

Boiler feed pumps

ES series

with mechanical seal or packing gland

PN 40 or PN 63

Research and development with recent test stands



Computer-controlled and fully automated test stands on the premises of Speck in Roth.

Measuring of hydraulics, power requirements, axial thrust, vibrations and NPSH values. Heads of up to 400 m and flow rates of up to 750 m³/h are possible.



Thermal oil test stand with pump surveillance system on the premises of Speck in Roth.

Research of impacts of high temperatures up to 350 °C on the lifetime of the pumps.

Your contacts

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International representatives

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Boiler feed pumps made by Speck

ES series

- » Horizontal multistage modular pumps
- » Designed for the delivery and circulation of clear or slightly contaminated liquids
- » Suitable for liquids without abrasive contaminants and without solid particles
- » Shaft bearing with two external rolling bearings
- » Hydraulically balanced impellers
- » Cast iron version and spheroidal graphite cast iron version

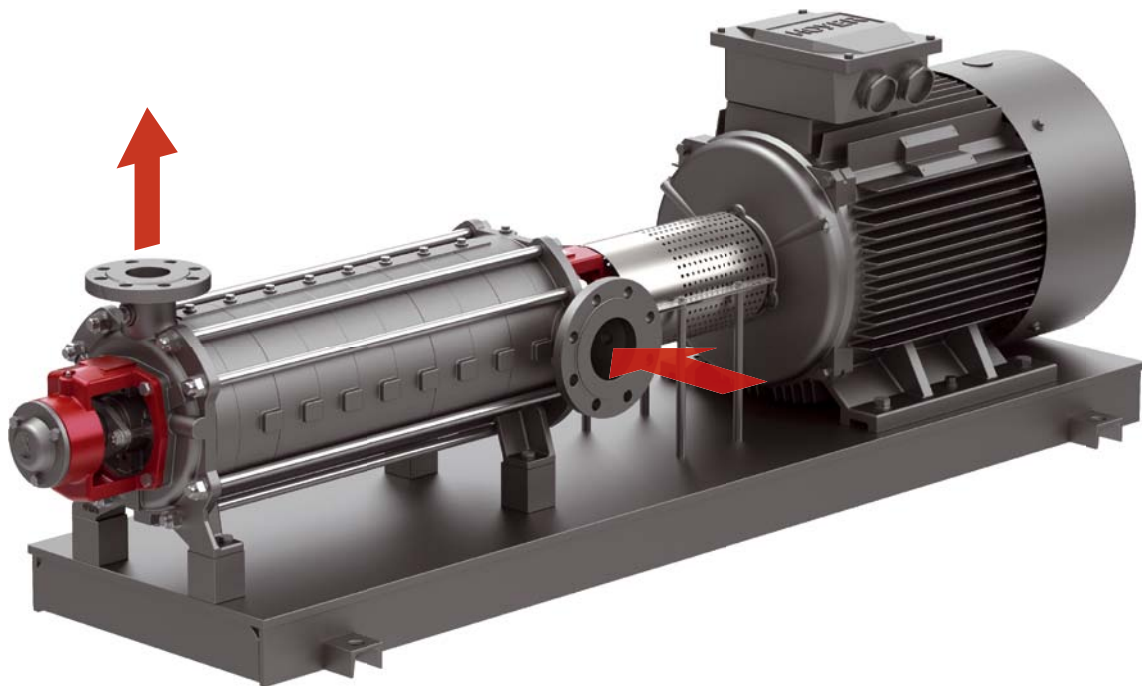
With mechanical seal

With packing gland

Nominal pressure PN 40 or PN 63

50 Hz $H_{\max.}$ 630 m / $Q_{\max.}$ 110 m³/h

60 Hz $H_{\max.}$ 400 m / $Q_{\max.}$ 125 m³/h



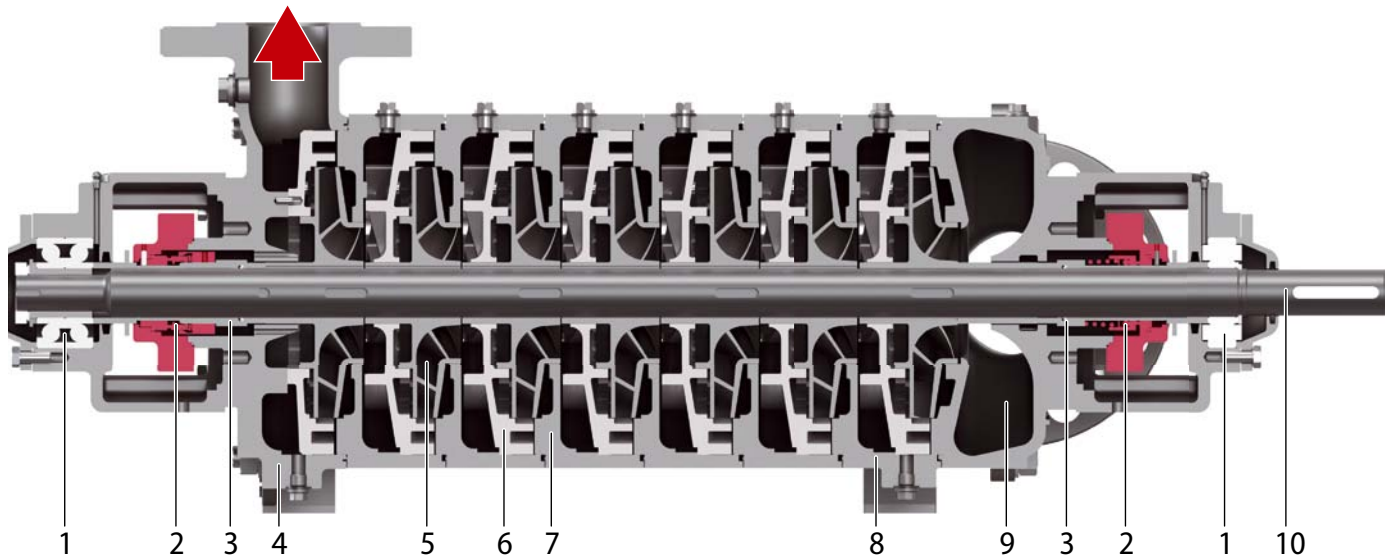
Proven boiler feed pumps for universal applications

