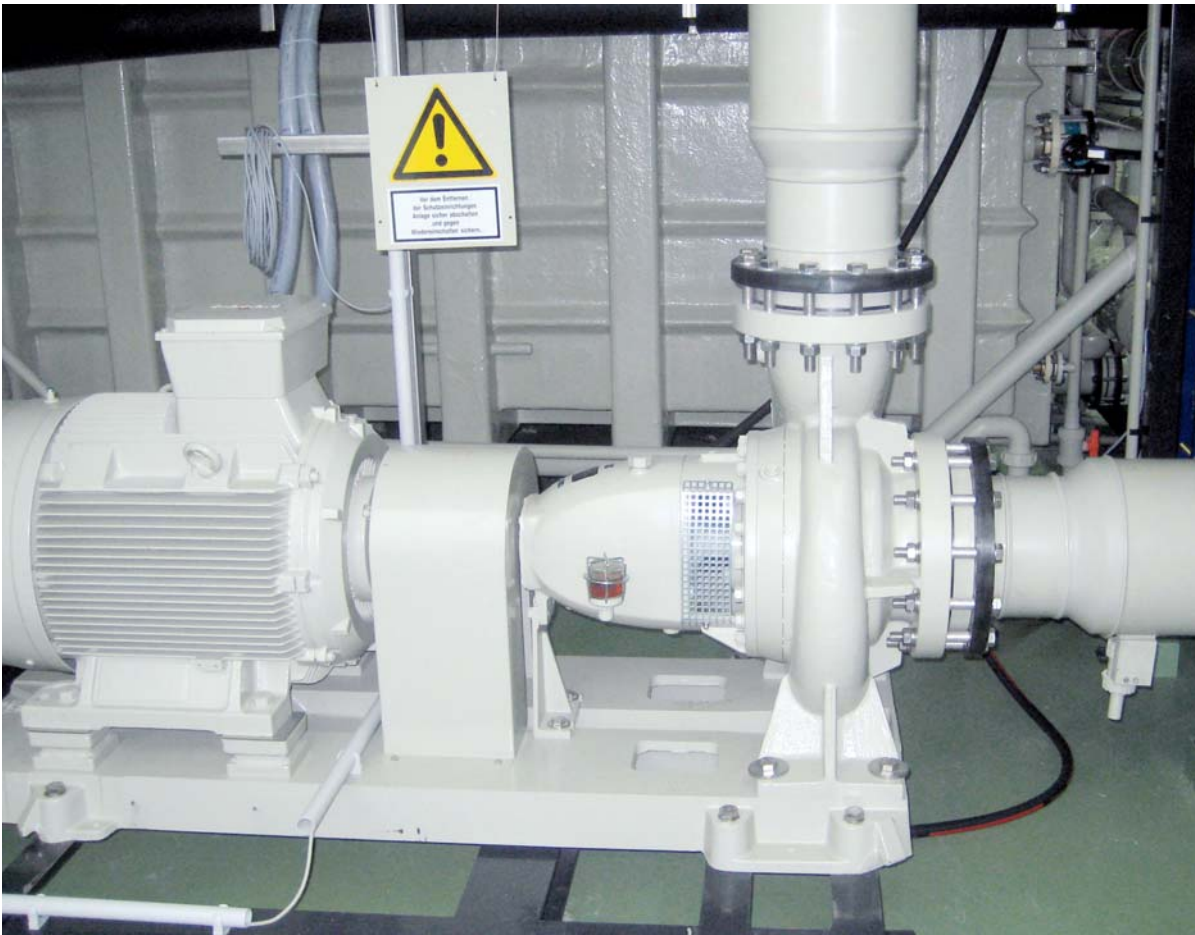
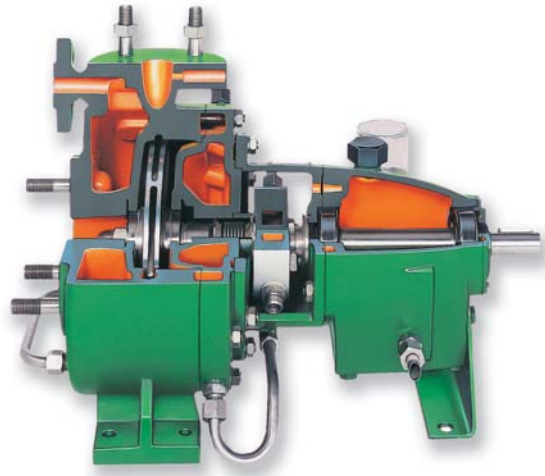




**DICKOW  
PUMPEN**



**Centrifugal Pumps  
acc. to DIN EN ISO 2858  
with Shaft Sealing  
Type NCL**

## General

The DICKOW centrifugal pump, type NCL, is designed for handling liquids in the chemical and petrochemical industry, in refineries, for heat transfer liquids ect.

