

**HVBW**  
Volute casing pumps

# VOLUTE CASING PUMPS HVBW

## VOLUTE CASING PUMPS

HVBW pumps are designed for pumping of clean liquids, eventually lightly polluted by mechanical impurities within 3% of liquid volume and with maximum grain size of 0,3 mm. The temperature of pumped media can vary from – 20 °C to + 180 °C, operational pressure to 2,5 MPa and density to 1050 kg.m<sup>3</sup>.

Within the pump design, construction elements required by API 610 standard are used.

HVBW pumps may pump various liquids: food material, potable water, used water, hot water, cooling water, desalinated water, oils, alkalines, eventually condensate. Other operational conditions possible only after approval by pump manufacturer.

## DESIGN

The pump design follows technical requirements for pumps according to ISO 9908 class III standard, by special demand to ISO 5199 standard.

The pump stator is designed for **PN16 (PN25)**.

The pump rotor is balanced following grade G6.3 as per ISO 1940-1 standard.

The pump is of volute-type with single-suction impeller. The suction branch follows the pump axis. The suction elbow or suction casting are connected to suction branch. The discharge branch is located tangentially, upright to side.

The pump stator consists of volute, replaceable front and rear sealing rings, dividing wall and seal. The pump stator is tested by hydrostatic water test.

The pump rotor consists of shaft and impeller with replaceable sealing rings. The pump rotor is

supported on roller bearings, laid in removable bearing housing.

In default design, the pumps are equipped with mechanical seal. The design of their sealing rooms follows ISO 3069 standard. The mechanical seals design follows the nature of pumped media, operational conditions and customer's requirements. The default design is single seal.

The bearing housing is designed in a way to cover several pump sizes. The whole pump line features various bearings sizes made by SKF, lubricated by „plastic grease“. The bearings lifetime exceeds 40 000 operational hours. The bearing housing is sealed through felt padding.

The pumps are manufactured in several design options. Elements, which may be combined upon customer's requirements, are:

### Suction part

Strainer, foot suction elbow, welded suction elbow, welded suction elbow embedded in concrete.

### Discharge part

Cast volute welded with cast diffuser, cast volute with removable cast diffuser, cast segment volute with cast diffuser embedded in concrete.

### Bearing part

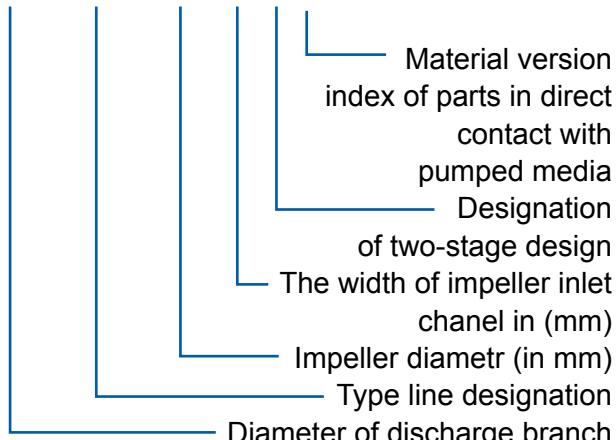
Bearing housing with roller bearings, for flows Q > 3000 l/s bearing housings with slide bearings.

The pump connection with pump drive is made by flexible multi - disc coupling. The longest spacer size is 7 metres, by application of guiding bearings up to 4 x 7 metres.

The pump drive may be located on pump base frame on the ceiling of machinery room or directly above the pump on concrete pillars (the shortest coupling design).

## Designation explanation

**400-HVBW-705-58/2-S5**



## TABLE OF MATERIAL VERSIONS INDEXES

The volute casing pumps HVBW are by default manufactured of material versions, which cover the most applications needed. Upon demand it is possible to combine various material versions or to replace the default materials by customer's ones. For the application of pumping aggressive solutions it is possible to apply epoxide, nickel, titane or teflon as a surface treatment.

Index	Description
S-5	steel version on the basis of carbon steel, cast suction elbows of EN-GLJ-250 material
S-6	steel version on the basis of carbon steel with an impeller of 12% chrome steel, cast suction elbows of EN-GLJ-250 material
S-8	steel version on the basis of carbon steel with an impeller of chrome-nickel-molybdenum austenitic steel 18/9/2, cast suction elbows of EN-GLJ-250 material
C-6	alloyed version on the basis of 12% chrome stainless steel
A-7	alloyed version on the basis of chrome-nickel austenitic steel 18/8

Index	Description
A-8	alloyed version on the basis of chrome-nickel-molybdenum austenitic steel 18/9/2
D-1	duplex version

## COOLING (HEATING)

Due to the fact that the HVBW pumps are designed for pumping of hot or cool media, they feature several ways of cooling (heating).

An informative division based on individual assessment of each operation modes:

- without cooling up to approx. 120°C
- cooling by water through dividing wall cooling chamber
- cooling by water through dividing wall cooling chamber, inner seal circulation via external cooler
- cooling by water through dividing wall cooling chamber, inner seal circulation via external cooler and flushing of pad and flange by cooling water

Similar ways are used in case of pumping cold media with low temperatures starting by -40°C.

