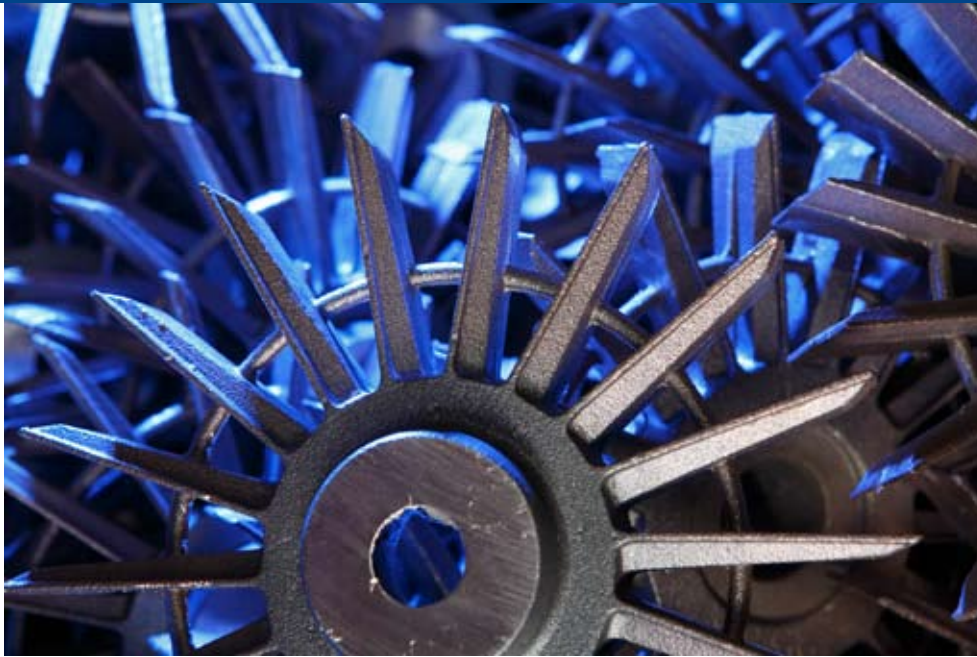


***Self-priming side channel pumps  
with reduced anti-cavitation surplus  
for pumping liquid hydrocarbons  
(including LPG) – type SKC, SKD***



ISO 9001  
ISO 14001  
PN-N-18001





**H** *Hydro-Vacuum S.A.* is the biggest Polish manufacturer of the broad range of pumps and pumping systems and it is also perceived as a member of European market of pump manufacturers.

The company has long-lasting tradition and many achievements. It was established in 1862, and started producing pumps in the thirties of the XX century basing on the license bought from world-famous companies manufacturing pumps. Today, the modern plant releases 70000 pumps and pumping systems every year, which are gladly welcome by European markets and win more and more world markets.

**Good quality of pumps manufactured by Hydro-Vacuum S.A. is ensured by:**

- ▶ Highly qualified staff,
- ▶ Modern technologies applied,
- ▶ Production processes management methods based on Integrated Quality, Environment and Occupational Health and Safety Management System compliant with such norms like **ISO 9001, 14001 and PN-N-18001**, which was confirmed by certificates obtained from notified auditing companies,
- ▶ Conformity of our products with directives of EU standards and particularly, conformity of pumps used in explosion hazard environment with the norm **ATEX 100a**,
- ▶ permanent modernisation and new designs.

*Broad assortment,  
unlimited capabilities*

**T**he scope of **Hydro-Vacuum S.A.** production includes:

- ▶ Borehole pumps,
- ▶ Self-priming side-channel pumps,
- ▶ Vacuum pumps and blowers with liquid ring,
- ▶ Centrifugal pumps for chemicals and pumps compliant with PN-EN 733 norm,
- ▶ Vertical pumps „in line” and pressure increase systems based on them,
- ▶ Submersible pumps,
- ▶ Electronic protection systems and pump control systems,
- ▶ Intermediate sewage pumping stations.



One of the biggest group of pumps manufactured by **Hydro-Vacuum S.A.** are impeller self-priming side-channel pumps. They are produced in numerous design types as well as in many material-type versions, starting from grey cast iron, through nodular cast iron, bronze, to cast carbon steel and cast austenitic steel. These pumps are broadly used for pumping neutral agents, but first of all chemically aggressive substances, petrol, oils, fuel, including mixture of liquid propane and butane (LPG) and other agents requiring reduced anti-cavitation reserve.



## *Major markets of Hydro-Vacuum S.A products*

**D**uring last several years, when Poland and Central Europe have become more and more interested in application of propane and butane mixture, especially as fuel for vehicles (today Poland is the second largest consumer of LPG in Europe), **Hydro-Vacuum S.A.** has become the predominant supplier of pumps designed for pumping LPG in this region. These are SKC and SKD type rotodynamic, liquid ring pumps with side channel and centrifugal impeller at the first pumping stage, with special structure of suction housing, which guarantees low pressure losses.



**Hydro-Vacuum S.A.** sells several thousand pumps of SKC and SKD type every year, 70% of which are exported. SKC and SKD pumps manufactured by **Hydro-Vacuum S.A.** successfully compete both in Poland and in foreign markets with similar products of other world-famous manufacturers.

Main foreign markets for our products are countries of Central and Eastern Europe. However, lately, these pumps have been increasingly used in Western Europe, whereas first preliminary series have been also sold to Peru, India, Great Britain, Tunisia, Iran and Afghanistan.

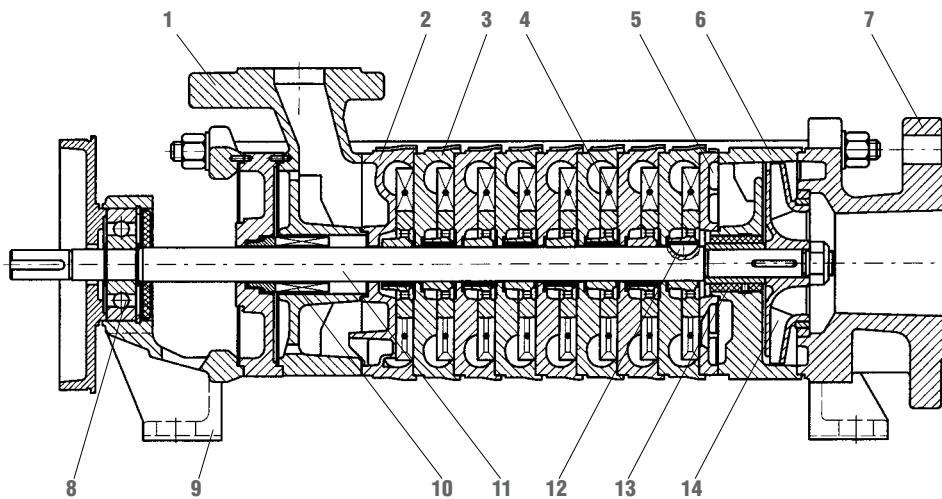
## APPLICATION

Rotodynamic, liquid ring SKC and SKD pumps with side channels, open impellers and centrifugal impeller on the first stage have been designed to pump liquids within the range of corrosion resistance of pump components. The SKC pump is designed as for operation with inflow or as conventionally sucking pump, after prior installation of a check valve on the suction pipeline and complete filling of the pump and suction pipeline.

The SKD pump is self-priming, i.e. it does require only filling up of the pump with no need for filling the suction pipeline.

The SKC pumps are able to pump liquids with minimal pressure surplus over boiling point. Low anti-cavitation reserve NPSHr and very good self-priming abilities are special advantages of these pumps.

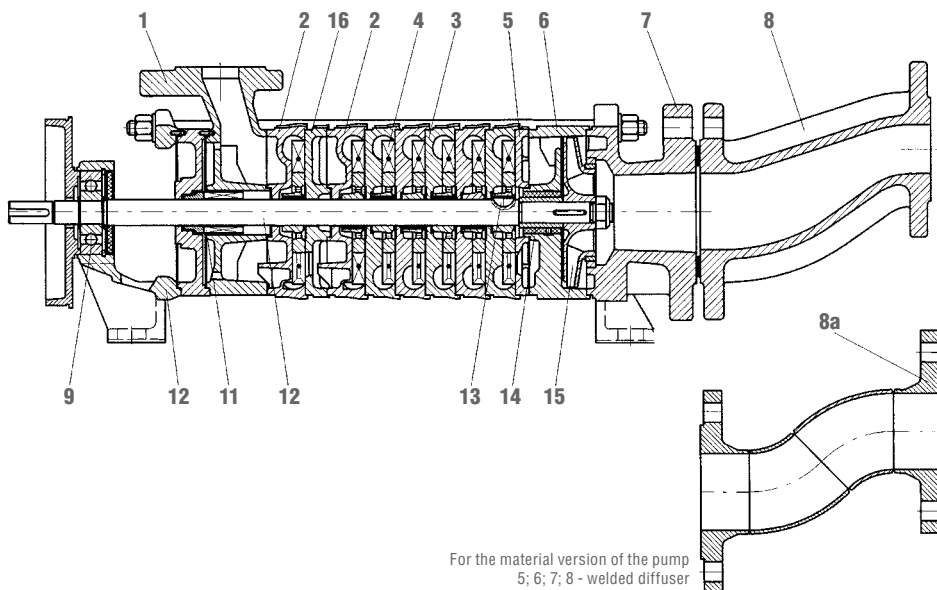
Cross-section of the pump, type SKC



### TYPE SKC

1. Discharge housing
2. Discharge module
3. Suction - discharge module
4. Impeller
5. Suction module
6. Stator
7. Suction housing
8. Ball bearing
9. Bearing housing
10. Shaft sealing
11. Shaft
12. Disk key
13. Slide bearing
14. Centrifugal impeller

Cross-section of the pump, type SKD



### TYPE SKD

1. Discharge housing
2. Discharge module
3. Suction - discharge module
4. Impeller
5. Suction module
6. Stator
7. Suction housing
8. Diffuser
- 8a. Welded diffuser
9. Ball bearing
10. Bearing housing
11. Shaft sealing
12. Shaft
13. Disk key
14. Slide bearing
15. Centrifugal impeller
16. Suction module (special)

For the material version of the pump  
5; 6; 7; 8 - welded diffuser

## Basic technical data

Capacity Q:	max. 30 m <sup>3</sup> /h
Delivery head Hmax:	max. 310 m
Temperature:	-40 <sup>o</sup> +180 °C
Liquid density:	up to 1,3 kg/dm <sup>3</sup>
Liquid viscosity:	up to 150 mm <sup>2</sup> /s

Solid, non-abrasive particles of the size up to 0,5 mm are permissible in vestigial amount. For hot liquids (from +70 °C to +180 °C), the delivery head of the pump should be decreased by 10-20 % comparing to pumping water at t=20 °C. Pump characteristics are valid for water at t=20 °C temperature and motor rotating speed n=1450 rpm.

