



smartSelect

Smart Pump Selection Program





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Who We Are

smartSelect was founded by the mechanical and software engineers who had desire to use their knowledge and experience in rotodynamic pump selection and analysis.

Has been operated by the team who supports their partners in all steps of the selection program which has become a prerequisite for the professionals in the sector during the process of introducing the program to the end user.

Consists of the professionals who are capable of providing trainings for use and understanding of the theoretical background of the software.

What We Do

smartSelect supports professional pump selection in the pump industry.

Provides sophisticated and well-thought-out tools for pump selection, data analysis and presentation for pump manufacturers, resellers and end users.

Offers reliable and powerful software to the pump industry. Uses knowledge and long dated experience of its founders program development stage.

Supports its customers in every aspect and meets their needs throughout the operation of the software.

How We Do

smartSelect believes in simplicity, professionalism and loyalty to the customer.

Simplicity is as the most important plus of a software and we design it that way. The user-friendliness of the software is a criterion we consider at every step.

User needs are taken at the center stage. Our design team anticipates customer needs and produces solutions with knowledge and experience.



SMART PUMP SELECTION PROGRAM



Perfect fit on all screens





smartSelect
Akıllı Pompa Seçim Programı

The Pump Selection Program is the face of your company, as your website or catalogues. A good selection program strengthens your perception of quality by your customers.

Speeds up your bidding processes, automates many manual calculations, and reduces engineering times by allowing your customers to choose their own pumps.

Contains the information that would not fit in printed catalogues. Reduces printed material costs significantly.



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Screenshots in this catalogue might be different than in the program due to the such as changes caused by browsers, visualization, screen size, etc.

smartSelect reserves the right to make changes without prior notice on the program due to the software improvement, troubleshooting, or the updates to browsers.

smartSelect is a web-based program, not a desktop application. A compatible web browser* and internet connection are required to use smartSelect.

*See System Requirements (Page 40) for compatible browsers.



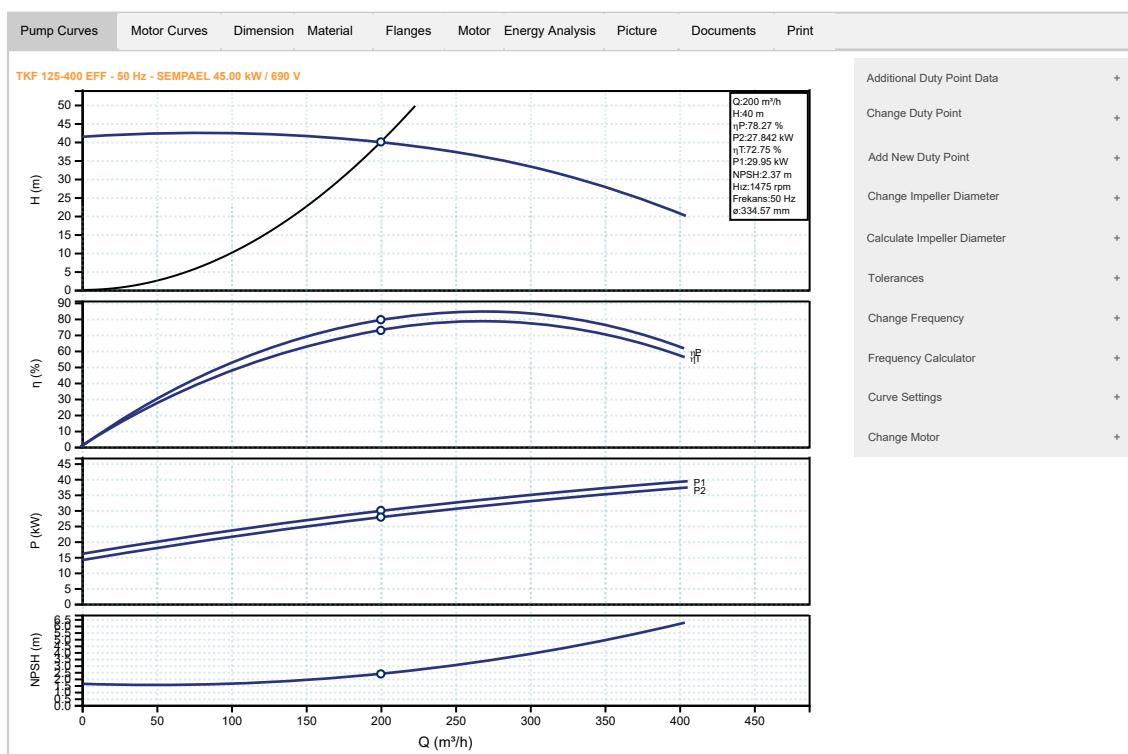
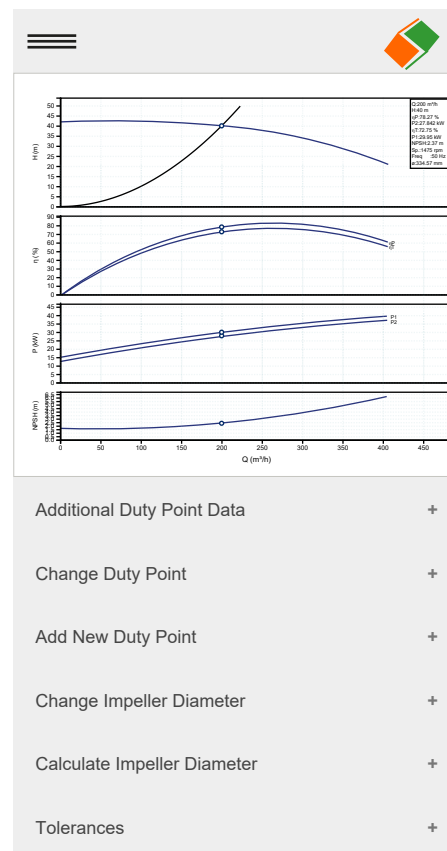
COMPATIBLE DEVICES

smartSelect is a pump selection program designed entirely for the web. In this way, it uses all the advantages of fast developing flexible web technologies.

Thanks to its web-based flexible design, the program is compatible with any device which has a web browser* such mobile phone, tablet, computer.**

* It is not compatible with any version of Internet Explorer.

** It is not an application developed specifically for mobile devices. It is the responsive feature of the program that adjusts the page layout according to the screen resolution. Responsive is resizing, hiding, minimizing, enlarging or moving HTML components to another area of web design according to screen size.



FLUID SELECTION

As a general rule, pump manufacturers use water to obtain pump performance curves, even if the fluid in which the pump will be used is different. For this reason, when the pump will pump different fluid, engineers must re-calculate the curves for the fluid to be used from the curves drawn for water.

smartSelect meanwhile allows pump selection for different Newtonian fluids. Calculates the coefficients of variation in the Flow Rate, Head, NPSH, Pump Efficiency values for these fluids, and determines the motor power by taking into account the density (according to ANSI/HI 9.6.7-2015 standard). Fluids can be selected from a database or custom fluids can be entered.

Although it is preferable to use the actual pump curves for the fluid to be used with high viscosity, ANSI/HI 9.6.7-2015 provides useful methods for high viscosity fluid pump curves in order to re-calculate them from the pump curves which were plotted initially for water. These methods involve certain errors at acceptable levels.

ANSI/HI 9.6.7-2015 calculation methods apply to the following pumps and fluids.

- Single and multistage pumps
- Closed and open impellers
- 310 - 2330 U.S. pumps with specific speed between 6 and 45 metric units
- Kinematic Viscosity: 1 - 3000 centistokes (cSt)
- Impeller Diameter: 5.5 -16 inch(140 - 406 [mm])
- EVN Flow Rate for Water: 32 - 1230 GPM (7.2 - 280 m3/hr)
- EVN Head for Water: 30- 427 feet (9 -130 m)
- EVN Efficiency for Water: 28% - 86%

Fluid

Water

Fluid

Water

Temperature

20.00

°C

Density

998.000

kg/m³

Dynamic Viscosity

1.000

centipoise



HEAD CALCULATION

Add Pipe						
Steel (ANSI) Galvanized						
Sch. 80						
Rated Diameter (mm)	Rated Diameter (inch)	Inner Diam.	Wall Thickness	Out.Diam.	Inner roughness	Add Pipe
6	¼	5.207	2.540	10.287	0.1500000	✓
8	¼	7.416	3.150	13.716	0.1500000	✓
10	¾	10.491	3.327	17.145	0.1500000	✓
15	¾	13.614	3.861	21.336	0.1500000	✓
20	¾	18.592	4.039	26.670	0.1500000	✓
25	1	24.053	4.674	33.401	0.1500000	✓
32	1 ¼	32.208	4.978	42.164	0.1500000	✓
40	1 ½	37.846	5.207	48.260	0.1500000	✓
50	2	48.997	5.664	60.325	0.1500000	✓
65	2 ½	58.751	7.137	73.025	0.1500000	✓
80	3	73.406	7.747	88.900	0.1500000	✓

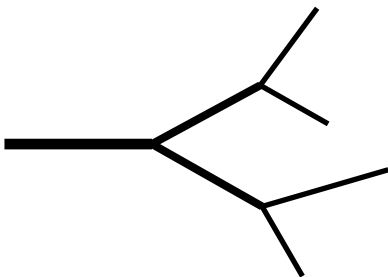
Head is the most important criteria in the selection of a pump after the flow rate. A pump selected according to an incorrectly calculated pump head causes serious problems as high energy consumption in the field. A pump with a head lower than the required head produces a lower-than-desired flow as well as high energy consumption. In the opposite case, the selected motor may be insufficient and cause similarly high energy costs.

Add Fitting				
40.00 mm (1 ½")				
Rated Diam. (mm / inch)	Fitting Name	K	Add Fitting	
40 1 ½	Bend	0.63	✓	
40 1 ½	Long Bend	0.34	✓	
40 1 ½	Bend Out of Pipe	0.25	✓	
40 1 ½	45 Bend	0.34	✓	
40 1 ½	180 Bend	1.05	✓	
40 1 ½	45 Bend	0.32	✓	
40 1 ½	90 Bend	1.26	✓	
40 1 ½	Gate Valve	0.15	✓	
40 1 ½	Ball Valve	7.10	✓	
40 1 ½	Angled Ball Valve	3.15	✓	
40 1 ½	Straight Pass. Valve	0.38	✓	
40 1 ½	Butterfly Valve	0.92	✓	

smartSelect offers useful tools for accurate calculation of pump head. The most difficult part of the calculation of the pump head is the calculation of the pressure losses. With smartSelect, losses can be calculated (according to the Colebrook–White equation) by using multiple pipes* and plumbing materials of different materials and diameters in the database.

Pipe No	Nominal Diam. (mm)	Inner Diam. (mm)	Thickness (mm)	Outer Diam. (mm)	Pipe Loss (m/1000 m)	Pipe Length	Pressure Loss	Operations	Fitting	Fitting Pressure Loss
1	200 (8")	211.558	3.759	219.076	0.4	1000	0.4	✗	45 Bend / 200 mm / 8" 180 Bend / 200 mm / 8" 45 Bend / 200 mm / 8" 45 Bend / 200 mm / 8"	0.037
2	150 (6")	161.468	3.404	168.276	1.49	1200	1.79	✗	45 Bend / 200 mm / 8" 180 Bend / 200 mm / 8" Gate Valve / 200 mm / 8" Ball Valve / 200 mm / 8"	0.043

* Pipes more than one mean end-jointed pipes. Calculation for branched pipes is not supported.



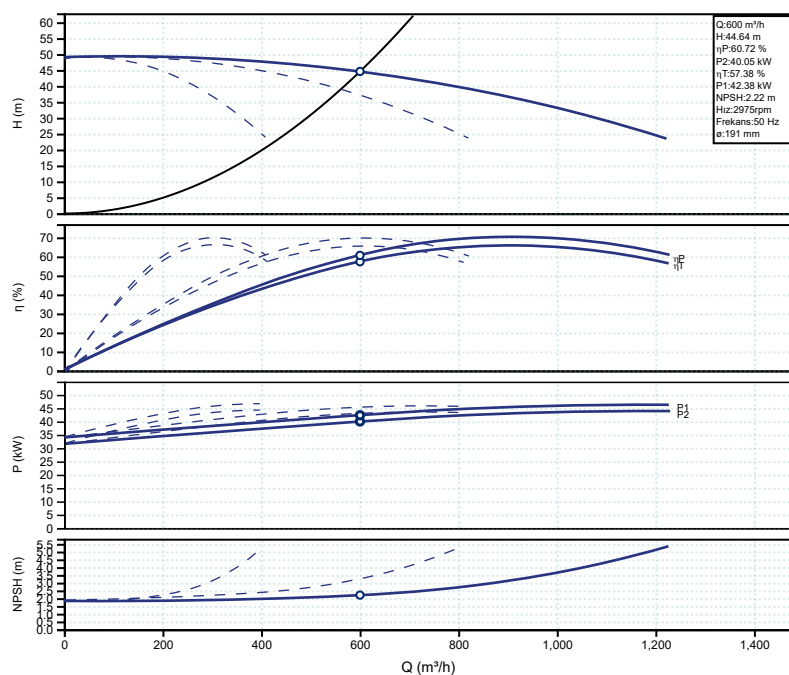
Branched pipes



End-jointed pipes



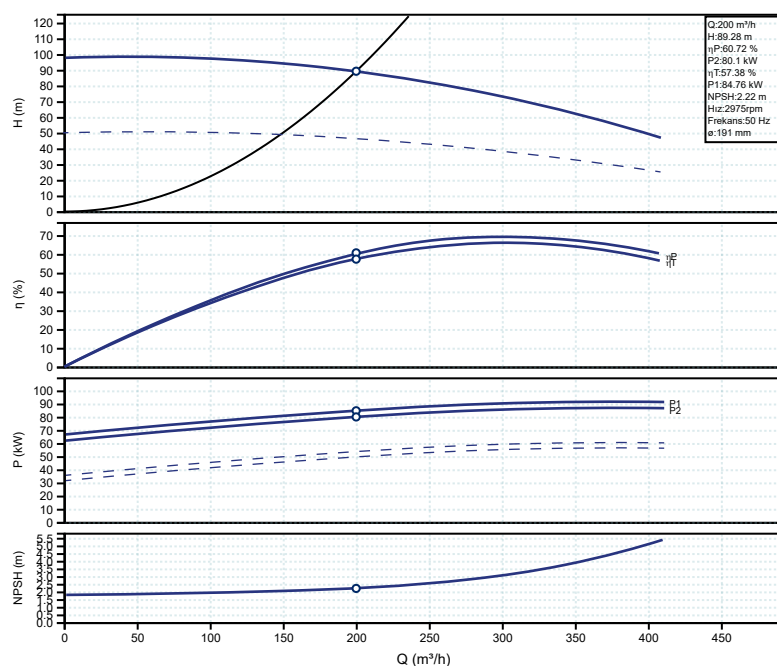
SERIAL AND PARALLEL PUMP SELECTION



In cases where the desired flow cannot be achieved by a single pump, parallel pump selection, and in cases where the desired head cannot be achieved with a single pump, serial pump selection is required.

Parallel pump selection feature offers very useful tools especially in the selection and calculation of booster and fire pumps using multiple parallel pumps.

smartSelect allows serial and parallel* pump selection. If Parallel or Serial connected pump is selected, it plots pump curves for single pump and multiple pumps. Especially when the pumps are operated at different numbers in parallel, the points where the pump curves coincide with the system curve, thus the operating points of the pumps can be seen.



* Series and parallel pumps cannot be selected at the same time.

Number of Pump

2

Serial

Parallel

Serial



ADVANCED OPTIONS

smartSelect selects a pump offering multiple alternatives for the desired duty point, taking into account motor options such as Efficiency Class, Voltage, Number of Phases.

Makes preliminary selections pump and motor and lists the pump-motor properties to be filtered when the pump duty point, fluid, and pump type are selected. The selection results can be narrowed down by selecting the desired features of the pump and motor. This filtering also speeds up the pump selection process.