Main applications

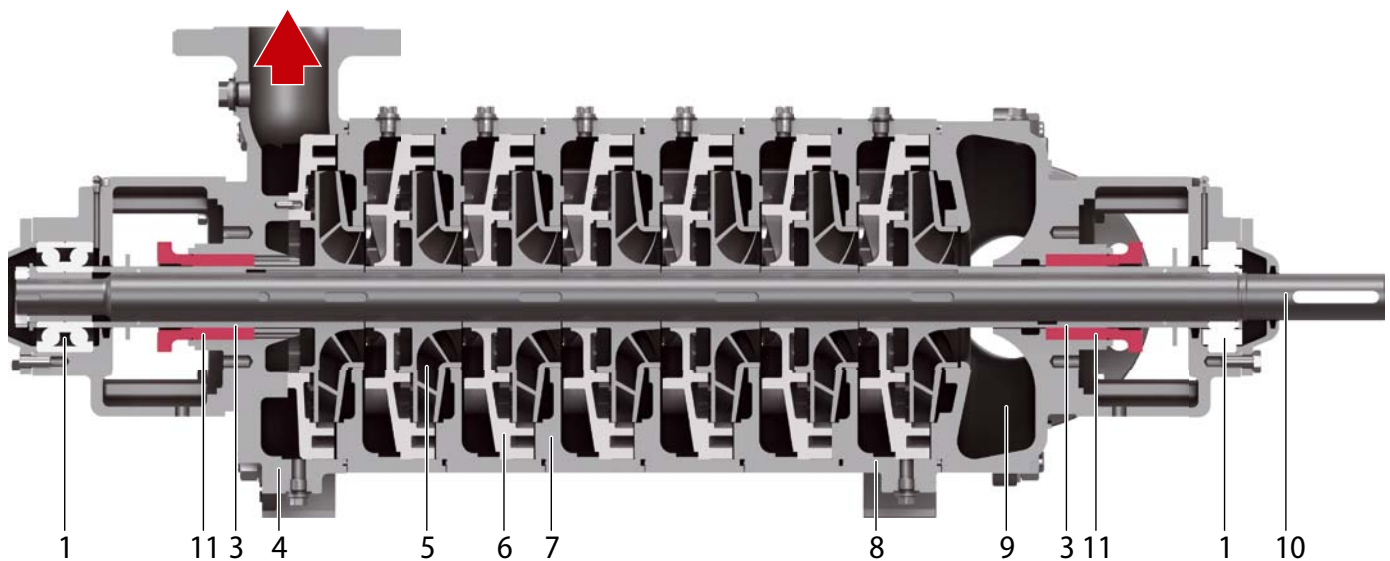
- » Delivery of hot water in boiler systems
- » Booster stations
- » Water supply units
- » Sprinkler units
- » Cleaning stations
- » Recovering of condensates (water)
- » Extracting palm oil

Modular system

Pumps with mechanical seal



Pumps with packing gland



No.	Designation
1	Rolling bearing
2	Mechanical seal
3	Shaft protection sleeve
4	Discharge casing
5	Impeller
6	Diffuser insert

No.	Designation
7	Stage casing
8	Stage casing with foot
9	Suction casing, from stage number 3: rotatable in steps of 90°
10	Shaft
11	Packing gland

Type code

Denomination

Type code Example	ES	40	07	LL	G4-	30	001
Denomination of series							
Pump size							
Number of stages							
Shaft bearing (table 1)							
Shaft sealing (table 2)							
Material design (table 3)							
Counting number							

Table 1 - Shaft bearing

Code	LL	LL	LL
Types / Sizes	ES32 / ES40	ES50	ES65 (PN 40) / ES65 (PN 63)
Design	1 roller bearing, 1 ball bearing	2 ball bearings	1 rolling bearing, 2 angle-seat ball bearings

Table 2 - Shaft sealing

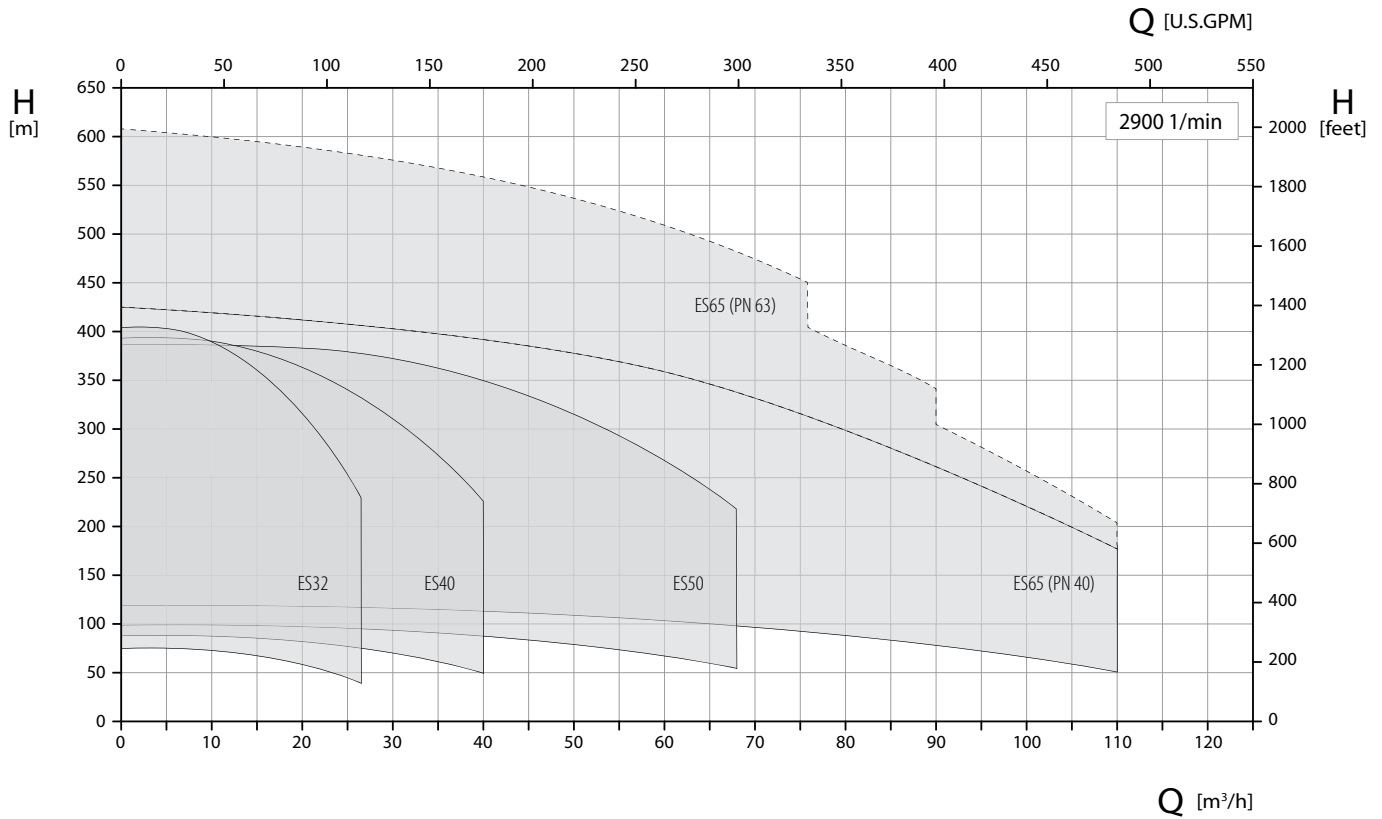
Code	G4	G6	X	SB
Types / Sizes	ES32 / ES40 / ES50 / ES65 (PN 40)	ES65 (PN 63)	ES32 / ES40 / ES50 / ES65 (PN 40)	
Shaft sealing	Mechanical seal			Packing gland
Material	SiC, carbon, FKM or SiC, carbon, EPDM			-
Max. operating pressure	suction side	12 bar 174 psi	16 bar 232 psi	Special version, on request
	discharge side	40 bar 580 psi	63 bar 910 psi	
Max. temperatures / media	SiC, carbon, FKM: Water max. 80 °C, other media max. 120 °C SiC, carbon, EPDM: Water without oil shares max. 120 °C			all media max. 105 °C