## Construction materials of SKC and SKD pumps

### Materials applied in SKC and SKD pumps

Part name	Construction materials „d”							
	1	2	3	4	5,6**	7	8	
Housings	grey cast iron	tin bronze	grey cast iron	grey cast iron	nodular cast iron	cast carbon steel	cast austenitic steel	
Modules	grey cast iron	chromium cast iron	grey cast iron	chromium cast iron	nodular cast iron	cast carbon steel	cast austenitic steel	
Impellers	tin bronze	tin bronze	nodular cast iron	tin bronze	tin bronze	tin bronze	cast austenitic steel	
Shaft	Stainless steel	acid resistant steel	Stainless steel	acid resistant steel	stainless steel	stainless steel	acid resistant steel	
Shaft seal	soft-cord seal* face mechanical***							

\* - The selection of the seal material type depends on the type of the liquid

\*\* - Minimal operation temperature – 40 °C

\*\*\* - There is possibility to produce pumps made of other materials (high-nickel cast irons, cast steel), but it requires separate technical and business arrangements

## Design variants of SKC and SKD pumps

Variant no	Variant name																
		SKC2	SKD2	SKC3	SKD3	SKC4	SKD4	SKC5	SKD5	SKC6	SKD6	SKC7	SKD7	SKC8	SKD8		
1030	Pump with cord packing with liquid chamber of temperature -30 °C ÷ +70 °C	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
1110	Pump with single end-face packing of V type for liquid of temperature -30 °C ÷ +70 °C	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
1130	Pump with single end-face packing of US type for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
1140	Pump with single end-face packing of VB type for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
1160	Pump with single end-face packing of 502 type for liquid of temperature -40 °C	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
1360	Pump with single end-face packing of V Quenching type for liquid of temperature -30 °C ÷ +70 °C	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
1380	Pump with single end-face packing of US Quenching type for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
1390	Pump with single end-face packing of YB Quenching type for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
1400	Pump with single end-face packing of 502 Quenching type for liquid of temperature -30 °C ÷ +70 °C	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
1600	Pump with double end-face packing, BACK TO BACK alignment of V+V type with barrage liquid for liquid of temperature -30 °C ÷ +70 °C	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
1610	Pump with double end-face packing, BACK TO BACK alignment of V+VB type with barrage liquid for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
1630	Pump with double end-face packing, BACK TO BACK alignment of U+US type with barrage liquid for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X					X	X	X	X		
1640	Pump with double end-face packing of BED type for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
1650	Pump with double end-face packing of BED type with installation of buffer fluid for liquid of temperature -30 °C ÷ +70 °C			X	X	X	X	X	X	X	X	X	X	X	X		
3040	Pump with cord packing with liquid chamber of temperature +70 °C ÷ +180 °C	X		X		X		X		X		X		X			
3110	Pump with single end-face packing of V type for liquid of temperature +70 °C ÷ +180 °C	X		X		X		X		X		X		X			
3130	Pump with single end-face packing of US type for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3140	Pump with single end-face packing of VB type for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3160	Pump with single end-face packing of 502 type for liquid of temperature +70 °C ÷ +180 °C	X		X		X		X		X		X		X			
3360	Pump with single end-face packing of V Quenching type for liquid of temperature +70 °C ÷ +180 °C	X		X		X		X		X		X		X			
3380	Pump with single end-face packing of US Quenching type for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3390	Pump with single end-face packing of YB Quenching type for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3400	Pump with single end-face packing of 502 Quenching type for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3600	Pump with double end-face packing, BACK TO BACK alignment of V+V type with barrage fluid for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3610	Pump with double end-face packing, BACK TO BACK alignment of V+VB type with barrage fluid for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3630	Pump with double end-face packing, BACK TO BACK alignment of U+US type with barrage fluid for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3640	Pump with double end-face packing of BED type for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			
3650	Pump with double end-face packing of BED type with installation of buffer fluid for liquid of temperature +70 °C ÷ +180 °C			X		X		X		X		X		X			

Depending on customer's needs as well as due to requirements resulting from regulations regarding their usage, SKC/SKD pumps can be produced with mechanical sealing of different type, including:

- single,
- double, in the „back to back” arrangement with barrage or buffer liquid installation,
- double, in the „tandem” arrangement with buffer liquid installation.

The standard mechanical sealing used by **Hydro-Vacuum S.A.** in the mentioned pumps is the single mechanical sealing, manufactured by Polish company Anga or by British company John Crane. It is also possible to equip pumps with mechanical sealing of other manufacturers, but this requires individual technical and commercial arrangements.

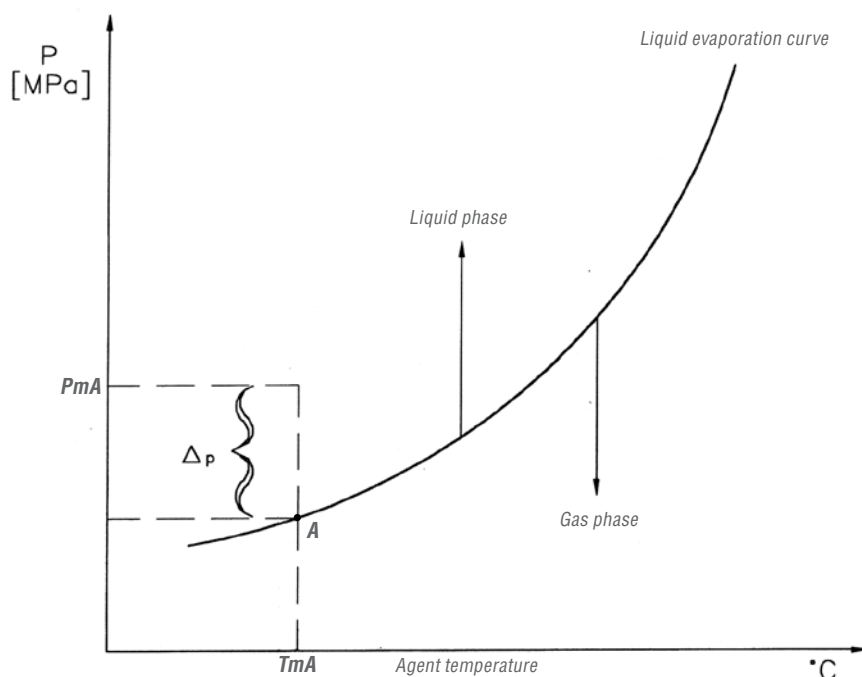
SKC/SKD pumps can be manufactured of grey cast iron, nodular cast iron, austenitic cast steel of the class G-X5CrNiMo19 11 2 or G-X25CrNiMo 25 9 3 and of cast carbon steel 200-400, as well as of special sort of nodular cast iron class 350.22 L, that retains plasticity in very low temperatures, which allows the pumps manufactured of this material to work at ambient temperatures below  $-40^{\circ}\text{C}$ .

## Technical requirements of hydraulic system in the liquid hydrocarbons pumping process (liquid propane-butane gas)

Certain physical rights are in force for liquid compounds such as propane-butane mixture and others. Liquid gas propane-butane is a mixture of higher saturated hydrocarbons characterised by high pressure of vapours dependant on ambient temperature. In normal physical conditions (1013hPa,  $20^{\circ}\text{C}$ ), they are gases which are heavier than the air (higher density than that for the air). And in case of non-controlled outflow of the gas, they trail over ground filling all the pits. Gaseous phase of that gas is flammable and while mixed with the air, it makes very dangerous explosive mixture.

Liquid phase of that gas is lighter than water and its vapours remain over the water surface. Turning from liquid to gas in the free space starts at the temperature of  $-30^{\circ}\text{C}$  (propane-butane mixture at the ratio of 50/50).

To keep the propane-butane mixture in liquid state during the whole distribution process, especially during the inflow to the impeller of the first stage of the pump, the pressure of the liquid has to have some surplus pressure  $\Delta p$  in comparison to the value determined from the liquid evaporation curve.



## Working conditions of the pumps

**Hydro-Vacuum S.A.** adapted SKC/SKD pumps to pump LPG also from underground tanks (with obligatory usage of check valve in the suction pipeline) by application of adequate constructional changes and selection of proper equipment. Maximum suction height for the agent such as LPG is about 4 m. Both versions are widely applied in LPG stations (see application diagrams attached). On customer request, pumps can be delivered with the following equipment manufactured by the plant: diffuser, gas phase separator as well as a check valve ZZG.

**Note:**

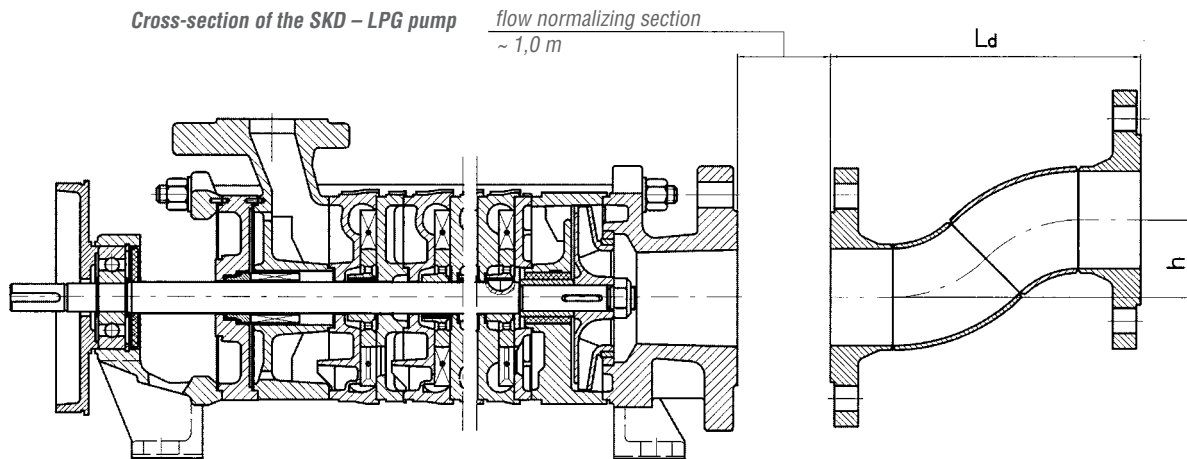
*Diffuser should be mounted to the flow normalizing pipeline (l= ~20d) – NOT TO THE PUMP!!!*

Working in heavy conditions, SKC/SKD pumps are distinguished by: failure-free operation (pumping millions of LPG litres without need for any repairs), relatively high efficiency, long-life and high quality.

In order to keep the pumping process and the pump operation undisturbed, there must be met the primary condition described by the following equation:

$$H_{zs} \cong -(NPSH_r + \Delta h_s) \text{ [m]}$$

- $\Delta h_s$  - value of hydraulic losses in the suction pipeline
- $H_{zs}$  - geometrical height of the inflow (n)
- $NPSH_r$  - required anti-cavitation reserve, determined by the manufacturer and guaranteeing correct operation of the pump (m).
- $NPSH_{av}$  - available anti-cavitation reserve, existing in the pumping system (m).



When the required  $H_{zs}$  value, determined during the calculation of the facility (LPG station) project is not met, as a consequence it would lead to pump destruction, especially regarding mechanical end-face sealing at the pump shaft, slide bearing of the pump and the entire hydraulic system (impellers and modules). Correctly designed pumping system should meet the following condition:

