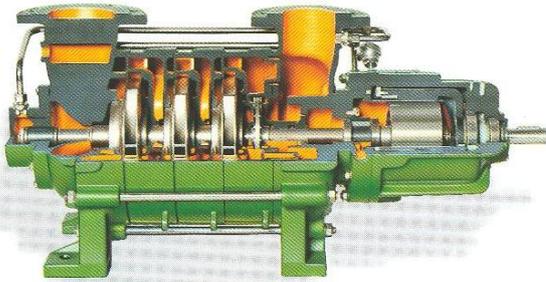




**DICKOW  
PUMPEN**



## Selfpriming Centrifugal Pumps Type HZS/HZSA

Issue 04/97

## General

The selfpriming multistage DICKOW-centrifugal pump is designed for handling hydrocarbons and other volatile liquids.

The HZS-type is used in tank farms, for offloading of rail cars and trucks, filling of storage tanks, feeding hydrant systems on air fields and for other applications where priming of empty suction pipes is required.

The HZSA-type with low NPSH-requirements and gas handling capability is developed for pumping liquified petroleum gas (LPG). Typical application is the filling of LPG-trucks in refineries.

The performance range is subdivided to achieve best efficiencies for all service conditions.

With a wide selection of materials and the possibility of applying several shaft sealing systems as well as a hermetically sealed permanent magnetic coupling, the HZS / HZSA-pumps are suitable for handling almost all kinds of liquids which are free of abrasive solids and of suitable viscosity.

## Construction

HZS / HZSA-pumps are multistage horizontal centrifugal pumps, combined with integrated gas-handling, selfpriming side channel stage on the discharge side.

### Suction- and discharge casing

The pump flanges of HZS-pumps are provided generally in vertical top position to grant a certain quantity of liquid in the pump which is necessary for priming empty suction pipes and lifting pumpage from under ground storage facilities. To obtain low NPSH-values, the suction casings of the HZS-pumps are designed as inlet spirals with a nominal flange diameter one size larger than the discharge casings.

The HZSA-pumps, used for applications with suction liquid level above pump centerline, have end suction design to obtain lowest NPSH-values.

### Impellers

The closed impellers are hydraulically balanced by wear ring gaps and balance holes, the anti-friction bearings are carrying only minor loads and further balancing devices are not necessary. For lowest NPSH-values, the impeller of the first stage is designed as a suction impeller with enlarged impeller eye.

### Bearing

The HZS-pump shaft is carried by generously dimensioned grease-lubricated double-row angular ball bearings and a roller bearing, located outside the pumped liquid. These bearings can be regreased through grease nipples, provided in the bearing cover.

The HZSA-pumps are provided with a Silicon Carbide sleeve bearing on the suction side which is - to avoid dry running - connected to the discharge side.

### Wear rings

Suction- and discharge casings, intermediate casings and diffusers are generally equipped with interchangeable wear rings. If requested, the pumps can also be equipped with impeller- and casing-wear rings.

### Priming Stage

The side channel stage is capable to evacuate the suction line and therefore to selfprime if initially filled with operating liquid. In the priming phase the side channel pump works as a positive displacement pump.

The displacement effect is created by a rotating liquid ring which enters and exits the side channel in a piston fashion by each rotation. This is generated by an interrupter in the side channel which separates suction and pressure area.