Table 3 - Material design

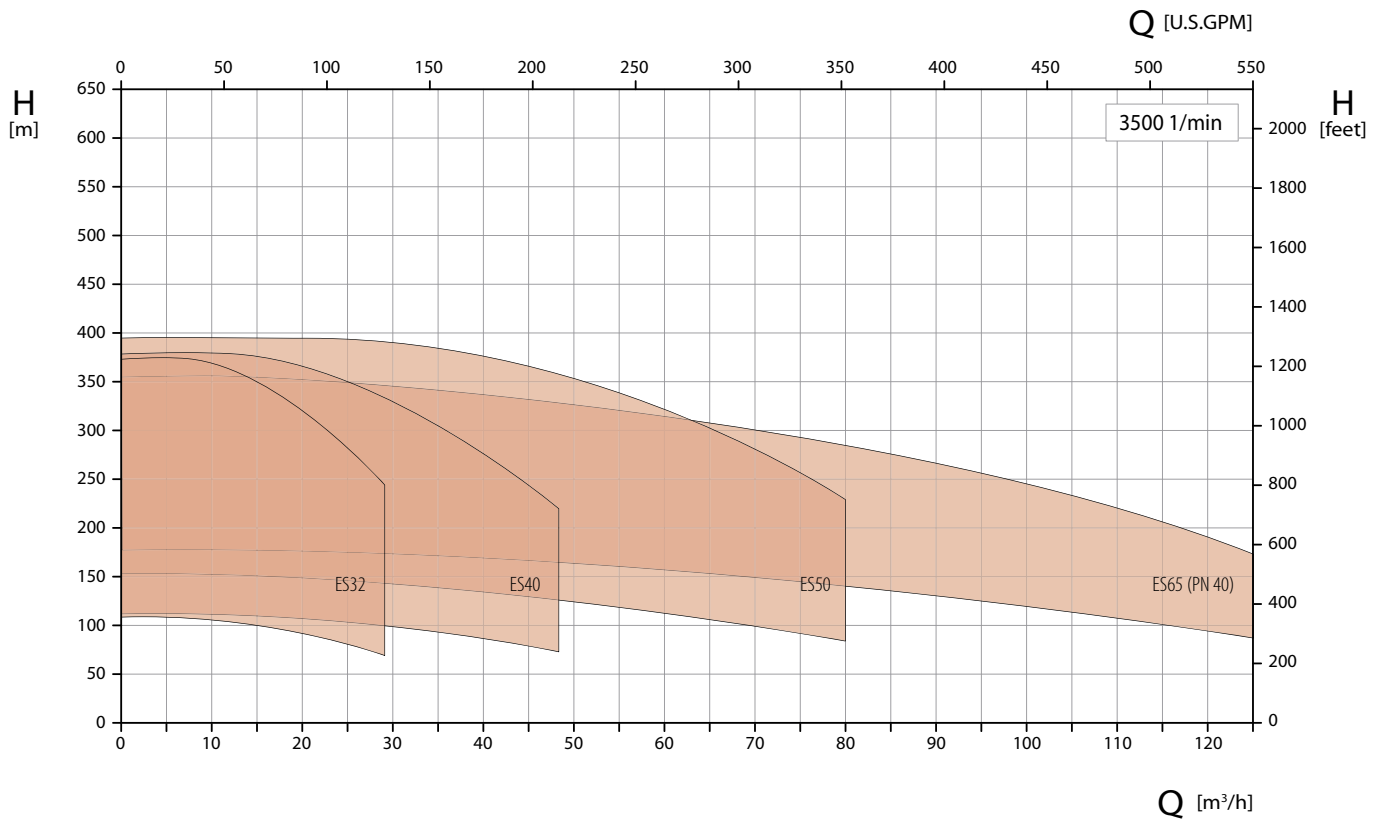
Code	30	30
Types / Sizes	ES32 / ES40 / ES50	ES65
Suction casing	EN-GJS-400-15	
Discharge casing	Spheroidal graphite cast iron	
Stage casing	EN-GJS-400-15	
Stage casing with foot	Spheroidal graphite cast iron	
Diffuser insert	EN-GJL-250	EN-GJL-250
Impeller	Cast iron	Cast iron
Shaft	1.4021 Cr-steel	1.4021 Cr-steel
Shaft protection sleeve	1.4122 CrMo-steel	1.4122 CrMo-steel

Performance range

50 Hz



60 Hz



Order-related tests and dimensioning

Pressure tests

Speck carries out the tests below as standard:

Gas pressure test

The gas pressure test is used to prove that the components are leak-proof. All components that bear pressure are tested, such as the discharge casing and the suction casing, stages and mechanical seal casing. The test is carried out with forming gas at 2 bar. The holding time is 15 minutes.

Hydrostatic pressure test

The hydrostatic pressure test is used to prove strength of the components and that the pump is leak-proof. The fully assembled pump is tested. The test is carried out with a hydrostatic test pressure based on prEN 12162; the hydrostatic test pressure corresponds to 1.3 x the nominal pressure (PN16) at 20 °C. The holding time is 30 minutes.

If you want to use pressure tests according to different criteria, please enter them in the request.

Testing the performance

At the customer's request, Speck offers the following tests:

Hydraulic tests

Measurement according to EN ISO 9906, Class II, Acceptance class 2B, Edition March 2013

NPSH test

In this test, the suction-side pressure is gradually reduced until the decrease in the delivered head reaches 3 % at a constant flow rate. At least four flows are evaluated that are spread appropriately over the admissible operating range. The NPSH value is not a guarantee point.

Vibration test

Vibration test according to EN ISO 5199, Edition 2002

The vibration values are measured radially and vertically at every operating point on the bearing casing at the nominal speed and with the corresponding flow rate.

Temperature measurement

The measurement is taken on the motor-side bearing at operating temperature. The operating temperature and the ambient temperature at every operating point measured are documented.

Standard conditions at site

- » Ambient temperature from - 20 °C to + 40 °C
- » Permissible altitude up to 1000 m above sea level

Deviations from the site conditions specified herein must already be disclosed in the inquiry.

