

Questionnaire

company: _____
 department: _____
 Mr./Mrs.: _____
 phone.: _____
 fax.: _____
 E-Mail: _____

Liquid

liquid: _____ viscosity: _____ cP
 temperature: _____ °C density: _____ g/cm³

Parameter

height: _____ m flow rate: _____ l/h

Propulsion

use country: _____
 voltage: _____ V frequency: _____ Hz

Design

☐ food (3,2µm) ☐ stainless steel machine feet with stainless steel motor cover
☐ stainless steel machine feet without motor cover
 pharma ☐ on motor foot without motor cover
☐ 0,4µm ☐ on stainless steel base without motor cover
☐ 0,8µm ☐ on stainless steel base with stainless steel motor cover
 roughness: _____ ☐ on base plate with coupling and motor

Options

☐ vertical design emptying: ☐ valve or
☐ trolley ☐ blindclamp
☐ heating-/cooling-jacket explosion-protect.: ☐ EExe (T3) or
☐ material 1.4435 ☐ EExde (T4)
☐ ΔFe < 1% frequency-convert. : ☐ external or
☐ internal (max: 7,5 kW)

Connections for suction- and delivery sides

suction side: nominal diameter: _____ connection type: ☐ ☐ ☐
 flange thread clamp
 delivery side: nominal diameter: _____ connection type: ☐ ☐ ☐
 flange thread clamp

Other comments

Hygienic and aseptic stainless steel
centrifugal pumps

self-priming and non self-priming for

beer and wort
milk and whey
mineralwater and softdrinks
juice and wine
pharmaceutical products
chemical products
CIP and so on

Kyffhäuser
Pumpen
Artern GmbH



Highlights of KPA Pumps

- ◆ electro-polished CrNiMo forged and sheet metal according to AISI 316L, perfect cleanability and high corrosion resistance
- ◆ material not in contact with product, stainless steel AISI 304
- ◆ no dead-end-design, with flushed and cooled mechanical seal
- ◆ modular system, identical spare parts for several sizes, e.g. 25mm diameter mechanical seal for pump types KN2, KN3, KN4 and S1 from 0,25 kW to 22,0 kW motor power
- ◆ open, semi-open, closed impeller
- ◆ user-friendly and low maintenance
- ◆ control adjustment possible by motor with integrated frequency converter up to 7,5 kW
- ◆ inducer for low NPSH-values
- ◆ testrun of each pump prior to shipment
- ◆ warranty 24 months
- ◆ 3A, EHEDG certificate where applicable

Tradition and experience ...

... since 1958 sanitary pumps for the food and pharmacy industry are manufactured in Artern Germany. Many years of experience in the development of these pumps and the definite integration of international standards are the prerequisite for the production of pumps with an outstanding price to value comparison. Our success speaks for itself – more than 100.000 pumps have been delivered since that time. Our pumps are characterized by electro-polished CrNiMo-rolled and forged steel, dead-end-free-design, CIP and SIP compatible, choice of nominal size, connections and motors, gentle pumping, simple spare part storage.

Stainless steel centrifugal pumps Normal- and self-priming (Design for example)



photo: **KN2** Design A
pump on stainless steel
machine feet with
stainless steel motor
cover
max. flow rate: **15.000 l/h**
max. height: **20m @50Hz**



photo: **KN4H** Design D
pump on stainless steel
base, special pump for high
pressure and flow rate
max. flow rate: **50.000 l/h**
max. height: **75m @50Hz**



photo: **KN3** Design AF
pump on trolley, inclusive
motor-protective-switch,
cable and europlug
max. flow rate: **50.000 l/h**
max. height: **40m @50Hz**



photo: **KM2** Design B
pump on stainless steel
machine feet without
stainless steel motor cover
max. flow rate: **15.000 l/h**
max. height: **110m @50Hz**



photo: **KN3H** Design KB
pump on stainless steel
machine feet with internal
frequency converter
max. flow rate: **50.000 l/h**
max. height: **48m @50Hz**



photo: **KM34** Design CV
pump in vertical design
especially for the pharma
industry
max. flow rate: **45.000 l/h**
max. height: **105m @50Hz**



photo: **KN4** Design B
pump on stainless steel
machine feet without
stainless steel motor cover
max. flow rate: **100.000 l/h**
max. height: **60m @50Hz**

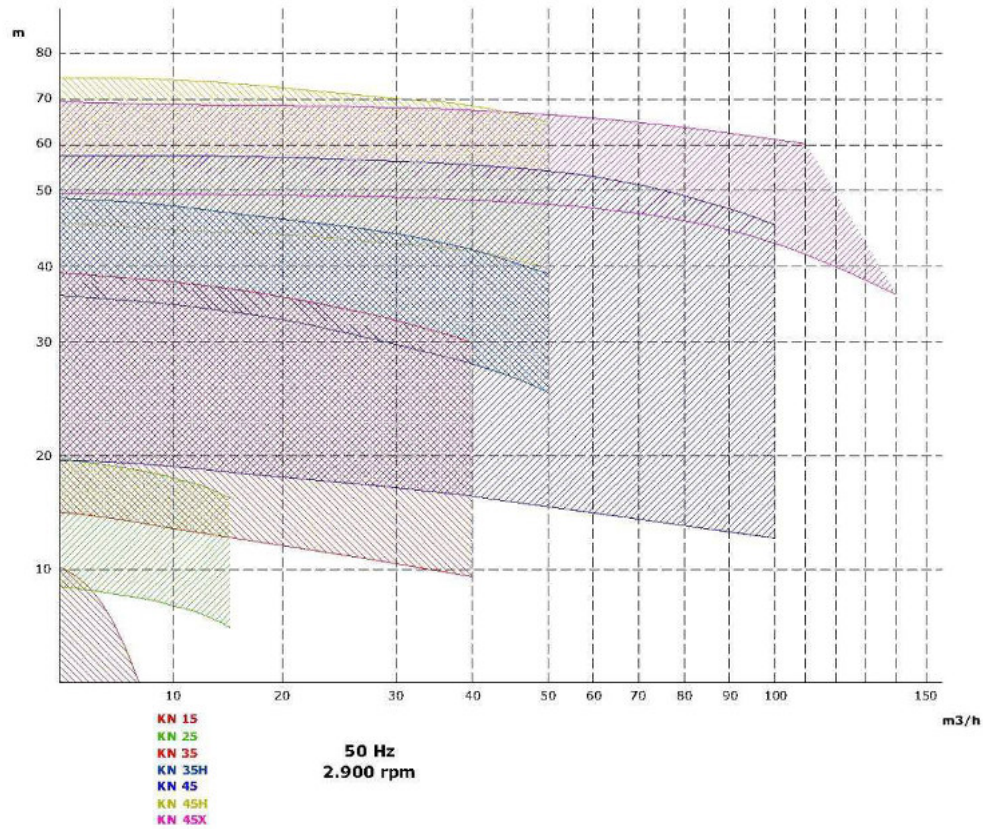


photo: **S** Design DV
self-priming pump on
stainless steel base with
stainless steel motor cover
max. flow rate: **40.000 l/h**
max. height: **28m @50Hz**

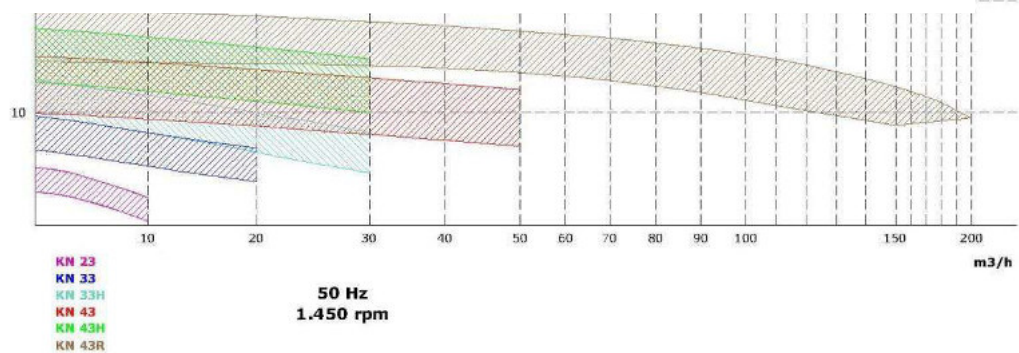
Standard program

Characteristics KN1 – KN4

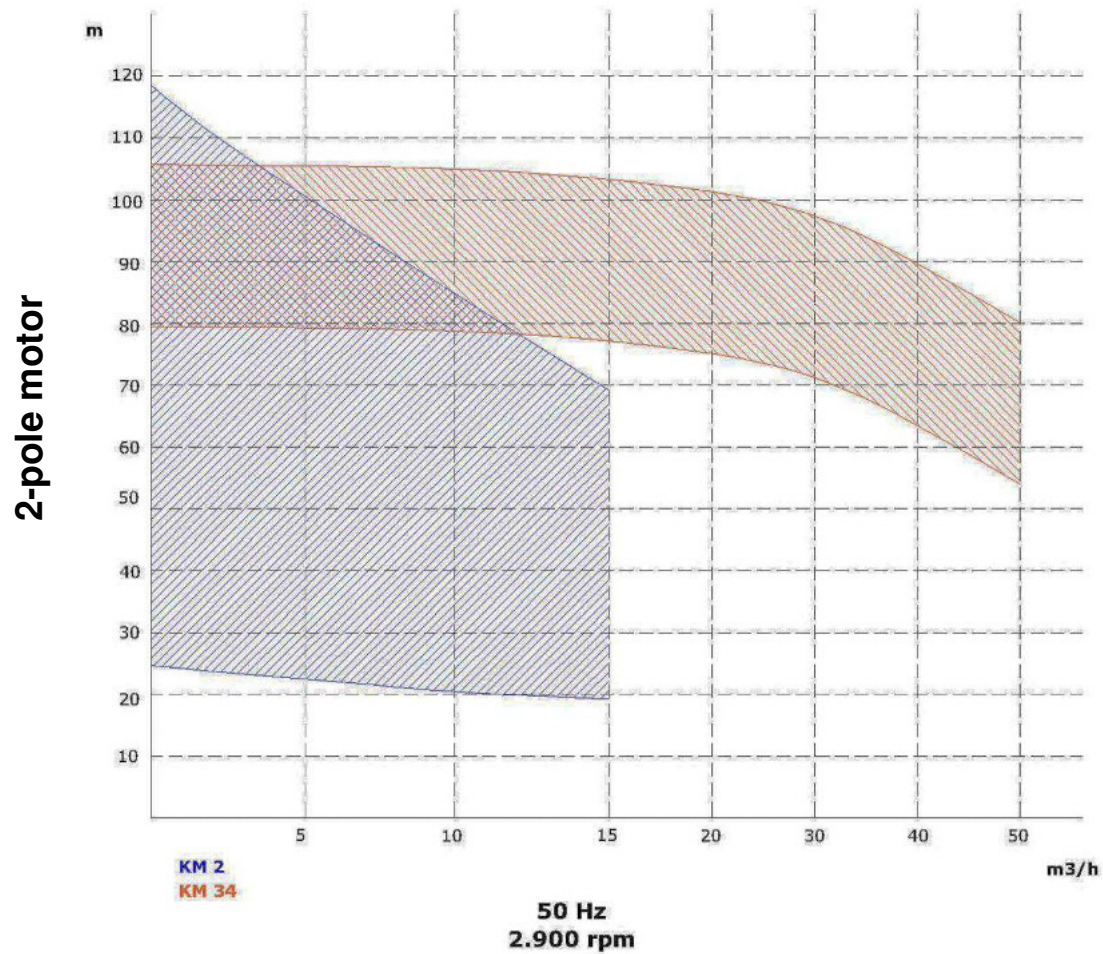
2-pole motor



4-pole motor



Characteristics KM2 / KM34



Content

1. Design KN1, non self-priming
 2. Design KN2, non self-priming
 3. Design KN3, non self-priming
 4. Design KN3H, non self-priming
 5. Design KN4, non self-priming
 6. Design KN4H, non self-priming
 7. Design KM2, multistage
 8. Design KM34, multistage
 9. Design S, self-priming
 10. Information
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Hygienic non self-priming – KN1

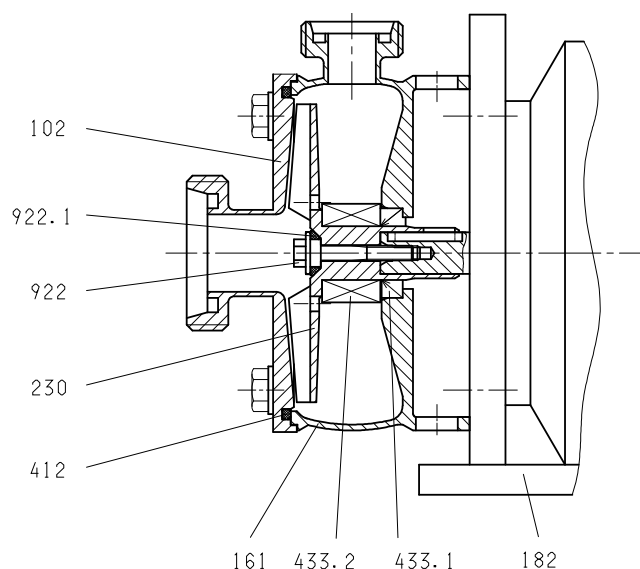


Design C

... for the brewery and beverage industry

Design	Thick-walled CrNiMo stainless steel casing, CrNiMo stainless steel casing cover, semi-opened CrNiMo stainless steel impeller, with hygienic chambered O-ring seal
Construction arrangements	T ... portable C ... on motor foot V ... vertically
Materials	All parts in contact with product correspond to the materials AISI 316L (1.4404 or 1.4435), stainless steel motor lantern, various process seal materials to suit application
Shaft seal	Adjusted self-cleaning and self-rinsing single mechanical seal with uniform shaft diameter of 18mm for aseptic applications and with material combinations depending on product
Parameter	♦ flow rate : max. 6.000 l/h (50Hz) ♦ discharge head : max. 1,0 bar (50Hz) ♦ motor power : max. 0,55 kW ♦ working temperature : max. 130°C ♦ operating pressure : max. 6 bar
Motor	IEC-standard motor IP55 hoseproof
Optional features	♦ explosion proof EExelIT3 or EExdelICT4 ♦ degree of protection IP65 ♦ alternative paint for motor (standard RAL 5015) ♦ casing with drainage connection or diaphragm valve
Connections	Connections in diameters: suction side DN25; pressure side DN15 according standard DIN11851 (other on request)

section KN1

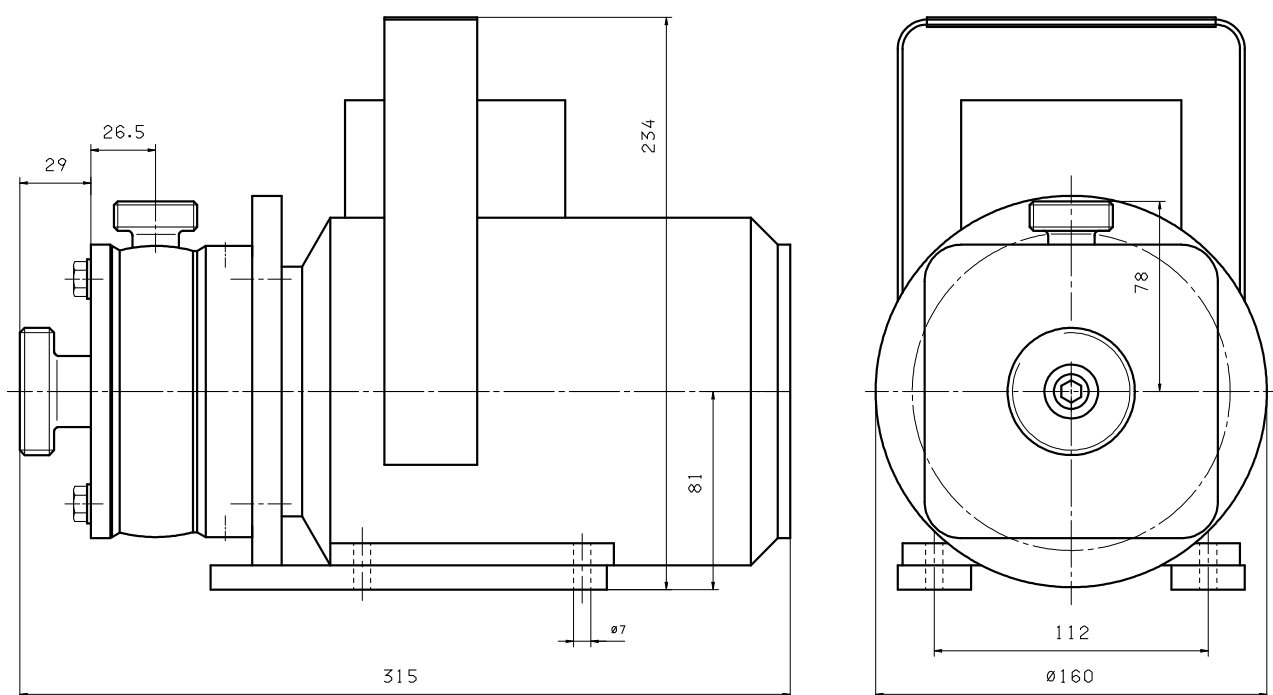


Technical changes reserved:
10 / 2015

numeral	component
102	casing (material AISI 316L)
161	casing cover (material AISI 316L)
182	base frame
230	impeller (semi-open; material AISI 316L)
412	O-Ring (flushed O-Ring in EPDM, NBR, FKM or perfluor-rubber)
433.1	shaft seal ring*
433.2	mechanical seal* (single mechanical seal in different design and material according to the requirements)
922	impeller screw (material AISI 316L)
922.1	O-Ring (flushed O-Ring in EPDM, NBR, FKM or perfluor-rubber)

*alternatively

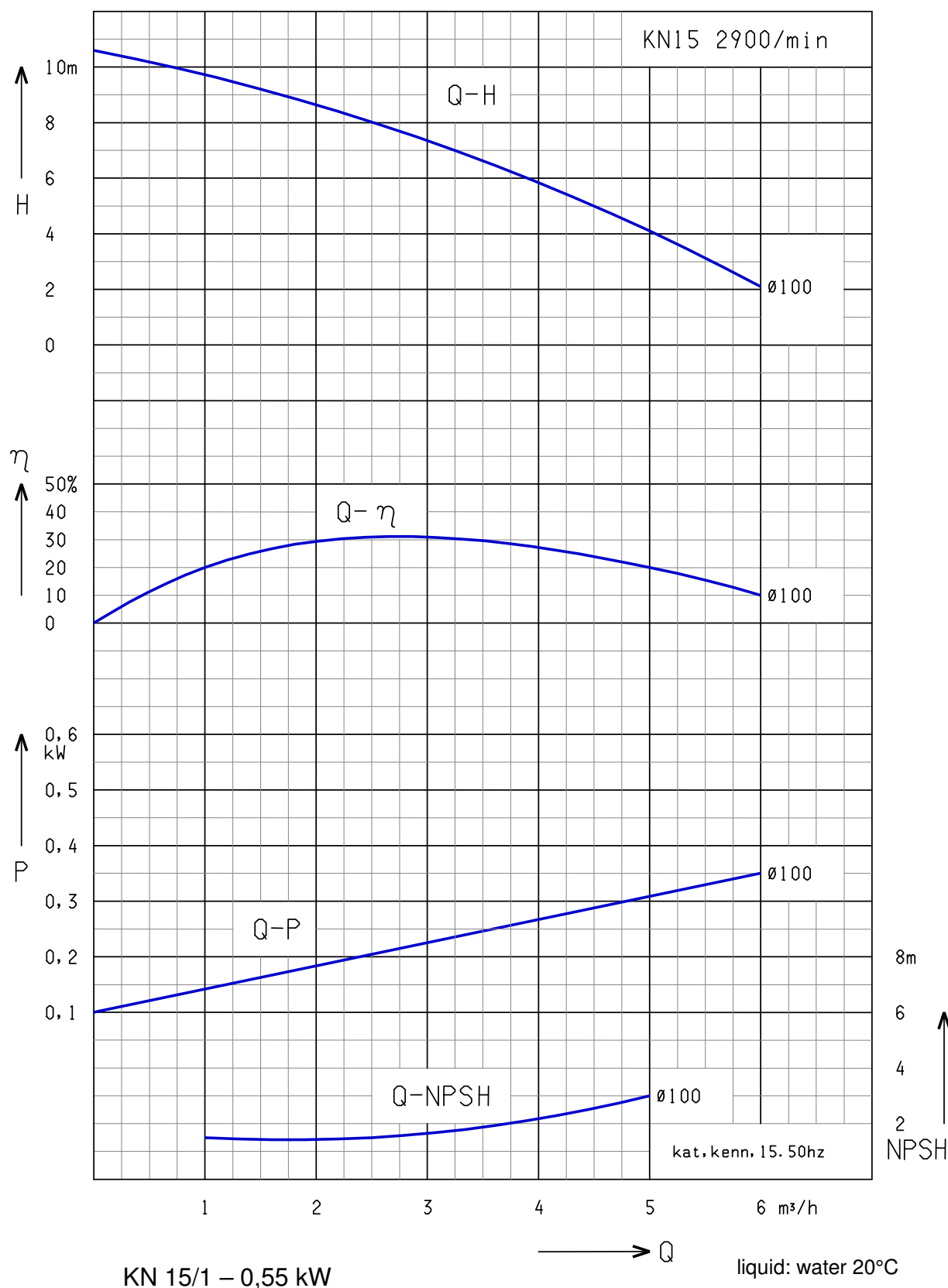
Dimensions **KN15** / Connections acc. to DIN 11851



Type	Weights [kg]	kW	rpm		Motor IEC	Inlet	Outlet
	Design T		50Hz	60Hz			
KN 15/1	11	0,55	2900	3500	071	25	15

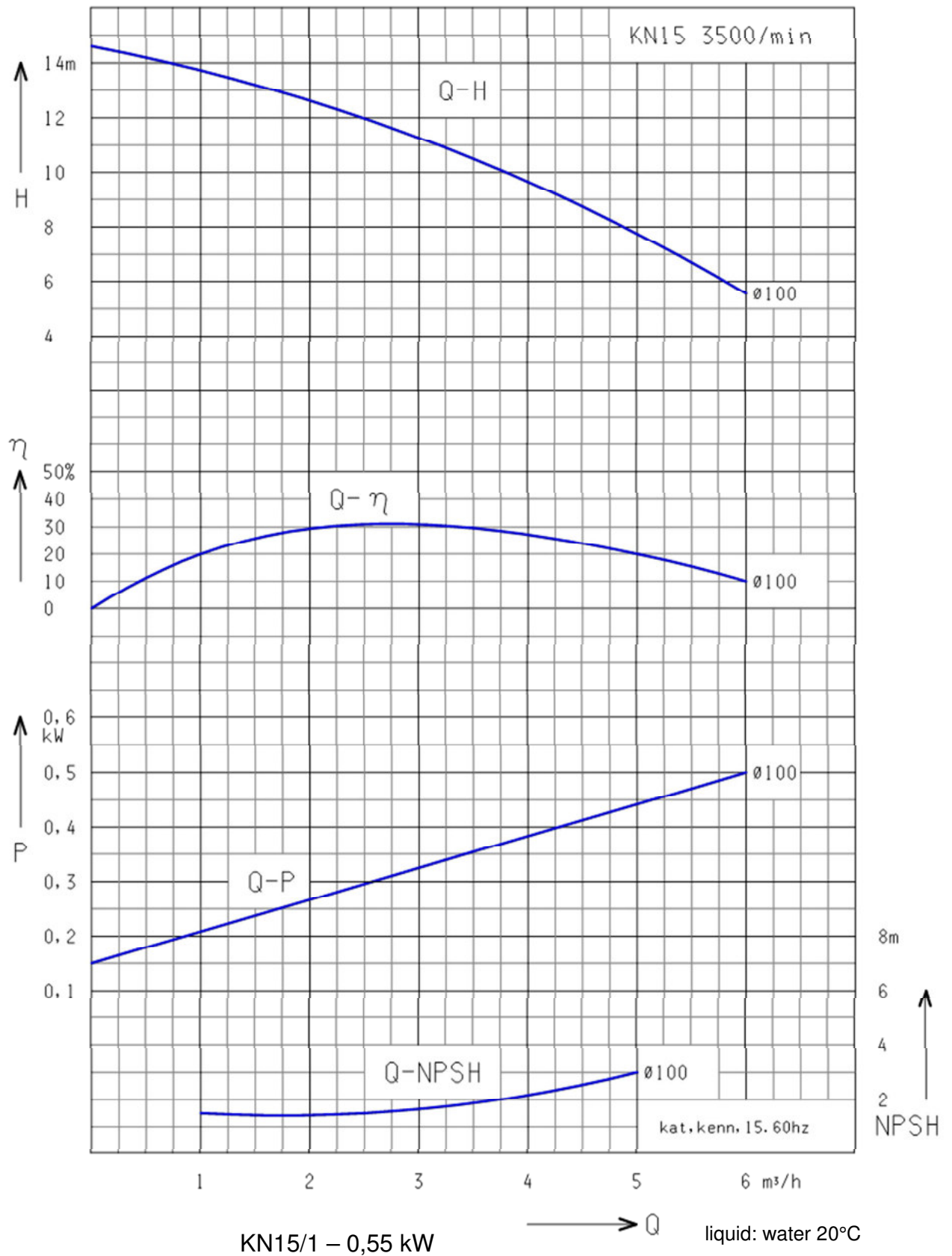
Characteristics KN15

50 Hz



Characteristics KN15

60 Hz



Hygienic / Aseptic non self-priming – KN2

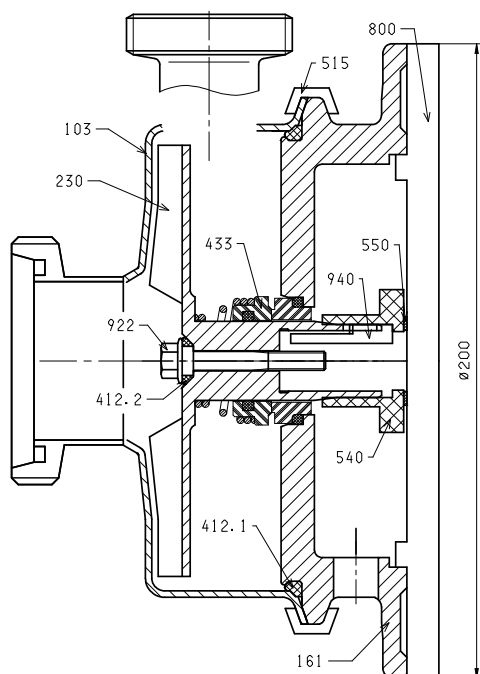


Design B

... for the brewery, beverage and pharmaceutical industry

Design	Thick-walled CrNiMo stainless steel casing, forged CrNiMo stainless steel casing cover, semi-opened CrNiMo stainless steel impeller, sturdy quick-release clamp ring with hygienic chambered O-Ring seal	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot, inclusive stainless steel motor cover	
Materials	All parts in contact with product correspond to the materials AISI 316L (1.4404 or 1.4435), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Adjusted self cleaning and self rinsing single mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	◆ flow rate : max. 15.000 l/h (50Hz) ◆ discharge head : max. 1,9 bar (50Hz) ◆ motor power : max. 1,5 kW ◆ working temperature : max. 130°C ◆ operating pressure : max. 10 bar	
Motor	IEC-standard motor IP55 hoseproof and with cold inductors, NEMA-standard motor on request	
Optional features	◆ internal frequency converter FCM 300 ◆ trolley with breaker and cable ◆ alternative paint for motor ◆ pole-changing electric motor	◆ ex-proof T3/T4 ◆ material 1.4435 ◆ motor IP65 ◆ emptying valve
Connections	Connection in diameters from DN25 up to DN50 or 1" up to 2" according to the following standards: DIN, IDF, Clamp, RJT, SMS, small flanges (other on request)	

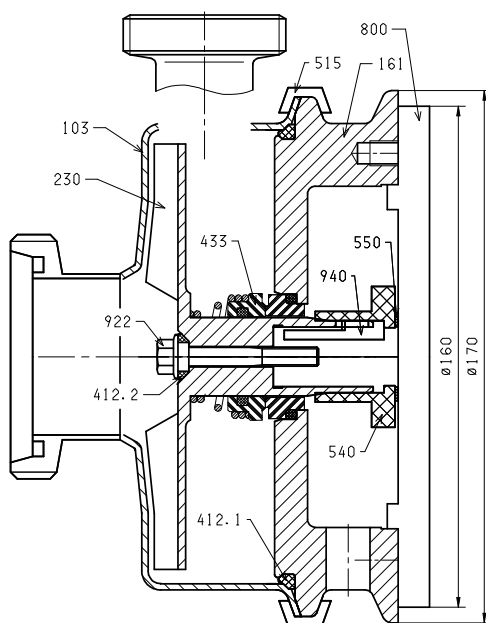
section KN2



Ersatzteilliste / Spare part list

Pos./Item	Benennung/Description
103	Ringgehäuse/Round casing
161	Gehäuse Ø200/Casing Ø200
230	Laufgrad/Impeller
412.1	O-Ring/O-ring
412.2	O-Ring/O-ring
433	Gleitringdichtung/Mechanical seal
515	Spannring/Clamping ring
540	Gummibuchse/Rubber bush
550	Stützscheibe/Supporting disc
800	Motor Ø200/Motor Ø200
922	Laufgradschraube/Impeller screw
940	Passfeder KN2/Feather key KN2

tp, et-zei, kn2g. schnitt



Ersatzteilliste / Spare part list

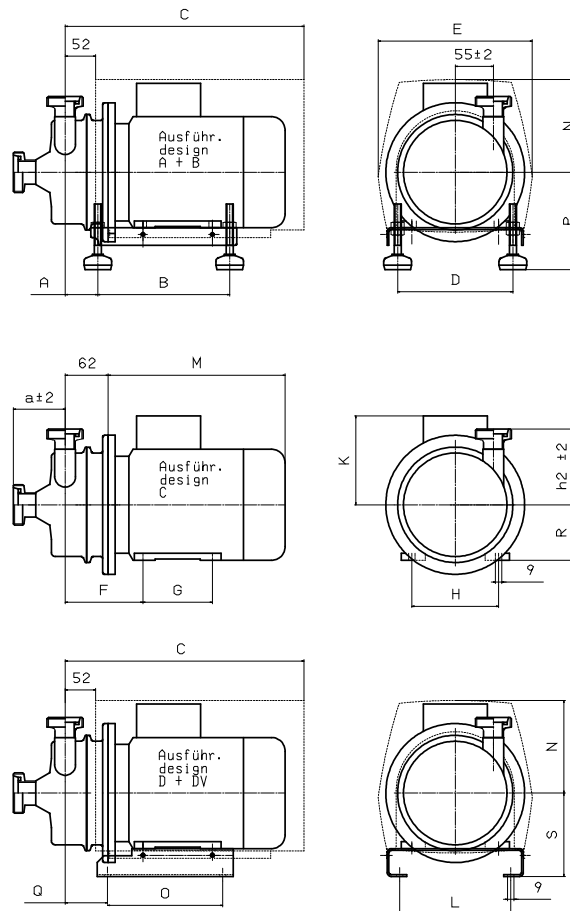
Pos./Item	Benennung/Description
103	Ringgehäuse/Round casing
161	Gehäuse Ø170/Casing Ø170
230	Laufgrad/Impeller
412.1	O-Ring/O-ring
412.2	O-Ring/O-ring
433	Gleitringdichtung/Mechanical seal
515	Spannring/Clamping ring
540	Gummibuchse/Rubber bush
550	Stützscheibe/Supporting disc
800	Motor Ø160/Motor Ø160
922	Laufgradschraube/Impeller screw
940	Passfeder KN2/Feather key KN2

tp, et-zei, kn2k. schnitt

Technical changes reserved!
10 / 2015

Dimensions KN23, KN25 / Connections acc. to DIN 11851

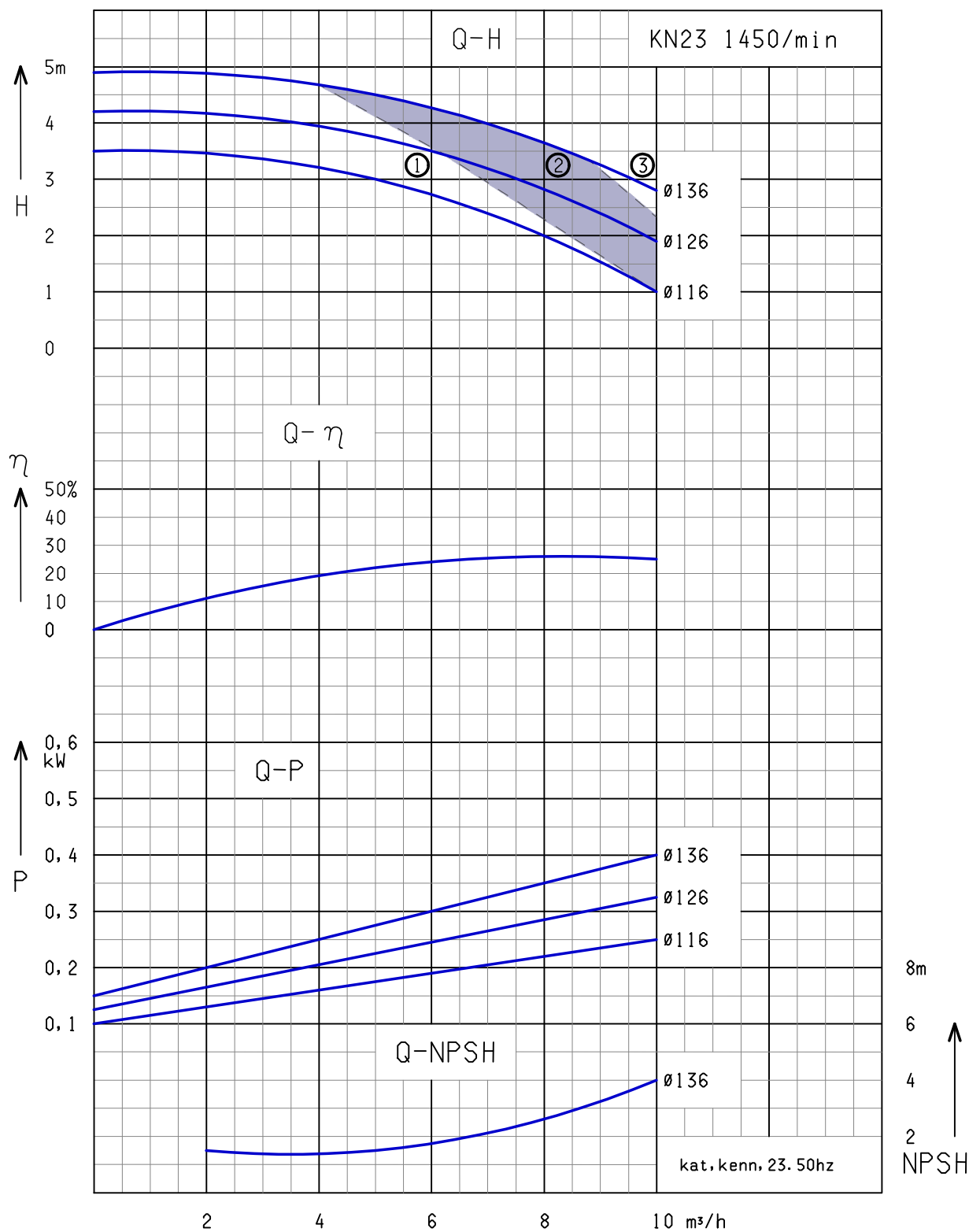
Inlet	25	32	32	40	40	40	50	50
Outlet	25	25	32	25	32	40	32	40
a	76	74	74	70	70	70	62	62
h2	109	109	107	109	107	108	107	108