## COUPLING

In order to connect the pump with the electric motor flexible multi-disc couplings are used. They enable perfect connection with electric motor even in case of big shaft radial offsetting caused by thermal dilatation. The coupling consists of spacer, which enables the drive torque transmission up to the distance of 7 metres (without guidance bearing) and 4 x 7 metres with guidance bearings.

# VOLUTE CASING PUMPS HVBW

## BASE FRAME

The base frame is welded under each pump foot and electric motor. The passage through machine hall ceiling enables partial installation of dismantled pump in vertical direction.

## QUALITY ASSURANCE

For nuclear power plant applications the pumps are delivered following special instructions upon customer's requirements.

As for ISO 9908 (ISO 5199) standards, the pump production process is checker within Quality Plan (QP), which is prepared by QA department, independently on production. The scope of QP is approved by the customer before manufacture start. Upon special request it is possible to carry out inspections, tests and documents checks upon customer's requests.

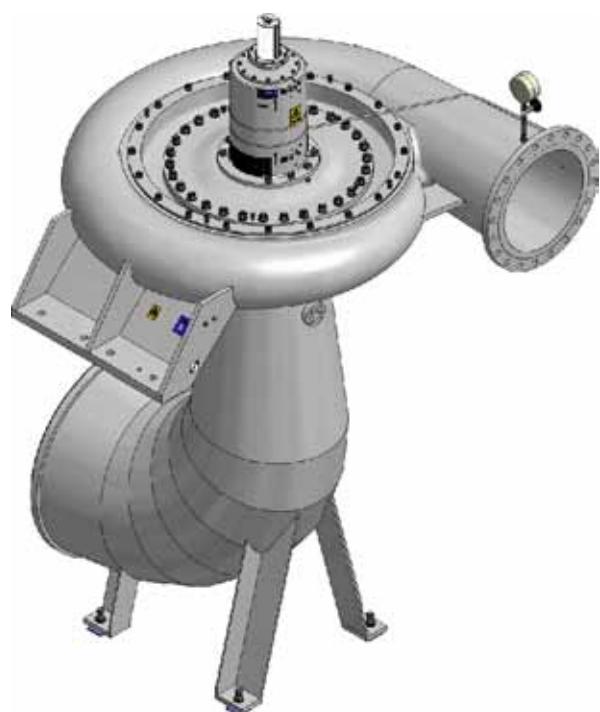
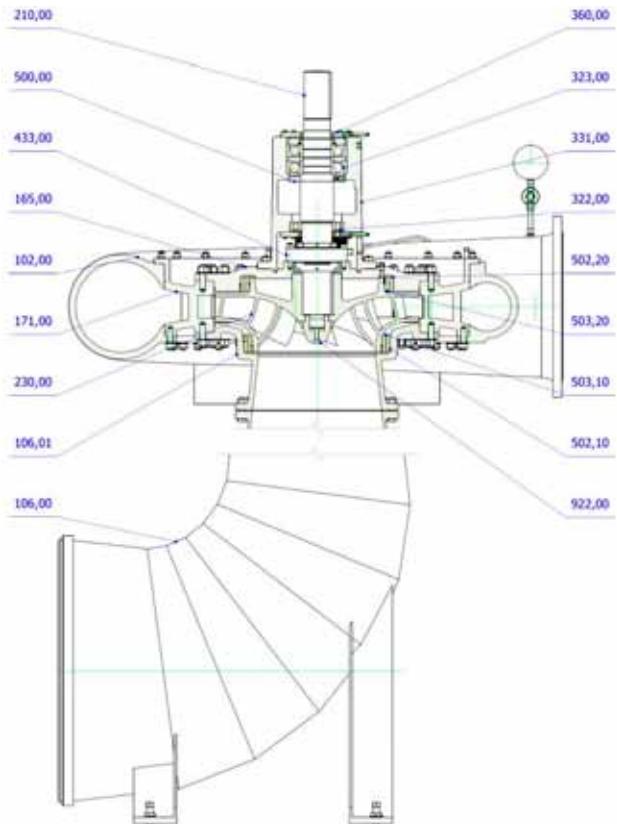
## APPLICATION OF PUMPS IN AN EXPOSIVE ATMOSPHERE ATEX



In petrochemical industry, as one of main branches of these pumps applications, often occurs a potentially explosive atmosphere (explosion danger of flammable gases, vapours or mists). For such atmospheres pumps with explosion protection of category 2G for zone 1 or of the 3G category for zone 2 are applicable. For ordering of pumps for a potentially explosive atmosphere a full specification of classification of surrounding flammable atmosphere, i.e. its temperature class (from T1 up to T6) and subgroup (IIA, IIB, IIC) is necessary together with the specification of the category and zone. Factory production label of pumps intended for application in a potentially explosive atmosphere contains the symbol and further necessary data.