Dimensioning

Assessment of the maximum pump outlet pressure

The pump outlet pressure at the pump outlet nozzle depends on

- » the pump inlet pressure
- » the density of the medium to be pumped

The maximum pump outlet pressure $p_{2\max\text{ op}}$ is calculated using the formula:

$$p_{2\max\text{ op}} = p_{1\max\text{ op}} + \rho \cdot g \cdot H \cdot 10^{-5}$$

With:

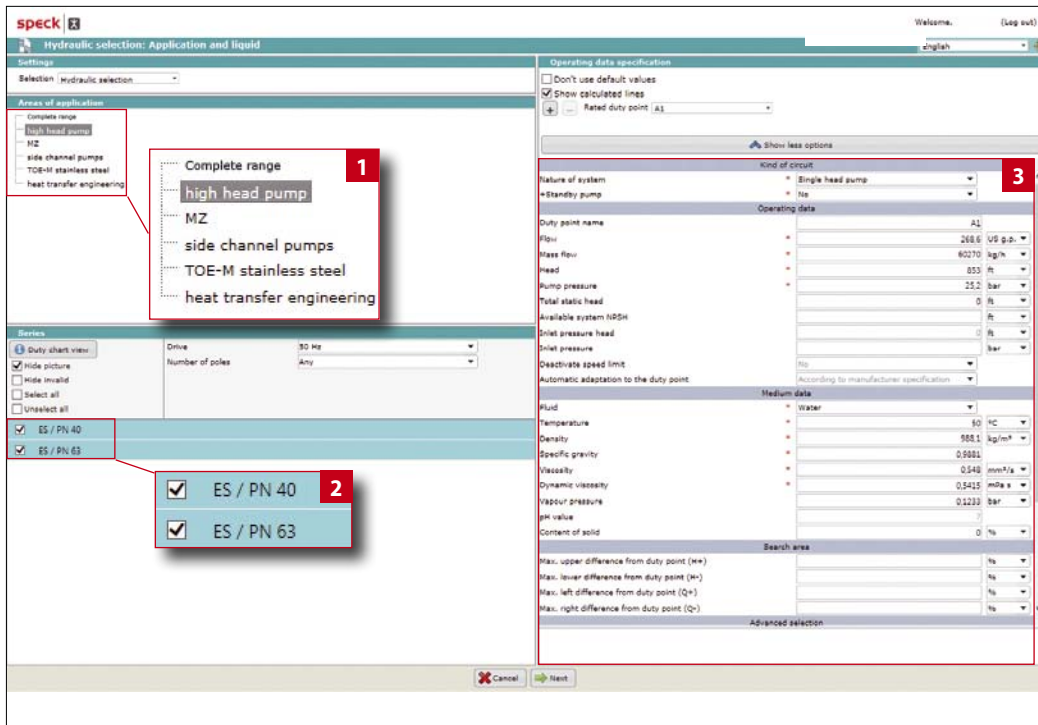
- $p_{2\max\text{ op}}$ = maximum pump outlet pressure [bar]
- $p_{1\max\text{ op}}$ = maximum pump inlet pressure [bar]
- ρ = density of the medium to be pumped [kg/m³]
- g = gravitation constant [m/s²]
- H = maximum total head at zero flow or at the peak of the pump's characteristic curve [m]

Pumps must be selected and operated in a way which ensures that the maximum pump outlet pressure does by no means exceed the maximum permissible operating pressure of the casing $p_{\text{all w c}}$ at operating pressure.

This also applies to commissioning while the discharge valve is closed.

Simple and optimal configuration software

SPAIX selection program



The software allows you to configure heat transfer pumps, side channel pumps and boiler feed pumps via your Internet browser. As well as design details, the system will also request operating details and details about the medium to be pumped.

Ideal for system planners

Speck now also offers the latest version 4 of the renowned SPAIX design software.

We make the program available to authorised customers who can pre-select the pumps within their system.

The web-based software always accesses an up-to-date database.

Easy pre-selection

The configuration system avoids a wide range of selection parameters with regard to design, sealing systems, hydraulics, operating conditions and media.

The software has language options for German and English.

Checking the pre-selection

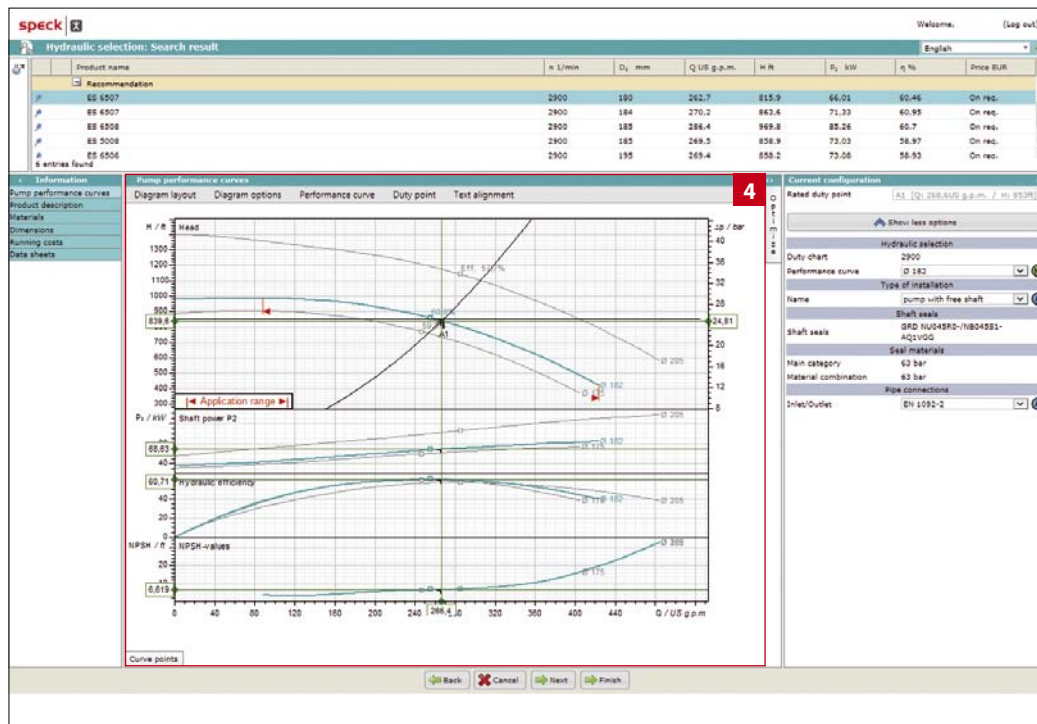
When the order is submitted, the customer's choices are double-checked to ensure that your project requirements are met.