Type	Weights (kg)			kW	rpm		Motor IE2	A	B	C	D	E	F	G	H	K	L	M	N	O	P	Q	R	S
	Design A+DV	Design B+D	Design C		50 Hz	60 Hz																		
KN23/1	19	17	15	0,25	1450		080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN23/2	19	17	15	0,37	1450	1750	080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN23/3	19	17	15	0,55	1450	1750	080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN23/4	21	19	17	0,75		1750	080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN25/1	19	17	15	0,55	2900		080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN25/2	19	17	15	0,75	2900	3500	080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN25/3	21	19	17	1,1	2900	3500	080	62	190	352	166	222	127	100	125	128	160	244	133	166	140+20	76	80	120
KN25/4	22	20	18	1,5	2900	3500	090L	25	286	435	210	272	131	125	140	146	200	283	159	286	160+20	25	90	160

Characteristics KN23

50 Hz

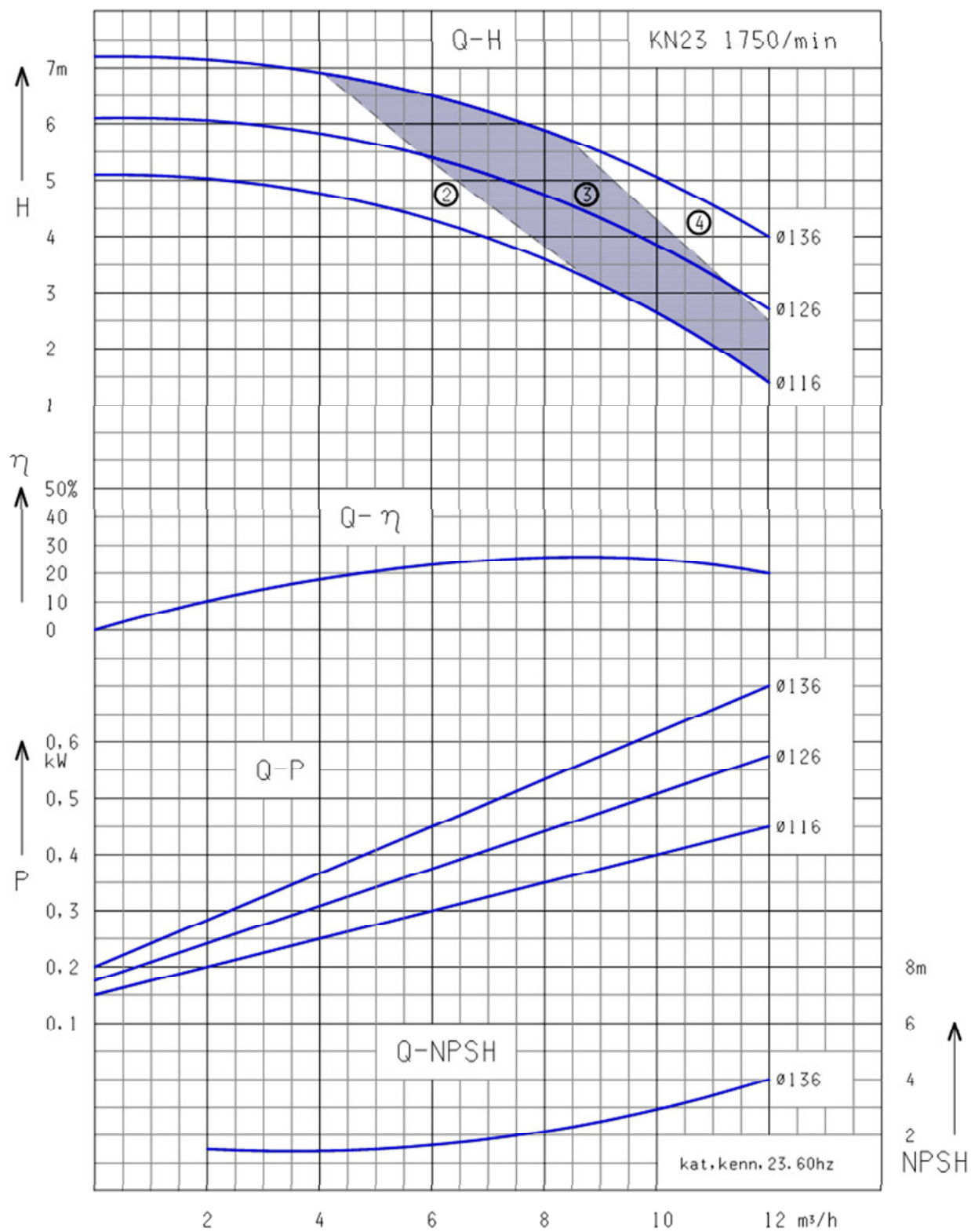


- ① KN23/1 – 0,25 kW ② KN23/2 – 0,37 kW
③ KN23/3 – 0,55 kW

liquid: water 20°C

Characteristics KN23

60 Hz



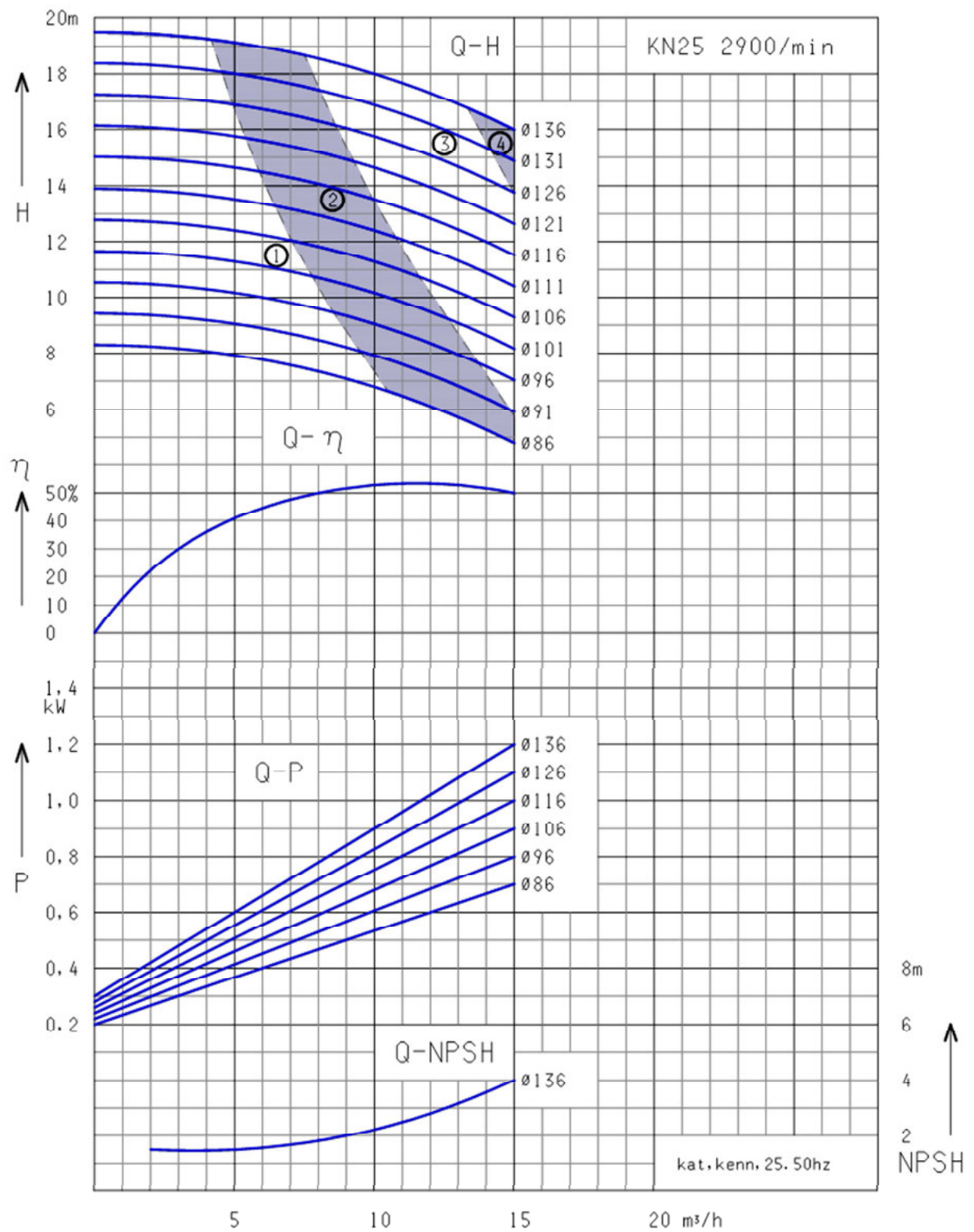
② KN23/2 – 0,37 kW ③ KN23/3 – 0,55 kW

④ KN23/4 – 0,75 kW

→ Q liquid: water 20°C

Characteristics KN25

50 Hz



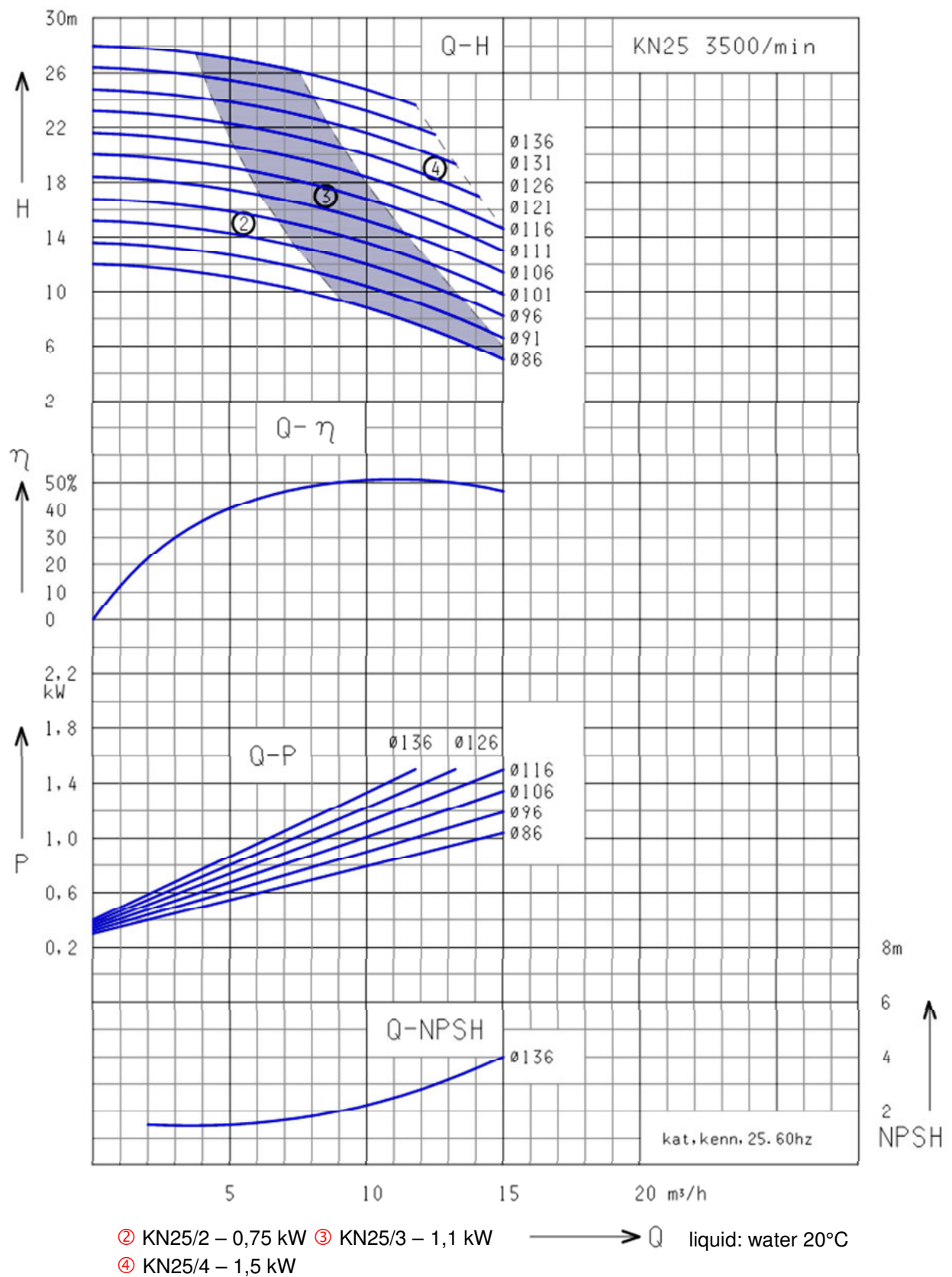
- ① KN25/1 – 0,55 kW ② KN25/2 – 0,75 kW
③ KN25/3 – 1,1 kW ④ KN25/4 – 1,5 kW

→ Q

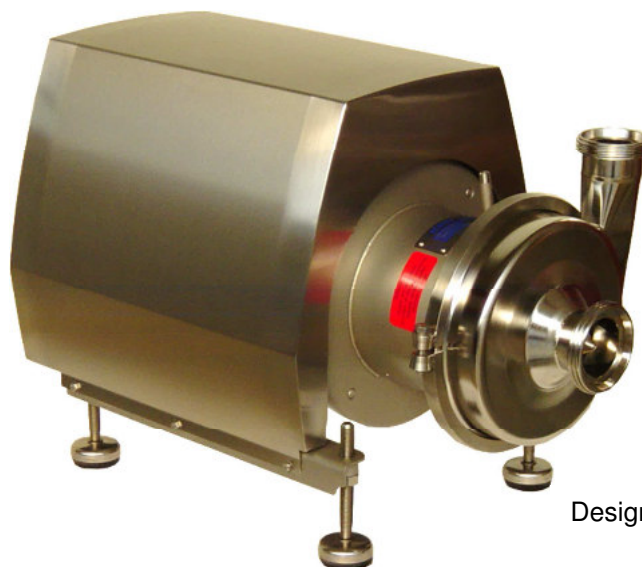
liquid: water 20°C

Characteristics KN25

60 Hz



Hygienic / Aseptic non self-priming – KN3

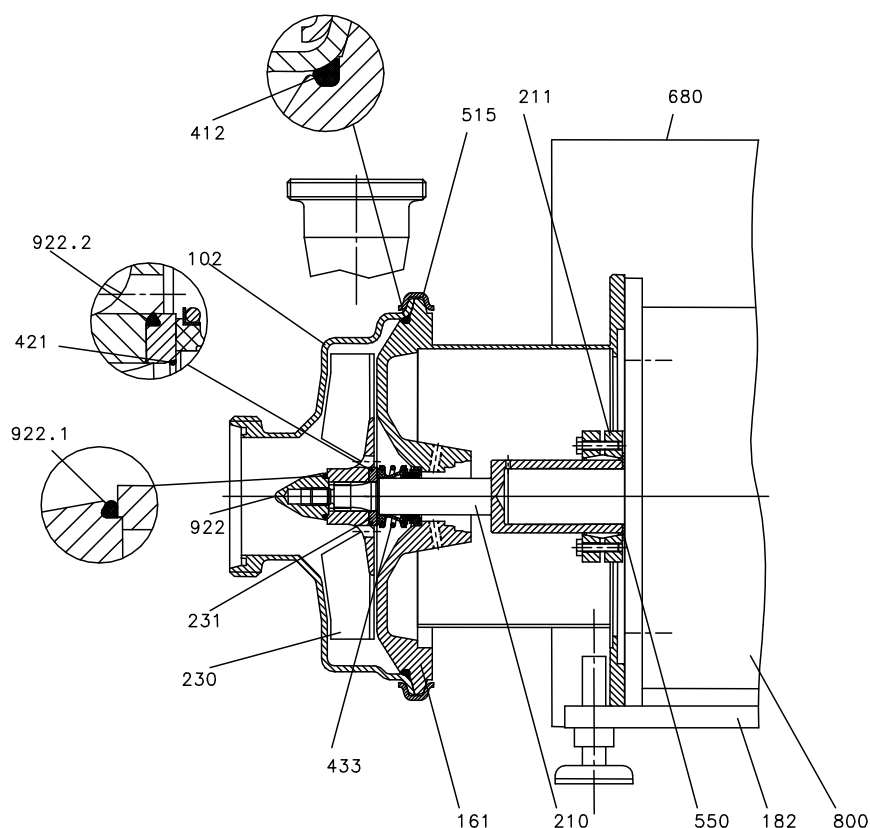


Design A

... for the brewery, beverage and pharmaceutical industry

Design	Deep drawn, thick-walled CrNiMo rolled steel casing, forged CrNiMo stainless steel casing cover, open CrNiMo stainless steel impeller on a strong dimensioned stub shaft, sturdy quick-release, clamp ring with sanitary chambered O-Ring seal	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot with stainless steel motor cover	
Materials	All parts in contact with the product correspond to the materials AISI 316L (1.4404, 1.4435 or 1.4581), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Adjusted self cleaning and self rinsing single or double mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	◆ flow rate : max. 50.000 l/h (50 Hz) ◆ discharge head : max. 4,0 bar (50 Hz) ◆ motor power : max. 9,0 kW ◆ working temperature : max. 130°C ◆ operating pressure : 16 bar	
Motor	IEC-standard motor IP55 hoseproof and with cold inductors, NEMA-standard motor on request	
Optional features	◆ internal frequency converter FCM300 ◆ trolley with breaker and cable ◆ heating-/cooling jacket ◆ ex-proof T3/T4 ◆ alternative paint for motor	◆ seal steam sterilisation ◆ pole-changing motor ◆ motor IP65 ◆ material 1.4435 ◆ emptying valve
Connections	Connections in diameters from DN40 up to DN80 or 1,5" up to 3" according to the following standards: DIN, IDF, Clamp, RJT, SMS, small flanges (other on request)	

section KN3

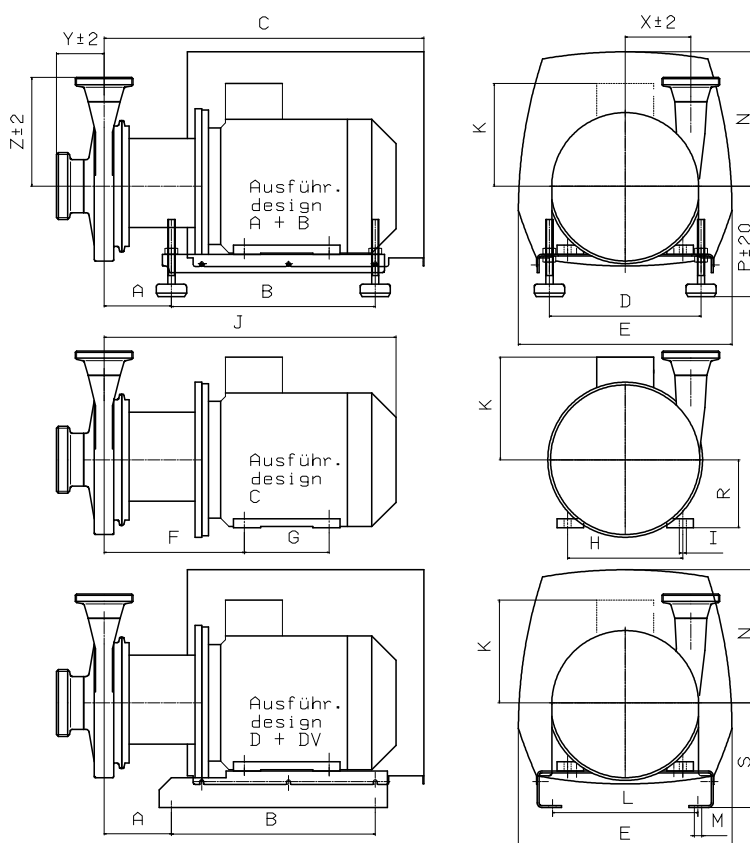


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numeral	component
102	volute casing (material AISI 316L), 3mm, variable connections
161	casing cover (thick-walled forging in material AISI 316L, resistant to pressure surges)
182	base frame (height-adjustable machine feet of stainless steel)
210	shaft (push-on shaft with uniform diameter for shaft seal of 25mm in AISI 316Ti)
211	shrink disc (shaft fastening for IEC-standard motor)
230	impeller (open or closed, precision casting in AISI 316Ti)
231	sealing bush
412	O-Ring (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)
421	radial seal (O-Ring in various seal materials)
433	mechanical seal (single or double mechanical seal of various designs in SiC/SiC, SiC/carbon, carbon/stainless steel or precision shaft packing ring with PTFE sealing lip)
515	clamping ring (quick-release fastener in stainless steel up to PN16)
550	disc
680	enclosure (stainless steel cover)
800	IEC- or NEMA-standard motor
922	impeller nut (material AISI 316L)
922.1	impeller seal (fully flushed, hygienic O-Ring in EPDM, NBR, FKM, or perfluorinated rubber)
922.2	impeller seal (fully flushed, hygienic O-Ring in EPDM, NBR, FKM, or perfluorinated rubber)

Dimensions KN33, KN35 / Connections acc. to DIN 11851

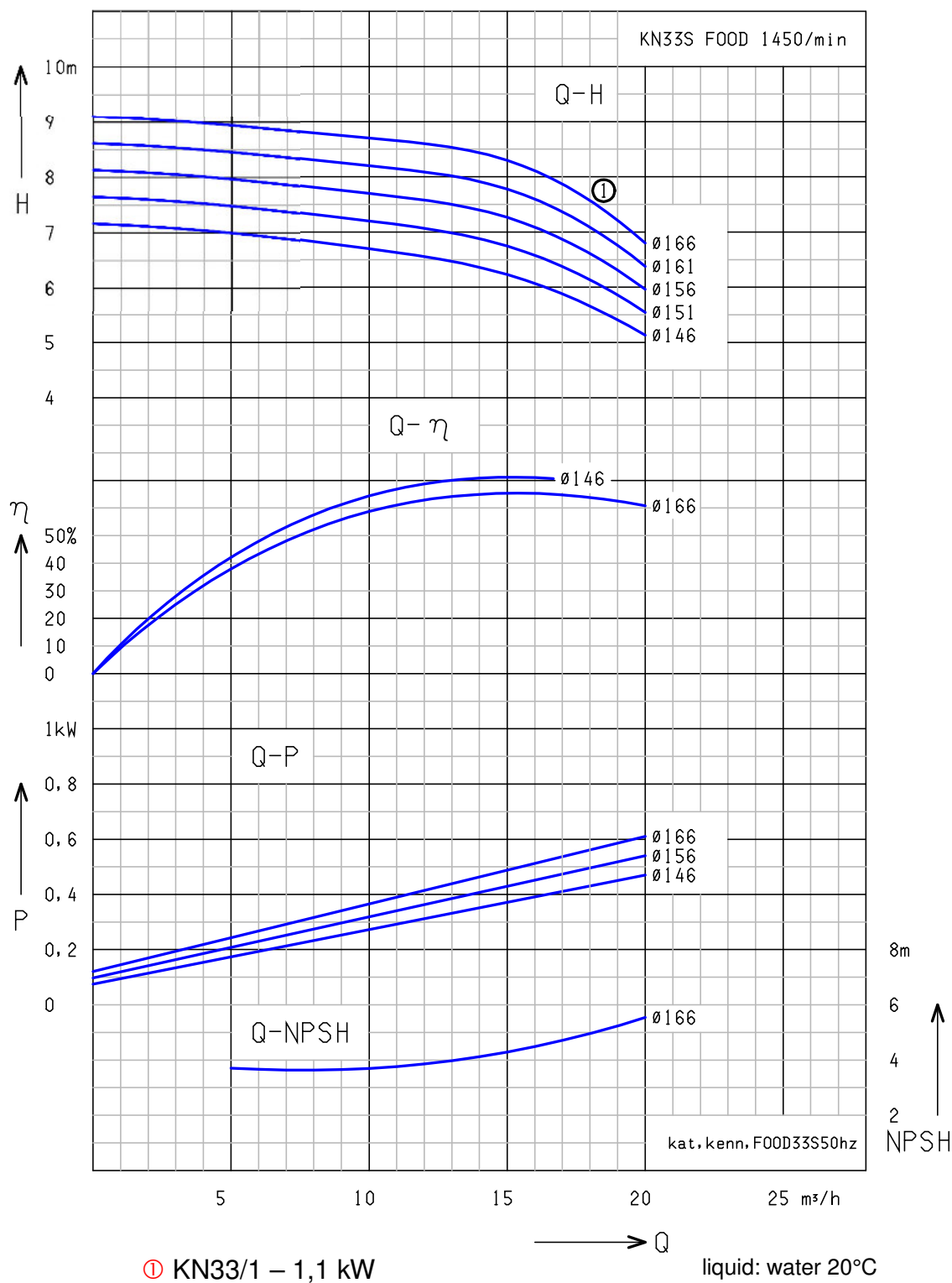
Inlet	32	40	40	50	50	50	65	65	65	80	80	80
Outlet	32	32	40	32	40	50	40	50	65	50	65	80
X	85	85	85	85	85	85	85	85	85	85	85	85
Y	74	69	69	70	70	70	67	67	67	66	66	66
Z	164	164	159	164	159	161	159	161	166	161	166	171



Type	Weights (kg)			kW	rpm		Motor IE2	Motor IE3	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S
	Design A+DV	Design B+D	Design C		50 Hz	60 Hz																			
KN33/1	34	31	28	1,1	1450		090S		99	286	470	210	272	205	125	140	9	418	149	200	9	159	160	90	160
KN35/1	34	31	28	1,5	2900		090S																		
KN33/2	37	34	31	1,5		1750	090L		99	286	423	210	272	205	125	140	9	428	149	200	9	159	160	90	160
KN35/2	38	35	32	2,2	2900	3500	090L																		
KN35/3	48	42	38	3,0	2900	3500	100L		102	336	588	250	322	222	140	160	12	462	153	240	12	207	170	100	160
KN35/4	47	41	37	4,0	2900	3500	112M		109	336	595	250	322	229	140	190	12	509	169	240	12	195	182	112	172
KN35/5.1	75	67	63	5,5	2900	3500		112M	109	336	595	250	322	229	140	190	12	509	169	240	12	195	182	112	172
KN35/6.1	77	69	65	7,5	2900	3500		112M																	
KN35/5.2				5,5	2900	3500		132M																	
KN35/6.2				7,5	2900	3500		132M	129	400	539	280	363	268	178	216	12	539	188	270	12	249	202	132	200
KN35/7	91	93	79	9,2		3500		132M																	

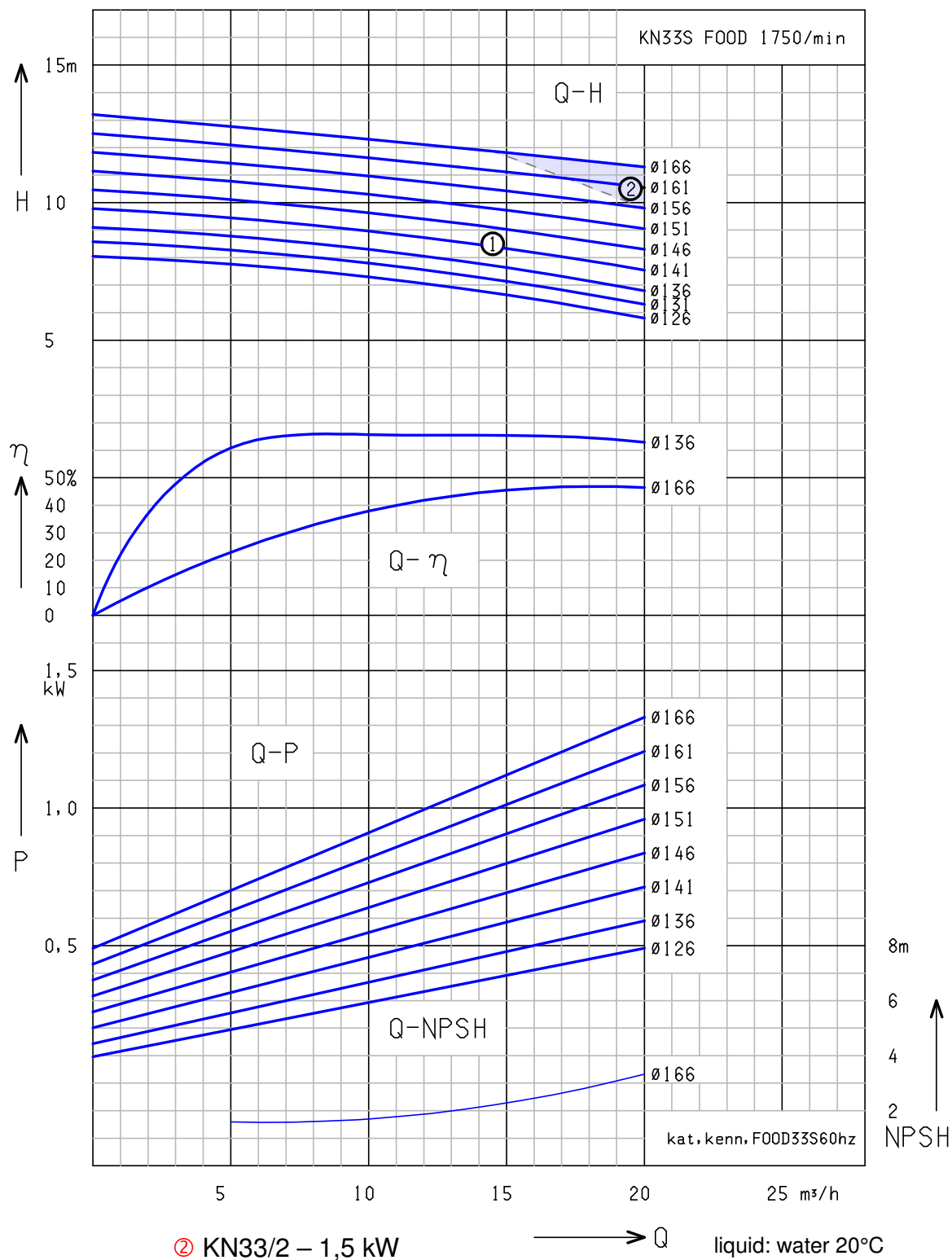
Characteristics KN33 Food (volute casing)

