



*Specialist for Pumping Technology*

## Session 30 – Selecting the Right Pump for the Application (2)

*Simon Smith February 2024*





# Presenter Profile – Simon Smith

Simon graduated with an honours degree in Chemical Engineering from the University of Surrey in 1978 and began a long career in the engineered pump industry spanning 40 years (so far!) with Peerless Pump, BW/IP International / Flowserve, SPP Pumps, Ruhrpumpen and Ebara Cryodynamics.

Over his long career he has filled various roles as Applications Engineer / Manager, Project Manager, Key Account Specialist, Vertical Pump Product Specialist, International Sales Engineer / Manager / Director and he has considerable experience in Training & Mentoring young engineers.





# Ruh*RP*umpen Short Courses

**Here is a listing of all the previous courses.**

- No 1 – API610 12th v 11th editions
- No 2 - Curve Shape (1)
- No 3 – The Importance of System Curves (1)
- No 4 - Selecting the Right Pump for the Application
- No 5 - NPSH & Nss
- No 6 - Mechanical Seals & Systems (1)
- No 7 - Firepumps
- No 8 - BB5 Barrel Pumps
- No 9 - Pump Instrumentation
- No 10 – Non-Destructive Examination
- No 11 - Vertical Pumps (Part 1) Type VS1, VS2, VS3
- No 12 – Vertical Pumps (Part 2) Type VS4, VS5, VS6 & VS7
- No 13 – Performance Testing of Centrifugal Pumps; the What, the Why & the How
- No 14 – Testing & Inspection of API 610 Pumps
- No 15 – Start-Up, Commissioning & Troubleshooting Centrifugal Pumps
- No 16 – Introduction to Positive Displacement (Plunger) Pumps
- No 17 – Refresher Session
- No 18 – Overhung Process Pumps OH1 & OH2

**Continued next slide**

Any you have missed you can get from our website [www.ruhrumpen.com](http://www.ruhrumpen.com)  
and follow the menu bar link to [RP Short Courses](#)



# Ruhr*RP*umpen Short Courses

## Here is a listing of all the previous courses. Contd

- No 19 – Vertical Overhung Process Pumps OH3-OH6
- No 20 – New Developments in the VS6 Market
- No 21 – BB4 Multistage Pumps for the Power Industry
- No 22 – Coking Process and Hydraulic Decoking Equipment
- No 23 – Pumps for the Desalination Market
- No 24 – Cryogenic Pumps
- No 25 – Magnetic Drive Pumps
- No 26 – Mechanical Seals & Systems (2)
- No 27 – The Importance of System Curves (2)
- No 28 – NPSH & Nss Made Simple (2)
- No 29 – Curve Shape, Head Rise & Allowable Tolerances (2)

Any you have missed you can get from our website [www.ruhrpumpen.com](http://www.ruhrpumpen.com)  
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- VTP pumps for major water transfer project in Bolivia
- COVID-19 UPDATE
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- Ruhrpumpen Resources
- Coolant System Maintenance
- RP delivers API 674 pumps for Gas Dehydration Package in Algeria
- Packing strips and packing gland tightening procedure



## All Courses





# Ruh*RP*umpen Short Courses

## SHORT COURSE 12

### **Vertical Pumps (VS4/5, VS6, VS7)**

Full session.

 Downloads. (14.73 MB)

## SHORT COURSE 13

### **Performance Testing and Inspection of API 610 Pumps**

Full session.

 Downloads. (4.58 MB)

## SHORT COURSE 14

### **Performance Testing and Inspection of API 610 Pumps**

Full session.

 Downloads. (7.30 MB)



# Ruh*RP*umpen Short Courses

## SHORT COURSE 14

### **Performance Testing and Inspection of API 610 Pumps**

Full session.

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## SHORT COURSE 15

### **Start-Up, Commissioning & Troubleshooting Centrifugal Pumps**

Full session.

 Downloads. (6.14 MB)

## SHORT COURSE 16

### **Introduction to Positive Displacement (Plunger) Pumps**

Session part 1.