1 List of all pump designs that can be configured in the software

2 List of all series within the pump designs

3 Selection parameters operating parameters and medium data in the first instance

4 Characteristic curve depending on hydraulic selection generated

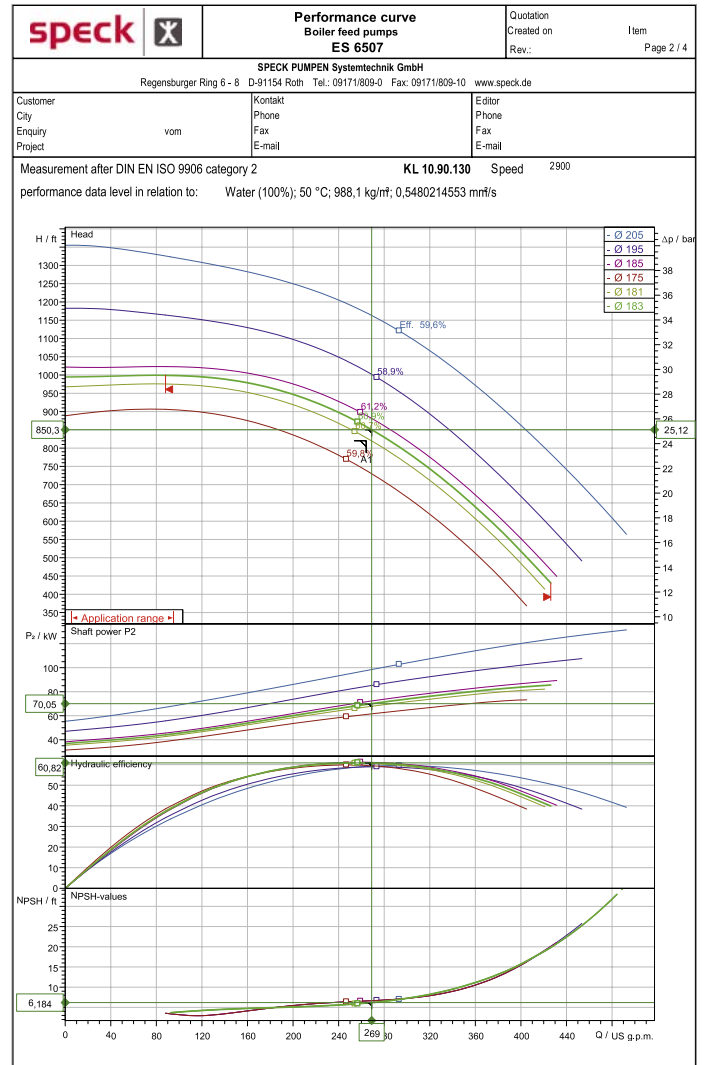


Characteristic curve depending on hydraulic selection

Documentation based on the selection program

speck		Data Sheet Boiler feed pumps ES 6507		Created on	Item
				Rev.:	Page 1 / 4
SPECK PUMPEN Systemtechnik GmbH Regensburger Ring 6 - 8 D-91154 Roth Tel.: 09171/809-0 Fax: 09171/809-10 www.speck.de					
Customer	vom		Kontakt	Phone	Editor
City			Phone	Fax	Phone
Enquiry			Fax	E-mail	Fax
Project			E-mail	E-mail	
Operating Data					
1 Fluid	Water	Flow rate	rated	269 US g.p.m.	Speed
2 Corrosive matters	keine/hot	min / max	80.7 / 426.2 US g.p.m.	Hydr. efficiency	60.82 %
3 Abrasive matters	keine/hot	Pressure	Inlet	0 bar (0)	hydr. power cons.
4 Solids	0	Disch.	25.12 bar (0)	Max. operating pressure	28.4 bar (0)
5 Oper. Temp. IW / IS	50 °C	Head	850.3 ft	Start-up temp.	
6 Density at tw	988.1 kg/m ³	Pressure differential	25.12 bar (0)	Flow rate at cold start	US g.p.m.
7 Kin. viscosity at IW / IS	0.548 mm ² /s	NPSH	System required	9.08 ft	Total abs. power at cold start
8 Vapor press. at IA	0.1233 bar	Spacer length	6.68 ft		kW
9 PH value	7				
Installation / Environment					
10 Building / Outside	Gebäude	Altitude	< 3281 ft	Amb. Temp. min	20 / 40 °C
11 under roof yes/no	Ja / Yes	Hazardous area		rel. Humidity	<55 %
Pumps					
12 No of stages Impeller-Ø	mm	6	175	Impeller type	direction of rotation
13 1	205	7	175	Suction port	Pressure rating
14 2	195	8		nom. diam. DN	EN 100
15 3	175	9		Standard	EN 1092-2
16 4	175	10		Delivery port	Pressure rating
17 5	175	11		Standard	EN 1092-2
Accessories					
18	Motor		Shaft seal		Base plate
19 Make	Type	Number of poles	GRD NU045R0-INB045S1-AQ1VGG	Description	
20 Specific design			Max. 120 °C / 63 bar	Specific design	
21 Rated power	kW	Degree of prot.	±5%	Coupling	Length
22 Rated current	A	Frequency	±2% Hz	Make	Width
23 1-phase / 3-phs	V	Voltage	V	Series	
24 Sound pressure level	dB(A)	Mounting		Frame size	Coupling protection
25 Explosion protection				Spacer length	mm
Materials					
26 Suction casing	EN-GJS-400-15	Discharge casing	EN-GJS-400-15		
27 Stage casing	EN-GJS-400-15	Suction stage with foot	EN-GJS-400-15		
28 Diffuser insert	EN-GJL-250	Impeller	EN-GJL-250		
29 Bearing support	EN-GJL-250	Bearing cover	EN-GJL-250		
30 Shaft	1.4122	O-ring	Viton		
31					
32					
Tests and Inspections					
33	Material Tests		Other Tests		Tests and Inspections
34 Suction casing	keine	keine	Hydrost. Pressure Test	Intem	Keine
35 Discharge casing	keine	keine	Gas Pressure Test	Intem	Keine
36 Stage casing	keine	keine	Performance curve	Keine	Keine
37 Suction stage with foot	keine	keine	NPSH-Measurement	Keine	Keine
38 Diffuser insert	keine	keine	Final check	Intem	Keine
39			Vibration temperature	Keine	Keine
40				Keine	Keine
41				Keine	Keine
Shipping data					
42 Net weight appr.	kg	Gross weight appr.	kg	pump color	Motor color
Documentation					
43 Dimensional drwg.	Cross sect. drwg.	Performance curve No.	Oper & Instruct. Man.	Other (see attached)	Qty
44 Rp 8.30. xxx	E 4022. xxx	KL 10.90.130	DE 1096.0902		1
Remarks					
45	motor article				
46	1) Motor equipment corresponds to ISO 9908				
	2) According to EN 10204				
	3) Yoke casing & casing cover				
	4) Without NPSH test				
	5) Scope of deliv. to price sheet				

Technical data sheet (example)



Characteristic curve (example)