Dimensions and performance range are developed according to DIN EN ISO 2858:2011-12. The whole range is subdivided that for all service conditions the best efficiency is guaranteed. The maximum capacities go up to 1000 m<sup>3</sup>/h or 4400 US gpm.

With a wide selection of materials and shaft sealing systems they are suitable to handle nearly all kind of liquids which are common in the above mentioned industries. For example we call light fuels (all kinds), acids, lyes, solvents, hydrocarbons, heat transfer liquids, heavy fuel, liquid sulphur, melted plastics, bitumen ect.

For handling hot water above 190 °C (375 °F), additionally our pump types NHL are available.

Relevant leaflet can be submitted on request.

## Design

The DICKOW centrifugal pumps type NCL are single-stage, single-flow volute casing pumps in back pull out design, with an end suction flange and a centerline discharge flange. Bearing housing with intermediate casing, shaft sealing and impeller is mounted to one unit.

With the back pull out design, unit can be removed without demounting the pipe connections.

In order to have full advantage of back pull out design spacer type couplings are recommended, the motor can then remain bolted on the base plate.

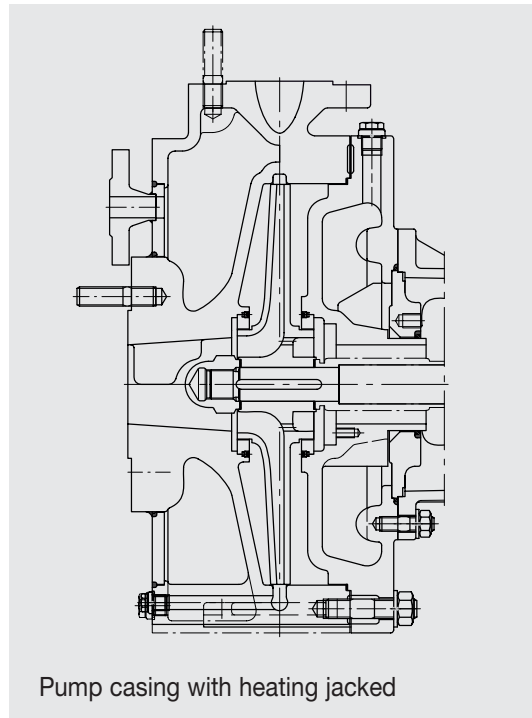
## Volute casing

The pump casing of standard design is cast in one piece and foot mounted on the base plate. The casing is sealed to the atmosphere by confined non-asbestos gaskets.

If required by end-user or handled fluid, following special designs are available:

## Pump casing with heating jacket

Pumps with heating jacket are required if the liquid temperature decreases when flowing through the pump or when the liquid temperature drops below the melting or crystallization point during plant shut down.



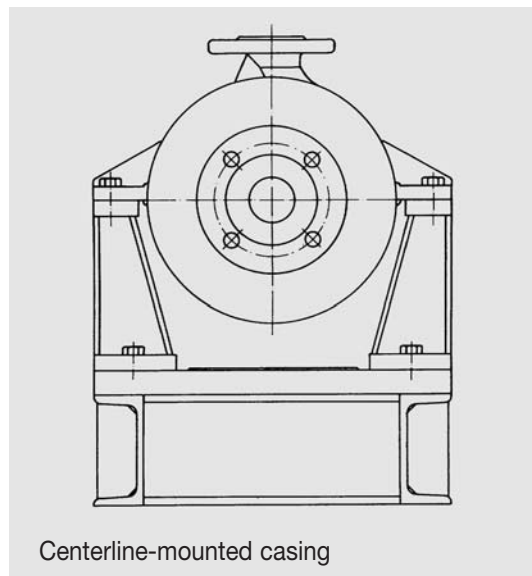
Pump casing with heating jacket

For example fluids like: Dimethylterephthalat (DMT), sulphuric liquid, Phenol etc.

Heating jackets on volute and intermediate casings with welded cover are designed for heating liquids up to 24 bar (350 psi) and 220 °C (430 °F).