Filters are available for the following:
Pole Number
Inlet Flange Dimension
Outlet Flange Dimension
Motor Power
Motor Efficiency Class
Voltage
Pump Model
Phase Number
Pump Minimum Efficiency

Advanced Options

Pole Number

☒ 2
☒ 4
☒ 6

Inlet

☒ DN 100
☒ DN 125
☒ DN 150
☒ DN 200
☒ DN 250
☒ DN 300

Outlet

☒ DN 80
☒ DN 100
☒ DN 125
☒ DN 150
☒ DN 200
☒ DN 250

Minimum Efficiency

10

Motor Power

☒ 30.00 kW
☒ 37.00 kW
☒ 45.00 kW
☒ 55.00 kW
☒ 75.00 kW
☒ 110.00 kW

Eff. Class

☒ IE2
☒ IE3

Voltage

☒ 400
☐ 690

Select All

*Using filters speeds up the pump selection process, but may prevent some or all pumps providing the duty point from appearing in the results table.

Using filters speeds up the pump selection process, but may prevent some or all pumps providing duty point from appearing in the results table.

Show advanced options can be turned on or off. In the off state, the program shows all pumps that provide the duty point with their alternative motors in the pump selection result table. For example, if the performance values of the motor at 230 V and 380 V voltages are entered separately, the same pump and motor are placed in two separate lines for 230 V and 380 V in the table.

☒ Show Advanced Options

5

ONLINE PUMP CATALOGUE AND FAMILY CURVES

smartSelect can generate Family Curves of pumps for a single selected pump type and a single number of poles. These curves are active curves and are selectable. Individual curves of the selected pump are displayed

End Suction Pumps

Search for Application Area



ERP
Horizontal End Suction Pump

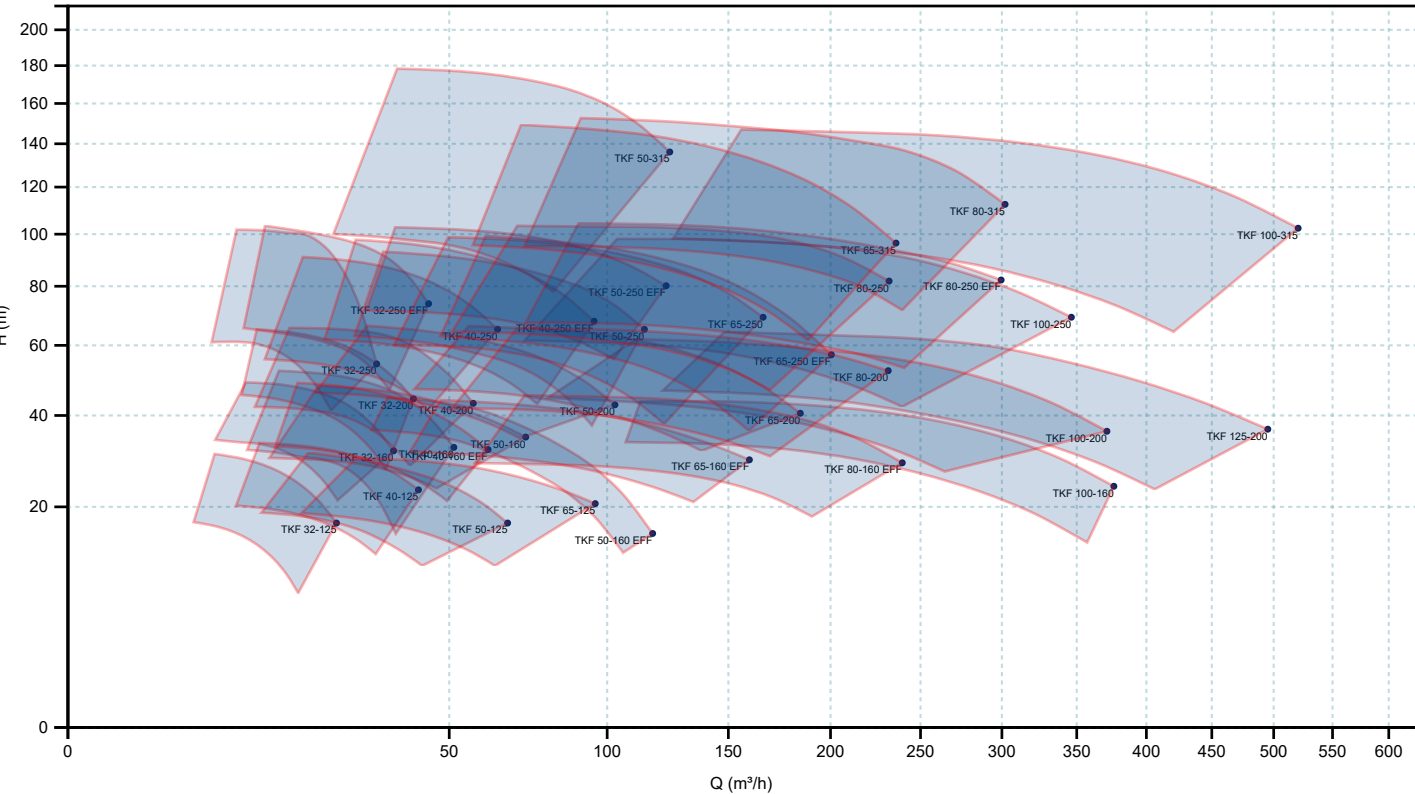


ERP-Y
Horizontal End Suction Hot Oil Pump



ERP-M
Horizontal End Suction Monoblock Pump

- ☒100-160☒100-200☒100-250☒100-315☒125-200☒32-125☒32-160☒32-200☒32-250☒32-250 EFF☒40-125☒40-160☒40-160 EFF☒40-200☒40-250☒40-250 EFF☒50-125☒50-160☒50-160 EFF☒50-200☒50-250☒50-250 EFF☒50-315☒65-125☒65-160 EFF☒65-200☒125-200☒150-250☒200-250 EFF☒250-350☒50-160



Family curves of a pump with performance values for different impeller diameters in the same casing.



On the online catalogue, pumps can be selected using filters such as frequency, number of poles, pump model and impeller type, number of stages. The operation area of the pump can be seen easily on family curves and individual curves. All curves and features of the selected pumps can be accessed in this area.

Frequency

50 Hz

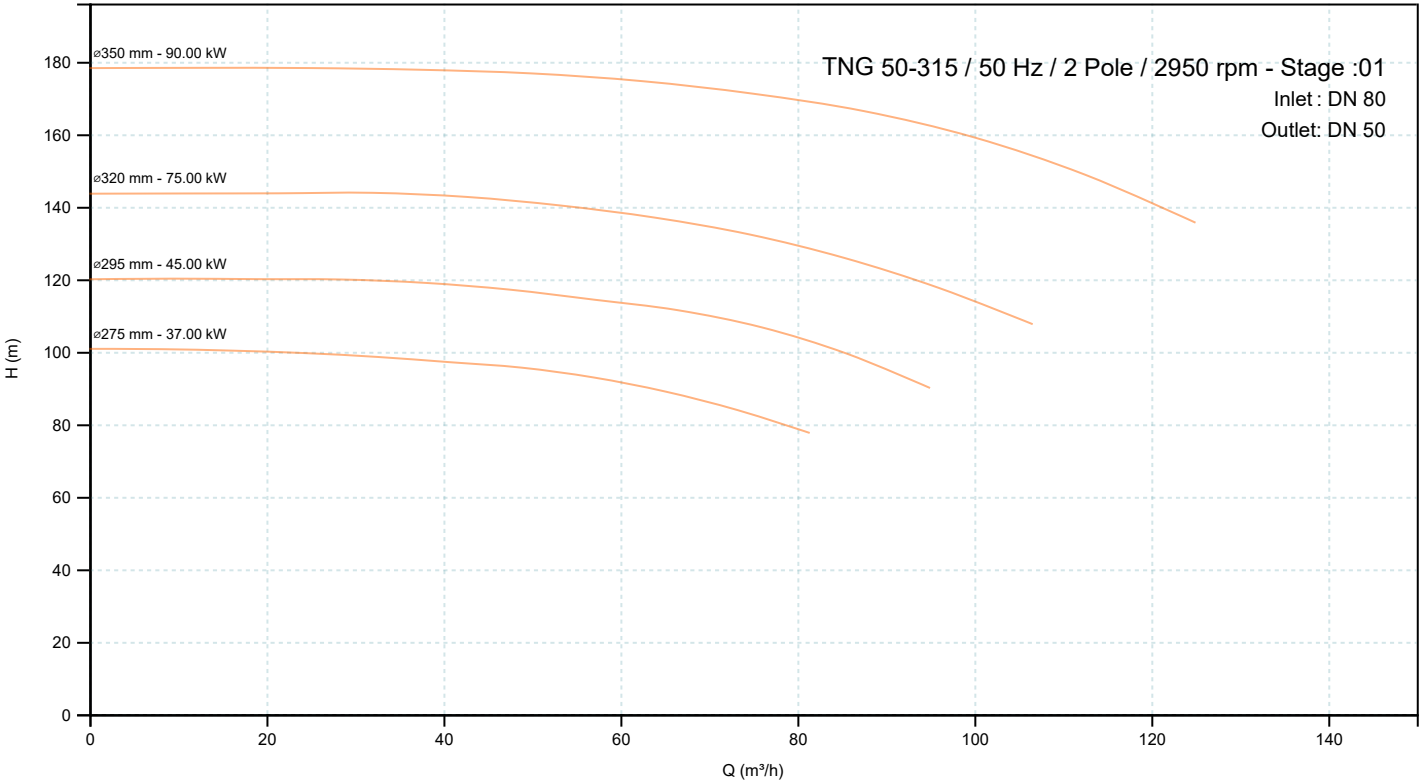
Pole Number

2 Pole

Pump Model

Choose...

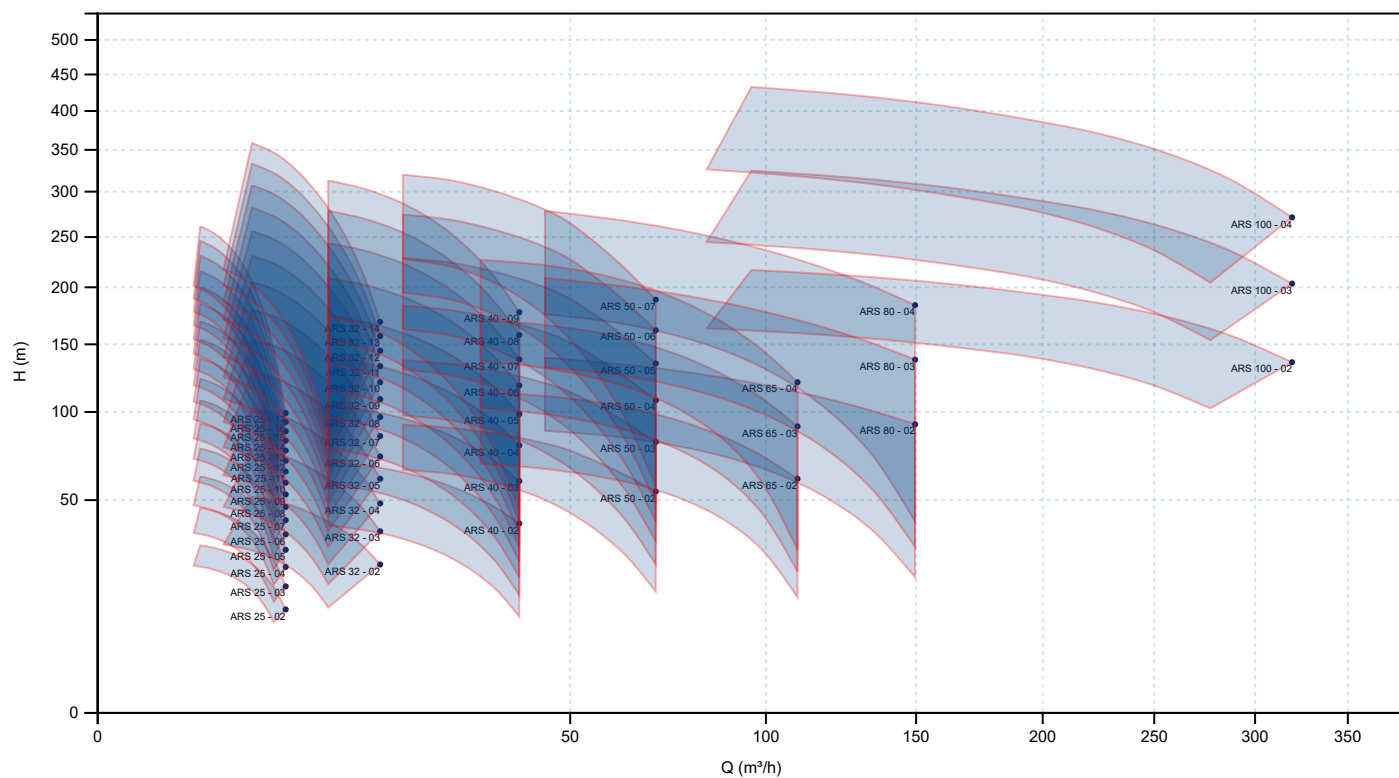
Pump family curves and individual curves are calculated for clean water only, without taking into account motor speeds. Units for flow and head can be changed.



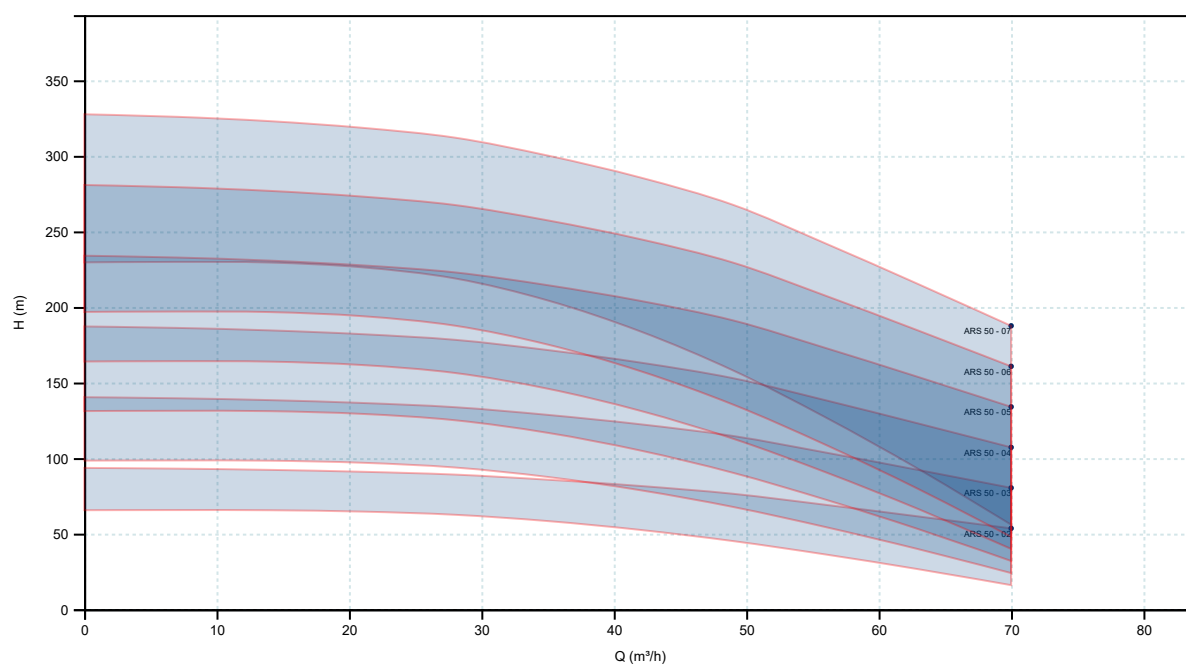
The individual curves for the selected pump are calculated based on motor power, maximum shaft power.



Family Curves for multistage pumps are plotted for all stages. Pump Performance values can be entered separately for each pump.