# CROSS - SECTIONAL DRAWING OF HVBW PUMP

**One-stage version with a removable diffuser and welded segment suction elbow. Suction elbow embeded in concrete.**



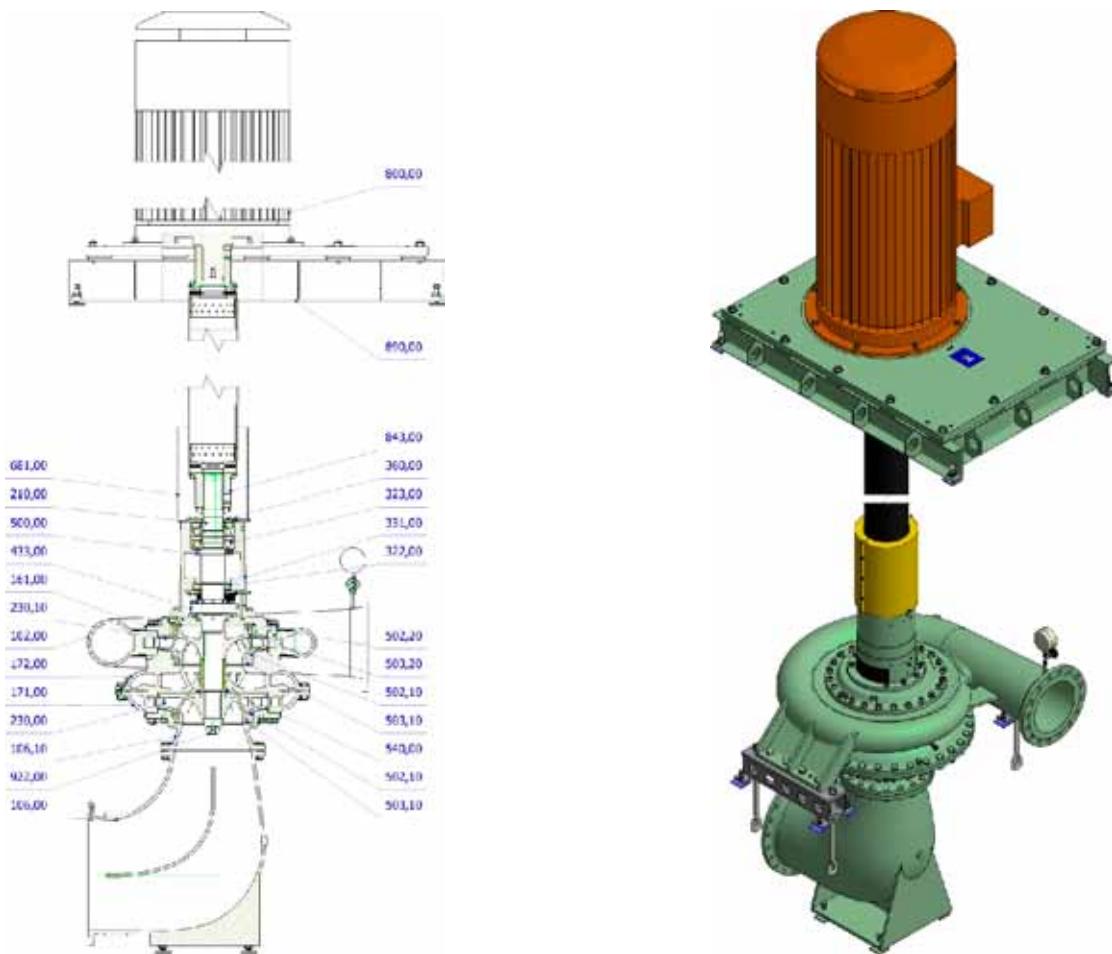
Position	Name
102.00	Volute
106.00	Suction elbow
106.01	Suction cover
161.00	Dividing wall
171,00	Diffuser
210.00	Shaft

Position	Name
230.00	Impeller
322.00	Journal bearing
323.00	Thrust bearing
331.00	Bearing housing
360.00	Cover
433.00	Mechanical seal

Position	Name
500.00	Sprayer
502.10	Housing sealing ring - front
502.20	Housing sealing ring - rear
503.10	Impeller sealing ring - front
503.20	Impeller sealing ring - rear
922.00	Impeller nut