## Centerline-mounted casing

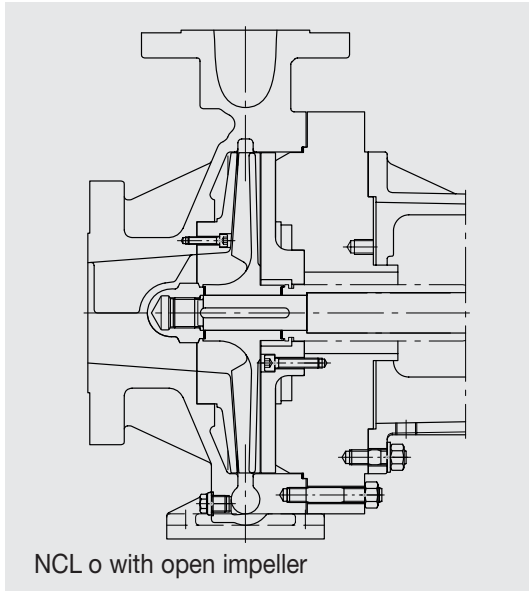
Hot fluids cause expansion of the pump casing. In order to minimize coupling misalignment and thermal stress we recommend centerline mounted pump casings for high temperatures. All NCL-sizes can be delivered with centerline supported pump casings on request.



Centerline-mounted casing

## Impeller

Closed impellers are standard. Impellers are casted in one piece with solid hubs. To minimize the axial load of the bearings, the impellers are fitted with wear rings on the back and balance holes to the suction. Impellers are properly statically and dynamically balanced in acc. to DIN ISO 1940T1 Grade 6,3.



For handling liquids, containing solids such as slurry and suspensions, the NCL o type with open impeller is available.

NCL o pumps are fitted with renewable wear disks on suction side to minimize maintenance costs.

The overhung mounted impellers are secured on the shaft by a key and a cap screw with Heli-Coil insert.

Not all pump sizes are available with open impeller.

## Wear rings

Volute casing and intermediate casing of NCL-pumps are both fitted with replaceable wear rings held in place by a press fit with locking screws. Additional impeller wear rings are available as an option.

The running clearances are in accordance with API 610.

## Shaft, shaft sleeve

The pump shaft is able to transmit the full driver output, is accurately machined throughout its entire length and has properly finished bearing surfaces.

In order to have satisfactory seal performance the shaft diameter and overhung are sized to minimize shaft deflection at the seal faces.

The shaft construction guarantees a critical speed of more than 10 % over the maximum operating speed. The connections "cap screw – hub" and "hub – shaft sleeve" are sealed by confined gaskets and the pump shaft has no contact to the pump fluid.

## Bearing

The pump shaft is carried by generously dimensioned antifriction bearings outside the pumped liquid. The bearings are oil lubricated. The oil level is regulated by a constant level oiler.

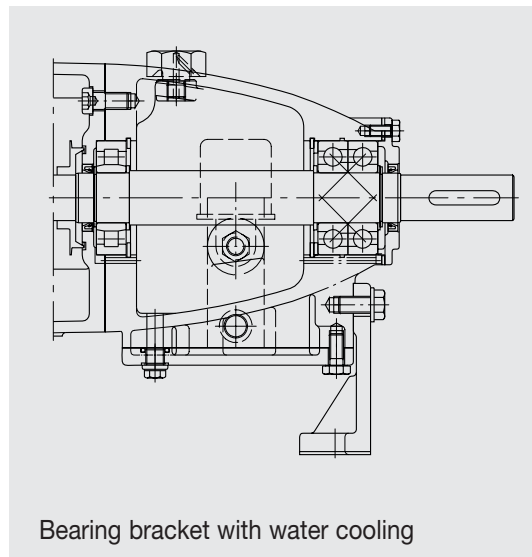
A fixed double-row angular ball bearing of Conrad-type (no filling slots) is mounted on coupling side, a roller bearing provides support on pump side. Calculated service life of bearings is min. 25000 hours.

## Bearing bracket

Bearing brackets of NCL-pumps are of split design. Therefore, it is possible to supply the pump sided bearing bracket lantern of corrosion resistant material when handling aggressive liquids.

The pump sided radial seal ring located in the bearing bracket lantern is protected by an additional deflector which avoids entrance of potential leakage from mechanical seal. The bearing bracket lantern is designed as drip pan and provided with a leakage connection.

If required, bearing bracket can be equipped with additional water cooling chamber.