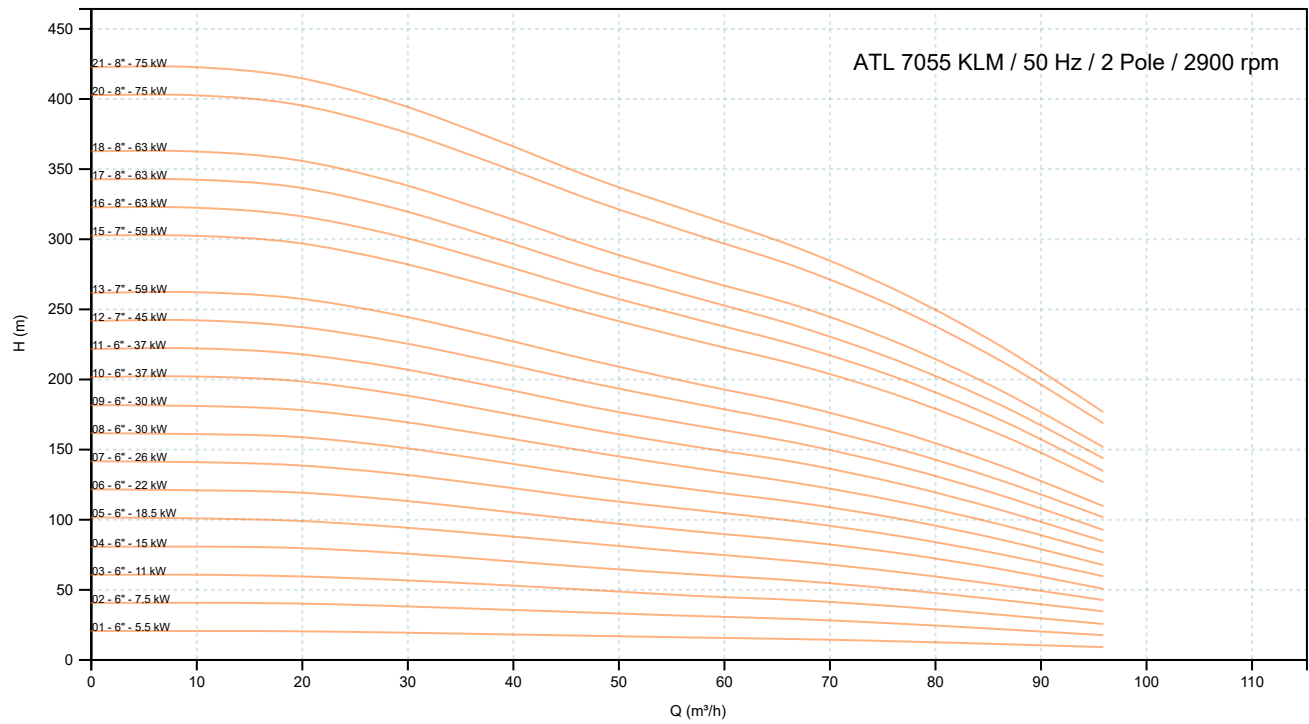
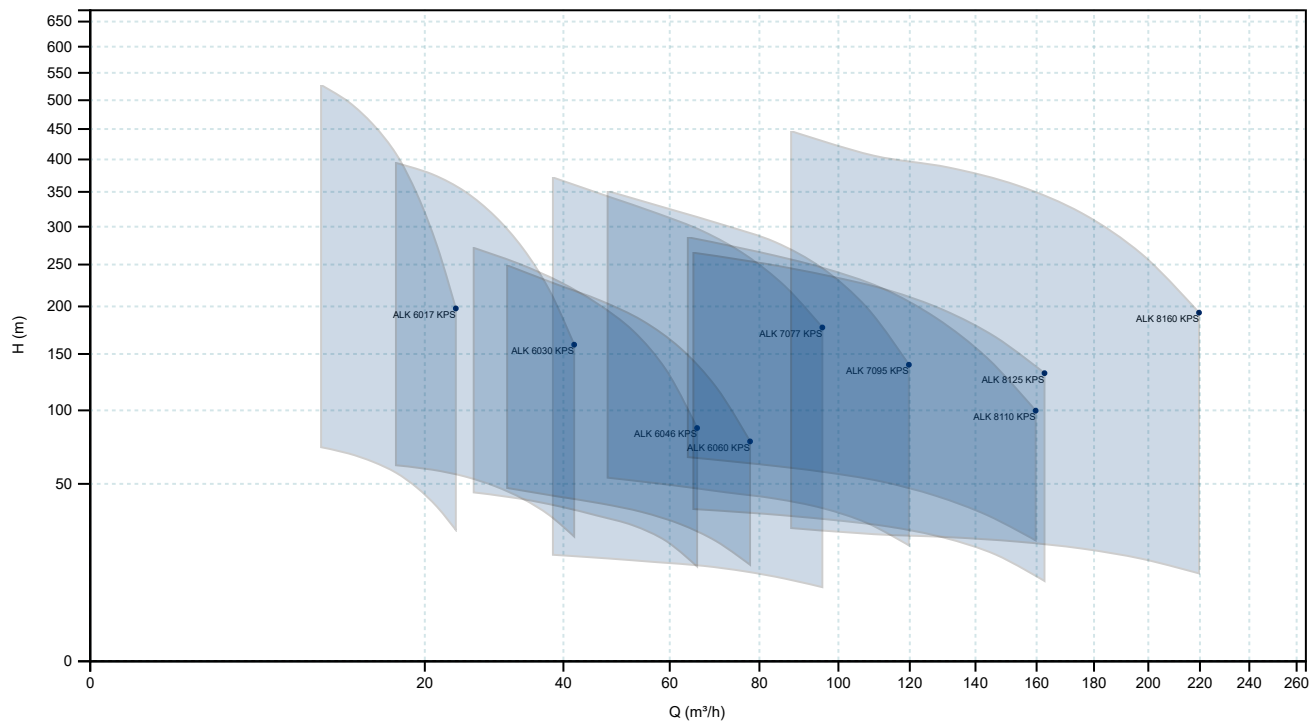
Family Curves for multistage pumps with different impeller diameters in the same housing.



Demonstration of working areas of different stages for a single pump model selected.



Clean Water Submersible Pumps Family Curves and stage curves for a single pump can be plotted separately. Pump Motor Power is predefined for each stage. Family Curves can be filtered by a pump diameter.



ADVANCED RESULT TABLE

The pump selection result table contains very detailed information about the pump and the associated motor. Since the program selects the pump and related motors together, sometimes too many results can be displayed in the table. That's why there are advanced options for filtering and sorting table results. Each numerical value can be sorted from the smallest to largest and from the largest to smallest.

Show 5 Result ▼

Pump Model ▼

Pole Number ▼

Efficiency Class ▼

Voltage ▼

Phase Number ▼

Motor Power ▼

Clean

Values which include motor functions such as motor efficiency and system efficiency also appear in the table. For example, if the selection is not made using the advanced options, IE2 and IE3 efficiency values of the same motor and system efficiency can be viewed and compared separately.

Requested Duty Point: 200 m³/h - 40 m

Pump Model	Frequency (Hz)	Flow (m³/h)	Head (m)	Head Deviation (%)	Pump Efficiency	Imp. Diam. (mm)	Shaft Power (kW)	Maximum Shaft Power (kW)	NPSHr (m)	Head (Q=0) (m)	Motor Power (kW)	Speed (rpm)	Voltage (V)	Phase Number	Pole Number	Efficiency Class
 TKM 80-160 / 01	50	200	37.45	-6.38	80.48	184	25.35	28	5.41	45.49	30.00	2970.0	400	3	2	IE3
 TKM 80-160 / 01	50	200	37.45	-6.38	80.48	184	25.35	28	5.41	45.49	30.00	2970.0	690	3	2	IE3
 TKM 80-160 / 01	50	200	37.27	-6.83	80.43	184	25.24	27.86	5.4	45.34	30.00	2965.0	400	3	2	IE2
 TKM 80-160 / 01	50	200	37.27	-6.83	80.43	184	25.24	27.86	5.4	45.34	30.00	2965.0	690	3	2	IE2
 TKM 100-400 / 01	50	200	41.17	2.93	80.01	340	28.04	28.53	6.29	47.81	30.00	1475.0	400	3	4	IE2

Previous

1

2

3

4

5

6

7

8

9

10

11

12

Next

- The Selection Result Table has the following values:
- Pump Flow

Pump Head

Closed Valve Head

Deviation from Head

Pump Efficiency

Motor Efficiency

System Efficiency

Impeller Diameter

Impeller Type

Pump Shaft Power

Pump Maximum Shaft Power

NPSHr

Motor Rated Power

Motor Current

Maximum Solid Size

Speed

Number of Poles

Motor Voltage

Motor Phase Number

Motor Efficiency

Class Pump Inlet Flange Diameter

Pump Outlet

Flange Diameter

- The table can be filtered for the following values:
- Minimum Efficiency

Pump Inlet

Flange Diameter

Pump Outlet

Flange Diameter

Motor Voltage

Phase Number

Motor Rated Power

Motor Efficiency Class

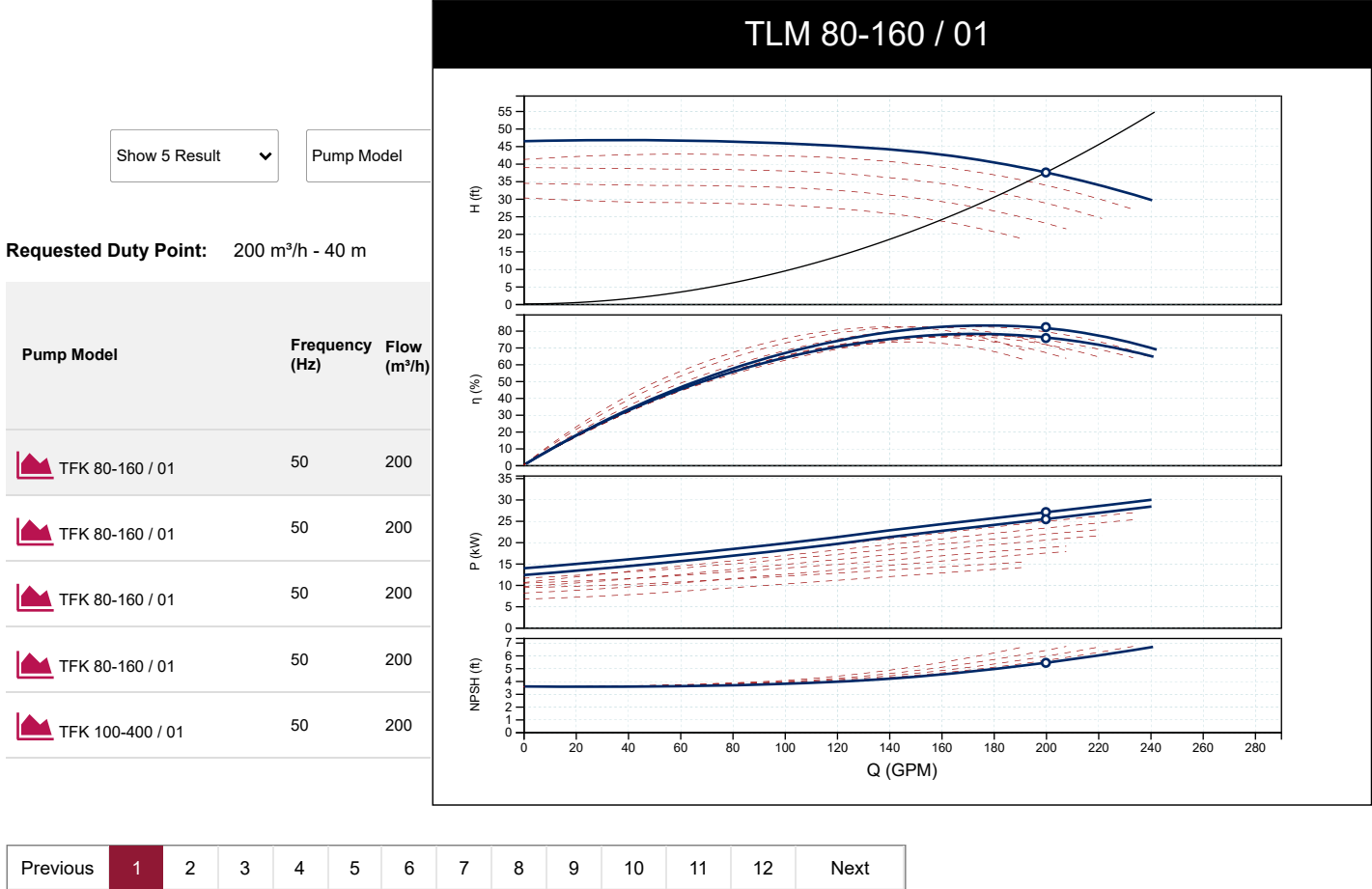
Pole Number

Pump Model



ADVANCED RESULT TABLE

Examining the results fast is important especially when there are many pumps to choose from. Operation area of duty points where we reach these duty points through which impeller diameter between minimum and maximum diameter are seen on the curves although the table demonstrate multiple values.



To achieve this, pump curves can be viewed by hovering over the curve icon  on the selection result table. This makes it possible to quickly obtain information on pump curves.

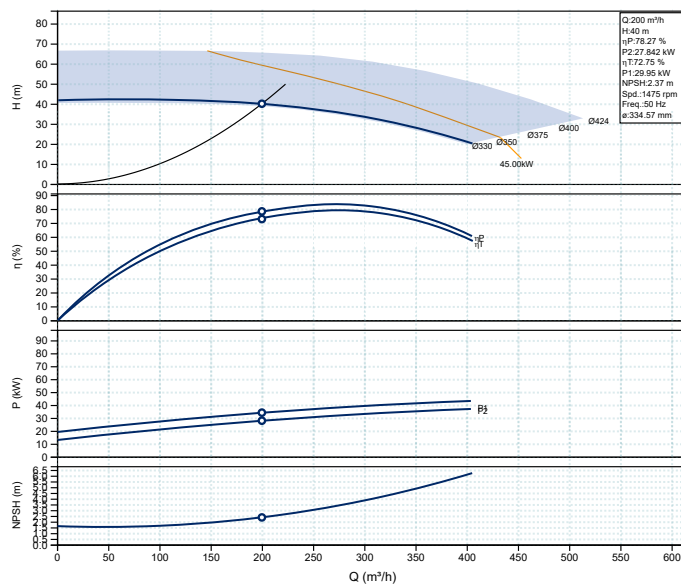
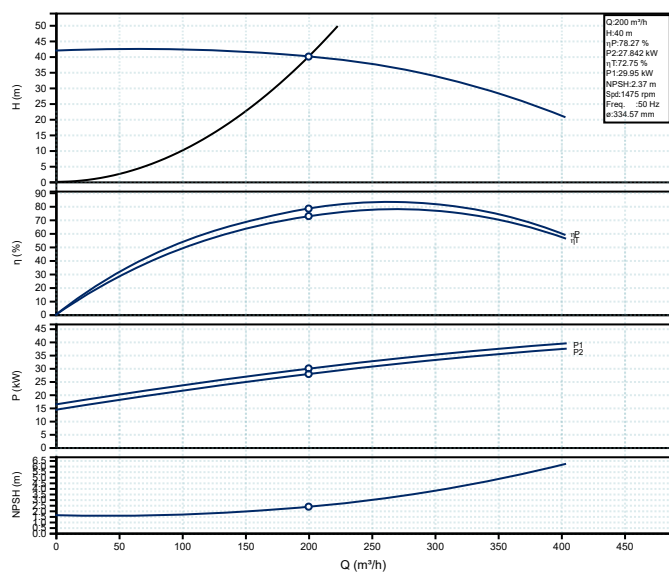
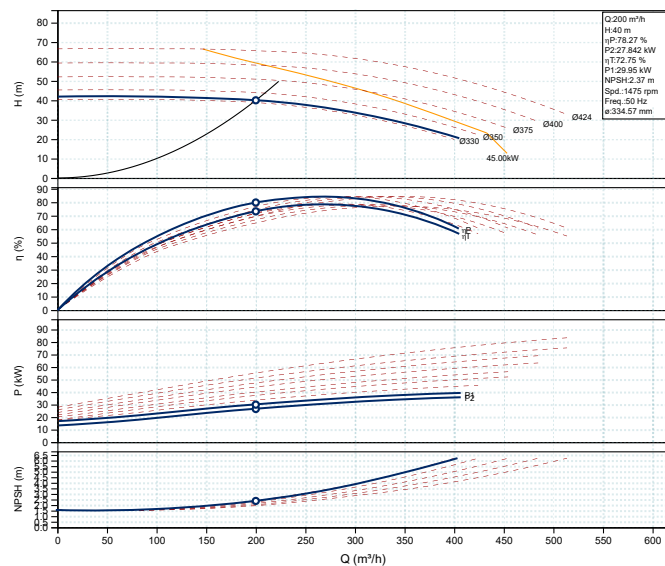


PUMP CURVES

smartSelect offers detailed curves about pumps. These curves also include motor-related values. Pump curves can be displayed for both the calculated impeller diameter and all standard impeller diameters. The pump operation area can also be viewed.