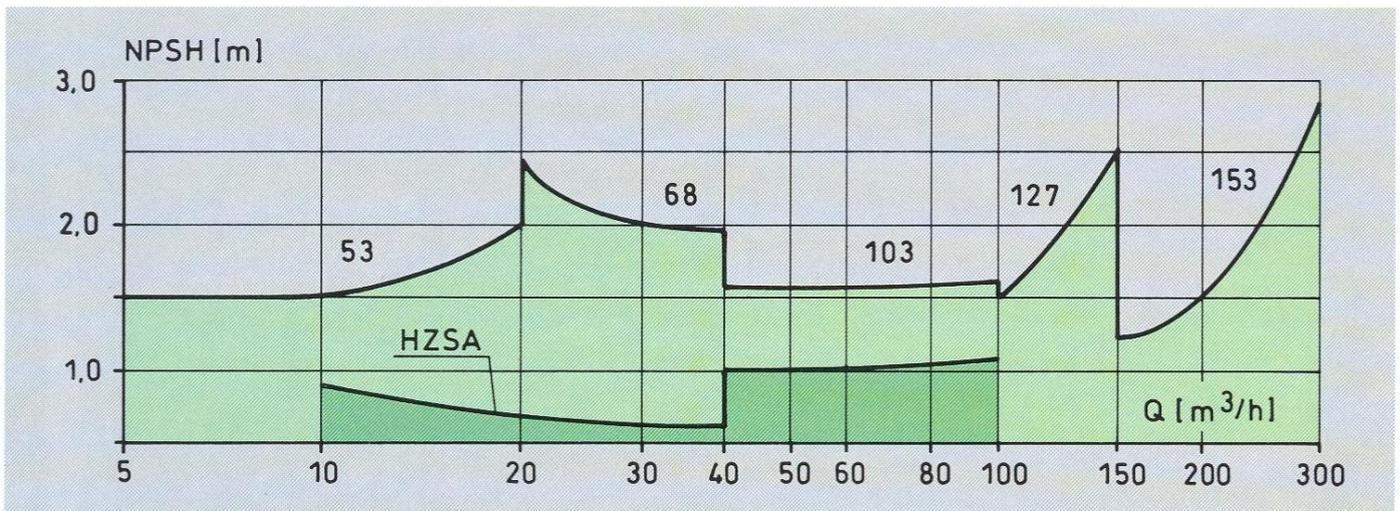
The piston effect conveys the gas from suction to discharge side. The priming stage works automatically, no auxiliary vent equipment required.

When pumping LPG, attention must be paid to gas entrainment by vapour bubbles. In practice, these pumps can handle this liquid-gas-mixtures without auxiliary device. Due to the increased pressure in the side channel stage, the gas bubbles turn to liquid gas-phase again.

### Materials

Standard materials for HZS / HZSA-pumps as follows:(special materials available on request)

| Pump part                           | Material  |
|-------------------------------------|---|
| Suction- and discharge casing       | Ductile iron GGG40.3<br>1.4408 (G-X5 CrNiMo 18.10)<br>Cast steel GS-C25 |
| Intermediate casing, venting device | Ductile iron GGG40.3<br>1.4408 (G-X5 CrNiMo 18.10)<br>Cast steel GS-C25 |
| Impellers and diffusers             | Cast iron GG25<br>1.4408 (G-X5 CrNiMo 18.10)                            |
| Priming impeller                    | 1.4457 (G-X25 CrNiMo 25.9)  |
| Suction- and pressure disc          | Cast iron GG25<br>1.4408 (G-X5 CrNiMo 18.10)                            |
| Pump shaft                          | 1.4021 (X20 Cr 13)<br>1.4571 (X10 CrNiMoTi 18.10)                       |
| Seal casing                         | Ductile iron GGG 40.3<br>1.4408 (G-X5 CrNiMo 18.10)                     |