50 Hz



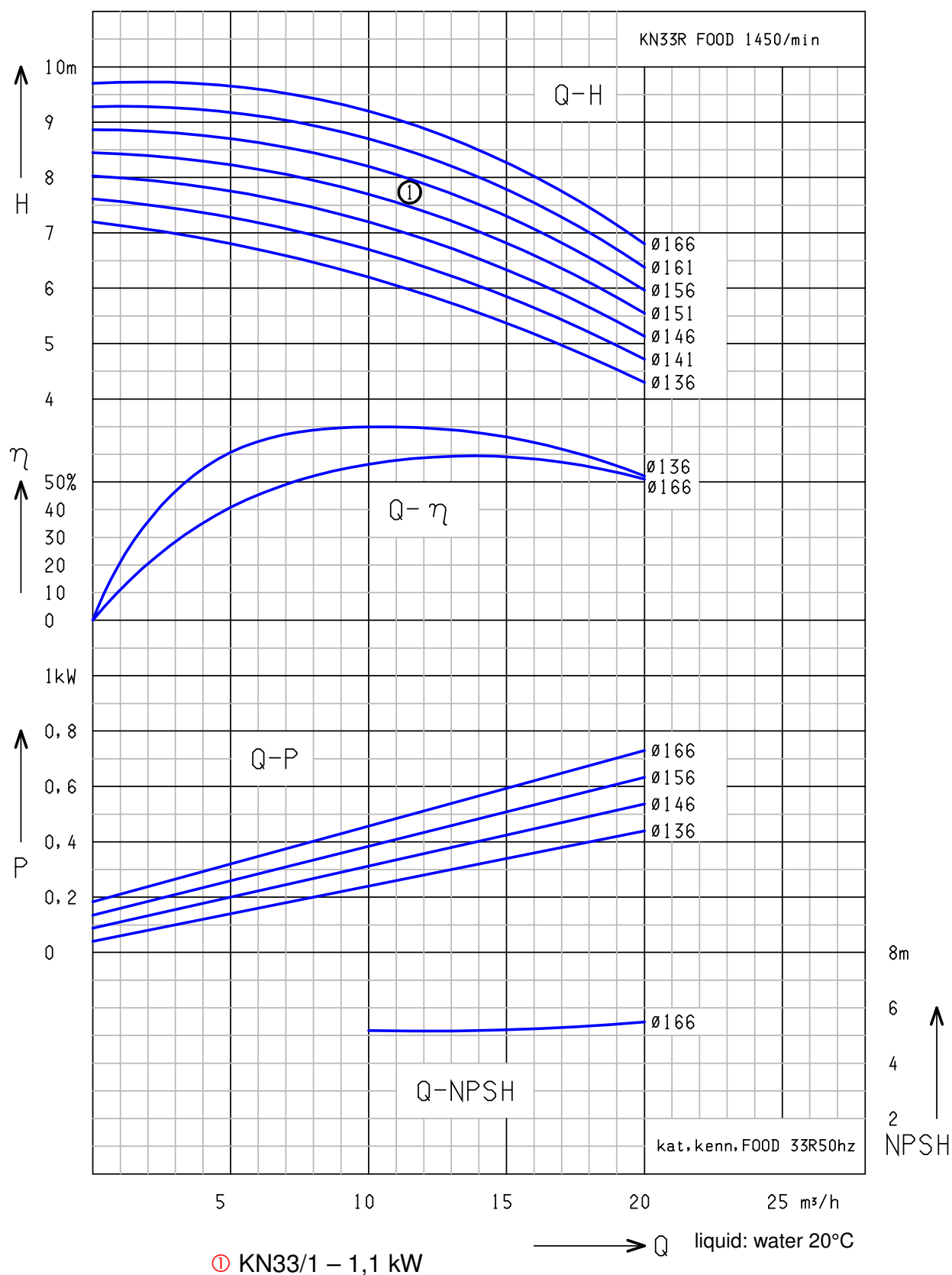
Characteristics KN33 Food (volute casing)

60 Hz



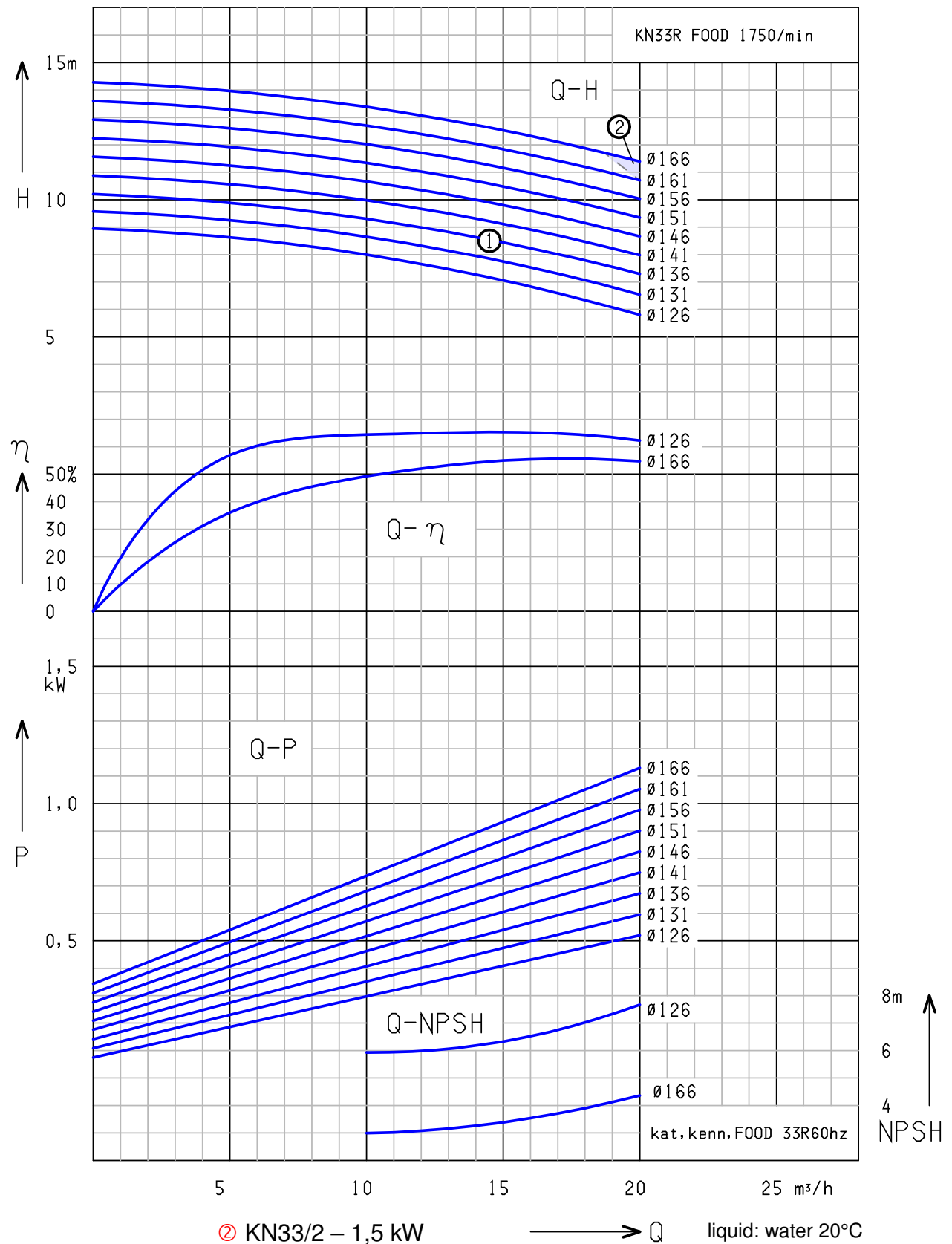
Characteristics KN33 Food (ring casing)

50 Hz



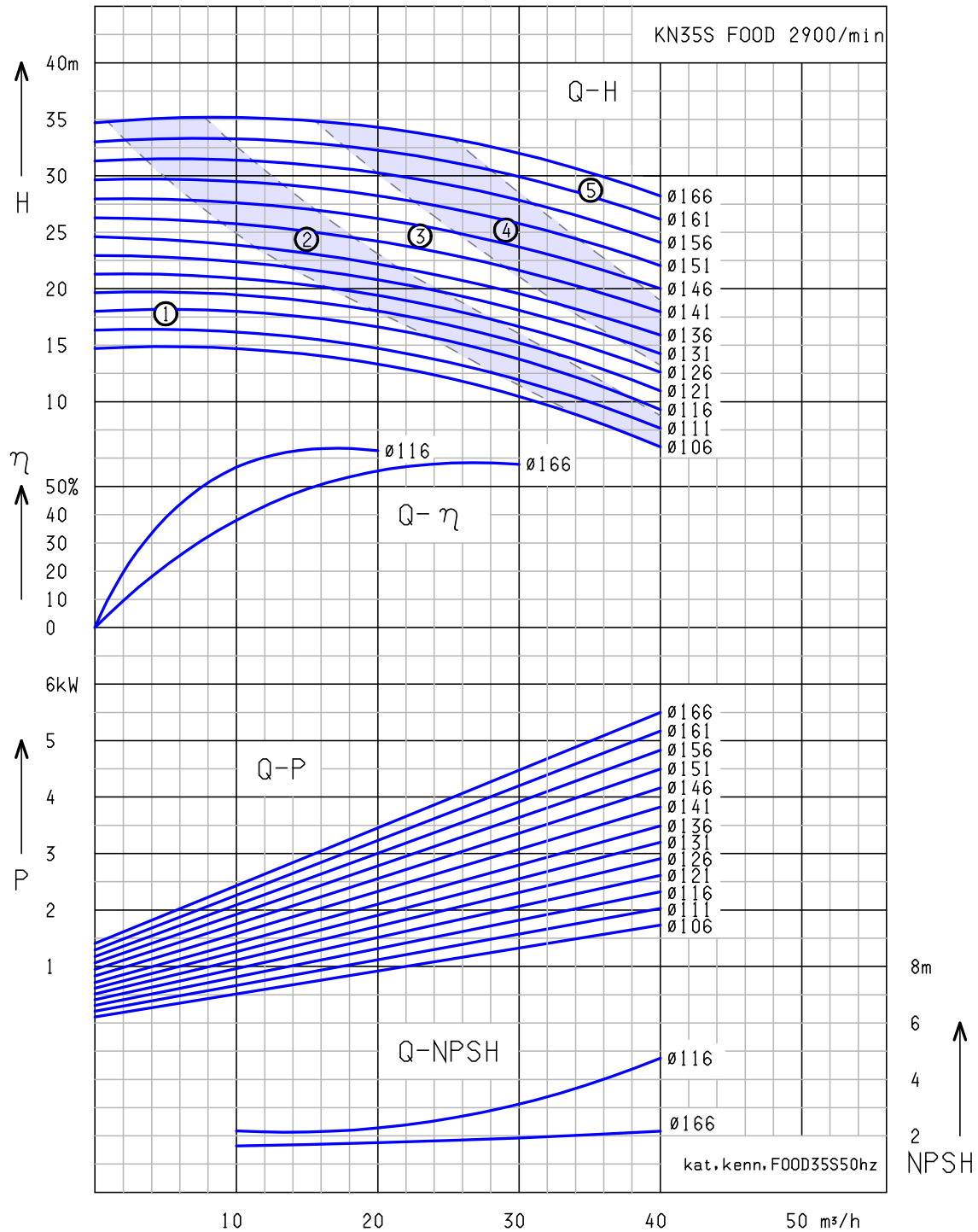
Characteristics KN33 Food (ring casing)

60 Hz



Characteristics KN35 Food (volute casing)

50 Hz

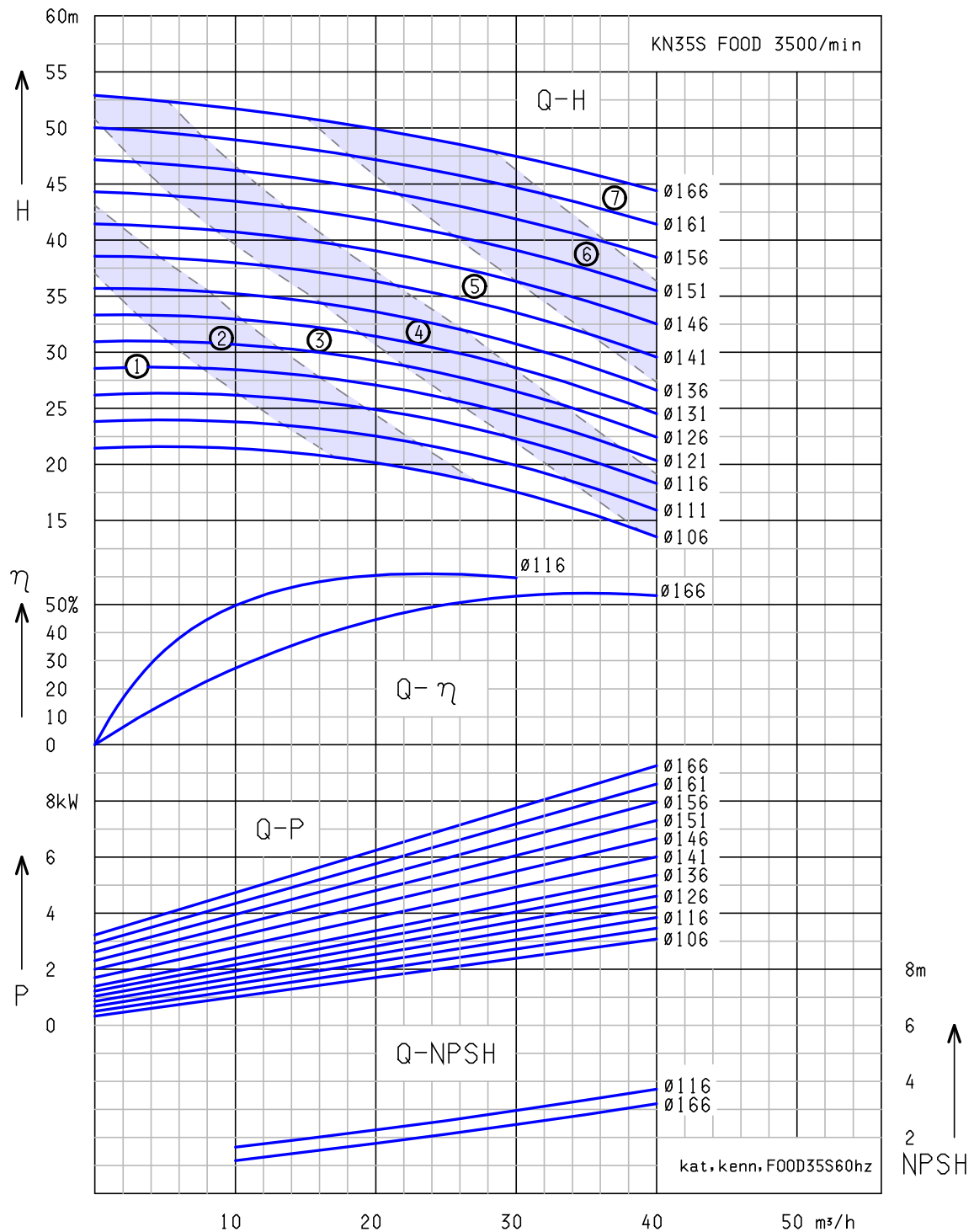


- ① KN35/1 – 1,5 kW ② KN35/2 – 2,2 kW
③ KN35/3 – 3,0 kW ④ KN35/4 – 4,0 kW
⑤ KN35/5 – 5,5 kW

→ Q liquid: water 20°C

Characteristics KN35 Food (volute casing)

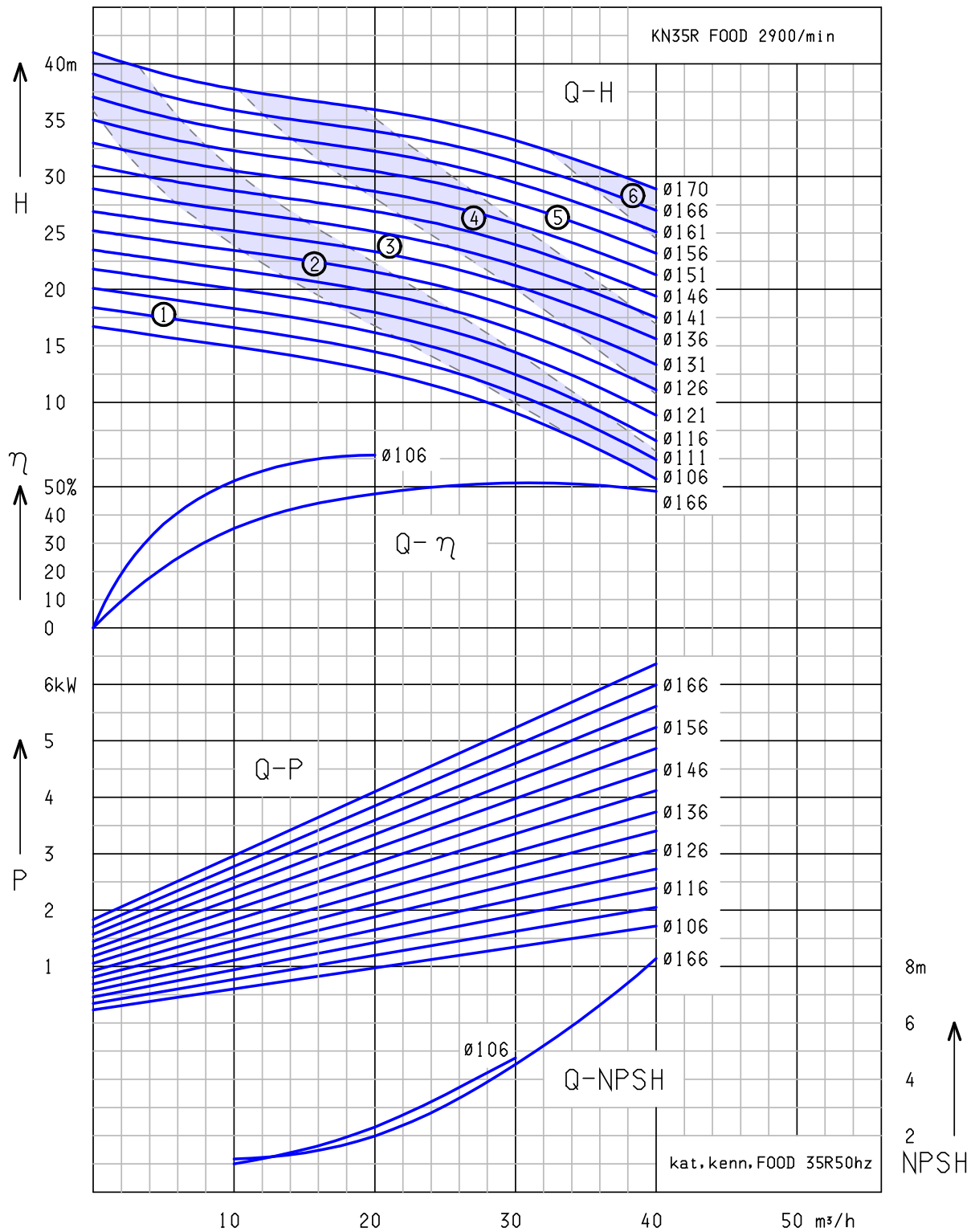
60 Hz



- ② KN35/2 – 2,2 kW ③ KN35/3 – 3,0 kW
 ④ KN35/4 – 4,0 kW ⑤ KN35/5 – 5,5 kW
 ⑥ KN35/6 – 7,5 kW ⑦ KN35/7 – 9,2 kW

Characteristics KN35 Food (ring casing)

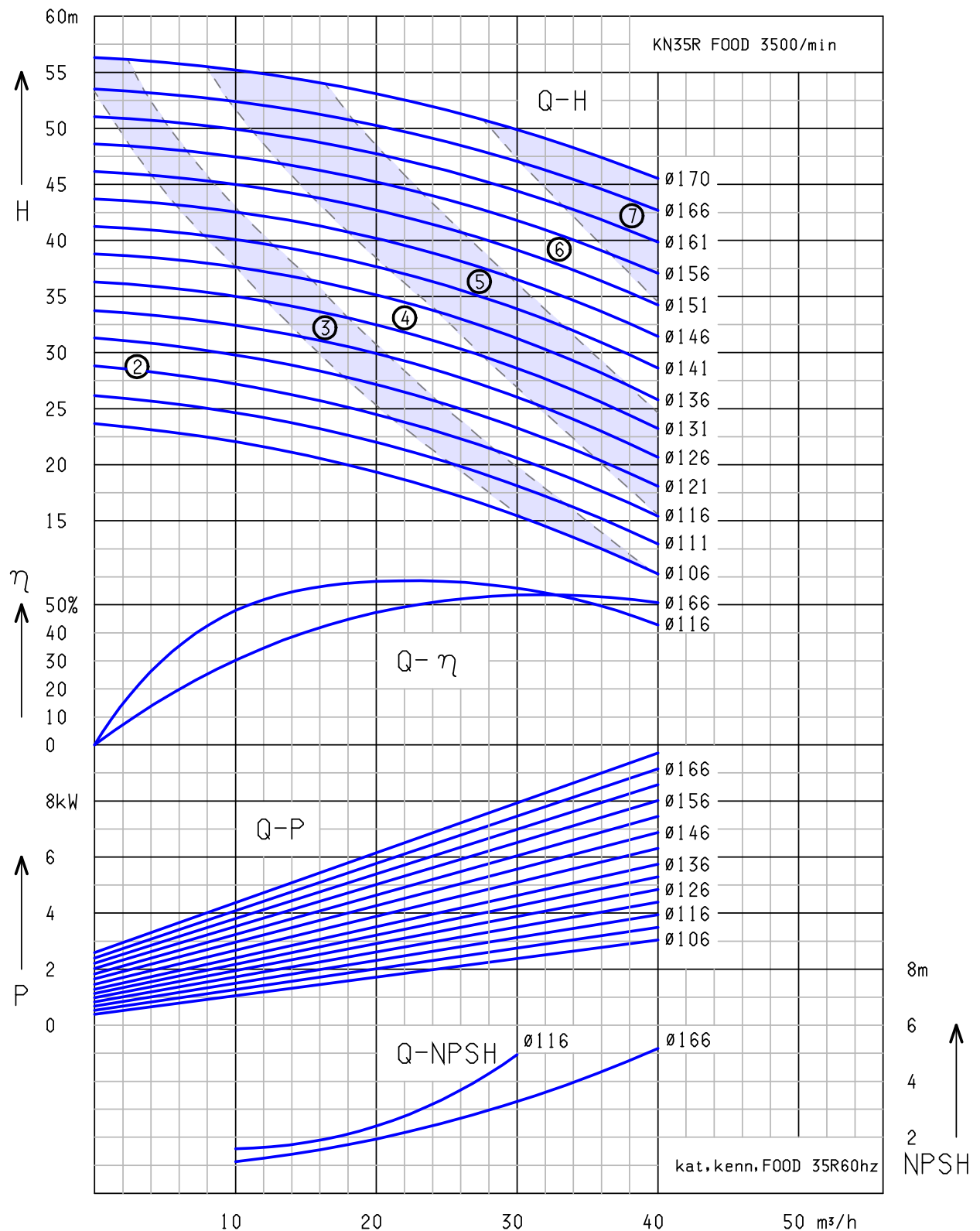
50 Hz



- ① KN35/1 – 1,5 kW ② KN35/2 – 2,2 kW
③ KN35/3 – 3,0 kW ④ KN35/4 – 4,0 kW
⑤ KN35/5 – 5,5 kW ⑥ KN35/6 – 7,5 kW

Characteristics KN35 Food (ring casing)

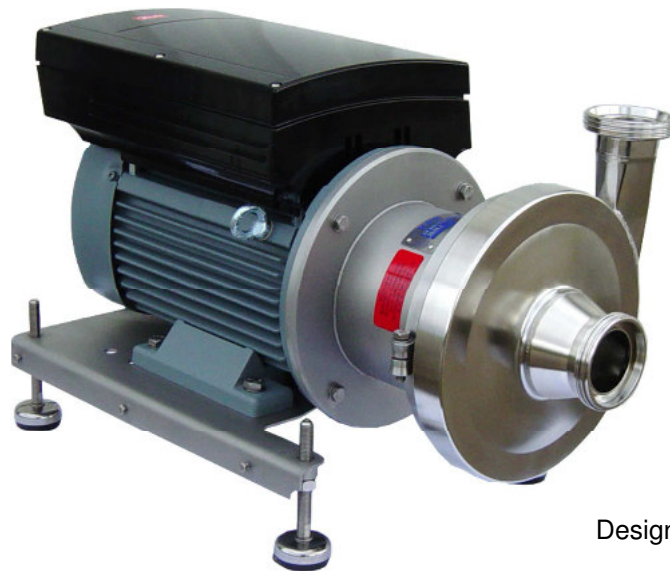
60 Hz



- ② KN35/2 – 2,2 kW ③ KN35/3 – 3,0 kW
④ KN35/4 – 4,0 kW ⑤ KN35/5 – 5,5 kW
⑥ KN35/6 – 7,5 kW ⑦ KN35/7 – 9,2 kW

→ Q liquid: water 20°C

Hygienic / Aseptic non self-priming – KN3H

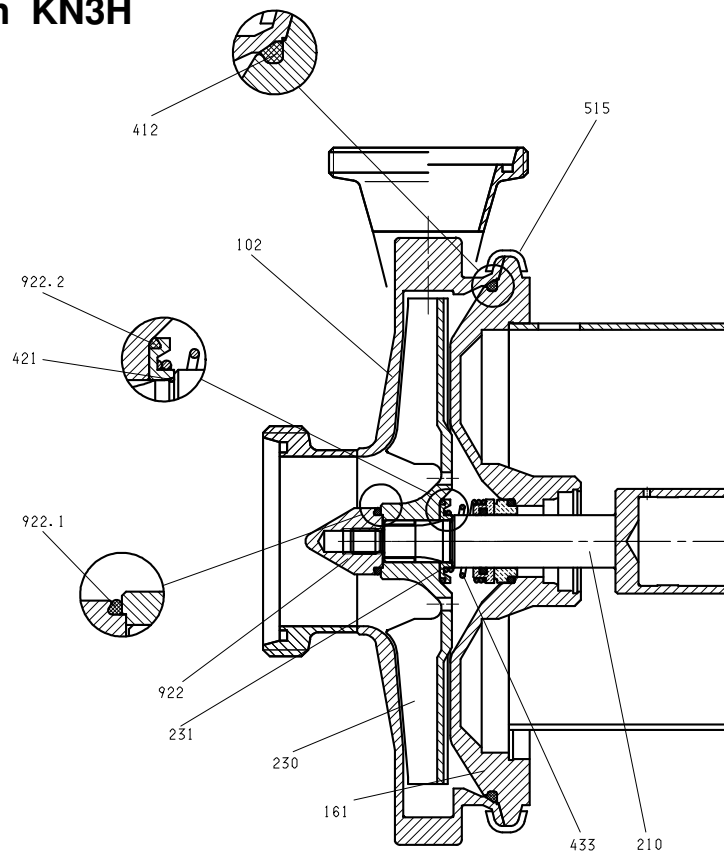


Design KB

... for the brewery, beverage and pharmaceutical industry

Design	Deep drawn, thick-walled CrNiMo rolled steel casing, forged CrNiMo stainless steel casing over, opened CrNiMo stainless steel impeller on a strong dimensioned stub shaft, sturdy quick-release clamp ring with sanitary chambered O-Ring seal	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot inclusive stainless steel motor cover	
Materials	All parts with product correspond to the materials AISI316L (1.4404, 1.4435, 1.4581), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Adjusted self cleaning and self rinsing single or double mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	◆ flow rate : max. 50.000 l/h (50 Hz) ◆ discharge head : max. 4,8 bar (50 Hz) ◆ motor power : max. 9,2 kW ◆ working temperature : max. 130°C ◆ operating pressure : 16 bar	
Motor	IEC-standard motor IP55 hoseproof and with cold inductors, NEMA-standard motor on request	
Optional features	◆ internal frequency converter FCM300 ◆ trolley with breaker and cable ◆ pump head heating/cooling-jacket ◆ ex-proof T3/T4 ◆ alternative paint for motor	◆ seal steam sterilisation ◆ pole-changing motor ◆ motor IP65 ◆ material 1.4435 ◆ emptying valve
Connections	Connection in diameters from DN50 up to DN80 or 2" up to 3" according to the following standards: DIN, IDF, Clamp, RJT, SMS, small flanges (other on request)	

section KN3H

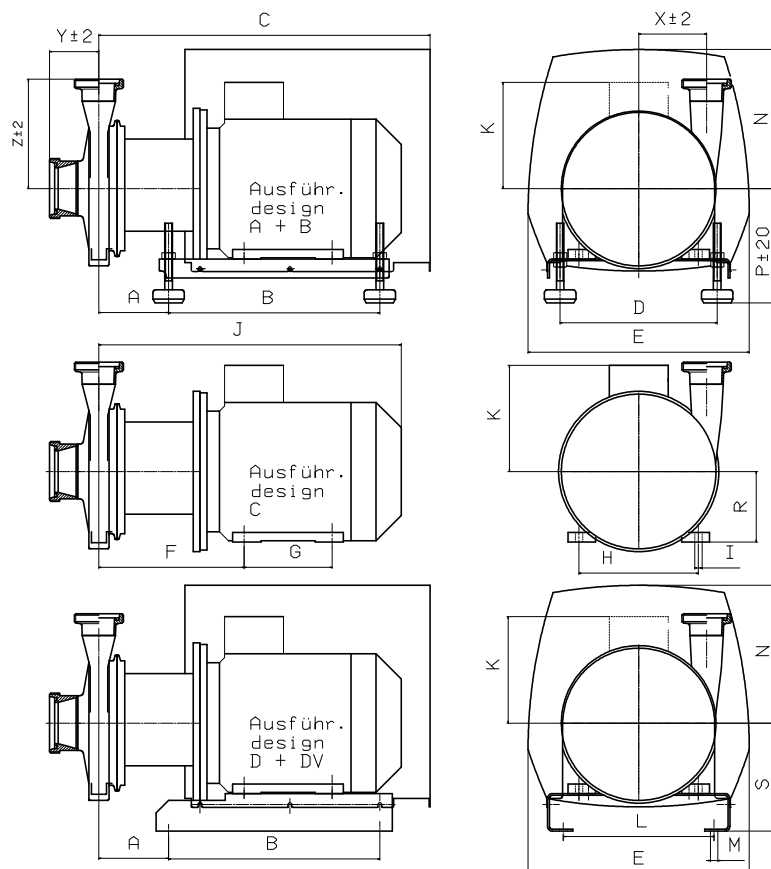


Technical changes reserved!
10 / 2015

numeral	component
102	volute casing (thick-walled forging in material AISI 316L, resistant to pressure surges)
161	casing cover (thick-walled forging in material AISI 316L, resistant to pressure surges)
182	base frame (height-adjustable machine feet of stainless steel)
210	shaft (push-on shaft with uniform diameter for shaft seal of 25mm)
211	shrink disc (shaft fastening for IEC-standard motor)
230	impeller (half-open, precision casting in AISI 316Ti)
231	sealing bush
412	O-Ring (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)
421	radial seal (O-Ring in various seal materials)
433	mechanical seal (single or double mechanical seal in various designs SiC/SiC, SiC/carbon, carbon/stainless steel or precision shaft packing ring with PTFE sealing lip)
515	clamping ring (quick-release fastener in stainless steel up to PN16)
550	disc
680	enclosure (stainless steel cover AISI 304)
800	IEC- or NEMA-standard motor
922	impeller nut (material AISI 316L)
922.1	impeller seal (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)
922.2	impeller seal (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)

