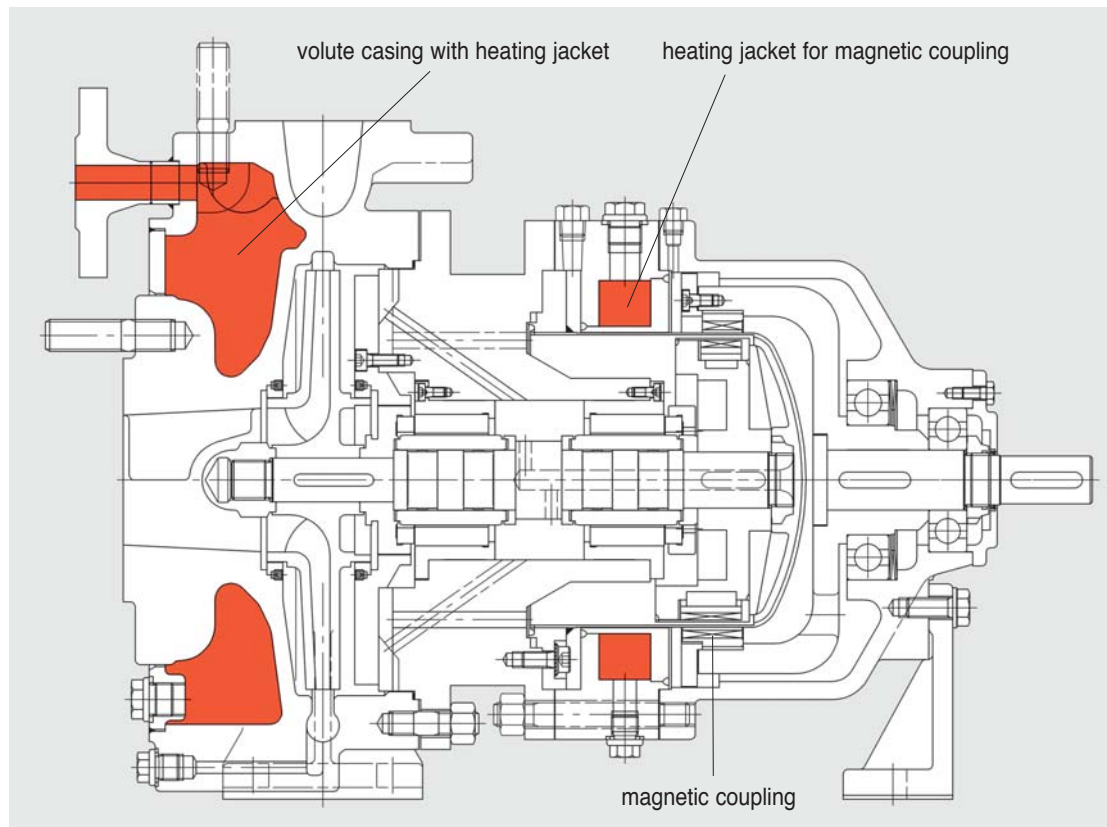


Optional designs

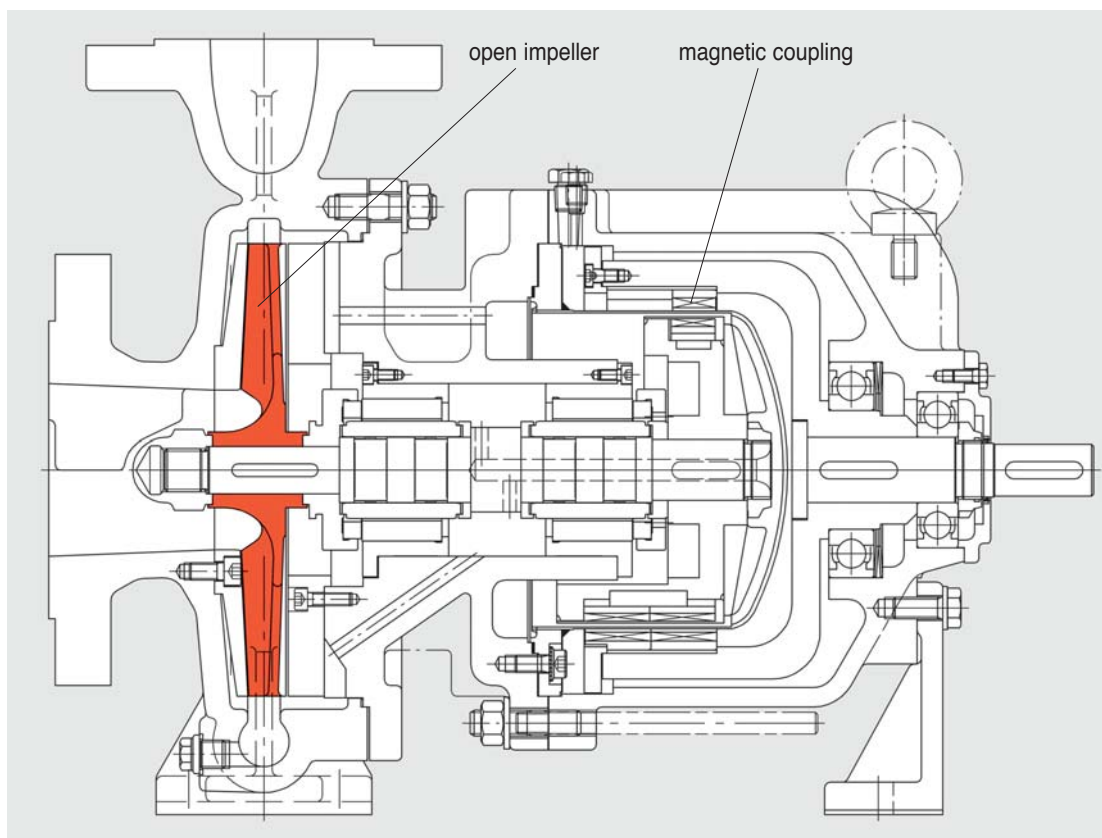
Type NMB – close coupled design