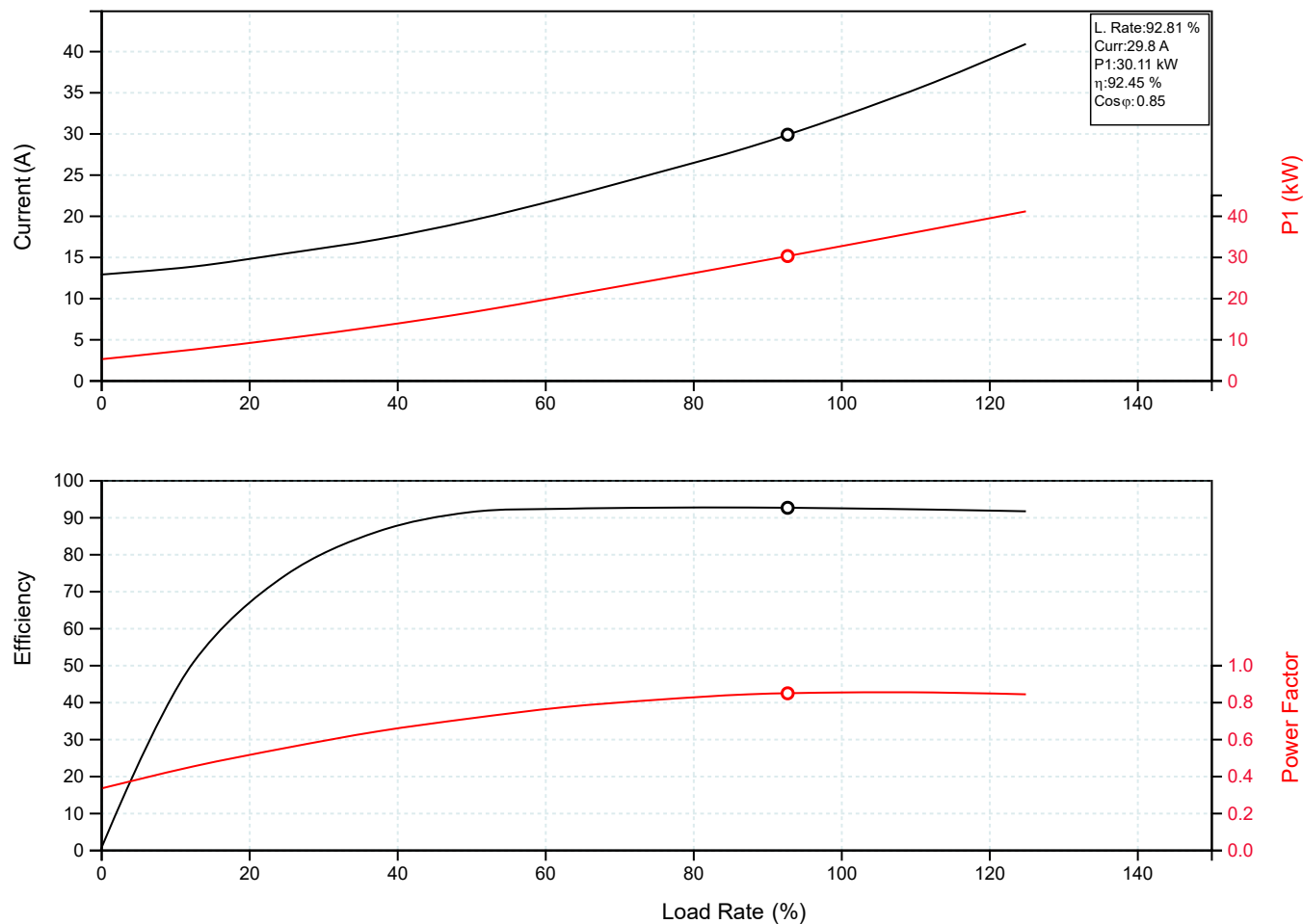
The following curves are drawn as a function of flow for the pump:

- Pump Head
- Pump Efficiency
- System Efficiency
- Pump Shaft Power
- Motor Electric Power
- NPSHr



MOTOR CURVES

smartSelect plots Current, Power, Power Factor and Motor Efficiency Curves based on the motor loading rate. Calculates the motor loading rate and calculates the motor values corresponding to this loading rate. These values are the actual values of the motor for the duty point of the pump. The actual operating point of the motor is shown on the curves. When the pump duty point is changed, this point and values also change.



Motor curves can be viewed both on a motor and pump curves page. The ability to view the motor curves on the pump curves page provides a simultaneous display of the effect of changing the pump duty point on the motor values.



CURVES CALCULATED ACCORDING TO MOTOR SPEED

smartSelect adapts the pump curves to the motor speed. While adding the pump performance values to the database, it is also specified for which speed the entered values are valid. The program recalculates the values in the database according to the affinity laws using the motor speed. This allows the calculated values to produce more accurate results for the selected motor.

$$\frac{Q_1}{Q_2} = \frac{n_1}{n_2}$$

$$\frac{H_1}{H_2} = \left(\frac{n_1}{n_2}\right)^2$$

$$\frac{P_1}{P_2} = \left(\frac{n_1}{n_2}\right)^3$$

Q: Flow
H: Head
P: Power
n: Speed

Since the motor speed can be defined for different efficiency classes, voltages, and number of phases, the actual pump operating values for each motor option can be calculated in this way.

Especially in high head pumps, the pump performance changes significantly depending on the motor speed. Calculation of the actual shaft power according to the motor speed also prevents the selection of an unnecessarily large motor or the selection of insufficient motor power, makes it easy to decide on the motor size.

Q: 12 m³/h
H: 277.49 m
ηP: 52.92 %
P2: 17.203 kW
ηT: 46.23 %
P1: 19.69 kW
NPSH: 1.74 m
Speed: 2940 rpm
Frequency: 50 Hz
Impeller Diameter: 140 mm

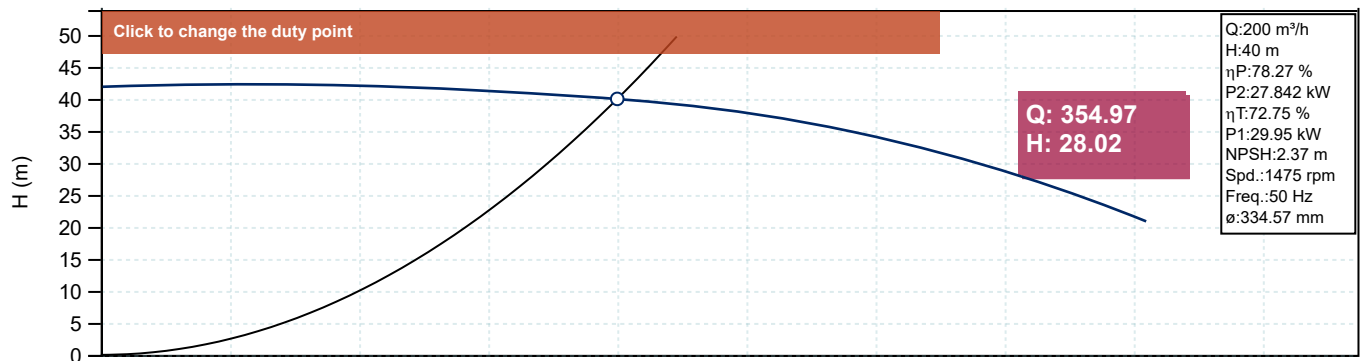
Q: 12 m³/h
H: 283.82 m
ηP: 52.93 %
P2: 17.595 kW
ηT: 48.74 %
P1: 19.11 kW
NPSH: 1.76 m
Speed: 2965 rpm
Frequency: 50 Hz
Impeller Diameter: 140 mm

The tables show the pump and motor performance values for the same pump and impeller diameter for two different motor size, 18.5 and 22 kW, with speeds of 2940 rpm and 2965 rpm, respectively.



ALTERING DUTY POINT ON THE CURVE SCREEN

In the program, the curve page opens for the pump selected from the table. The duty point of the pump can be changed to display the values of the pump under different operating conditions on the curve sheet.



The duty point can be changed by clicking a point on the curve or by typing the desired flow value in a text box. When the curve is hovered, the curve becomes thicker and selectable, and a warning appears as "Click to Change the Duty Point". While the cursor is hovering over the curve, there is a pointer that shows the flow and head where the cursor is on the curve. The flow on the pointer indicates the flow value that will be calculated when the curve is clicked.

The program warns the user if the entered flow rate is higher than the maximum flow rate at the calculated impeller diameter and speed of the pump.

Change Duty Point -

Flow (m³/h)

450

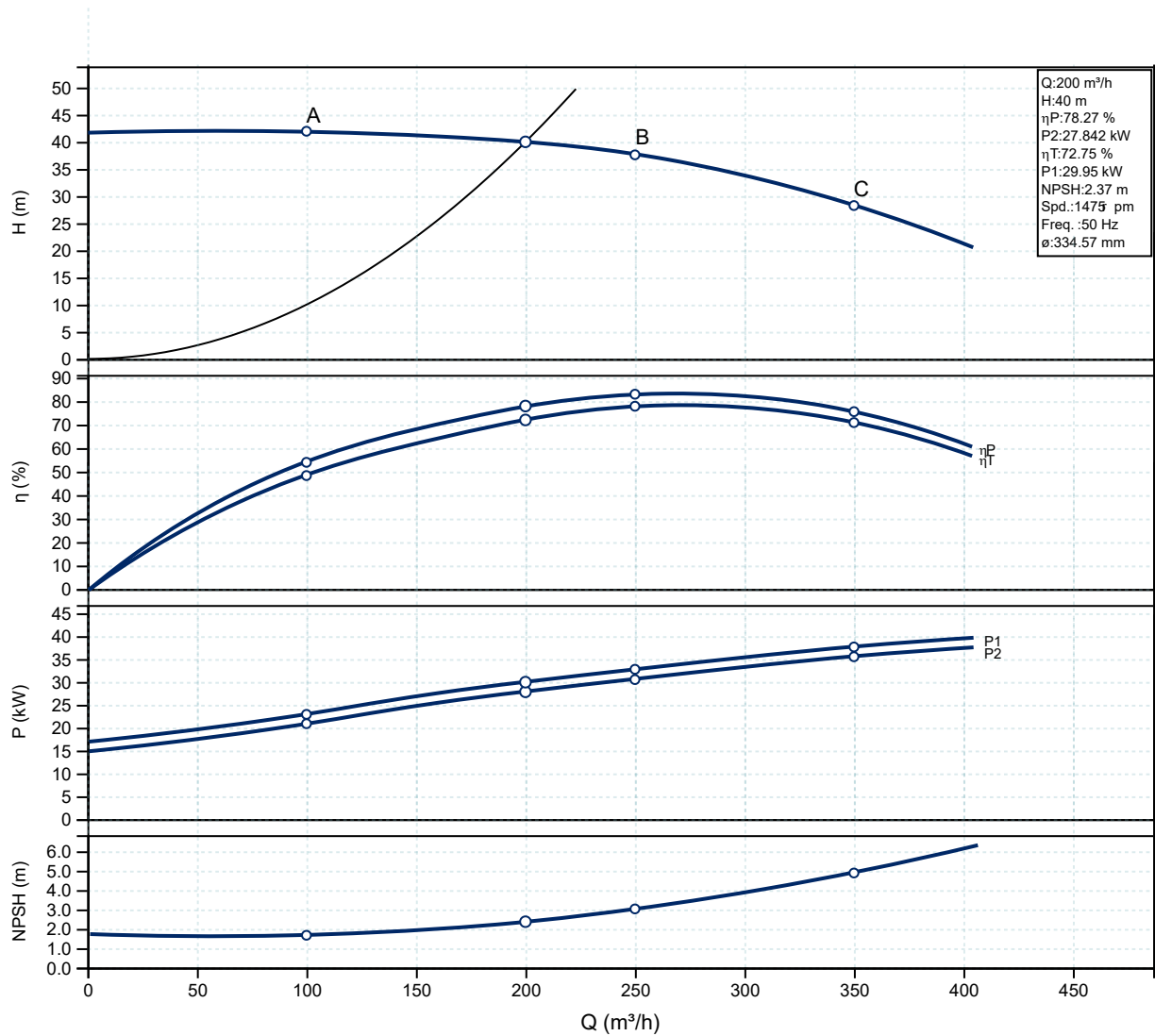
Calculate

Requested flow is more than maximum flow.



ADDITIONAL DUTY POINTS

The performance values of the pump at different flow rates can be displayed on the curve. Also, performance values for added points are displayed in the table. These points are also included in the generated PDF report. Points can be identified by granting a name to the point in concern.



Add New Duty Point

Flow (m³/h)

350

Duty Point Name

C

Calculate

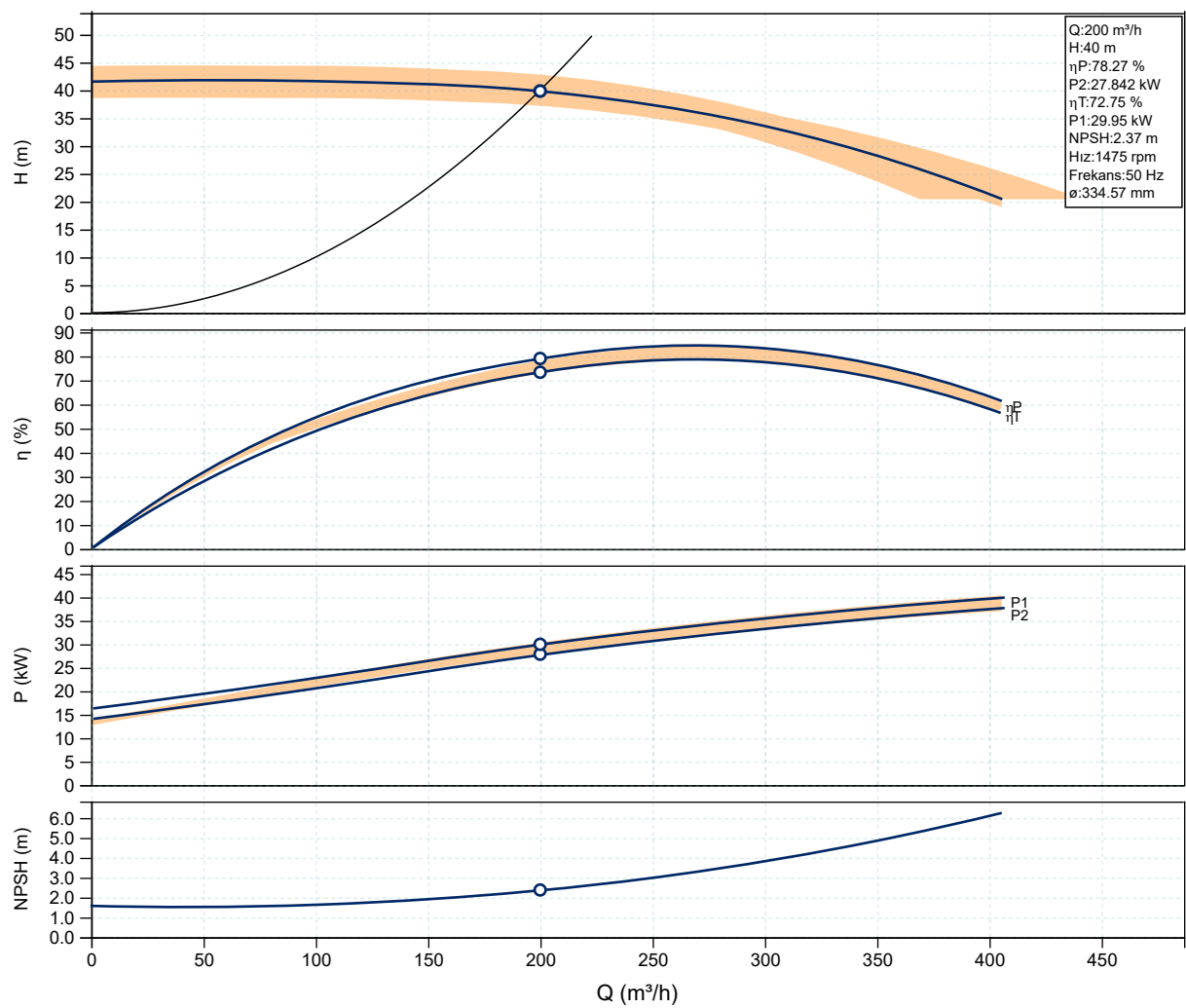
Additional Duty Point Data

Point Name	Flow	Head	Pump Efficiency	P3	Total Efficiency	P1	NPSH
A	100	41.49	53.71	20.88	48.94	22.91	1.61
B	250	37.6	83.56	30.65	77.85	32.89	3.03
C	350	28.26	76.36	35.13	71.26	37.64	4.85



TOLERANCES

The tolerance area of the performance values of the pumps can be shown on the curve. Tolerances are according to ISO 9906-2012 Standard. Grade 3B is used by default, but tolerances can be changed.