# CROSS - SECTIONAL DRAWING OF HVBW PUMP

**Two-stage version with cast suction elbow.**



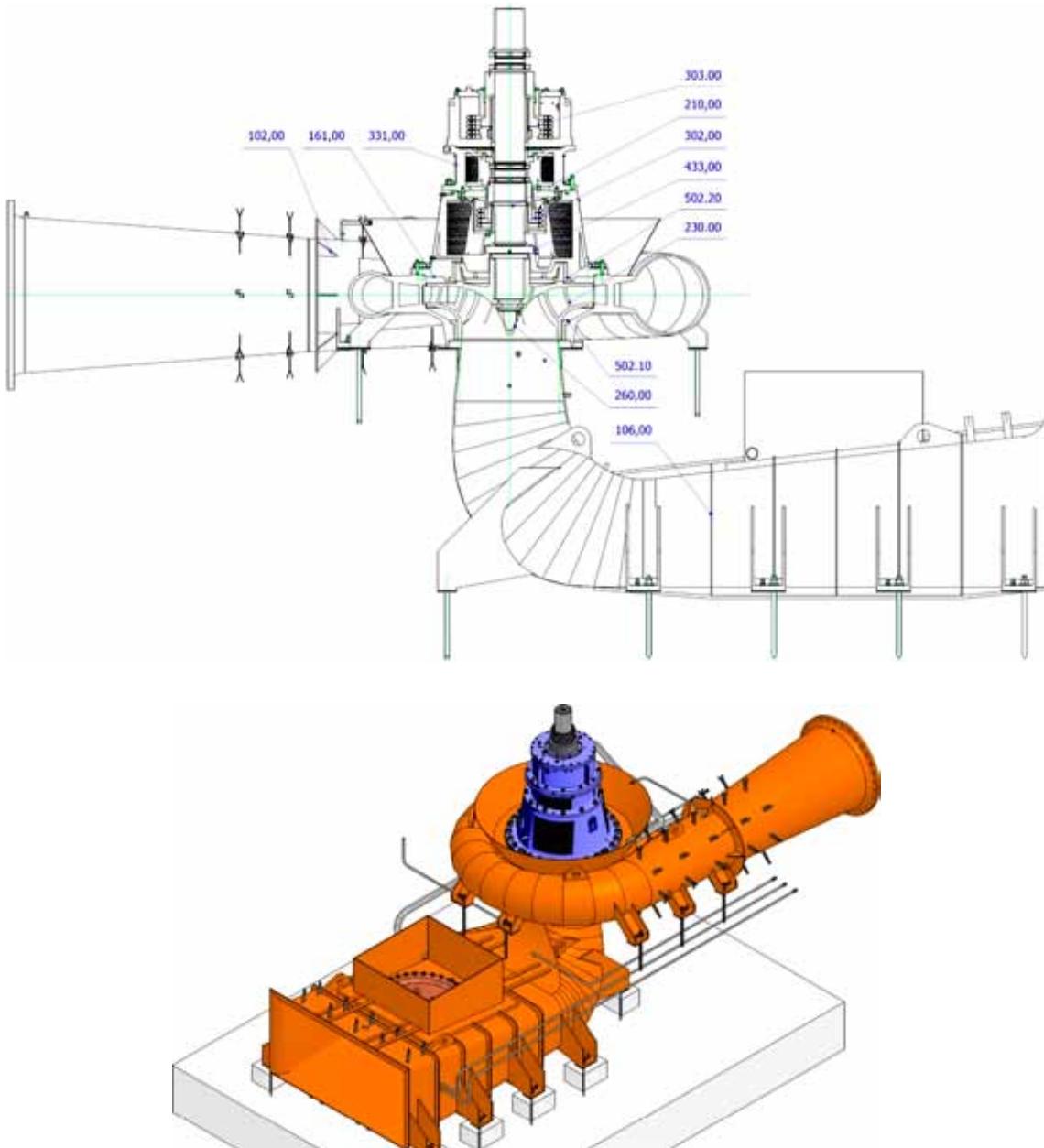
Position	Name
102,00	Volute
106,00	Suction elbow
106,10	Suction cover
161,00	Dividing wall
171,00	Diffuser 1°
172,00	Converter 1°
210,00	Shaft
230,00	Impeller 1°

Position	Name
230,10	Impeller 2°
322,00	Jourbal bearing
323,00	Thrust bearing
331,00	Bearinhg housing
360,00	Cover
433,00	Mechanical seal
500,00	Sprayer
502,10	Housing sealing ring - front

Position	Name
502,20	Housing sealing ring - rear
503,10	Impeller sealing ring - front
503,20	Impeller sealing ring - rear
540,00	Bearing
681,00	Coupling cover
800,00	Electric motor
890,00	Base frame
922,00	Impeller nut

# CROSS-SECTIONAL DRAWING OF HVBW PUMP

**One-stage version with welded segment volute, welded suction housing and bearing housing with slide bearings. Suction housing and volute embeded in concrete.**