Session Part 2.

 Downloads. (10.50 MB)





# Session 30 – “Selecting the Right Pump for the Application (2)”

*Aimed at Process and Mechanical Engineers and Consultant Engineers specifying pumping equipment as well as Applications & Sales Engineers selecting and quoting them. Develop an understanding as to which type of pump is appropriate for different applications.*

*Will cover such topics as when to transition from an OH2 to a BB2, when to consider VS6 pumps, Barrel vs Horizontal Split Case multi-stage pumps*

▪



## Scenario A

Process Engineer or Mechanical / Rotating Equipment Engineer

You have preliminary process data for a pump

For example:

200m<sup>3</sup>/hr, 200m TDH, 5m NPSHA, SG 0.7, Temp 150°C, 50 Hz

What sort of pump will this be?

You guess OH2

Are you right?

I am going to give you the tools to be able to check this out & save you getting yourself into trouble.



## Scenario B

Sales or Applications Engineer

Your customer (from Scenario A) has phoned you up with the same preliminary data

200m<sup>3</sup>/hr, 200m TDH, 5m NPSHA, SG 0.7, Temp 150°C

“What sort of pump do I need, just a quick check, don’t spend long on it?”

What do you do?

Do you immediately plug the duty into your pump selection program and tell your customer the first selection it comes up with?





Size			Speed, rated (rpm)	Motor poles	Bowl Efficiency (%)	Pump Efficiency (%) ▼
<input type="checkbox"/>	SM 6x14 (A) (BB3) CH		1485	4	-	76.19
<input type="checkbox"/>	SM 4x11 (A) (BB3)		2960	2	-	75.78
<input type="checkbox"/>	SM 4x11 (D) (BB3) CH		2960	2	-	75.54
<input type="checkbox"/>	SM 4x9.5 (A) (BB3)		2960	2	-	75.43
<input type="checkbox"/>	 SM 4x11 (C) (BB3) CH		2965	2	-	75.08
<input type="checkbox"/>	 SM 4x11 (C) (BB3) CH		2965	2	-	73.62
<input type="checkbox"/>	AB 8x6x15 C-C (A) CH		1485	4	-	72.86
<input type="checkbox"/>	 SM 4x11 (C) (BB3) CH		2965	2	-	72.56
<input type="checkbox"/>	SM 4x11 (B) (BB3)		2960	2	-	71.77



Size			Speed, rated (rpm)	Motor poles	Bowl Efficiency (%)	Pump Efficiency (%) ▼
<input type="checkbox"/>	4X15J (BB2)		2975	2	-	69.80
<input type="checkbox"/>	4X15JH (BB2)		2975	2	-	69.80
<input type="checkbox"/>	RON 6x14 (A)		2960	2	-	69.68
<input type="checkbox"/>	JTN 6 x 4 x 9 1/2 (A) (BB3)		2960	2	-	69.05
<input type="checkbox"/>	AB 6x4x12 (B)		2960	2	-	68.74
<input type="checkbox"/>	RON-D 6x13 (A) CH		2960	2	-	68.64
<input type="checkbox"/>	RON-D 6x13 (B) CH		2960	2	-	68.64
<input type="checkbox"/>	SCE 6x4x16 (A) Inducer 1 (OH2)		2960	2	-	66.77
<input type="checkbox"/>	SCE 6x4x16 (A) (OH2)		2960	2	-	66.77



## Lessons Learned

- Pump selection programs are STUPID
- They are a great tool but a poor master
- ALWAYS KNOW THE PUMP YOU EXPECT TO SEE BEFORE YOU USE THE PUMP SELECTION PROGRAM