$$NPSH_{av} > NPSH_r \text{ [m]}$$

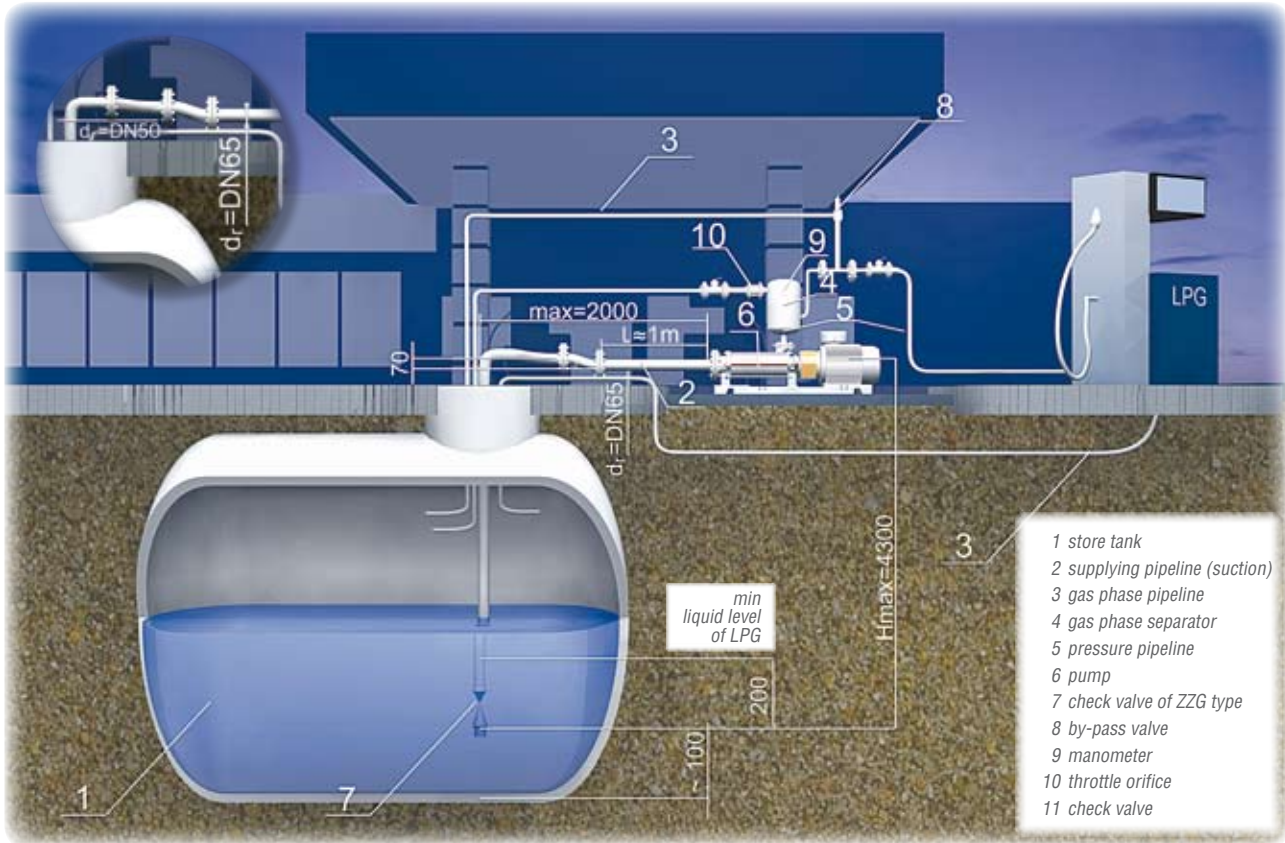
One may minimise the height of inflow  $H_{zs}$  by decreasing the hydraulic losses  $\Delta h_s$  in the suction pipeline (inflow) and this is the only parameter that we can adjust.

Pump	$L_d$ (Length of diffuser)	h
SKD2 - LPG	202	44
SKD3 - 4 - LPG	224	55
SKD5-6-LPG	270	70
SKD7-8-LPG	316	88



# LPG VERSION PUMPS

Example diagram of SKD pump application for distribution of propane-butane mixture in co-operation with the underground tank

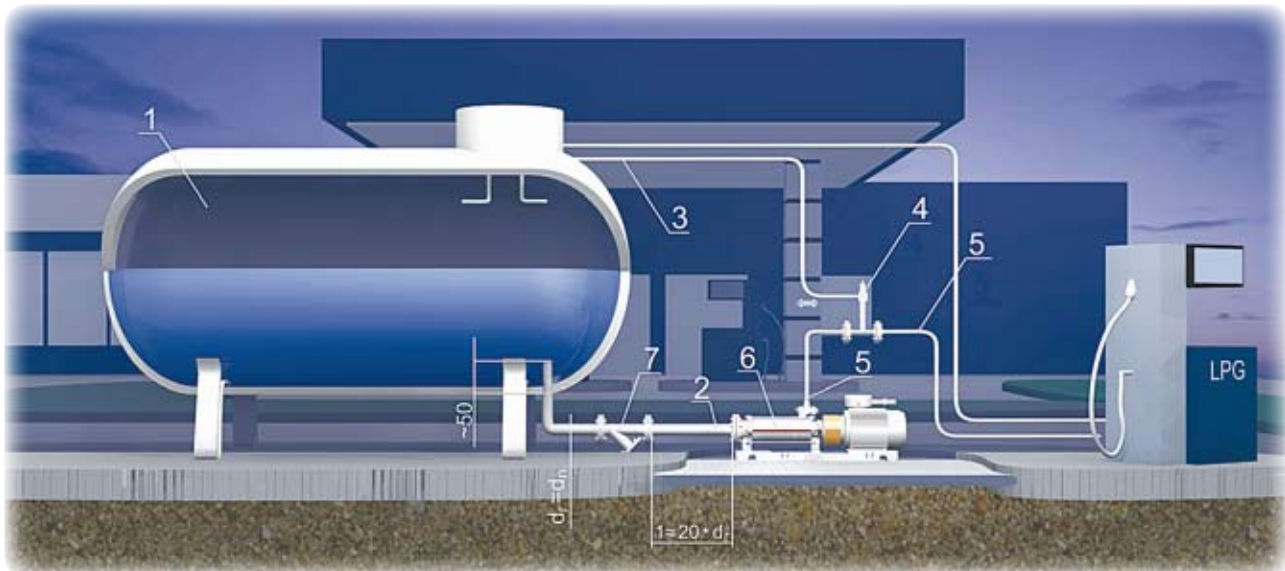


**Note:**

Protect the suction pipeline from sunshine. For maximum suction depth, pressure losses on the suction pipeline may not exceed 0,035 bar.

$d_s$  – diameter of the pump suction connector pipe.

Example diagram of SKC pump application for distribution of propane-butane mixture in co-operation with the ground tank

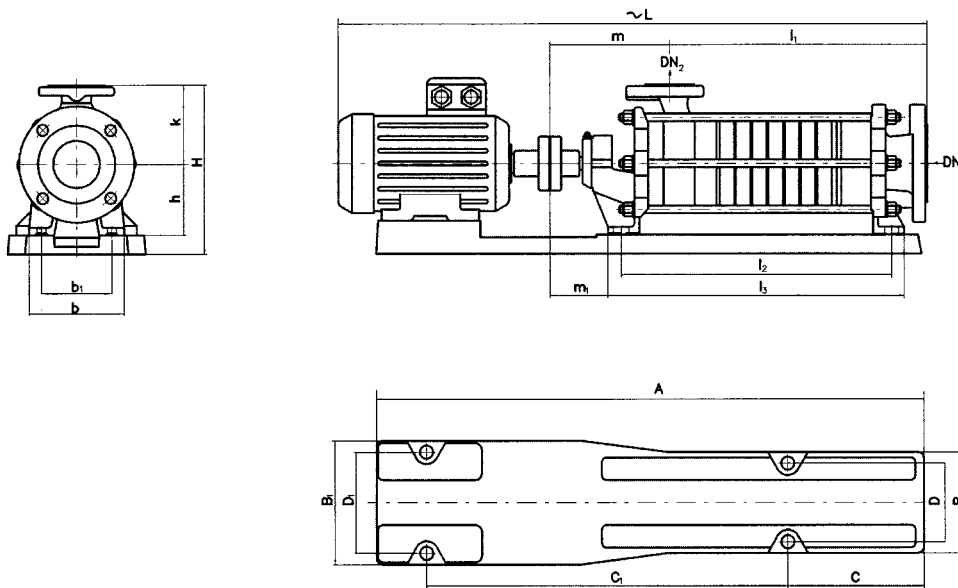


**Note:**

Protect the suction pipe from sunshine.

$d_s$  - diameter of the pump suction connector pipe

## Dimensions of the SKC pump



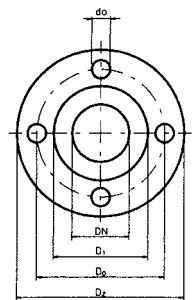
SKC Pressure side

Pump type dimension	DN <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>0</sub>	d <sub>0</sub>	i
SKC.2	25	68	115	85	14	4
SKC.3	32	78	140	100	18	4
SKC.4	32	78	140	100	18	4
SKC.5	40	88	145	110	18	4
SKC.6	40	88	145	110	18	4
SKC.7	50	102	160	125	18	4
SKC.8	65	122	185	145	18	8

Suction side

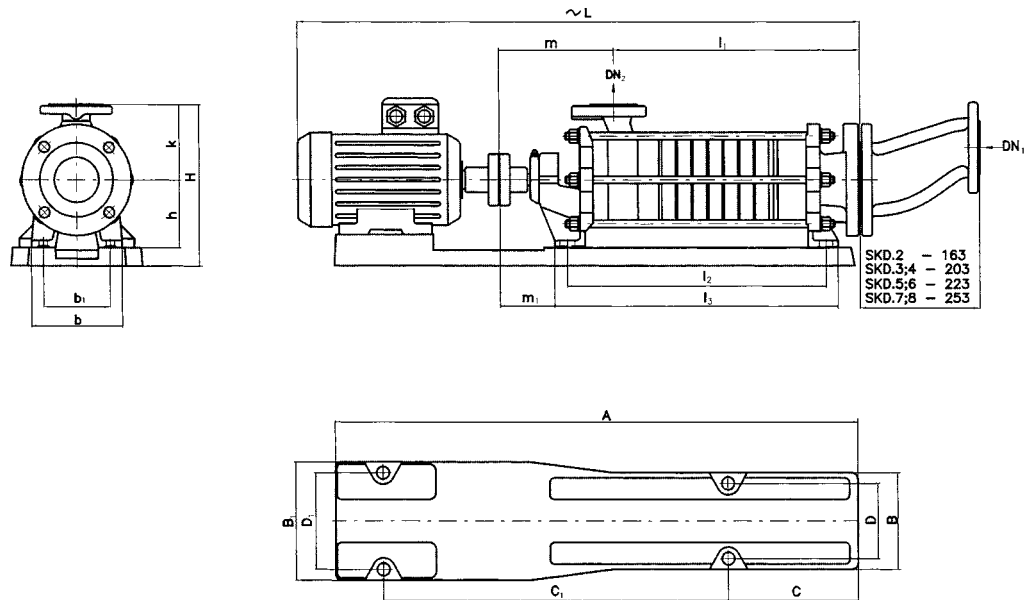
Pump type dimension	DN <sub>1</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>0</sub>	d <sub>0</sub>	i
SKC.2	50	102	165	125	18	4
SKC.3	65	122	185	145	18	8
SKC.4	65	122	185	145	18	8
SKC.5	80	138	200	160	18	8
SKC.6	80	138	200	160	18	8
SKC.7	100	158	235	190	22	8
SKC.8	100	158	235	190	22	8

Collar sizes



$i$  - number of holes

## Dimensions of the SKD pump



SKD Pressure side

Pump type dimension	DN <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>0</sub>	d <sub>0</sub>	i
SKD.2	25	68	115	85	14	4
SKD.3	32	78	140	100	18	4
SKD.4	32	78	140	100	18	4
SKD.5	40	88	145	110	18	4
SKD.6	40	88	145	110	18	4
SKD.7	50	102	160	125	18	4
SKD.8	65	122	185	145	18	8

Suction side\*

Pump type dimension	DN <sub>1</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>0</sub>	d <sub>0</sub>	i
SKD.2	32	78	140	100	18	4
SKD.3	42	88	150	110	18	4
SKD.4	42	88	150	110	18	4
SKD.5	50	102	165	125	18	4
SKD.6	50	102	165	125	18	4
SKD.7	65	122	185	145	18	4
SKD.8	65	122	185	145	18	4

\* for SKD pumps of material type 5; 6; 7; and 8, the collar sizes the same as for SKC pumps

The dimensions of 1-stage SKC and SKD pumps are identical – they are marked as SKC pumps