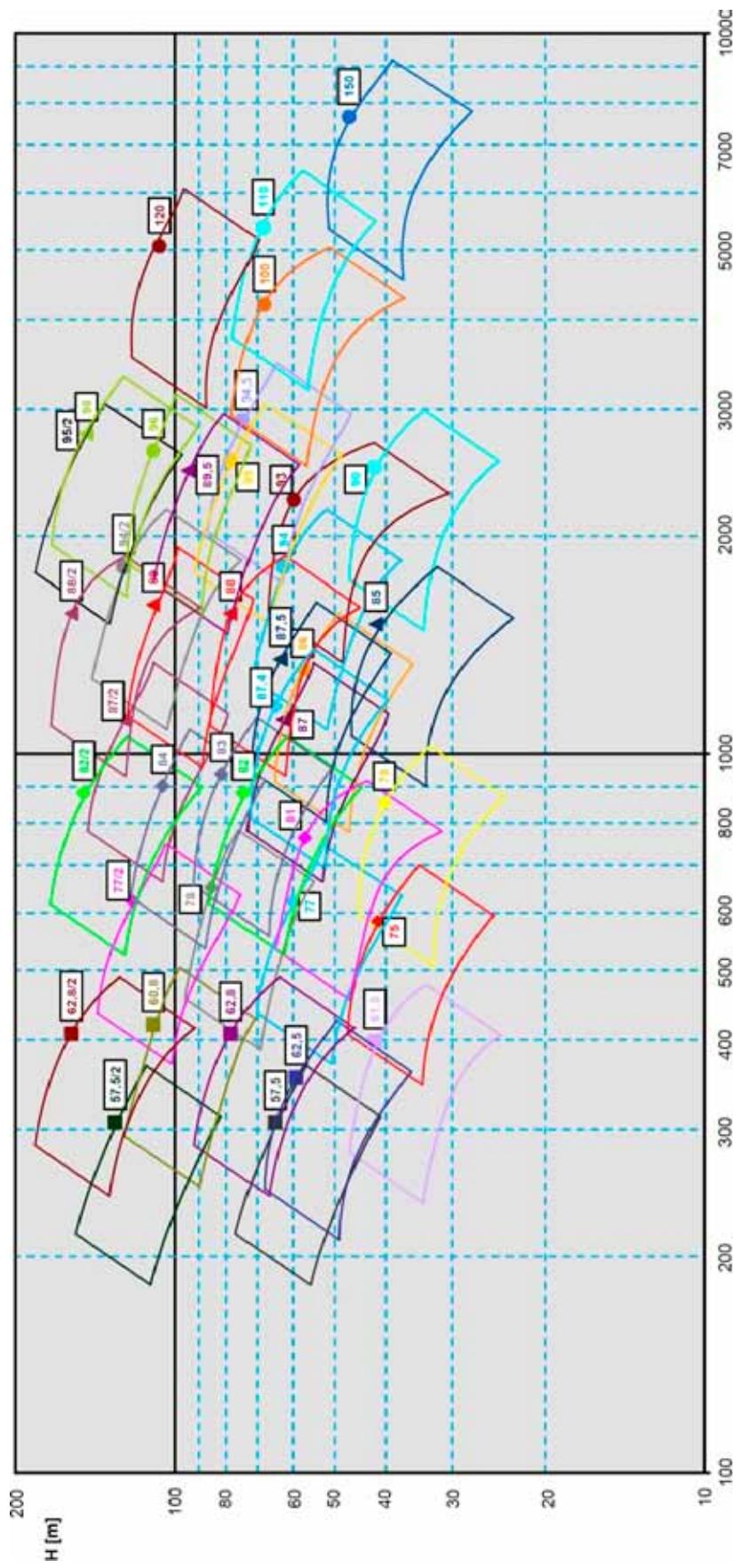
Position	Name
102.00	Volute
106.00	Suction housing
161.00	Cover
210.00	Shaft

Position	Name
230.00	Impeller
302.00	Journal bearing
303.00	Thrust bearing
331.00	Bearing housing

Position	Name
433.00	Mechanical seal
502.10	Housing sealing ring - front
502.20	Housing sealing ring - rear
260.00	Impeller head

# PERFORMANCE RANGE

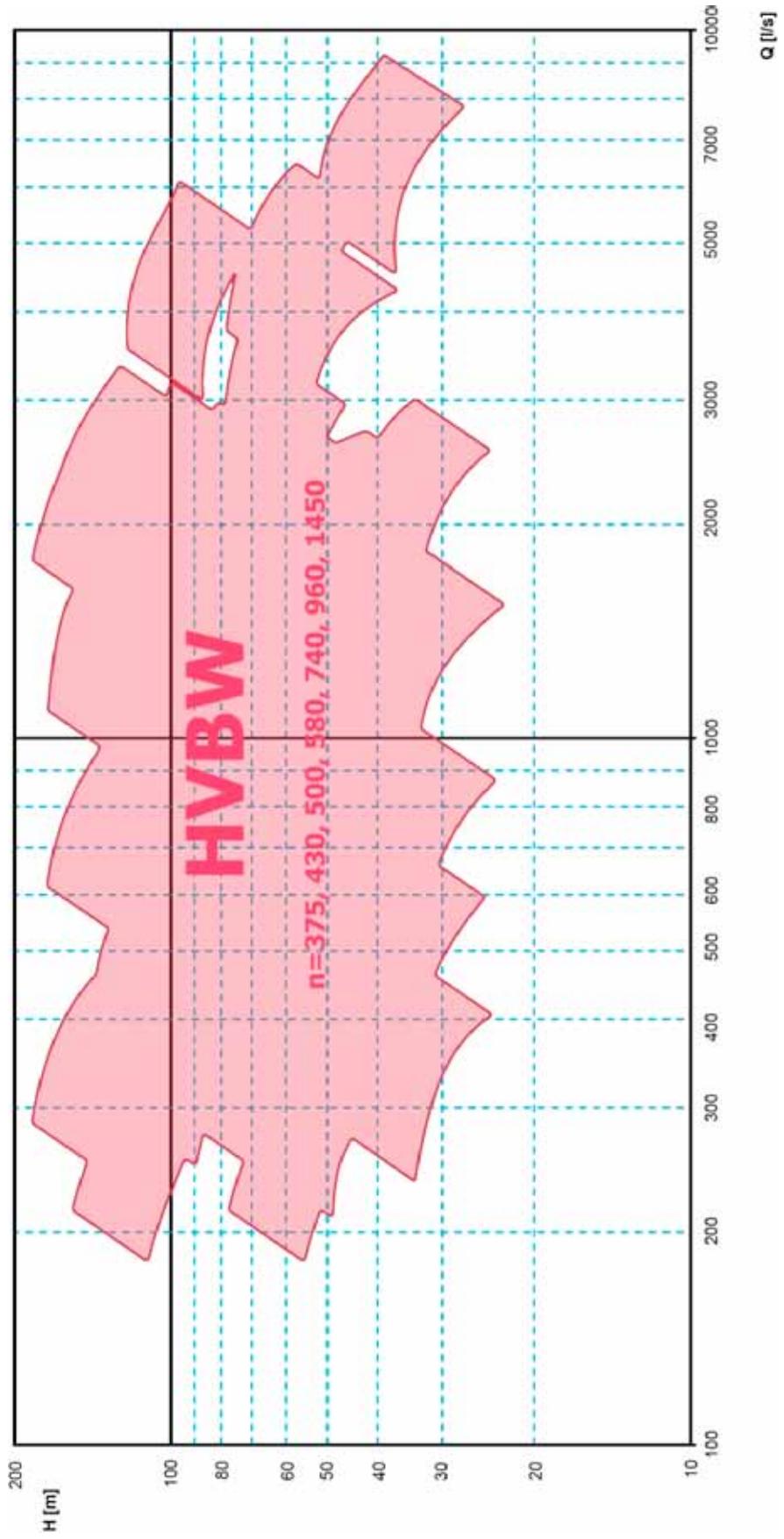
**HvBW type – pumps with a diffuser,**  
**n = 375, 430, 500, 580, 600, 740, 960, 1450 1/min**



