Submersible Pump in Discharge Tube

AmaCan P

AmaCan P 400 - 290
AmaCan P 500 - 325
AmaCan P 600 - 351
AmaCan P 700 - 471
AmaCan P 800 - 471
60 Hz

General Arrangement Drawings

Contents

Water Applications: Water Transport / Waste Water Transport, Flood Protection

Submersible Pump in Discharge Tubes

AmaCan P

Designation

Example: AmaCan PA3 400-290 / 15 6 UW G1 IE4

Table 1: Designation key

Code	Description	
AmaCan	Type series	
P	Impeller type	
	P	Propeller
A	Impeller variant	
	A	
3	Number of vanes	
400	Nominal diameter of the discharge tube [mm]	
290	Nominal impeller diameter [mm]	
15	Motor size	
6	Number of motor poles	
UW	Motor version	
	UT, UV	Three-phase asynchronous motor, non-explosion-proof
	XT, XV	Three-phase asynchronous motor, explosion-proof
	UW	Three-phase synchronous motor, non-explosion-proof
	XW	Three-phase synchronous motor, explosion-proof
G1	Material variant	
	G1	Gray cast iron, standard material variant
	G2	Gray cast iron, casing wear ring made of stainless steel
	G3	Gray cast iron with Zn anodes, shaft made of A 276 type 431 stainless steel
IE4	Motor efficiency classification[1]	
	-[2]	No efficiency classification
	IE3	Premium Efficiency
	IE4	Super Premium Efficiency

Selection information

Information for pump selection

The guaranteed point of submersible pumps in discharge tubes is measured at a head of 1.65 ft [0.5 m] above the motor. The documented characteristic curves refer to this data. This must be taken into account when calculating system losses. The indicated heads and performance data apply to pumped fluids with a density $\rho = 7.48\ \text{lbs/ft}^3$ [$1\ \text{kg/dm}^3$] and a kinematic viscosity ν of up to 20 mm^2/s.

- Adjust the power input to the density of the fluid handled: P_2 (required) = ρ [kg/dm^3] (fluid handled) × P_2 (documented)
- Select the operating point with the largest power input within an operating range. Select a motor size providing a power reserve to compensate the tolerances in the system characteristic / pump characteristic.

Table 2: Recommended motor power reserve[3]

P_2		Reserve		
[hp]	[kW]	Mains operation	With frequency inverter	
			Motor version	
			UV, XV, UT, XT	UW, XW
≤ 40	≤ 30	10 %	15 %	10 %
> 40	≤ 30	5 %	10 %	5 %

Intake chamber

Determine the minimum water level t_{1min} (diagram in general arrangement drawing):
The minimum water level t_{1min} is the water level required in the pump's suction chamber to ensure the following:

- The hydraulic system (impeller) is sufficiently submerged (shown in diagram depending on pump size).
- The pump does not draw in air-entraining vortices (shown in diagram depending on flow rate).
- The hydraulic system is free from cavitation (check against the $NPSH_{required}$ value indicated the technical literature). The following conditions must be met:
  - $NPSH_{available} > NPSH_{required}$ + safety margin
  - $NPSH_{available}$ = 33 ft [10.0 m] + (t_1 - t_3 - $h_7/2$)
  - Safety margin:
    up to Q_{opt} ⇒1.65 ft [0.5 m]
    larger than Q_{opt} ⇒ 3.3 ft [1.0 m]

Head (H)

The total pump head is composed as follows:
$H = H_{geo} + \Delta H_V$

H_{geo} (static head)

- Without discharge elbow: difference between suction-side water level and overflow edge
- With discharge elbow: difference between suction-side and discharge-side water level

1 The IEC 60034-30 standard is not binding for submersible motor pumps. Efficiencies are calculated / determined by analogy with the measurement method specified in IEC 60034-2. The marking is used for submersible motors that achieve efficiency levels similar to those of standard motors acc. to the IEC 60034-30 standard.
2 Blank
3 If larger power reserves are stipulated by local regulations, these larger reserves must be provided.

1580.399/01-EN-US

ΔH_V (losses in the system)

- Starting 1.65 ft [0.5 m] downstream of the pump: e.g. pipe friction, elbow, swing check valve, etc.

Inlet losses, riser losses and elbow losses

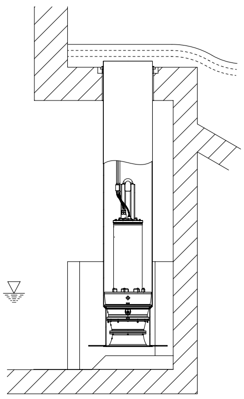
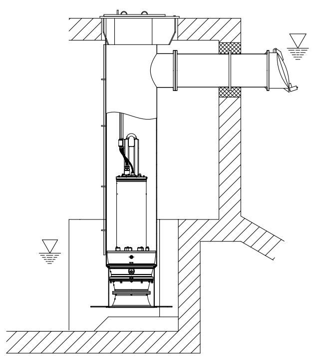
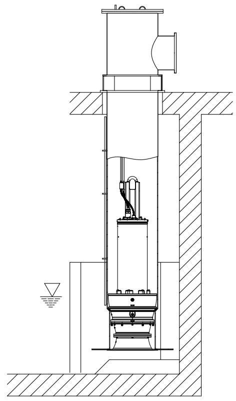
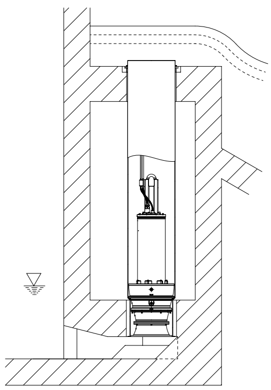
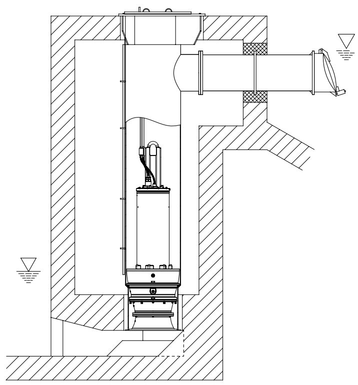
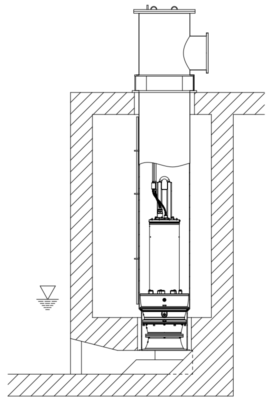
Losses are caused by the inlet, riser and elbow (and/or free discharge).

- Losses in the riser up to the indicated reference level (1.65 ft [0.5 m] above the motor) are taken into account in the documented characteristic curves.
- Inlet losses and elbow losses are system losses. These losses must be taken into account for selection.
- For information on structural requirements, pump installation and pump sump design please refer to the KSB know-how brochure "Planning Information: Amacan Submersible Pumps in Discharge Tubes" 1581.025.

Installation types

Nine design variants are available[4]:

Table 3: Overview of installation types

		
BU[5]/BUS[6] discharge tube	CU[5]/CUS[6] discharge tube	DU[5]/DUS[6] discharge tube
Overflow design for installation in open intake chamber	Design with underfloor discharge line for installation in open intake chamber	Design with above floor discharge nozzle for installation in open intake chamber
		
BG[5] discharge tube	CG[5] discharge tube	DG[5] discharge tube
Overflow design for installation in covered intake chamber for low suction-side water levels	Design with underfloor discharge line for installation in covered intake chamber for low suction-side water levels	Design with above-floor discharge nozzle for installation in covered intake chamber for low suction-side water levels

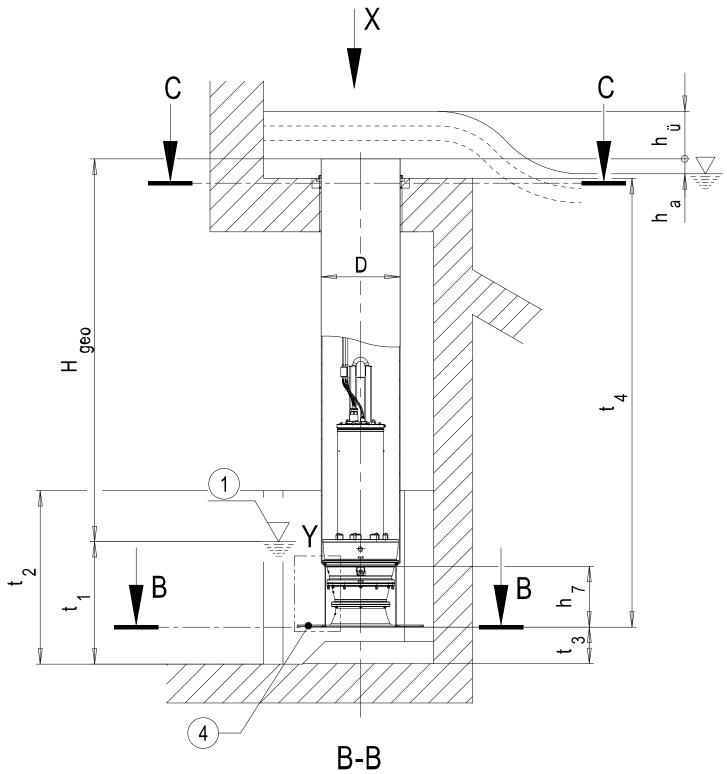
1580.399/01-EN-US

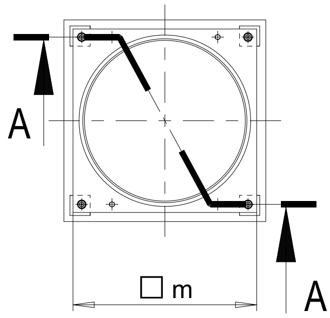
4 For information on the various designs (foundation dimensions, intake chamber, etc.) refer to the general arrangement drawings.
5 Design without suction umbrella
6 Design with suction umbrella

General arrangement drawings

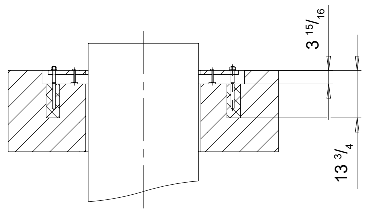
General arrangement drawings [inch]

Installation types BU/BUS

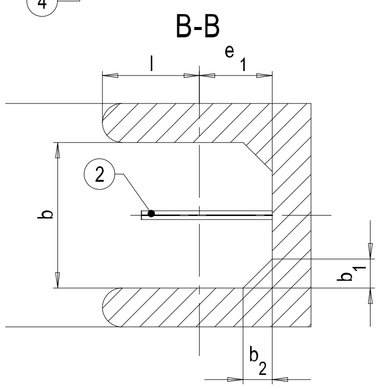


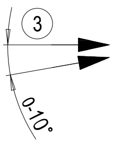


Detail X: Support plate of the discharge tube

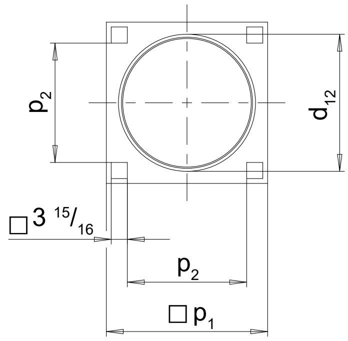


Section A-A: Foundation recesses, dimensions in [inch]

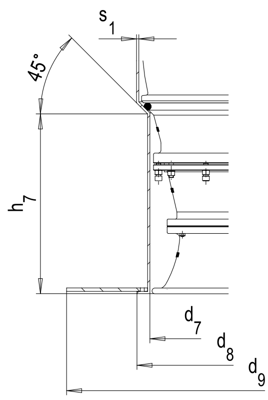




$V_{max.}$ = 3.3 ft/s
$V_{max.}$ = 1 m/s



Section C-C: Foundation recesses[7], dimensions in [inch]



Detail Y: Seating ring

①: Minimum water level (values see diagram on the next pages)
②: Flow-straightening vane (⇨ Page 27)
③: Approach flow
④: Suction umbrella; option for reducing the minimum water level t_1

1580.399/01-EN-US

7 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 4: Dimensions

Size	D	b	b_1		b_2		d_7	d_8	d_9	d_{12}
			Suction umbrella		Suction umbrella					
			✗	✓	✗	✓				
			d_8	d_9	d_8	d_9				
	[inch]									
400-290	16	34 2/3	6 8/9	–	6 8/9	–	13 7/9	16	25 3/5	17 5/7
500-325	20	49 1/5	9 5/6	–	9 5/6	–	17 1/3	19 7/8	31 1/2	21 2/3
600-351	24	49 1/5	9 5/6	–	9 5/6	–	19 2/3	24	31 1/2	25 3/5
700-471	28	59	11 4/5	–	11 4/5	–	23 5/8	28	43 1/3	29 1/2
800-471	32	59	11 4/5	–	11 4/5	–	23 5/8	28	43 1/3	33 1/2

Table 5: Dimensions

Size	e_1[8)]		h_a	h_7	$l_{min.}$	m	p_1	p_2	s_1	t_3[8)]	$t_{4\ min.}$[9)]
	Suction umbrella										
	✗	✓									
	d_8	d_9									
	[inch]										
400-290	11 4/5	16 3/4	4	8 6/7	19 2/3	19 2/3	23 5/8	13 2/5	2/7	8 1/4	65
500-325	13 7/9	19 2/3	4	16 1/2	33 1/2	23 5/8	27 5/9	17 1/3	2/7	10 5/8	68 8/9
600-351	15 3/4	19 2/3	4	21 1/4	33 1/2	27 5/9	31 1/2	21 1/4	1/3	12 3/5	70 6/7
700-471	17 5/7	25 3/5	4	16 1/2	41 1/3	31 1/2	35 3/7	25 1/5	1/3	15	94 1/2
800-471	17 5/7	25 3/5	4	16 1/2	41 1/3	35 5/6	39 3/8	29 1/7	1/3	15	108 1/4

t_2 = 1.1 x water level, maximum 2 x t_1
Height of corner lining (b_1 and b_2) like t_2

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH

Loss diagram

Calculation formulas:

$H = H_{geo} + \Delta H_v$

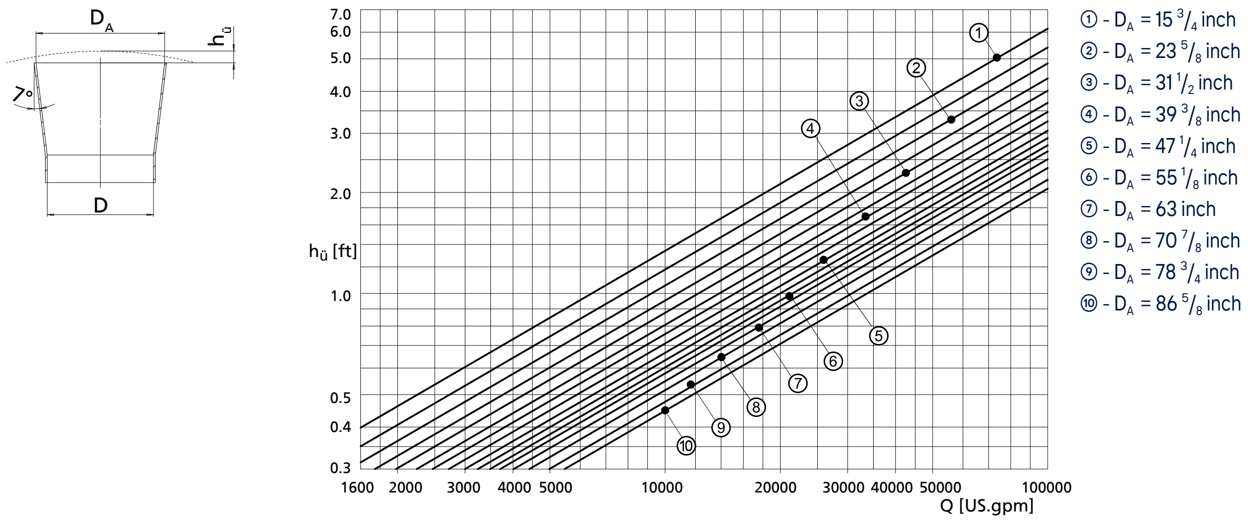
ΔH_v

- Overflow head $h_ü$ (see diagram)
- Loss in the riser (pipe friction)
- Outlet loss $v^2 / 2g$ (v refers to D_A)

Overflow head $h_ü$ depends on Q and the discharge diameter D_A. The characteristic curve values only apply to unimpeded outlet in all directions; otherwise they are approximate values only.