The minimum and maximum values for the selected tolerance range are shown in a table.

Tolerance Class

- Grade 3B
- Grade 2U
- Grade 2B
- Grade 1B
- Grade 1E
- Grade 1U

Tolerance

☐ Show Tolerance Area

Tolerance Class

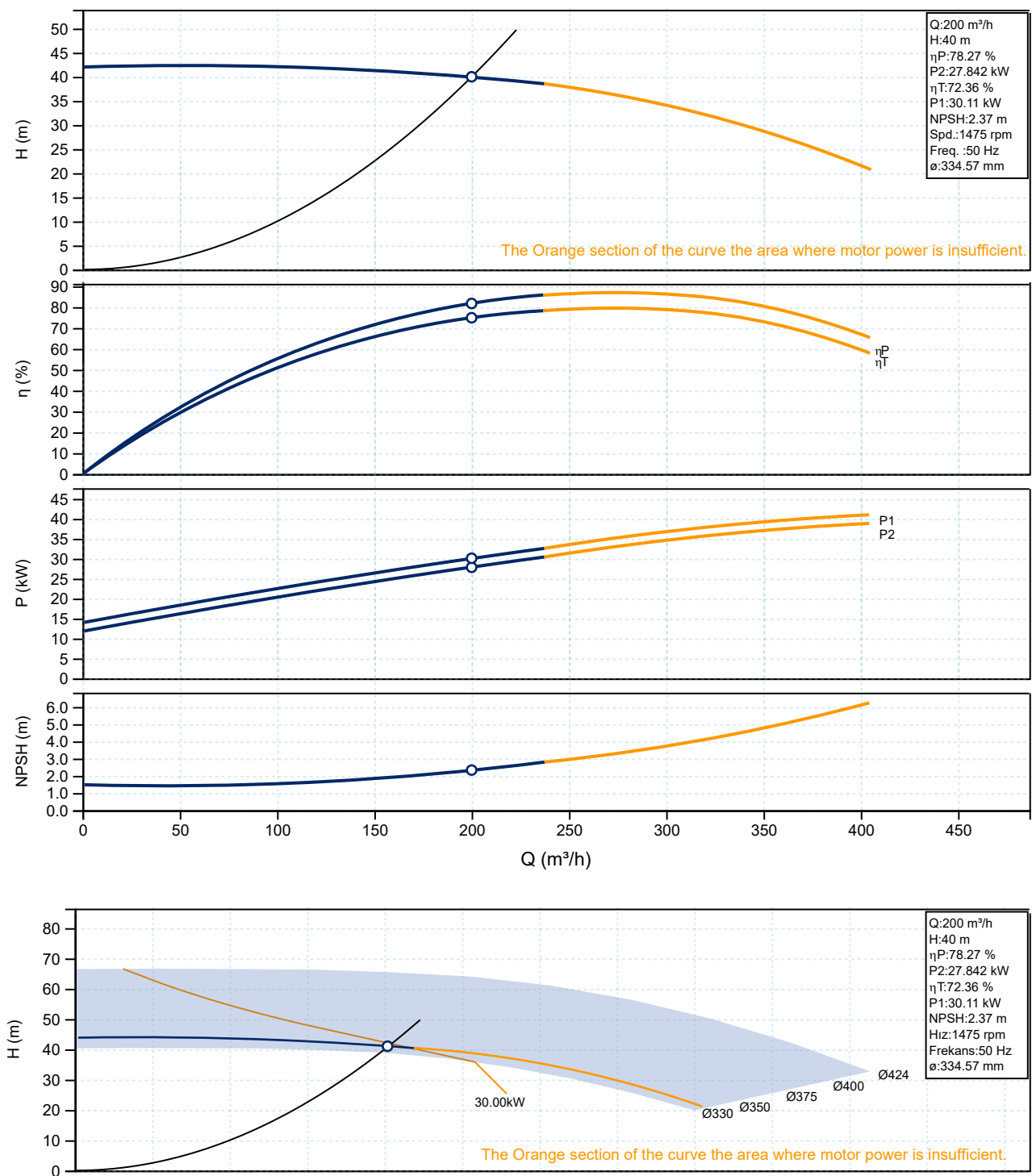
3B

Values	Tolerances	Minimum	Maximum
Flow	TQ: ± 9	182	218
Head	TH: ± 7	37.2	42.8
Shaft Power	TP: + 9	27.84	30.35
Efficiency	Tη: -7	72.79	78.27



MOTOR POWER ANALYSIS

When selecting a pump, the motor power is selected to exceed the shaft power at the duty point. The power of the selected motor may not be sufficient for the entire curve. In this case, the region where the motor power is insufficient is indicated with orange color and an explanation is placed on the curve.

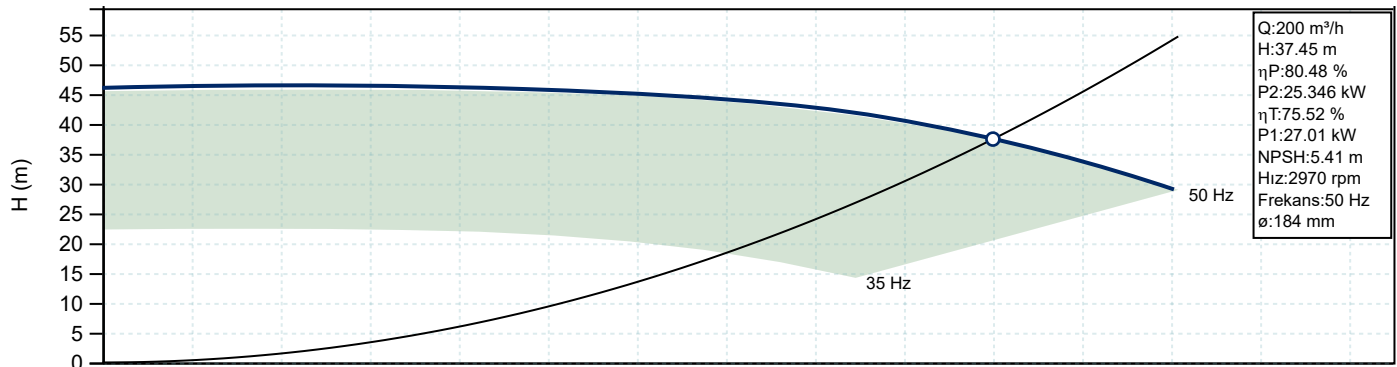


In addition, when the operation area is shown for all impeller diameters of the pump, a curve is displayed demonstrating in which region of the curve area the selected motor power is sufficient. This curve is also updated when the motor power is changed.

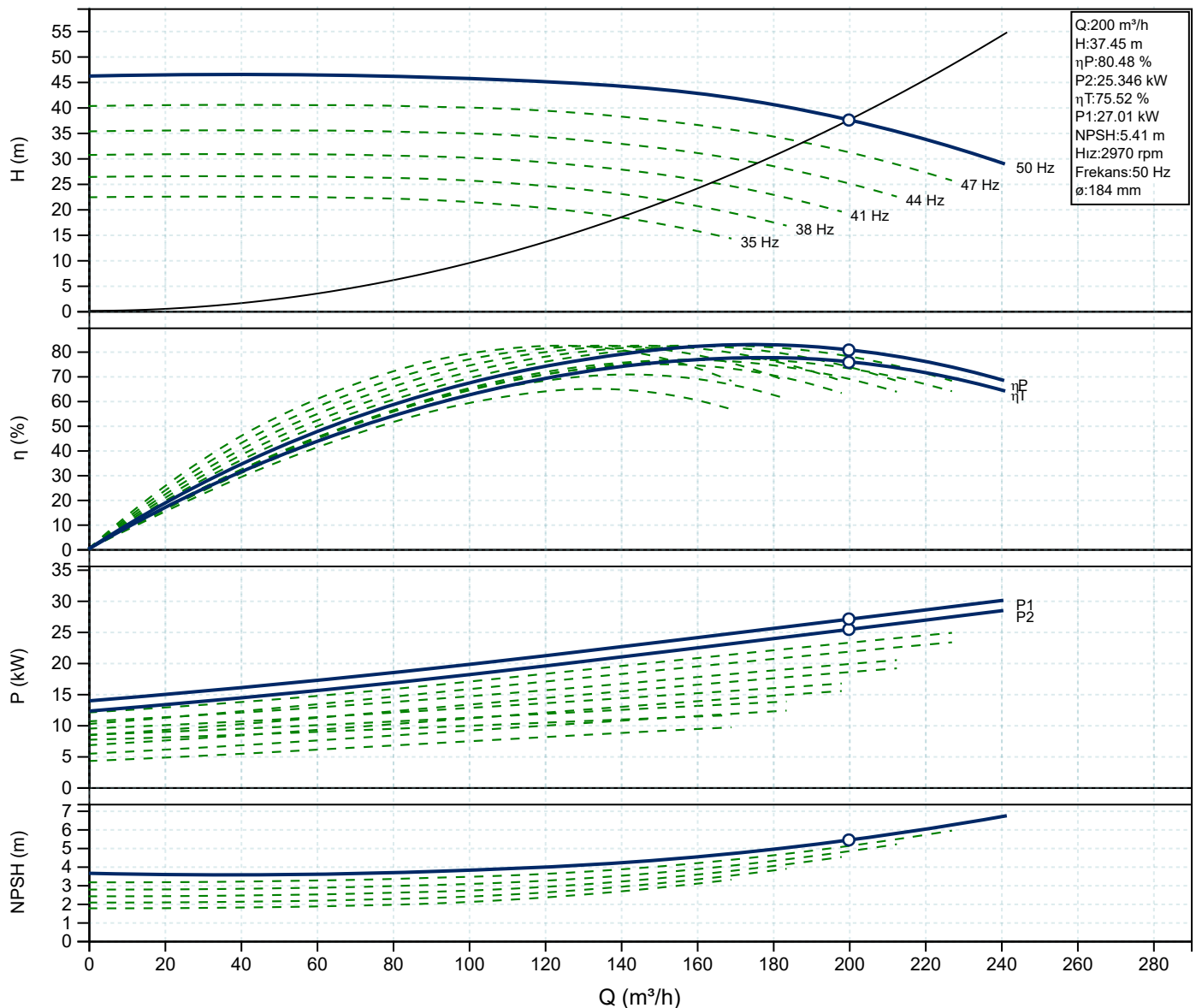


FREQUENCY ANALYSIS

smartSelect allows you to create curves of the pump at different frequencies and see the operating points. It plots the operation area in the maximum and minimum frequency range in the Q-H curve area. When any flow and head point is clicked in this area, the program calculates the frequency that provides this point.



Curves can be plotted for the minimum and maximum frequency range of the pump.



FREQUENCY ANALYSIS

The main curve can be plotted for any frequency. The desired frequency can be selected from a list or it can be calculated by entering it especially into decimal frequencies. The frequency, flow or head can be changed to remain constant or to follow the system curve.

Change Frequency

☒ Show Frequency Area

☐ Show Frequency Curves

45 Hz

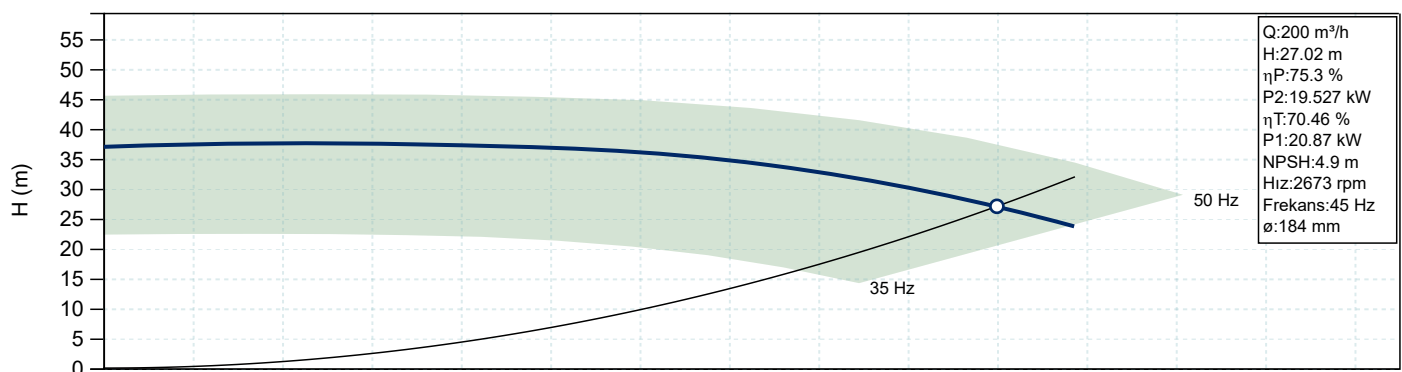
☒ Constant Flow

☐ Constant Head

☐ Follow System Curve

Frequency (Hz)

Calculate



Frequency Calculator

Flow (m³/h)

200

Head (m)

50

The requested flow is higher than maximum flow at maximum frequency.

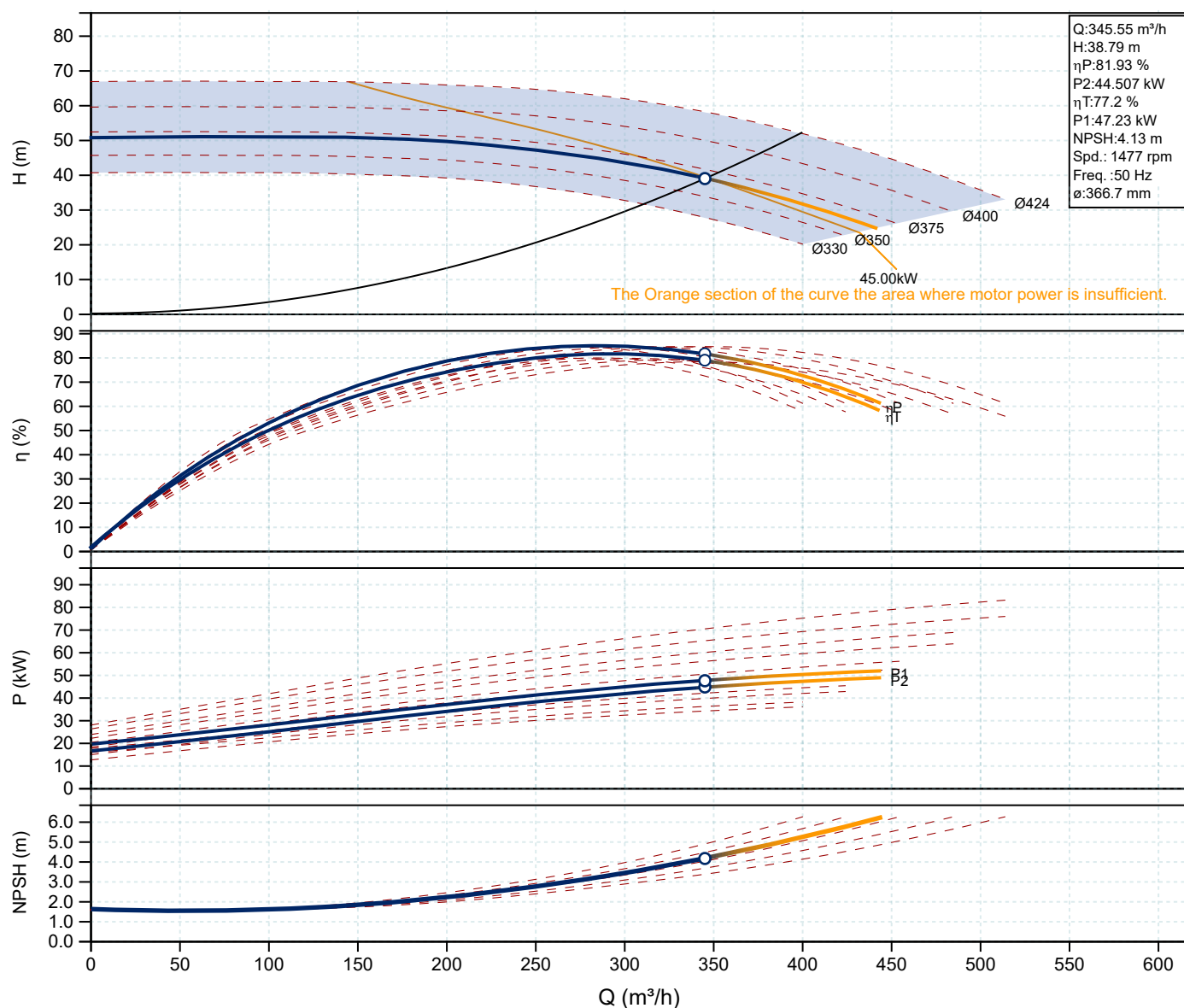
Calculate

smartSelect calculates the frequency providing the duty point when any flow rate and head are entered within the pump operating range for minimum and maximum frequency. If the entered values are out of the operation area, the program warns the user.