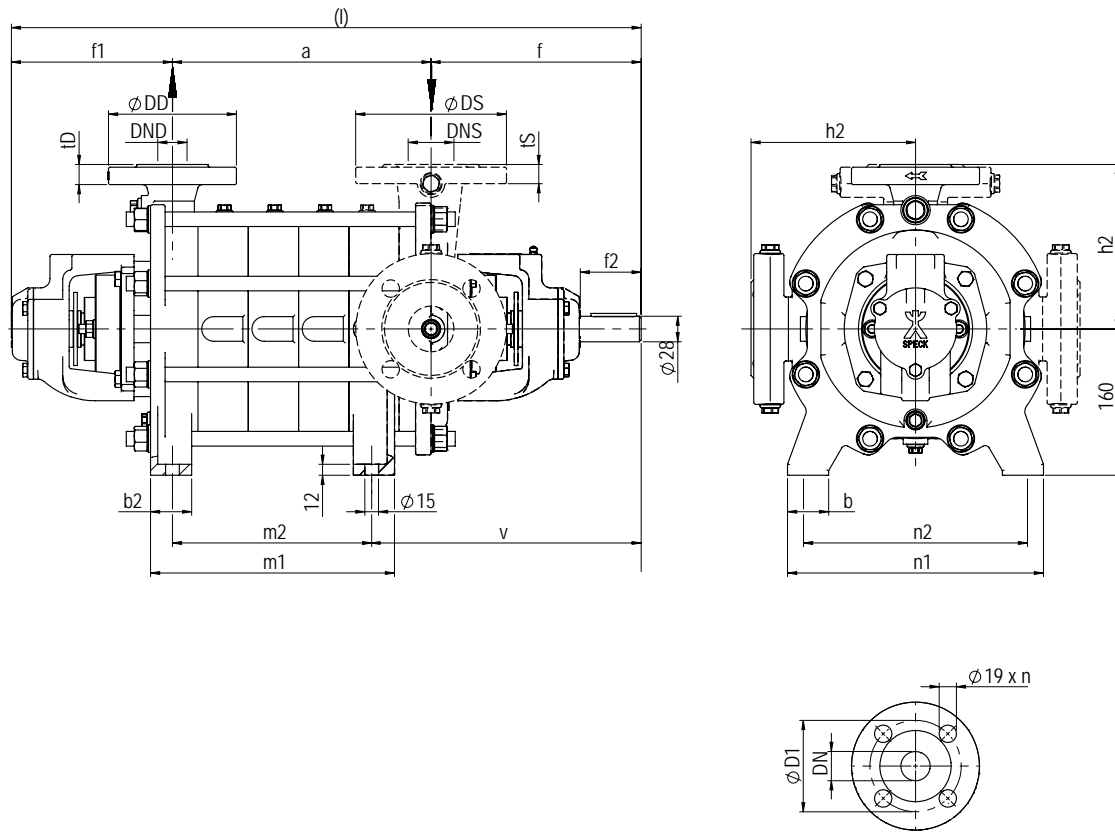
speck		Dimension drawing Boiler feed pumps ES 6507		Customer	City	Kontakt	Phone	Editor
				City		Phone	Fax	Phone
						Fax	E-Mail	E-Mail
				SPECK PUMPEN Systemtechnik GmbH Regensburger Ring 6 - 8 D-91154 Roth Tel.: 09171/809-0 Fax: 09171/809-10 www.speck.de		Created on 2015-07-09		Item
						Rev.:		2015-07-09
						Page 4 / 4		
Pumpe freie Welle		Motor		Anschlüsse		Dimensions in mm		
				Suction port	Delivery port	DNS	100	
				EN 1092-2	EN 1092-2	DS	220	
				DN 100 PN 16	DN 65 PN 40	IS	24	
				ø D1 180 mm	ø D1 145 mm	DND	6E	
				ø D2 19 mm	ø D2 19 mm	DD	18E	
				D2 x 8	D2 x 8	ID	24	
						a	51C	
						m1	46E	
						m2	38E	
						l	102E	

Dimensional drawing (example)

Save projects

Interim configuration results such as characteristic curves, scale drawings or technical data sheets can be saved as a project and generated as a pdf file.

ES32 / ES40 / ES50 – Dimensions



ES32 | PN 40

Size	a	m1	m2	(l)	b2	Ød	f1	f	v	h2
ES3202	118	103	53	522						
ES3203	173	158	108	577						
ES3204	228	213	163	632						
ES3205	283	268	218	687						
ES3206	338	323	273	742	45	28	174	230	295	180
ES3207	393	378	328	797						
ES3208	448	433	383	852						
ES3209	503	488	438	907						
ES3210	558	543	492	962						
ES3211	613	598	548	1017						

Discharge flange PN 40				
DND	DD	D1	n	tD
DN 32	140	100	4	22

Suction flange PN 16				
DNS	DS	D1	n	tS
DN 50	165	125	4	21

ES40 | PN 40

Size	a	m1	m2	(l)	b2	Ød	f1	f	v	h2
ES4002	135	115	55	597						
ES4003	195	175	115	657						
ES4004	255	235	175	717						
ES4005	315	295	235	777	50	32	197	265	345	180
ES4006	375	355	295	837						
ES4007	435	415	355	897						
ES4008	495	475	415	957						
ES4009	555	535	475	1017						

Discharge flange PN 40				
DND	DD	D1	n	tD
DN 40	150	110	4	19

Suction flange PN 16				
DNS	DS	D1	n	tS
DN 65	185	145	4	21

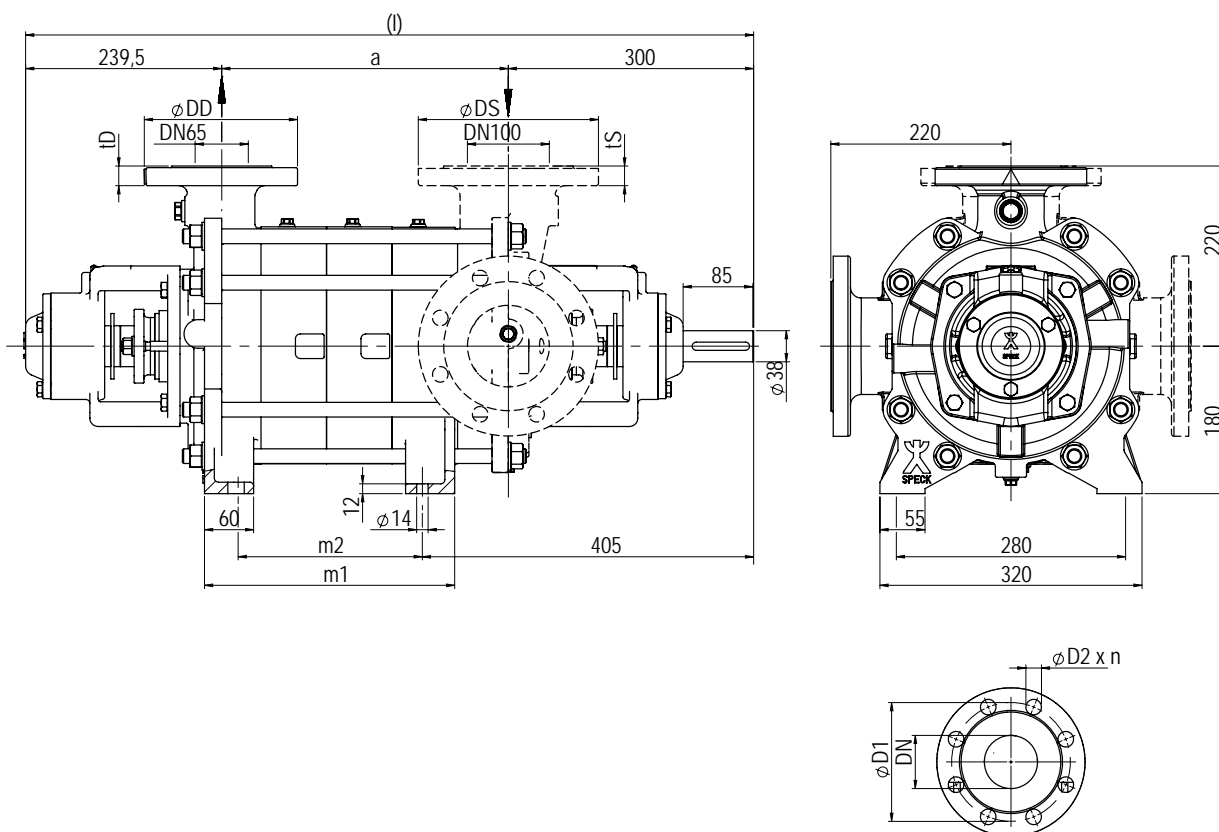
ES50 | PN 40

Size	a	m1	m2	(l)	b2	Ød	f1	f	v	h2
ES5002	153	133	63	625						
ES5003	218	198	128	690						
ES5004	283	263	193	755						
ES5005	348	328	258	820	55	32	197	275	365	200
ES5006	413	393	323	885						
ES5007	478	458	388	950						
ES5008	543	523	453	1015						