1580.399/01-EN-US

8 Observe this dimension.
9 Value for maximum motor length



Minimum water level diagrams

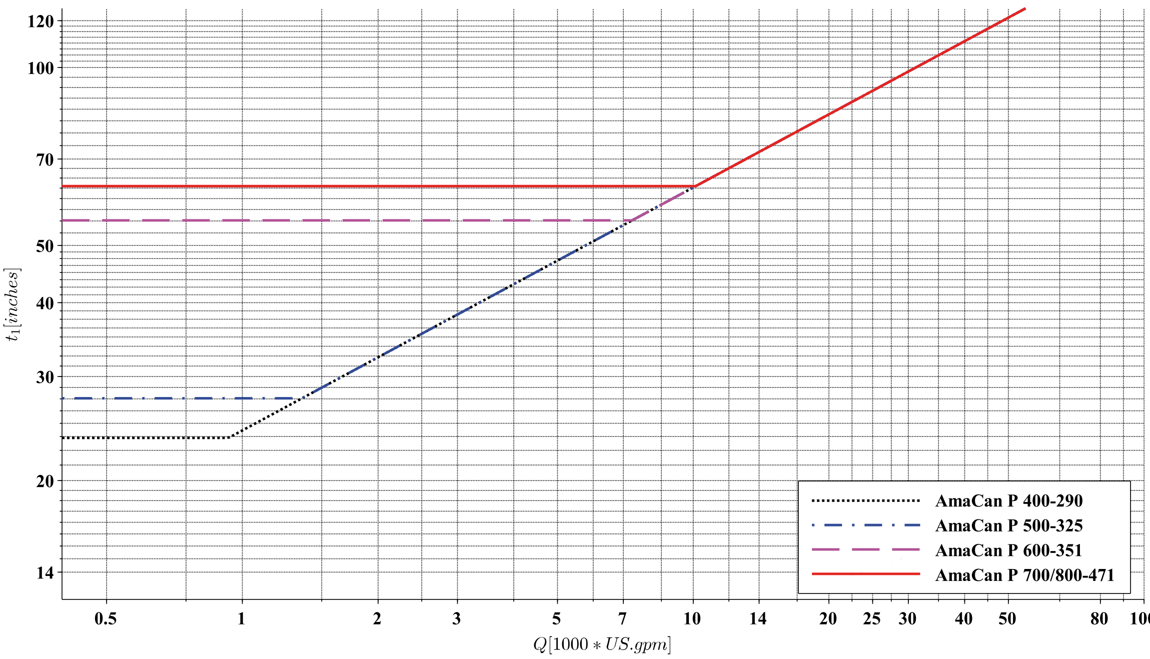


Fig. 1: Open intake chamber, design without suction umbrella Ø d_8

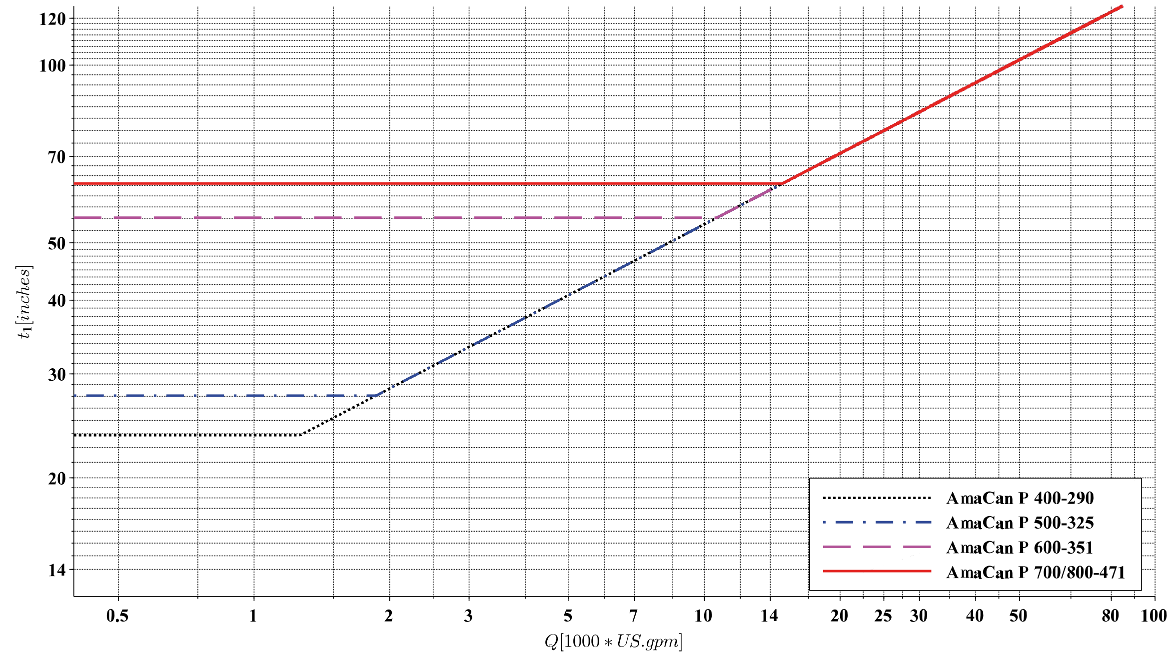
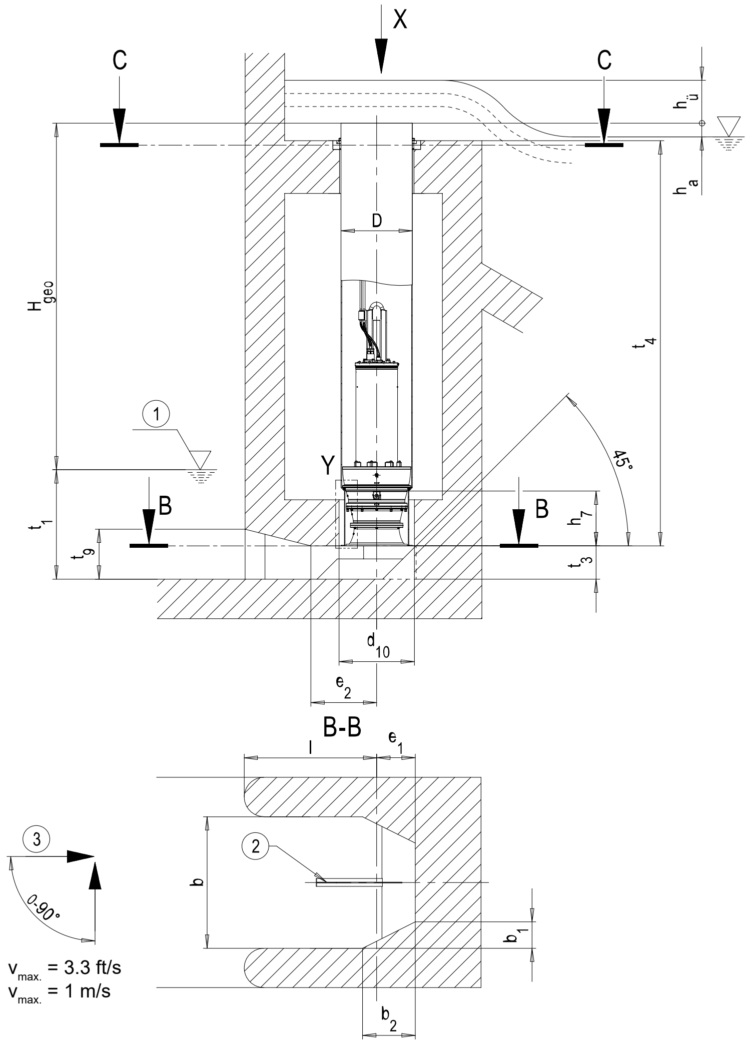
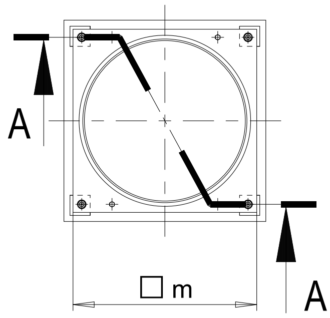


Fig. 2: Open intake chamber, design with suction umbrella Ø d_9

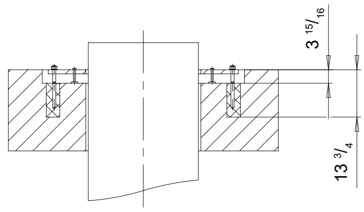
Installation type BG



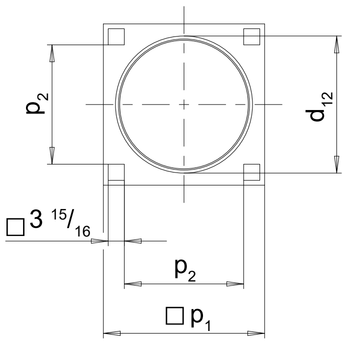
①: Minimum water level (values see diagrams on the following pages)
②: Flow-straightening vane (⇨ Page 27)
③: Approach flow



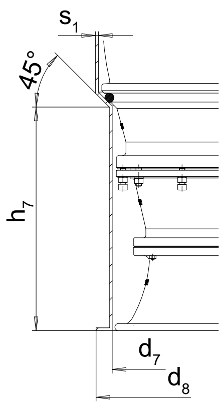
Detail X: Support plate of the discharge tube



Section A-A: Foundation recesses, dimensions in [inch]



Section C-C: Foundation recesses[10], dimensions in [inch]



Detail Y: Seating ring

1580.399/01-EN-US

10 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 6: Dimensions [inch]

Size	D	b	b_1	b_2	d_7	d_8	d_{10}	d_{12}	e_1 [11]	e_2	h_a
400-290	16	34 2/3	6 8/9	13 7/9	13 7/9	16	18	17 5/7	10 3/7	17 1/3	4
500-325	20	49 1/5	9 5/6	19 2/3	17 1/3	19 7/8	21 6/7	21 2/3	14 3/4	24 3/5	4
600-351	24	49 1/5	9 5/6	19 2/3	19 2/3	24	26	25 3/5	14 3/4	24 3/5	4
700-471	28	59	11 4/5	23 5/8	23 5/8	28	30	29 1/2	17 5/7	29 1/2	4
800-471	32	59	11 4/5	23 5/8	23 5/8	28	30	33 1/2	17 5/7	29 1/2	4

Table 7: Dimensions [inch]

Size	h_7	$l_{min.}$	m	p_1	p_2	s_1	t_3 [12]	$t_{4\ min.}$ [13]	t_9
400-290	8 6/7	34 2/3	19 2/3	23 5/8	13 2/5	2/7	8 1/4	65	13
500-325	16 1/2	49 1/5	23 5/8	27 5/9	17 1/3	2/7	10 5/8	68 8/9	14 3/4
600-351	21 1/4	49 1/5	27 5/9	31 1/2	21 1/4	1/3	12 3/5	70 6/7	18 1/2
700-471	16 1/2	59	31 1/2	35 3/7	25 1/5	1/3	15	94 1/2	22 4/9
800-471	16 1/2	59	35 5/6	39 3/8	29 1/7	1/3	15	108 1/4	22 4/9

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH

Loss diagram

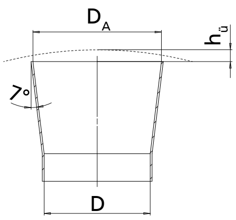
Calculation formulas:

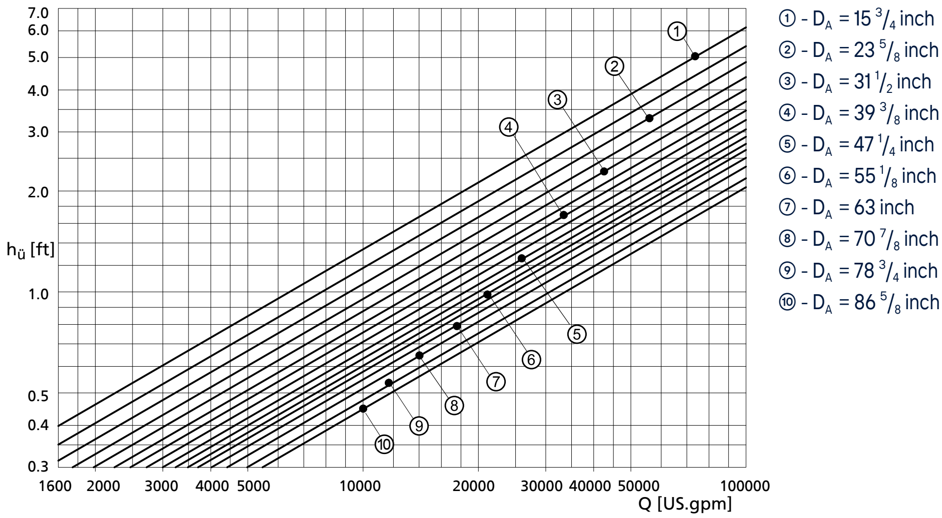
$H = H_{geo} + \Delta H_v$

ΔH_v

- Overflow head $h_ü$ (see diagram)
- Loss in the riser (pipe friction)
- Outlet loss $v^2 / 2g$ (v refers to D_A)

Overflow head $h_ü$ depends on Q and the discharge diameter D_A. The characteristic curve values only apply to unimpeded outlet in all directions; otherwise they are approximate values only.





1580.399/01-EN-US

11 Observe this dimension.
12 Observe this dimension.
13 Value for maximum motor length

Minimum water level diagrams

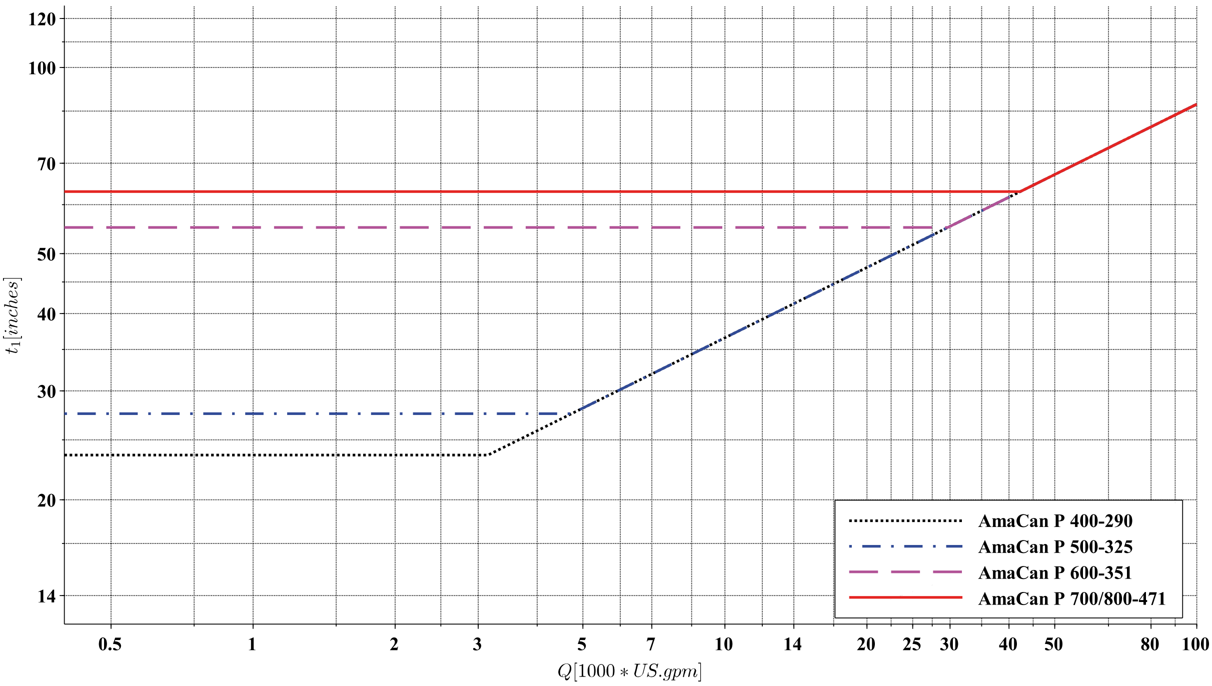
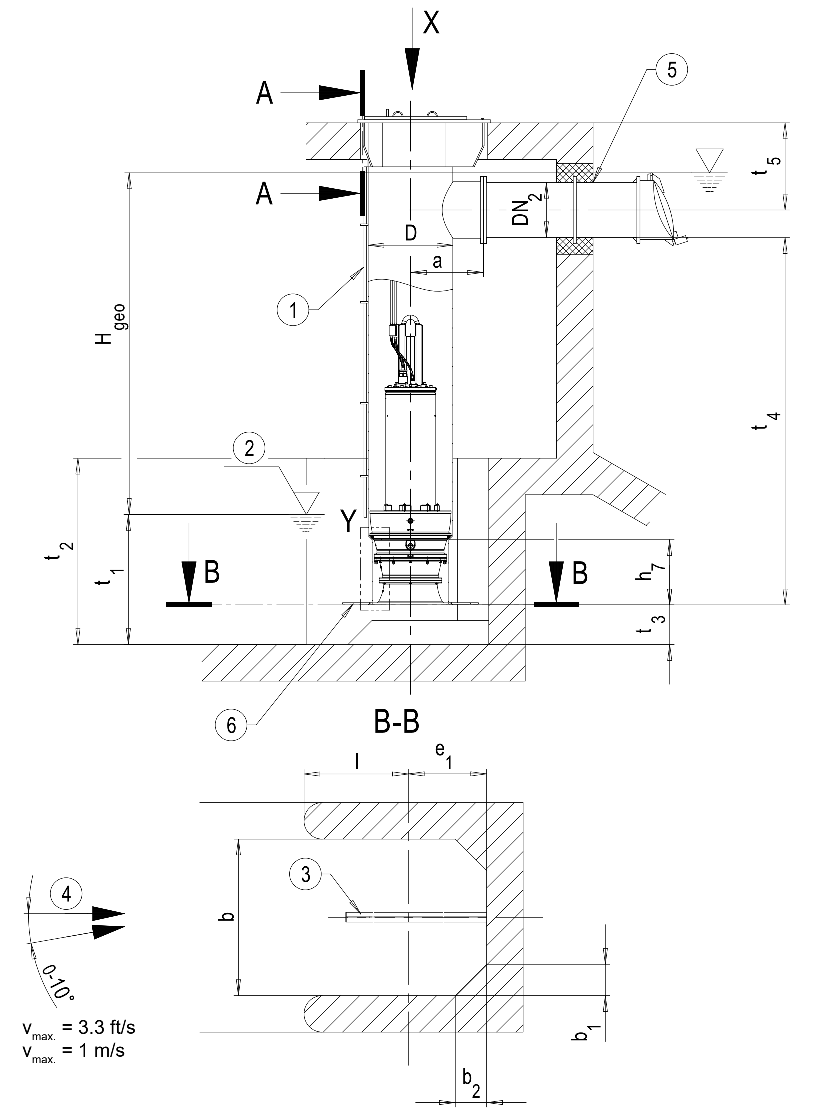


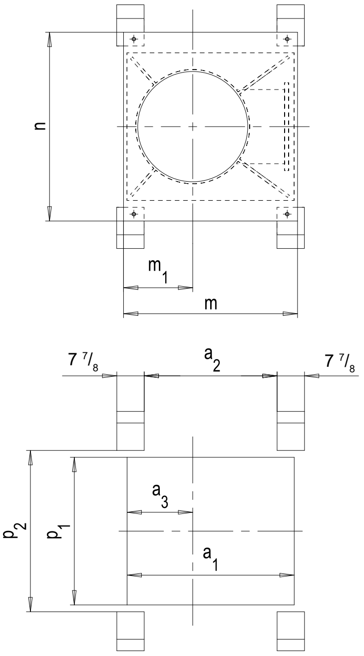
Fig. 3: Installation type BG: Covered intake chamber

1580.399/01-EN-US

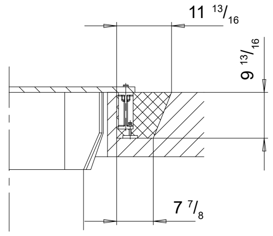
Installation types CU/CUS



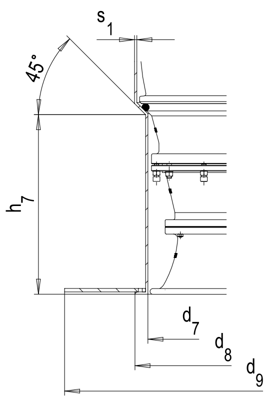
①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 27)
④: Approach flow
⑤: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.
⑥: Suction umbrella - Option for reducing the minimum water level t_1



Detail X: Support plate of the discharge tube, foundation recesses[14] Dimensions in [inch]



Section A-A: Foundation recesses, dimensions in [inch]



Detail Y: Seating ring

1580.399/01-EN-US

14 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 8: Dimensions [inch]

Size	$DN_{2\ min.}$	$DN_{2\ max.}$	D	a	a_1	a_2	a_3	b	b_1		b_2		d_7
									Suction umbrella		Suction umbrella		
									✗	✓	✗	✓	
									d_8	d_9	d_8	d_9	
400-290	9 5/6	15 3/4	16	16 1/2	28 1/3	18 1/2	10 5/6	34 2/3	6 8/9	–	6 8/9	–	13 7/9
500-325	11 4/5	19 2/3	20	20 6/7	34 2/3	24 4/5	12 4/5	49 1/5	9 5/6	–	9 5/6	–	17 1/3
600-351	13 7/9	23 5/8	24	24	39 3/8	29 1/2	15	49 1/5	9 5/6	–	9 5/6	–	19 2/3
700-471	15 3/4	27 5/9	28	25 3/5	44	34 1/4	17	59	11 4/5	–	11 4/5	–	23 5/8
800-471	19 2/3	31 1/2	32	27 5/9	48	38 1/5	18 8/9	59	11 4/5	–	11 4/5	–	23 5/8

Table 9: Dimensions [inch]

Size	d_8	d_9	e_1 [15]		h_7	$l_{min.}$	m	m_1	n	p_1	p_2	s_1	t_3 [15]	$t_{4\ min.}$ [16]	$t_{5\ min.}$ [17]
			Suction umbrella												
			✗	✓											
			d_8	d_9											
400-290	16	25 3/5	11 4/5	16 3/4	8 6/7	19 2/3	30 1/3	11 4/5	37 4/5	26	30	2/7	8 1/4	68 8/9	24 2/5
500-325	19 7/8	31 1/2	13 7/9	19 2/3	16 1/2	33 1/2	36 3/5	13 7/9	41 3/4	30	33 6/7	2/7	10 5/8	72 5/6	26 3/8
600-351	24	31 1/2	15 3/4	19 2/3	21 1/4	33 1/2	41 1/3	16	45 2/3	33 6/7	37 4/5	1/3	12 3/5	74 4/5	28 1/3
700-471	28	43 1/3	17 5/7	25 3/5	16 1/2	41 1/3	46	18	49 3/5	37 4/5	41 3/4	1/3	15	98 3/7	30 1/3
800-471	28	43 1/3	17 5/7	25 3/5	16 1/2	41 1/3	50	19 7/8	54 1/7	42 1/3	46 1/4	1/3	15	112 1/5	32 7/8

t_2 = 1.1 x water level, maximum 2 x t_1
Height of corner lining (b_1 and b_2) like t_2

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH

Loss diagram

Calculation formulas:

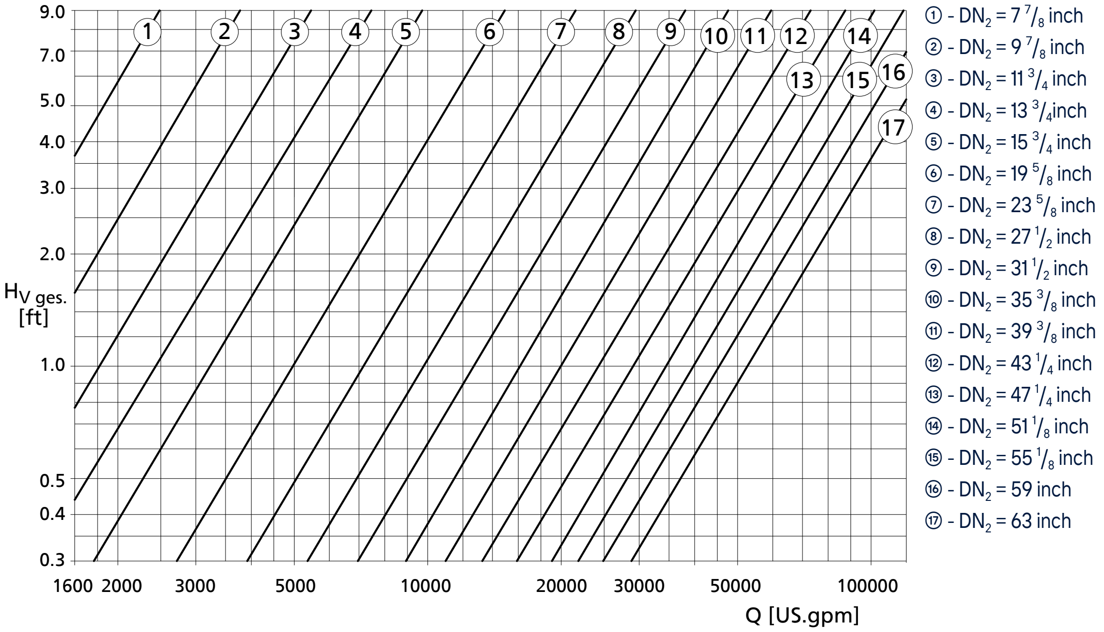
$H = H_{geo} + \Delta H_v$

ΔH_v
- Loss in the riser (pipe friction)
- $H_{v\ ges.}$ (see diagram)