IMPELLER DIAMETER ANALYSIS

smartSelect draws the pump curves for standard impeller diameters and the operation area between the minimum and maximum impeller diameter, as well as the impeller diameter providing the duty point. When a point in the operation area that corresponds to any flow rate and head is clicked, it calculates the impeller diameter providing this point and plots the curve for this impeller diameter.



IMPELLER DIAMETER ANALYSIS

Pump curves can be replotted for standard impeller diameters which are selected from the list. Also, pump curves are able to be drawn for the impellers are not in the list when minimum and maximum impeller diameters are given.

Calculate Impeller Diameter -

Flow (m³/h)

Head (m)

Calculate

Change Impeller Diameter -

Standard Impeller Diameters

☐ Show Only Calculated Impeller Diameter

☒ Show Pump Operation Area

Choose... ▼

Enter Impeller Diameter

Ø 330.00 - Ø 424.00 mm

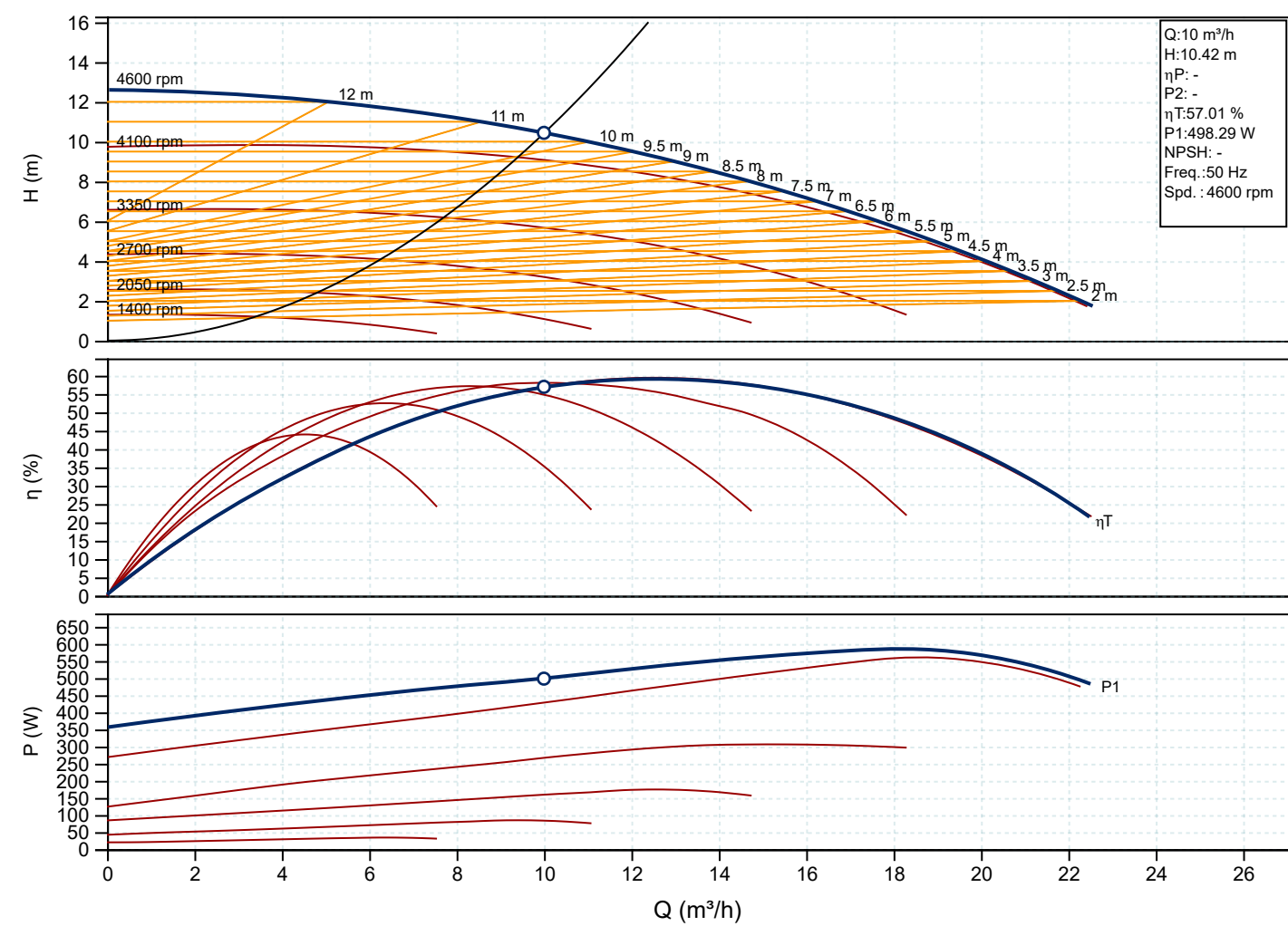
Calculate

The program calculates the required impeller diameter for an entered flow rate and head so that the pump's performance for different impeller diameters can be analyzed. The user is warned if the entered duty point is outside the operation area for the minimum and maximum impeller diameters.



HOT WATER CIRCULATION PUMPS

smartSelect has a special selection and curve drawing algorithm for hot water circulation pumps, whose performance curve is defined for different speeds. Lines can be displayed on the curves indicating the operating points for manual, constant pressure and variable pressure.



Hot water circulation pumps can be selected for water containing antifreeze at different concentrations and curves can be drawn for these fluids.

Fluid —

Water + %50 Antifreeze ▼

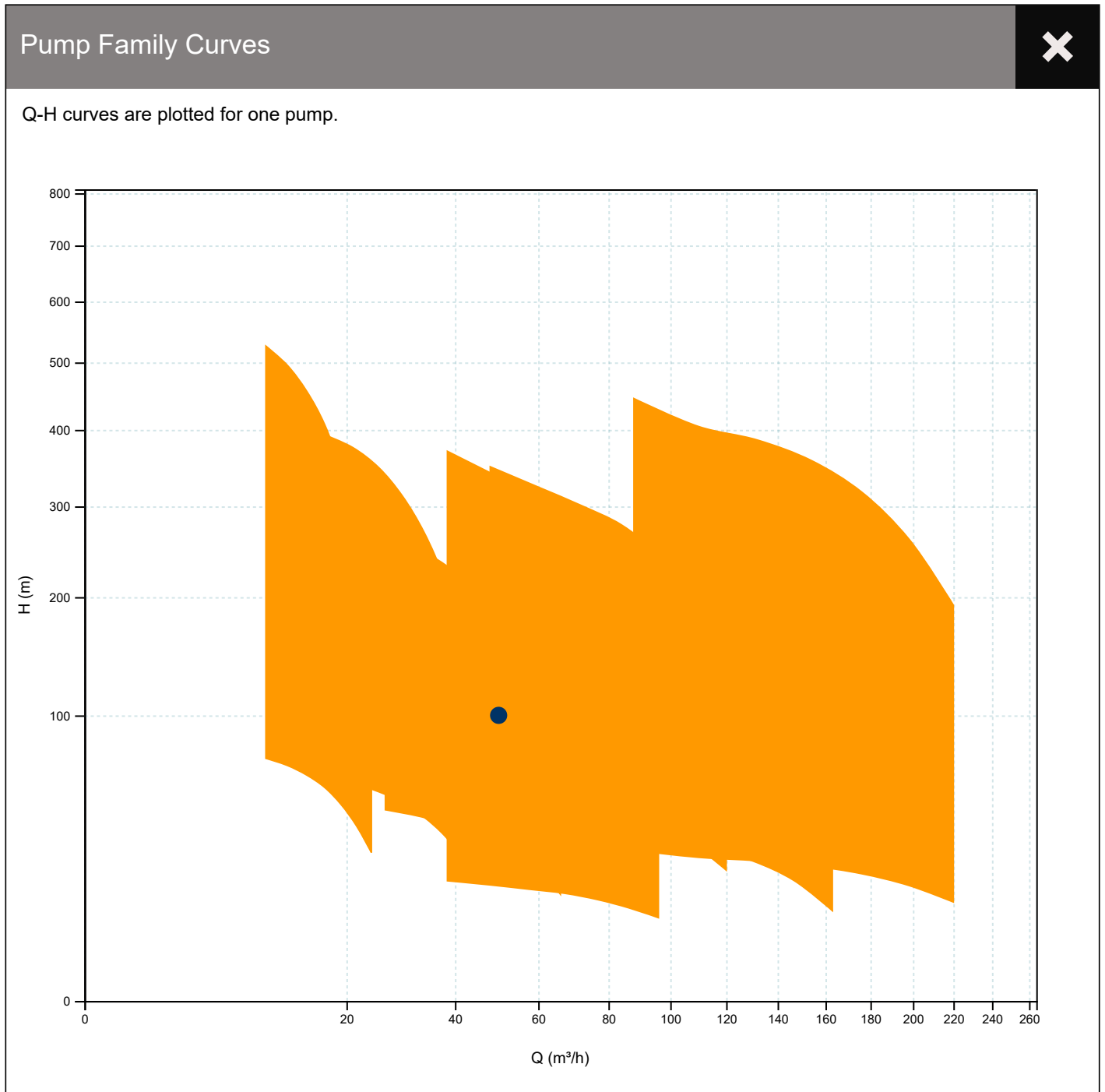
Fluid Water + %50 Antifreeze

Ambient Temp. -10.00 °C



DUTY POINT ON FAMILY CURVES

smartSelect plots the family curves of the pump so that the operating limits of the pump can be displayed on the input screen of the pump duty point. If family curves are displayed after the flow and head are entered, the duty point is displayed on the family curves. Thus, it can be easily seen whether the selected pump type provides the desired operating point.



Family curves can be displayed simultaneously for a single pole and a single pump series. For pumps with more than one pole, the family curves must be examined separately. Family curves can be displayed for parallel and serial connected pumps if the number of pumps and connection type are specified.

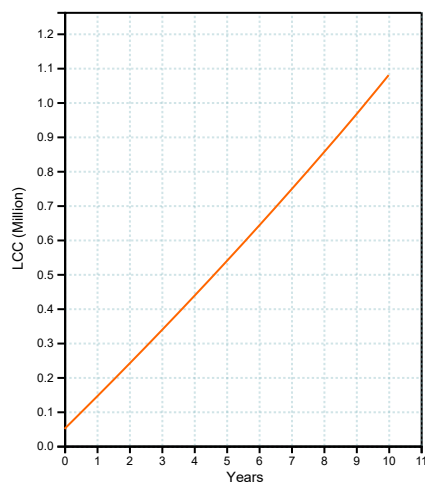
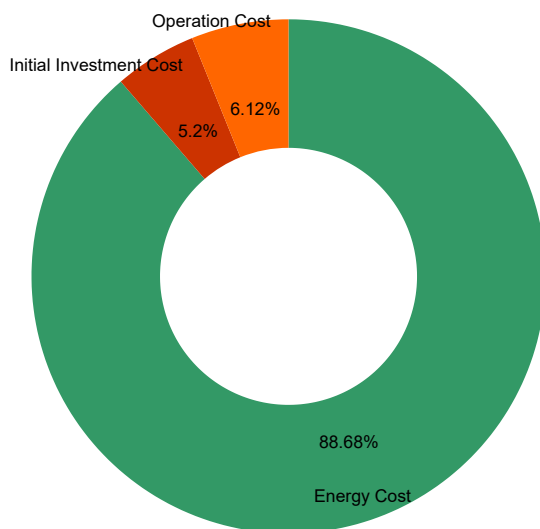


LIFE CYCLE COST (LCC) ANALYSIS

smartSelect offers tools for life time cost analysis in order to analyze different alternatives as different pumps, motor, piping, control method.

Life Cycle Cost Components:

- Pump Cost
- Piping, Building Cost
- Periodic Maintenance Cost
- Installation and Commissioning Cost
- Annual Efficiency Reduction
- Operating Cost
- Annual Maintenance Cost
- Production Loss Due to Malfunction
- Environmental Cost
- Disassembly and Dismantling Cost
- Energy Cost



LCC Data

Detailed LCC Analysis

₹

Operation Life	10	Year
Pump Cost	10000	₹
Piping, Building etc. Cost	30000	₹
Periodic Maintenance	1000	₹ / Year
Installation and Commissioning	10000	₹
Annual Efficiency Reduction	1	%
Operation Cost	2000	₹ / Year
Annual Maintenance Cost	1000	₹ / Year
Production Loss Because of Failure	2000	₹ / Year
Environmental Cost	500	₹ / Year
Disassembly and Dismantling Cost	2000	₹
Annual Operating Time	3600	Hours / Year
Unit Energy Cost	0.8	₹ / kWh
Interest Rate	9	%
Inflation Rate	8	%

Calculate

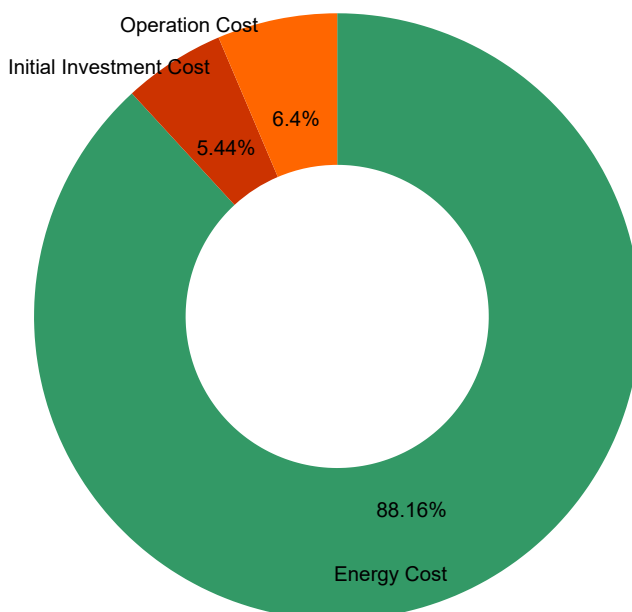
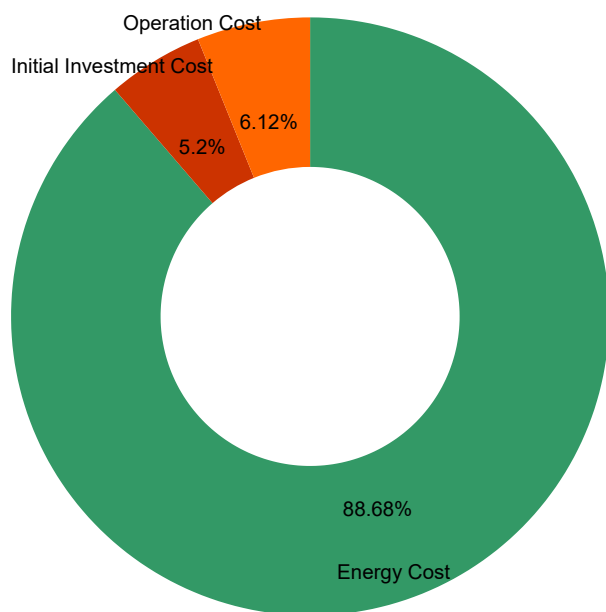
Life Cycle Cost Analysis enables comparison of alternative systems at the project phase rather than calculating the life cycle cost of a pumping system exactly and accurately.



LIFE CYCLE COST (LCC) ANALYSIS

The most important cost component of a pumping system is the energy cost. For this reason, it is important to calculate the energy costs correctly. It is important for a more realistic cost analysis to include the efficiency reduction of the pump in order to see the change in the energy cost over the years. When calculating the energy cost of the pump, smartSelect also takes into account the reduction in efficiency of the pump.

For instance, the effect of the factors such as pump material, coating selection into the pump efficiency through years could be calculated.



LCC analysis for different pump cost and efficiency drop, at other variables remain constant. Efficiency reduction is respectively 1% and 2%.