# SELECTION OF PUMPS AND THEIR DIMENSIONS

Selection and dimensions of pumps sets of SKC.2 and SKD.2 types

Pump type dimension	Completeness					Coupling	Motor		Foundation plate		Overall dimensions of the pump set																	
	1	2	3	5	type		Mechanical size	Power	Plate	Block	H	b <sub>1</sub>	-L	h	k	b	m	m <sub>1</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>
	kg						-	kW	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SKC.2.01	13,0	14,0	28,2	33,0	EZ1	714A	0,25	60.59.01.1	68.40.25.1	215	90	593	90	90	120	175	77	177	212	252	740	72	560	-	122	215	178	
SKC.2.02	15,3	16,3	30,5	34,7	EZ1	714B	0,37	60.59.01.1	68.40.25.1	215	90	615	90	90	120	175	77	197	232	272	740	72	560	-	122	215	178	
				35,3		714A	0,25																					613
				36,4		714B	0,37																					635
SKC.2.03 SKD.2.02	16,6	17,6	31,8	38,0	EZ1	804A	0,55	60.59.01.1	68.40.03.1	215	90	656	90	90	120	175	77	217	252	292	740	72	560	-	122	215	178	
				39,3		804B	0,75																					668
				37,7		714B	0,37																					633
SKC.2.04 SKD.2.03	17,9	18,9	33,1	40,6	EZ1	804A	0,55	60.59.01.1	68.40.03.1	215	90	676	90	90	120	175	77	217	252	292	740	72	560	-	122	215	178	
				40,6		804B	0,75																					688
				41,9		804A	0,55																					696
SKC.2.05 SKD.2.04	19,2	20,2	34,4	47,1	EZ1	90S4	1,10	60.59.01.1	68.40.03.1	215	90	708	90	90	120	175	77	237	272	312	740	72	560	-	122	215	178	
				41,9		804A	0,55																					716
				43,2		804B	0,75																					728
SKC.2.06 SKD.2.05	20,5	21,5	35,7	48,4	EZ1	90S4	1,10	60.59.01.1	68.40.03.1	215	90	755	90	90	120	175	77	257	292	332	740	72	560	-	122	215	178	
				48,4		90L4	1,50																					780
				50,9		804A	0,55																					736
SKC.2.07 SKD.2.06	21,8	22,8	37,0	52,2	EZ1	804A	0,55	60.59.01.1	68.40.03.1	215	90	748	90	90	120	175	77	277	312	352	740	72	560	-	122	215	178	
				44,5		804B	0,75																					756
				45,8		804B	0,75																					768
SKC.2.08 SKD.2.07	23,1	24,1	38,3	51,0	EZ1	90S4	1,10	60.59.01.1	68.40.03.1	215	90	795	90	90	120	175	77	297	332	372	740	72	560	-	122	215	178	
				53,5		90L4	1,50																					820
				47,1		804B	0,75																					788
SKD.2.08	24,4	25,4	39,6	54,8	EZ1	90S4	1,10	60.59.01.1	68.40.03.1	215	90	815	90	90	120	175	77	317	352	392	740	72	560	-	122	215	178	
				48,4		804B	0,75																					840
				53,6		90S4	1,10																					808
				56,1	EZ1	90L4	1,50	60.59.01.1	-	215	90	835	90	90	120	175	77	337	372	412	740	72	560	-	122	215	178	
												860																

Selection and dimensions of pumps sets of SKC.3 and SKD.3 types

Pump type dimension	Completeness					Coupling	Motor		Foundation plate		Overall dimensions of the pump set																	
	1	2	3	5	type		Mechanical size	Power	Plate	Block	H	b <sub>1</sub>	-L	h	k	b	m	m <sub>1</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>
	kg						-	kW	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SKC.3.01	26	27	49	63	EZ1	90S4	1,1	60.45.01.1	68.40.16.1	297	112	735	112	125	152	185	84	227	249	288	755	25	620	-	155	250	226	
				65,5		90L4	1,5																					760
SKC.3.02	28	29	51	65	EZ1	90S4	1,1	60.45.01.1	68.40.16.1	297	112	758	112	125	152	185	84	250	272	311	755	25	620	-	155	250	226	
				67,5		90L4	1,5																					829
				76		100L4A	2,2																					829
SKC.3.03 SKD.3.02	30	31	53	67	EZ1	90S4	1,1	60.45.01.1	68.40.16.1	297	112	781	112	125	152	185	84	273	295	334	755	25	620	-	155	250	226	
				69,5		90L4	1,5																					806
				78		100L4A	2,2																					852
SKC.3.04 SKD.3.03	32	33	55	79	EZ1	100L4B	3,0	60.45.01.1	68.40.17.1	297	112	875	112	125	152	185	84	296	318	357	755	25	620	-	155	250	226	
				69		90S4	1,1																					804
				71,5		90L4	1,5																					829
SKC.3.05 SKD.3.04	34,5	35,5	57,5	80	EZ1	100L4A	2,2	60.45.01.1	68.40.17.1	297	112	875	112	125	152	185	84	296	318	357	755	25	620	-	155	250	226	
				81		100L4B	3,0																					875
				89		112M4	4,0																					883
SKC.3.06 SKD.3.05	36,5	37,5	65,5	74	EZ1	90L4	1,5	60.45.01.1	68.40.16.1	297	112	852	112	125	152	185	84	319	341	380	755	25	620	-	155	250	226	
				82		100L4A	2,2																					898
				82,5		100L4B	3,0																					898
SKC.3.07 SKD.3.06	38,5	39,5	67,5	83,5	EZ1	112M4	4,0	60.46.01.1	68.40.17.1	292	112	875	112	125	152	185	84	342	364	403	965	260	545	131	155	285	261	
				91,5		112M4	4,0																					906
				92		90L4	1,5																					875
SKC.3.08 SKD.3.07	40,5	41,5	69,5	92,5	EZ1	100L4A	2,2	60.46.01.1	68.40.17.1	292	112	875	112	125	152	185	84	365	387	426	965	260	545	131	155	285	261	
				93,5		100L4B	3,0																					944
				101,5		112M4	4,0																					952
SKD.3.08	42,5	41,5	69,5	94,5	EZ1	100L4A	2,2	60.46.01.1	68.40.17.1	292	112	875	112	125	152	185	84	388	410	449	965	260	545	131	155	285	261	
				95,5		100L4B	3,0																					967
				103,5		112M4	4,0																					975
SKD.3.08	45	73		133	EZ3	132S4	5,5	68.40.18.1	68.40.18.1	312	112	1058	112	125	152	185	84	411	433	472	965	260	545	131	155	285	261	
				144		132M4	7,5																					1096
				94,5		100L4A	2,2																					990
				103,5	EZ1	100L4B	3,0	60.46.01.1	-	292	112	998	112	125	152	185	84	411	433	472	965	260	545	131	155	285	261	
				135	EZ3	132S4	5,5	68.40.18.1	-	312	112	1081																
				146	EZ3	132M4	7,5	68.40.18.1	-	312	112	1119																

# SELECTION OF PUMPS AND THEIR DIMENSIONS

Selection and dimensions of pumps sets of SKC.4 and SKD.4 types

Pump type dimension	Completeness				Coupling	Motor		Foundation plate		Overall dimensions of the pump set																	
	1 with free shaft end	2 with coupling	3 with coupling and plate	5 with coupling, motor and plate		Me- chan- ical size	Power	Plate	Block	H	b <sub>1</sub>	~L	h	k	b	m	m <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>
	kg				type	-	kW																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SKC.4.01	26	27	49	63	EZ1	90S4	1,1	60.45.01.1	68.40.16.1	297	112	738	112	125	152	185	84	230	252	291	755	25	620	-	155	250	226
				65,5		90L4	1,5					763															
SKC.4.02	28	29	51	65	EZ1	90S4	1,1	60.45.01.1	68.40.16.1	297	112	764	112	125	152	185	84	256	278	317	755	25	620	-	155	250	226
				67,5		90L4	1,5					789															
				76		100L4A	2,2					835															
				77		100L4B	3,0																				
SKC.4.03 SKD.4.02	30	31	53	69,5	EZ1	90L4	1,5	60.45.01.1	68.40.16.1	297	112	815	112	125	152	185	84	282	304	343	755	25	620	-	155	250	226
				78		100L4A	2,2																				
				79		100L4B	3,0																				
				87		112M4	4,0					866															
SKC.4.04 SKD.4.03	32,5	33,5	55,5	80,5	EZ1	100L4A	2,2	60.45.01.1	68.40.17.1	297	112	891	112	125	152	185	84	308	330	369	755	25	620	-	155	250	226
				81,5		100L4B	3,0																				
				89,5		112M4	4,0																				
				125		EZ3	132S4					5,5															
SKC.4.05 SKD.4.04	35	36	64	89	EZ1	100L4A	2,2	60.46.01.1	68.40.17.1	292	112	913	112	125	152	185	84	334	356	395	965	260	545	131	155	285	261
				90		100L4B	3,0																				
				98		112M4	4,0																				
				127,5		EZ3	132S4					5,5															
SKC.4.06 SKD.4.05	37,5	38,5	66,5	91,5	EZ1	100L4A	2,2	60.46.01.1	68.40.17.1	292	112	939	112	125	152	185	84	360	382	421	965	260	545	131	155	285	261
				92,5		100L4B	3,0																				
				100,5		112M4	4,0																				
				130		EZ3	132S4					5,5															
SKC.4.07 SKD.4.06	40	41	69	94	EZ1	100L4B	3,0	60.46.01.1	68.40.17.1	292	112	965	112	125	152	185	84	386	408	447	965	260	545	131	155	285	261
				103		112M4	4,0																				
				132,5		132S4	5,5																				
				143,5		EZ3	132M4					7,5															
SKC.4.08 SKD.4.07	42	43	71	96	EZ1	100L4B	3,0	60.46.01.1	68.40.17.1	292	112	991	112	125	152	185	84	412	434	473	965	260	545	131	155	285	261
				105		112M4	4,0																				
				134,5		132S4	5,5																				
				145,5		EZ3	132M4					7,5															
SKD.4.08	44	45	73	98	EZ1	100L4B	3,0	60.46.01.1	68.40.17.1	292	112	1017	112	125	152	185	84	438	460	499	965	260	545	131	155	285	261
				107		112M4	4,0																				
				136,5		132S4	5,5																				
				147,5		EZ3	132M4					7,5															

Selection and dimensions of pumps sets of SKC.5 and SKD.5 types

Pump type dimension	Completeness				Coupling	Motor		Foundation plate		Overall dimensions of the pump set																	
	1 with free shaft end	2 with coupling	3 with coupling and plate	5 with coupling, motor and plate		Me- chan- ical size	Power	Plate	Block	H	b <sub>1</sub>	~L	h	k	b	m	m <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>
	kg				type	-	kW																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SKC.5.01	40	41	67	81	EZ1	90S4	1,1	60.48.01.1	68.40.07.1	332	145	789	132	140	185	211	82	255	287	332	810	180	505	162	186	284	260
				83,5		90L4	1,5					814															
				92		100L4A	2,2					860															
SKC.5.02	44	45	71	87,5	EZ1	90L4	1,5	60.48.01.1	68.40.07.1	332	145	844	132	140	185	211	82	285	317	362	810	180	505	162	186	284	260
				96		100L4A	2,2					890															
				97		100L4B	3,0					890															
				105		112M4	4,0					898															
SKC.5.03 SKD.5.02	48	49	80	114	EZ1	112M4	4,0	60.49.01.1	68.40.05.1	332	145	928	132	140	185	211	82	315	347	392	945	200	610	162	186	325	300
				143,5		132S4	5,5					1011															
SKC.5.04 SKD.5.03	52	54,5	85,5	119,5	EZ3	112M4	4,0	60.49.01.1	68.40.05.1	332	145	962	132	140	185	211	82	345	377	422	945	200	610	162	186	325	300
				147,5		132S4	5,5					1041															
				158,5		132M4	7,5					1079															
SKC.5.05 SKD.5.04	56	57	88	122	EZ1	112M4	4,0	60.49.01.1	68.40.05.1	332	145	988	132	140	185	211	82	375	407	452	945	200	610	162	186	325	300
				151,5		132S4	5,5					1071															
				162,5		132M4	7,5					1109															
				194,5		160M4	11,0					1220															
SKC.5.06 SKD.5.05	60	61	92	126	EZ1	112M4	4,0	60.50.01.1	68.40.05.1	332	145	1018	132	140	185	211	82	405	437	482	1090	220	710	162	186	325	300
				155,5		132S4	5,5					1101															
				166,5		132M4	7,5					1139															
				198,5		160M4	11,0					1250															
SKC.5.07 SKD.5.06	64	65	96	130	EZ1	112M4	4,0	60.50.01.1	68.40.05.1	332	145	1048	132	140	185	211	82	435	467	512	1090	220	710	162	186	325	300
				159,5		132S4	5,5					1131															
				170,5		132M4	7,5					1169															
				202,5		160M4	11,0					1280															
SKC.5.08 SKD.5.07	68	69	100	134	EZ1	112M4	4,0	60.50.01.1	68.40.05.1	332	145	1078	132	140	185	211	82	465	497	542	1090	220	710	162	186	325	300
				163,5		132S4	5,5					1161															
				174,5		132M4	7,5					1199															
				206,5		160M4	11,0					1310															
				226,5		160L4	15,0					1354															
				222,5		160L4	15,0					1324															
SKD.5.08	72	73	104	138	EZ1	112M4	4,0	60.50.01.1	68.40.05.1	332	145	1108	132	140	185	211	82	495	527	572	1090	220	710	162	186	325	300
				167,5		132S4	5,5					1191															
				178,5		132M4	7,5					1229															
				210,5		160M4	11,0					1340															
				230,5		160L4	15,0					1384															