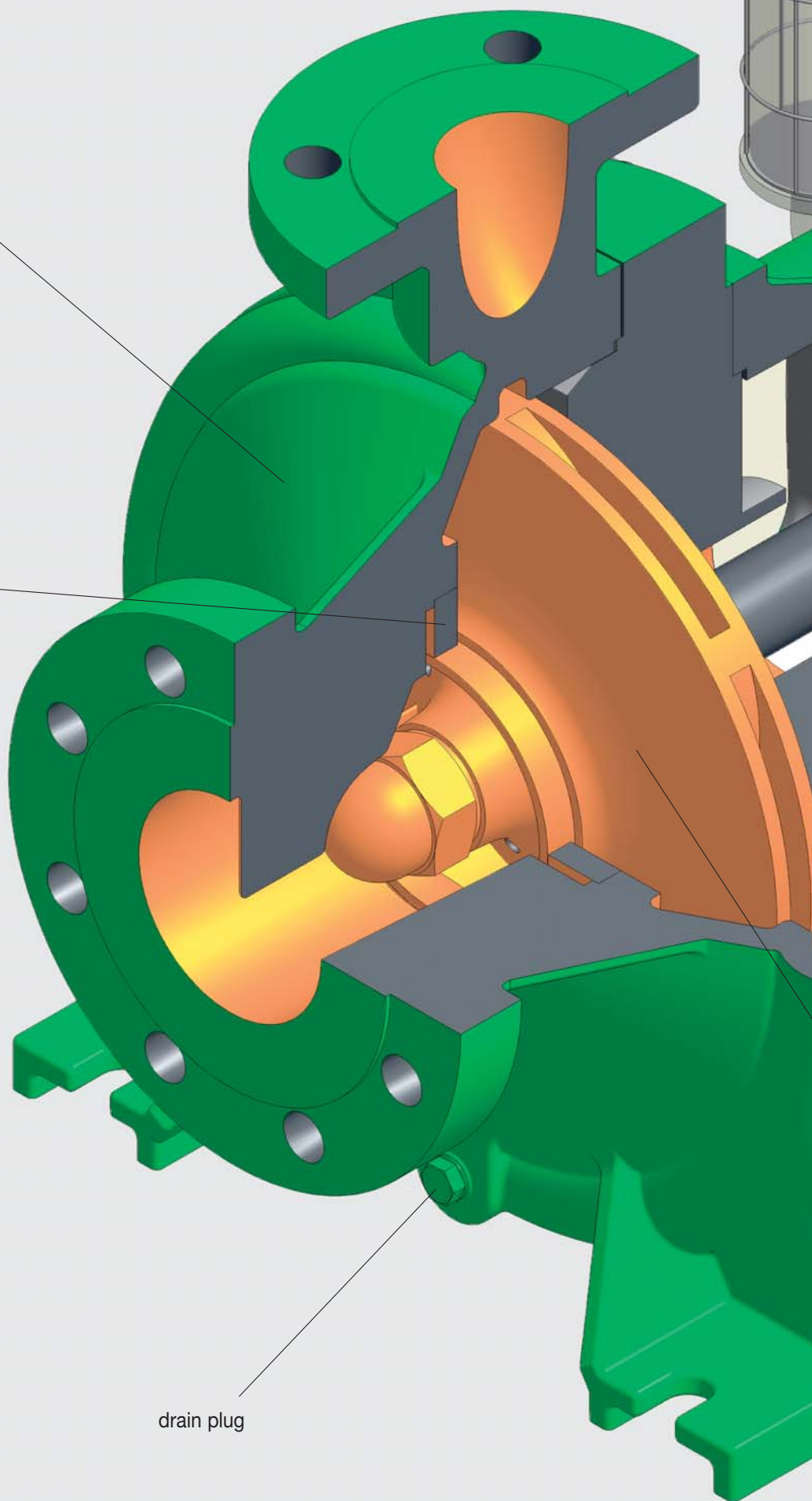


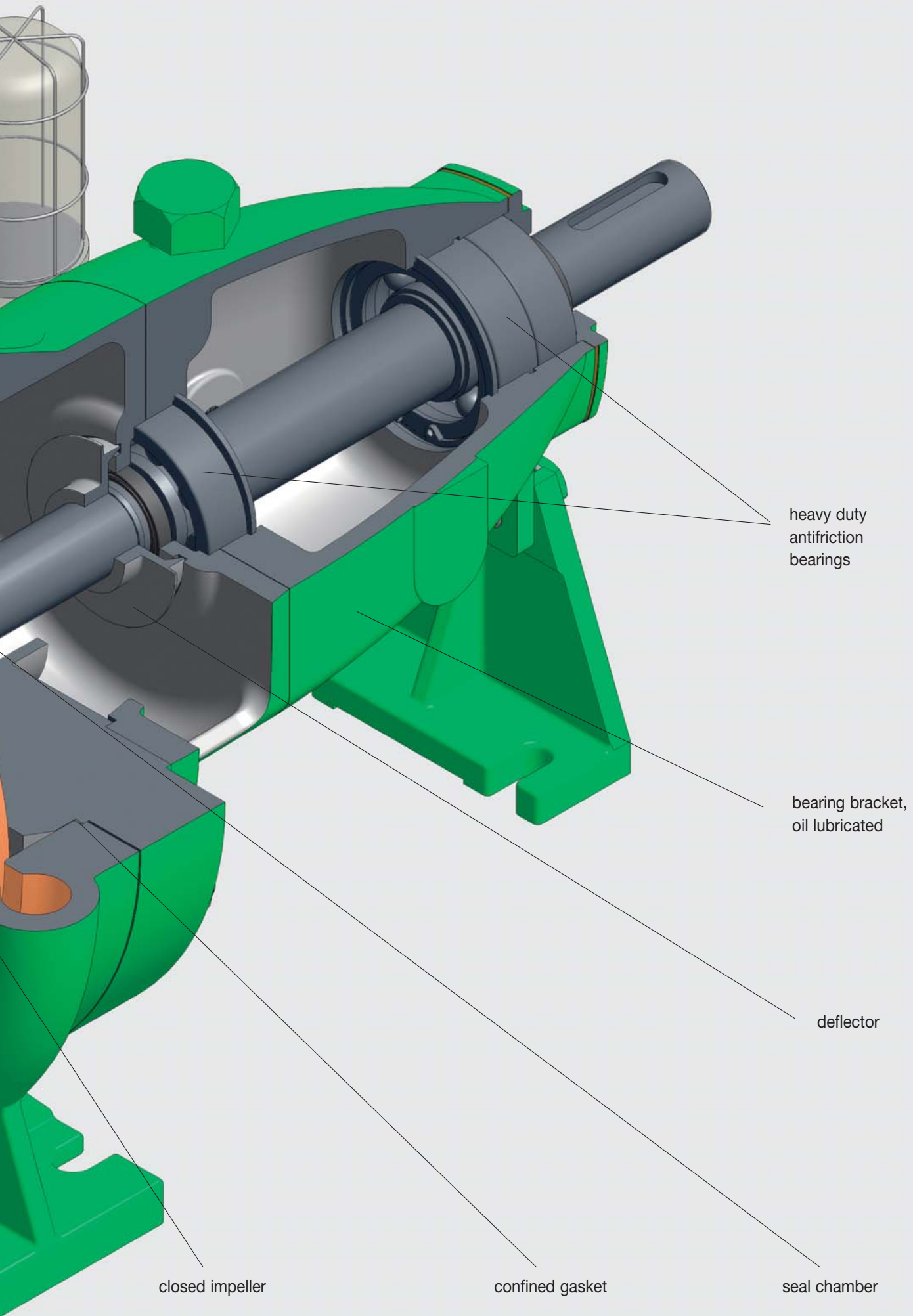
## NCL-Design

volute casing,  
foot mounted

replaceable  
wear ring

drain plug





heavy duty  
antifriction  
bearings

bearing bracket,  
oil lubricated

deflector

closed impeller

confined gasket

seal chamber

## Hazardous area

Together with suitable Ex-drive motors, the NCL-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.