Discharge flange PN 40				
DND	DD	D1	n	tD
DN 50	165	125	4	25

Suction flange PN 16				
DNS	DS	D1	n	tS
DN 80	200	160	8	25

ES65 – Dimensions



ES65 | PN 40

Size	a	m1	m2	(l)
ES6502	190	146	65	730
ES6503	270	226	145	810
ES6504	350	306	225	890
ES6505	430	386	305	970
ES6506	510	466	385	1050
ES6507	590	546	465	1130

Discharge flange PN 40						
DND	DD	D1	n	tD	D2	
DN 65	185	145	8	24	19	

Suction flange PN 16						
DNS	DS	D1	n	tS	D2	
DN 100	220	180	8	24	19	

ES65 | PN 63

Size	a	m1	m2	(l)
ES6505	430	386	305	970
ES6506	510	466	385	1050
ES6507	590	546	465	1130
ES6508	670	626	545	1210
ES6509	750	706	625	1290
ES6510	830	786	705	1370

Discharge flange PN 63						
DND	DD	D1	n	tD	D2	
DN 65	205	160	8	28	23	

Suction flange PN 63						
DNS	DS	D1	n	tS	D2	
DN 100	253	200	8	33	23	

Flanges

Flanges in acc. with EN 1092 PN 40.
Flanges in acc. with EN 1092-2, drilled in acc. with ANSI 150 lbs or 300 lbs on request.

Direction of rotation

Direction of rotation is clockwise with view towards pump shaft

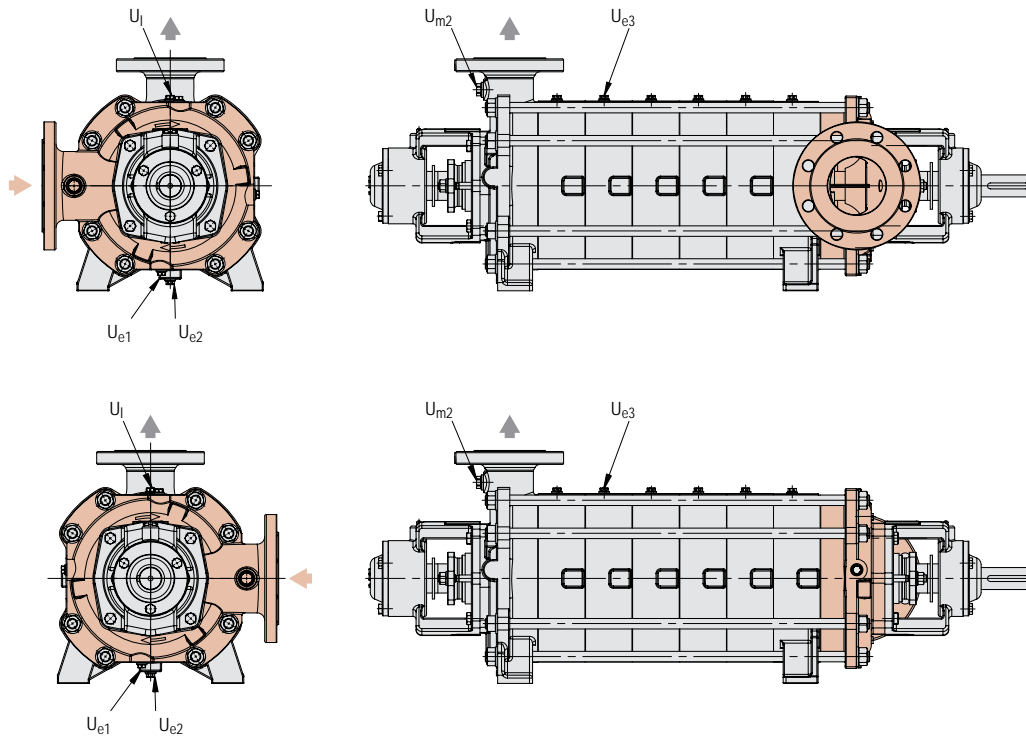
Connections

Position of inlet and outlet nozzle

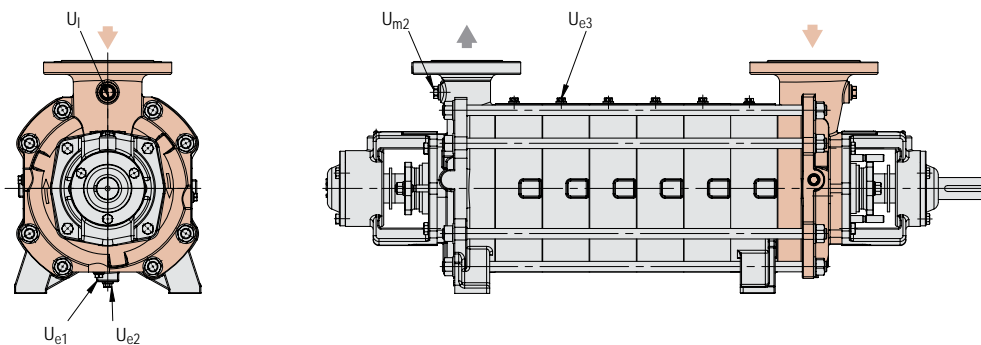
The outlet nozzle is always on the top. The inlet nozzle can be rotated 90°.

	Number of stages	
	2	≥ 3
Position of inlet nozzle	Nozzle at the side	Nozzle at the side / on top
Position of outlet nozzle	on top	on top