$H_{v\ ges.}$ comprises:
- Elbow
- Discharge pipe length = 5 x DN_2
- Swing check valve
- Outlet losses $v^2/2g$

1580.399/01-EN-US

15 Observe this dimension.
16 Value for maximum motor length
17 Selected for DN2 max.



Minimum water level diagrams

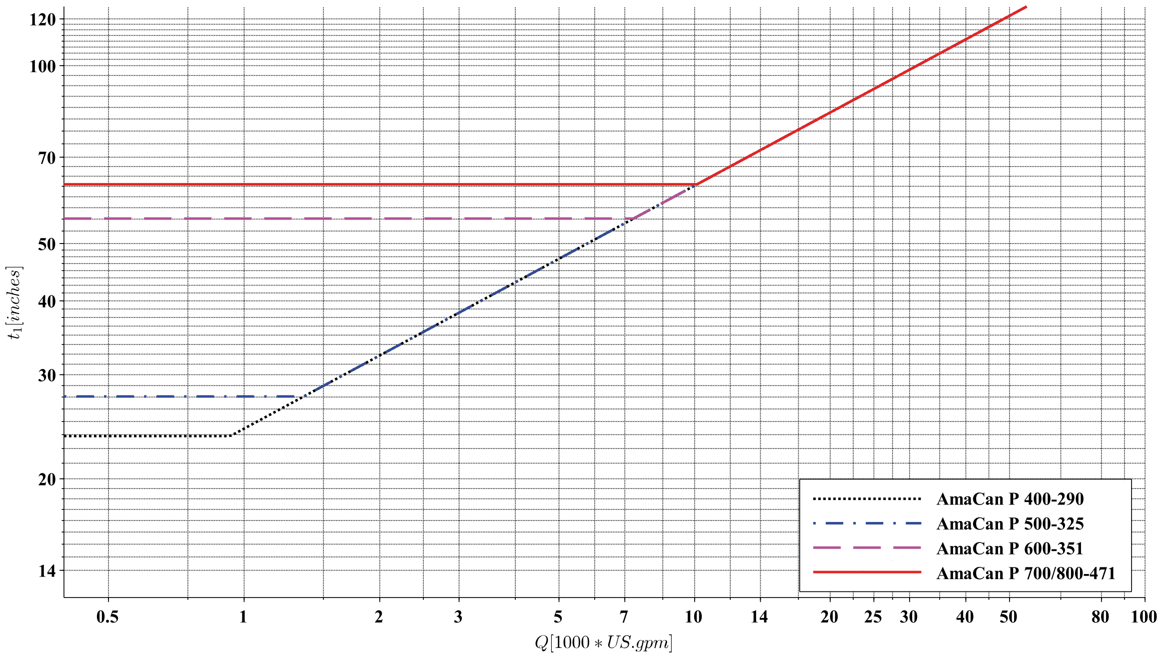


Fig. 4: Installation type CU: Open intake chamber, design without suction umbrella Ø d_8

1580.399/01-EN-US

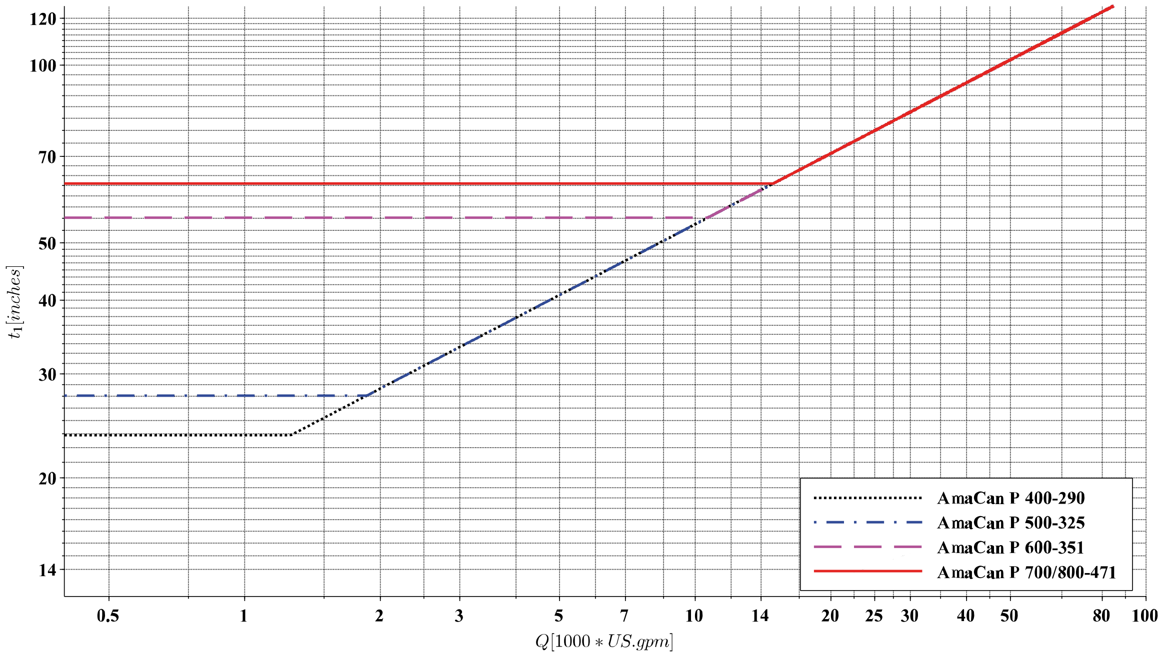
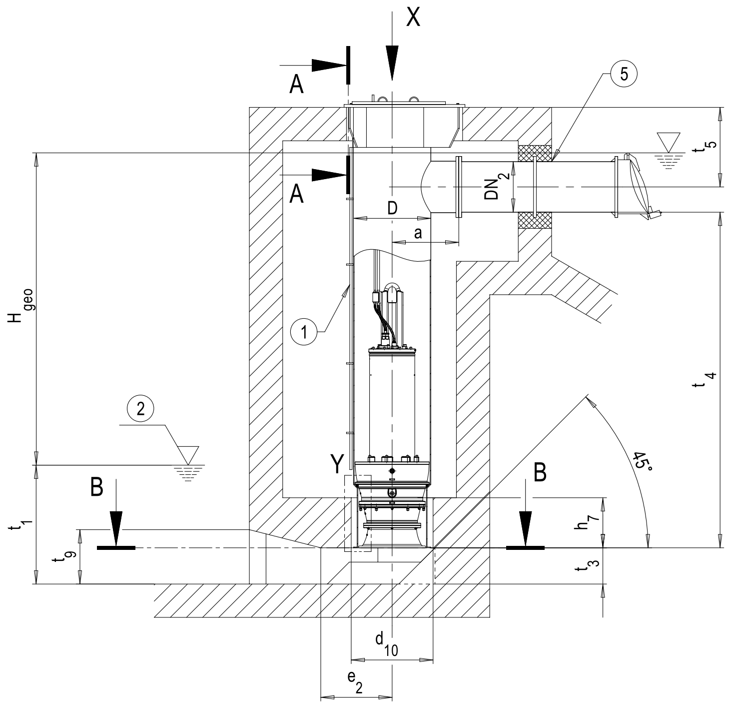
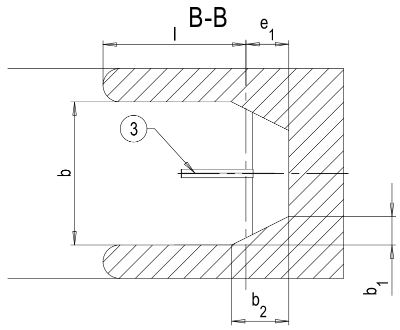


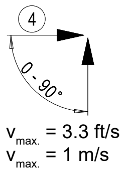
Fig. 5: Installation type CUS: Open intake chamber, design with suction umbrella Ø d_9

1580.399/01-EN-US

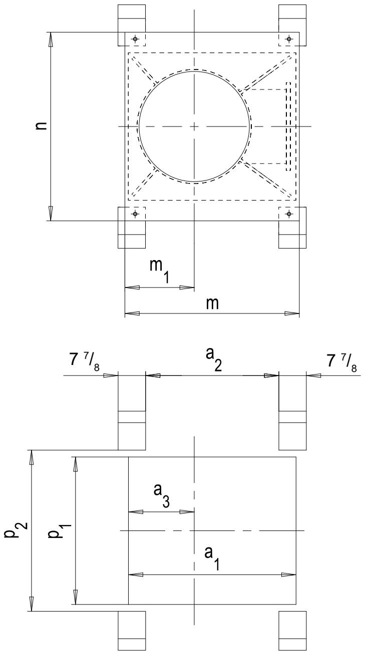
Installation type CG



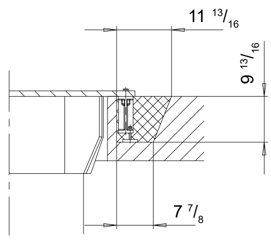




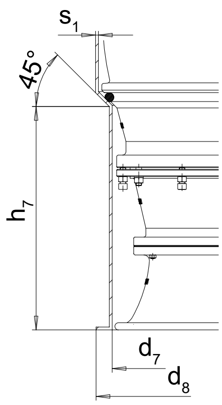
①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 27)
④: Approach flow
⑤: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.



Detail X: Support plate of the discharge tube, foundation recesses[18], dimensions in [inch]



Section A-A: Foundation recesses, dimensions in [inch]



Detail Y: Seating ring

Table 10: Dimensions [inch]

Size	$DN_{2\ min.}$	$DN_{2\ max.}$	D	a	a_1	a_2	a_3	b	b_1	b_2	d_7	d_8	d_{10}
400-290	9 5/6	15 3/4	16	16 1/2	28 1/3	18 1/2	10 5/6	34 2/3	6 8/9	13 7/9	13 7/9	16	18
500-325	11 4/5	19 2/3	20	20 6/7	34 2/3	24 4/5	12 4/5	49 1/5	9 5/6	19 2/3	17 1/3	19 7/8	21 6/7
600-351	13 7/9	23 5/8	24	24	39 3/8	29 1/2	15	49 1/5	9 5/6	19 2/3	19 2/3	24	26
700-471	15 3/4	27 5/9	28	25 3/5	44	34 1/4	17	59	11 4/5	23 5/8	23 5/8	28	30
800-471	19 2/3	31 1/2	32	27 5/9	48	38 1/5	18 8/9	59	11 4/5	23 5/8	23 5/8	28	30

18 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 11: Dimensions [inch]

Size	e_1[19]	e_2	h_7	$l_{min.}$	m	m_1	n	p_1	p_2	s_1	t_3[19]	$t_{4\ min.}$[20]	$t_{5\ min.}$[21]	t_9
400-290	10 3/7	17 1/3	8 6/7	34 2/3	30 1/3	11 4/5	37 4/5	26	30	2/7	8 1/4	68 8/9	24 2/5	13
500-325	14 3/4	24 3/5	16 1/2	49 1/5	36 3/5	13 7/9	41 3/4	30	33 6/7	2/7	10 5/8	72 5/6	26 3/8	14 3/4
600-351	14 3/4	24 3/5	21 1/4	49 1/5	41 1/3	16	45 2/3	33 6/7	37 4/5	1/3	12 3/5	74 4/5	28 1/3	18 1/2
700-471	17 5/7	29 1/2	16 1/2	59	46	18	49 3/5	37 4/5	41 3/4	1/3	15	98 3/7	30 1/3	22 4/9
800-471	17 5/7	29 1/2	16 1/2	59	50	19 7/8	54 1/7	42 1/3	46 1/4	1/3	15	112 1/5	32 7/8	22 4/9

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH
- Discharge flanges to DIN EN 1092-1 PN6 / DIN EN 1092-2 PN6

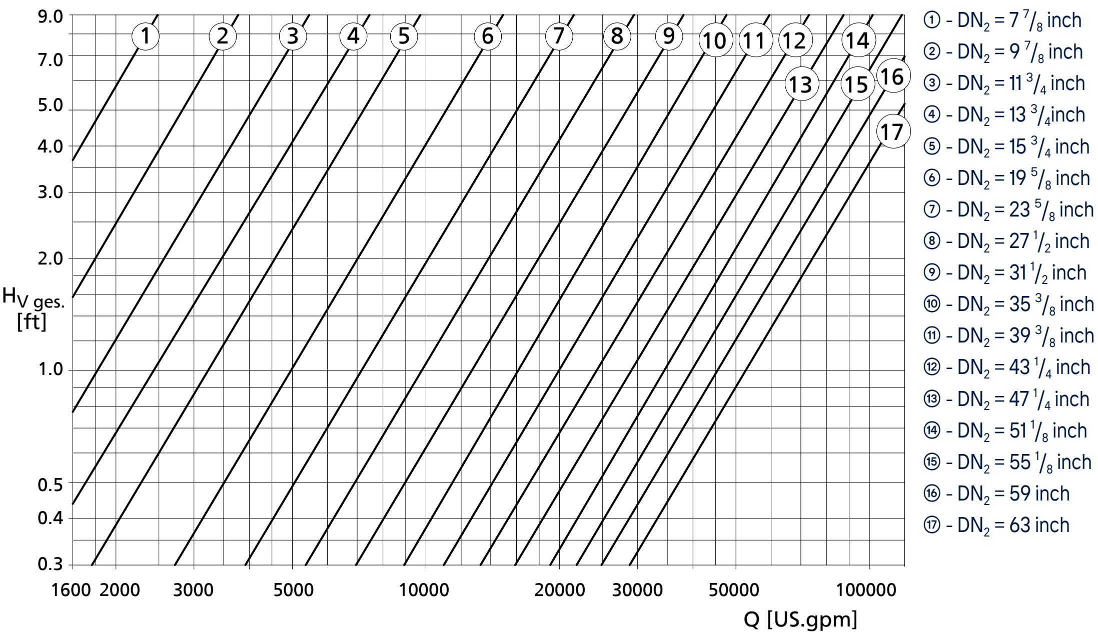
Loss diagram

Calculation formulas:

$H = H_{geo} + \Delta H_v$

ΔH_v
- Loss in the riser (pipe friction)
- $H_{v\ ges.}$ (see diagram)

$H_{v\ ges.}$ comprises:
- Elbow
- Discharge pipe length = 5 x DN_2
- Swing check valve
- Outlet losses $v^2/2g$



19 Observe this dimension.
20 Value for maximum motor length
21 Selected for DN2 max.

Minimum water level diagrams

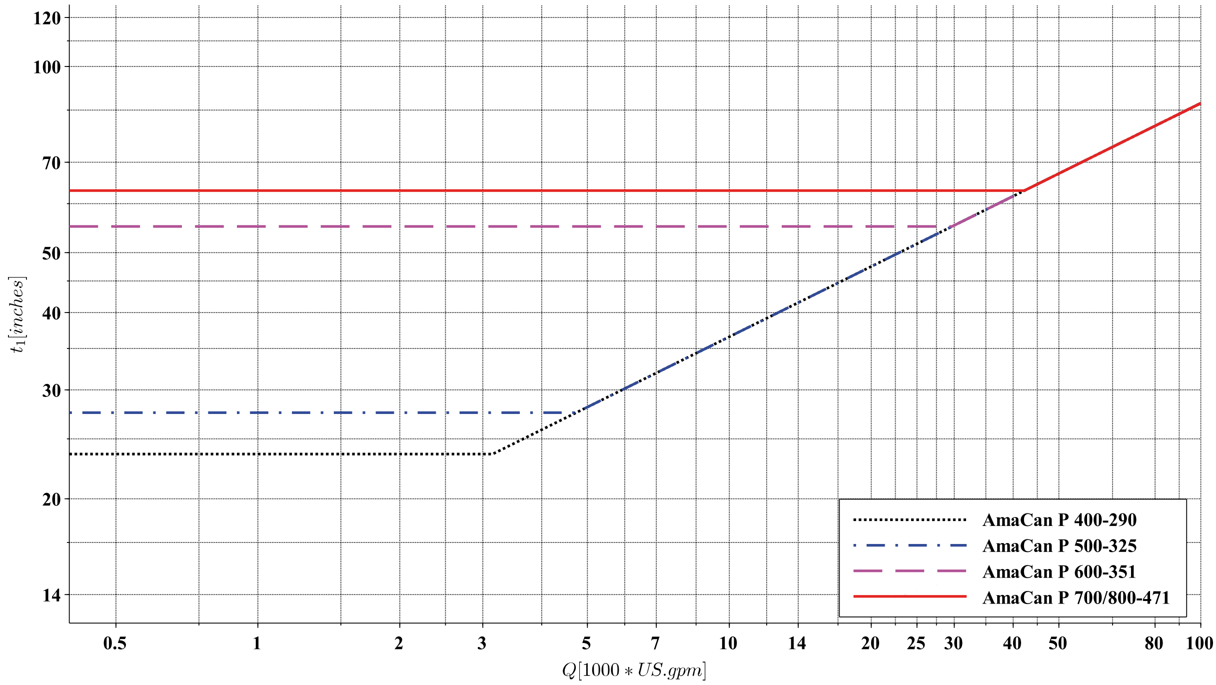
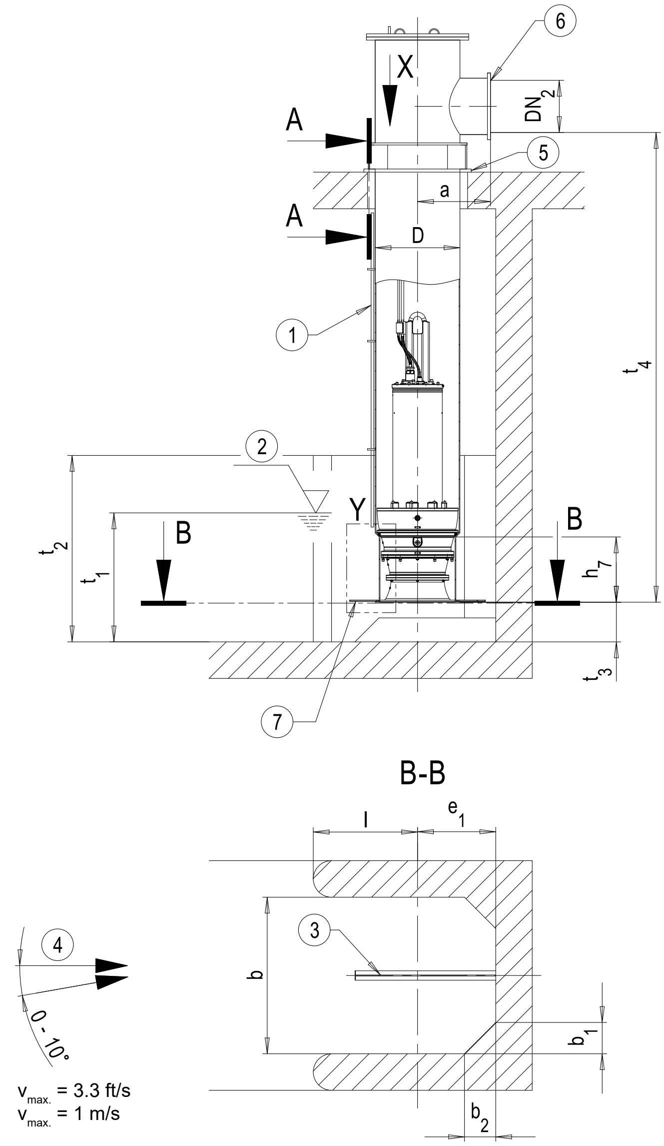
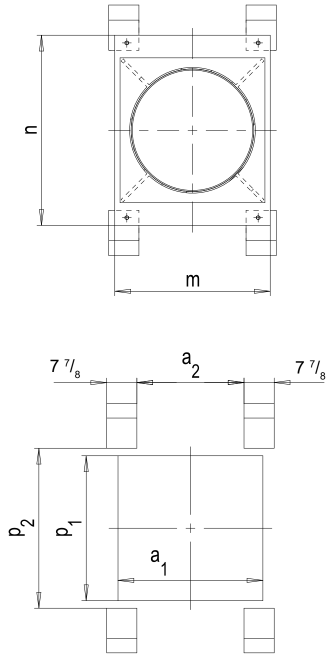