Dimensions KN33H, KN35H / Connections acc. to DIN 11851

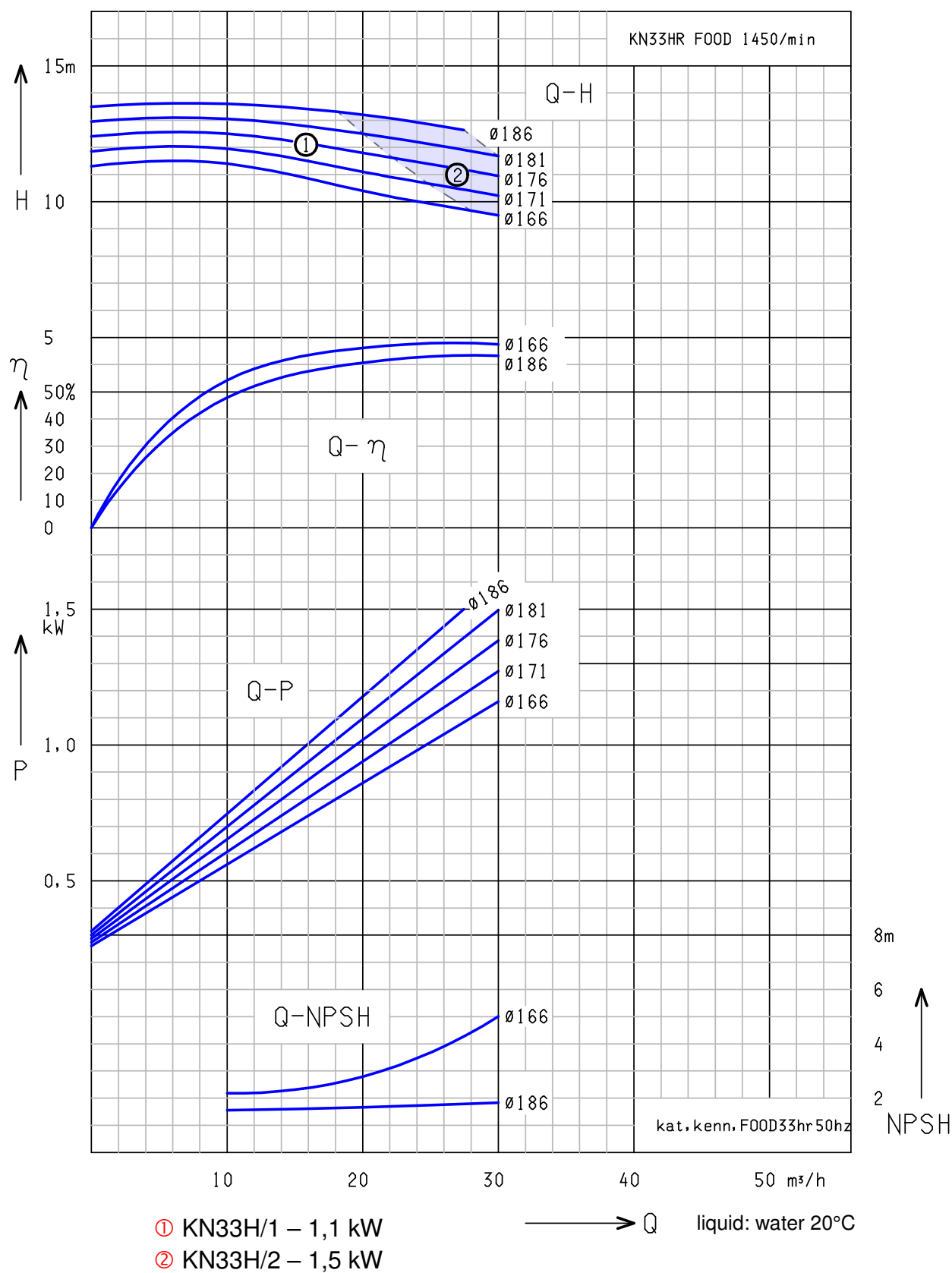
Inlet	32	40	40	50	50	50	65	65	65	80	80	80
Outlet	32	32	40	32	40	50	40	50	65	50	65	80
X	108	108	108	108	108	108	108	108	108	108	108	108
Y	114	106	106	90	90	90	78	78	78	78	78	78
Z	177	177	172	177	172	174	172	174	179	174	179	184



Type	Weights (kg)			kW	rpm		Motor IE2	Motor IE3	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S
	Design A+DV	Design B+D	Design C		50 Hz	60 Hz																			
KN33H/1	32	29	26	1,1	1450	1750	090L		101	286	511	210	272	207	125	140	9	431	149	200	9	159	160	90	160
KN33H/2	36	33	30	1,5	1450	1750	090L																		
KN33H/3	41	38	34	2,2	1450	1750	100L		104	336	590	250	322	224	140	160	12	474	153	240	12	207	170	100	160
KN35H/1	49	43	39	4,0	2900	3500	112M		104	336	597	250	322	224	140	160	12	491	153	240	12	207	170	112	172
KN35H/2.1	67	61	57	5,5	2900	3500		112M	111	336	597	250	322	231	140	190	12	511	169	240	12	195	182	112	172
KN35H/3.1	77	71	67	7,5	2900	3500		112M										541							
KN35H/4	93	85	81	9,2	2900	3500		132M	131	400	711	280	363	270	178	216	12	616	188	270	12	240	202	132	200
KN35H/5	107	101	95	11,0	2900	3500		132M										636							

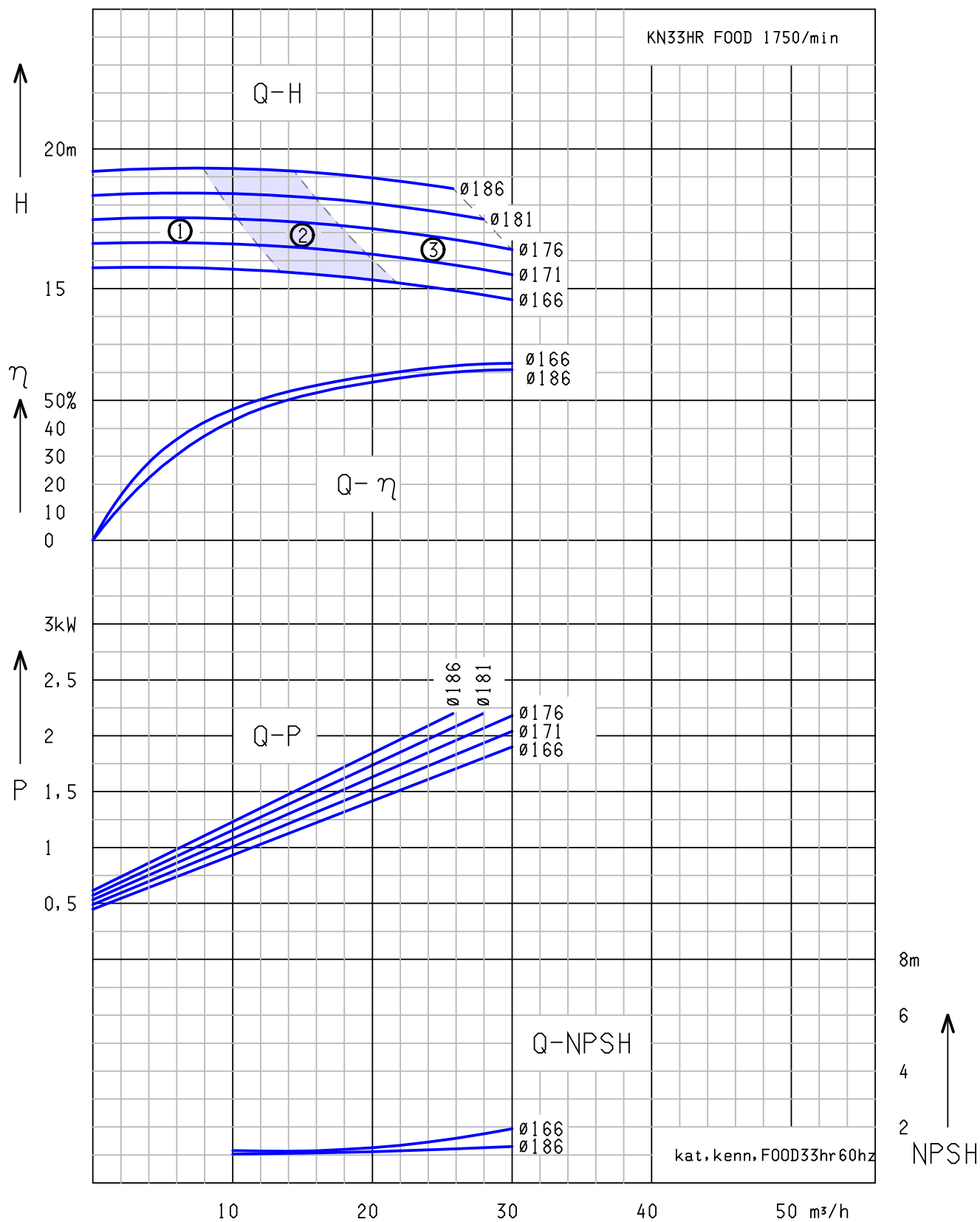
Characteristics KN33H Food (ring casing)

50 Hz



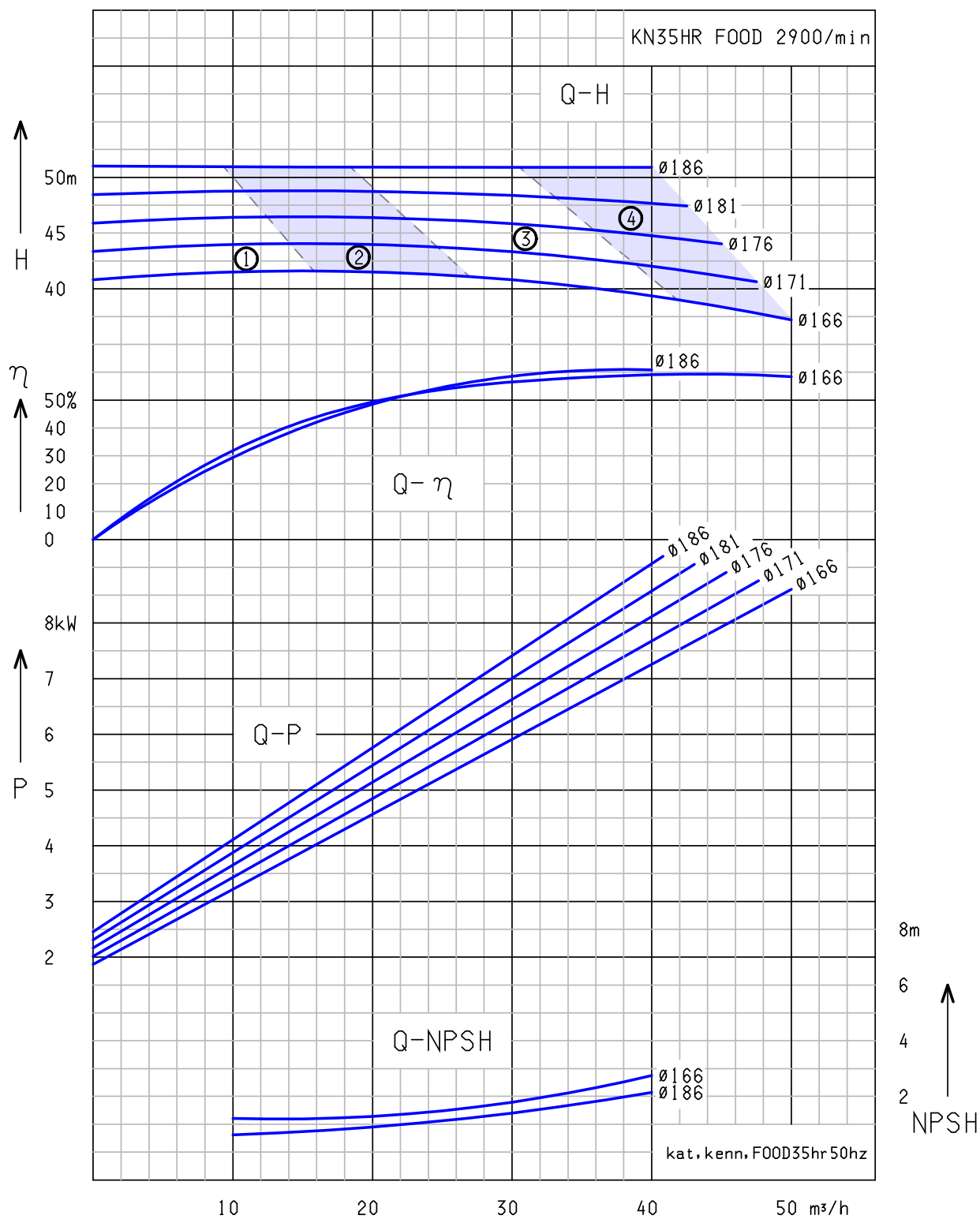
Characteristics KN33H Food (ring casing)

60 Hz



Characteristics KN35H Food (ring casing)

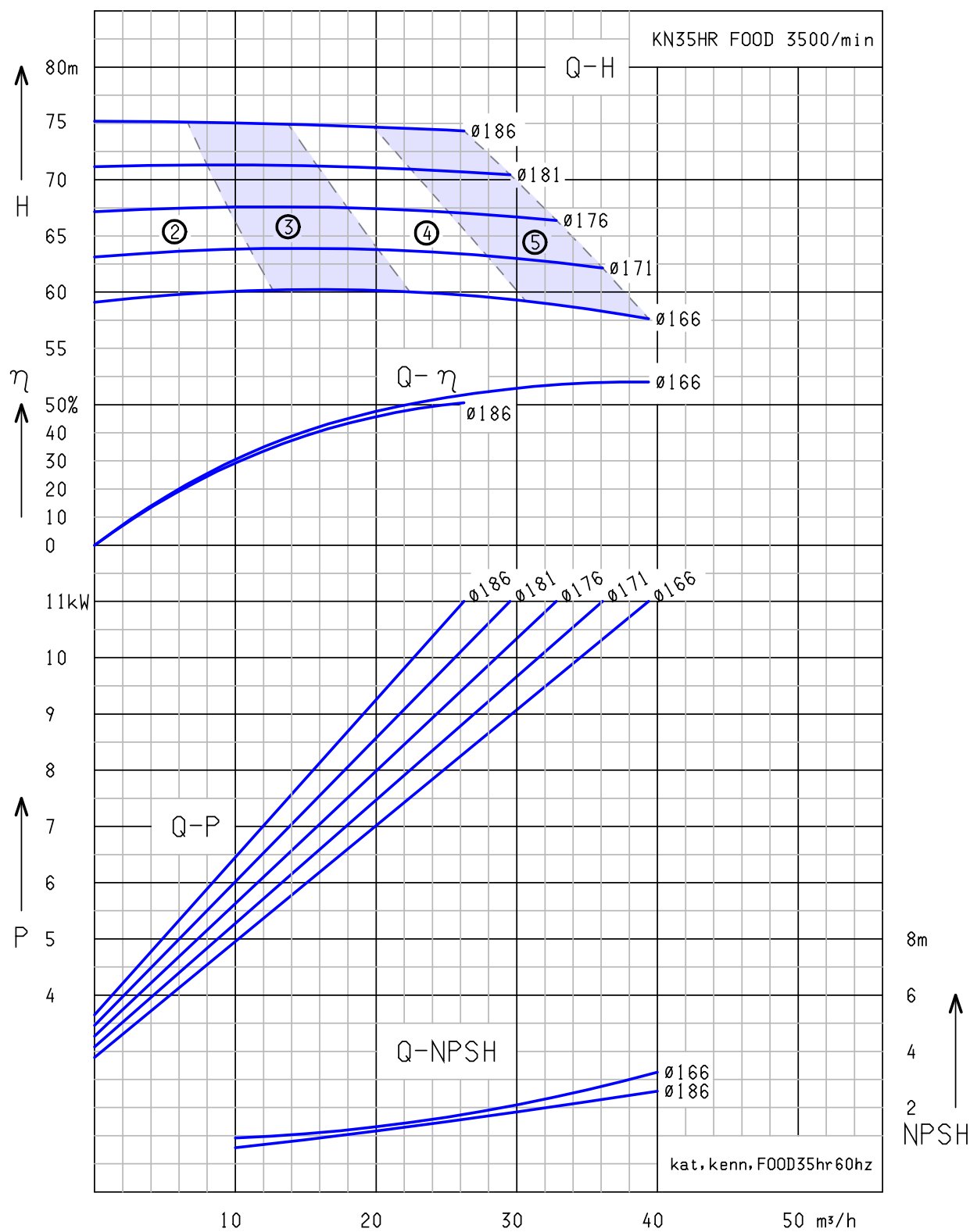
50 Hz



- ① KN35H/1 – 4,0 kW ② KN35H/2 – 5,5 kW
③ KN35H/3 – 7,5 kW ④ KN35H/4 – 9,2 kW

Characteristics KN35H Food (ring casing)

60 Hz



- ② KN35H/2 – 5,5 kW ③ KN35H/3 – 7,5 kW
④ KN35H/4 – 9,2 kW ⑤ KN35H/5 – 11,0 kW

→ Q liquid: water 20°C

Hygienic / Aseptic non self-priming – KN4

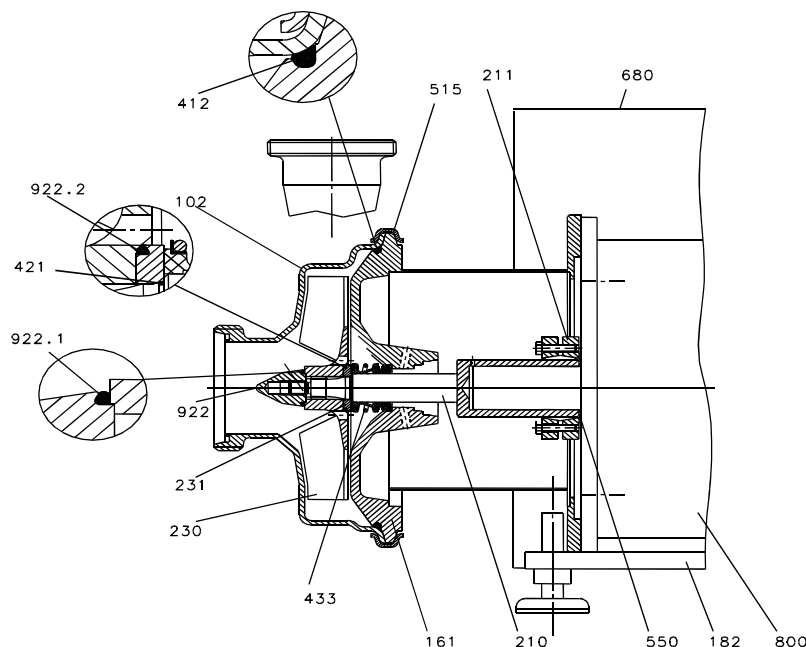


Design A+B

... for the brewery, beverage and pharmaceutical industry

Design	Deep drawn, thick-walled CrNiMo rolled steel casing, forged CrNiMo stainless steel casing cover, opened CrNiMo stainless steel impeller on a strong dimensioned stub shaft, sturdy quick-release clamp ring with sanitary chambered O-Ring seal	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot incl. Stainless steel motor cover	
Materials	All parts in contact with product correspond to the materials AISI 316L (1.4404, 1.4435, 1.4581), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Adjusted self cleaning and self rinsing single or double mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	◆ flow rate : max. 100.000 l/h (50 Hz) ◆ discharge head : max. 6,0 bar (50 Hz) ◆ motor power : max. 22,0 kW ◆ working temperature : max. 130°C ◆ operating pressure : 16 bar	
Motor	IEC-standard motor IP55 hoseproof and with cold inductors, NEMA-standard motor on request	
Optional features	◆ internal frequency converter FCM300 ◆ trolley with breaker and cable ◆ pump head heating-/cooling-jacket ◆ ex-proof T3/T4 ◆ alternative paint for motor	◆ seal steam sterilisation ◆ pole-changing motor ◆ motor IP65 ◆ material 1.4435 ◆ emptying valve
Connections	Connections in diameters from DN50 up to DN100 or 2" up to 4" according to the following standards: DIN, IDF, clamp, RJT, SMS, small flanges (other on request)	

section KN4

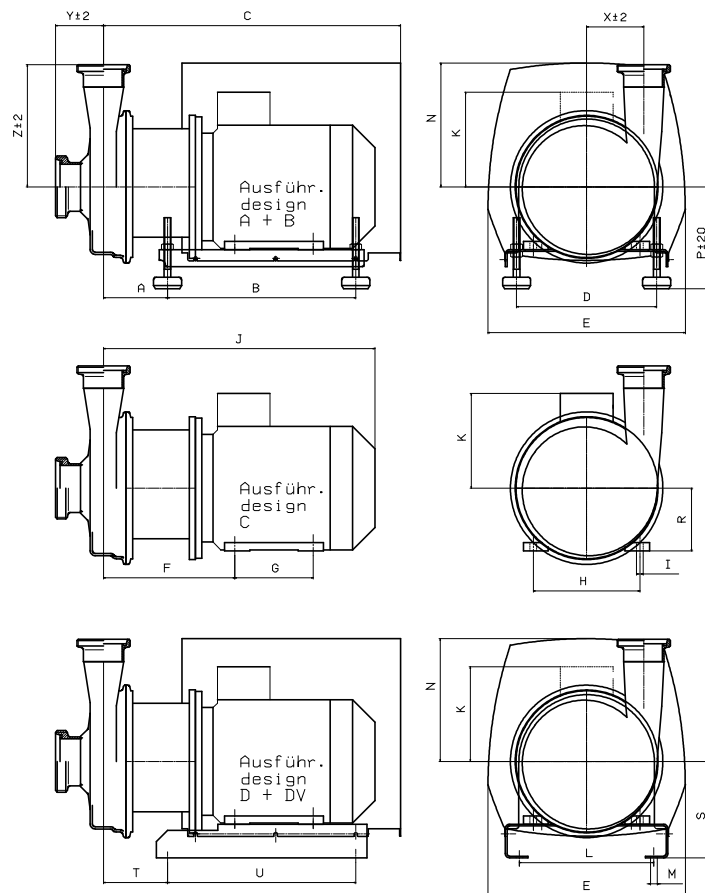


Technical changes reserved!
10 / 2015

numeral	component
102	volute casing (material AISI 316L; 4mm; variable connections)
161	casing cover (thick-walled forging in material AISI 316L, resistant to pressure surges)
182	base frame (height-adjustable machine feet in stainless steel)
210	shaft (push-on shaft with uniform diameter for shaft seal of 25mm in AISI 316Ti)
211	shrink disc (shaft fastening for IEC-standard motor)
230	impeller (open or closed, precision casting in AISI 316Ti)
231	sealing bush
412	O-Ring (fully flushed, hygienic O-Ring in EPDM, FKM, NBR or perfluorinated rubber)
421	radial seal (O-Ring in various seal materials)
433	mechanical seal (single or double mechanical seal of various designs in SiC/SiC, SiC/carbon, carbon/stainless steel or precision shaft packing ring with PTFE sealing lip)
515	clamping ring (quick-release fastener in stainless steel up to PN16)
550	disc
680	enclosure (stainless steel cover)
800	IEC- or NEMA-standard motor
922	impeller nut (material AISI 316L)
922.1	impeller seal (fully flushed, hygienic O-Ring in EPDM, FKM, NBR or perfluorinated rubber)
922.2	impeller seal (fully flushed, hygienic O-Ring in EPDM, FKM, NBR or perfluorinated rubber)

Dimensions KN43, KN45 / Connections acc. to DIN 11851

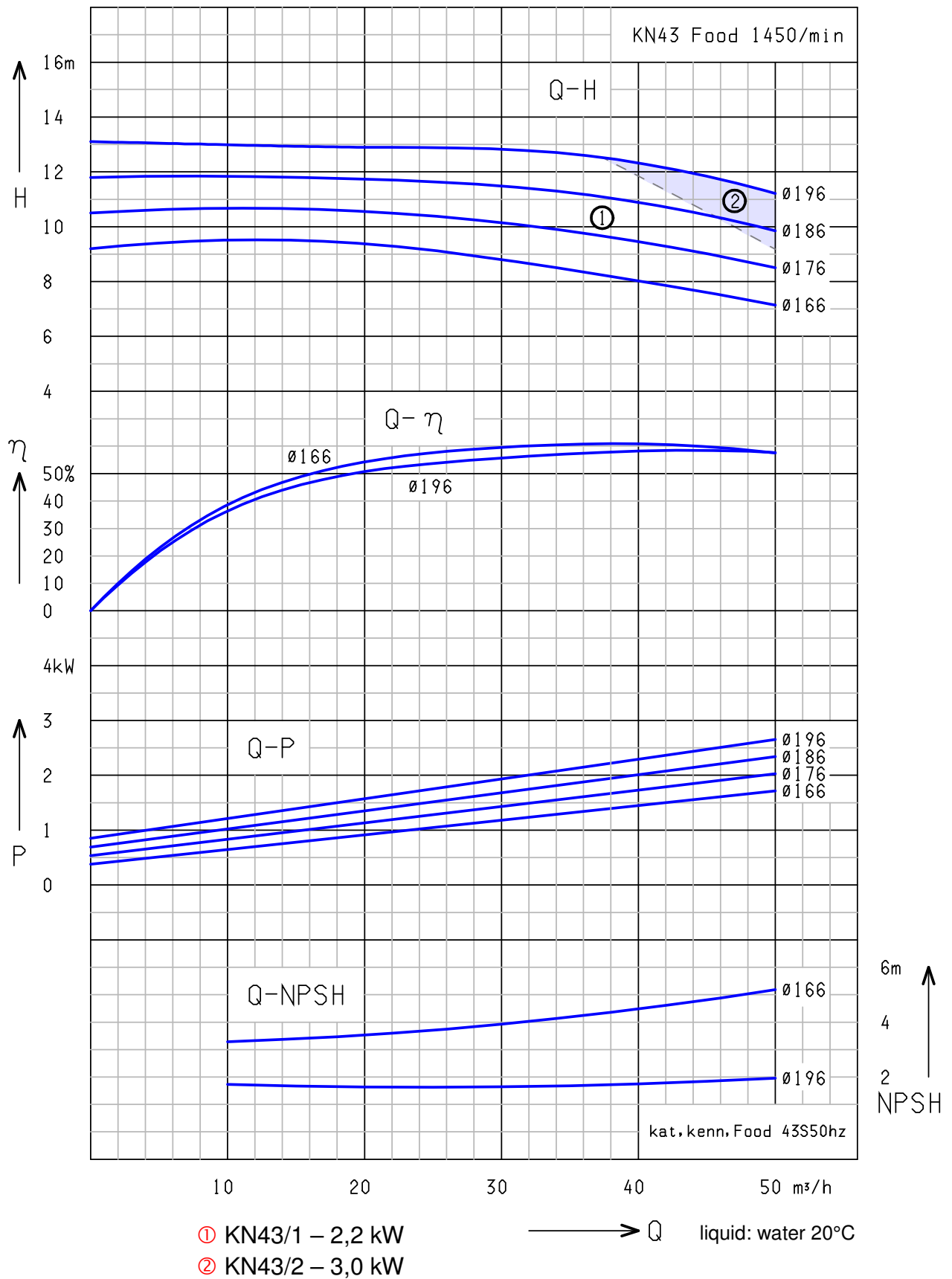
Inlet	50	65	65	80	80	80	100	100	100
Outlet	50	50	65	50	65	80	65	80	100
X	102	102	102	102	102	102	102	102	102
Y	90	90	90	86	86	86	87	87	87
Z	218	218	218	218	218	223	218	223	233



Type	Weights (kg)			kW	rpm		Motor IE2	Motor IE3	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S	T	U
	Design A+DV	Design B+D	Design C		50 Hz	60 Hz																					
KN43/1	52	43	36	2,2	1450	1750	100L		107	336	593	250	322	227	140	160	12	467	153	240	12	233	207	100	160	107	336
KN43/2	61	52	45	3,0	1450	1750	100L											507									
KN43/3	61	52	45	4,0		1750	112M		114	336	600	250	322	234	140	190	12	504	169	240	12	221	195	112	172	114	336
KN45/1.1	91	82	75	5,5	2900			112M	114	336	600	250	322	234	140	190	12	514	169	240	12	221	195	112	172	114	336
KN45/2.1	84	75	68	7,5	2900	3500		112M	114	336	600	250	322	234	140	190	12	544	169	240	12	221	195	112	172	114	336
KN45/3	98	89	80	9,2	2900	3500		132M										619									
KN45/4.1	115	106	97	11,0	2900	3500		132M	134	400	714	280	363	273	178	216	12	639	188	270	12	289	248	132	200	134	400
KN45/5	164	154	145	15,0	2900	3500		160M	197	490	824	300	423	327	210	254	14	736	250	300	13	283	282	160	230	217	450
KN45/6	167	157	148	18,5	2900	3500		160L	197	490	824	300	423	327	254	254	14	736	250	300	13	283	282	160	230	217	450
KN45/7.1	187	177	168	22,0	2900	3500		160L	197	490	824	300	423	327	254	254	14	766	250	300	13	283	282	160	230	217	450
KN45/8	278	268	259	30,0	2900	3500		180L	182	490	969	300	463	340	279	279	14	866	299	300	13	350	341	180	250	202	450