Inlet nozzle at the side

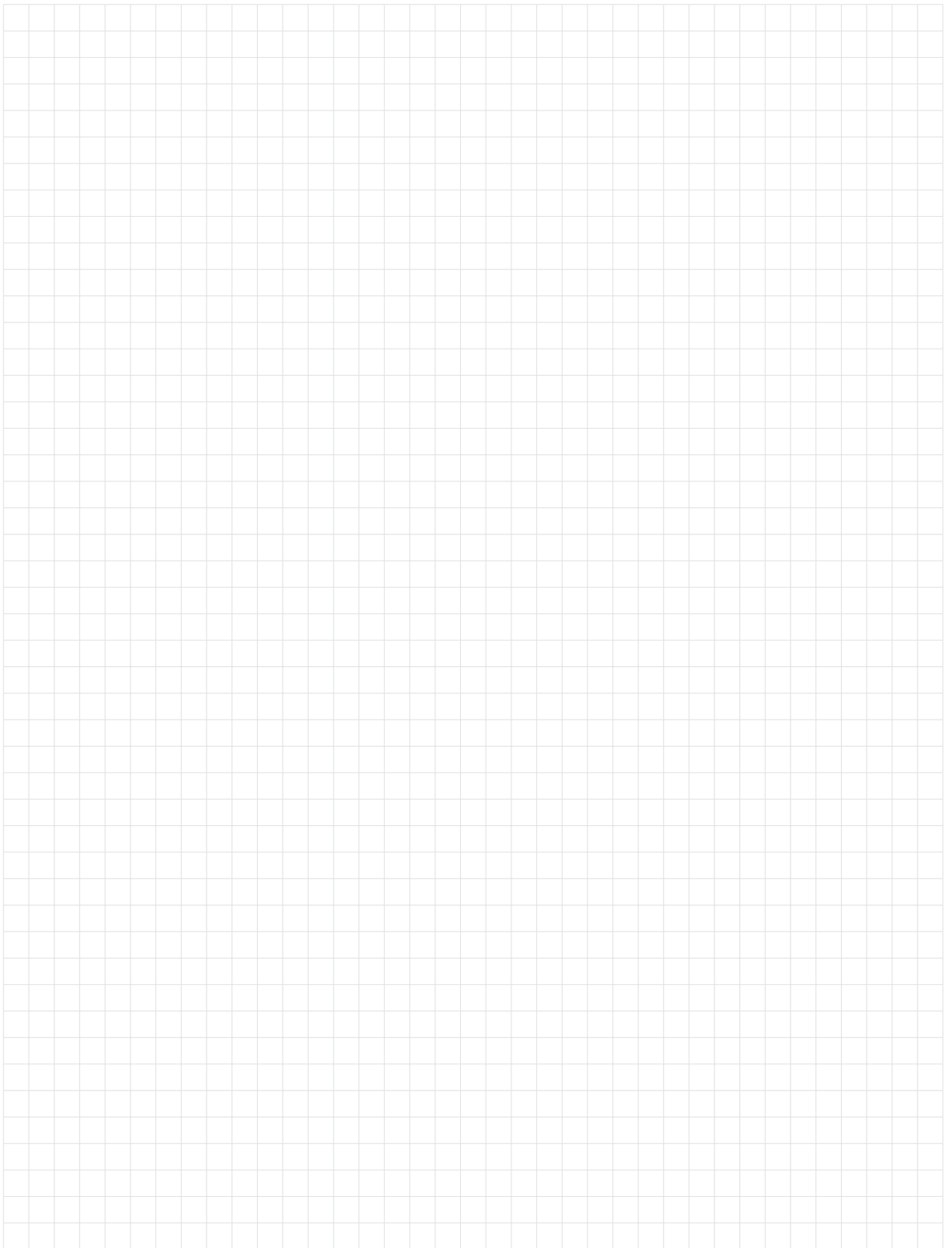


Inlet nozzle on top



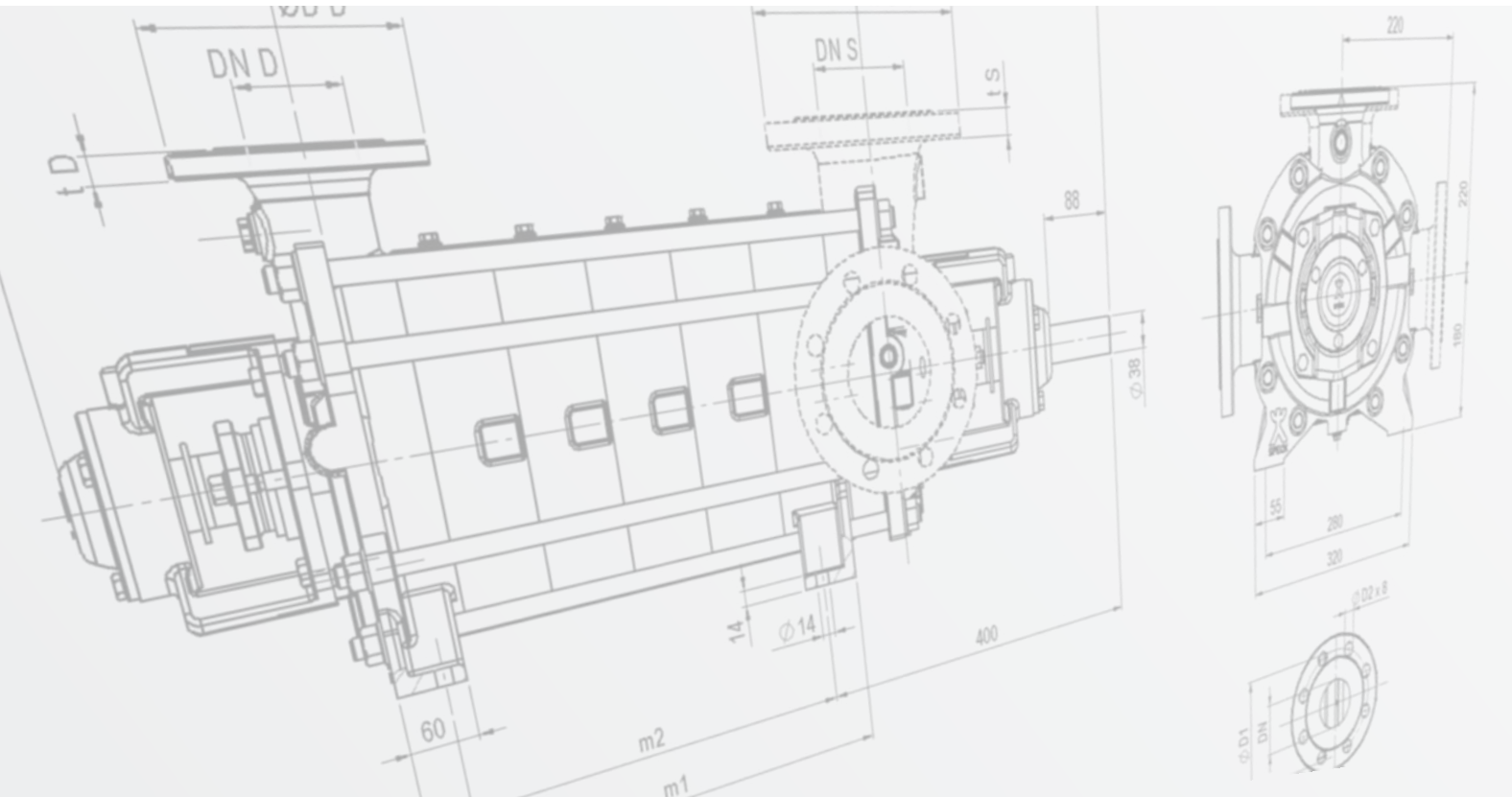
Designation	Connection	Sizes		
		ES32	ES40/ ES50	ES65
U_{e1}	Drainage (screw plug)	G 1/4	G 1/4	G 1/4
U_{e2}	Drainage (screw plug)	-	G 1/4	G 1/4
U_{e3}	Drainage (screw plug)	G 1/4	G 1/4	G 1/4
U_i	Vent (screw plug)	G 1/4	G 1/4	G 1/4
U_{m1}	Pressure gauge connection	G 3/8	G 3/8	G 1/2
U_{m2}	Pressure gauge connection	G 1/2	G 1/2	G 1/2

Your notes



Your notes





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