Fig. 6: Installation type CG: Covered intake chamber

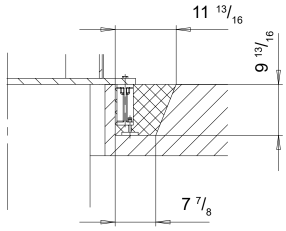
Installation types DU/DUS



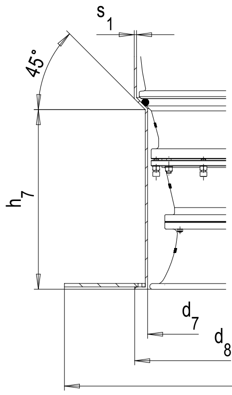
$v_{max.}$ = 3.3 ft/s
$v_{max.}$ = 1 m/s



Detail X: Support plate of the discharge tube, foundation recesses[22] Dimensions in [inch]



Section A-A: Foundation recesses, dimensions in [inch]



Detail Y: Seating ring

①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 27)
④: Approach flow
⑤: Not pressure-proof
⑥: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.
⑦: Suction umbrella; option for reducing the minimum water level t_1

1580.399/01-EN-US

22 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 12: Dimensions [inch]

Size	$DN_{2\,min.}$	DN_2 max.	D	a	a_1	a_2	b	b_1		b_2	
								Suction umbrella		Suction umbrella	
								✗	✓	✗	✓
								d_8	d_9	d_8	d_9
400-290	9 5/6	15 3/4	16	16 1/2	21 2/3	11 4/5	34 2/3	6 8/9	–	6 8/9	–
500-325	11 4/5	19 2/3	20	20 6/7	25 3/5	15 3/4	49 1/5	9 5/6	–	9 5/6	–
600-351	13 7/9	23 5/8	24	24	30	20	49 1/5	9 5/6	–	9 5/6	–
700-471	15 3/4	27 5/9	28	25 3/5	33 6/7	24	59	11 4/5	–	11 4/5	–
800-471	19 2/3	31 1/2	32	27 5/9	37 4/5	28	59	11 4/5	–	11 4/5	–

Table 13: Dimensions [inch]

Size	d_7	d_8	d_9	e_1[23]		h_7	$l_{min.}$	m	n	p_1	p_2	s_1	t_3[23]	$t_{4\,min.}$[24]
				Suction umbrella										
				✗	✓									
				d_8	d_9									
400-290	13 7/9	16	25 3/5	11 4/5	16 3/4	8 6/7	19 2/3	24 2/5	33 6/7	21 2/3	25 3/5	2/7	8 1/4	68 8/9
500-325	17 1/3	19 7/8	31 1/2	13 7/9	19 2/3	16 1/2	33 1/2	28 1/3	37 4/5	25 3/5	29 1/2	2/7	10 5/8	72 5/6
600-351	19 2/3	24	31 1/2	15 3/4	19 2/3	21 1/4	33 1/2	32 2/3	41 3/4	30	33 6/7	1/3	12 3/5	74 4/5
700-471	23 5/8	28	43 1/3	17 5/7	25 3/5	16 1/2	41 1/3	36 3/5	45 2/3	33 6/7	37 4/5	1/3	15	98 3/7
800-471	23 5/8	28	43 1/3	17 5/7	25 3/5	16 1/2	41 1/3	40 5/9	49 3/5	37 4/5	41 3/4	1/3	15	112 1/5

t_2 = 1.1 x water level, maximum 2 x t_1
Height of corner lining (b_1 and b_2) like t_2

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH
- Discharge flanges to DIN EN 1092-1 PN6 / DIN EN 1092-2 PN6

Loss diagram

Calculation formulas:

$H = H_{geo} + \Delta H_v$

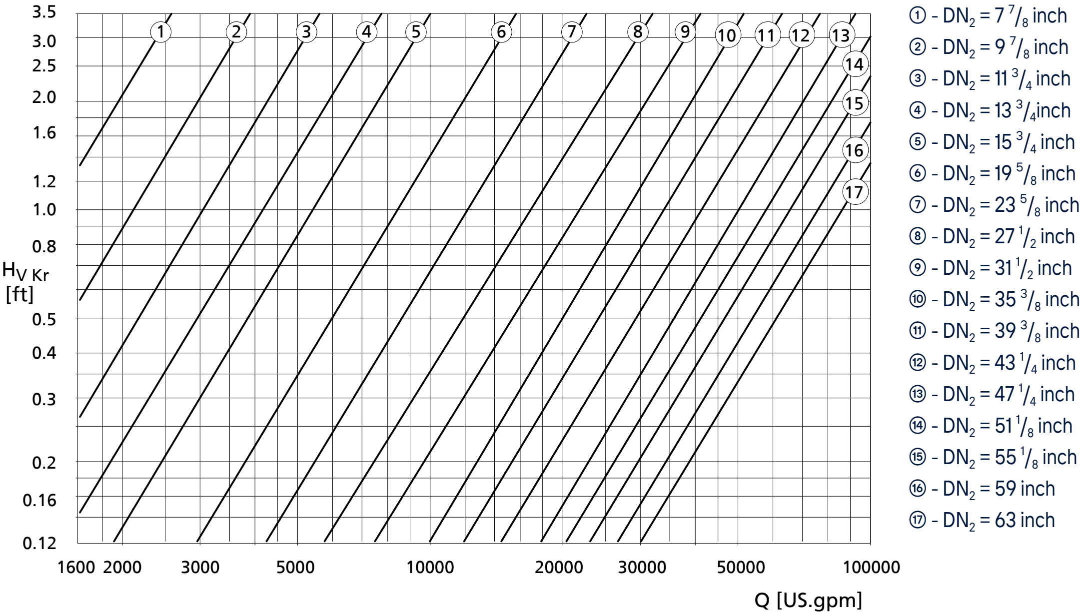
ΔH_v

- Loss in the elbow $h_{V\,Kr}$ (see diagram)
- Loss in the riser (pipe friction)
- $H_{V\,Anl.}$ (valves, etc.)

$H_{V\,Anl.}$ must be determined for the specific system.

1580.399/01-EN-US

23 Observe this dimension.
24 Value for maximum motor length



Minimum water level diagrams

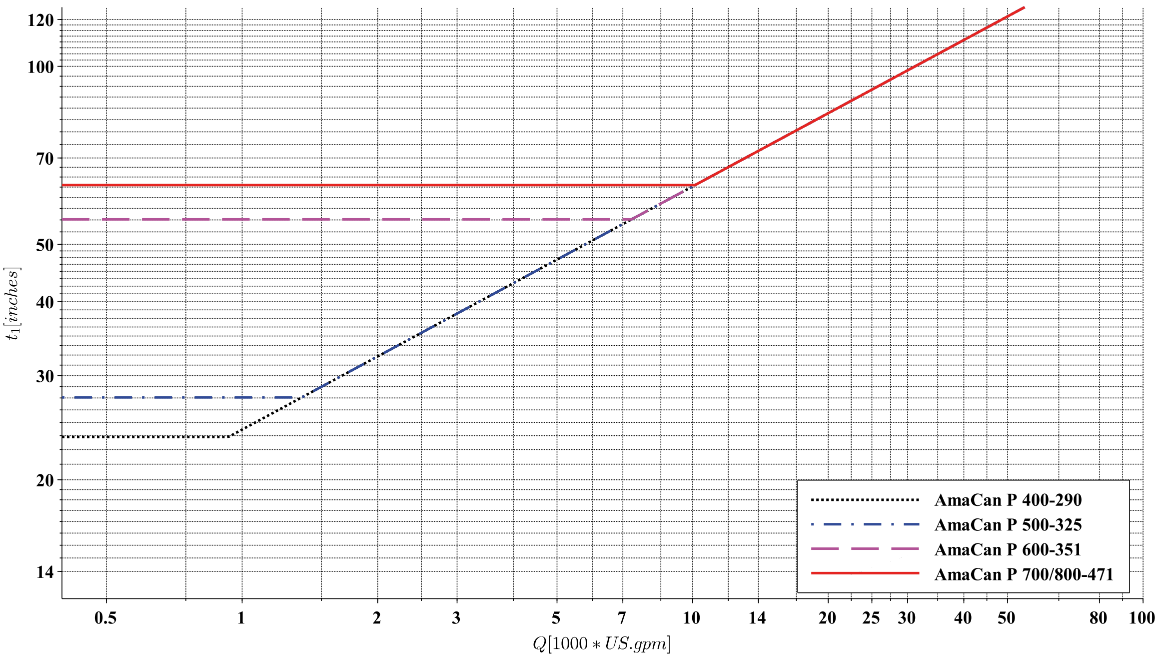


Fig. 7: Installation type DU: Open intake chamber, design without suction umbrella Ø d_8

1580.399/01-EN-US

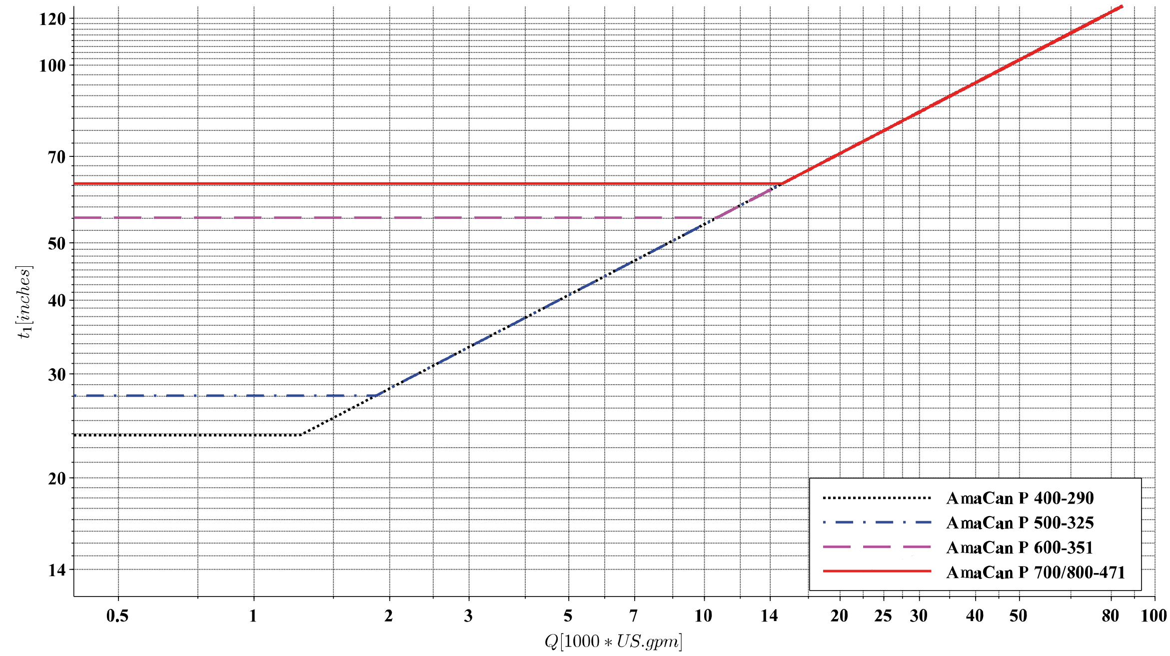
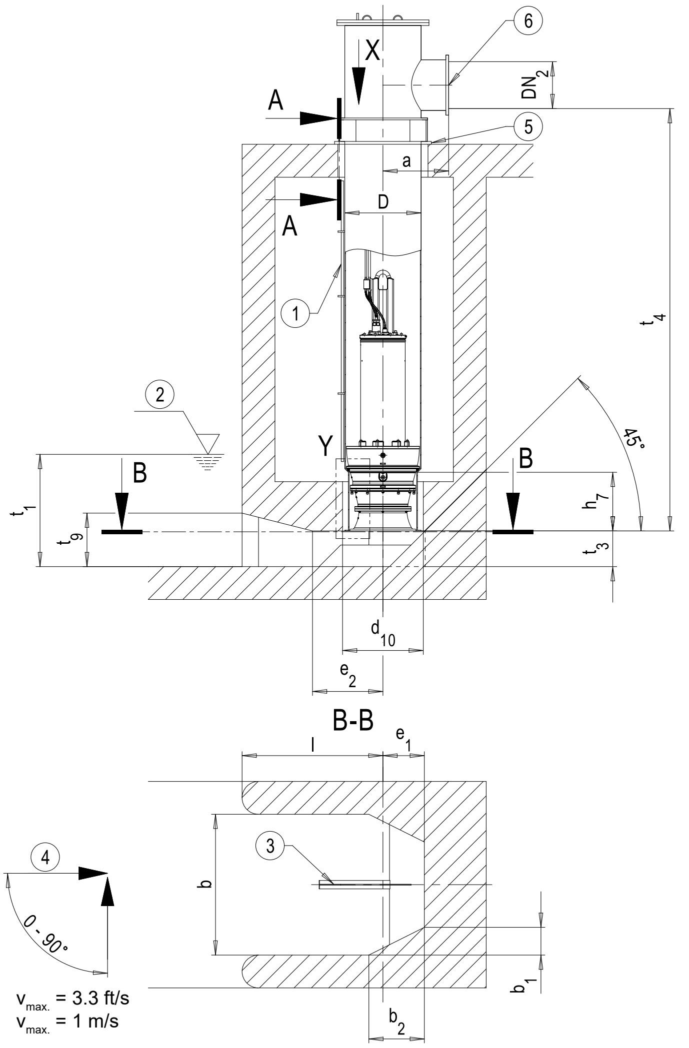
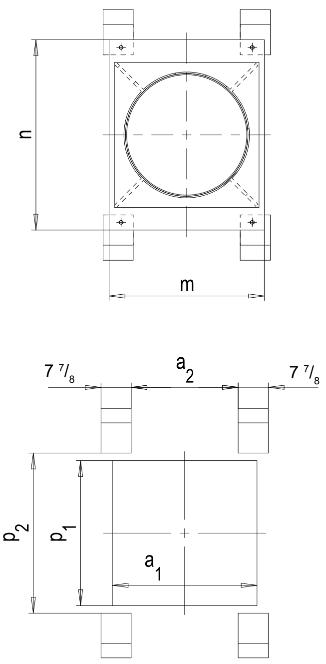


Fig. 8: Installation type DUS: Open intake chamber, design with suction umbrella Ø d_9

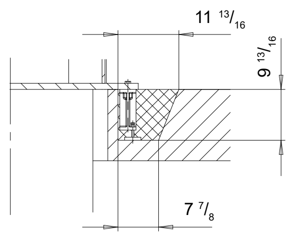
Installation type DG



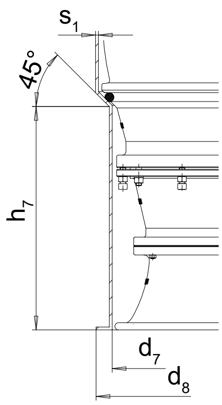
①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 27)
④: Approach flow
⑤: Not pressure-proof
⑥: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.



Detail X: Support plate of the discharge tube, foundation recesses[25] Dimensions in [inch]



Section A-A: Foundation recesses, dimensions in [inch]



Detail Y: Seating ring

Table 14: Dimensions [inch]

Size	$DN_{2\,min.}$	$DN_{2\,max.}$	D	a	a_1	a_2	b	b_1	b_2	d_7	d_8	d_{10}
400-290	9 5/6	15 3/4	16	16 1/2	21 2/3	11 4/5	34 2/3	6 8/9	13 7/9	13 7/9	16	18
500-325	11 4/5	19 2/3	20	20 6/7	25 3/5	15 3/4	49 1/5	9 5/6	19 2/3	17 1/3	19 7/8	21 6/7
600-351	13 7/9	23 5/8	24	24	30	20	49 1/5	9 5/6	19 2/3	19 2/3	24	26
700-471	15 3/4	27 5/9	28	25 3/5	33 6/7	24	59	11 4/5	23 5/8	23 5/8	28	30
800-471	19 2/3	31 1/2	32	27 5/9	37 4/5	28	59	11 4/5	23 5/8	23 5/8	28	30

25 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

1580.399/01-EN-US

Table 15: Dimensions [inch]

Size	e_1[26]	e_2	h_7	$l_{min.}$	m	n	p_1	p_2	s_1	t_3[26]	$t_{4\ min.}$[27]	t_9
400-290	10 3/7	17 1/3	8 6/7	34 2/3	24 2/5	33 6/7	21 2/3	25 3/5	2/7	8 1/4	68 8/9	13
500-325	14 3/4	24 3/5	16 1/2	49 1/5	28 1/3	37 4/5	25 3/5	29 1/2	2/7	10 5/8	72 5/6	14 3/4
600-351	14 3/4	24 3/5	21 1/4	49 1/5	32 2/3	41 3/4	30	33 6/7	1/3	12 3/5	74 4/5	18 1/2
700-471	17 5/7	29 1/2	16 1/2	59	36 3/5	45 2/3	33 6/7	37 4/5	1/3	15	98 3/7	22 4/9
800-471	17 5/7	29 1/2	16 1/2	59	40 5/9	49 3/5	37 4/5	41 3/4	1/3	15	112 1/5	22 4/9

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH
- Discharge flanges to DIN EN 1092-1 PN6 / DIN EN 1092-2 PN6

Loss diagram

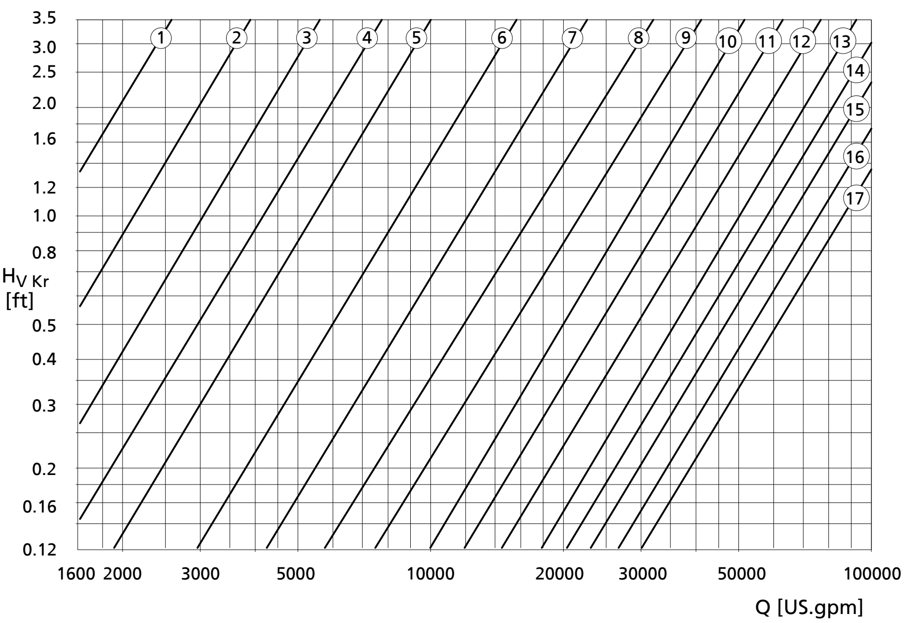
Calculation formulas:

$H = H_{geo} + \Delta H_v$

ΔH_v

- Loss in the elbow $h_{V\ Kr}$ (see diagram)
- Loss in the riser (pipe friction)
- $H_{V\ Anl.}$ (valves, etc.)

$H_{V\ Anl.}$ must be determined for the specific system.