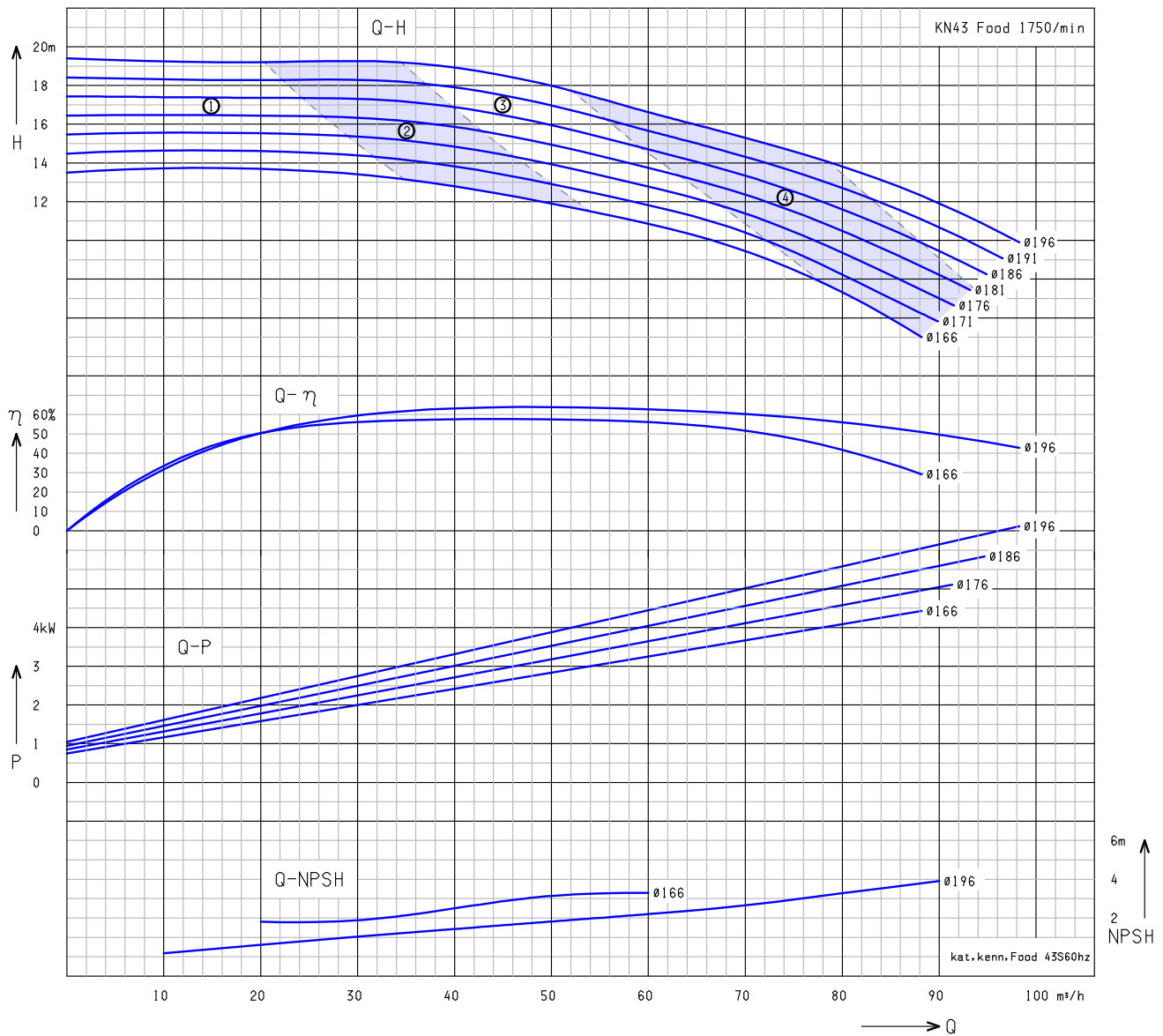
Characteristics KN43 Food

50 Hz



Characteristics KN43 Food

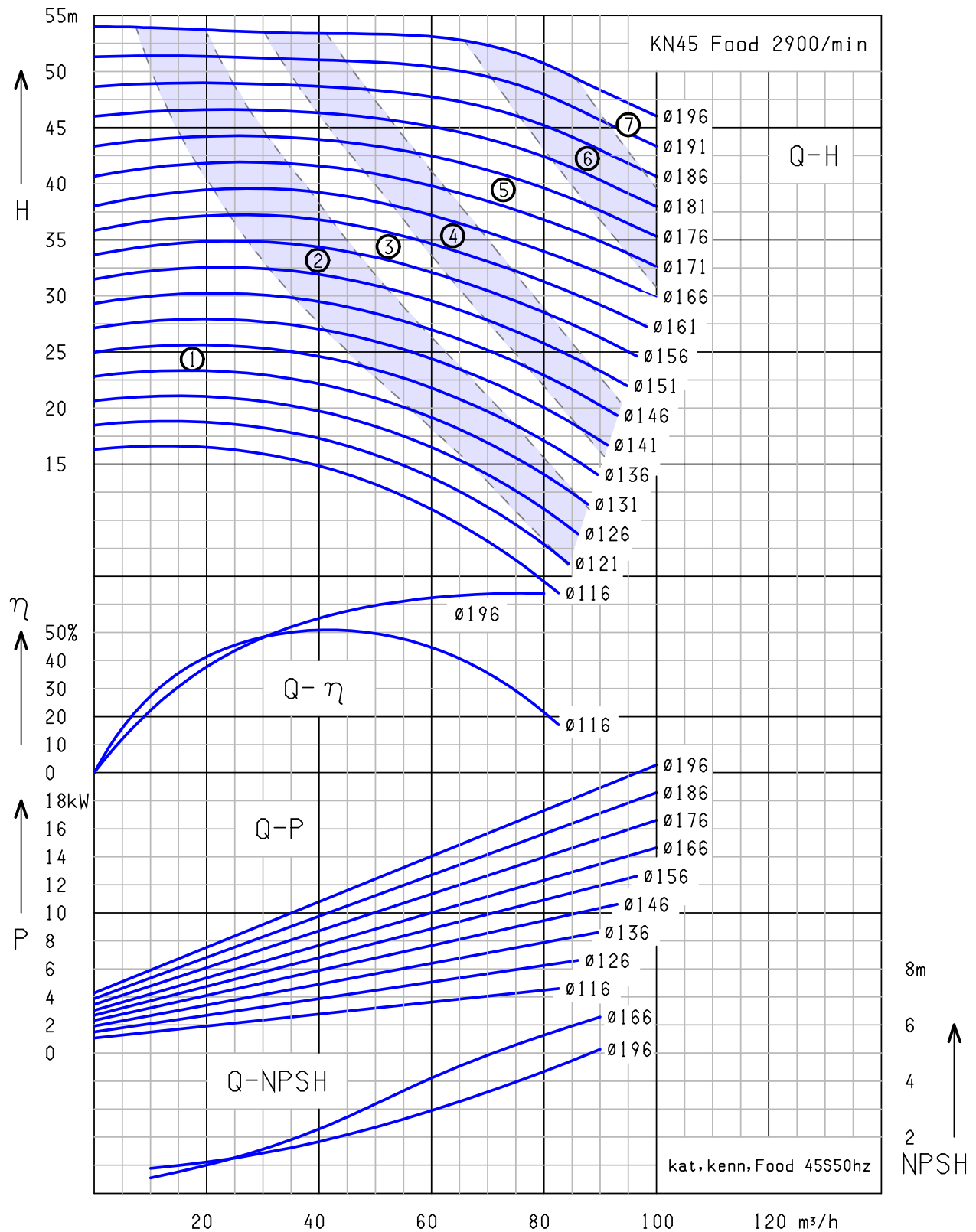
60 Hz



- ① KN43/1 – 2,2 kW ② KN43/2 – 3,0 kW
③ KN43/3 – 4,0 kW ④ KN43/4 – 5,5 kW

Characteristics KN45 Food

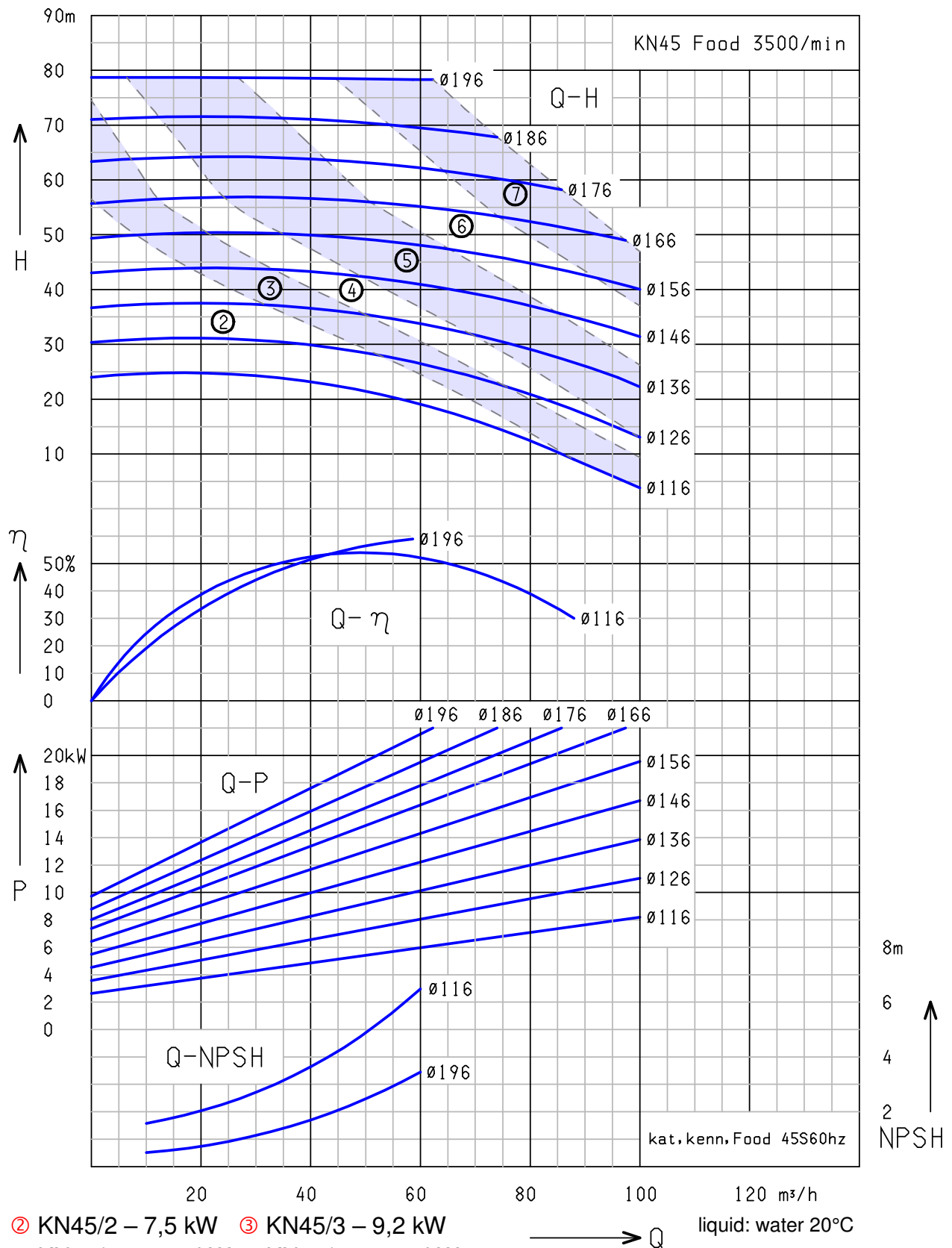
50 Hz



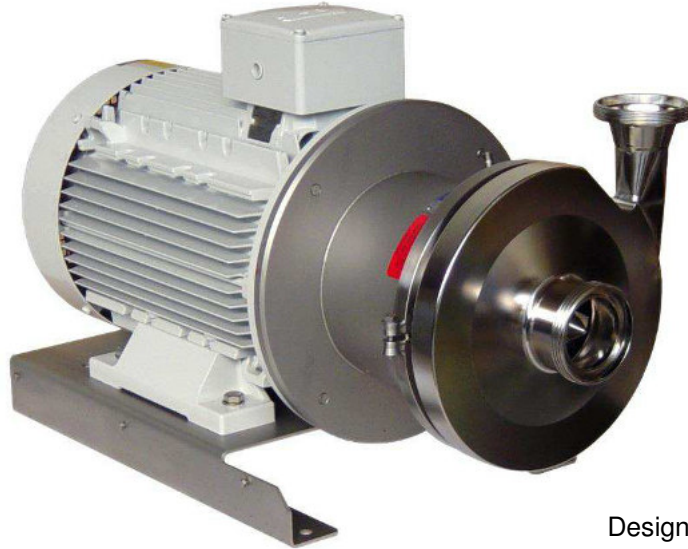
- ① KN45/1 – 5,5 kW ② KN45/2 – 7,5 kW
 ③ KN45/3 – 9,2 kW ④ KN45/4 – 11,0 kW
 ⑤ KN45/5 – 15,0 kW ⑥ KN45/6 – 18,5 kW
 ⑦ KN45/7 – 22,0 kW

Characteristics KN45 Food

60 Hz



Hygienic / Aseptic non self-priming – KN4H

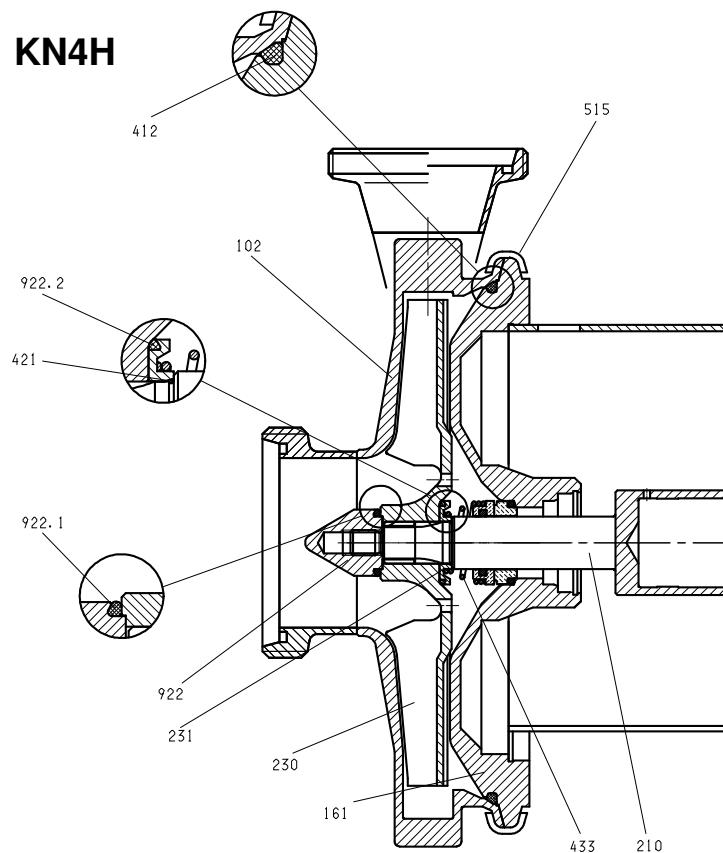


Design D

... for the brewery, beverage and pharmaceutical industry

Design	Deep drawn, thick-walled CrNiMo rolled steel casing, forged CrNiMo stainless steel casing cover, opened CrNiMo stainless steel impeller on a strong dimensioned stub shaft, sturdy quick-release clamp ring with sanitary chambered O-Ring seal	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot incl. stainless steel motor cover	
Materials	All parts in contact with product correspond to the materials AISI316L (1.4404, 1.4435, 1.4581), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Adjusted self cleaning and self rinsing single or double mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	◆ flow rate : max. 50.000 l/h (50 Hz) ◆ discharge head : max. 7,7 bar (50 Hz) ◆ motor power : max. 18,5 kW ◆ working temperature : max. 130°C ◆ operating pressure : 16 bar	
Motor	IEC-standard motor IP55 hoseproof and with cold inductors, NEMA-standard motor on request	
Optional features	◆ internal frequency converter FCM300 ◆ trolley with breaker and cable ◆ pump head heating-/cooling-jacket ◆ ex-proof T3/T4 ◆ alternative paint for motor	◆ seal steam sterilisation ◆ pole-changing motor ◆ motor IP65 ◆ emptying valve ◆ material 1.4435
Connections	Connection in diameters from DN50 up to DN80 or 2" up to 3" according to the following standards: IDF, DIN, clamp, SMS, RJT, small flanges (other on request)	

section KN4H

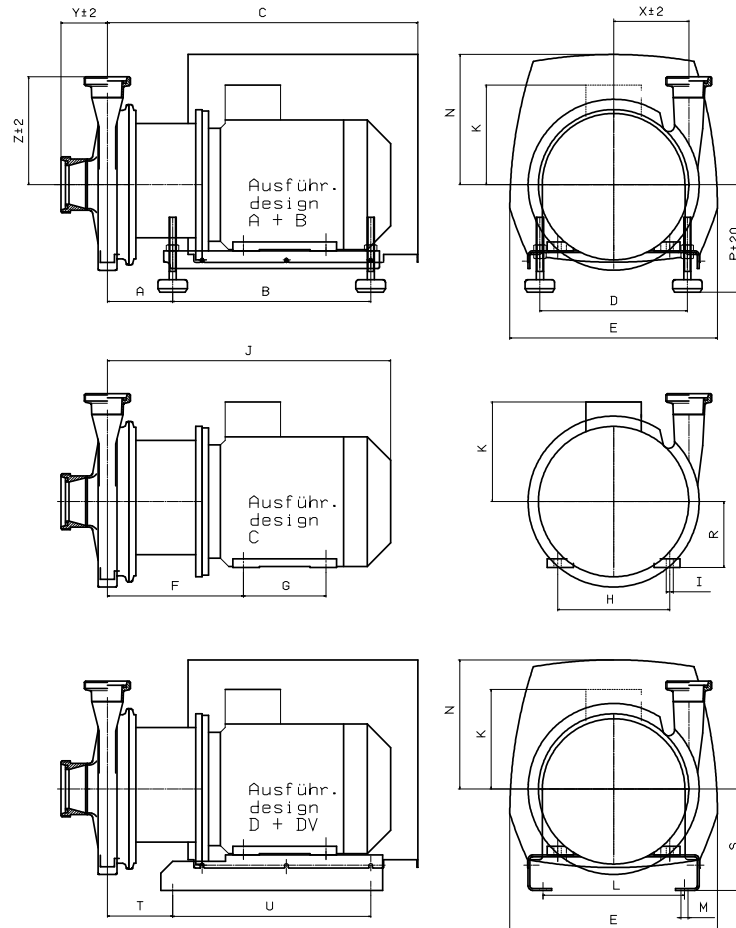


Technical changes reserved!
 10 / 2015

numeral	component
102	volute casing (thick-walled forging in material AISI316L, resistant to pressure surges)
161	casing cover (thick-walled forging in material AISI316L, resistant to pressure surges)
182	base frame (height-adjustable machine feet of stainless steel)
210	shaft (push-on shaft with uniform diameter for shaft seal of 25mm in AISI 316Ti)
211	shrink disc (shaft fastening for IEC-standard motor)
230	impeller (half-open, precision casting in AISI 316Ti)
231	sealing bush
412	O-Ring (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)
421	radial seal (O-Ring in various seal materials)
433	mechanical seal (single or double mechanical seal of various designs in SiC/SiC, SiC/carbon, carbon/stainless steel or precision shaft packing ring with PTFE sealing lip)
515	clamping ring (quick-release fastener in stainless steel up to PN16)
550	disc
680	enclosure (stainless steel cover)
800	IEC- or NEMA-standard motor
922	impeller nut (material AISI 316L)
922.1	impeller seal (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)
922.2	impeller seal (fully flushed, hygienic O-Ring in EPDM, NBR, FKM or perfluorinated rubber)

Dimensions KN43H, KN45H / Connections acc. to DIN 11851

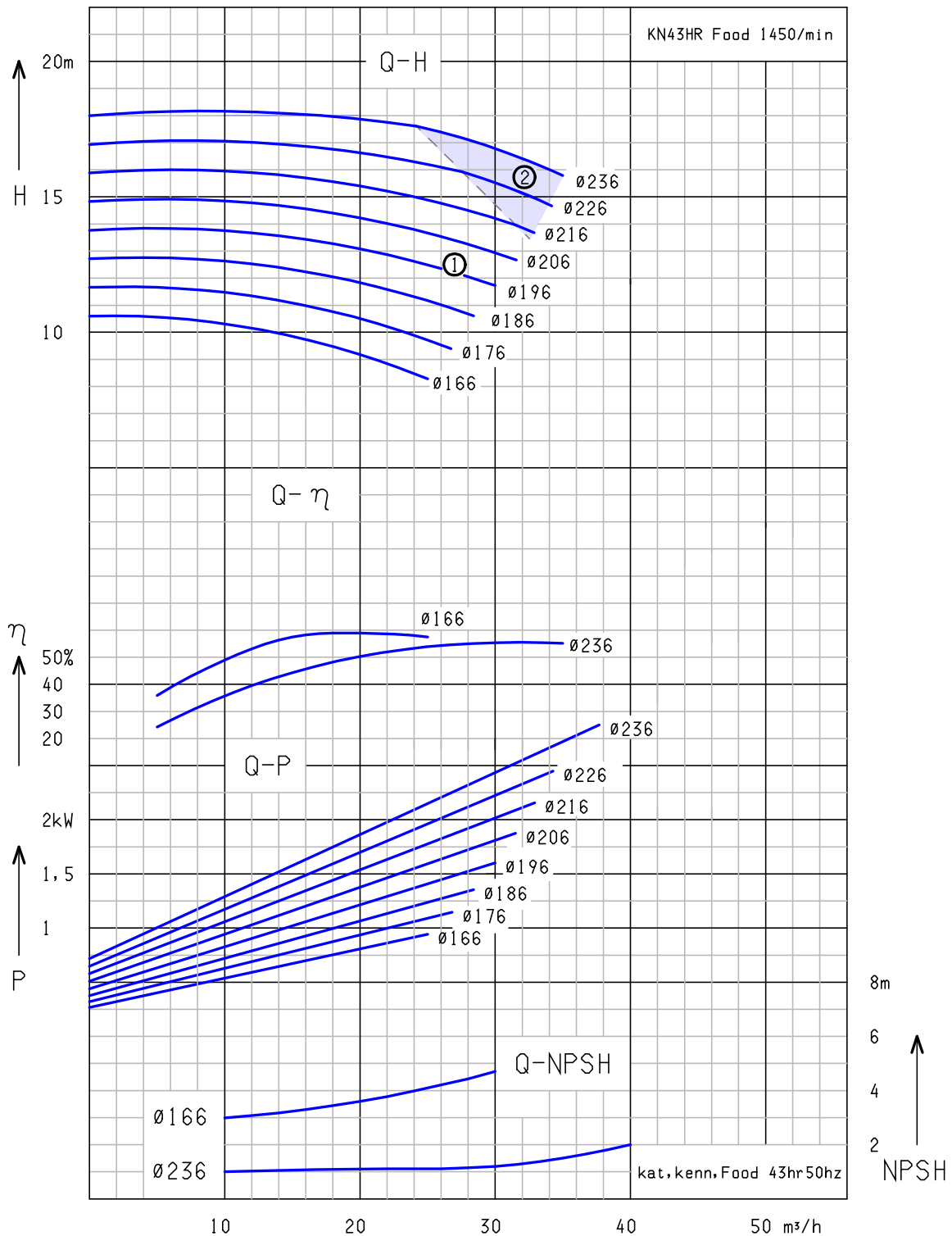
Inlet	32	40	40	50	50	50	65	65	65	80	80	80
Outlet	32	32	40	32	40	50	40	50	65	50	65	80
X	128	128	128	128	128	128	128	128	128	128	128	128
Y	115	107	107	91	91	91	79	79	79	79	79	79
Z	186	186	181	186	181	183	181	183	188	183	188	193



Type	Weights (kg)			kW	rpm		Motor IE2	Motor IE3	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S	T	U
	Design A+DV	Design B+D	Design C		50 Hz	60 Hz																					
KN43H/1	55	46	39	2,2	1450	1750	100L		103	336	590	250	322	223	140	160	12	463	153	240	12	207	170	100	160	103	336
KN43H/2	64	55	48	3,0	1450	1750	100L		103	336	590	250	322	223	140	160	12	503	153	240	12	207	170	100	160	103	336
KN43H/3	65	56	49	4,0	1450	1750	112M		110	336	597	250	322	230	140	190	12	500	169	240	12	195	182	112	172	110	336
KN45H/1.1	79	70	63	5,5	2900	3500		112M	110	336	597	250	322	230	140	190	12	511	169	240	12	195	182	112	172	110	336
KN45H/2.1	86	76	70	7,5	2900	3500		112M	110	336	597	250	322	230	140	190	12	541	169	240	12	195	182	112	172	110	336
KN45H/3	101	96	85	9,2	2900	3500		132M	134	400	711	280	363	269	178	216	12	616	193	270	12	248	202	132	200	130	400
KN45H/4.1	118	109	102	11,0	2900	3500		132M	134	400	711	280	363	269	178	216	12	636	193	270	12	248	202	132	200	130	400
KN45H/5	167	157	148	15,0	2900	3500		160M	197	490	821	300	423	323	210	254	14	733	250	300	13	283	230	160	230	213	450
KN45H/6	170	160	151	18,5	2900	3500		160L	197	490	821	300	423	323	210	254	14	733	250	300	13	283	230	160	230	213	450
KN45H/7.1	192	182	173	22,0	2900	3500		160L	197	490	821	300	423	323	210	254	14	763	250	300	13	283	230	160	230	213	450

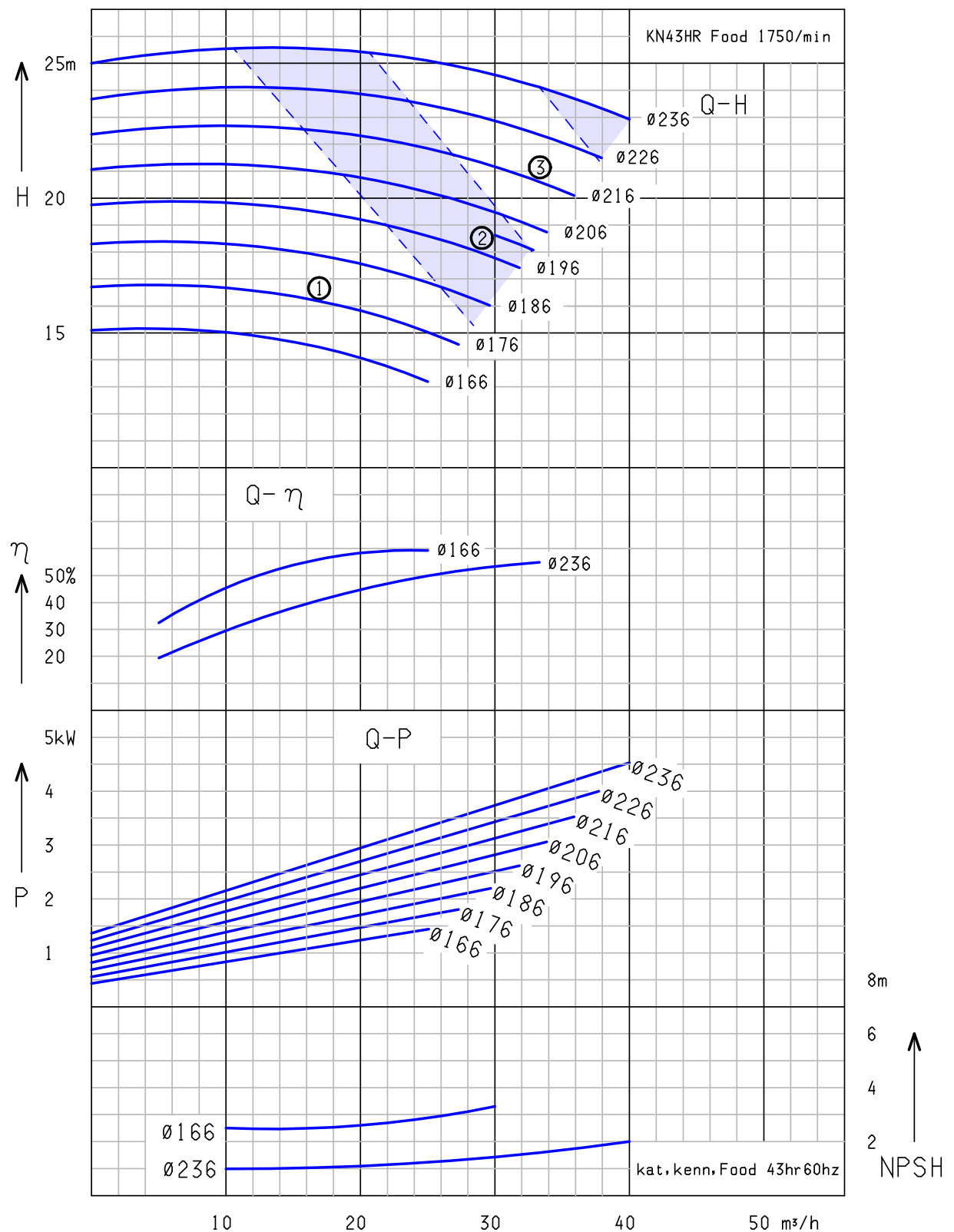
Characteristics KN43H Food (ring casing)

50 Hz



Characteristics KN43H Food (ring casing)

60 Hz

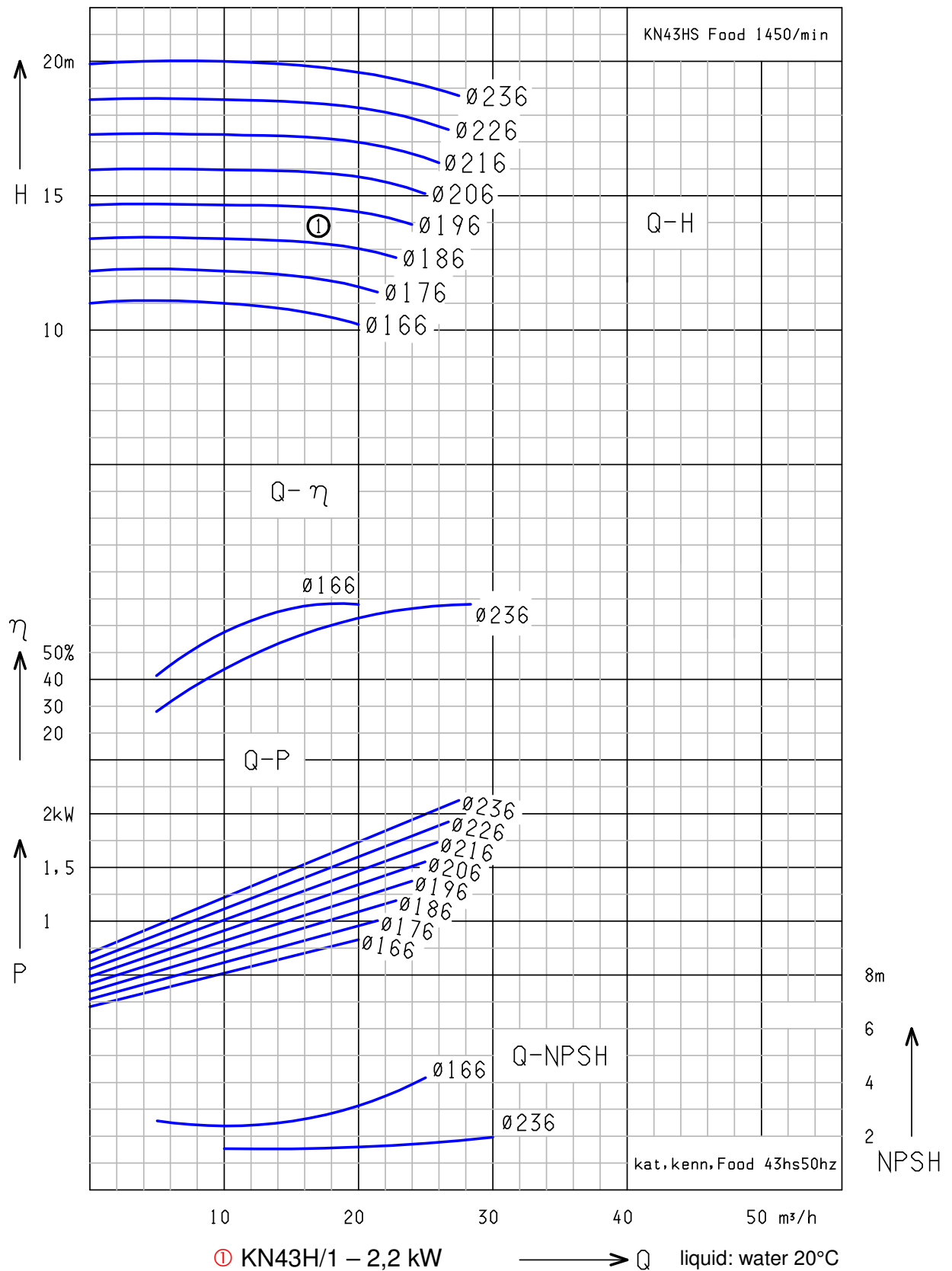


- ① KN43H/1 – 2,2 kW ② KN43H/2 – 3,0 kW
③ KN43H/3 – 4,0 kW

→ Q liquid: water 20°C

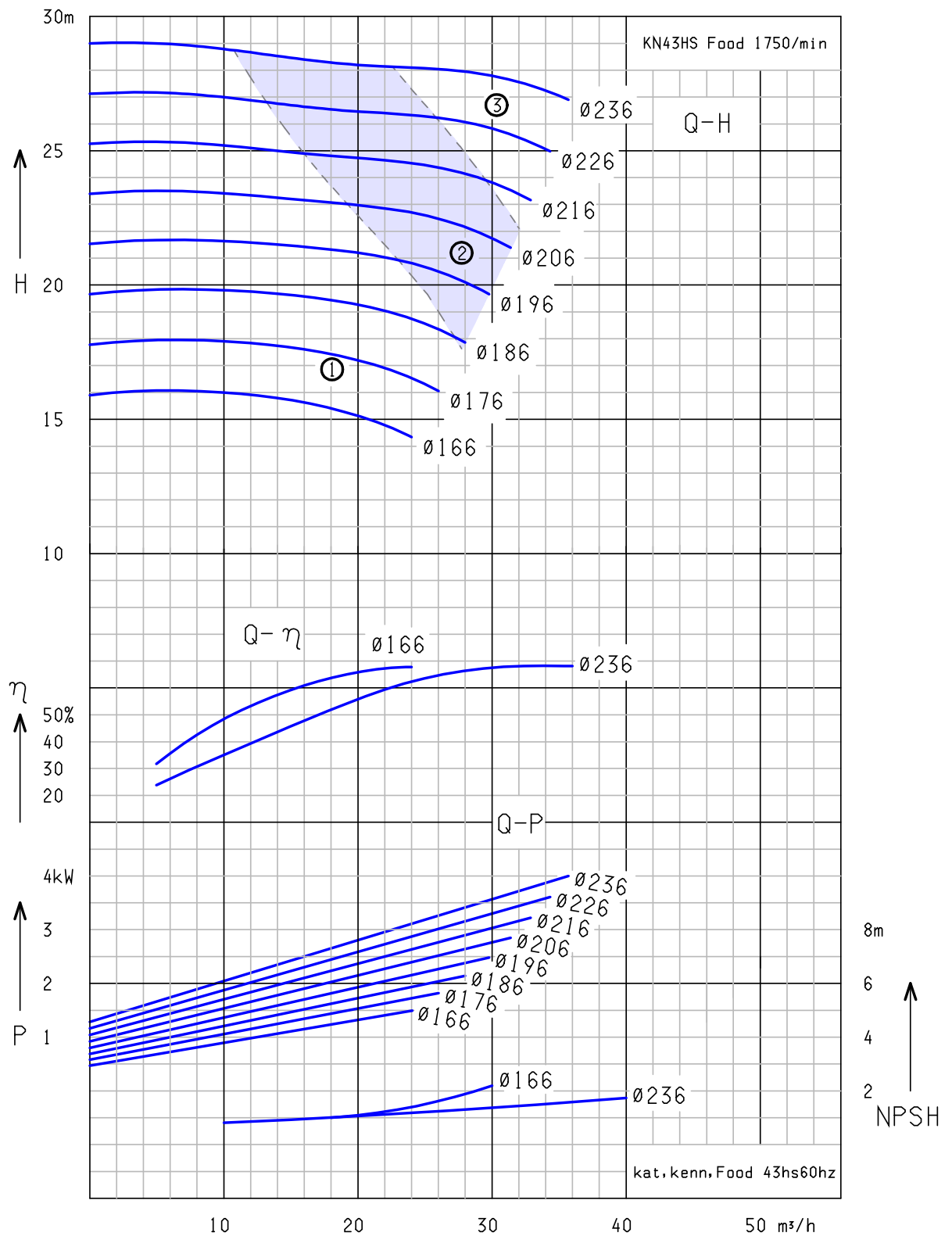
Characteristics KN43H Food (volute casing)