## Application limit

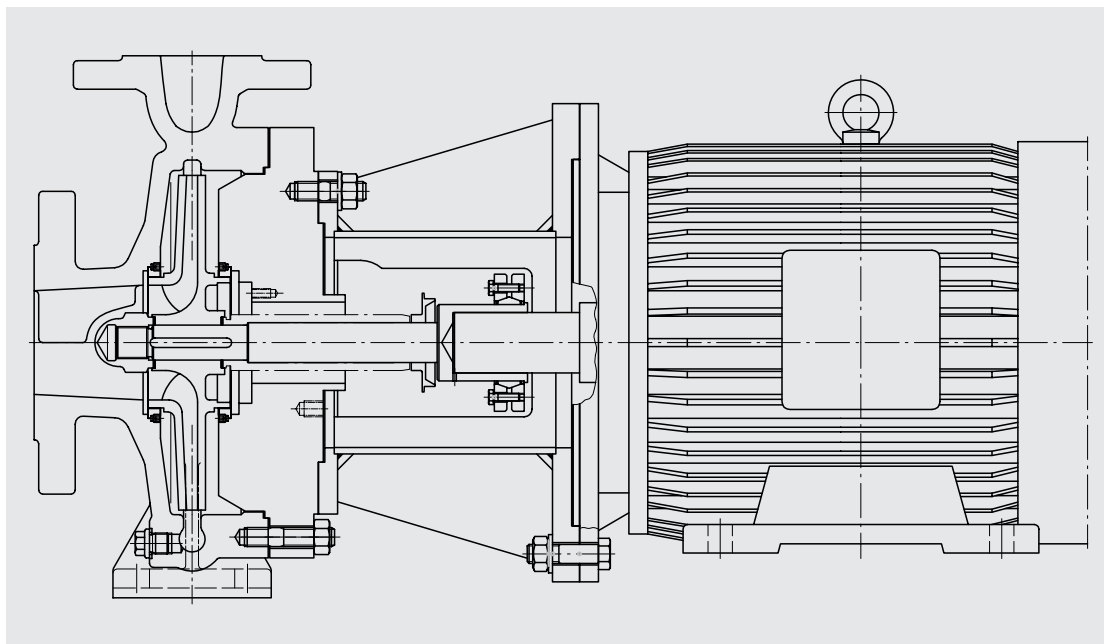
Hot water up to 190 °C / 374 °F	(NCL s + NCL hu)
Thermal oils up to 350 °C / 662 °F	(NCL s + NCL hu)
Pressure limits:	NCL s – 20 bar / 290 psi - 190 °C / 374 °F NCL hu – 24 bar / 348 psi - 100 °C / 212 °F (16 bar / 232 psi - 350 °C / 662 °F) NCL h – 16 bar / 232 psi - 100 °C / 212 °F
	Higher pressures on request

## Materials

The following specified materials are standard execution.  
Further materials are available on request.

Pumpe type	NCL s	NCL hu	NCL h
Volute casing	EN-GJS-400-18-LT	GP 240 GH	1.4408
Impeller	EN-GJL-250	EN-GJL-250	1.4408
Intermediate casing	EN-GJS-400-18-LT / St	GP 240 GH / St	1.4408 / 1.4571
Shaft	1.4021	1.4021	1.4021
Shaft sleeve	1.4571	1.4571	1.4571
Cap screw	St. 60	St. 60	1.4571
Bearing bracket	EN-GJL-250	EN-GJL-250	EN-GJL-250
Bearing bracket lantern	EN-GJL-250	EN-GJL-250	EN-GJL-250

## Type NCB – close coupled design



## Shaft sealing

### Gland packing

Gland packings are fitted with split cages and split stuffing box ring for an easy replacement of packing rings. Internal circulation or external flushing is possible.

Mechanical seals can be installed in the packing chamber on site, no re-machining of parts required.

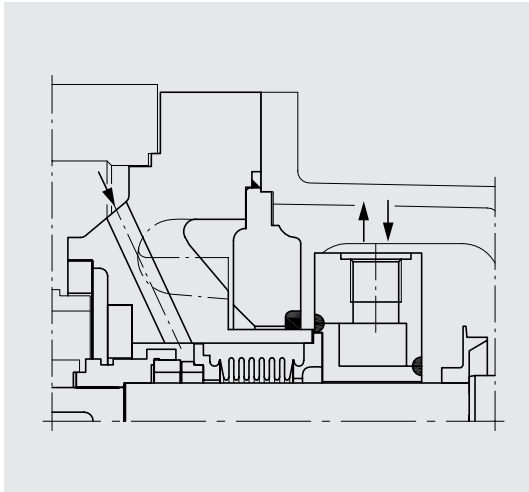
### Mechanical seal

Pumps can also be fitted with all kind of mechanical seals such as single, tandem or double seals. The standard seal chamber is designed to accommodate seals acc. to DIN EN 12756:2001-03.

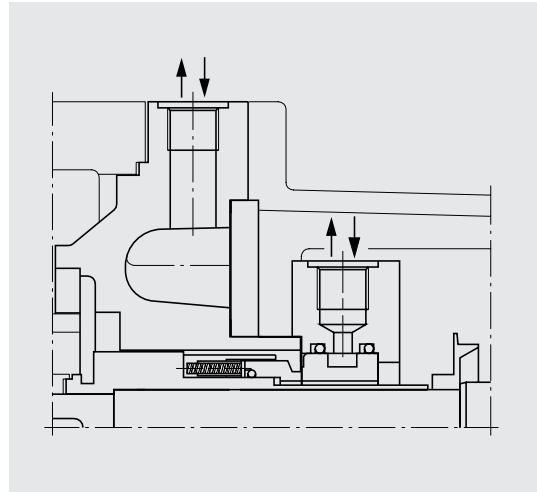
Special seal chambers for cartridge seals, also acc. to API 682 Cat. 1, can be machined.