① - $DN_2 = 7\,^7/_8$ inch
② - $DN_2 = 9\,^7/_8$ inch
③ - $DN_2 = 11\,^3/_4$ inch
④ - $DN_2 = 13\,^3/_4$ inch
⑤ - $DN_2 = 15\,^3/_4$ inch
⑥ - $DN_2 = 19\,^5/_8$ inch
⑦ - $DN_2 = 23\,^5/_8$ inch
⑧ - $DN_2 = 27\,^1/_2$ inch
⑨ - $DN_2 = 31\,^1/_2$ inch
⑩ - $DN_2 = 35\,^3/_8$ inch
⑪ - $DN_2 = 39\,^3/_8$ inch
⑫ - $DN_2 = 43\,^1/_4$ inch
⑬ - $DN_2 = 47\,^1/_4$ inch
⑭ - $DN_2 = 51\,^1/_8$ inch
⑮ - $DN_2 = 55\,^1/_8$ inch
⑯ - $DN_2 = 59$ inch
⑰ - $DN_2 = 63$ inch

1580.399/01-EN-US

26 Observe this dimension.
27 Value for maximum motor length

Minimum water level diagrams

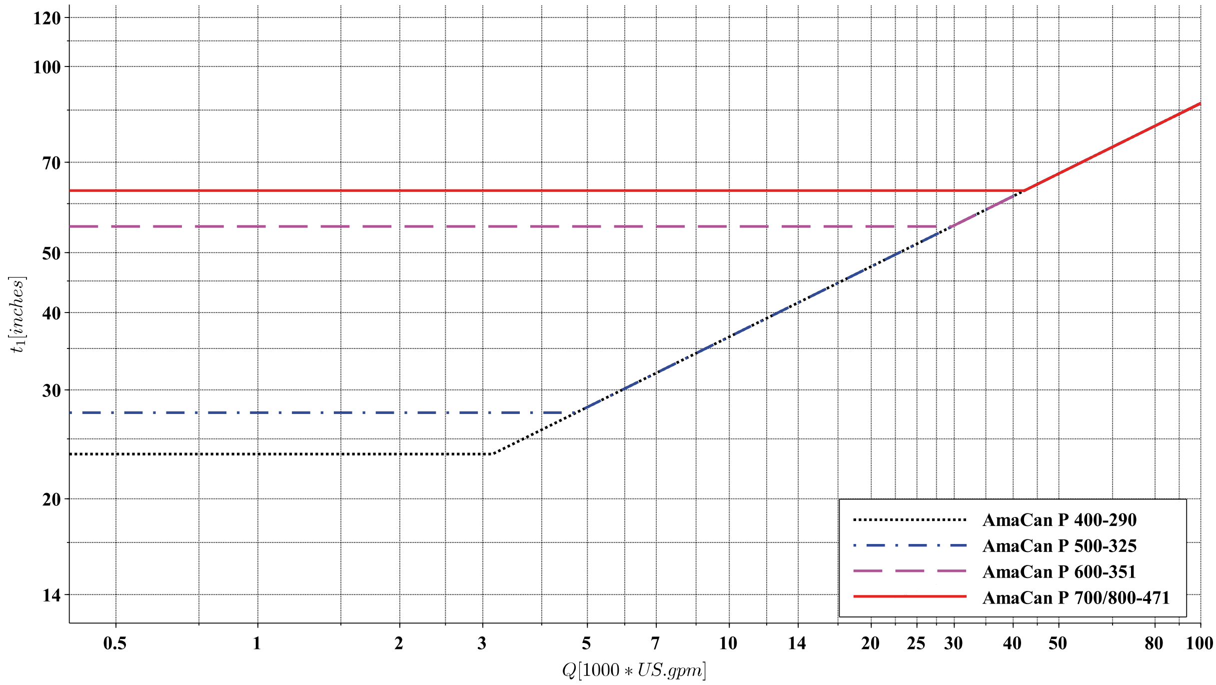


Fig. 9: Covered intake chamber

Dimensions of the flow-straightening vane

Design of the intake chamber wall surfaces (to prevent vortex formation)

The flow-straightening vane is indispensable for the inlet conditions of the pump set. It prevents the development of a submerged vortex (floor vortex) which could cause a drop in performance, for example. In addition, the floor and wall surfaces of the intake chamber should be designed as a rough concrete surface. Rough surfaces minimize the separation of boundary layers that may cause wall and floor vortices.

Flow-straightening vane and intake chamber

- The anti-swirl baffles in the bellmouth must be aligned with the flow-straightening vane.
- The bail of the pump is oriented in the same direction as the anti-swirl baffles in the bellmouth.

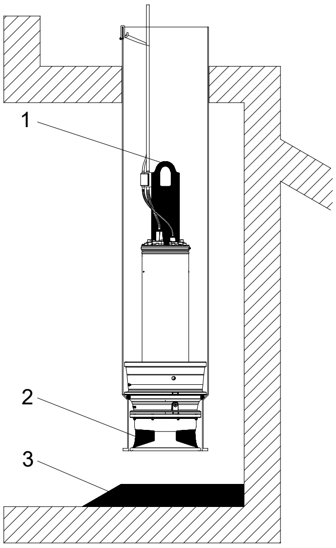
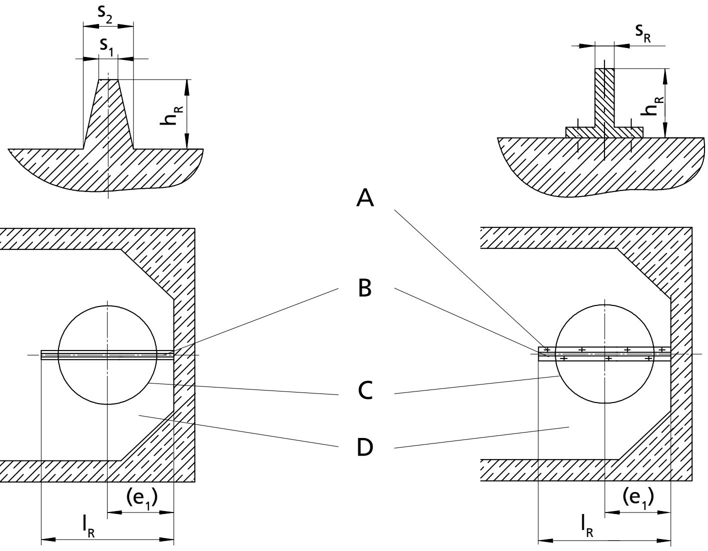


Fig. 10: Installation position of the pump set

1	Bail
2	Anti-swirl baffles
3	Flow-straightening vane



A	Bolted to the floor of the intake chamber
B	Flow-straightening vane centered beneath the discharge tube
C	Discharge tube
D	Intake chamber

1580.399/01-EN-US

Installation types BU, BUS, CU, CUS, DU, DUS

Table 16: Dimensions [inch]

Size	h_R	s_1	s_2	s_R	(e_1)		l_R	
					Suction umbrella		Suction umbrella	
					✗	✓	✗	✓
					d_8	d_9	d_8	d_9
400-290	5 1/8	3/5	2 1/3	2/5	11 4/5	19 2/3	21 1/4	37
500-325	7 1/2	4/5	2 3/4	2/5	13 7/9	25 3/5	27 5/9	51 1/6
600-351	7 1/2	4/5	2 3/4	2/5	15 3/4	19 2/3	34 4/9	37
700-471	9	1	3 1/2	2/5	17 5/7	25 3/5	39 3/8	47 1/4
800-471	9	1	3 1/2	2/5	17 5/7	25 3/5	39 3/8	47 1/4

Installation types BG, CG, DG

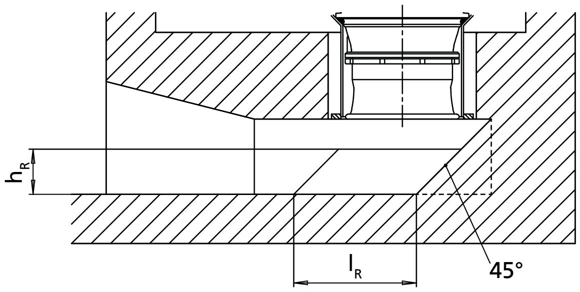


Fig. 11: Flow-straightening vane for covered intake chamber

Table 17: Dimensions [inch]

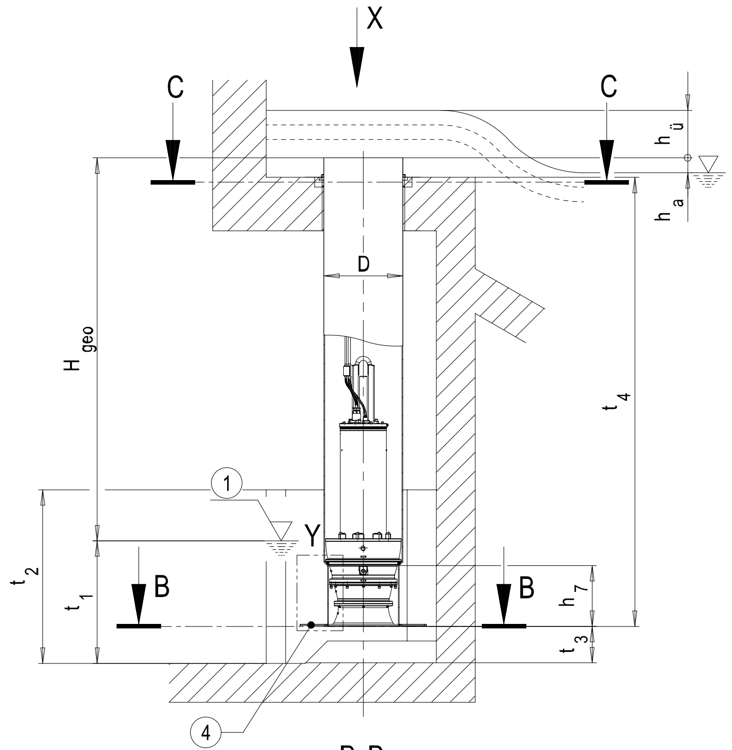
Size	h_R	s_1	s_2	s_R	l_R [28]
400-290	5 1/8	3/5	2 1/3	2/5	12 3/5
500-325	7 1/2	4/5	2 3/4	2/5	18 8/9
600-351	7 1/2	4/5	2 3/4	2/5	21 1/2
700-471	9	1	3 1/2	2/5	25 3/5
800-471	9	1	3 1/2	2/5	25 3/5

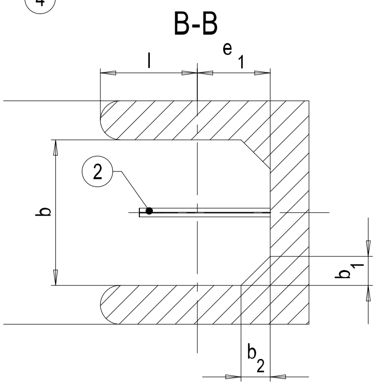
1580.399/01-EN-US

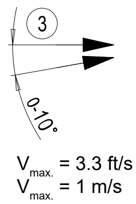
28 Adjust length IR of the flow-straightening vane to the 45° angle of the intake chamber.

General arrangement drawings [mm]

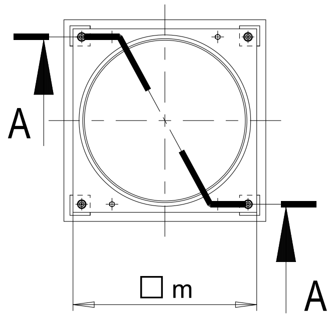
Installation types BU/BUS



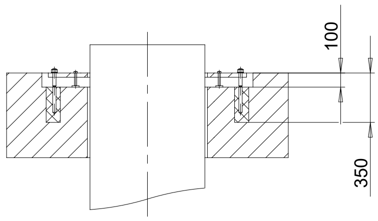




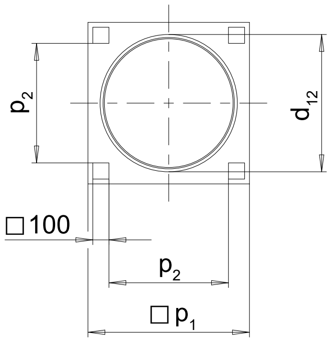
①: Minimum water level (values see diagram on the next pages)
②: Flow-straightening vane (⇨ Page 49)
③: Approach flow
④: Suction umbrella; option for reducing the minimum water level t_1



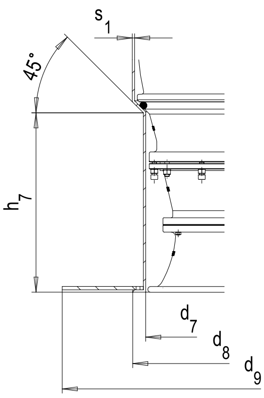
Detail X: Support plate of the discharge tube



Section A-A: Foundation recesses, dimensions in [mm]



Section C-C: Foundation recesses[29] Dimensions in [mm]



Detail Y: Seating ring

29 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 18: Dimensions [mm]

Size	D	b	b_1		b_2		d_7	d_8	d_9	d_{12}
			Suction umbrella		Suction umbrella					
			✗	✓	✗	✓				
			d_8	d_9	d_8	d_9				
400-290	406	880	175	–	175	–	350	405	650	450
500-325	508	1250	250	–	250	–	440	505	800	550
600-351	610	1250	250	–	250	–	500	610	800	650
700-471	711	1500	300	–	300	–	600	710	1100	750
800-471	813	1500	300	–	300	–	600	710	1100	850

Table 19: Dimensions [mm]

Size	e_1[30]		h_a	h_7	$l_{min.}$	m	p_1	p_2	s_1	t_3[30]	$t_{4\ min.}$[31]
	Suction umbrella										
	✗	✓									
	d_8	d_9									
400-290	300	425	100	225	500	500	600	340	7	210	1650
500-325	350	500	100	420	850	600	700	440	7	270	1750
600-351	400	500	100	540	850	700	800	540	8	320	1800
700-471	450	650	100	420	1050	800	900	640	8	380	2400
800-471	450	650	100	420	1050	910	1000	740	8	380	2750

Loss diagram

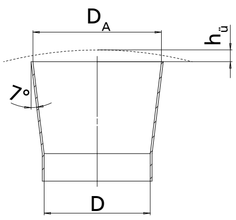
Calculation formulas:

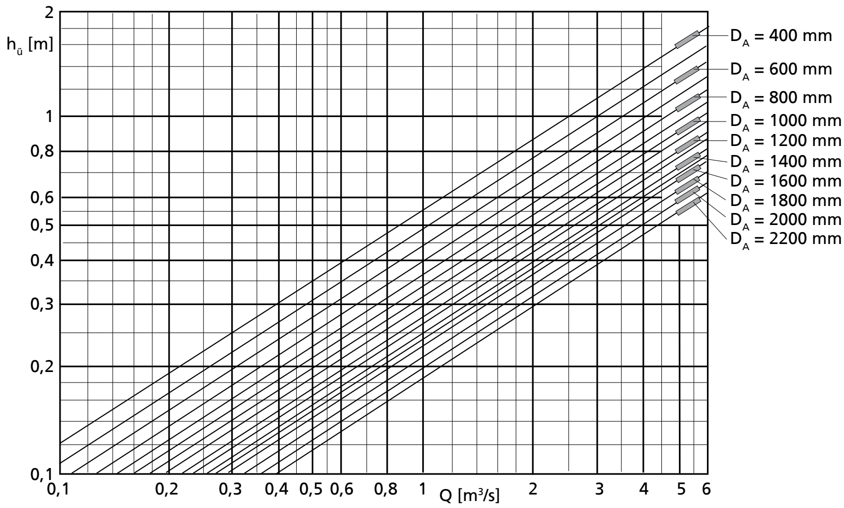
$H = H_{geo} + \Delta H_v$

ΔH_v

- Overflow head $h_ü$ (see diagram)
- Loss in the riser (pipe friction)
- Outlet loss $v^2 / 2g$ (v refers to D_A)

Overflow head $h_ü$ depends on Q and the discharge diameter D_A. The characteristic curve values only apply to unimpeded outlet in all directions; otherwise they are approximate values only.





1580.399/01-EN-US

30 Observe this dimension.
31 Value for maximum motor length

Minimum water level diagrams

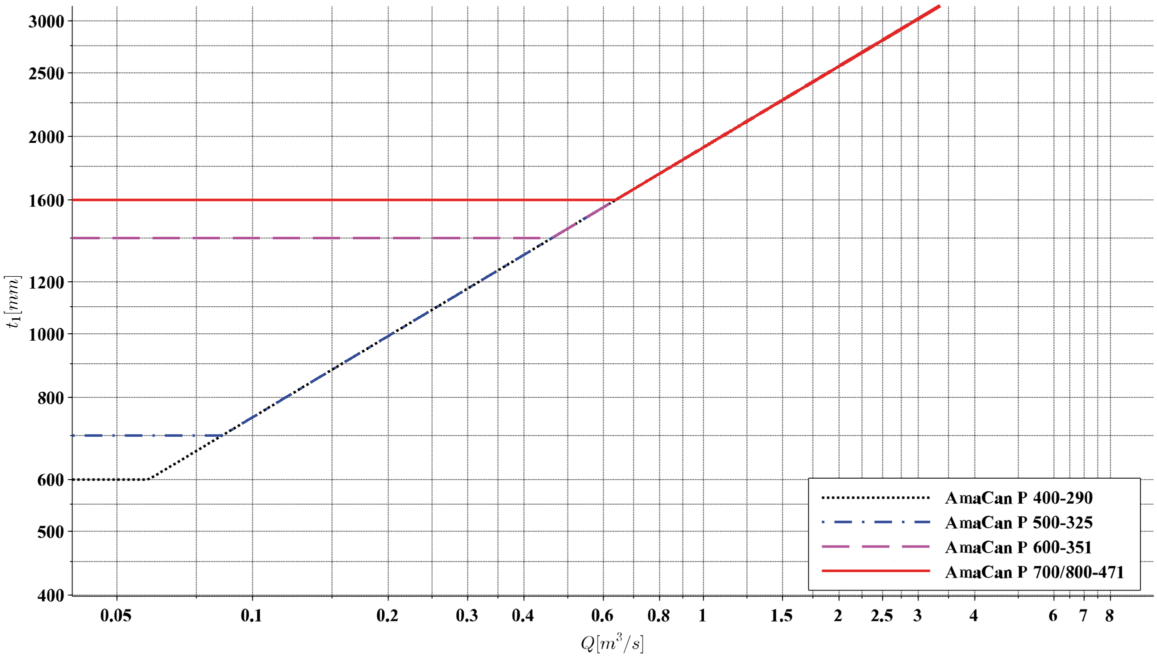


Fig. 12: Installation type BU: Open intake chamber, design without suction umbrella Ø d_8

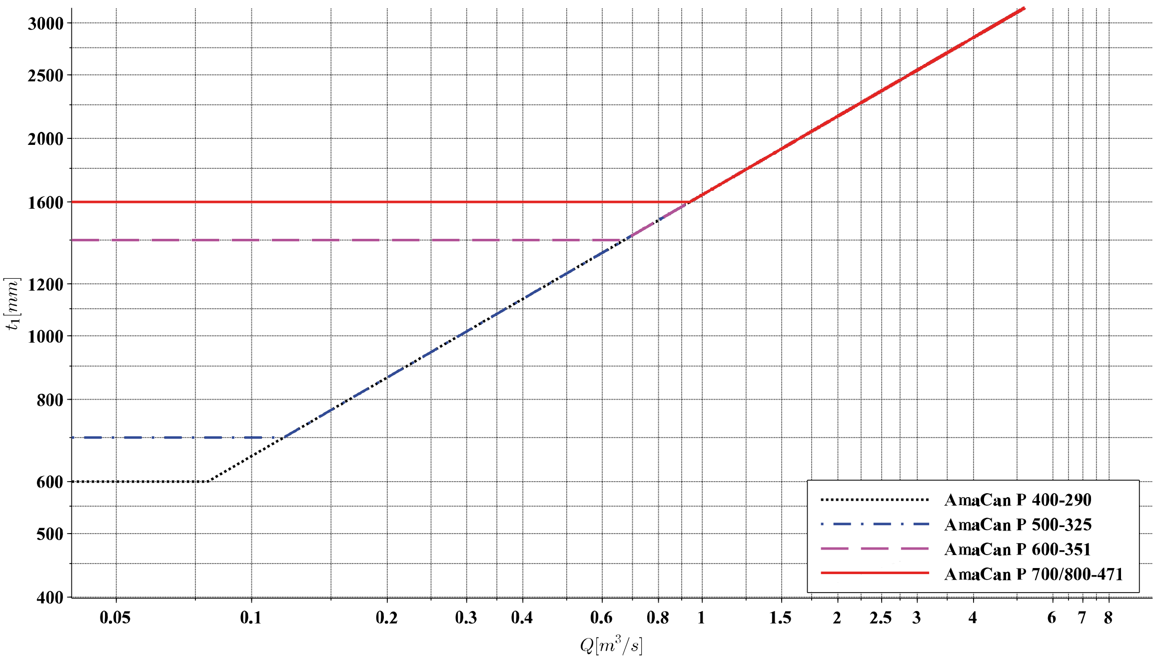
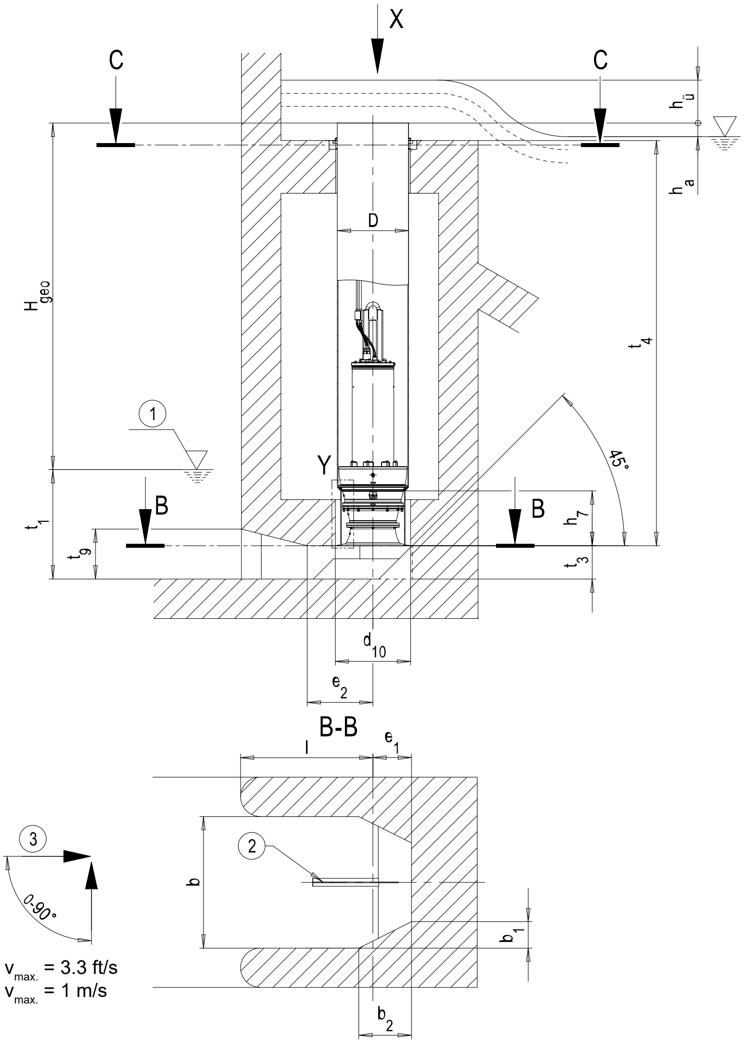