Selection and dimensions of pumps sets of SKC.6 and SKD.6 types

Pump type dimension	Completeness				Coupling type	Motor		Foundation plate		Overall dimensions of the pump set																	
	1	2	3	5		Me- chanical size	Power	Plate	Block	H	b <sub>1</sub>	~L	h	k	b	m	m <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>
	with free shaft end	with coupling	with coupling and plate	with coupling, motor and plate																							
	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
SKC.6.01	38,5	39,5	65,5	90,5	EZ1	100L4A	2,2	60.48.03.1	-	332	145	860	132	140	185	211	82	262	294	339	810	180	501	162	186	284	260
				91,5		100L4B	3,0					860															
SKC.6.02	42,5	43,5	69,5	94,5	EZ1	100L4A	2,2	60.48.03.1	-	332	145	890	132	140	185	211	82	297	329	374	810	180	501	162	186	284	260
				95,5		100L4B	3,0					890															
				103,5	112M4	4,0	898																				
SKC.6.03	46,5	47,5	78,5	109,5	EZ1	112M4	4,0	60.49.01.1	68.40.05.1	332	145	928	132	140	185	211	82	332	364	409	945	200	610	162	186	325	300
				142		132S4	5,5					1011															
SKD.6.02	49	80	80	153	EZ3	132M4	7,5	-	-	332	145	1049	132	140	185	211	82	367	399	444	945	200	610	162	186	325	300
				157		132M4	7,5					962															
SKC.6.04	50,5	51,5	82,5	116,5	EZ1	112M4	4,0	60.49.01.1	68.40.05.1	332	145	1041	132	140	185	211	82	367	399	444	945	200	610	162	186	325	300
				146		132S4	5,5					1049															
SKD.6.03	53	84	84	157	EZ3	132M4	7,5	-	-	332	145	1079	132	140	185	211	82	367	399	444	945	200	610	162	186	325	300
				157		132M4	7,5					992															
SKC.6.05	54,5	57	88	120,5	EZ1	112M4	4,0	60.50.01.1	68.40.05.1	332	145	1071	132	140	185	211	82	402	434	479	1090	220	710	162	186	325	300
				150		132S4	5,5					1109															
				161	132M4	7,5	1220																				
				193	160M4	11,0	1220																				
SKD.6.04	57	88	88	154	EZ3	132S4	5,5	60.50.02.1	-	332	145	1101	132	140	185	211	82	437	469	514	1090	220	710	162	186	325	300
				165		132M4	7,5					1139															
				165	132M4	7,5	1250																				
				197	160M4	11,0	1294																				
				217	160L4	15,0	1294																				
				217	160L4	15,0	1294																				
SKC.6.06	58,5	61	92	154	EZ3	132S4	5,5	60.50.01.1	-	332	145	1139	132	140	185	211	82	437	469	514	1090	220	710	162	186	325	300
				165		132M4	7,5					1139															
				197	160M4	11,0	1250																				
				217	160L4	15,0	1294																				
SKD.6.05	61	92	92	154	EZ3	132S4	5,5	60.50.01.1	-	332	145	1139	132	140	185	211	82	437	469	514	1090	220	710	162	186	325	300
				165		132M4	7,5					1139															
				197	160M4	11,0	1250																				
				217	160L4	15,0	1294																				
				217	160L4	15,0	1294																				
				217	160L4	15,0	1294																				
SKC.6.07	62,5	65	96	158	EZ3	132M4	7,5	60.50.01.1	68.40.05.1	332	145	1161	132	140	185	211	82	472	504	549	1090	220	710	162	186	325	300
				169		132M4	7,5					1161															
				201	160M4	11,0	1280																				
				201	160M4	11,0	1280																				
				201	160M4	11,0	1280																				
SKD.6.06	65	96	96	162	EZ3	132S4	5,5	60.50.01.1	68.40.05.1	332	145	1161	132	140	185	211	82	504	539	584	1090	220	710	162	186	325	300
				173		132M4	7,5					1161															
				205	160M4	11,0	1310																				
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
SKC.6.08	66,5	69	100	173	EZ3	132M4	7,5	60.50.01.1	-	332	145	1199	132	140	185	211	82	504	539	584	1090	220	710	162	186	325	300
				205		160M4	11,0					1199															
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
SKD.6.07	69	100	100	173	EZ3	132M4	7,5	60.50.01.1	-	332	145	1199	132	140	185	211	82	504	539	584	1090	220	710	162	186	325	300
				205		160M4	11,0					1199															
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
				225	160L4	15,0	1354																				
SKD.6.08	70,5	73	104	166	EZ3	132S4	5,5	60.50.01.1	-	332	145	1191	132	140	185	211	82	539	574	619	1090	220	710	162	186	325	300
				177		132M4	7,5					1191															
				209	160M4	11,0	1229																				
				229	160M4	11,0	1340																				
				229	160L4	15,0	1384																				
				229	160L4	15,0	1384																				

Selection and dimensions of pumps sets of SKC.7 and SKD.7 types

Pump type dimension	Completeness				Coupling type	Motor		Foundation plate		Overall dimensions of the pump set																	
	1	2	3	5		Me- chanical size	Power	Plate	Block	H	b <sub>1</sub>	~L	h	k	b	m	m <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>
	with free shaft end	with coupling	with coupling and plate	with coupling, motor and plate																							
	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
SKC.7.01	56	57	88	113	EZ1	100L4B	3,0	60.52.01.1	68.40.15.1	395	150	933	160	165	200	249	105	290	335	385	950	210	580	176	200	270	252
				122		112M4	4,0					941															
				152	132S4	5,5	1023																				
SKC.7.02	63	64	95	121	EZ1	100L4B	3,0	60.52.01.1	68.40.15.1	395	150	979	160	165	200	249	105	332	377	427	950	210	580	176	200	270	252
				130		112M4	4,0					987															
				159	132S4	5,5	1066																				
				170	132M4	7,5	1104																				
				203	160M4	11,0	1215																				
				203	160M4	11,0	1215																				
SKC.7.03	70	72,5	104	136	EZ1	112M4	4,0	60.52.01.1	68.40.05.1	395	150	1029	160	165	200	249	105	374	419	469	950	210	580	176	200	270	252
				166		132S4	5,5					1107															
				177	132M4	7,5	1145																				
				174	160M4	11,0	1256																				
				185	160L4	15,0	1300																				
SKD.7.02	72,5	112	104	174	EZ3	160M4	11,0	60.55.01.1	68.40.05.1	415	150	1256	160	165	200	249	105	374	419	469	1245	240	820	176	200	350	326
				185		160L4	15,0					1300															
				185	160L4	15,0	1300																				
				185	160L4	15,0	1300																				
SKC.7.04	77	79,5	112	174	EZ3	132S4	5,5	60.54.01.1	68.40.05.1	395	150	1071	160	165	200	249	105	416	461	511	1110	240	720	176	200	270	252
				185		132M4	7,5					1109															
				224	160M4	11,0	1147																				
				244	160L4	15,0	1258																				
				244	160L4	15,0	1302																				
				244	160L4	15,0	1302																				
SKD.7.03	82,5	142	307	224	EZ7	180M4	18,5	60.57.01.1	68.40.09.1	435	150	1356	160	165	200	249	105	458	503	553	1580	360	890	176	200	400	376
				307		112M4	4,0					1113															
				117	151	181	132S4	5,5	60.54.01.1	-	395	1191															
SKC.7.05	84	86,5	119	181	EZ3	132M4	7,5	60.55.01.1	68.40.05.1	415	150	1229	160	165	200	249	105	458	503	553	1110	240	720	176	200	270	

# SELECTION OF PUMPS AND THEIR DIMENSIONS

Selection and dimensions of pumps sets of SKC.8 and SKD.8 types

Pump type dimension	Completeness				Coupling	Motor		Foundation plate		Overall dimensions of the pump set																				
	1	2	3	5		type	Me- chanical size	Power	Plate	Block	H	b <sub>1</sub>	~L	h	k	b	m	m <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	A	C	C <sub>1</sub>	D	B	B <sub>1</sub>	D <sub>1</sub>		
	with free shaft end	with coupling	with coupling and plate	with coupling, motor and plate			kg	-																					kW	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
SKC.8.01	68	69	100	126	EZ1	100L4B	3.0	60.52.01.1	68.40.15.1	390	150	961	160	160	200	257	105	306	359	409	950	210	580	176	200	270	252			
			134	112M4		4.0	68.40.05.1		969																					
SKC.8.02	75	76	107	133	EZ1	100L4B	3.0	60.52.01.1	68.40.15.1	390	150	1010	160	160	200	257	105	355	408	458	950	210	580	176	200	270	252			
			141	112M4		4.0	68.40.05.1		1018																					
			78	109	171	132S4	5.5	EZ3	132M4	7.5	60.53.01.1	-	410	1096	160	160	200	257	105	355	408	458	1065	210	685	176	200	310	286	
				110	160M4	11.0	1134																							
SKC.8.03 SKD.8.02	82	83	115	149	EZ1	112M4	4.0	60.54.01.1	68.40.05.1	390	150	1067	160	160	200	257	105	404	457	507	1110	240	720	176	200	270	252			
			117	188		132S4	5.5		1145																					
			85	124	199	160M4	11.0	EZ3	160M4	11.0	60.55.01.1	68.40.05.1	410	1183	160	160	200	257	105	404	457	507	1245	240	820	176	200	350	326	
				88	127	292	EZ7		180M4	18.5				1294																
SKC.8.04 SKD.8.03	89	92	124	186	EZ3	132S4	5.5	60.54.01.1	68.40.05.1	390	150	1116	160	160	200	257	105	453	506	556	1110	240	720	176	200	270	252			
			131	197		132M4	7.5		1194																					
			95	134	235	160M4	11.0	EZ7	160M4	11.0	60.55.01.1	68.40.05.1	410	1232	160	160	200	257	105	453	506	556	1245	240	820	176	200	350	326	
				90	122	249	160L4		15.0	1387																				
SKC.8.05 SKD.8.04	96	99	141	245	EZ3	160M4	11.0	60.56.01.1	-	390	150	1393	160	160	200	257	105	502	555	605	1280	250	820	176	200	310	286			
			101	160		266	160L4		15.0			1437																		
SKC.8.06 SKD.8.05	103	106	148	253	EZ3	160M4	11.0	60.56.01.1	-	390	150	1442	160	160	200	257	105	551	604	654	1280	250	820	176	200	310	286			
			109	168		273	160L4		15.0			1486																		
			SKC.8.07 SKD.8.06	110	113	172	277	EZ3	160M4	11.0	60.57.02.1	68.40.08.1	430	150	1491	160	160	200	257	105	600	653	703	1580	360	890	176	200	400	376
						116	175		297	160L4		15.0			1535															
SKC.8.08 SKD.8.07	117	120	179	284	EZ3	160M4	11.0	60.57.02.1	68.40.08.1	430	150	1540	160	160	200	257	105	649	702	752	1580	360	890	176	200	400	376			
			123	182		304	160L4		15.0			1584																		
			SKD.8.08	124	127	186	291	EZ3	160M4	11.0	60.57.02.1	68.40.08.1	430	150	1638	160	160	200	257	105	698	751	801	1580	360	890	176	200	400	376
						130	189		311	160L4		15.0			1633															
				354	EZ7	180M4	18.5	60.57.02.1	68.40.19.1	430	150	1682	160	160	200	257	105	698	751	801	1580	360	890	176	200	400	376			
				364		180L4	22.0		1682																					
				454		200L4	30.0		-			1807																		

## The pump symbol structure

The pump symbol consists of the following elements.