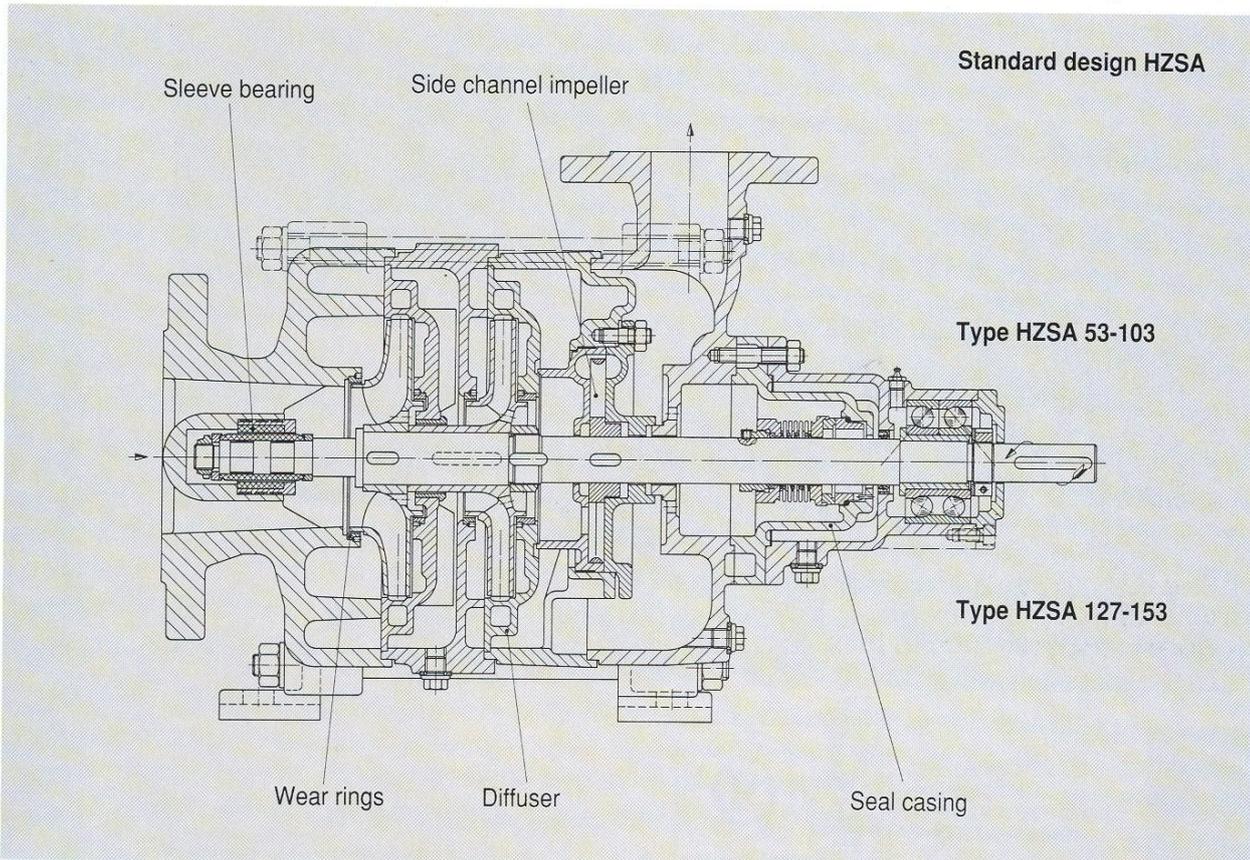
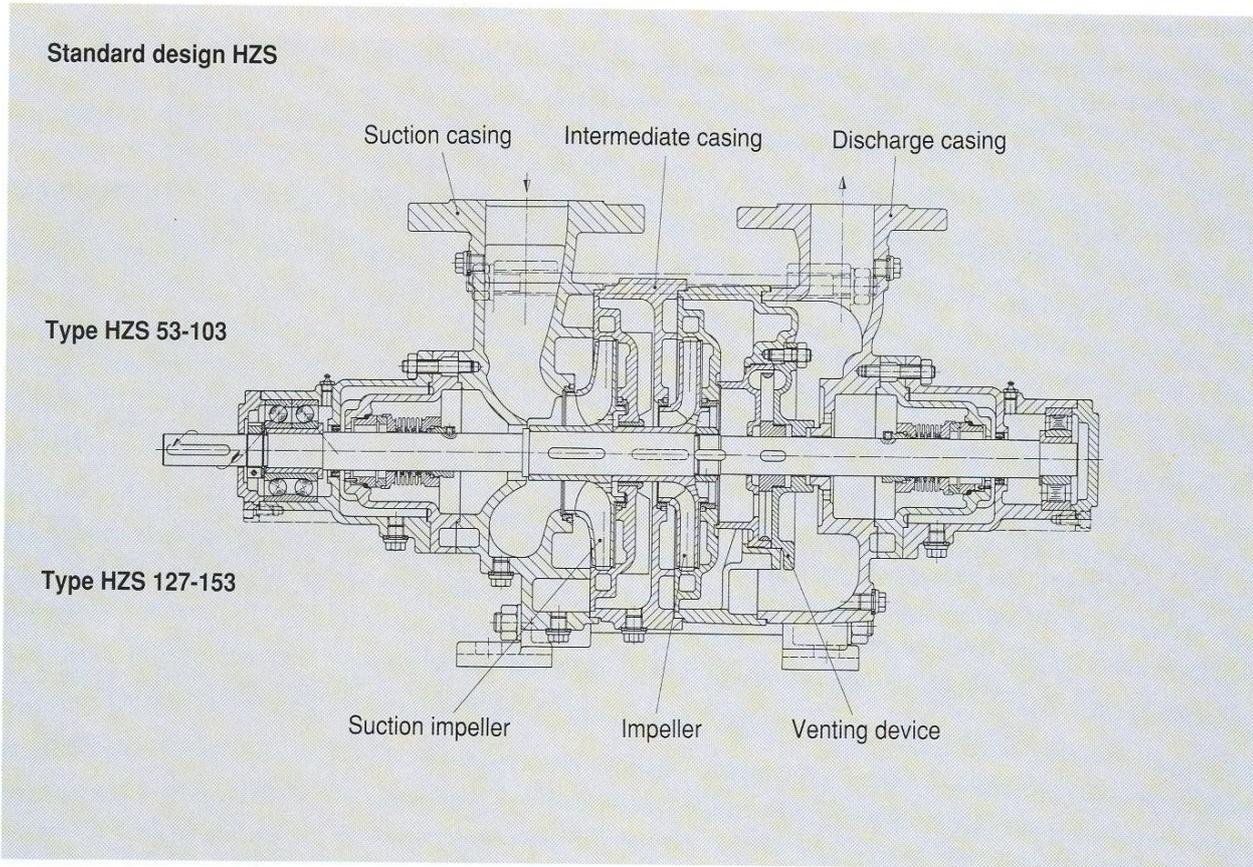