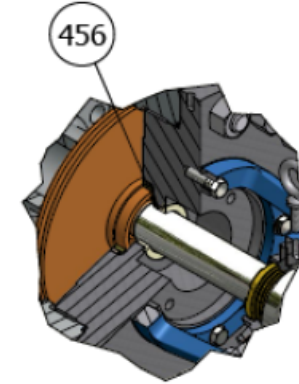
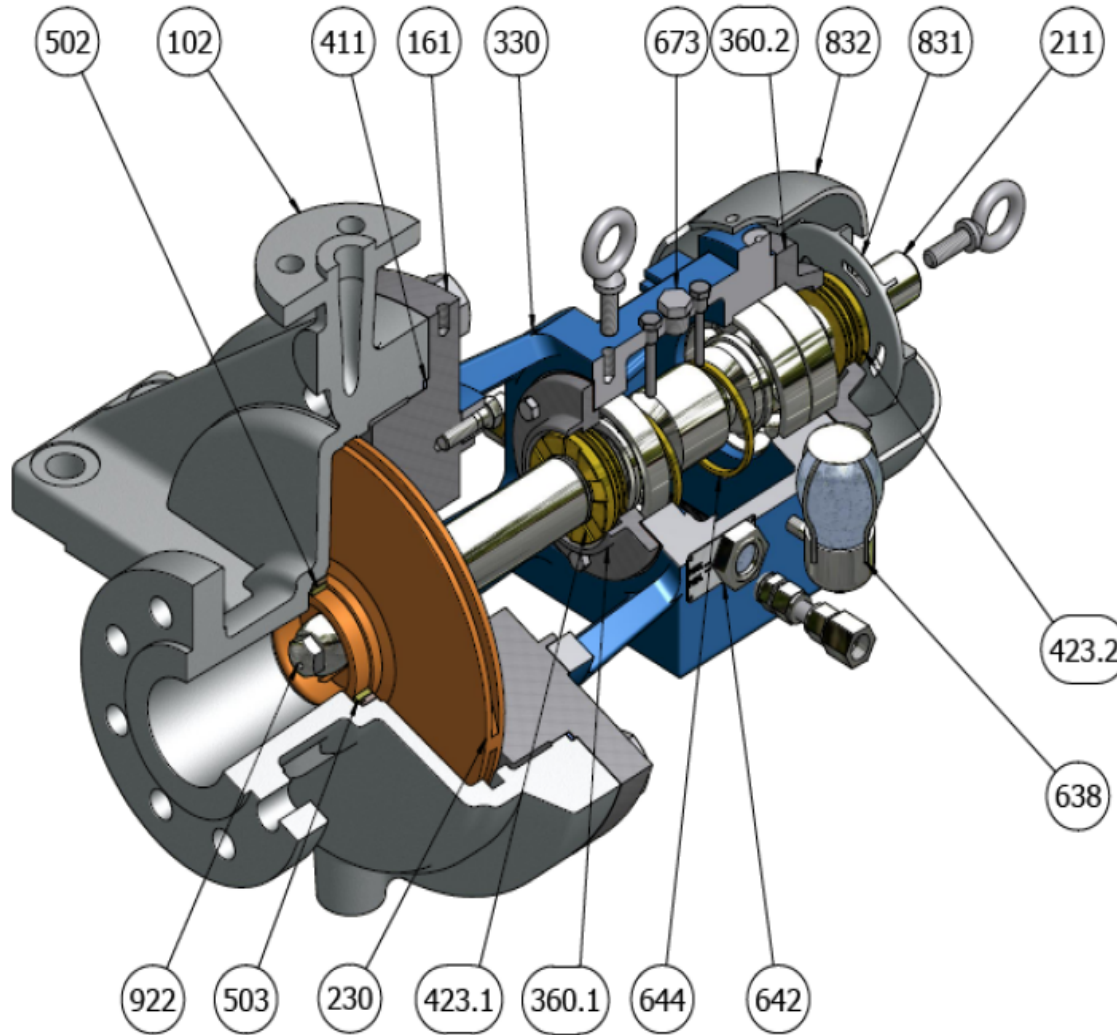
I am going to give you the tools to be able to check this out & save you getting yourself into trouble.