S K C 6 0 8 5 1 1 6 0 5  
a a a b c c d e<sub>1</sub> e<sub>2</sub> e<sub>3</sub> e<sub>4</sub> h

where: a a a - classification group SK and product type  
C - for work with inflow  
D - for work with deep suction

b - pump size (2-8)

c c - pump type dimension (01-08), number of stages of the pump

d - Material selection

e<sub>1</sub>e<sub>2</sub>e<sub>3</sub>e<sub>4</sub> - pump design

h - delivery completeness,

## Pump marking for liquid propane-butane gas (LPG)

Pumps for LPG gas are made only from materials „5” or „6” and only as the design type „1160” for SKC and „1161” for SKD. It is necessary to add „LPG” at the end of the marking.

Example of the marking:

SKC.4.08.5.1160.5.LPG

SKD.4.08.5.1161.5.LPG

## Delivery completeness

1 - The pump with free shaft end

2 - The pump with coupling

3 - The pump with coupling, foundation bolts, and coupling guard on the foundation plate

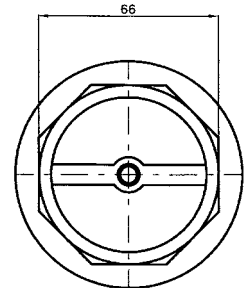
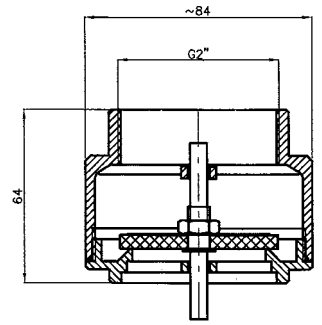
4 - Completeness 3 + motor

## Additional equipment for SKD - LPG pumps

On customer request, the SKD - LPG pump can be additionally equipped with the following items manufactured by **Hydro-Vacuum S.A.**:

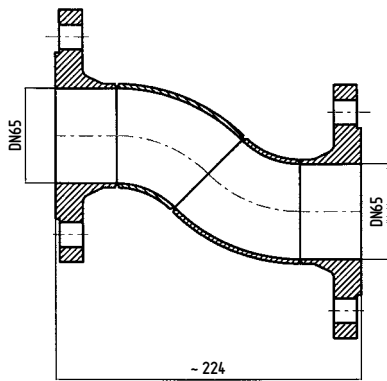
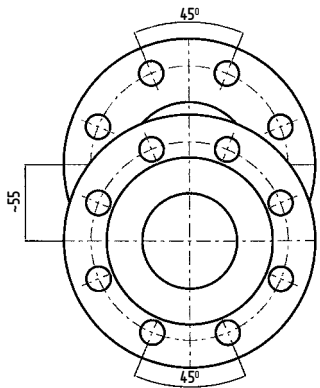
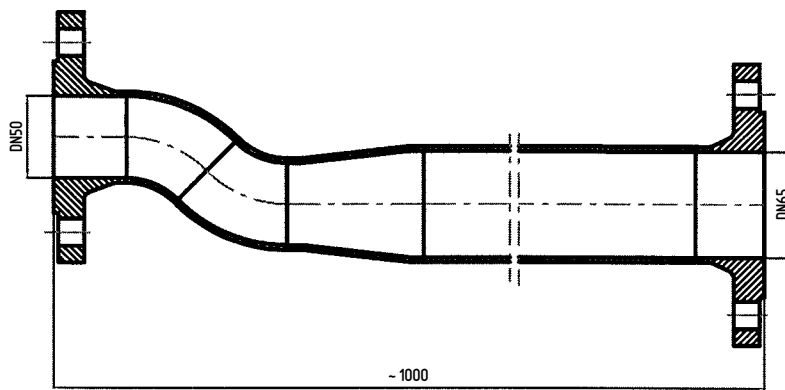
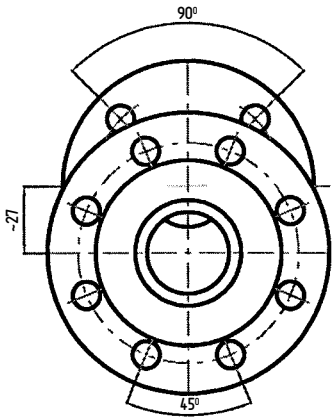
- ▶ separator
- ▶ diffuser
- ▶ flow normalizing section
- ▶ ZZG check valve

The diffuser and the flow normalizing section are offered made of unalloyed steel or of austenitic steel for as low working temperatures as -20°C or -40°C, including pumps made of unalloyed steel under the supervision of the Office of Technical Inspection.



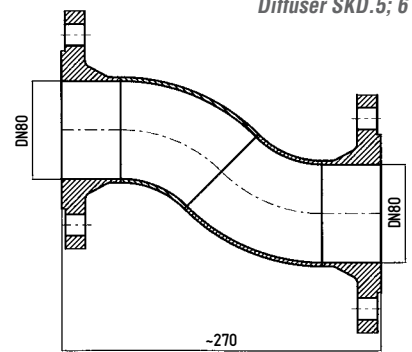
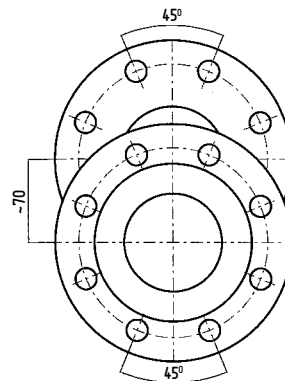
Check valve

Flow normalizing section SKD.3; 4

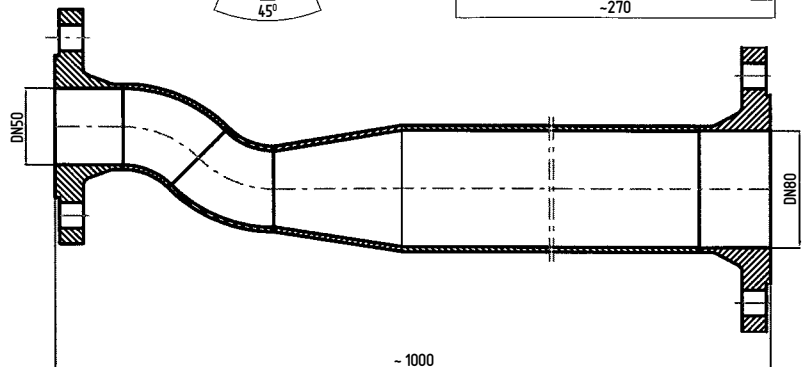
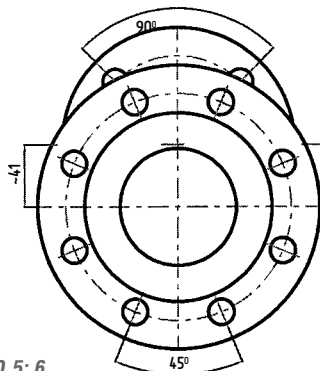


Diffuser SKD.3; 4

Diffuser SKD.5; 6

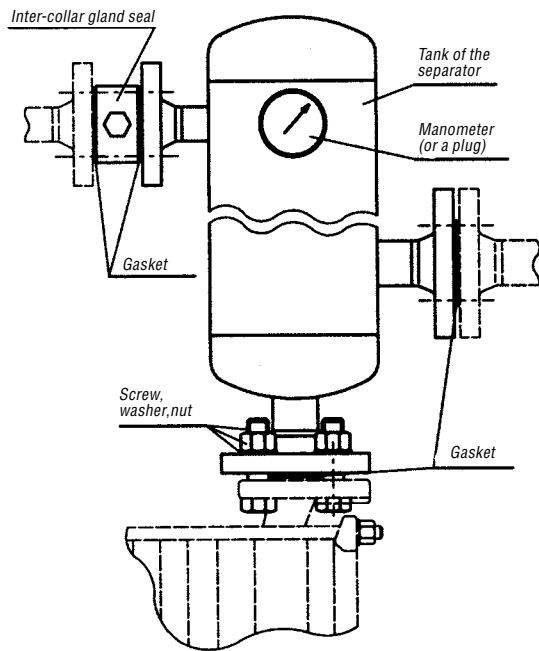


Flow normalizing section SKD.5; 6



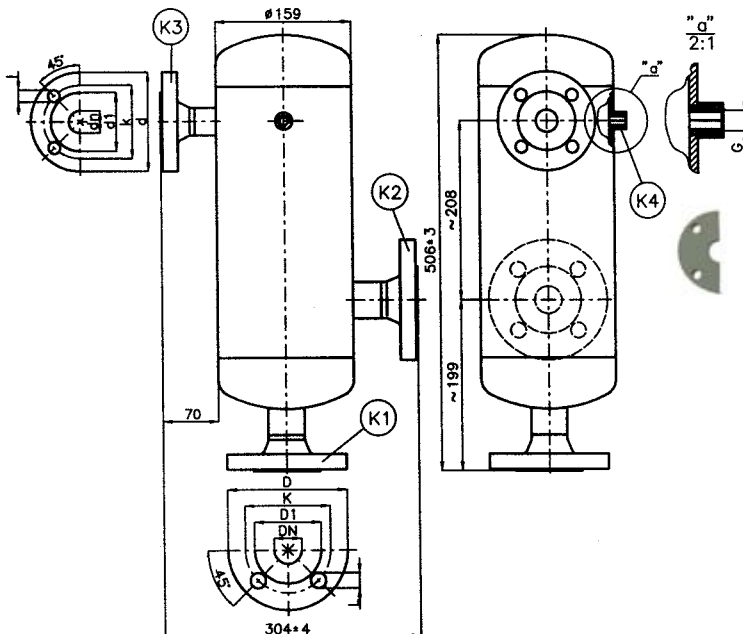
# ADDITIONAL EQUIPMENT

Separator assembly scheme  
(elements included in the set)



Separator's type (mark on the name plate)	Design variant	Supply completeness	Minimal working temperature	Type of the pump
ZBS.4/1	3250	1 (with a manometer)	- 20 °C	SKD.3/4
		3 (with a cork)		
ZBS.4/3	4260	2 (with a manometer)	- 40 °C	
		4 (with a cork)		
ZBS.4/2	3270	1 (with a manometer)	- 20 °C	SKD.5/6
		3 (with a cork)		
ZBS.4/4	4280	2 (with a manometer)	- 40 °C	
		4 (with a cork)		

Dimensions of the separator



Type of connectors	
K1	Inlet from the pump
K2	Outlet of the liquid phase (to the distributor)
K3	Outlet of the gas phase (to the tank)
K4	Connector pipe of a manometer