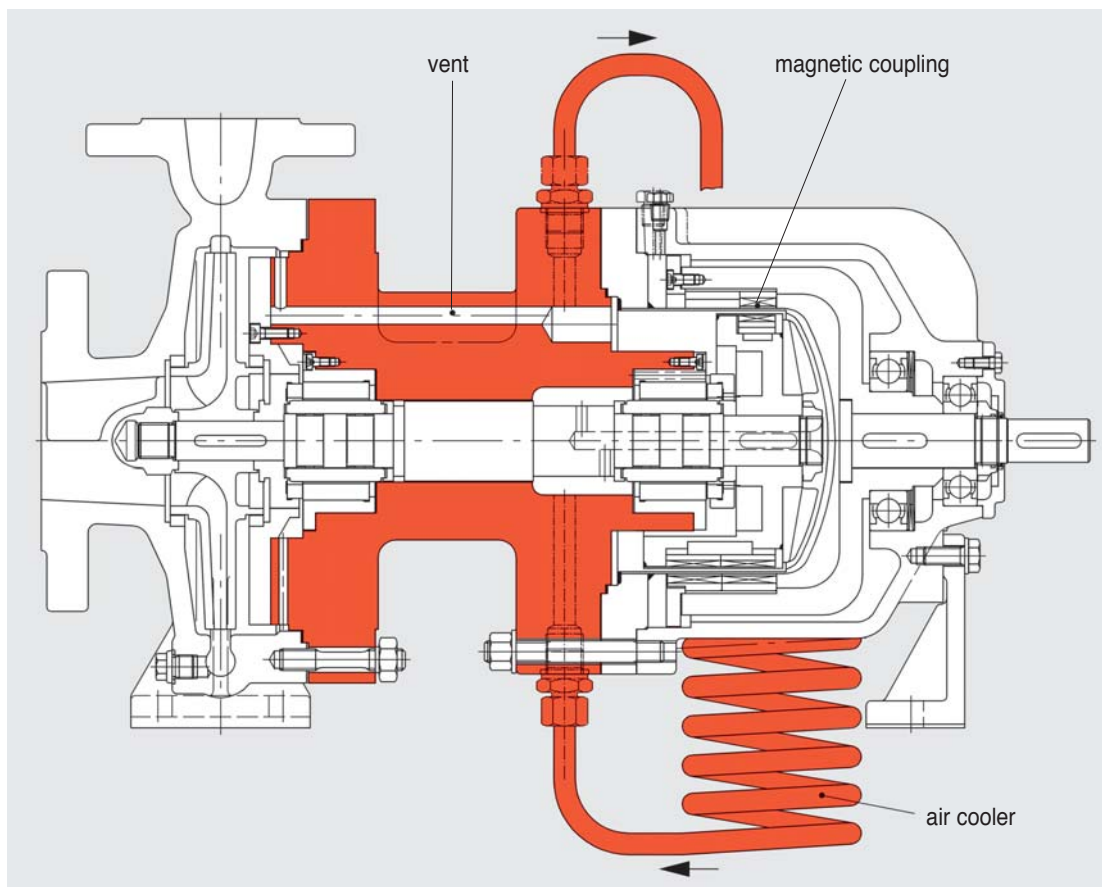
Type NML b – with heating jacket



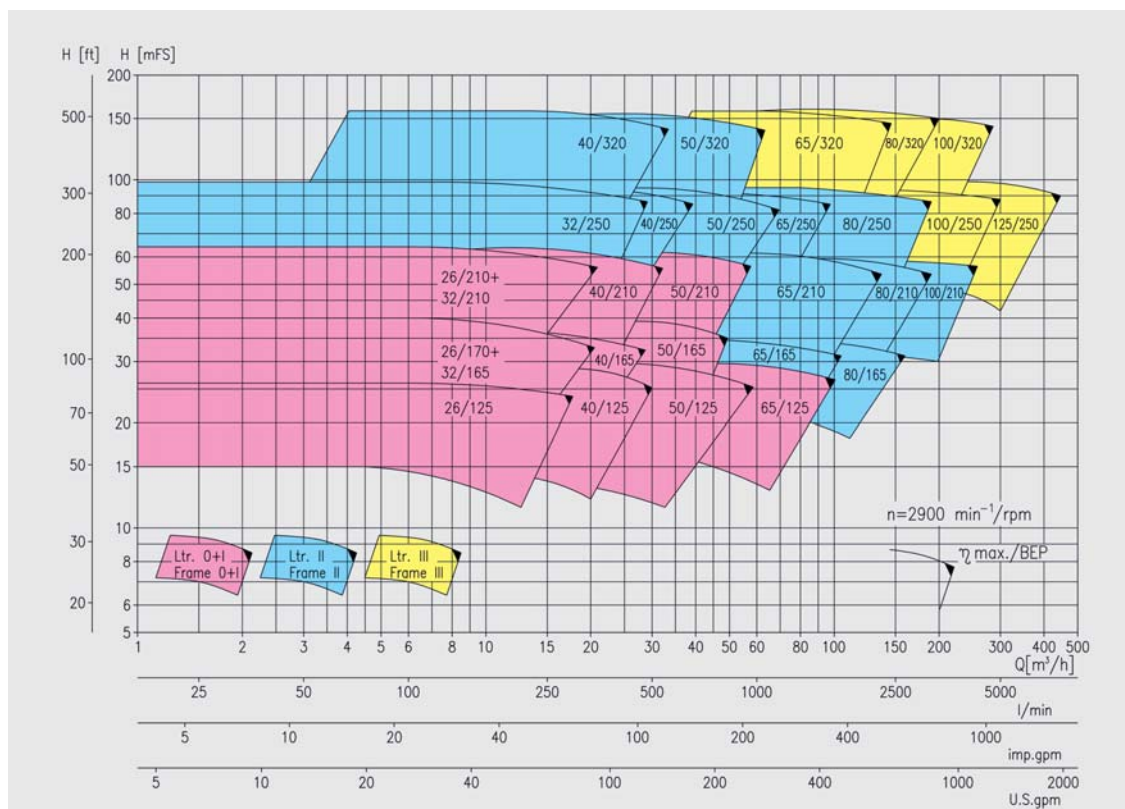