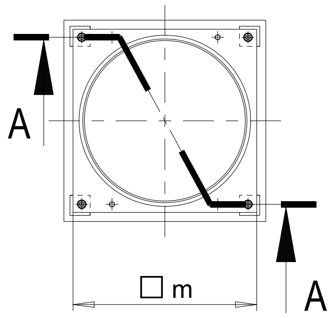
Fig. 13: Installation type BUS: Open intake chamber, design with suction umbrella Ø d_9

1580.399/01-EN-US

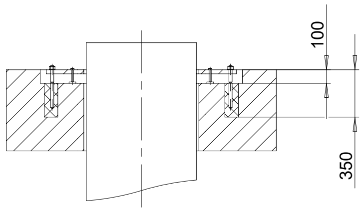
Installation type BG



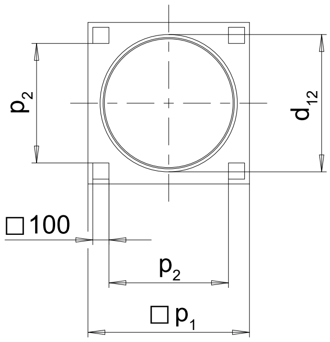
①: Minimum water level (values see diagrams on the following pages)
②: Flow-straightening vane (⇨ Page 49)
③: Approach flow



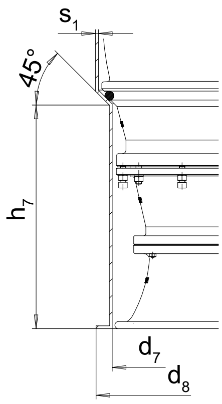
Detail X: Support plate of the discharge tube



Section A-A: Foundation recesses, dimensions in [mm]



Section C-C: Foundation recesses[32] Dimensions in [mm]



Detail Y: Seating ring

1580.399/01-EN-US

32 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 20: Dimensions [mm]

Size	D	b	b_1	b_2	d_7	d_8	d_{10}	d_{12}	e_1[33]	e_2	h_a
400-290	406	880	175	350	350	405	455	450	265	440	100
500-325	508	1250	250	500	440	505	555	550	375	625	100
600-351	610	1250	250	500	500	610	660	650	375	625	100
700-471	711	1500	300	600	600	710	760	750	450	750	100
800-471	813	1500	300	600	600	710	760	850	450	750	100

Table 21: Dimensions [mm]

Size	h_7	$l_{min.}$	m	p_1	p_2	s_1	t_3[34]	$t_{4\ min.}$[35]	t_9
400-290	225	880	500	600	340	7	210	1650	330
500-325	420	1250	600	700	440	7	270	1750	375
600-351	540	1250	700	800	540	8	320	1800	470
700-471	420	1500	800	900	640	8	380	2400	570
800-471	420	1500	910	1000	740	8	380	2750	570

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH

Loss diagram

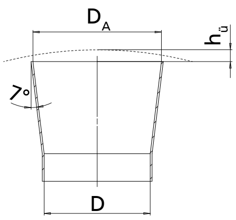
Calculation formulas:

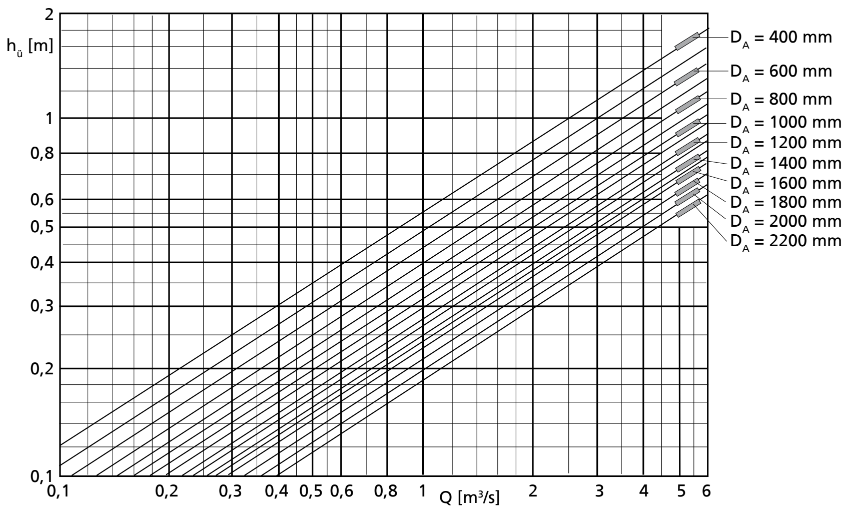
$H = H_{geo} + \Delta H_v$

ΔH_v

- Overflow head $h_ü$ (see diagram)
- Loss in the riser (pipe friction)
- Outlet loss $v^2 / 2\,g$ (v refers to D_A)

Overflow head $h_ü$ depends on Q and the discharge diameter D_A. The characteristic curve values only apply to unimpeded outlet in all directions; otherwise they are approximate values only.





1580.399/01-EN-US

33 Observe this dimension.
34 Observe this dimension.
35 Value for maximum motor length

Minimum water level diagrams

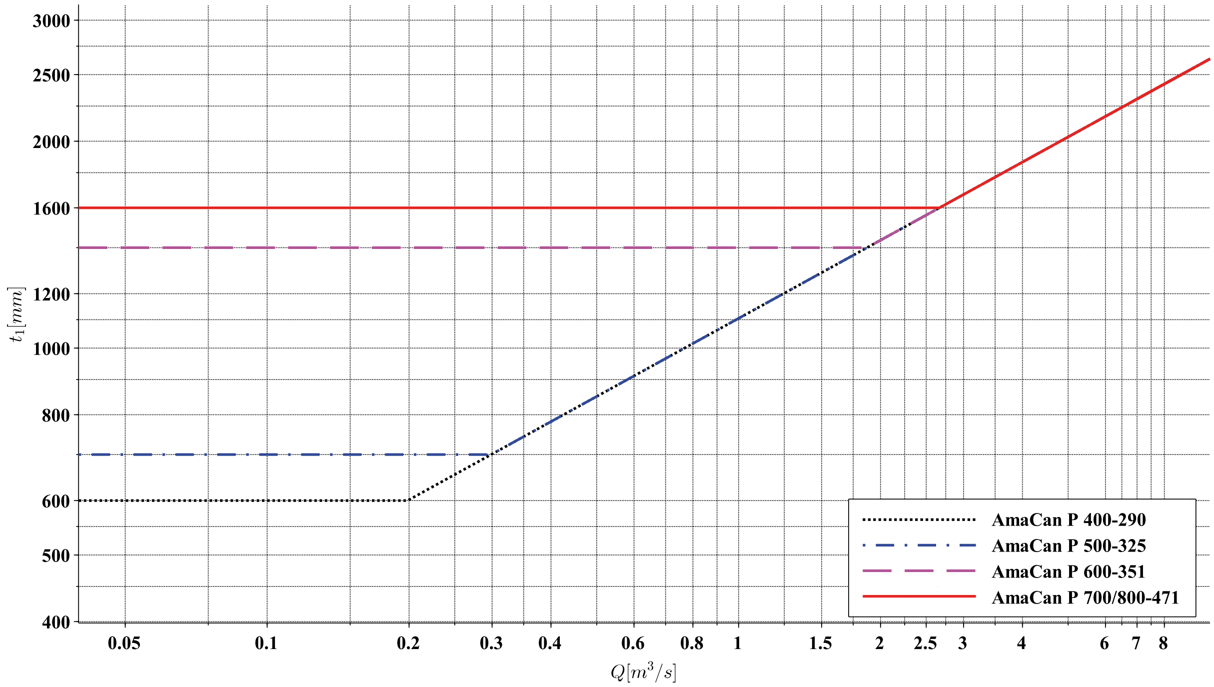
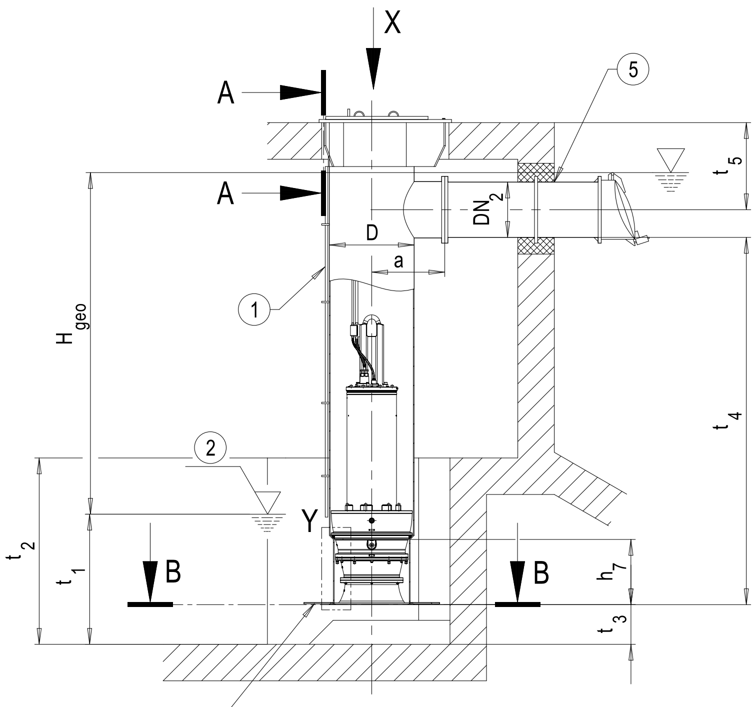
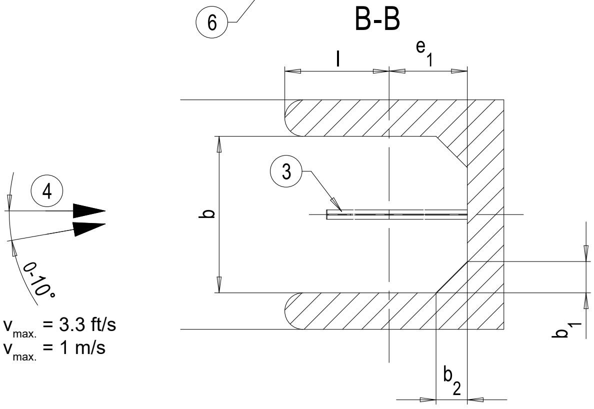


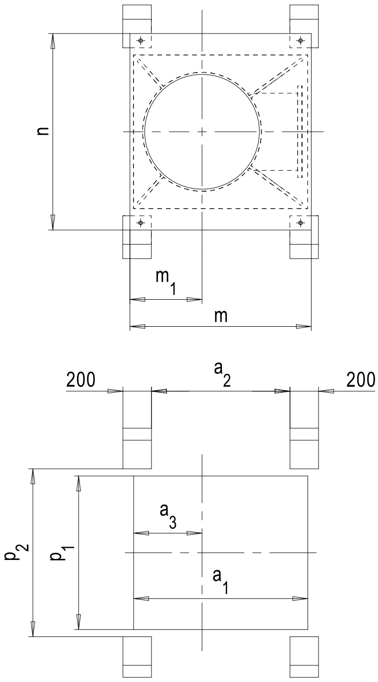
Fig. 14: Installation type BG: Covered intake chamber

1580.399/01-EN-US

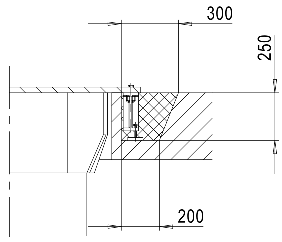
Installation types CU/CUS



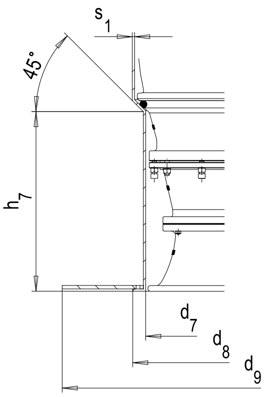




Detail X: Support plate of the discharge tube, foundation recesses[36)] Dimensions in [mm]



Section A-A: Foundation recesses, dimensions in [mm]



Detail Y: Seating ring

①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 49)
④: Approach flow
⑤: Connect the discharge pipe to the discharge pipe without transmitting any stresses or strains.
⑥: Suction umbrella - Option for reducing the minimum water level t_1

1580.399/01-EN-US

36 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 22: Dimensions [mm]

Size	$DN_{2\ min.}$	$DN_{2\ max.}$	D	a	a_1	a_2	a_3	b	b_1		b_2		d_7
									Suction umbrella		Suction umbrella		
									✗	✓	✗	✓	
									d_8	d_9	d_8	d_9	
400-290	250	400	406	420	720	470	275	880	175	–	175	–	350
500-325	300	500	508	530	880	630	325	1250	250	–	250	–	440
600-351	350	600	610	610	1000	750	380	1250	250	–	250	–	500
700-471	400	700	711	650	1120	870	430	1500	300	–	300	–	600
800-471	500	800	813	700	1220	970	480	1500	300	–	300	–	600

Table 23: Dimensions [mm]

Size	d_8	d_9	e_1 [37]		h_7	$l_{min.}$	m	m_1	n	p_1	p_2	s_1	t_3 [37]	$t_{4\ min.}$ [38]	$t_{5\ min.}$ [39]
			Suction umbrella												
			✗	✓											
			d_8	d_9											
400-290	405	650	300	425	225	500	770	300	960	660	760	7	210	1750	620
500-325	505	800	350	500	420	850	930	350	1060	760	860	7	270	1850	670
600-351	610	800	400	500	540	850	1050	405	1160	860	960	8	320	1900	720
700-471	710	1100	450	650	420	1050	1170	455	1260	960	1060	8	380	2500	770
800-471	710	1100	450	650	420	1050	1270	505	1375	1075	1175	8	380	2850	835

t_2 = 1.1 x water level, maximum 2 x t_1
Height of corner lining (b_1 and b_2) like t_2

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH

Loss diagram

Calculation formulas:

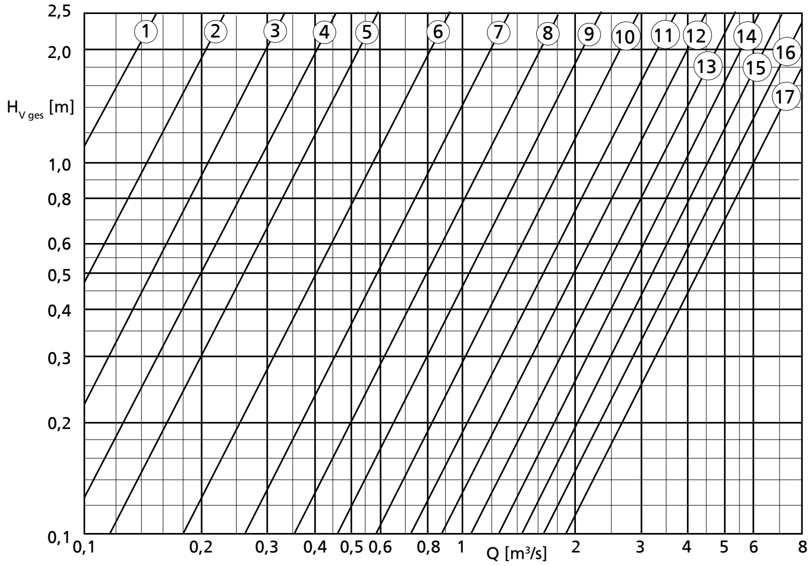
$H = H_{geo} + \Delta H_v$

ΔH_v
- Loss in the riser (pipe friction)
- $H_{v\ ges.}$ (see diagram)

$H_{v\ ges.}$ comprises:
- Elbow
- Discharge pipe length = 5 x DN_2
- Swing check valve
- Outlet losses $v^2/2g$

1580.399/01-EN-US

37 Observe this dimension.
38 Value for maximum motor length
39 Selected for DN2 max.



① - DN_2 = 200 mm
② - DN_2 = 250 mm
③ - DN_2 = 300 mm
④ - DN_2 = 350 mm
⑤ - DN_2 = 400 mm
⑥ - DN_2 = 500 mm
⑦ - DN_2 = 600 mm
⑧ - DN_2 = 700 mm
⑨ - DN_2 = 800 mm
⑩ - DN_2 = 900 mm
⑪ - DN_2 = 1000 mm
⑫ - DN_2 = 1100 mm
⑬ - DN_2 = 1200 mm
⑭ - DN_2 = 1300 mm
⑮ - DN_2 = 1400 mm
⑯ - DN_2 = 1500 mm
⑰ - DN_2 = 1600 mm

Minimum water level diagrams

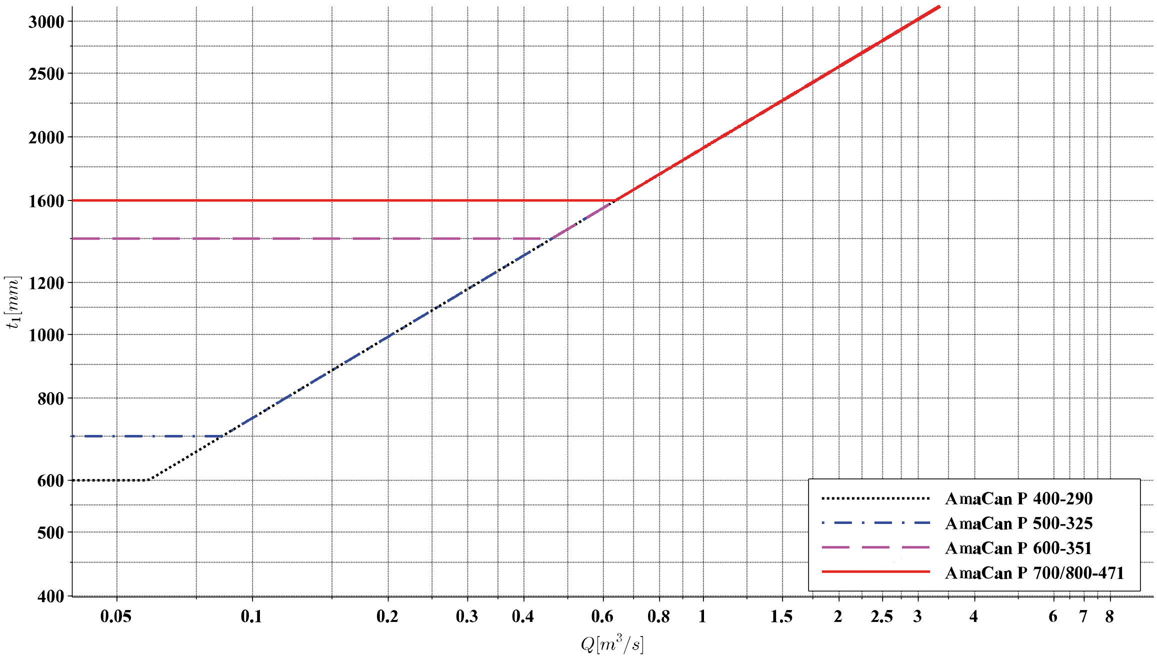


Fig. 15: Installation type CU: Open intake chamber, design without suction umbrella Ø d_8