### NPSH-Values

When handling hydrocarbons, condensates and other volatile liquids, it can happen that the pump fluid flashes in the impeller inlet of the first stage and interrupts or influences the flow.

However, the lower the NPSH-value of the pump, the smaller will be this risk. Due to the hydraulical design of the suction casing and the impellers as described before, NPSH-values as shown above can be obtained.

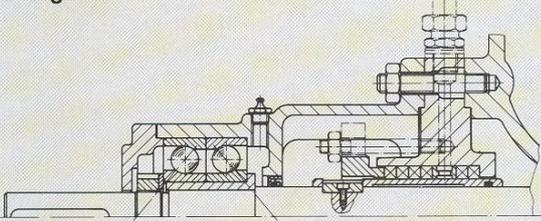
Sectional drawings



## Shaft sealing systems

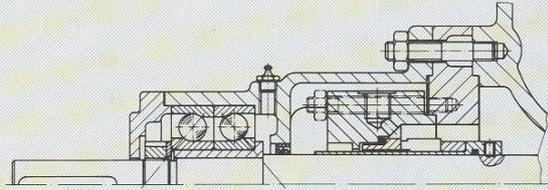
The following shaft sealings can be applied, depending on the pumped liquid and customer's specification:

**Design K2**



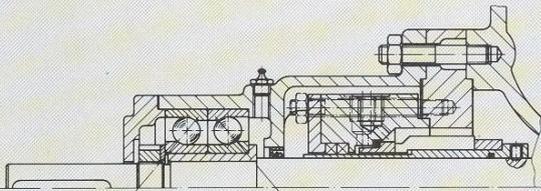
Gland packing with barrier fluid connection

**Design G**



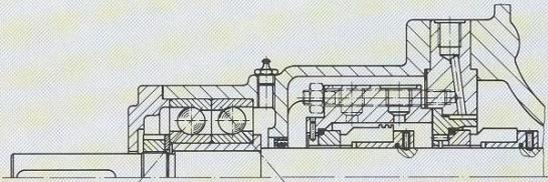
Single unbalanced mechanical seal, acc. to DIN 24960

**Design Geq**



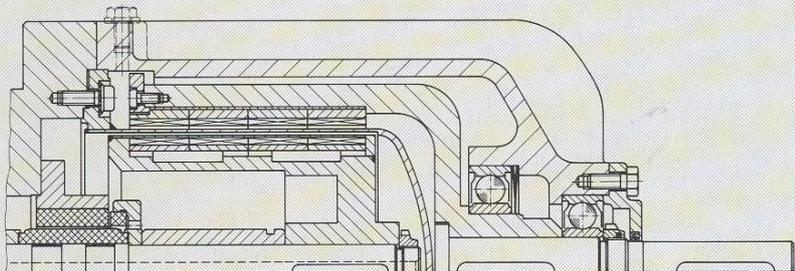
Single balanced mechanical seal with auxiliary stuffing box, acc. to DIN 24960