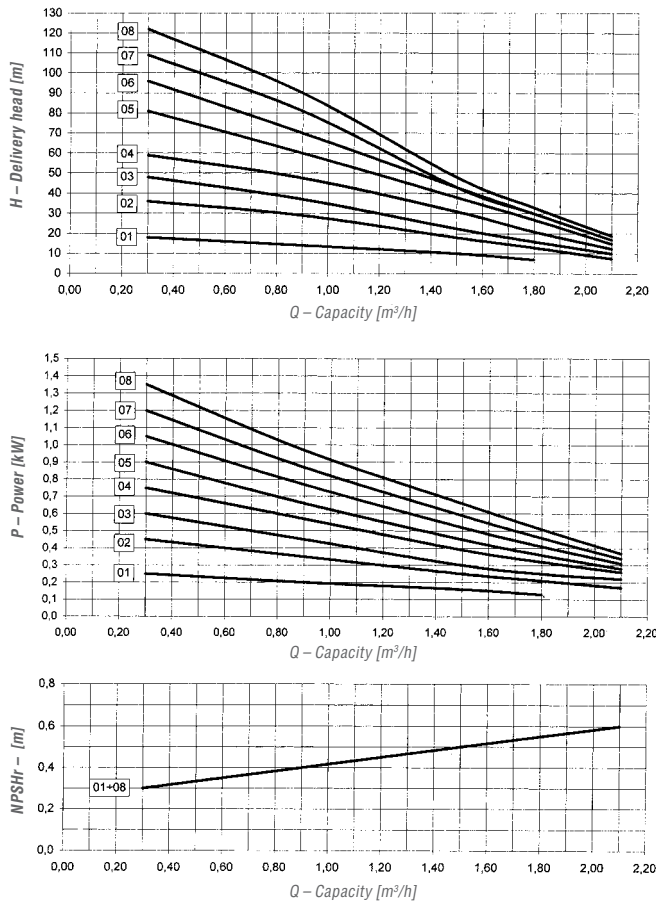
\* - Collar sizes acc. to the norm PN-ISO 7005-1  
\*\* - assembly lengths of the gland seal is 40 mm

Design variant	DN	D1	K	D	L	dn	d1	k	d	l	G
3250	32	76	100	140	18	25	65	85	115	14	G 1/4"
4260											G 1/2"
3270	40	84	110	150	18						G 1/4"
4280											G 1/2"

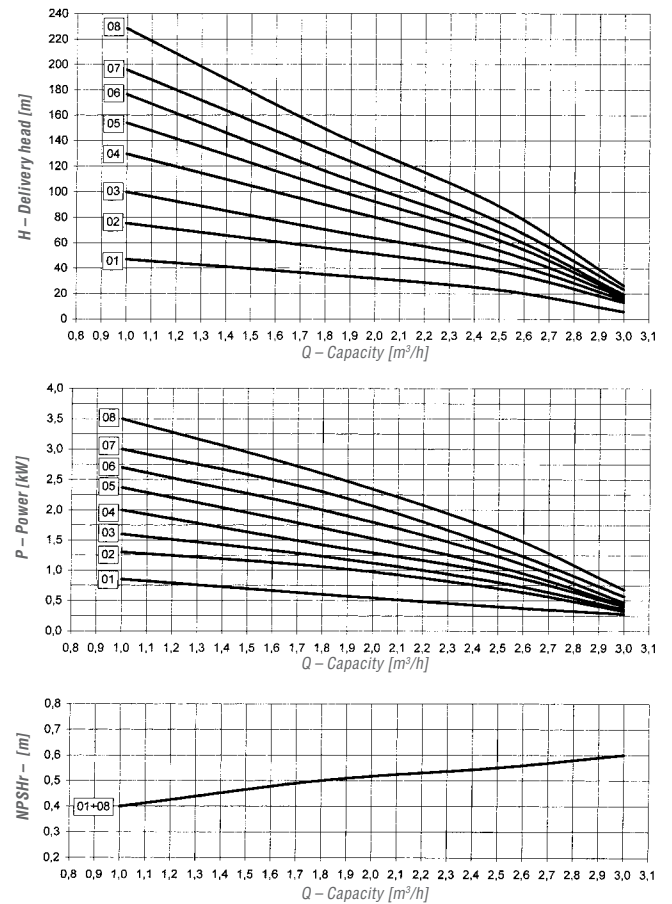


# CHARACTERISTICS

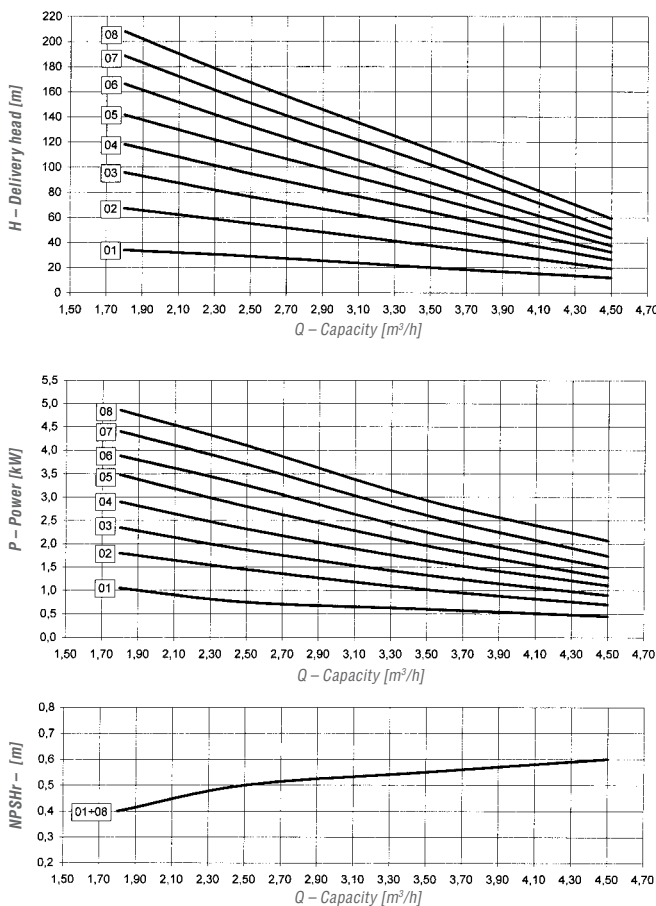
The characteristics of the SKC.2 and SKD.2 pump 50 Hz



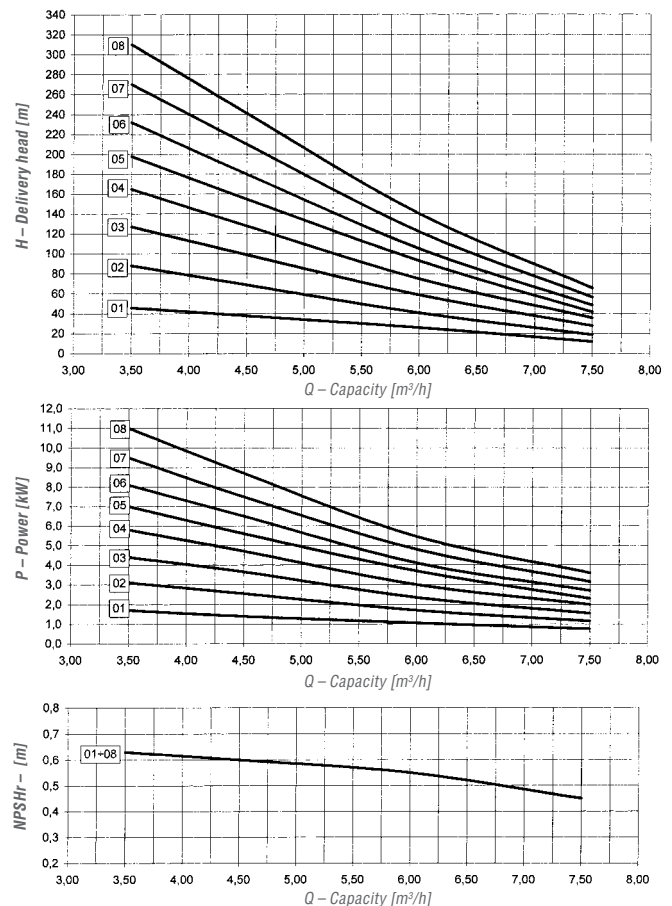
The characteristics of the SKC.3 and SKD.3 pump 50 Hz



The characteristics of the SKC.4 and SKD.4 pump 50 Hz



The characteristics of the SKC.5 and SKD.5 pump 50 Hz

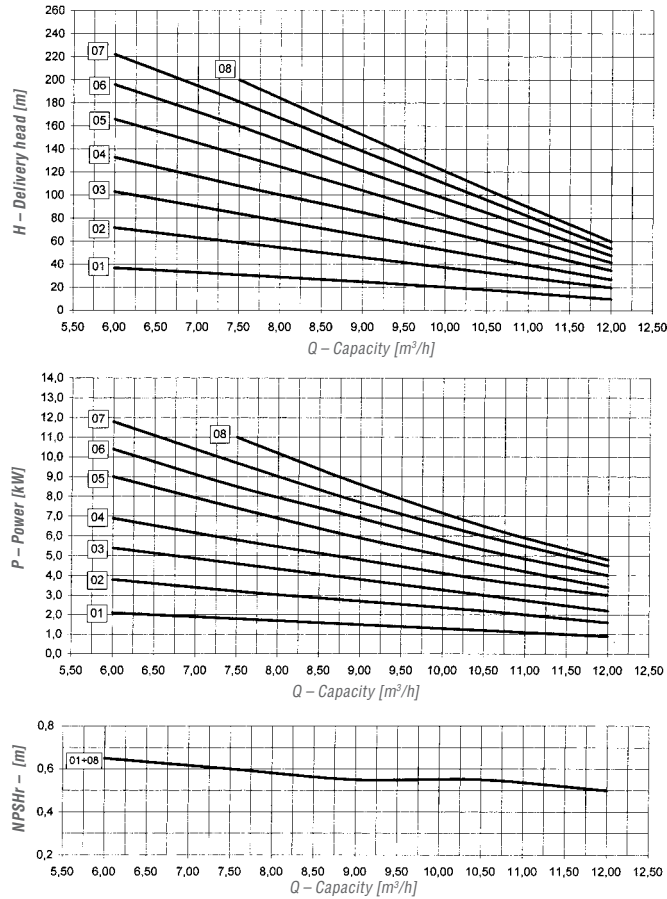


Description of the characteristic quantities of SKC/SKD.2 ÷ SKC/SKD.8 pumps:

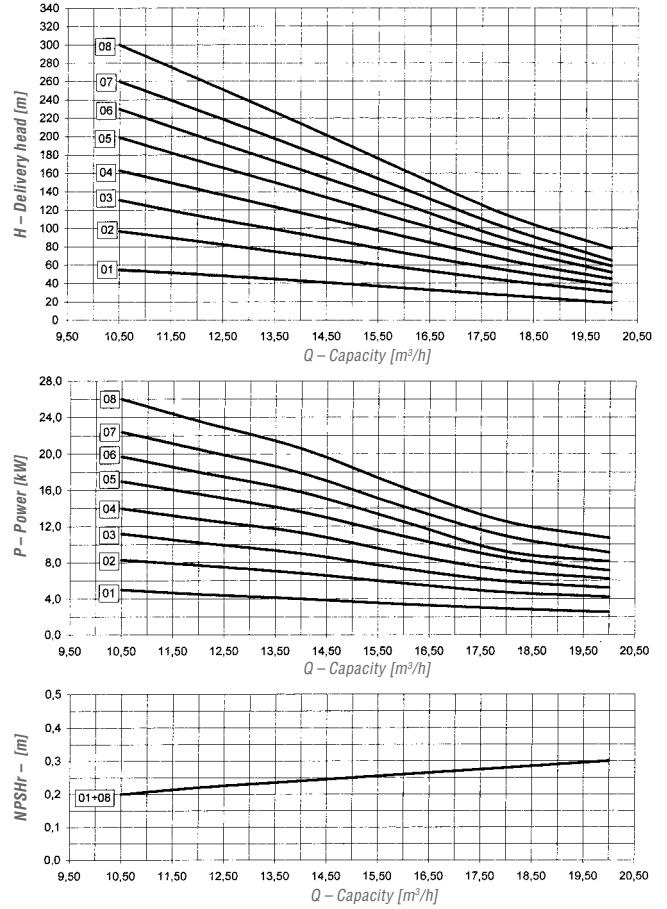
H[m] - H delivery head    Q[m³/h] - Q Capacity    NPSH[m] - net positive suction head    P[kW] - Power of one stage