**Q [l/s]**

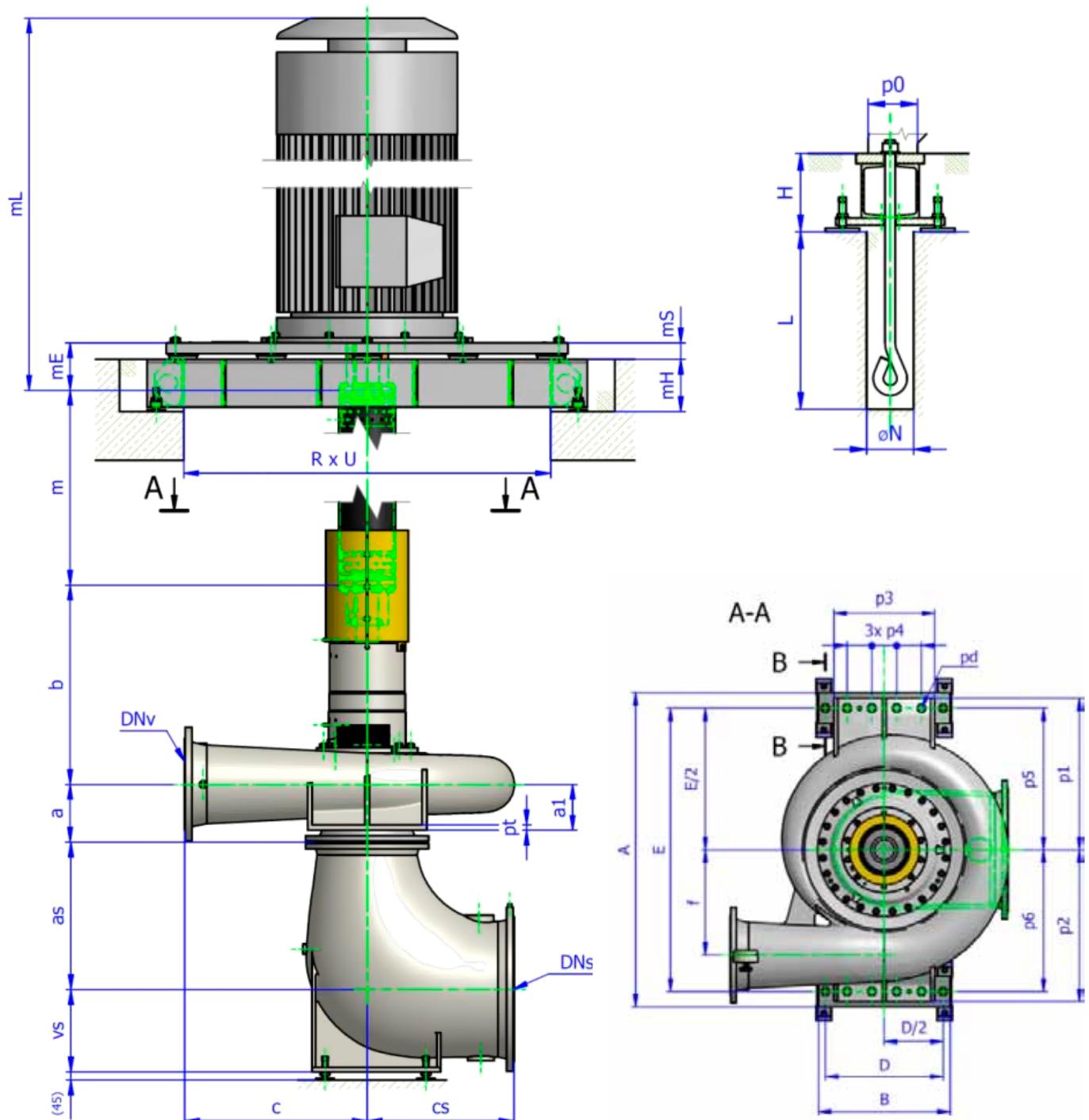
(n=1450 1/min square mark, 960 1/min = rhomb mark, 740 1/min = triangle mark, < 600 1/min = ring mark)