1580.399/01-EN-US

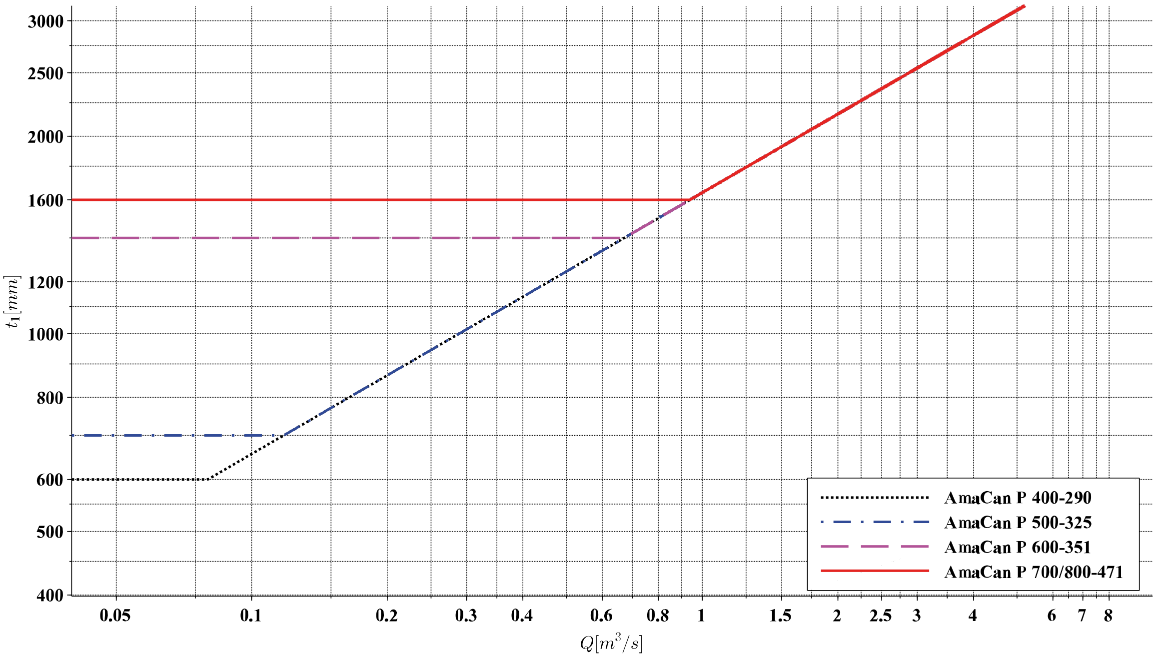
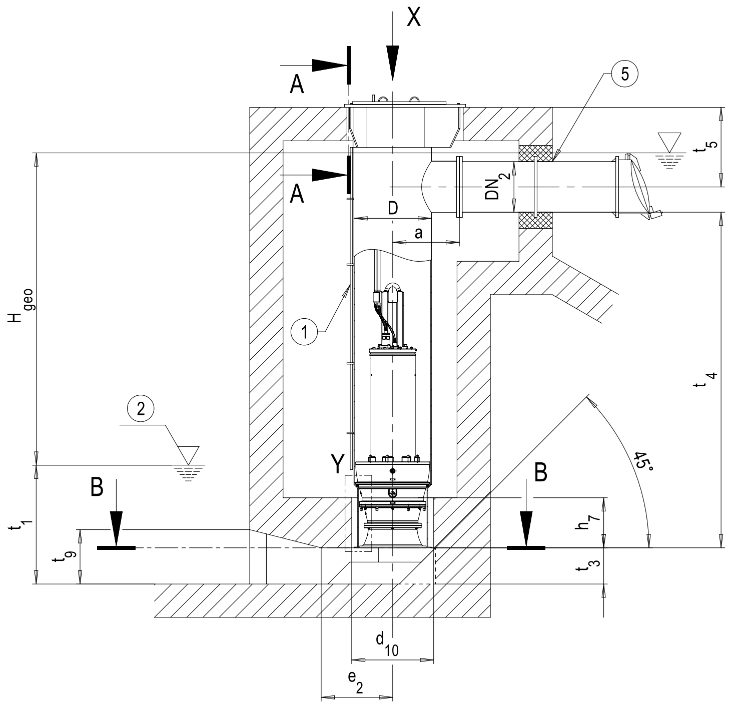
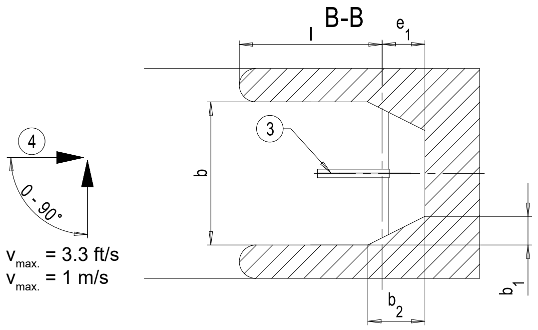


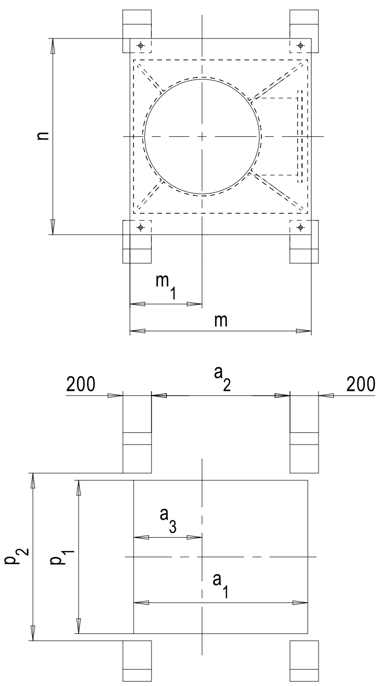
Fig. 16: Installation type CUS: Open intake chamber, design with suction umbrella Ø d_9

1580.399/01-EN-US

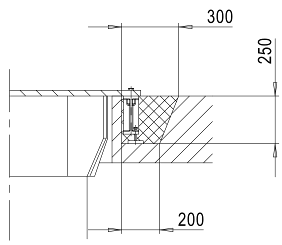
Installation type CG



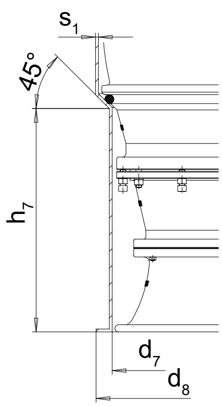




Detail X: Support plate of the discharge tube, foundation recesses[40] Dimensions in [mm]



Section A-A: Foundation recesses, dimensions in [mm]



Detail Y: Seating ring

①: Vent line
②: Minimum water level (values see diagram on the next page)
③: Flow-straightening vane (⇨ Page 49)
④: Approach flow
⑤: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.

Table 24: Dimensions [mm]

Size	$DN_{2\ min.}$	$DN_{2\ max.}$	D	a	a_1	a_2	a_3	b	b_1	b_2	d_7	d_8	d_{10}
400-290	250	400	406	420	720	470	275	880	175	350	350	405	455
500-325	300	500	508	530	880	630	325	1250	250	500	440	505	555
600-351	350	600	610	610	1000	750	380	1250	250	500	500	610	660
700-471	400	700	711	650	1120	870	430	1500	300	600	600	710	760
800-471	500	800	813	700	1220	970	480	1500	300	600	600	710	760

40 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

1580.399/01-EN-US

Table 25: Dimensions [mm]

Size	e_1[41]	e_2	h_7	$l_{min.}$	m	m_1	n	p_1	p_2	s_1	t_3[41]	$t_{4\,min.}$[42]	$t_{5\,min.}$[43]	t_9
400-290	265	440	225	880	770	300	960	660	760	7	210	1750	620	330
500-325	375	625	420	1250	930	350	1060	760	860	7	270	1850	670	375
600-351	375	625	540	1250	1050	405	1160	860	960	8	320	1900	720	470
700-471	450	750	420	1500	1170	455	1260	960	1060	8	380	2500	770	570
800-471	450	750	420	1500	1270	505	1375	1075	1175	8	380	2850	835	570

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH
- Discharge flanges to DIN EN 1092-1 PN6 / DIN EN 1092-2 PN6

Loss diagram

Calculation formulas:

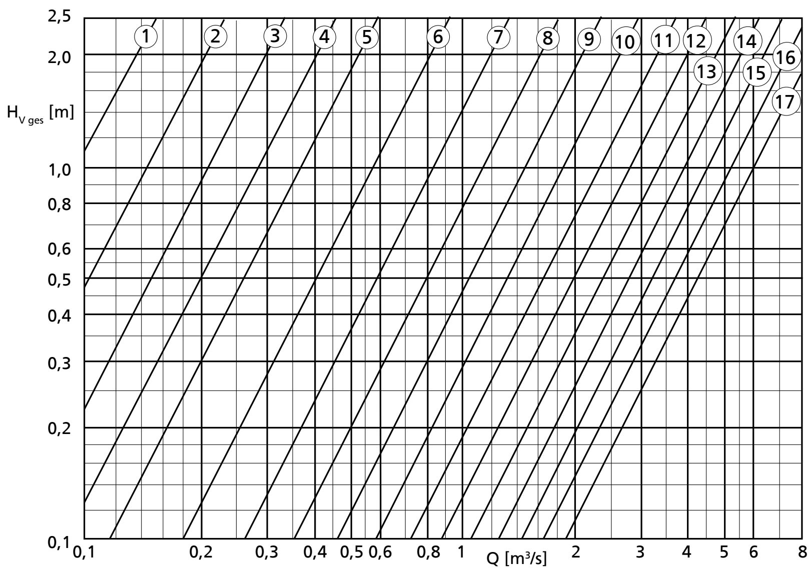
$H = H_{geo} + \Delta H_v$

ΔH_v

- Loss in the riser (pipe friction)
- $H_{v\,ges.}$ (see diagram)

$H_{v\,ges.}$ comprises:

- Elbow
- Discharge pipe length = 5 x DN_2
- Swing check valve
- Outlet losses $v^2/2g$



① - DN_2 = 200 mm
② - DN_2 = 250 mm
③ - DN_2 = 300 mm
④ - DN_2 = 350 mm
⑤ - DN_2 = 400 mm
⑥ - DN_2 = 500 mm
⑦ - DN_2 = 600 mm
⑧ - DN_2 = 700 mm
⑨ - DN_2 = 800 mm
⑩ - DN_2 = 900 mm
⑪ - DN_2 = 1000 mm
⑫ - DN_2 = 1100 mm
⑬ - DN_2 = 1200 mm
⑭ - DN_2 = 1300 mm
⑮ - DN_2 = 1400 mm
⑯ - DN_2 = 1500 mm
⑰ - DN_2 = 1600 mm

1580.399/01-EN-US

41 Observe this dimension.
42 Value for maximum motor length
43 Selected for DN2 max.

Minimum water level diagrams

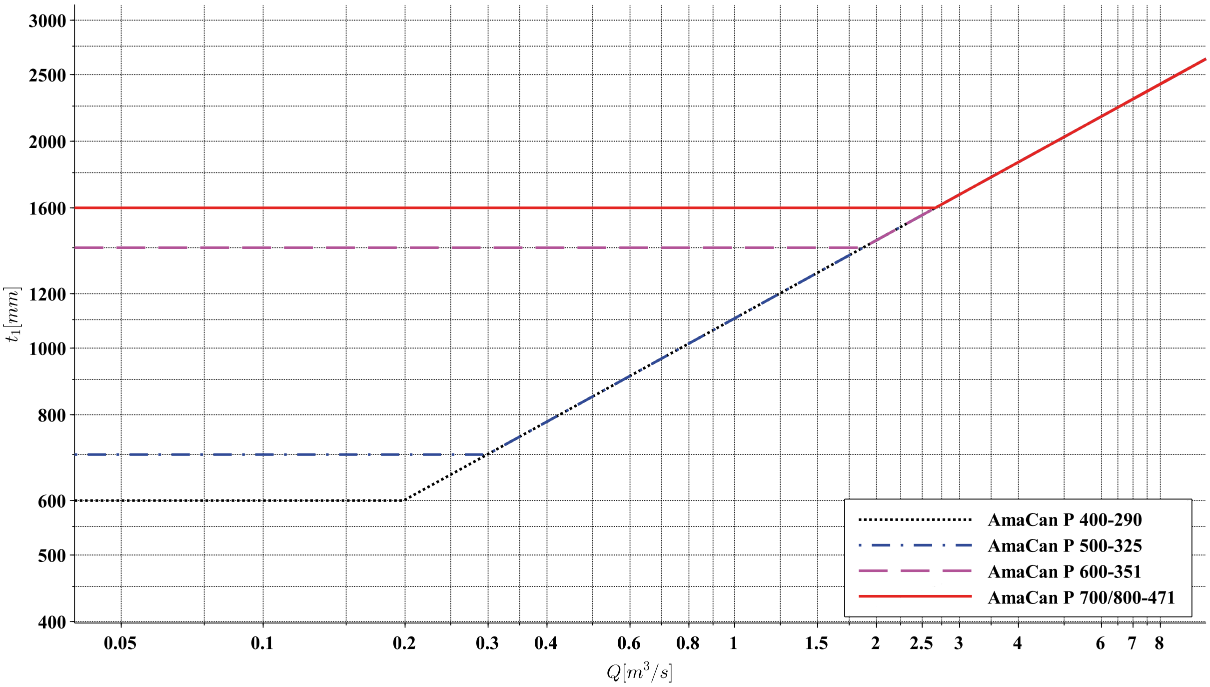
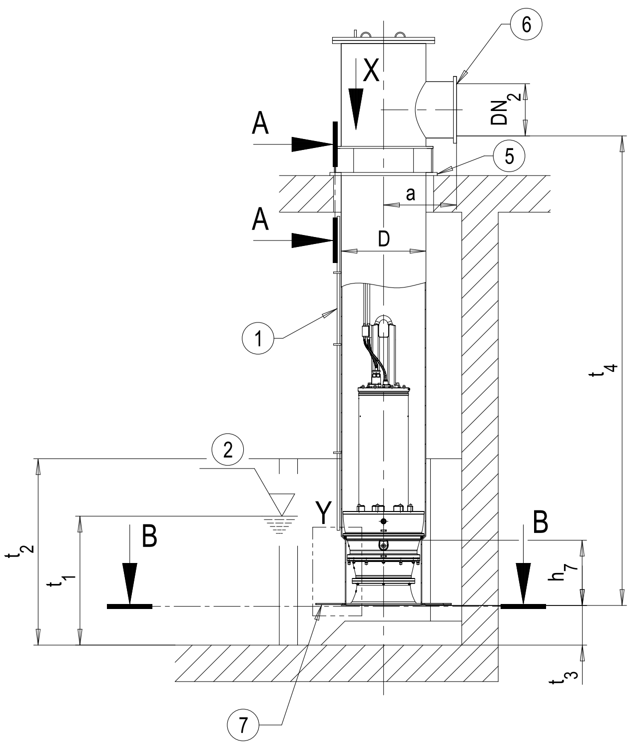
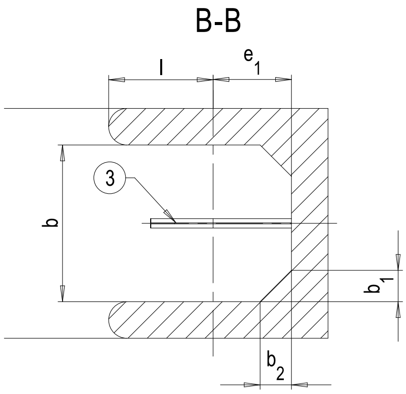


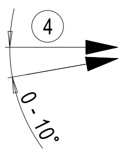
Fig. 17: Installation type CG: Covered intake chamber

1580.399/01-EN-US

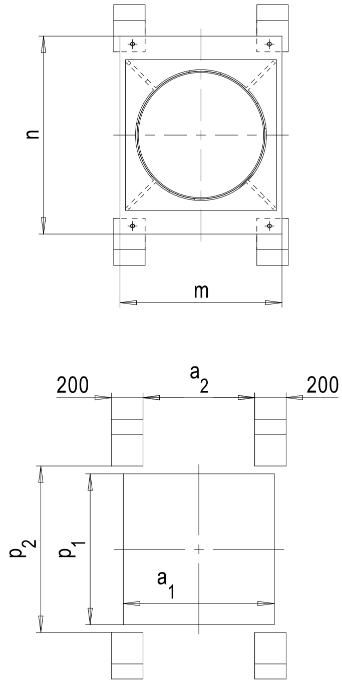
Installation types DU/DUS



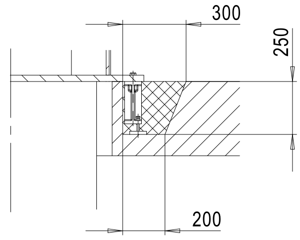




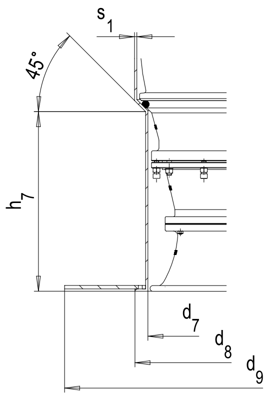
$v_{max.}$ = 3.3 ft/s
$v_{max.}$ = 1 m/s



Detail X: Support plate of the discharge tube, foundation recesses[44)] Dimensions in [mm]



Section A-A: Foundation recesses, dimensions in [mm]



Detail Y: Seating ring

①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 49)
④: Approach flow
⑤: Not pressure-proof
⑥: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.
⑦: Suction umbrella; option for reducing the minimum water level t_1

1580.399/01-EN-US

44 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 26: Dimensions [mm]

Size	$DN_{2\,min.}$	DN_2 max.	D	a	a_1	a_2	b	b_1		b_2	
								Suction umbrella		Suction umbrella	
								✘	✓	✘	✓
								d_8	d_9	d_8	d_9
400-290	250	400	406	420	550	300	880	175	–	175	–
500-325	300	500	508	530	650	400	1250	250	–	250	–
600-351	350	600	610	610	760	510	1250	250	–	250	–
700-471	400	700	711	650	860	610	1500	300	–	300	–
800-471	500	800	813	700	960	710	1500	300	–	300	–

Table 27: Dimensions [mm]

Size	d_7	d_8	d_9	e_1[45]		h_7	$l_{min.}$	m	n	p_1	p_2	s_1	t_3[45]	$t_{4\,min.}$[46]
				Suction umbrella										
				✘	✓									
				d_8	d_9									
400-290	350	405	650	300	425	225	500	620	860	550	650	7	210	1750
500-325	440	505	800	350	500	420	850	720	960	650	750	7	270	1850
600-351	500	610	800	400	500	540	850	830	1060	760	860	8	320	1900
700-471	600	710	1100	450	650	420	1050	930	1160	860	960	8	380	2500
800-471	600	710	1100	450	650	420	1050	1030	1260	960	1060	8	380	2850

t_2 = 1.1 x water level, maximum 2 x t_1
Height of corner lining (b_1 and b_2) like t_2

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH
- Discharge flanges to DIN EN 1092-1 PN6 / DIN EN 1092-2 PN6

Loss diagram

Calculation formulas:

$H = H_{geo} + \Delta H_v$

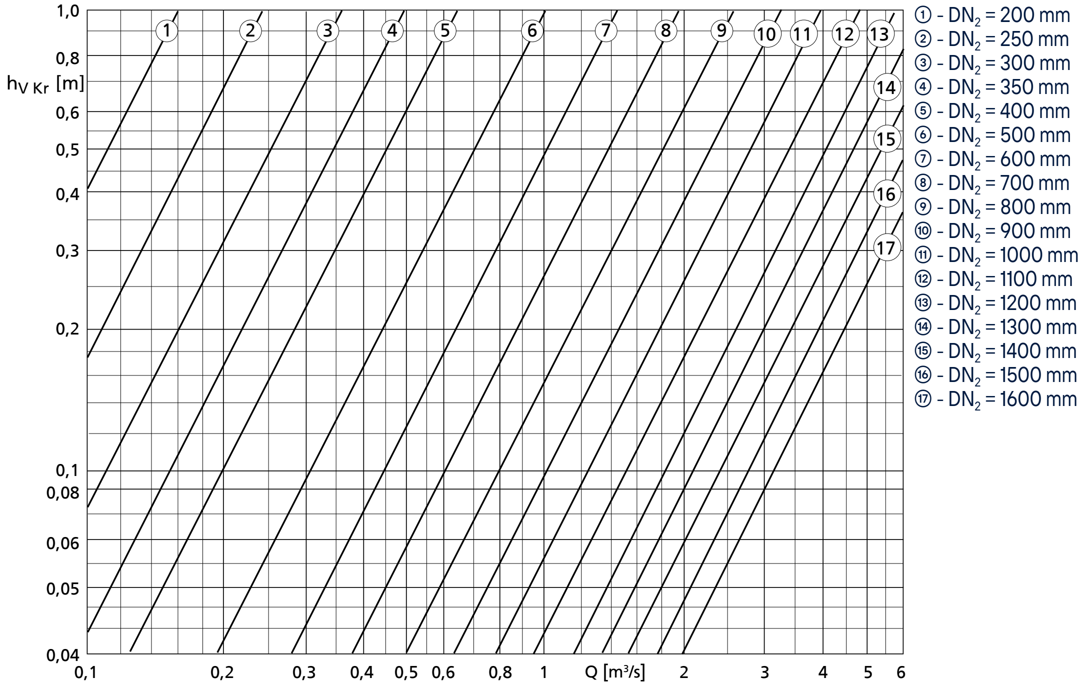
ΔH_v

- Loss in the elbow $h_{V\,Kr}$ (see diagram)
- Loss in the riser (pipe friction)
- $H_{V\,Anl.}$ (valves, etc.)

$H_{V\,Anl.}$ must be determined for the specific system.