50 Hz



Characteristics KN43H Food (volute casing)

60 Hz

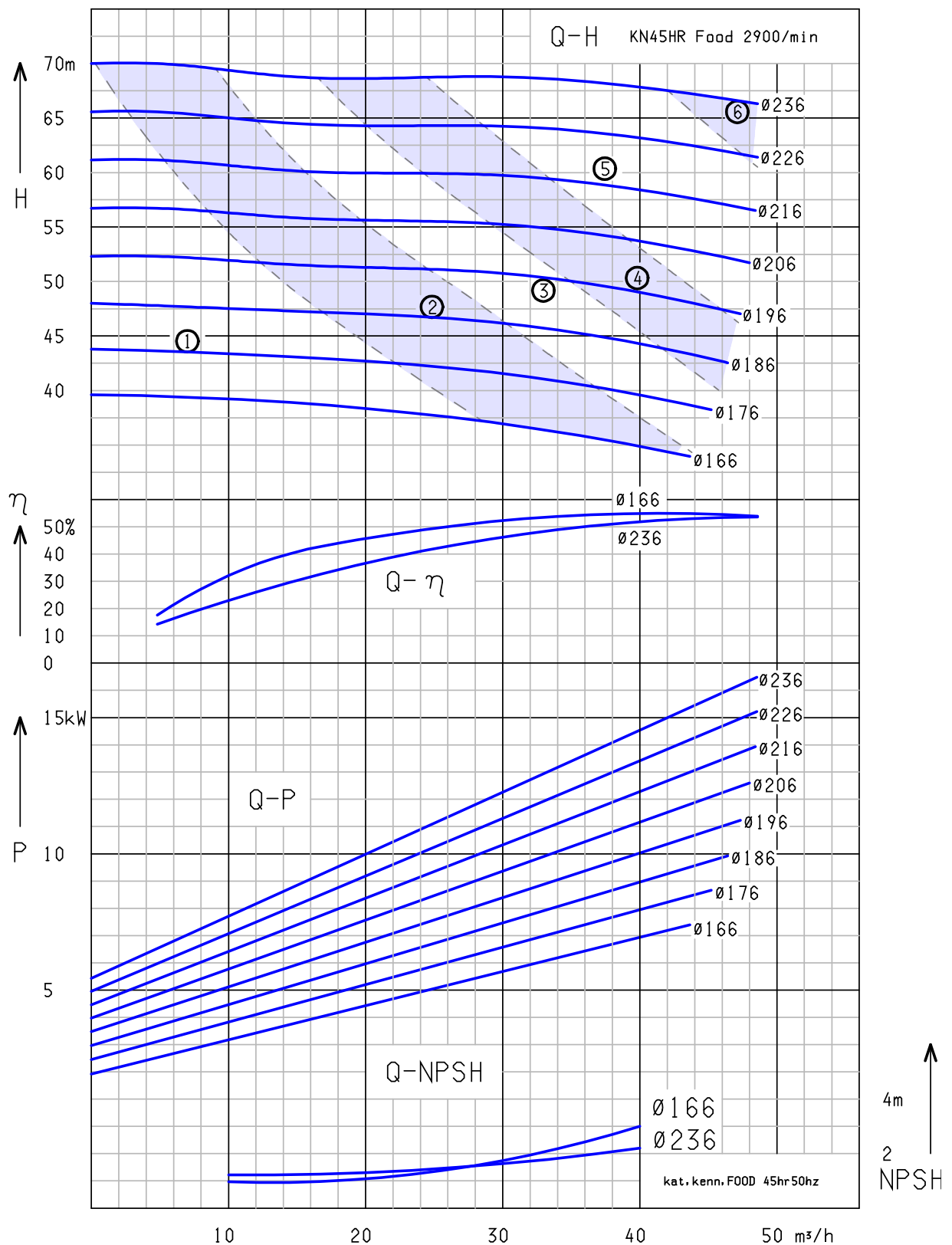


- ① KN43H/1 – 2,2 kW ② KN43H/2 – 3,0 kW
③ KN43H/3 – 4,0 kW

→ Q liquid: water 20°C

Characteristics KN45H Food (ring casing)

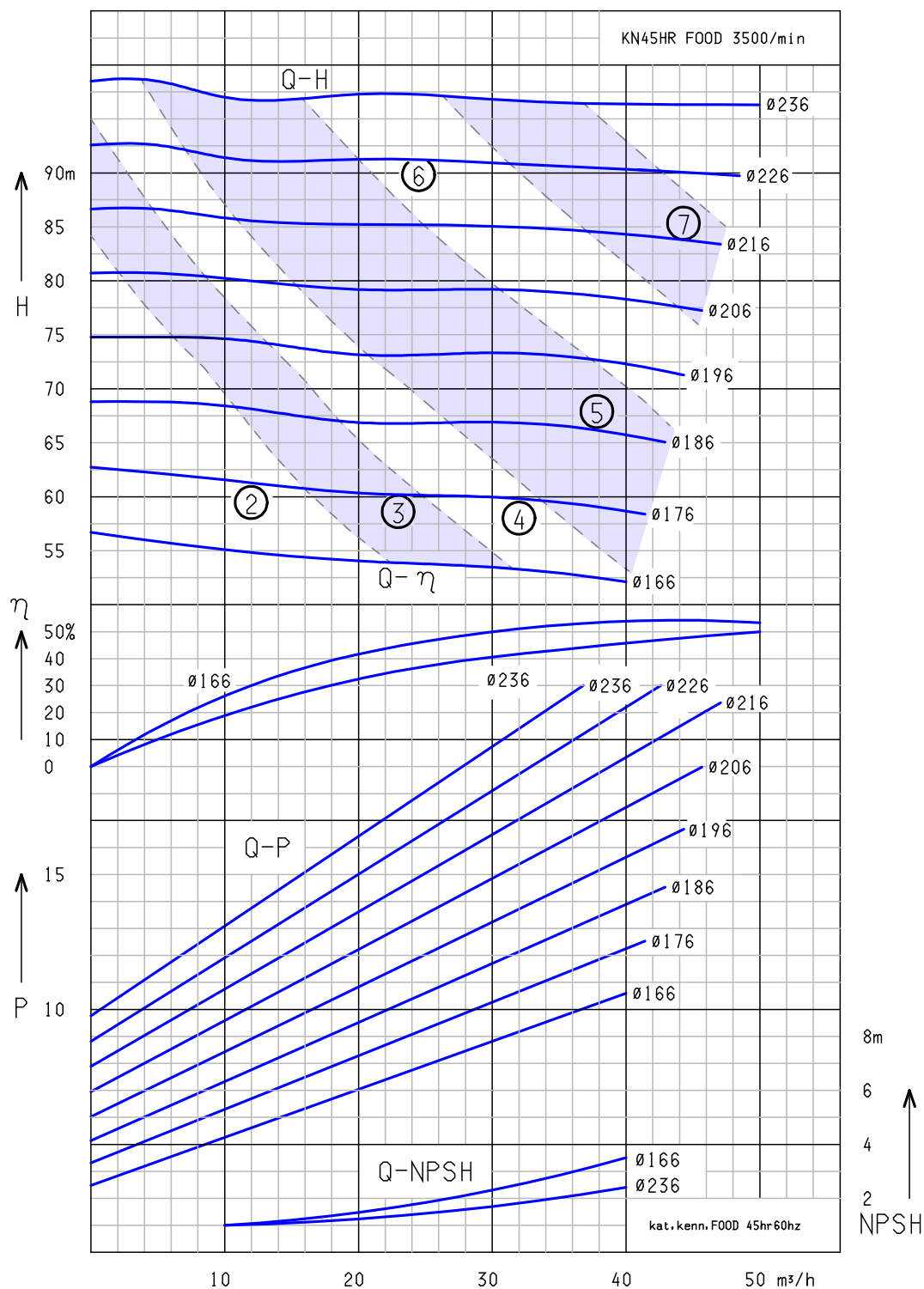
50 Hz



- ① KN45H/1 – 5,5 kW ② KN45H/2 – 7,5 kW
 ③ KN45H/3 – 9,2 kW ④ KN45H/4 – 11,0 kW
 ⑤ KN45H/5 – 15,0 kW ⑥ KN45H/6 – 18,5 kW

Characteristics KN45H Food (ring casing)

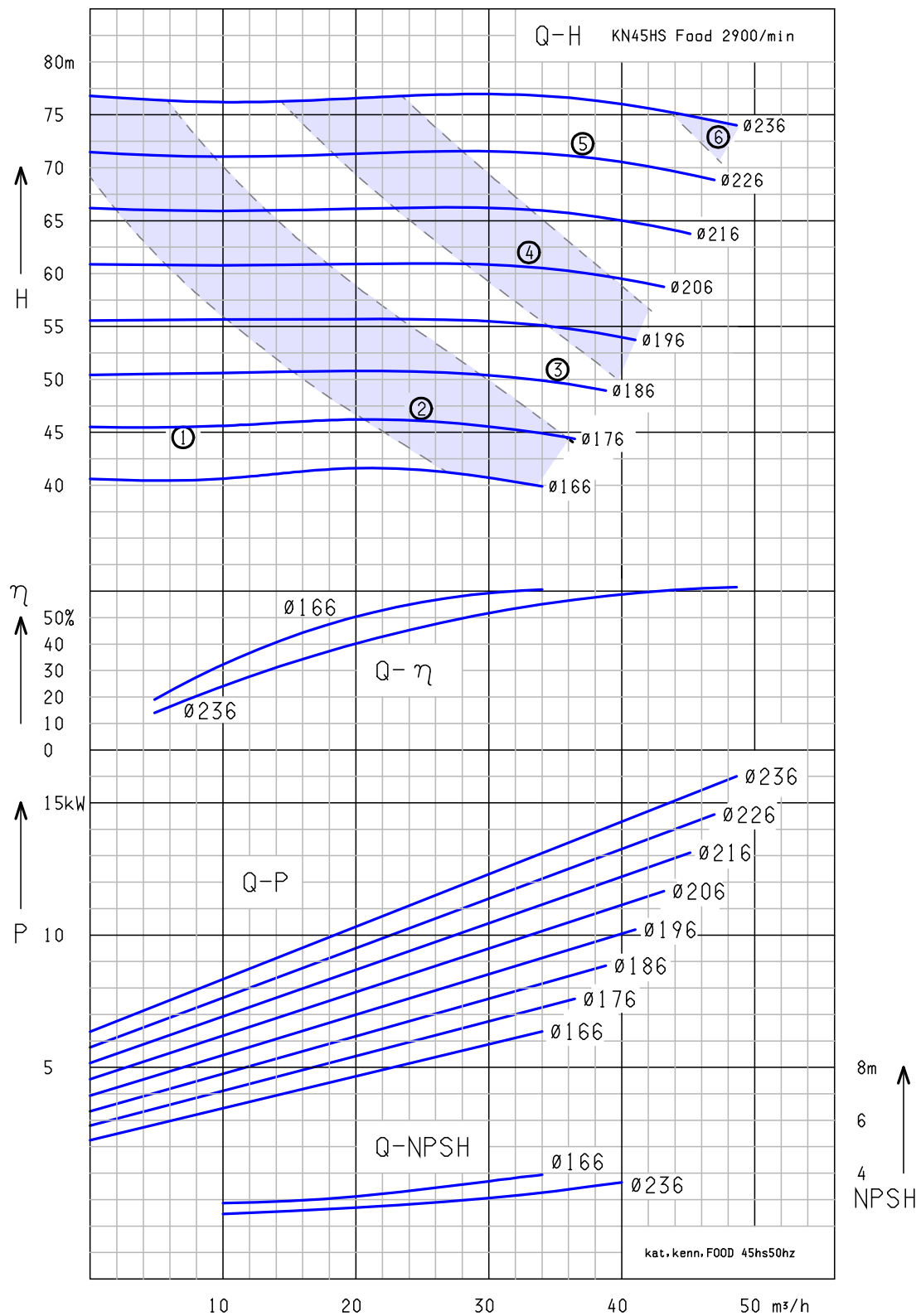
60 Hz



- ② KN45H/2 – 7,5 kW ③ KN45H/3 – 9,2 kW
 ④ KN45H/4 – 11,0 kW ⑤ KN45H/5 – 15,0 kW
 ⑥ KN45H/6 – 18,5 kW ⑦ KN45H/7 – 22,0 kW

Characteristics KN45H Food (volute casing)

50 Hz

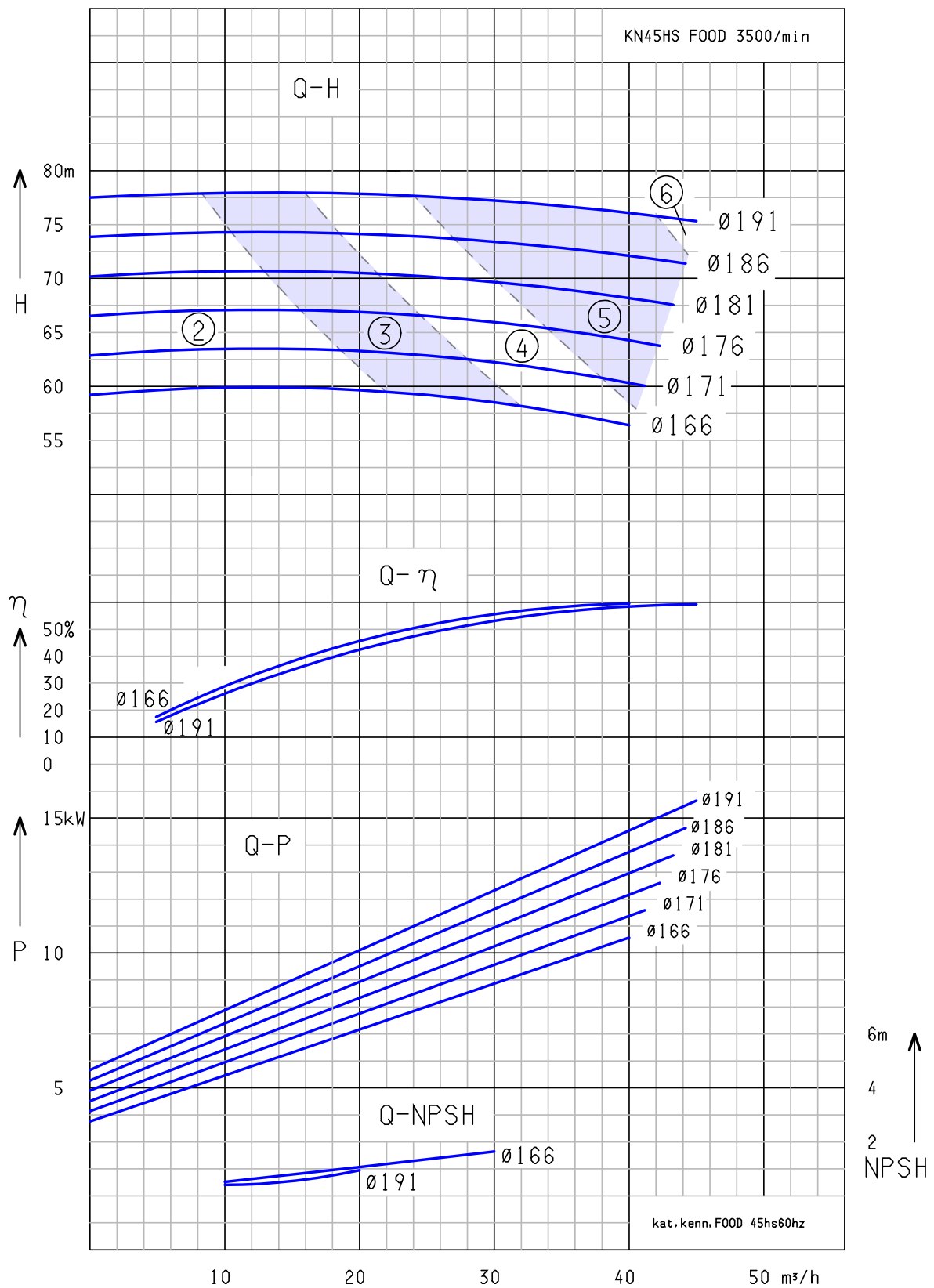


- ① KN45H/1 – 5,5 kW ② KN45H/2 – 7,5 kW
 ③ KN45H/3 – 9,2 kW ④ KN45H/4 – 11,0 kW
 ⑤ KN45H/5 – 15,0 kW ⑥ KN45H/6 – 18,5 kW

→ Q liquid: water 20°C

Characteristics KN45H Food (volute casing)

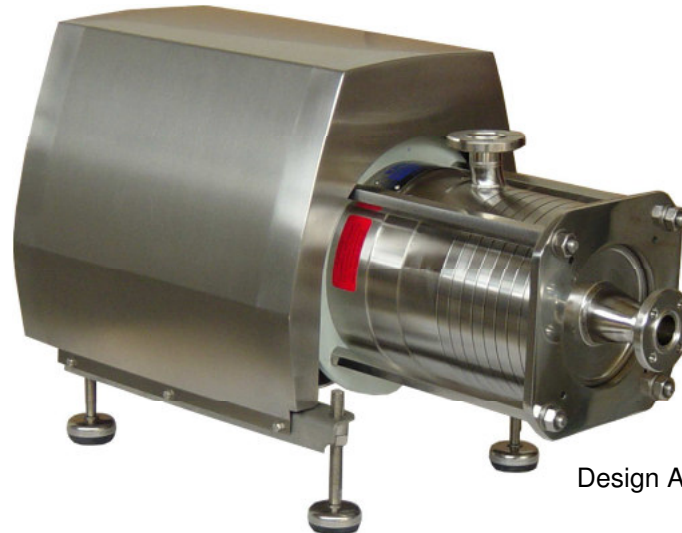
60 Hz



- ② KN45H/2 – 7,5 kW ③ KN45H/3 – 9,2 kW
 ④ KN45H/4 – 11,0 kW ⑤ KN45H/5 – 15,0 kW
 ⑥ KN45H/6 – 18,5 kW

→ Q liquid: water 20°C

Hygienic multistage non self-priming – KM2

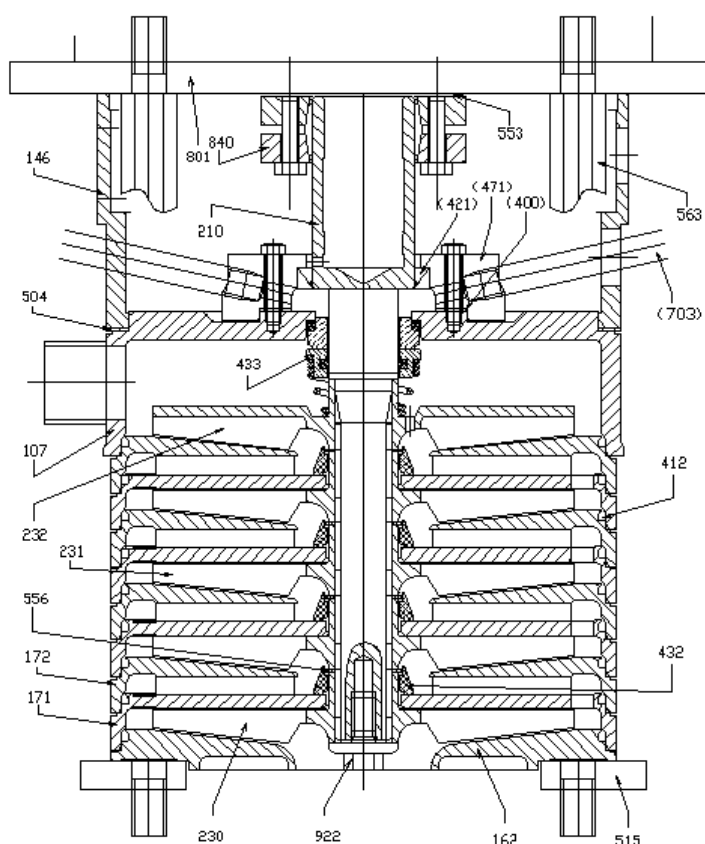


Design A

... for brewery and beverage industry

Application	Brewery and beverage industry, dairys as pressure pump, CIP cleaning, distillery, laundry facilities, domestic and drinking water	
Media	Beer, AfG, milk, alcohol solutions, soap suds, ...	
Design	Thick-walled CrNiMo steel casing and casing over, open CrNiMo stainless steel impeller on a strong dimensioned stub shaft, hygienic chambered O-Ring seal, from 2stage up to 5stage available	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot incl. stainless steel motor cover	
Materials	All parts in contact with product correspond to the materials AISI 316L (1.4404) stainless steel motor lantern, various process seal materials acc. FDA suit to application	
Shaft seal	Adjusted self cleaning and self rinsing single or double mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	♦ flow rate : max. 15.000 l/h (50 Hz) ♦ discharge head : max. 11 bar (50 Hz) ♦ motor power : max. 7,5 kW ♦ working temperature : max. 130°C ♦ operating pressure : 16 bar	
Motor	IEC-standard motor IP55 hoseproof and with PTC, NEMA-standard motor on request	
Optional features	♦ DANFOSS internal frequency converter ♦ ex-proof T3/T4 ♦ double mechanical seal ♦ alternative paint for motor ♦ seal steam sterilisation	
Connections	Connection in diameters from DN25 up to DN50 or 1" up to 2" according to the following standards: DIN, IDF, clamp, SMS, RJT, small flanges (other on request)	

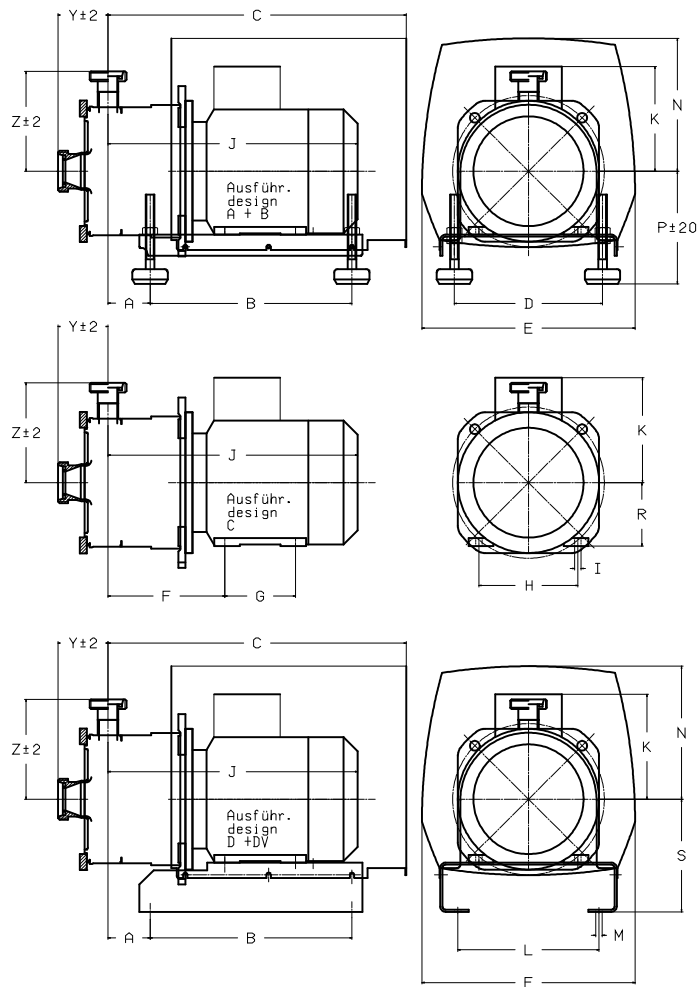
section KM25



Technical changes revised!
10 / 2015

numeral	component
107	pressure casing
146	lantern
162	suction cover
171	leading casing
172	back casing
210	shaft
230	impeller suction stage
231	impeller middle stage
232	impeller end stage
400	seal
412	O-Ring
421	PTFE lip seal (only double shaft seal)
432	PTFE-disc
433	mechanical seal
471	socket
504	distance disc
515	clamping disc
553	supporting disc
556	adjusting disc
563	bolt
703	pipe for flushing (only double shaft seal)
801	motor
840	shrink disc
922	impeller screw

Dimensions KM21 – KM25 Horizontal / Connections acc. to DIN 11851

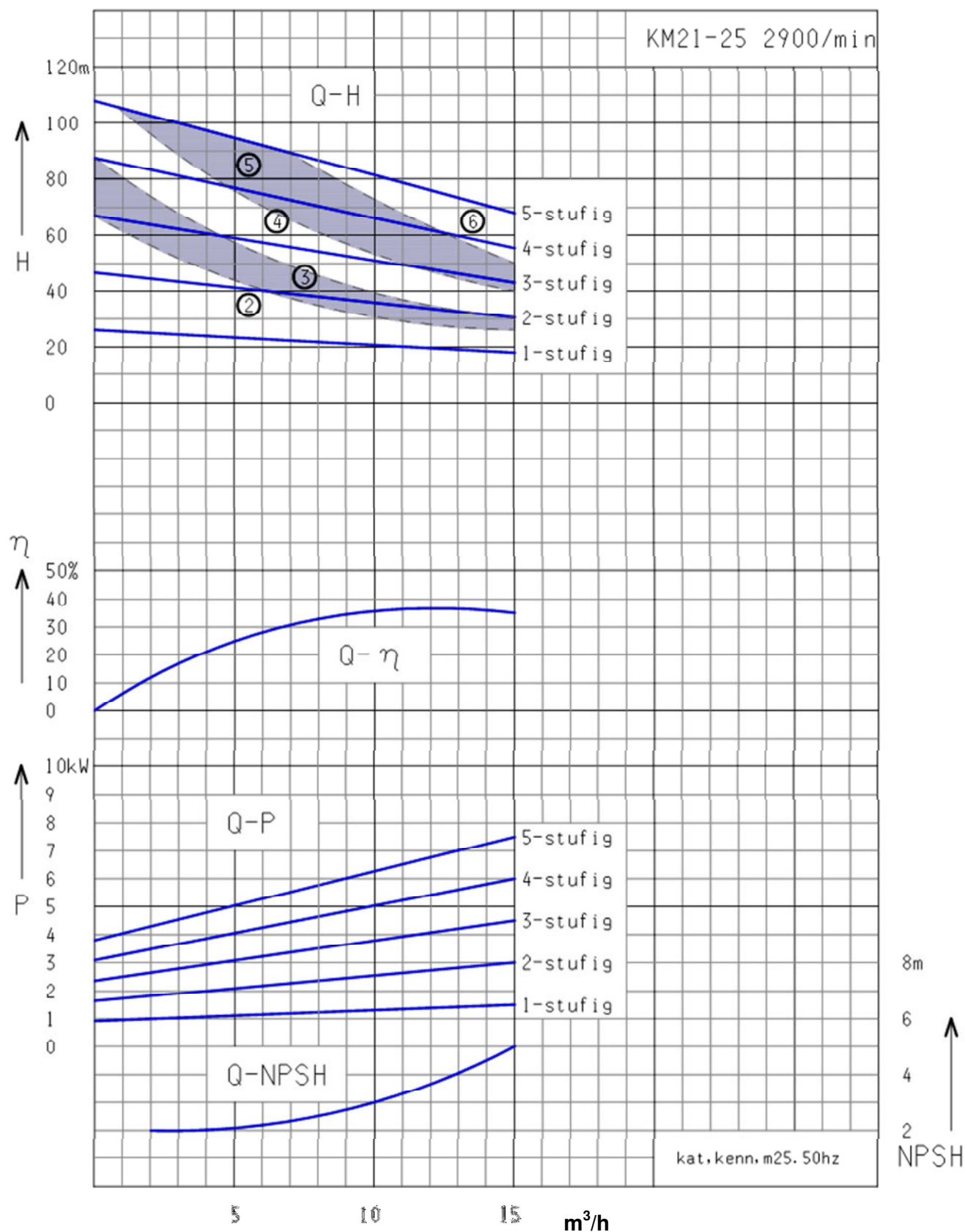


Inlet		32	40	50
Outlet		25	25	25
Y	KM21	71	68	66
	KM22	97	94	92
	KM23	123	120	118
	KM24	149	146	144
	KM25	175	172	170
Z		142	142	142

Type	kW	rpm 50 Hz	Motor IE2	Motor IE3	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S
KM21/1	1,5	2900	090S		60	286	470	210	272	166	125	125	9	379	146	200	9	159	160	90	160
KM21/2	2,2	2900	090L		60	286	423	210	272	166	125	125	9	389	149	200	9	159	160	90	160
KM22/2	2,2	2900	090L		60	286	423	210	272	166	125	125	9	389	149	200	9	159	160	90	160
KM22/3	3,0	2900	100L		46	336	532	250	322	166	140	140	12	406	153	240	12	207	170	100	160
KM22/4	4,0	2900	112M		53	336	539	250	322	173	140	140	12	423	169	240	12	195	182	112	172
KM23/3	3,0	2900	100L		46	336	532	250	322	166	140	140	12	406	153	240	12	207	170	100	160
KM23/4	4,0	2900	112M		53	336	539	250	322	173	140	140	12	443	169	240	12	195	182	112	172
KM23/5	5,5	2900		112M	53	336	539	250	322	173	140	140	12	453	169	240	12	195	182	112	172
KM24/4	4,0	2900	112M		53	336	539	250	322	173	140	140	12	443	169	240	12	195	182	112	172
KM24/5	5,5	2900		112M	53	336	539	250	322	173	140	140	12	453	169	240	12	195	182	112	172
KM24/6	7,5	2900		112M	53	336	539	250	322	173	140	140	12	483	169	240	12	195	182	112	172
KM25/5	5,5	2900		112M	53	336	539	250	322	173	140	140	12	453	169	240	12	195	182	112	172
KM25/6	7,5	2900		112M	53	336	539	250	322	173	140	140	12	483	169	240	12	195	182	112	172