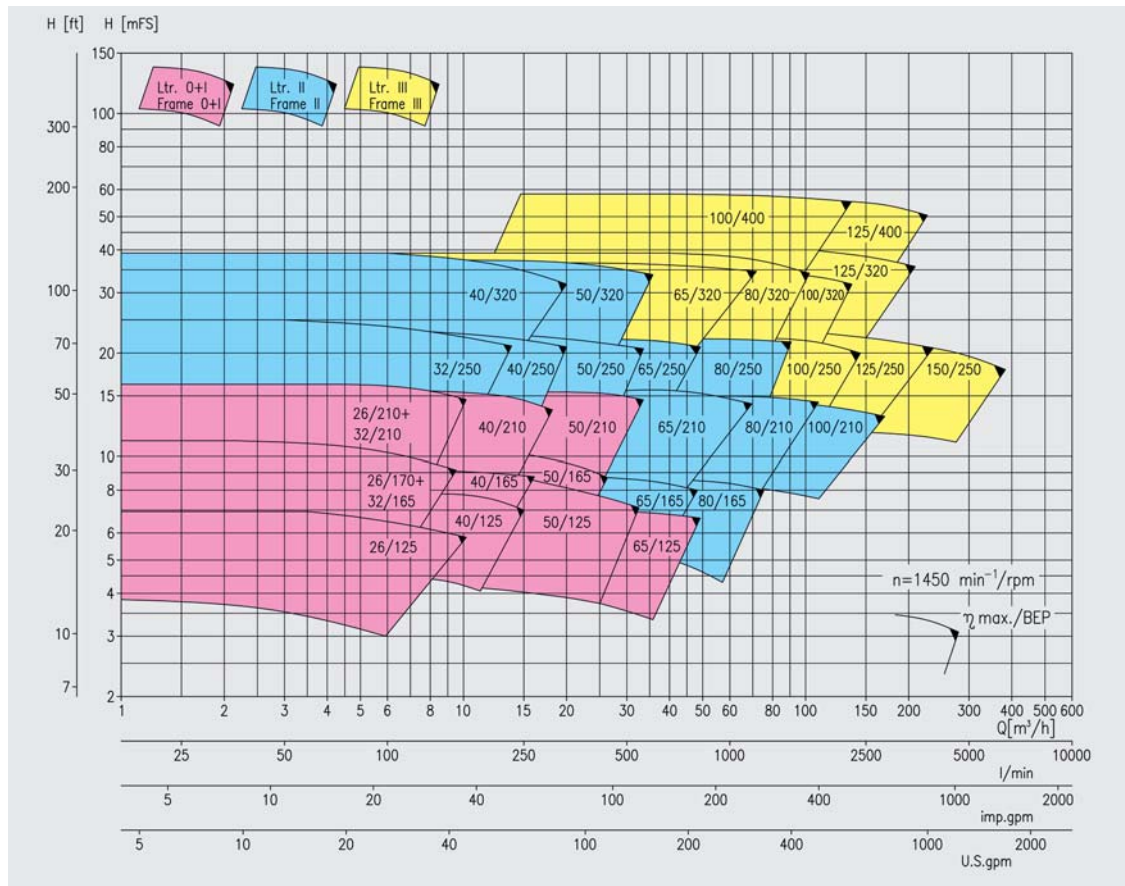
Type NML o – with open impeller



Type NHM – hot water design



Performance range



Performance curves for the individual pump sizes, also for 1750 / 3500 rpm, with NPSH-values and power consumption, are available on request.