**Design Te**



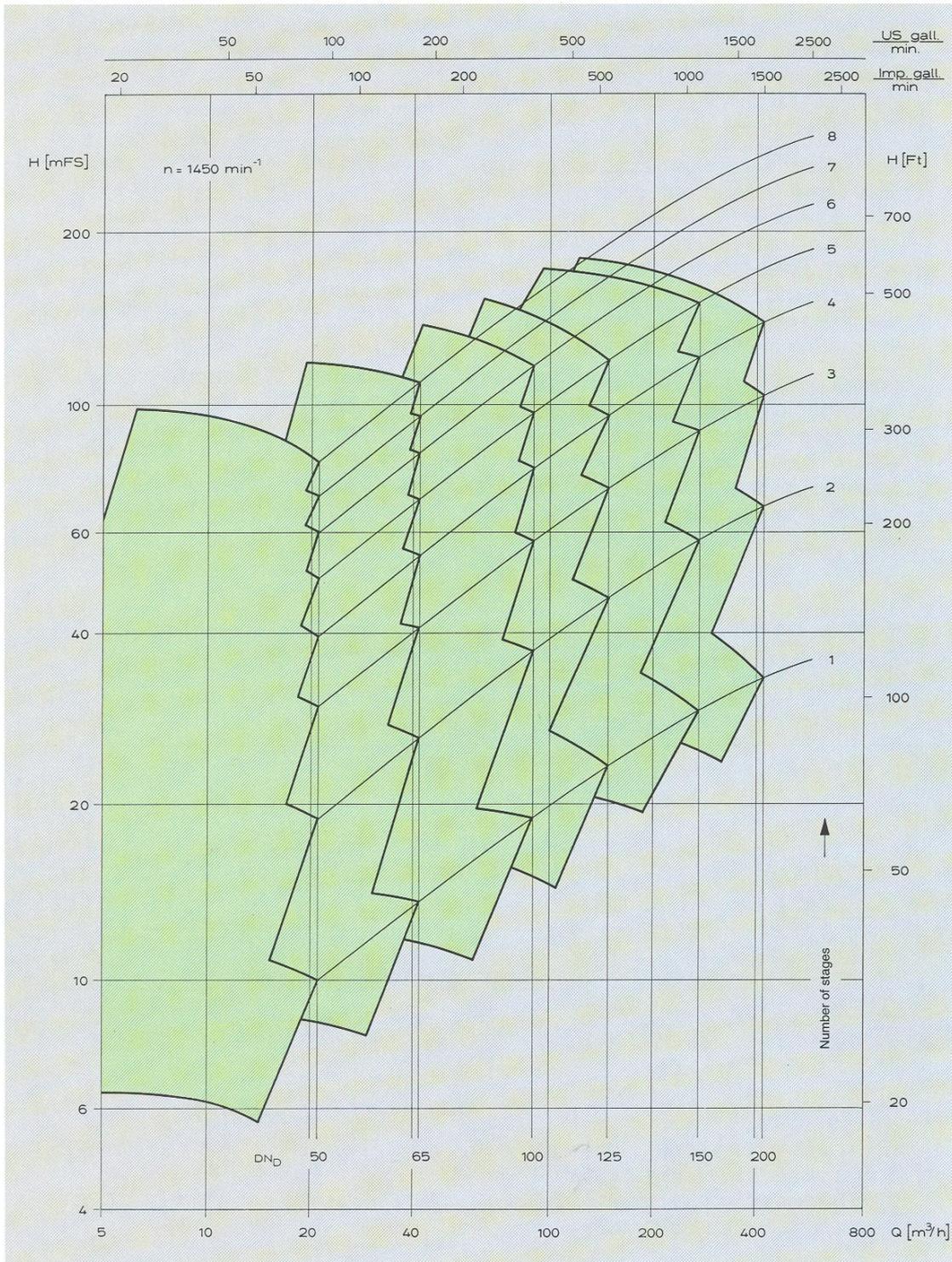
Balanced Tandem mechanical seal, acc. to DIN 24960

**Permanent Magnetic Coupling**



Hermetically sealed permanent magnetic coupling for handling dangerous, explosive and toxic liquids. Please ask for detailed technical literature.

## Performance table



Performance curves for the different pump sizes are available on request and are supplied with our technical offers in general.