1580.399/01-EN-US

45 Observe this dimension.
46 Value for maximum motor length



Minimum water level diagrams

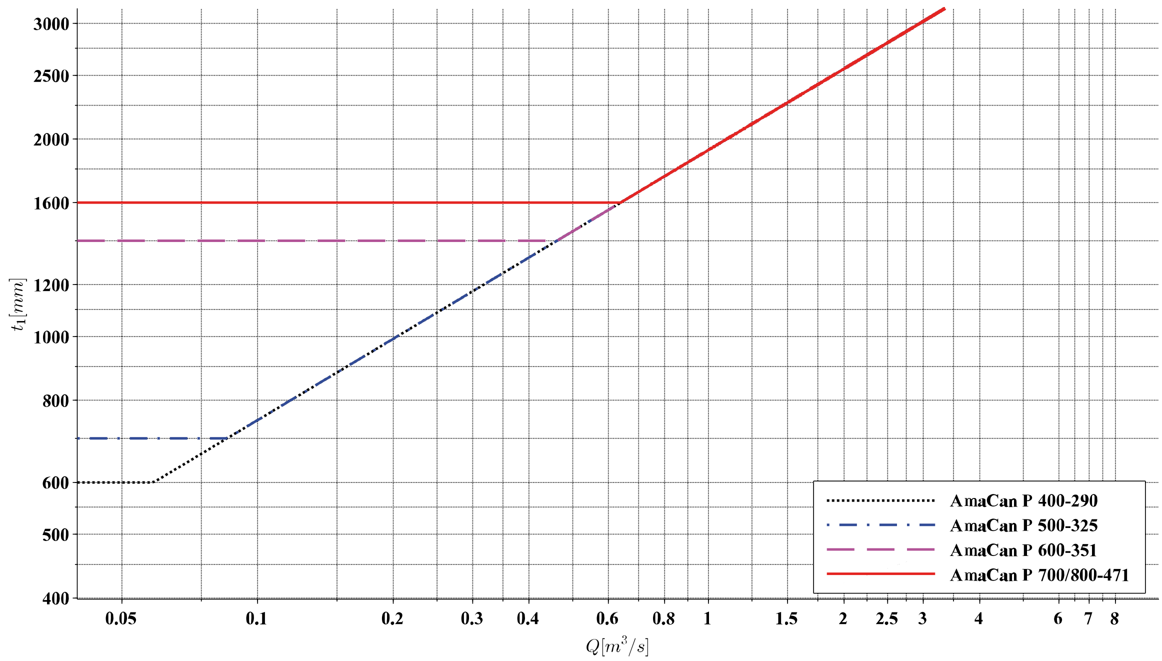


Fig. 18: Installation type DU: Open intake chamber, design without suction umbrella Ø d_8

1580.399/01-EN-US

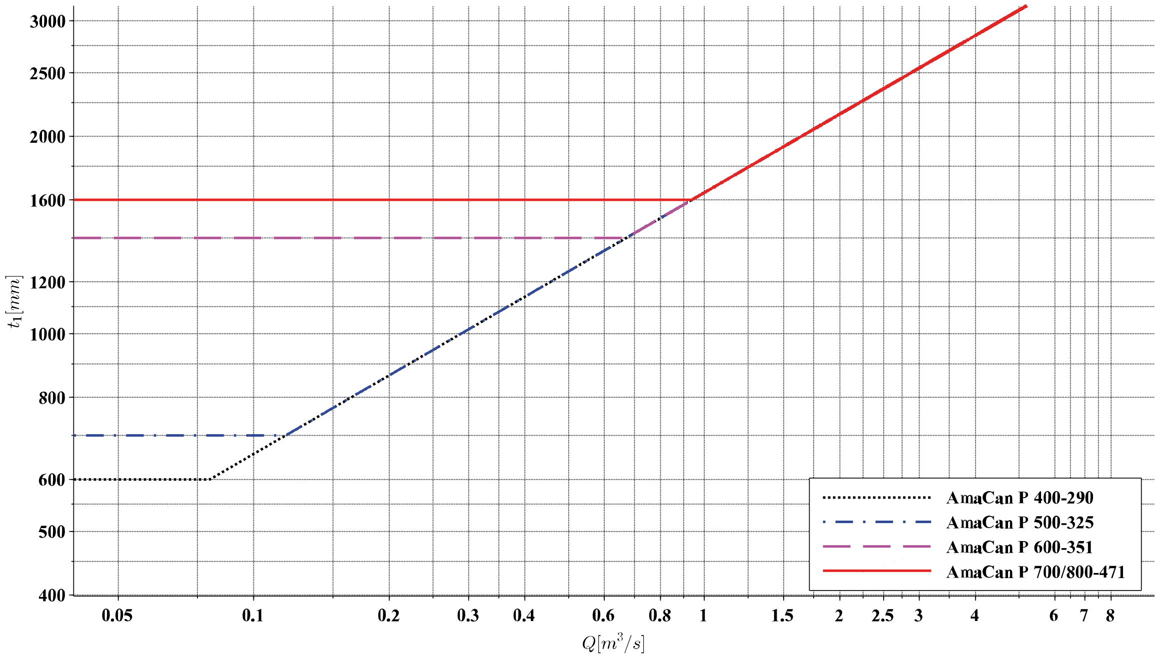
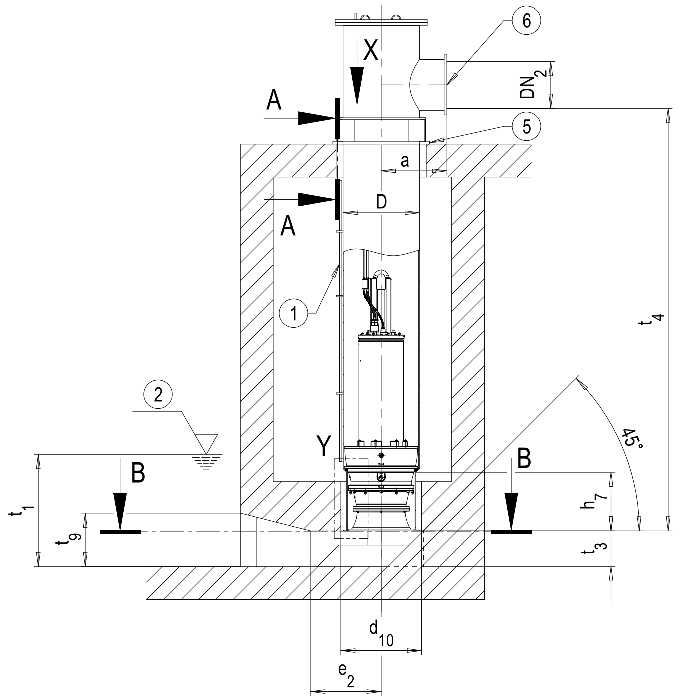
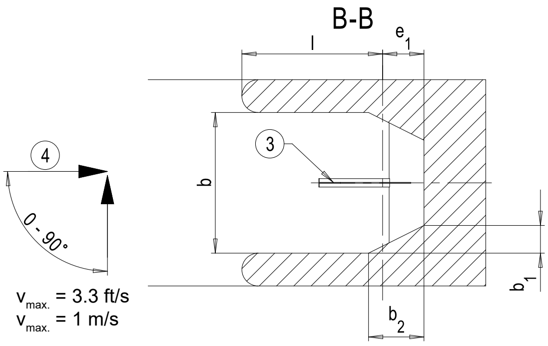


Fig. 19: Installation type DUS: Open intake chamber, design with suction umbrella Ø d_9

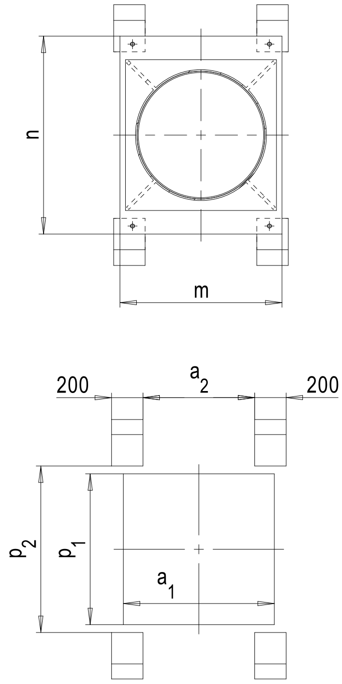
1580.399/01-EN-US

Installation type DG

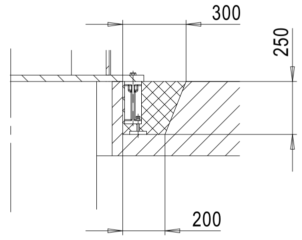




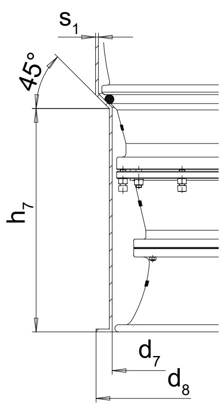
①: Vent line
②: Minimum water level (values see diagram on the next pages)
③: Flow-straightening vane (⇨ Page 49)
④: Approach flow
⑤: Not pressure-proof
⑥: Connect the discharge pipe to the discharge tube without transmitting any stresses or strains.



Detail X: Support plate of the discharge tube, foundation recesses[47] Dimensions in [mm]



Section A-A: Foundation recesses, dimensions in [mm]



Detail Y: Seating ring

1580.399/01-EN-US

Table 28: Dimensions [mm]

Size	$DN_{2\,min.}$	$DN_{2\,max.}$	D	a	a_1	a_2	b	b_1	b_2	d_7	d_8	d_{10}
400-290	250	400	406	420	550	300	880	175	350	350	405	455
500-325	300	500	508	530	650	400	1250	250	500	440	505	555
600-351	350	600	610	610	760	510	1250	250	500	500	610	660
700-471	400	700	711	650	860	610	1500	300	600	600	710	760
800-471	500	800	813	700	960	710	1500	300	600	600	710	760

47 All dimensions for foundation recesses apply to discharge tube design without intermediate flange.

Table 29: Dimensions [mm]

Size	e_1 [48]	e_2	h_7	$l_{min.}$	m	n	p_1	p_2	s_1	t_3 [48]	$t_{4\,min.}$ [49]	t_9
400-290	265	440	225	880	620	860	550	650	7	210	1750	330
500-325	375	625	420	1250	720	960	650	750	7	270	1850	375
600-351	375	625	540	1250	830	1060	760	860	8	320	1900	470
700-471	450	750	420	1500	930	1160	860	960	8	380	2500	570
800-471	450	750	420	1500	1030	1260	960	1060	8	380	2850	570

Permissible dimensional tolerances:

- Tolerances in building construction to DIN 18202, Part 4, Group B
- Welded design: B/F to DIN EN ISO 13920
- Tolerances for conical seat (detail Y): ISO 2768-mH
- Discharge flanges to ISO 7005/2, DIN 2501 PN6

Loss diagram

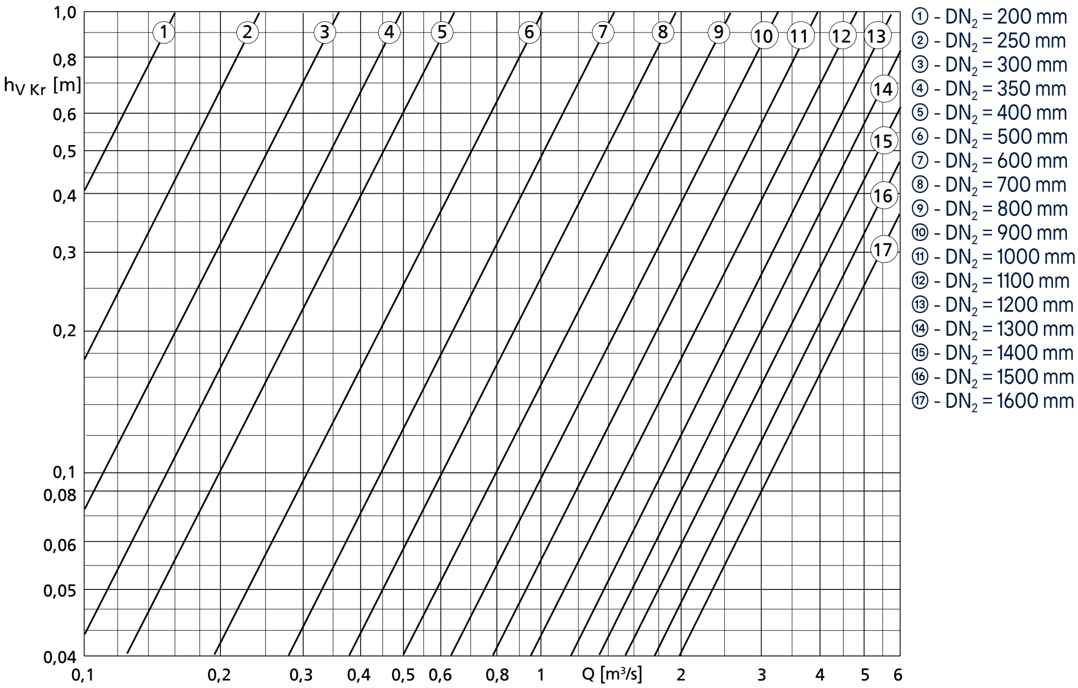
Calculation formulas:

$H = H_{geo} + \Delta H_v$

ΔH_v

- Loss in the elbow $h_{V\,Kr}$ (see diagram)
- Loss in the riser (pipe friction)
- $H_{V\,Anl.}$ (valves, etc.)

$H_{V\,Anl.}$ must be determined for the specific system.



1580.399/01-EN-US

48 Observe this dimension.
49 Value for maximum motor length

Minimum water level diagrams

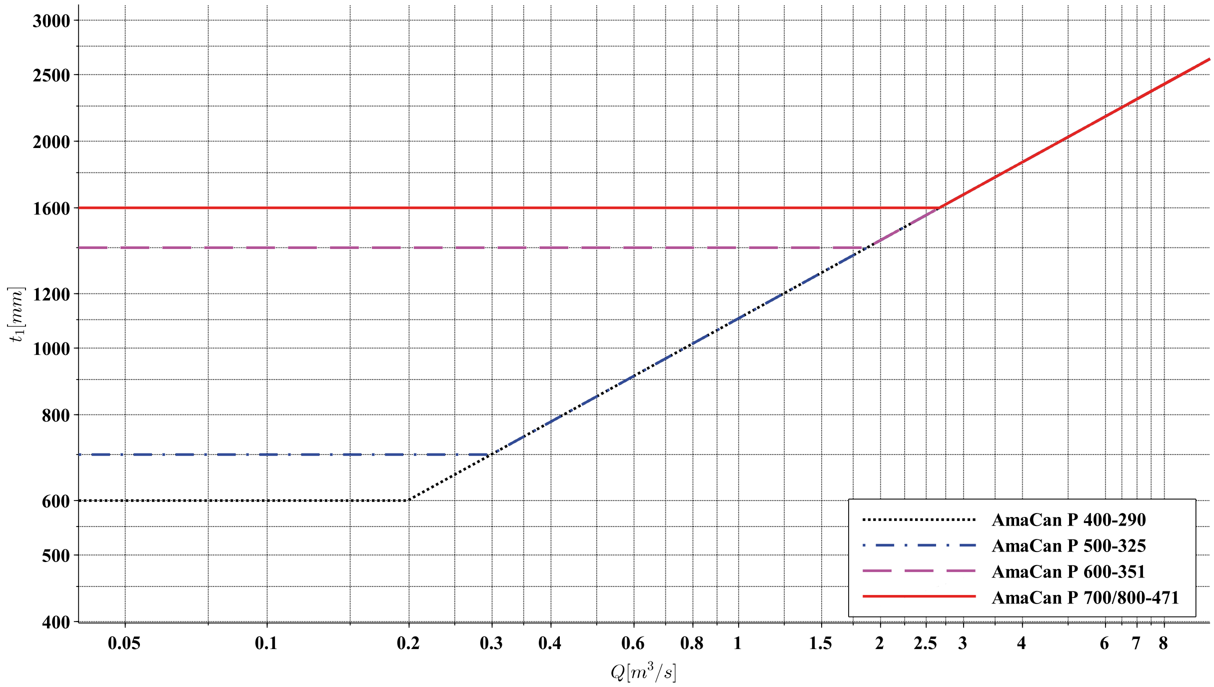


Fig. 20: Installation type DG: Covered intake chamber

1580.399/01-EN-US

Dimensions of the flow-straightening vane

Design of the intake chamber wall surfaces (to prevent vortex formation)

The flow-straightening vane is indispensable for the inlet conditions of the pump set. It prevents the development of a submerged vortex (floor vortex) which could cause a drop in performance, for example. In addition, the floor and wall surfaces of the intake chamber should be designed as a rough concrete surface. Rough surfaces minimize the separation of boundary layers that may cause wall and floor vortices.

Flow-straightening vane and intake chamber

- The anti-swirl baffles in the bellmouth must be aligned with the flow-straightening vane.
- The bail of the pump is oriented in the same direction as the anti-swirl baffles in the bellmouth.

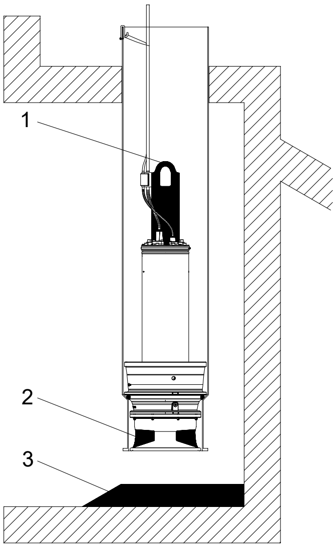
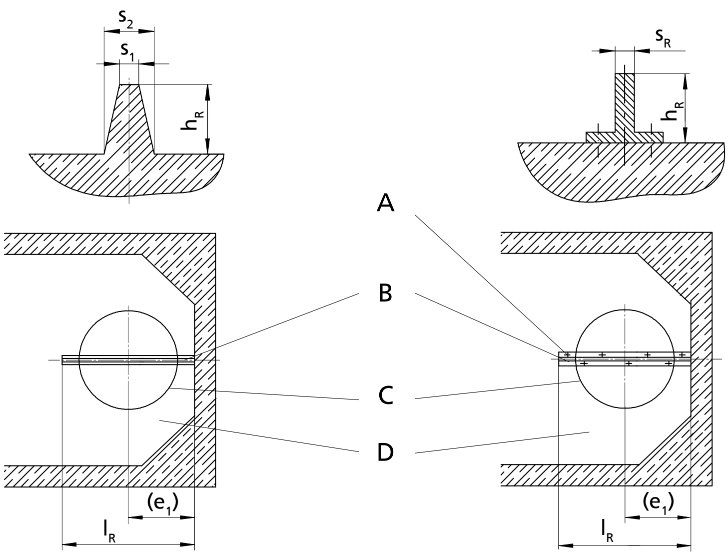


Fig. 21: Installation position of the pump set

1	Bail
2	Anti-swirl baffles
3	Flow-straightening vane

Variant 1
Flow-straightening vane cast from concrete

Variant 2
Steel section



A	Bolted to the floor of the intake chamber
B	Flow-straightening vane centered beneath the discharge tube
C	Discharge tube
D	Intake chamber

1580.399/01-EN-US

Installation types BU, BUS, CU, CUS, DU, DUS

Table 30: Dimensions [mm]

Size	h_R	s_1	s_2	s_R	(e_1)		l_R	
					Suction umbrella		Suction umbrella	
					✗	✓	✗	✓
					d_8	d_9	d_8	d_9
400-290	130	15	60	10	300	500	540	940
500-325	190	20	70	10	350	650	700	1300
600-351	190	20	70	10	400	500	875	940
700-471	230	25	90	10	450	650	1000	1200
800-471	230	25	90	10	450	650	1000	1200

Installation types BG, CG, DG

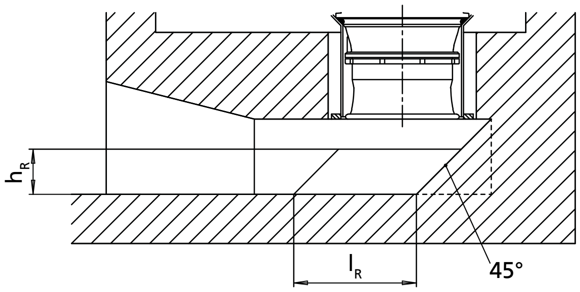


Fig. 22: Flow-straightening vane for covered intake chamber

Table 31: Dimensions [mm]

Size	h_R	s_1	s_2	s_R	l_R[50]
400-290	130	15	60	10	320
500-325	190	20	70	10	480
600-351	190	20	70	10	545
700-471	230	25	90	10	650
800-471	230	25	90	10	650

1580.399/01-EN-US

50 Adjust length IR of the flow-straightening vane to the 45° angle of the intake chamber.

2025-06-18

1580.399/01-EN-US

KSB SE & Co. KGaA
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0
www.ksb.com