Guaranteed parameters of pumps with flows starting by 3000 l/s are verified on a model pump. For such units there is a new hydraulic size made.  
 Pumps sizes „XX/2“ are two-stage versions of „XX“ size.



*HVBW – vertical, centrifugal, volute-type pumps with a diffuser according to ISO 9908, (ISO 5199), for pumping of clean and lightly polluted liquids with temperature -15 ÷ 140°C. Branches PN25 (PN16, 10, 6).*

# BASIC DIMENSIONS



Size	Type	Shaft MU	Weight m [kg] <sup>1)</sup>	Weight m [kg] <sup>1)</sup>	Dimensions [mm]																			Základový štrob																	
					Dns	Pns	Dnv	Pnv	a	a1	b	as	vs	c	cs	f	pdl	pt	p0	p1	p2	p3	p4	p5	A	B	D	E	RxU	mH	mS	N	Nch	L	H						
57,5	300-HVBN-485-40	70	4,1	966	260	DN400	Pn10	DN16	236	200	695	500	270	570	500	468	27	38	125	630	630	450	340	580	580	1325	670	1160	1300x600	165	70	110	35	290	260	M30x600					
57,5/2	300-HVBN-485-40/2	90	8,5	1580	260	DN400	Pn10	DN25	590	200	734	500	270	570	500	468	27	38	125	630	630	450	340	580	580	1325	670	1160	1200x1200	205	70	110	35	440	260	M30x750					
60,8	300-HVBN-485-48	90	5,1	1301	260	DN400	Pn10	DN16	205	200	794	500	270	660	500	570	35	30	160	810	810	600	140	730	730	1660	820	710	1460	1450x750	165	70	110	35	285	265	M30x600				
61,5	400-HVBN-410-80	70	3,8	1447	690	DN600	Pn10	DN400	PN16	280	250	715	495	415	650	600	680	33	30	150	980	700	170	905	2000	920	810	1810	1600x900	205	70	110	35	290	260	M30x600					
62,5	300-HVBN-465-58	70	3,9	927	280	DN400	Pn10	DN30	PN16	375	200	705	500	270	502	500	465	33	35	130	700	700	520	124	640	640	1450	740	630	1280	1200x550	165	70	110	35	285	265	M30x600			
62,8	300-HVBN-535-44	80	4,8	1142	280	DN400	Pn10	DN30	PN16	200	220	791,5	500	270	630	500	515	35	30	150	780	780	650	160	705	705	1600	870	760	1410	1400x750	185	70	110	35	435	265	M30x750			
62,8/2	300-HVBN-535-44/2	100	9,5	1680	280	DN400	Pn10	DN30	PN25	500	220	809	500	270	630	500	515	35	30	150	780	780	650	160	705	705	1600	870	760	1410	1400x400	205	70	110	35	435	265	M30x750			
75	500-HVBN-600-77	80	3,55	2111	690	DN600	Pn10	DN50	PN16	365	320	816,5	495	415	800	600	620	39	45	200	970	970	750	180	910	910	2060	970	860	1820	1700x900	205	80	110	35	410	290	M30x750			
77	400-HVBN-705-58	100	9,6	2067	690	DN600	Pn10	DN400	PN16	275	250	862,5	495	415	995	600	680	33	30	145	980	980	650	160	915	915	2015	870	760	1830	1900x1800	265	80	110	35	335	365	M30x750			
77/2	400-HVBN-705-58/2	140	16,7	3554	690	DN600	Pn10	DN400	PN16	687	250	1080	495	415	995	600	680	33	30	145	980	980	650	160	915	915	2015	870	760	1830	1900x1800	265	80	110	35	335	365	M30x750			
78	400-HVBN-800-63	120	13,44	2722	690	DN600	Pn10	DN400	PN16	280	340	1027	495	415	970	600	755	33	30	145	980	980	600	160	900	900	200	780	780	1760	1020	920	1800	1800x1000	265	80	110	35	335	365	M30x750
79	600-HVBN-606-118	90	6,1	2589	900	DN700	Pn10	DN600	PN16	320	415	870	660	500	885	650	685	36	50	160	1100	840	200	1020	1020	2240	1060	950	2040	2000x1000	265	80	110	35	330	370	M30x750				
81	500-HVBN-680-85	100	8,7	2841	900	DN700	Pn10	DN500	PN16	300	320	828	660	500	885	650	690	42	50	200	1050	800	190	950	2140	1020	910	1900	2000x950	265	80	110	35	330	370	M30x750					
82	500-HVBN-790-65	120	13,7	3099	900	DN700	Pn10	DN600	PN16	250	350	1037	660	500	930	650	765	42	55	200	1100	900	210	1000	2240	1120	1010	2000	2100x1000	325	80	110	35	325	375	M30x750					