Characteristics KM21-KM25

50 Hz

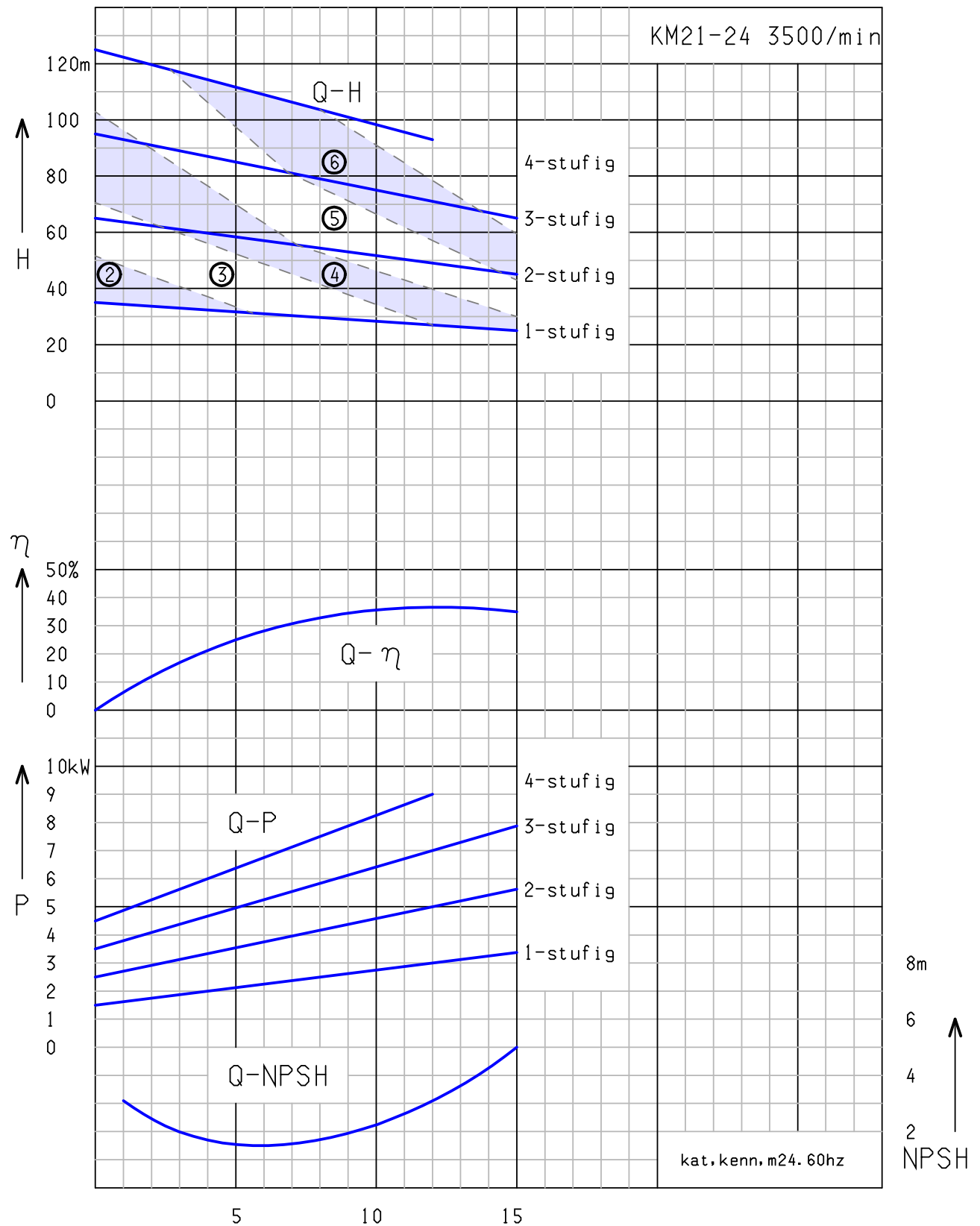


- ② KM2.../2 – 2,2 kW ③ KM2.../3 – 3,0 kW
④ KM2.../4 – 4,0 kW ⑤ KM2.../5 – 5,5 kW
⑥ KM2.../6 – 7,5 kW

liquid: water 20°C

Characteristics KM21-KM24

60 Hz



- ② KM2.../2 – 2,2 kW ③ KM2.../3 – 3,0 kW
④ KM2.../4 – 4,0 kW ⑤ KM2.../5 – 5,5 kW
⑥ KM2.../6 – 7,5 kW

$\text{m}^3/\text{h} \rightarrow Q$ liquid: water 20°C

Hygienic / Aseptic multistage non self-priming – KM3



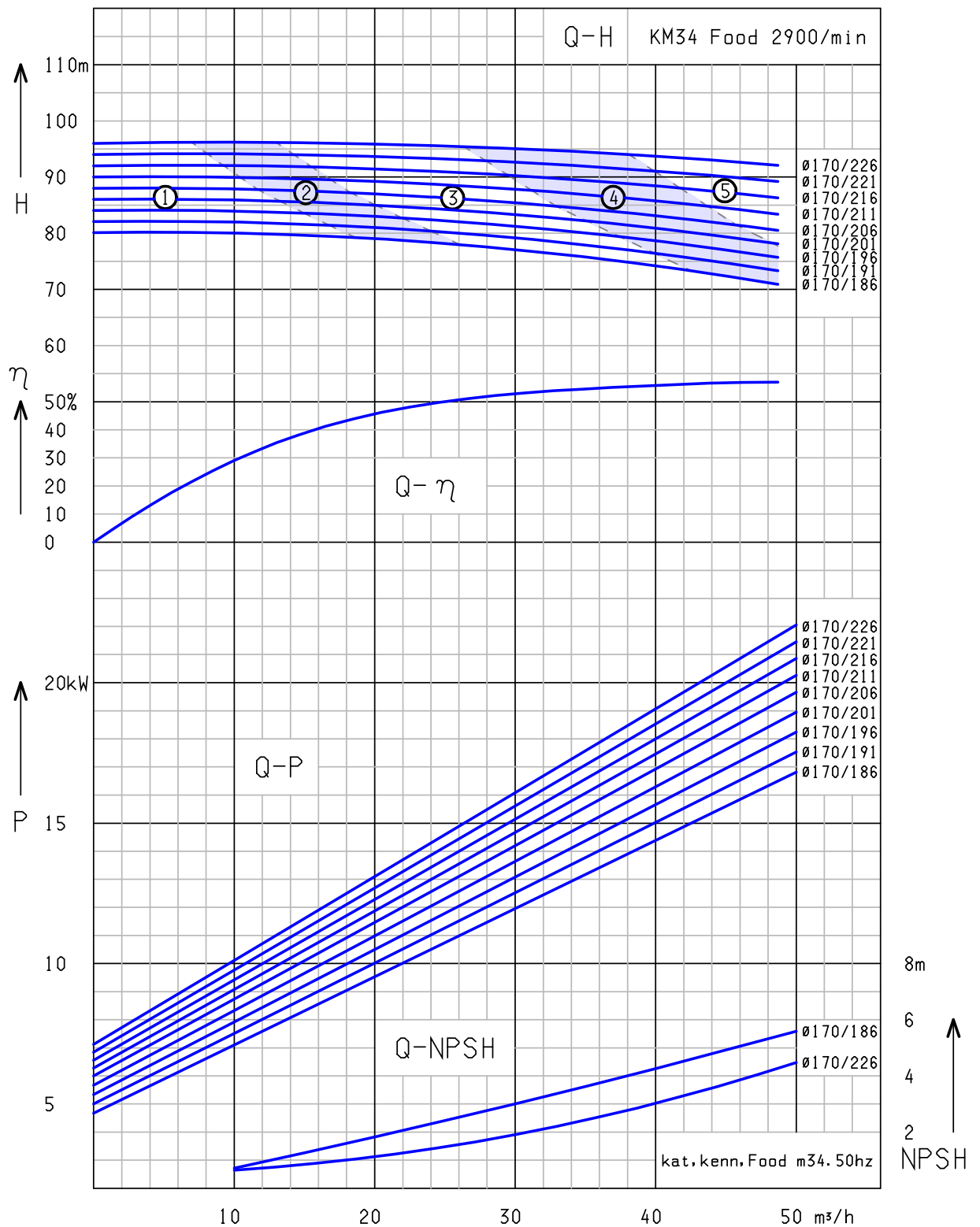
Design CV

... for the brewery, beverage and pharmaceutical industry

Design	Forged thick-walled CrNiMo steel volute casing, forged CrNiMo stainless steel casing cover, open/semi-open CrNiMo stainless steel impeller on a strong dimensioned stub shaft, sturdy quick-release clamp ring with hygienic chambered O-Ring seal	
Construction arrangements	A ... on adjustable stainless steel machine feet and with stainless steel motor cover B ... on adjustable stainless steel machine feet C ... motor foot CV ... vertical design D ... on stainless steel foot DV ... on stainless steel foot incl. stainless steel motor cover	
Materials	All parts in contact with product correspond to the materials AISI 316L (1.4404, 1.4435, 1.4581), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Adjusted self cleaning and self rinsing single or double mechanical seal with uniform shaft diameter of 25mm for aseptic applications and with material combinations depending on product	
Parameter	◆ flow rate : max. 45.000 l/h (50 Hz) ◆ discharge head : max. 10,5 bar (50 Hz) ◆ motor power : max. 30,0 kW ◆ working temperature : max. 130°C ◆ operating pressure : 16 bar	
Motor	IEC-standard motor IP55 hoseproof and with cold inducters, NEMA-standard motor on request	
Optional features	◆ internal frequency converter FCM375 ◆ motor IP65 ◆ trolley with breaker and cable ◆ alternative paint for motor ◆ pump head heating-/cooling-jacket ◆ ex-proof T3/T4 ◆ Produktberührt komplett 1.4435 ◆ pole-changing motor	
Connections	Connection in diameters from DN50 up to DN80 or 2" up to 3" according to the following standards: IDF, DIN, clamp, RJT, SMS, small flanges (other on request)	

Characteristics KM34 Food

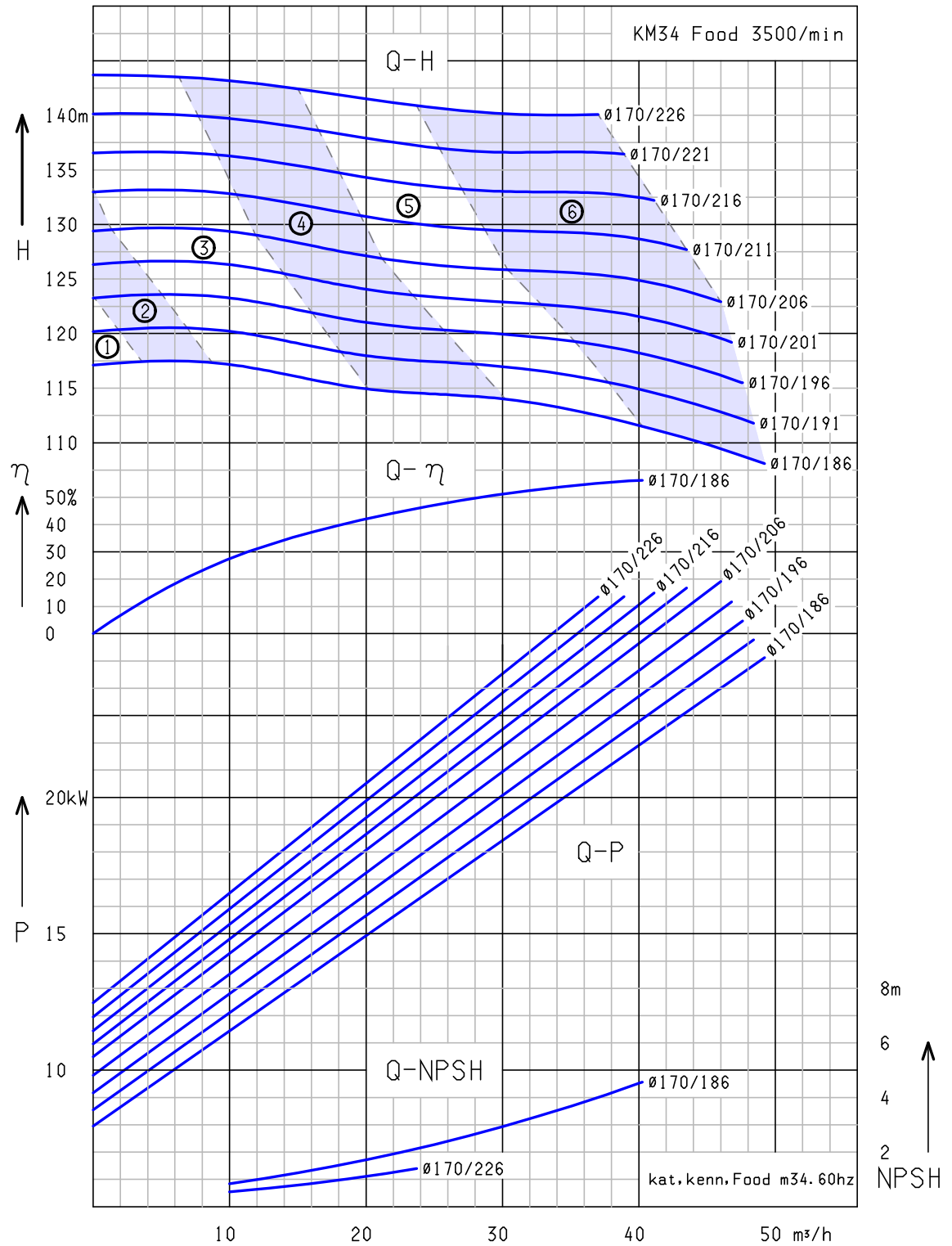
50 Hz



- ① KM34/1 – 9,2 kW ② KM34/2 – 11,0 kW
③ KM34/3 – 15,0 kW ④ KM34/4 – 18,5 kW
⑤ KM34/5 – 22,0 kW

Characteristics KM34 Food

60 Hz



- ① KM34/1 – 9,2 kW ② KM34/2 – 11,0 kW
 ③ KM34/3 – 15,0 kW ④ KM34/4 – 18,5 kW
 ⑤ KM34/5 – 22,0 kW ⑥ KM34/6 – 30,0 kW

Hygienic / Aseptic self-priming – S

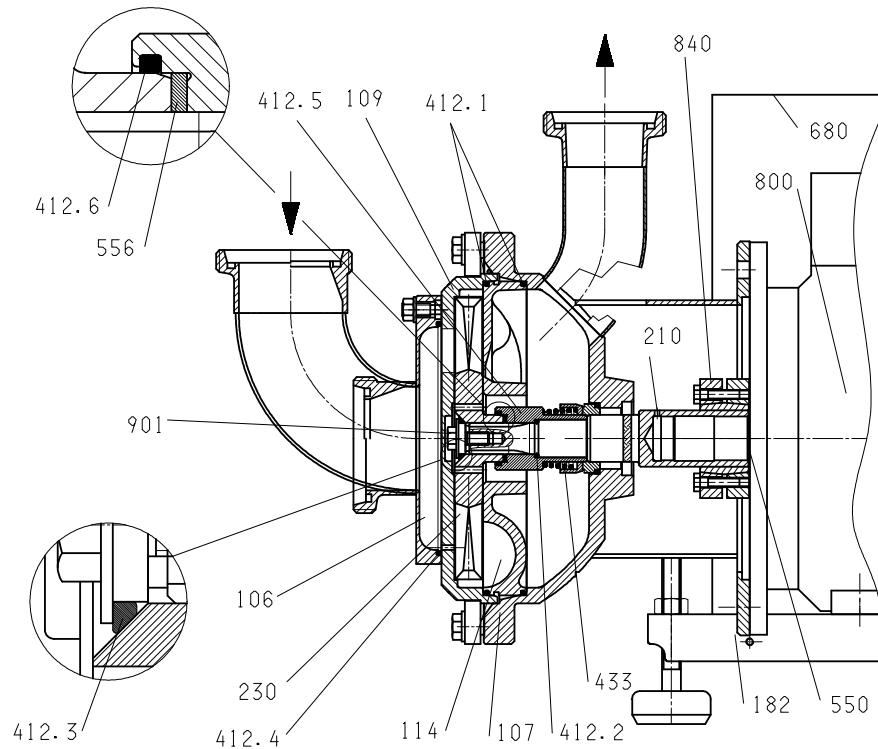


Design DV

... for the brewery, beverage and pharmaceutical industry

Design	Suction and pressure casing made of forged, thick-walled stainless steel, channel wall inserts and impeller made of investment-cast stainless steel	
Construction arrangements	A ... on adjustable stainless steel machine feet, stainless steel motor cover B ... on adjustable stainless steel machine feet C ... on motor foot D ... on stainless steel foot DV ... on stainless steel foot incl. stainless steel motor cover	
Materials	All parts in contact with product correspond to the materials, AISI 316L (1.4404) or AISI 304 (1.4301), stainless steel motor lantern, various process seal materials to suit application	
Shaft seal	Depending on the application	
Parameter	◆ flow rate : max. 40.000 l/h (50 Hz) ◆ discharge head : max. 3,0 bar (50 Hz) ◆ motor power : max. 11 kW ◆ working temperature : max. 90°C ◆ operating pressure : 10 bar	
Optional features	◆ trolley with breaker and cable ◆ vertical or central suction connection ◆ ex-proof T3/T4 ◆ emptying valve	◆ pole-changing motor ◆ motor IP65 ◆ alternative paint for motor
Connections	Connection in diameters from DN40 up to DN80 or 2" up to 3" according to the following standards: DIN, IDF, RJT, clamp, SMS, small flanges (other on request)	

section S

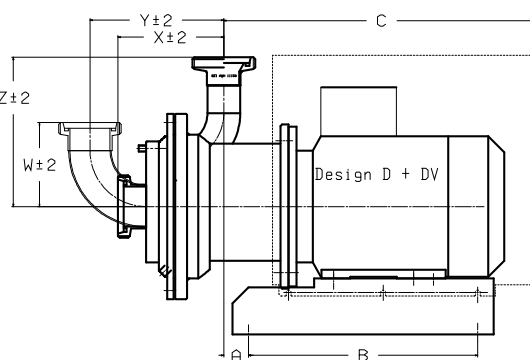
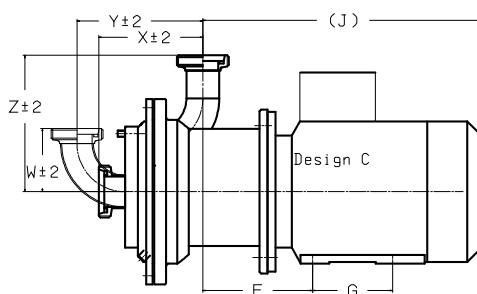
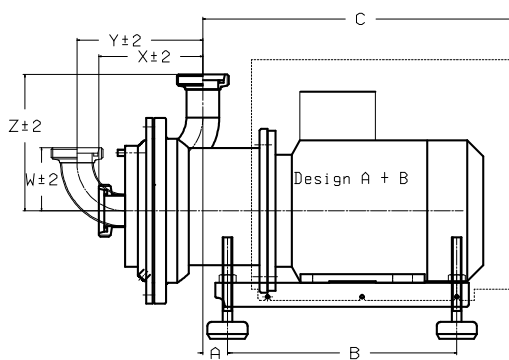


Technical changes reserved!
10 / 2015

numeral	component
106	suction casing (milling part)
107	pressure casing (intensive against hammer power)
109	suction part (milling part)
182	base frame (height-adjustable machine feet of stainless steel)
210	shaft (shaft of stainless steel)
230	star-impeller (investment cast)
412	O-Ring (fully flushed, hygienic O-Rings in EPDM, NBR, FKM, ..)
433	mechanical seal (single mechanical seal in various versions and material combinations, quench possible)
550	supporting disc
556	adjusting disc (adjust the impeller)
680	enclosure (stainless steel cover)
800	IEC-standard motor
840	shrink disc (shaft fixing for the motor)
901	star-impeller fixing screw

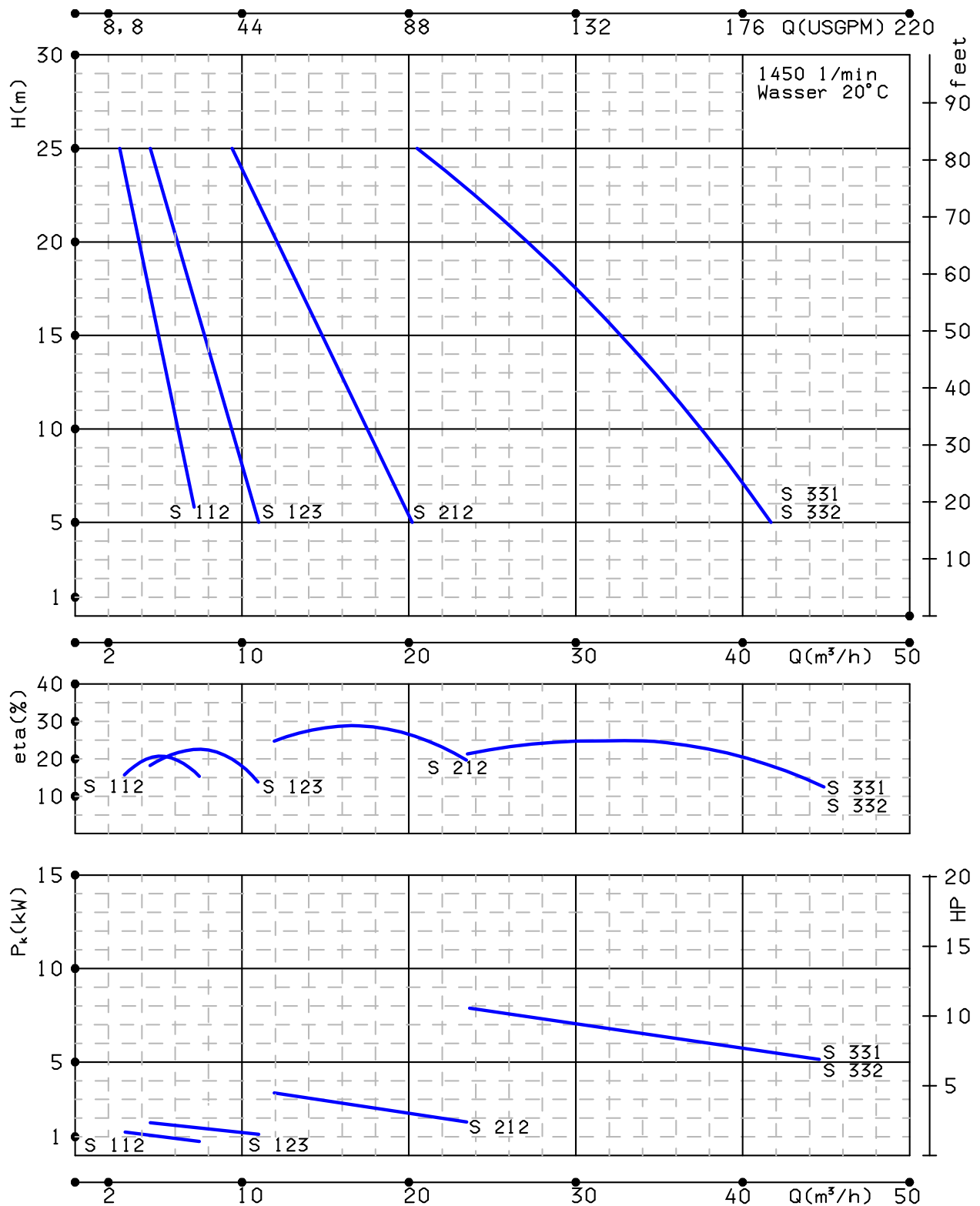
Dimensions S / Connections acc. to DIN 11851

Type	S112	S123	S212	S331
Weights (kg)	Design A+DV	48	73	102
	Design B+D	46	60	97
	Design C	43	57	64
kW	1,5	2,2	4,0	7,5
rpm 50Hz	1450	1450	1450	1450
Motor	IE2	090L	100L	112M
	IE3			132M
A	31	34	42	65
B	286	336	336	400
C	441	520	528	645
D	210	250	250	280
E	272	322	322	363
F	137	154	162	204
G	125	140	140	178
H	140	160	190	216
I	9	12	12	12
(J)	360	394	433	555
(K)	146	153	169	193
L	200	240	240	270
M	9	12	12	12
N	159	207	195	249
P±20	160	170	182	202
R	90	100	112	132
S	160	160	172	200
W DNS1	93	93	105	135
X DNS1	130	133	155	183
Y DNS1	157	160	190	228
W DNS2	95	95	110	135
X DNS2	132	132	160	183
Y DNS2	157	160	190	228
Z DND1	190	190	208	236
Z DND2	192	192	213	236
DNS1	40	40	50	65
DNS2	50	50	65	80
DND1	40	40	50	65
DND2	50	50	65	80



Characteristics S

50 Hz



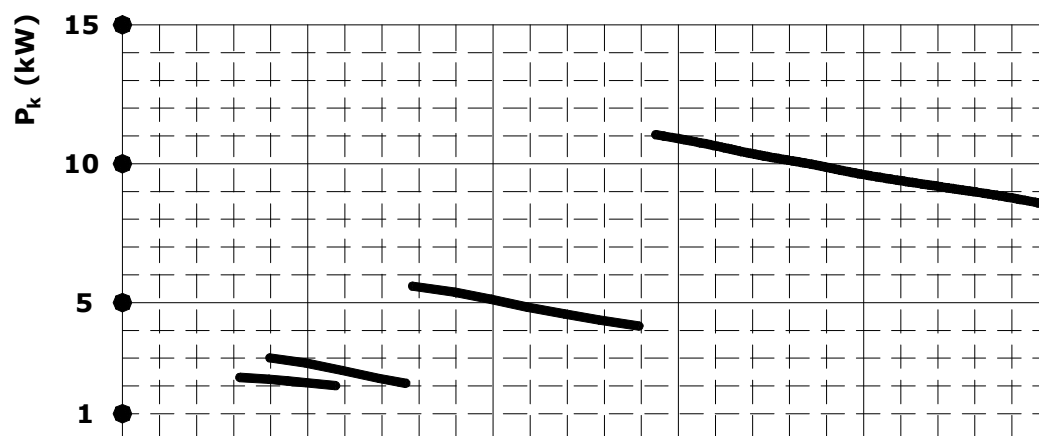
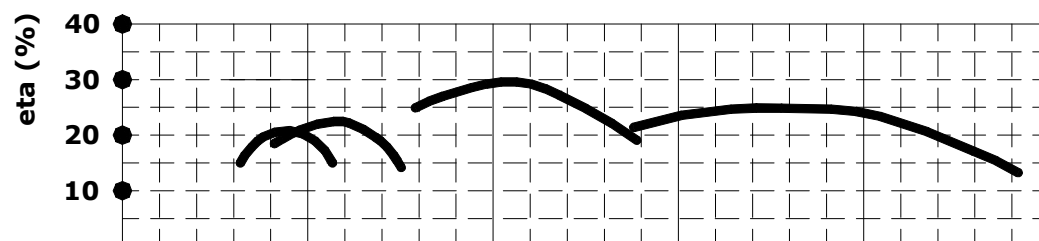
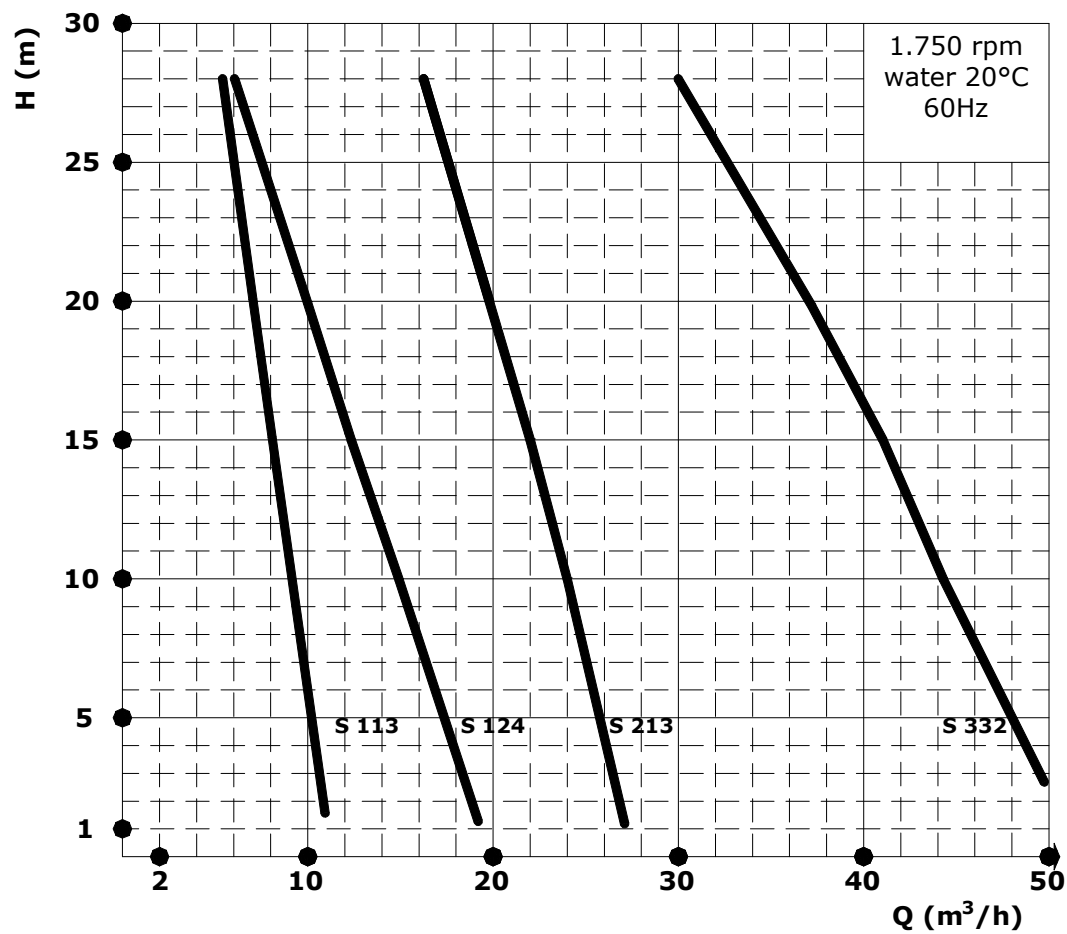
Technical changes reserved!

liquid: water 20°C

S112 – 1,5 kW **S123** – 2,2 kW **S212** – 4,0 kW
S331 – 7,5 kW **S332** – 11,0 kW

Characteristics S

60 Hz



S113 – 2,2 kW S124 – 3,0 kW
S213 – 5,5 kW S332 – 11,0 kW

liquid: water 20°C

pump **complete** in stainless steel, no varnished parts

standard motor cover in stainless steel, protection against jet

cover easily removable

connections in various nominal diameters and designs

clamping ring:
pressure proof clamping ring
guarantee a disassembly
without any difficulties, pipes
can remain mounted

**stainless steel
machine feet**
safe hold

volute casing guarantee
optimum efficiency

Centrifugal pump with integrated frequency converter

gentle pumping

- no choking in the pressure pipe
- stepless flow control
- no heat transfer into the product
- flow control in case of changing viscosities
- low shearing forces
- exchange to multistage pumps

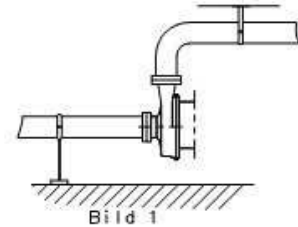
cost saving

- elimination of FC in control panel
- with protected motor cable
- integrated radio screened filter
- elimination of butterfly valves
- optimum efficiency by adaption on existing parameters

Installation criteria:

1.

The pump is in the pipeline system fixed point!
The pipes are stress free adapt to the suction and the discharge of the pump.
The pump must be disassembled without coercion from the pipeline (1).
The pump must stand firmly on their feet and is fixedly mounted on a foundation.

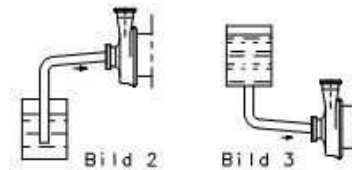


2.

The suction line must be checked for tightness because entrained air can decrease the flow.

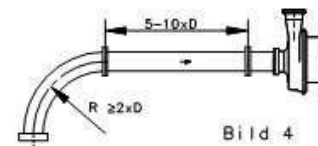
3.

A suction line is constantly puts upward toward the pump (2). A supply line must fall from the tank to the pump (3).



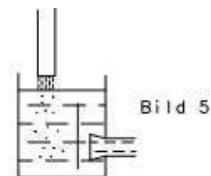
4.

The suction line should be as short as possible (4).
Pipe elbows are not installed immediately upstream of the pump.



5.

In the suction line no shutoff should be installed if possible, is it still necessary, then the obturator may be used under any circumstances for regulating the flow rate.

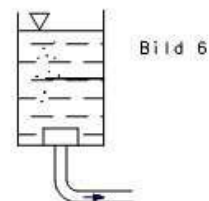


6.

The nominal diameter of the pressure pipe should be equal to or less than the nominal diameter of the suction line

7.

Shut-off valves for regulating the flow are to be located behind the pressure port.



8.

When connecting the pump to tank the risk of air suction through appropriate measures (grid, shielding) is to prevent (5, 6).

9.

Especially with hot liquids the thermal expansion of the pipeline is to be noted (Tab. 1).

Δt [°C]	30	50	60	70	80	90
mm/10m	4,8	8,0	9,6	11,2	12,8	14,4

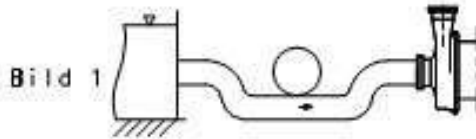
Tab. 1

Linear expansion on steel pipes

Avoid installing in the following examples as possible:

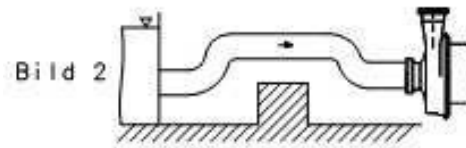
1.

U-shaped pipes to the pump should be avoided.
They lead to undesirable deposits (1) or to bubble wraps (2).



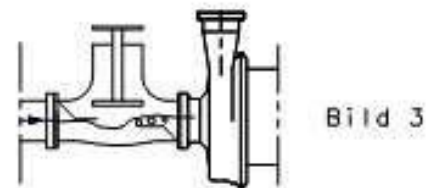
2.