Years	Energy Cost
1	77.688,00
2	78.473,00
3	79.273,00
4	80.091,00
5	80.925,00
6	81.777,00
7	82.647,00
8	83.535,00
9	84.443,00
10	85.371,00
Total	814.223,00

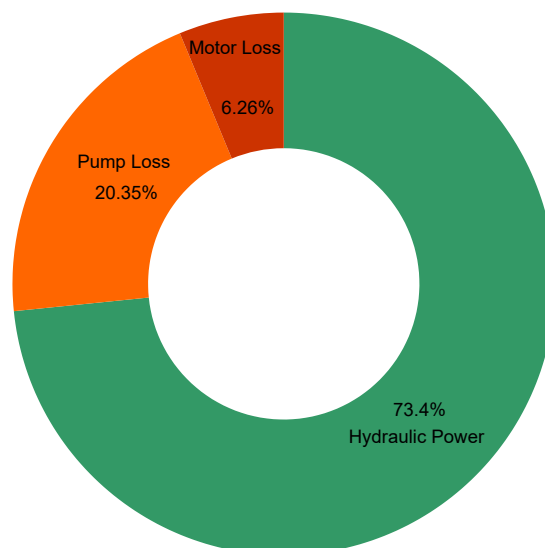
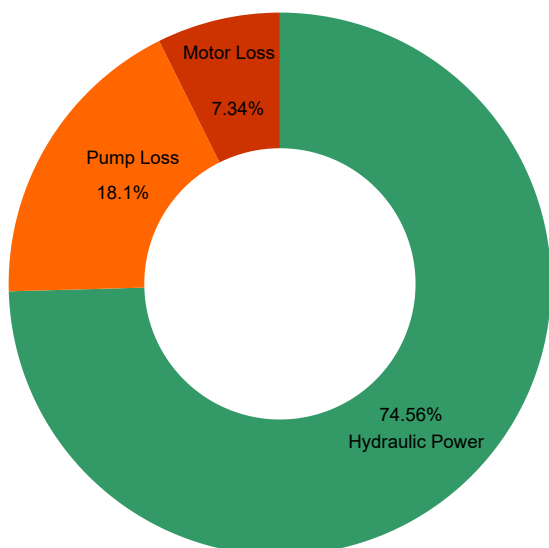
Years	Energy Cost
1	77.688,00
2	80.091,00
3	82.647,00
4	85.371,00
5	88.282,00
6	91.398,00
7	94.741,00
8	98.339,00
9	102.221,00
10	106.422,00
Total	814.223,00



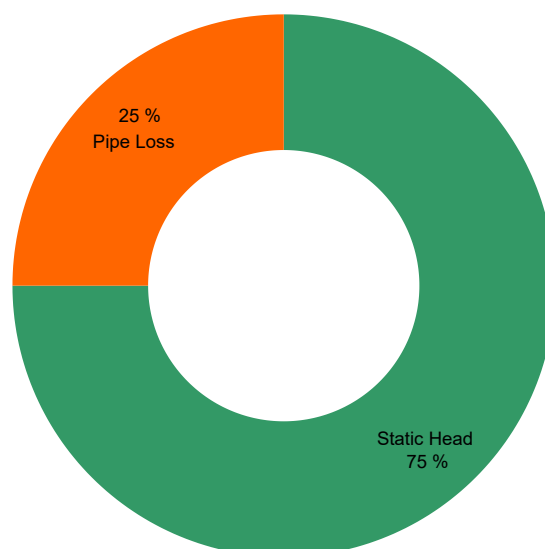
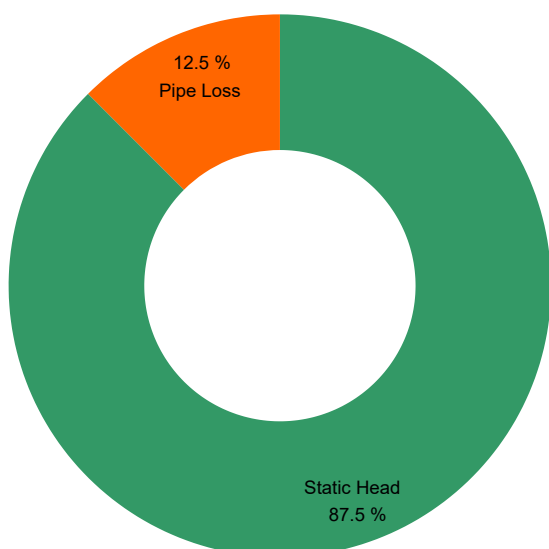
ENERGY ANALYSIS

smartSelect provides tools to examine different alternatives in terms of energy consumption by detailing the hydraulic power, pump losses, motor losses, and the shares of pipe friction losses in the consumed energy.

The effect of choosing a small or large pipe diameter for the same flow rate in terms of energy consumption or the effects of motor efficiency class in terms of energy consumption, for instance, can be examined.



At other factors remains constant, energy analysis of IE2 & IE3 respectively. For the IE2 motor, the share of the motor in the energy consumption is increasing.



The place of pipe losses in energy consumption for small pipe diameter and large pipe diameter, respectively, for the same flow rate.



BOOSTER SET and DUTY POINT CALCULATION

smartSelect has tools for calculating peak flow and head for booster set. Detailed peak flow calculations can be made according to DIN 1988 by choosing simple calculations with the building type or by selecting the water consuming installation materials and machines in the unit one by one.

Add Building Section ✕

Building Type

Residence ▼

Number of Person :

Consumption

Coefficient for Consumption per person

Minimum ▼

Simultaneity Factor

Minimum ▼

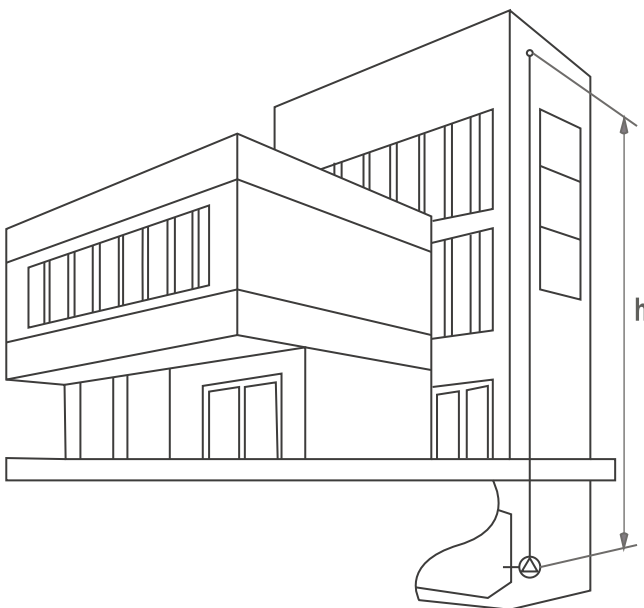
Add

Add Consumption Point ✕

Consumption Point	Size	Consumption	Add
Tap with aerator	DN 15	0.3	✓
Tap without aerator	DN 20	0.5	✓
Tap without aerator	DN 25	1	✓
Tap with aerator	DN 10	0.15	✓
Tap with aerator	DN 15	0.15	✓
Shower Faucet	DN 15	0.15	✓
Bathtub	DN 15	0.15	✓
Kitchen Sink	DN 15	0.07	✓
Sink	DN 15	0.07	✓
Sloset	DN 15	0.07	✓
Household type washing machine (acc. to DIN 60456)	DN 15	0.15	✓

A simple booster head calculation can be made with the building dimensions.

Calculate Head ✕



$$h = \text{Number of Floor} * \text{Floor Height}$$

Number of Floor

1 ▼

Floor Height (m)

2.8

Outlet Pressure

1.5 Bar ▼

Loss Factor *(Loss occurs in piping. As a rule it is 20 percent of total head.)*

% 20 ▼

Add



BOOSTER SET and DUTY POINT CALCULATION

smartSelect has a special pump selection algorithm for boosters. According to the number of spare pumps selected, it scans the pumps according to the maximum and minimum number of pumps in the booster set and selects the appropriate booster sets which have different pump numbers.

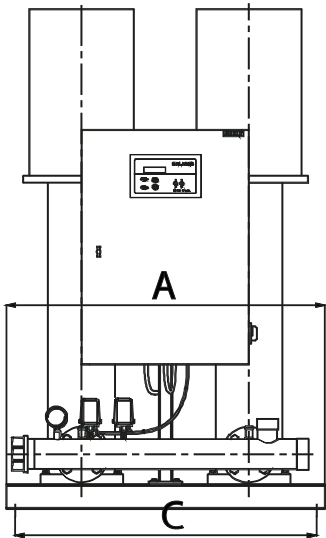
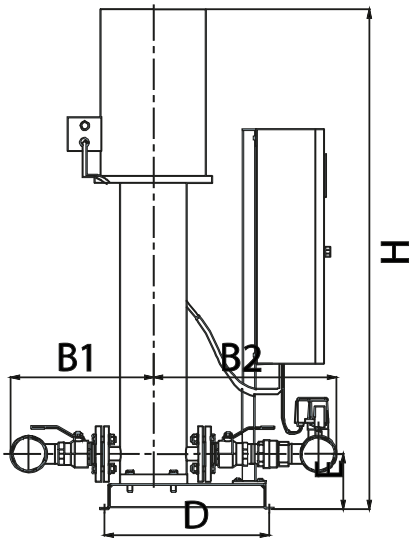
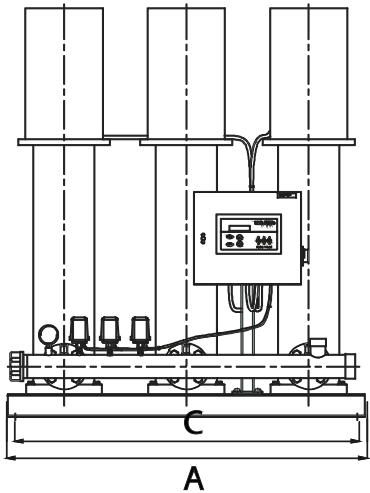
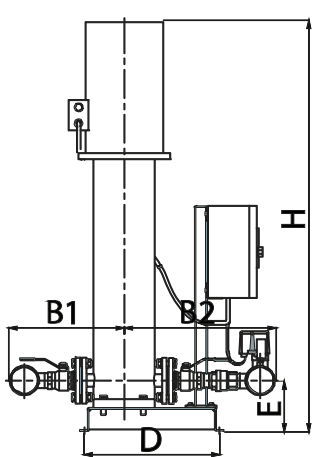
Number of Stand-By Pump

1

▼

Selection of booster sets with different pump numbers, including one stand-by pump for the same operating point.

Pump Model ↕	Number of Pump ↕
KJPS-T 10 / 07 - 3	2 + 1
KJPS-T 10 / 09 - 3	2 + 1
KJPS-T 10 / 16 - 3	2 + 1
KJPS-T 5 / 08 - 3	2 + 1
KJPS-T 5 / 11 - 3	2 + 1
KJPS-T 5 / 14 - 3	2 + 1
KJPS-T 5 / 22 - 3	2 + 1



smartSelect enables users to observe booster sets which has various pump numbers. The dimensions of a single pump in the set can be displayed, as well as the dimensions of the booster sets which have various pump number.



CABLE DIAMETER CALCULATION FOR CLEAN WATER SUBMERSIBLE PUMPS

Power transmission is sustained by a hundreds of meters long cables between panel and motor in clean water submersible pumps, which are commonly used in deep wells. Voltage drops, which adversely affect the motor, and energy losses frequently observed through this long cable.

It is important to choose the diameter of this cable in a way that is cost effective and at the same time reduces voltage drop and energy losses. smartSelect enables optimum cable selection by calculating alternative cable diameters and voltage drop and energy losses for these diameters using the power input of the electric motor.

Inputs for Cable Diameter Calculation:

Starting Method
Maximum Voltage Drop
Cable Material
Cable Length

Cable Calculator

Starting Method

Direct

Voltage Drop

Maximum (%) 3

Cable Material

Copper

Cable Length (m)

100

Calculate

Option	Cable Size	Voltage Drop	Energy Loss	Max. Current
1	3 x 10	2.5 %	685.1 W	60 A*
2	3 x 16	1.6 %	428.2 W	80 A*

smartSelect calculates two alternative cable diameters that may be suitable for the given inputs and gives the cable size, voltage drop, energy loss and maximum current the cable can carry for these cables.

*For conditions where sufficient heat transfer is provided, such as when the cable is in water, this value is lower if the cable is not in water.

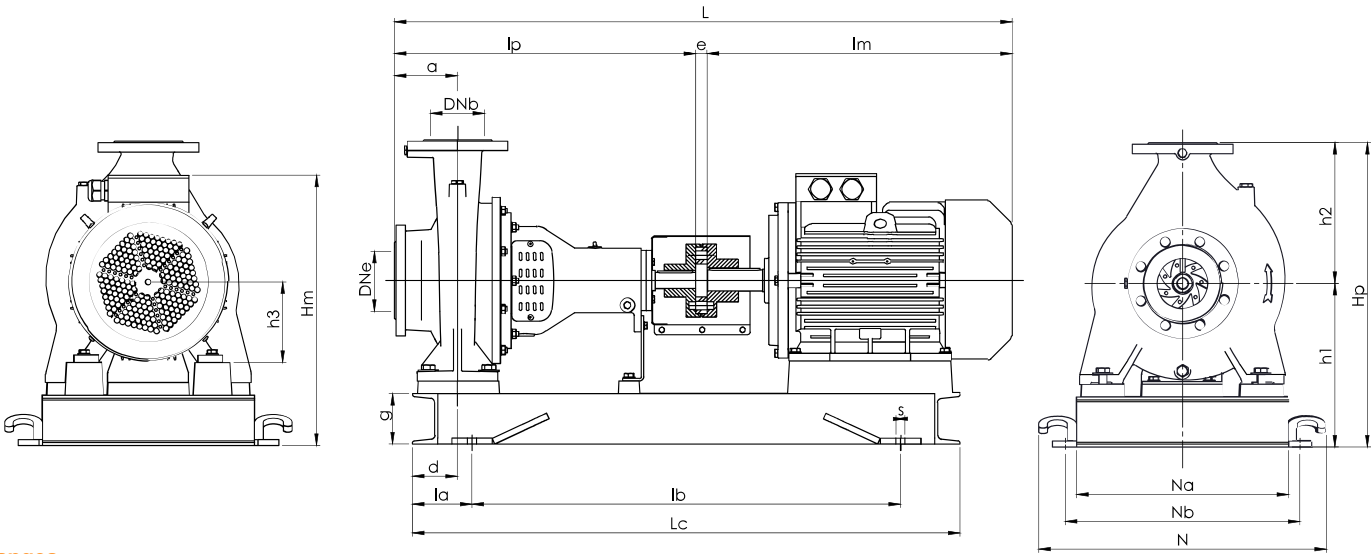
Calculations are for a maximum water temperature of 25 °C.



PUMP DIMENSIONS WITH MOTOR

smartSelect allows displaying the bare shaft dimensions as well as the pump-motor dimensions as a set that can change with the selected motor. Set dimensions are defined with the motor and the dimensions change when the motor is changed.

Dimension with motor	✓
Bareshaft Pump Dimension	
Dimension with motor	



Flanges

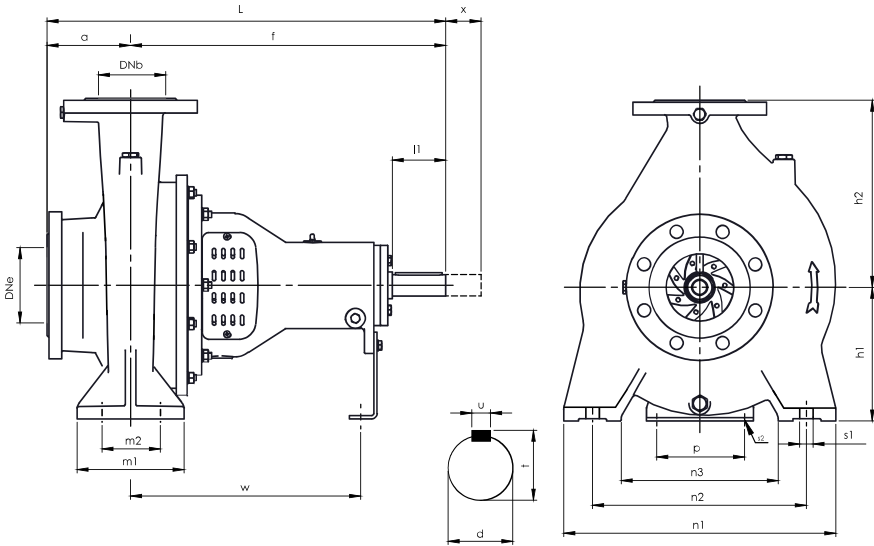
Index	Dimension
DNe	DN 125
DNb	DN 100

Pump Casing

Index	Dimension (mm)
a	125.00
l_p	225.00
L	245.00
h_1	654.00
h_2	325.00
H_p	445.00

Motor

Index	Dimension (mm)
l_m	85.00
h_3	223.00
H_m	124.00



MATERIAL OPTIONS

smartSelect enables the material of the desired parts of the pump to be displayed and selected. For each part, a standard material and material options are shown and selection is made. Both the name of the material and the material numbers in DIN, EN and ASTM Standards are shown. Thus, it is ensured that suitable material numbers are displayed for customers accustomed to different standards.