82/2	500-HVBN-790-65/2	150	45	5080	900	DN700	Pn10	DN600	PN25	700	350	1272	660	500	930	650	765	42	55	200	1100	900	210	1000	2240	1120	1010	2000	2300x1800	325	80	110	35	325	375	M30x350					
83	500-HVBN-795-82	120	18,5	3259	900	DN700	Pn10	DN600	PN16	300	280	1047	660	500	900	650	765	42	30	160	1100	900	210	1020	2240	1120	1010	2040	2300x1000	325	80	110	35	525	375	M30x350					
84	500-HVBN-890-70	140	19,3	4155	900	DN700	Pn10	DN500	PN25	300	280	1242	660	500	970	650	840	42	35	160	1250	900	200	1170	2540	1120	1010	2340	2600x150	325	80	110	35	525	375	M30x350					
85	800-HVBN-800-157	140	19,5	4324	1400	DN1000	Pn10	DN800	PN16	500	1152	1000	700	1000	1300	880	42	55	220	1400	1000	240	1290	2840	1320	1160	2590	2300x1300	325	80	110	57	485	415	M42x3x950						
86	600-HVBN-900-112	140	28,7	4162	940	DN800	Pn10	DN600	PN16	490	320	1122	800	500	1250	900	900	39	50	160	1300	1300	1000	250	1240	2680	1220	1110	2480	2500x1100	325	80	110	57	530	370	M42x3x950				
87	500-HVBN-934-77	140	31	4433	940	DN800	Pn10	DN500	PN16	440	400	1082	800	500	855	900	900	42	55	220	1200	900	210	1120	2500	1120	1010	2240	2100x1100	325	80	110	57	525	375	M42x3x950					
87/2	500-HVBN-934-77/2	190	56	7088	940	DN800	Pn10	DN600	PN25	750	400	1482	800	500	855	900	900	42	55	220	1200	900	210	1120	2500	1120	1010	2240	2100x2200	325	80	110	57	525	375	M42x3x950					
87,4	600-HVBN-755-97	140	17,7	4441	940	DN800	Pn10	DN600	PN16	650	450	1102	800	500	974	900	780	42	55	220	1225	950	220	1145	2560	1170	1060	2280	2280x150	325	80	110	57	525	375	M42x3x950					
87,5	600-HVBN-950-95	140	38	5321	940	DN800	Pn10	DN600	PN16	480	450	1091	800	500	1140	900	950	42	55	220	1380	1380	1140	280	1300	2860	1360	1250	2600	2600x350	325	80	110	57	525	375	M42x3x950				
88	600-HVBN-1045-96	170	47,2	6340	980	DN1000	Pn10	DN600	PN16	462	370	1444	865	630	1230	1200	1005	38	55	250	1500	1500	1000	250	1375	3040	1220	1110	2750	2600x2100	325	80	110	57	530	370	M42x3x950				
88/2	600-HVBN-1045-86/2	190	137	8639	980	DN1000	Pn10	DN600	PN25	1100	370	1524	865	630	1230	1200	1005	38	55	250	1500	1500	1000	250	1375	3040	1320	1120	2750	2600x2100	325	80	110	57	530	370	M42x3x950				
89	700-HVBN-1717-93	170	59,8	6825	2200	DN1000	Pn10	DN700	PN16	500	450	1442	900	630	1250	1200	1050	42	55	250	1500	1500	1300	310	1375	3040	1620	1460	2750	2700x450	325	110	160	57	485	415	M42x3x950				
89,5	800-HVBN-1200-110	280	127	13340	6000	DN1600	Pn10	DN800	PN16	500	600	2100	1800	1000	1403	1800	1170	45	55	250	1500	1500	1300	310	1375	3040	1620	1460	2750	3200x2000	325	110	160	57	525	375	M42x3x950				
90	1000-HVBN-1024-200	170	52,2	10285	2400	DN1000	Pn10	DN800	PN16	600	600	1502	1000	700	1280	1300	1100	48	65	300	1550	1550	1400	340	1400	3140	1720	1560	2800	2900x1450	325	110	160	57	485	415	M42x3x950				
93	800-HVBN-1170-146	170	75,5	10285	2400	DN1000	Pn10	DN800	PN16	600	600	1502	1000	700	1280	1300	1100	48	65	300	1550	1550	1400	340	1400	3140	1720	1560	2800	2900x1450	325	110	160	57	485	415	M42x3x950				
94	700-HVBN-1190-98	170	69,8	8105	2200	DN1000	Pn10	DN700	PN16	600	550	1447	900	630	1120	1200	1050	48	55	250	1450	1450	1350	320	1325	2940	1670	1510	2650	2600x1450	325	110	160	57	485	415	M42x3x950				
94/2	700-HVBN-1190-98/2	190	137	10570	2200	DN1000	Pn10	DN700	PN16	1200	550	1527	9																												



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2014

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