Valves immediately before the pump inlet should have the same flow cross-section as the suction line.
The throttling of the valve could have resulted in flow-cavitation (3).



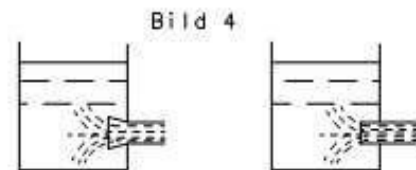
3.

The elastic installation of a pump on rubber pads as vibration-isolation should be avoided.



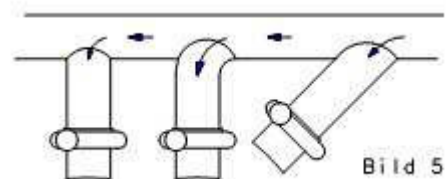
4.

Drain pipes from tanks should have a funnel-shaped inlet area. A straight inlet results in a flow restriction (4).

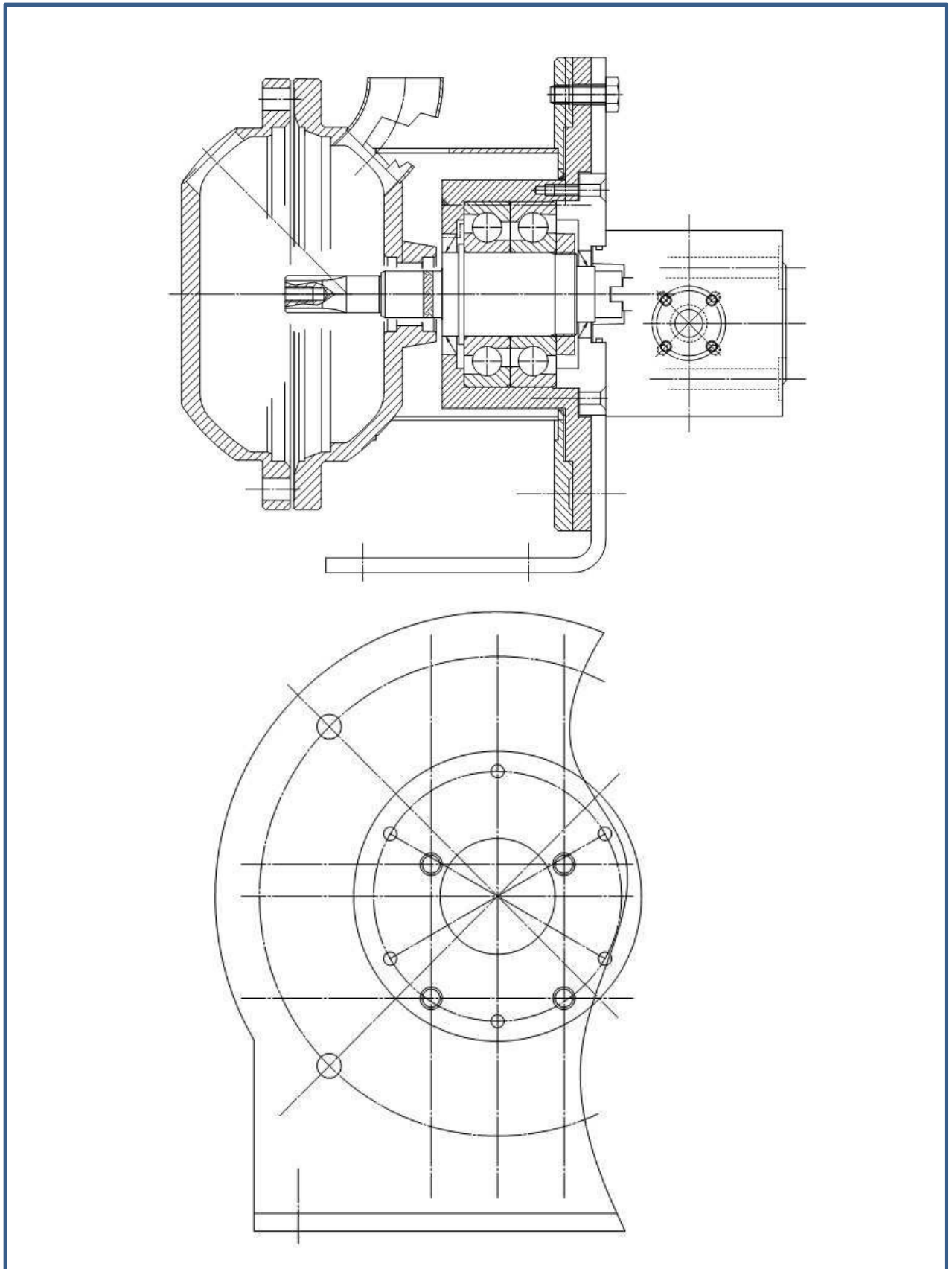


5.

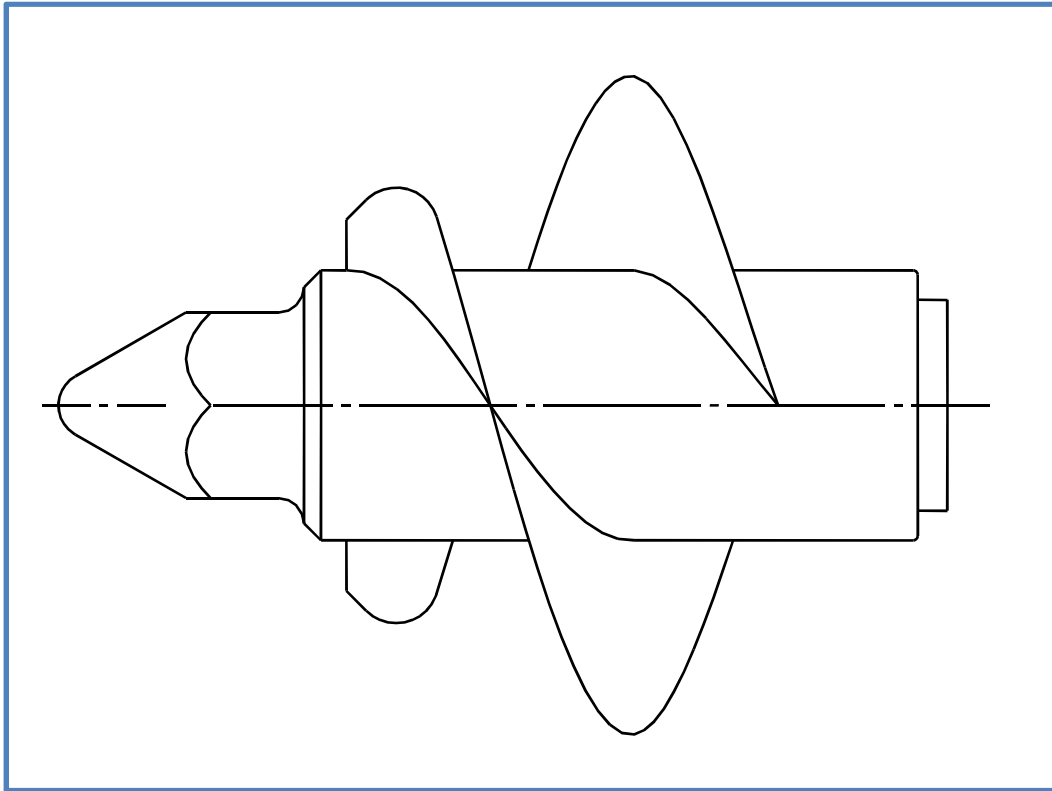
T-pieces, close elbows or bends immediately at the suction of the pump are to avoid (5).
Here is also the risk of flow-cavitation available.



Stainless steel centrifugal pump with hydraulic drive



Inducer



- inducers are used in risk of cavitation
- they increase the pressure in the inlet region of the impeller
- the feed height of hot liquids can be kept low
- cavitation noise can be reduced or avoided
- heights of plants can be minimized

What is cavitation?



Definition:

Cavitation is defined as the formation and sudden collapse of vapor-filled cavities in flowing liquids.

How and where cavitation occurs?



Steam bubbles are formed at locations where the pressure on the belonging to the temperature of the liquid evaporation pressure drops. In centrifugal pumps, pressure reduction takes place in the suction line, danger area here is the impeller inlet. Resulting cavities are entrained by the liquid flow and get into areas of higher pressure, where they condense abruptly and coincide.

What are the consequences of cavitation?



- Decrease in flow characteristics and the efficiency of the pump tot he complete tearing of the flow rate
- Increase noise to loud rattle
- Rough running
- Damage to the impeller and other internal parts of the pump

Cavitation endangered areas?



- Pumping off wort from whirlpool
- CIP-feed
- Vacuum evaporations

How can cavitation be prevented?



- Quick and correctly sized suction line
- Large suction head at the pump
- Strict compliance with the temperature regime (see chapter NPSH)

What is NPSH?



Definition:

The net energy level in the inlet cross-section of the pump is called NPSH. (**Net Positive Suction Head**)
The net energy level is the difference between energy level and the evaporation pressure.

What is NPSH_{erf}?



.. is the minimum required for a pump with certain parameters and certain pumped liquid on the restriction of the cavitation energy level at the inlet port of the pump, also called NPSH of the pump

What is NPSH_{vorh}?



.. is the existing system of the net energy level at the inlet port of the pump. The NPSH of the system is calculated:

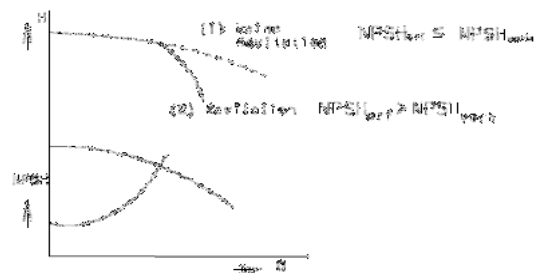
$$NPSH_{\text{vorh}} = 10^5 \cdot \frac{p_b + p_e - p_D}{\rho \cdot g} + \frac{v^2}{2g} + z_a - H_{vs} \quad [\text{m}]$$

p_b	(absolute) atmospheric pressure	v^2	speed in the tank
p_D	(absolute) steam pressure	H_{vs}	Loss of height in suction line
p_e	excess/under pressure	z_a	difference in altitude between the suction side water level and the middle of the inlet cross-section

How can cavitation be avoided?



$$NPSH_{\text{erf}} \leq NPSH_{\text{vorh}}$$



Maximum place of installation height of the pump?



$$z_e \geq NPSH_{\text{erf}} + H_{vs} - \frac{p_e + p_b - p_D}{\rho \cdot g} - \frac{v^2}{2g}$$

If there is a positive value z_e the pump must be at least the amount of z_e be positioned below the entrance-side liquid level.

What does quench mean?



Quench is applying the atmospheric side surfaces of a mechanical seal with an external medium with atmospheric pressure. The quench is used when a single-acting mechanical seal is not necessary or not is only partially functional or a double seal with pressurization.

What causes quench?

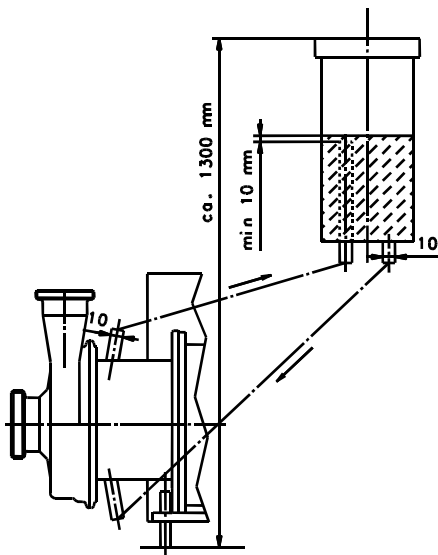


Liquid quench:

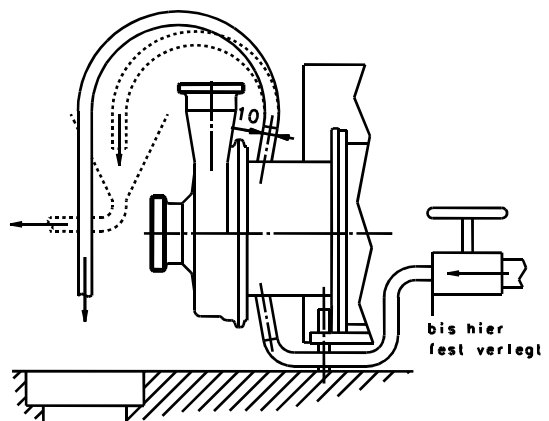
- absorption and removal of leakage
- lubrication and cooling
- dry-running protection
- air exclusion -> air exclusion -> contact of the leakage with atmosphere is prevented
- lubricating-film stabilisation
- aseptic locks with condensate

Steam quench:

- heating -> prevent solidification of the leakage
- air exclusion and leakage dissipation
- aseptic block

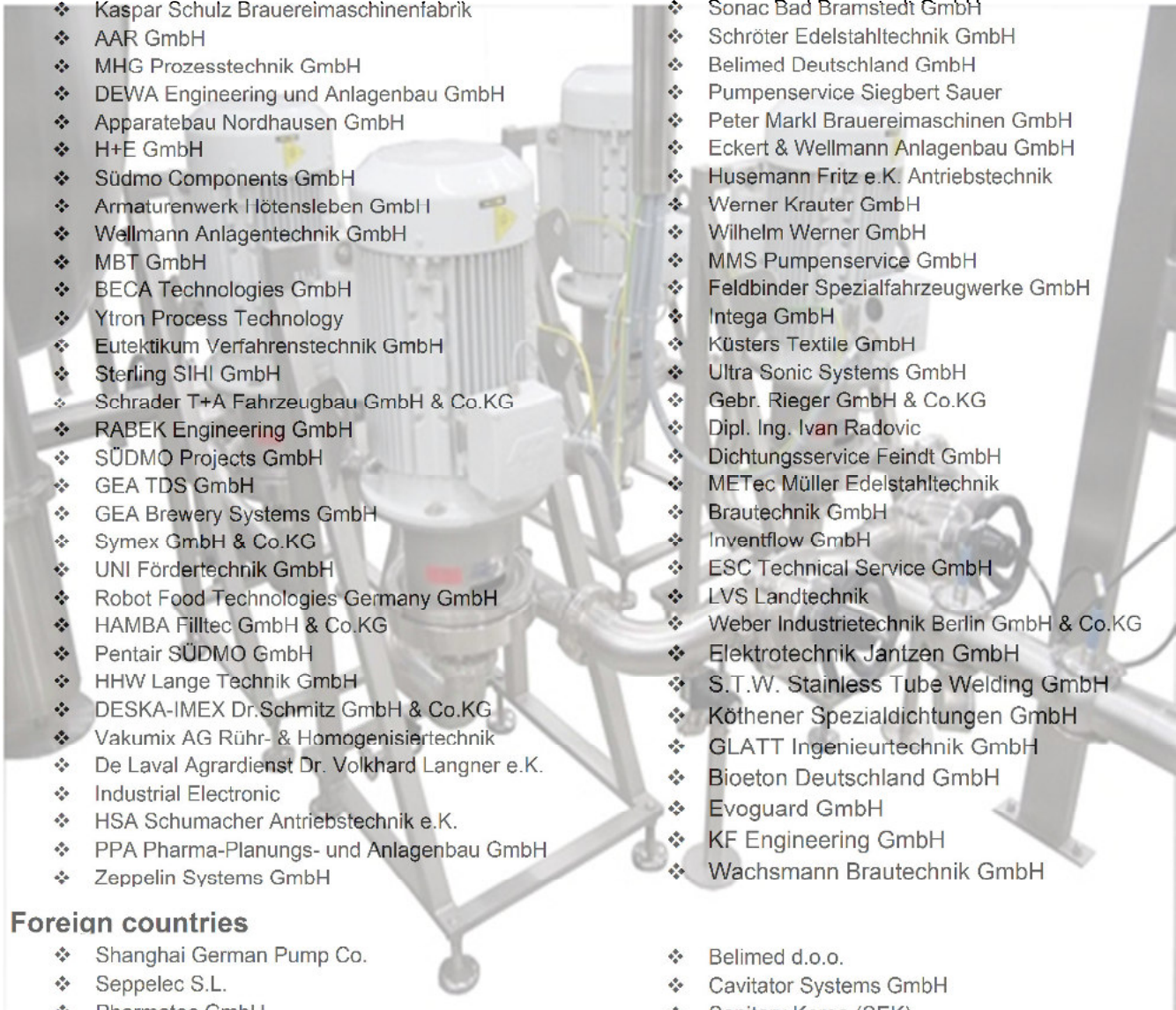


Example 1:
Quench from high center tank, circulation of the liquid through thermosyphon



Example 2:
Foreign liquid to quench;
transfer to an external system

Germanv

- 
- ❖ Schröder Maschinebau KG
 - ❖ Belimed Technik GmbH
 - ❖ Letzner Pharmawasseraufbereitung GmbH
 - ❖ Carl GmbH
 - ❖ Kyffhäuser Service- und Anlagentechnik GmbH
 - ❖ GEA Diessel GmbH
 - ❖ MTA GmbH
 - ❖ LP Project Service GmbH
 - ❖ HST Maschinenbau GmbH
 - ❖ Kaspar Schulz Brauereimaschinenfabrik
 - ❖ AAR GmbH
 - ❖ MHG Prozesstechnik GmbH
 - ❖ DEWA Engineering und Anlagenbau GmbH
 - ❖ Apparatebau Nordhausen GmbH
 - ❖ H+E GmbH
 - ❖ Südmo Components GmbH
 - ❖ Armaturenwerk Hötensleben GmbH
 - ❖ Wellmann Anlagentechnik GmbH
 - ❖ MBT GmbH
 - ❖ BECA Technologies GmbH
 - ❖ Ytron Process Technology
 - ❖ Eutektikum Verfahrenstechnik GmbH
 - ❖ Sterling SIHI GmbH
 - ❖ Schrader T+A Fahrzeugbau GmbH & Co.KG
 - ❖ RABEK Engineering GmbH
 - ❖ SÜDMO Projects GmbH
 - ❖ GEA TDS GmbH
 - ❖ GEA Brewery Systems GmbH
 - ❖ Symex GmbH & Co.KG
 - ❖ UNI Fördertechnik GmbH
 - ❖ Robot Food Technologies Germany GmbH
 - ❖ HAMBA Filltec GmbH & Co.KG
 - ❖ Pentair SÜDMO GmbH
 - ❖ HHW Lange Technik GmbH
 - ❖ DESKA-IMEX Dr.Schmitz GmbH & Co.KG
 - ❖ Vakumix AG Rühr- & Homogenisierertechnik
 - ❖ De Laval Agrardienst Dr. Volkhard Langner e.K.
 - ❖ Industrial Electronic
 - ❖ HSA Schumacher Antriebstechnik e.K.
 - ❖ PPA Pharma-Planungs- und Anlagenbau GmbH
 - ❖ Zeppelin Systems GmbH
 - ❖ Starch and Sweetener GmbH
 - ❖ Ingenieure Willy Wandrach GmbH
 - ❖ Kyffhäuser Maschinenfabrik Artern GmbH
 - ❖ BdB GmbH
 - ❖ Concept GMP Engineering GmbH & Co.KG
 - ❖ BWT Pharma und Biotech GmbH
 - ❖ Kleinschmidt Lebensmitteltechnik
 - ❖ PROKOPH-Elektro-MSR-Technik
 - ❖ Planttech Engineering GmbH
 - ❖ Sonac Bad Bramstedt GmbH
 - ❖ Schröder Edelstahltechnik GmbH
 - ❖ Belimed Deutschland GmbH
 - ❖ Pumpenservice Siegbert Sauer
 - ❖ Peter Markl Brauereimaschinen GmbH
 - ❖ Eckert & Wellmann Anlagenbau GmbH
 - ❖ Husemann Fritz e.K. Antriebstechnik
 - ❖ Werner Krauter GmbH
 - ❖ Wilhelm Werner GmbH
 - ❖ MMS Pumpenservice GmbH
 - ❖ Feldbinder Spezialfahrzeugwerke GmbH
 - ❖ Intega GmbH
 - ❖ Küsters Textile GmbH
 - ❖ Ultra Sonic Systems GmbH
 - ❖ Gebr. Rieger GmbH & Co.KG
 - ❖ Dipl. Ing. Ivan Radovic
 - ❖ Dichtungsservice Feindt GmbH
 - ❖ METec Müller Edelstahltechnik
 - ❖ Brautechnik GmbH
 - ❖ Inventflow GmbH
 - ❖ ESC Technical Service GmbH
 - ❖ LVS Landtechnik
 - ❖ Weber Industrietechnik Berlin GmbH & Co.KG
 - ❖ Elektrotechnik Jantzen GmbH
 - ❖ S.T.W. Stainless Tube Welding GmbH
 - ❖ Köthener Spezialdichtungen GmbH
 - ❖ GLATT Ingenieurtechnik GmbH
 - ❖ Bioeton Deutschland GmbH
 - ❖ Evoguard GmbH
 - ❖ KF Engineering GmbH
 - ❖ Wachsmann Brautechnik GmbH

Foreign countries

- ❖ Shanghai German Pump Co.
- ❖ Sepelec S.L.
- ❖ Pharmatec GmbH
- ❖ Neumo Egmo Spain S.L.
- ❖ Alfred Gruber Gesellschaft m.b.H.
- ❖ Dongjin Energy Systems Co.
- ❖ PN The Process Network do Brasil Ltda.
- ❖ ZETA Biopharma GmbH
- ❖ Sterling Fluid Systems (Austria) GmbH
- ❖ O.Salm & Co. Ges. m.b.H.
- ❖ Neumo Turkey
- ❖ Recinox Montagens
- ❖ HännyTec AG
- ❖ Elotes Engineering Industrial Service Ltd. Co.
- ❖ AT Pomp Sp. z o.o.
- ❖ Belimed d.o.o.
- ❖ Cavitator Systems GmbH
- ❖ Sanitary Korea (SEK)
- ❖ Unitec NV
- ❖ Bilfinger Industrietechnik Salzburg GmbH
- ❖ REGOM Instruments s.r.o.
- ❖ Pentair Water Process Technology BV
- ❖ MEEC
- ❖ Pharmalab India
- ❖ Armatec AS
- ❖ Edelflex S.A.
- ❖ Trade Star
- ❖ EGMO Ltd.
- ❖ F.B.I. (Thailand) Co. Ltd.
- ❖ Flow Technology

Germany

- ❖ Baltic Distillery GmbH
- ❖ Erzquellbrauerei Siegtal Haas GmbH & Co.KG
- ❖ Hammerschmiede OHG
- ❖ Frankfurter Brauhaus GmbH
- ❖ Aspera Brauerei Riese GmbH
- ❖ Privatbrauerei Waldhaus Joh. Schmid GmbH
- ❖ Brauerei Gotha ZNL Oettinger Brauerei
- ❖ Braumanufaktur Forsthaus Templin
- ❖ Schloßberg Spirituosen
- ❖ Radeberger Gruppe KG
- ❖ Vormann Brauerei
- ❖ Lautergold Paul Schubert GmbH
- ❖ Wein- und Sektkellerei Ostrau
- ❖ Brauerei Ustersbach Adolf Schmid KG
- ❖ Privatbrauerei am Rollberg GmbH
- ❖ Karls Brauhaus
- ❖ Privatbrauerei Schwerter Meißen
- ❖ Alternburger Brauerei
- ❖ Berliner Pilsner Brauerei
- ❖ Feldschlößchen AG
- ❖ Landskron Brauerei
- ❖ Leipziger Brauhaus
- ❖ Meininger Privatbrauerei
- ❖ Vereinsbrauerei Apolda
- ❖ Brauhaus Preußen Pils
- ❖ Brauerei Schumacher GmbH
- ❖ Martini Brauerei
- ❖ Sternquell Brauerei

Foreign countries

- ❖ Malka Brewery
- ❖ Brauerei Fohrenburg GmbH & Co.KG
- ❖ Steam Whistle Brewing The Roundhouse
- ❖ Brauerei Gusswerk GmbH
- ❖ San Miguel Brewery Vietnam Ltd.
- ❖ Aruba Brewery
- ❖ Amstar Brewery
- ❖ Astika AD, Haskovo
- ❖ Brahma
- ❖ Bianca Interbrew
- ❖ Brouwarij Haacht
- ❖ CCU Santa Fe
- ❖ Cervecerias Dorada y Cusco
- ❖ Cerveceria Paraguayo S.A.
- ❖ Cerveria Taquina
- ❖ El Gouna Beverages Co.
- ❖ INTERBREW Belgium
- ❖ Interbrew Proberci S.A.
- ❖ Jagodinska Pivara
- ❖ Kamenitza AD Plovdiv
- ❖ Klein Brewery
- ❖ Liyang Tianmuhu Brewery
- ❖ Backpacket Brewing
- ❖ McCullan Brewery Sri Lanka
- ❖ Nikolaev Yanter Brewery
- ❖ Olivaria Brewery Minsk
- ❖ Orval Brewery
- ❖ Österreichische Brau AG
- ❖ Pilsner Urquell
- ❖ Riedel Drankenindustrie
- ❖ Zhejiang Shiliang Brewery

Germany

- ❖ Chemiewerk Bad Köstritz
- ❖ Anklam Extrakt GmbH
- ❖ Procter & Gamble Manufacturing GmbH
- ❖ Fresenius Kabi Deutschland GmbH
- ❖ Microcellulose Weißenborn GmbH & Co.KG
- ❖ Merck KGaA
- ❖ Pharma Wernigerode GmbH
- ❖ Ecronova Polymer GmbH
- ❖ Dr. Franz Köhler Chemie GmbH
- ❖ Netzsch Feinmahltechnik GmbH
- ❖ Serumwerk Bernburg AG
- ❖ BASF Personal Care and Nutrition GmbH
- ❖ Rhein Biotech
- ❖ Schwarzkopf & Henkel Produktion Europe
- ❖ Evonik Fibres GmbH
- ❖ Chrion Behring GmbH
- ❖ Ciba Vision
- ❖ Initial Textil Service GmbH
- ❖ Leipziger Arzneimittelwerk
- ❖ Beiersdorf Manufacturing Waldheim GmbH
- ❖ J.Rettenmaier & Söhne GmbH & Co.KG
- ❖ Engelhard Arzneimittel GmbH & Co.KG
- ❖ Berlin Chemie AG
- ❖ Amino GmbH
- ❖ Dr. Gerhard Mann chem.-pharm. Fabrik GmbH
- ❖ Steigerwald Arzneimittelwerk GmbH
- ❖ Sanofi-Aventis Deutschland GmbH
- ❖ Oncotec Pharma
- ❖ Boehringer Ingelheim GmbH & Co.KG
- ❖ Nordmark Arzneimittel GmbH & Co.KG
- ❖ Azopharma GmbH
- ❖ Bayer AG
- ❖ Membrana GmbH
- ❖ Nattermann GmbH
- ❖ R&P Scherer
- ❖ Sächsisches Serumwerk Dresden
- ❖ Schwenk Baustoffwerke

Foreign countries

- ❖ EVER Neuro Pharma GmbH
- ❖ Pharmed India Pvt. Ltd.
- ❖ Orion Corporation
- ❖ ARABIO
- ❖ Nobel Ilac Sanayi ve Ticaret A.S.
- ❖ Takeda Austria GmbH
- ❖ Novartis Pharma AG
- ❖ Roche Diagnostics GmbH
- ❖ Synthon BV
- ❖ Tianjin Tasly Pharmaceutical group
- ❖ Gulf Pharmaceutical Industries
- ❖ Baxter Innovations GmbH
- ❖ GEBRO Pharma GmbH
- ❖ GlaxoSmithKline Biologicals
- ❖ Claro Products GmbH
- ❖ Crown Labs Las Vegas
- ❖ EBEWE Pharma
- ❖ Sero Laboratories
- ❖ Solvay
- ❖ Lonza s.r.o.

Germany

- ❖ Bayerische Milchindustrie eG
- ❖ Milchwerke Oberfranken West eG
- ❖ DMK Deutsches Milchkontor GmbH
- ❖ Fraunhofer IME
- ❖ Frischli Milchwerke GmbH
- ❖ Meierei-Genossenschaft
- ❖ Milch und Zuchtfarm GmbH Nessa
- ❖ Sächsische Milcherzeugergenossenschaft eG
- ❖ Fude + Serrahn Milchprodukte GmbH & Co.KG
- ❖ Herzgut Landmolkerei eG
- ❖ Allerstedter Käserei H.-J. Poelmeyer GmbH
- ❖ Dittersdorfer Milch GmbH
- ❖ Schwarzwaldmilch GmbH Offenburg
- ❖ Milchwerke Ingolstadt Thalmässing eG
- ❖ Molkerei Niesky GmbH
- ❖ Schwarzwaldmilch GmbH Freiburg
- ❖ Hemme Milch GmbH & Co.KG
- ❖ Molkerei Prenzlau
- ❖ Molkerei Rostock
- ❖ Molkerei Schmachtenhagen
- ❖ Molkerei Wiedergeltingen
- ❖ Synanon GmbH
- ❖ Thüringer Milchwerke
- ❖ Ziegenkäserei Falkenhain
- ❖ Agra – Milch eG Frohndorf/Orlishausen
- ❖ Rieckens Landmilch GmbH
- ❖ Breitenburger Milchzentrale eG
- ❖ Albhof Theo Schömbucher
- ❖ Ökodorf Brodowin
- ❖ Milchverwertung Ostallgäu eG
- ❖ Breitung Käserei
- ❖ Bützower Molkerei
- ❖ Cambell's Germany
- ❖ Hansano Molkerei
- ❖ Harzmolkerei Wernigerode
- ❖ Heinrichtaler Milchwerke
- ❖ Hipp GmbH
- ❖ Hochland AG
- ❖ Hofkäserei Fachdorf
- ❖ Inselmilch Rügen
- ❖ Ausbildungsmolkerei Oranienburg
- ❖ Life Food
- ❖ Meggle GmbH
- ❖ Molkerei Lindenberg
- ❖ Permalatmolkerei Gransee
- ❖ Nestlé Biessenhofen
- ❖ Onken GmbH
- ❖ Ziegenkäserei Großbraunshain

Foreign countries

- ❖ Feinkäserei Bantel & Möggers
- ❖ Yeo Valley Farms
- ❖ Corporacion Alimentaria
- ❖ Molkerei Aschrad
- ❖ Molkerei Brjansk
- ❖ Molkerei Gomel
- ❖ Molkerei Minsk
- ❖ Molkerei Mogilew

Germany

- ❖ Dohrn & Timm GmbH & Co.KG
- ❖ Rheinsberger Preussenquelle GmbH
- ❖ Hassia Mineralquellen GmbH & Co.KG
- ❖ Salvus Mineralbrunnen
- ❖ Bell Flavours & Fragrances GmbH
- ❖ Apfelweinkelterei Herberth
- ❖ Aqua Römer GmbH
- ❖ Blaue Quellen Rhens
- ❖ Großkellerei Rötha
- ❖ Golschtal Kellerei
- ❖ Libehna Raguhn
- ❖ Mosterei Hohenseefeld
- ❖ Mosterei Satow
- ❖ Mosterei Apel
- ❖ Mosterei Breitbarth
- ❖ Mosterei Schulz
- ❖ Spreewälder Fruchtsäfte
- ❖ Teegut Mineralwasser
- ❖ Troy Aqua
- ❖ Lichtenauer Mineralquellen GmbH
- ❖ Fahner Frucht Handels- und Verarbeitungs GmbH
- ❖ Glockengold Fruchtsaft AG
- ❖ Max Wurstlich Fruchtsaftkellerei
- ❖ Hansa Heemann AG
- ❖ Coca-Cola (Halle-Saale/München/Weimar)
- ❖ Elmenhorster Fruchtsäfte
- ❖ Fruchtquell Dodow
- ❖ Haarmann & Reimer Holzminden
- ❖ Heil- und Mineralbrunnen Bad Lauchstädt
- ❖ Kellerei Burkhard
- ❖ Kellerei Biederman
- ❖ Mosterei Börner & Hermann
- ❖ Mosterei Kühne
- ❖ Mosterei Mehlhorn
- ❖ Mosterei Oertel
- ❖ Südthüringer Mineralbrunnen KG
- ❖ Süßmosterei Linke

Foreign countries

- ❖ Coca-Cola (Beijing, Xiamen, Chengdu, Kunming, Port Louis, Minsk, Kiew, Sevilla, Teneriffa, La Coruna, Malaga)
- ❖ Elmenhorster Fruchtsäfte
- ❖ JV – EL KOL Taschkent
- ❖ Pepsi-Cola (Cairo)