Material Standard

DIN

DIN

EN

AISI/SAE/ASTM

In the material list, the standard material comes first and selected. The material other than the standard can be selected through the list.

Pump Body

Cast Iron / 06025

Stuffing Box

Cast Iron / 06025

Impeller

Cast Iron / 06025

Shaft

Chrome Steel / 1.4021

Bearing Box

Cast Iron / 06025

In addition, the parts and bill of materials allow optional parts to be displayed and selected. Optional parts, such as wear rings, are indicated as optional and are only displayed in the parts list if the material is selected.

Wear Ring

Optional Part. To add part please choose material.

Material Standard

Cast Iron

Cast Iron

Bronze

Pump options with different material groups can be defined on the program. For example, two different pump versions can be defined, the impeller standard material of which is cast iron or bronze. Similar material selection operations can be performed on these versions. If desired, different sizes can be defined for the version



SEAL OPTIONS

smartSelect allows adding different seal types for each pump type. For example, only the mechanical seal option can be selected for a wastewater pump, while both mechanical seal and soft seal selection are allowed for an end-suction pump.

Shaft Seal

Soft Packing

Soft Packing

Mechanical Seal

Choose...

SP - Standard

In addition, various brands and seals can be selected in accordance with these brands' values temperatures and pressure

Shaft Seal

Mechanical Seal

Choose

XXXXX

YYYYY

SP - Standard

Shaft Seal

Soft Packing

XXXXX

SP - Standart

SP - Option 1

SP - Standart

The operating temperature, operating pressure, surface materials etc. are displayed for the selected seal.

Brand	SS
Type	Soft Packing
Seal Code	SP - Standard
Min. Operation Temperature	-20.00 °C
Max. Operation Temperature	100.00 °C
Maximum Pressure	10.00 Bar
Maximum Pressure	145.00 Psi



MOTOR OPTIONS

smartSelect allows different motors to be defined for different pump types. Different motors are defined for instance for clean water submersible pumps and end-suction pumps.

Motors can be defined separately for 1 and 3 phases. In this way, the performance values and dimensions of a motor of the same power and the same brand can be added and displayed separately in different phase numbers.

Motor performance and dimensions can be added for different efficiency classes and different voltage values of the same motor such as IE2, IE3, IE4.

Change Motor

XXXX- IE2

XXXX- IE2

XXXX- IE3

Choose...

380 V

Show Motor Curves

Selection of motor brand and efficiency class.

Change Motor

XXXXX- IE2

Seq...

23EG200LB - 30 kW

23EG200LB - 37 kW

23EG200LB - 45 kW

23EG200LB - 55 kW

Show Motor Curves

Selection of motor power.

Change Motor

XXXXX- IE2

23EG200LB - 37 kW

230 V

380 V

400 V

415 V

Selection of motor voltage.

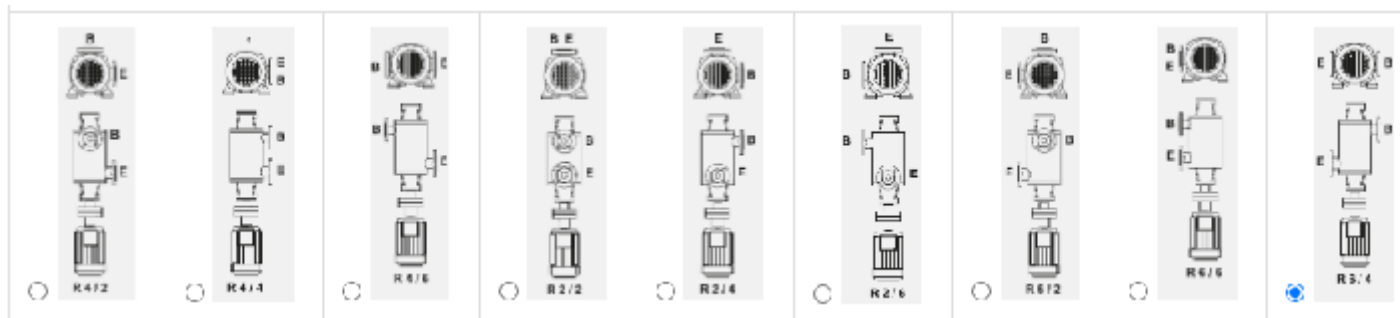


SELECTION OF FLANGE POSITION

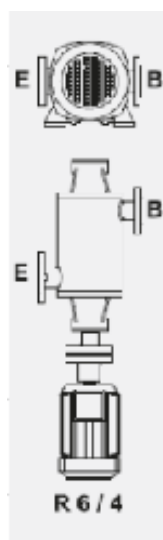
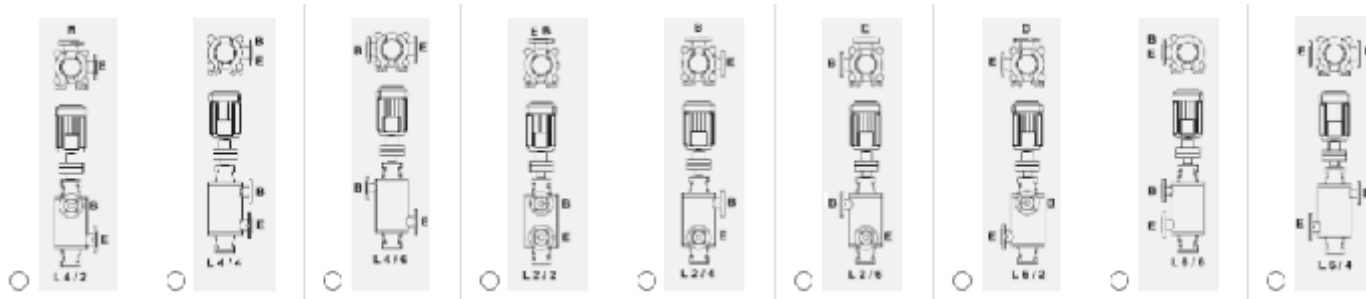
Flange position can be selected and shown in the pumps which may have different flange positions such as horizontal multistage pump.

Flange positions can be displayed for clockwise rotation when viewed from the motor side and counterclockwise rotation when viewed from the motor side.

Clockwise rotation as viewed from the motor side (Suction flange on the motor side)



Anti-clockwise rotation as viewed from the motor side (Discharge flange on the motor side)



Detailed display of selected flange location

Clockwise rotation as viewed from the motor side
(Suction flange on the motor side)

Outlet flange, left when viewed from motor side
Discharge Flange, right when viewed from motor side.

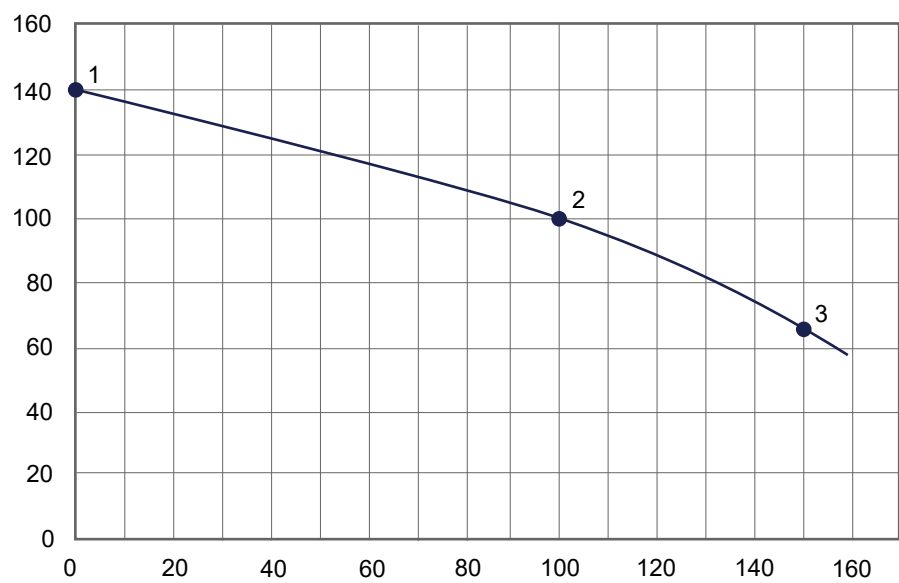


FIRE FIGHTING PUMPS SELECTION

Due to the special importance of fire pumps, they differ from other pumps in terms of their material and performance characteristics. These differences and features are defined in the NFPA 20 standard. Fire pumps are designed and manufactured to provide maximum reliability and net outlet pressure value throughout their lifetime.

Fire pumps require a different selection algorithm due to their intended use. The curve of the selected pump must fulfill certain conditions. While efficiency is a very important criterion for other pumps, efficiency is not an important criterion as fire pumps will be operated only in periodic control tests during their lifetime. smartSelect selects fire pumps according to NFPA Standard by considering all these factors.

smartSelect allows to define pump sets containing fire pump and additional equipment.



Pump Curve Requirements

Closed Valve Head should not exceed 140% of the operating point head.
The pump curve should provide a flow rate of 150% of the duty point. The head at this flow should not be less than 65% of the operating point head.

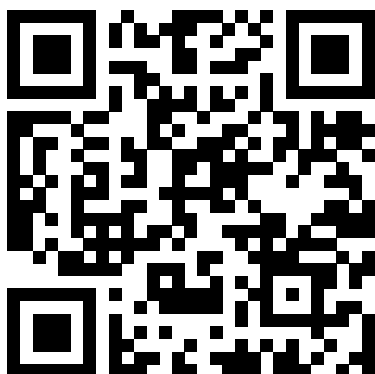
2 (Duty Point)		1 (Shut-Off)		3 (150 Percent of Duty Point)	
Flow	Head	Flow	Head	Flow	Head
100 m³/h	100 m	0 m³/h	En Fazla 140 m	150 m³/h	Min. 65 m



QR CODE and PROGRAM LINK

For each pump whose smartSelect data sheet is retrieved, the pump, related motor, duty point, etc. generates a link containing the information and displays a QR code containing the link's information on the information sheet with this link. Clicking on the QR code on the PDF or scanning the QR code with a mobile device opens the page of the relevant pump with the operating point without the need to reselect the pump.

In this way, the customer can make a more detailed examination by opening the page of the relevant pump directly from the information sheet containing the information of the pump related to the selected pump.



Since the information that the QR code and the link can carry is limited, all the selected information about the pump cannot be uploaded to the QR code. Information such as Material Information, additional operating points are not displayed on the pop page. Standard materials are shown as pump materials.

Data that can be transferred with QR Code:

- Flow
- Head
- Flow Unit
- Head Unit
- Fluid Information
- Motor Information
- Voltage
- Number of Series or Parallel Pumps
- Number of Poles
- Pump Version



VERSIONS

Choose one of the ready-made versions that suits you or create your own on the next page.

	Basic	Pro	Premium
Fluid Selection	☐	☒	☒
Head Calculation	☐	☒	☒
Serial and Parallel Pump Selection	☐	☒	☒
Advanced Filters	☐	☒	☒
Online Pump Catalogue and Family Curves	☐	☒	☒
Advanced Result Table	☒	☒	☒
Motor Curves	☐	☐	☐
Performance Values Calculated for Motor Speed	☒	☒	☒
Altering the Duty Point on the Curve Screen	☒	☒	☒
Additional Duty Point	☒	☒	☒
Tolerances	☐	☒	☒
Motor Power Analysis	☐	☒	☒
Frequency Analysis	☐	☒	☒
Impeller Diameter Analysis	☐	☒	☒
Hot Water Circulation Pumps	☐	☐	☒
Observing the Duty Point on Family Curves	☐	☒	☒
Life Cycle Cost (LCC) Analysis	☐	☐	☒
Booster Set and Duty Point Calculation	☐	☐	☒
Cable Size Calculation for Clean Water Submersible Pumps	☐	☐	☐
Dimensions with Motor	☒	☒	☒
Material Options	☒	☒	☒
Shaft Seal Options	☒	☒	☒
Motor Options	☒	☒	☒
Flange Position Selection	☒	☒	☒
Fire Fighting Pumps Selection	☒	☒	☐
QR Code	☒	☒	☒

☒ Standard

☐ Optional



CUSTOMIZE YOUR OWN PROGRAM

Customize your own program by clicking on the boxes. ☒

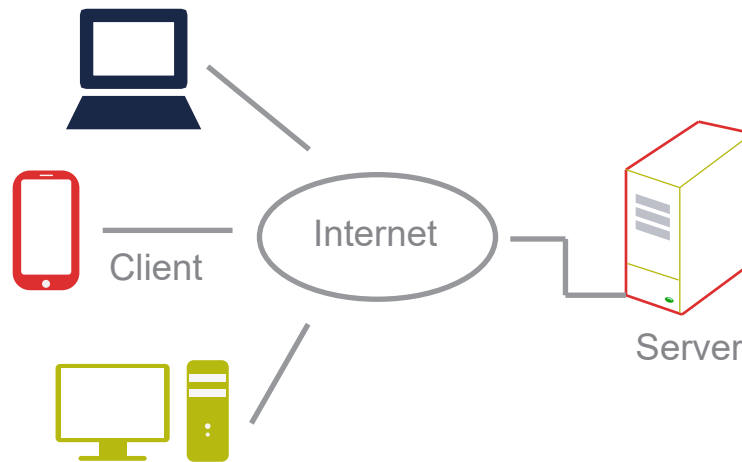
Fluid Selection	☐
Head Calculation	☐
Serial and Parallel Pump Selection	☐
Advanced Filters	☐
Online Pump Catalogue and Family Curves	☐
Motor Curves	☐
Tolerances	☐
Motor Power Analysis	☐
Frequency Analysis	☐
Impeller Diameter Analysis	☐
Sıcak Su Sirkülasyon Pompaları	☐
Observing the Duty Point on Family Curves	☐
Life Cycle Cost (LCC) Analysis	☐
Booster Set and Duty Point Calculation	☐
Cable Size Calculation for Clean Water Submersible Pumps	☐
Fire Fighting Pumps Selection	☐

* Selected modules are added to the Basic Version.



SYSTEM REQUIREMENTS

In web-based applications, when the client tries to enter a site / program, it reaches the main web server and requests information from this server. The server, that is, the web server, also presents the requested information to the user.



SERVER REQUIREMENTS

smartSelect uses php software language and mySQL database infrastructure, which is the most common server software on the server side. The server-side requirements are as follows:

- Domain Name
- PHP 7 and above
- mySQL
- Average 23 MB Disk Space (The number of modules added to the program affects the disk space of the program.)
- Sufficient Database Space (Pump, motor, dimension drawings, etc. affect the required space for the database. Please contact us for a rough calculation of the required space).
- 2 Core Processor*
- 4GB RAM*
- Admin Panel: cPanel
- Inodes Quantity: 200.000*
- Operating System: CloudLinux 7.5*

CLIENT REQUIREMENT

Modern web browsers.

Any version of Internet Explorer (IE) does not support the program.

The program operates successfully on following web browsers. For different web browsers and versions please contact us:

Chrome 114.0.5735.110 (64 Bit), Firefox 113.0.2 (64 bit), Microsoft Edge 114.0.1823.43(64 Bit)

*Minimum requirements. Fast response of servers will be possible with machines with higher configurations. In cases where the number of pumps is high, server speed becomes important.

Screenshots in this catalog, changes caused by browsers, visualization, screen size, etc. It may differ from what appears in the program for reasons.

smartSelect is a tool for development, troubleshooting, updates to browsers, etc. reserves the right to make changes on the program and modules for reasons without prior notice.







smartSelect

Smart Pump Selection Program