Heating or cooling of the seal chamber is possible. Single seals can be equipped with throttle bushings, quench connections or auxiliary packing.

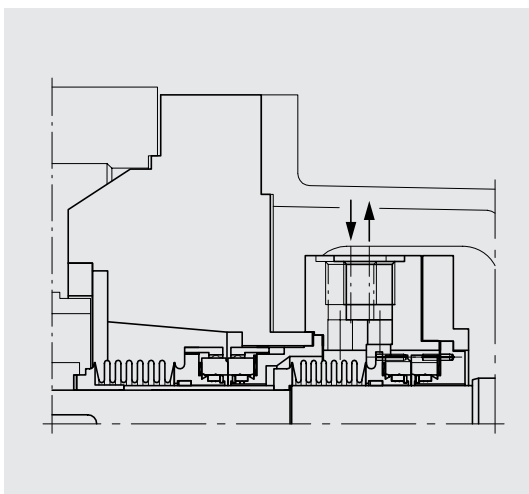
### Mechanical seals arrangements



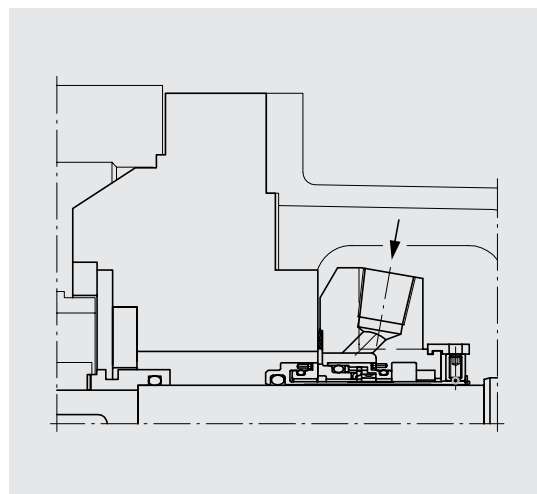
Single mechanical seal with heating jacket, system DICKOW N6b, bellow type, to handle DMT, Sulphur etc.



Single mechanical seal with water cooled seal ring, Burgmann H75G15, to handle hot water up to 190 °C (374 °F).