# CHARACTERISTICS

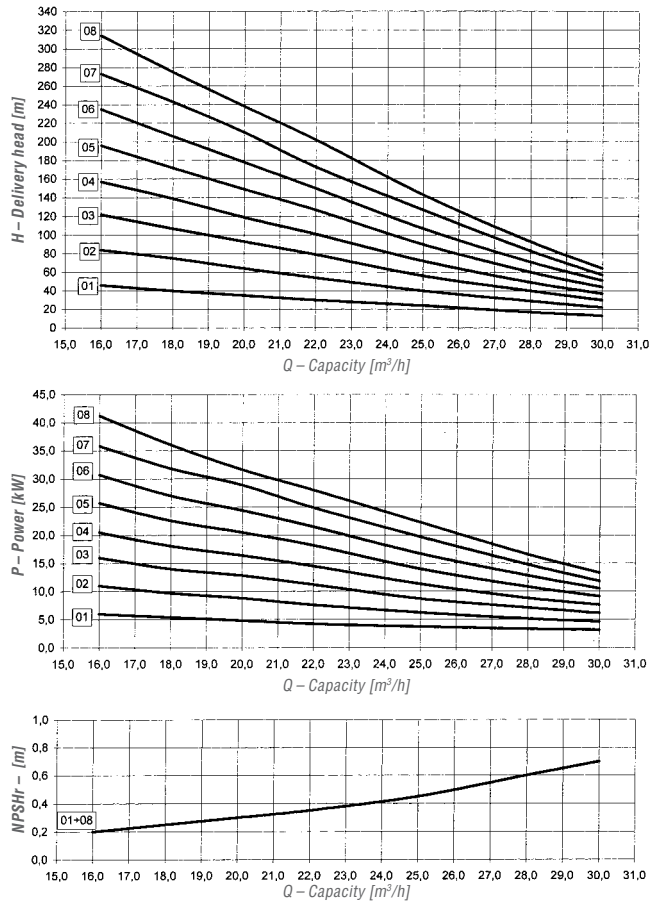
The characteristics of the SKC.6 and SKD.6 pump 50 Hz



The characteristics of the SKC.7 and SKD.7 pump 50 Hz



The characteristics of the SKC.8 and SKD.8 pump 50 Hz



## Technical requirements

**During assembly of the installation, special attention should be paid to meeting the following technical requirements:**

- ▶ when assembling the pump which is going to cooperate with an underground tank, it is necessary to minimize the resistance of flow in the suction pipeline. Hence the pump should be mounted as close as possible to the vertical section of the pipe coming out of the underground tank (max. 2m far from the suction flange of the pump). The minimum diameter of the suction pipe should be 2 inches. The underground tank should be equipped with ZZG check valve which was functionally tested and is characterised by minimum flow resistance.
- ▶ one should try to maximally limit the flow resistance in the suction pipe
- ▶ flow cross-section should not be changed just before the pump, by assembly of elbows, filters, valves or reducers
- ▶ it is absolutely necessary to apply a gas flow normalizing section before the intake to the SKC pump ( $L_{min}=20d$ )

During the switch-off of the pump, the ball valve on the pressure side of the pump must be opened in half. In case of complete opening of that valve, there is a danger of gas evaporation (the pump would operate beyond the catalogue range). The ball valve in the pressure equalizing pipe and the ball valve at the suction side must be entirely opened during the pump start-up, one must be absolutely sure that the pump is filled with liquid gas.

**To be sure that the pump is filled with the gas, it is recommended to install a flow meter or a flow indicator, below the ball valve in the pressure pipe.**

- ▶ the suction pipe should be as short as possible; the entire pumping system should be protected against external heat impact.
- ▶ the gas flow speed in the suction pipe cannot exceed 1m/s
- ▶ for contaminated liquids, the pipeline should be equipped with the filter
- ▶ the free section of the filter must be at least three times as big as the nominal diameter of the intake pipe of the pump
- ▶ the filter should be cleaned periodically
- ▶ minimal diameter of the suction pipe must be at least of the same length as pump connectors ( $d_r \geq d_s$ ) along the whole length of the pipeline (from the tank outlet to the pump connector).
- ▶ gas flow direction is marked on the pump with arrows
- ▶ installation of the pipe must be performed in such a way that there is no stress at the connections to the pump (it is recommended to use compensators)
- ▶ before connecting to the pump, the pipe installation should be carefully cleaned of welding chips, rasping, stain and other foreign bodies
- ▶ if the pipe is installed in the area of explosion hazard, one has to apply devices required by the binding safety regulations.
- ▶ motor rotation direction must be consistent with the pump rotation direction (marked on the suction housing)

**Local regulations concerning electrical devices should be observed.**

- ▶ motor rotation direction is counterclockwise, looking at the pump from the motor direction
- ▶ it is necessary to check the position of the coupling after putting the pump on the foundation and connecting it to the installation.

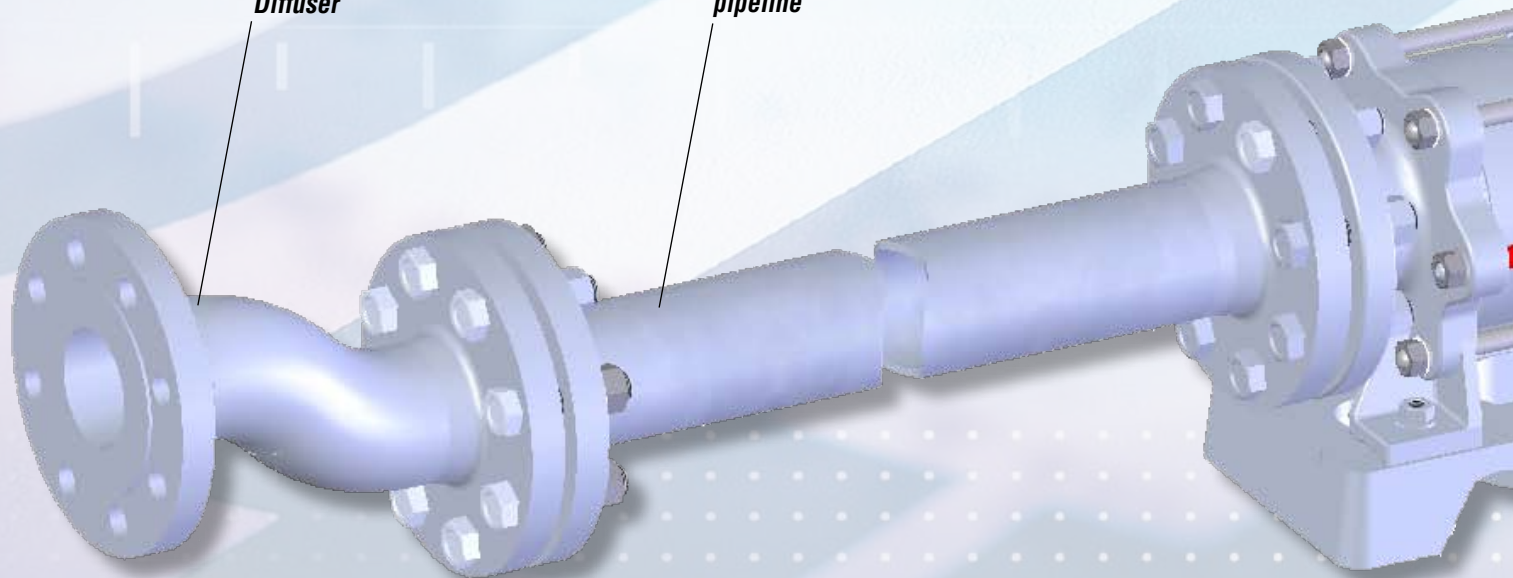
*Hydrostatic valve*

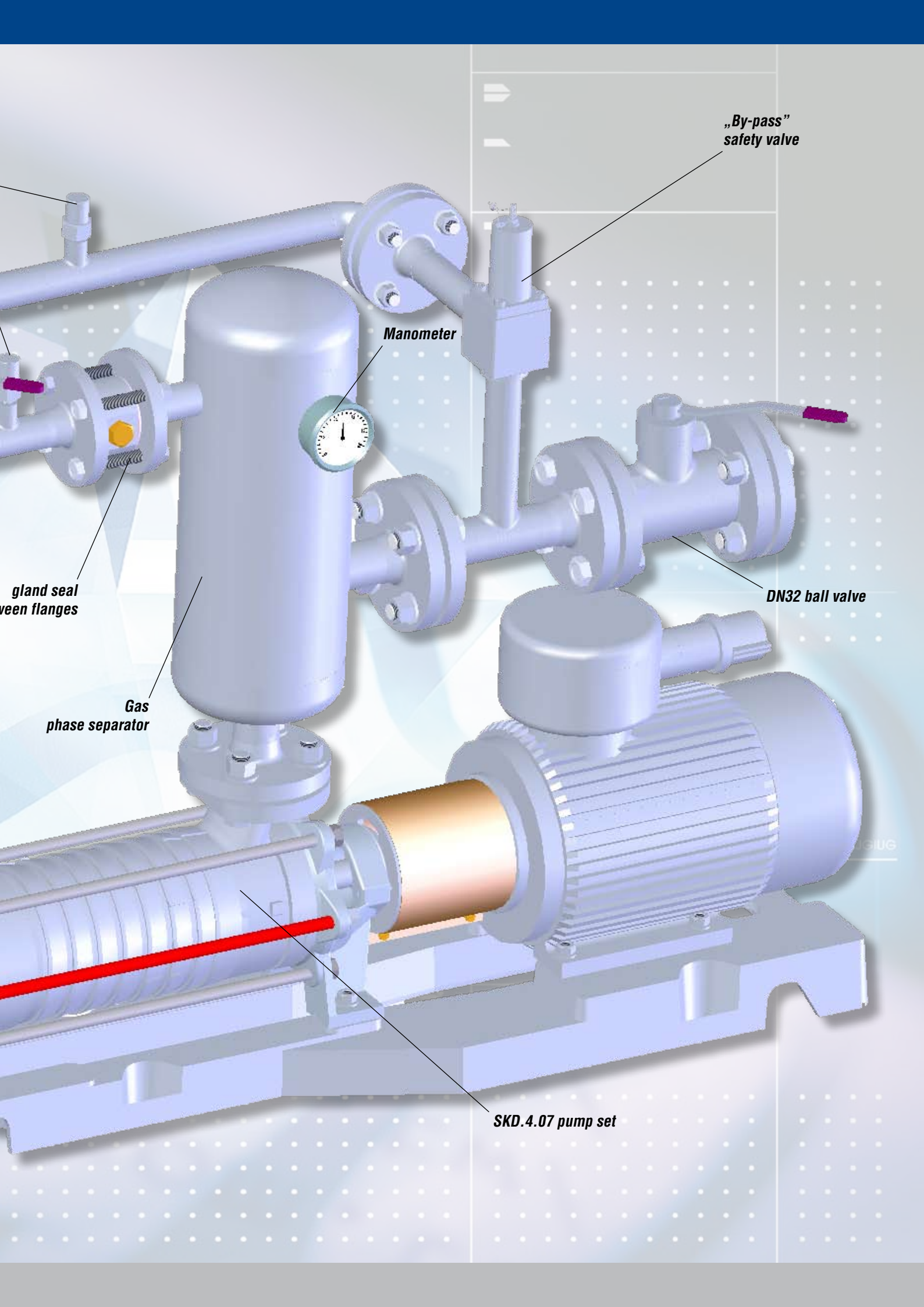
*DN25 ball valve*

*betw*

*Diffuser*

*Flow normalizing pipeline*





**„By-pass”  
safety valve**

**Manometer**

**gland seal  
between flanges**

**DN32 ball valve**

**Gas  
phase separator**

**SKD.4.07 pump set**

## *Export Department*



### *Hydro-Vacuum S.A.*

- ▶ *is a company that has existed on the market over 140 years*
- ▶ *designed, manufactured and sold millions of pumps*



**HYDRO-VACUUM<sup>®</sup> S.A.**

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