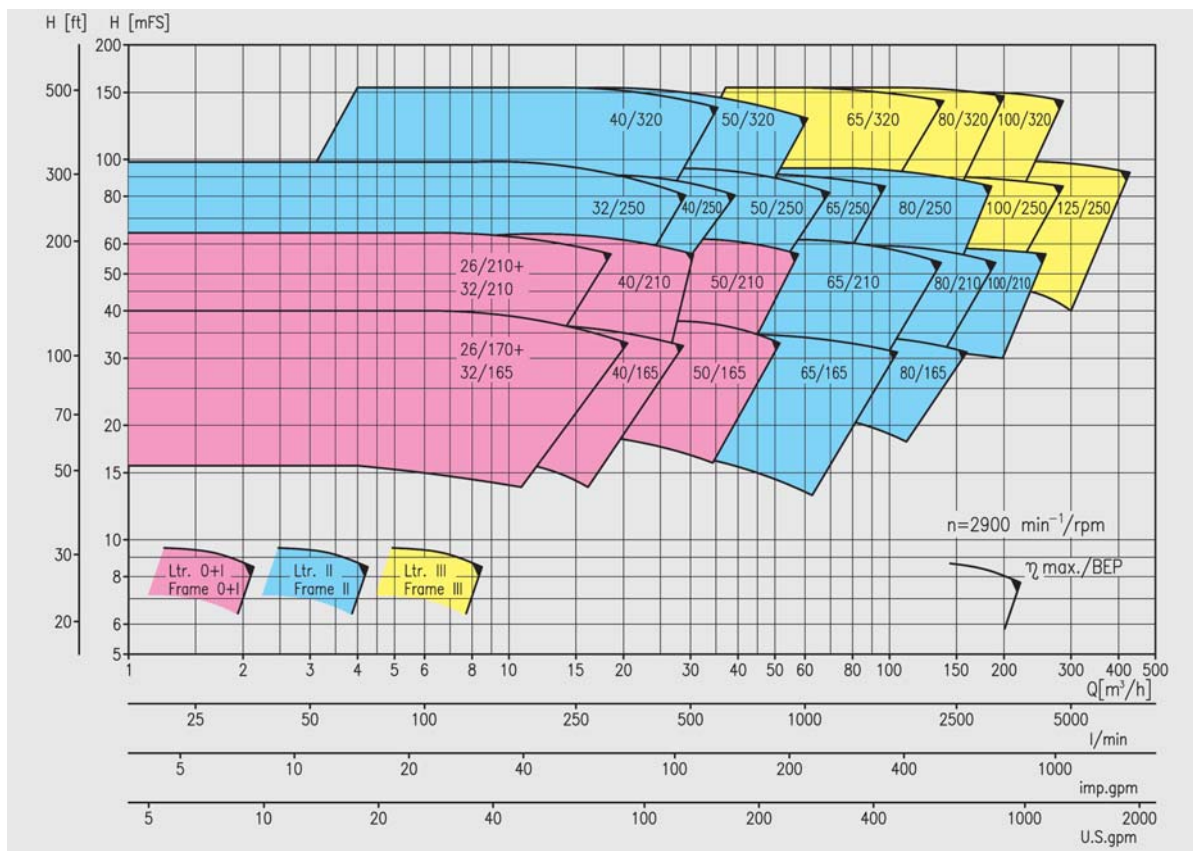
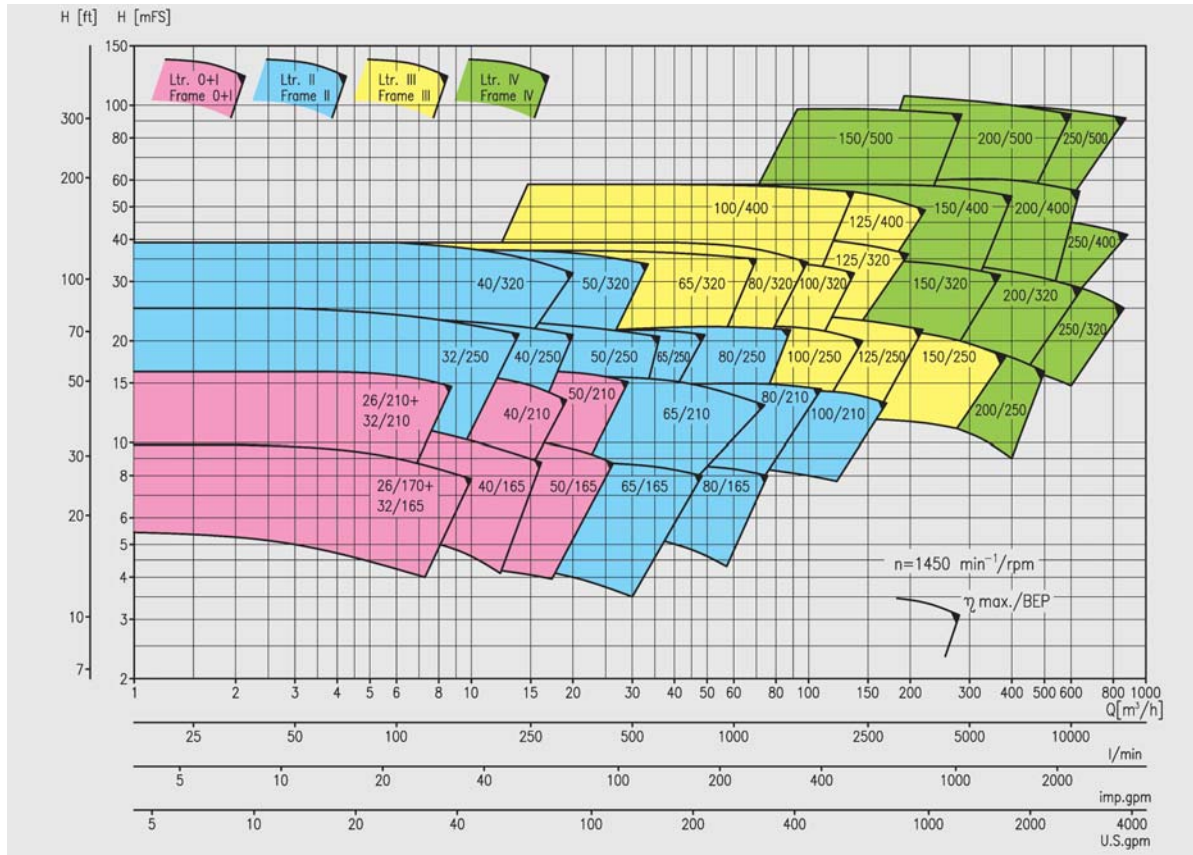


Tandem mechanical seal with Plan 52, system DICKOW N9, bellow type, to handle heat transfer oil up to 350 °C (660 °F).



Single mechanical seal, cartridge type, for quick and easy maintenance.

## Performance range



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

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