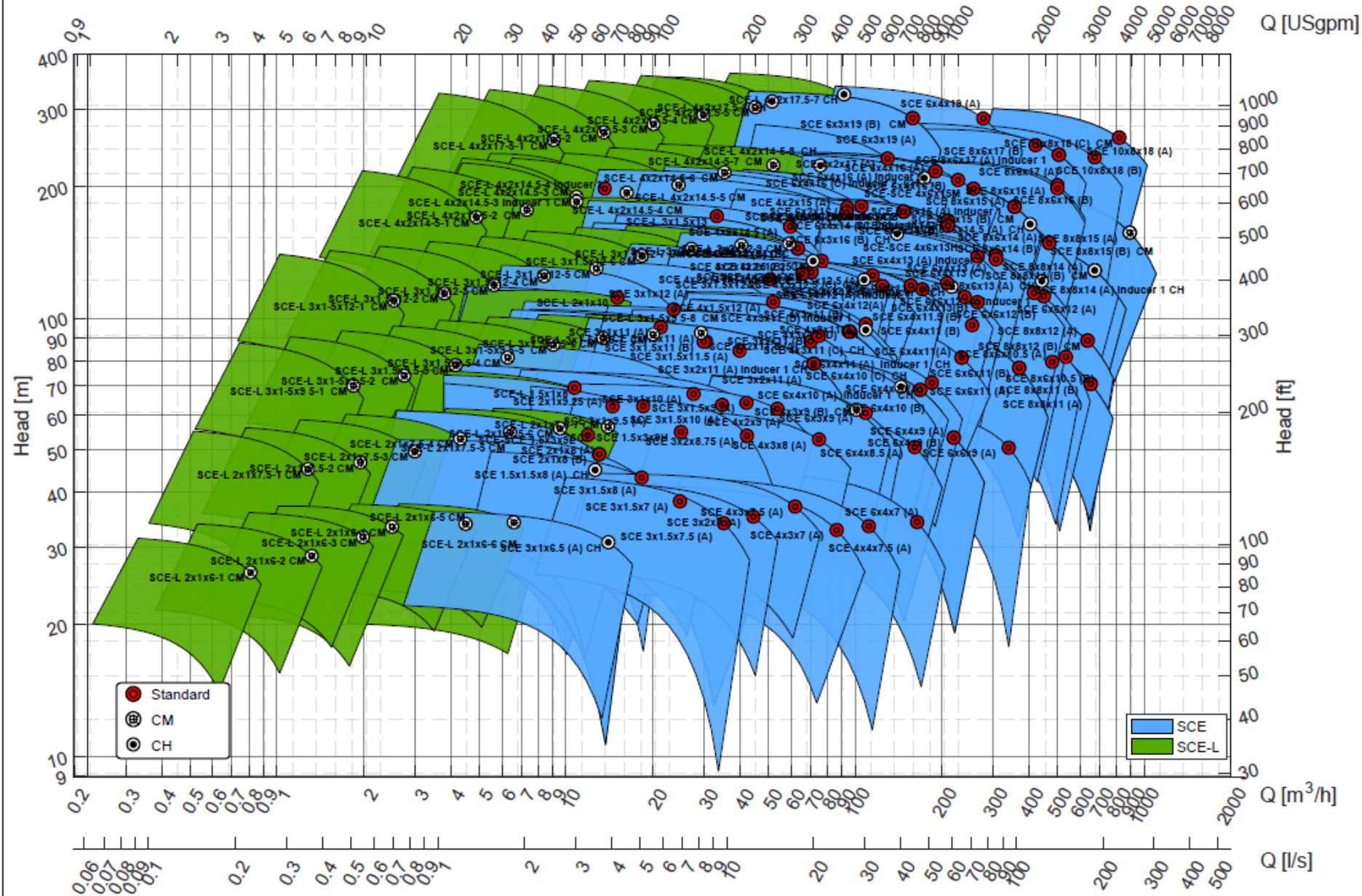


# SCE Pump

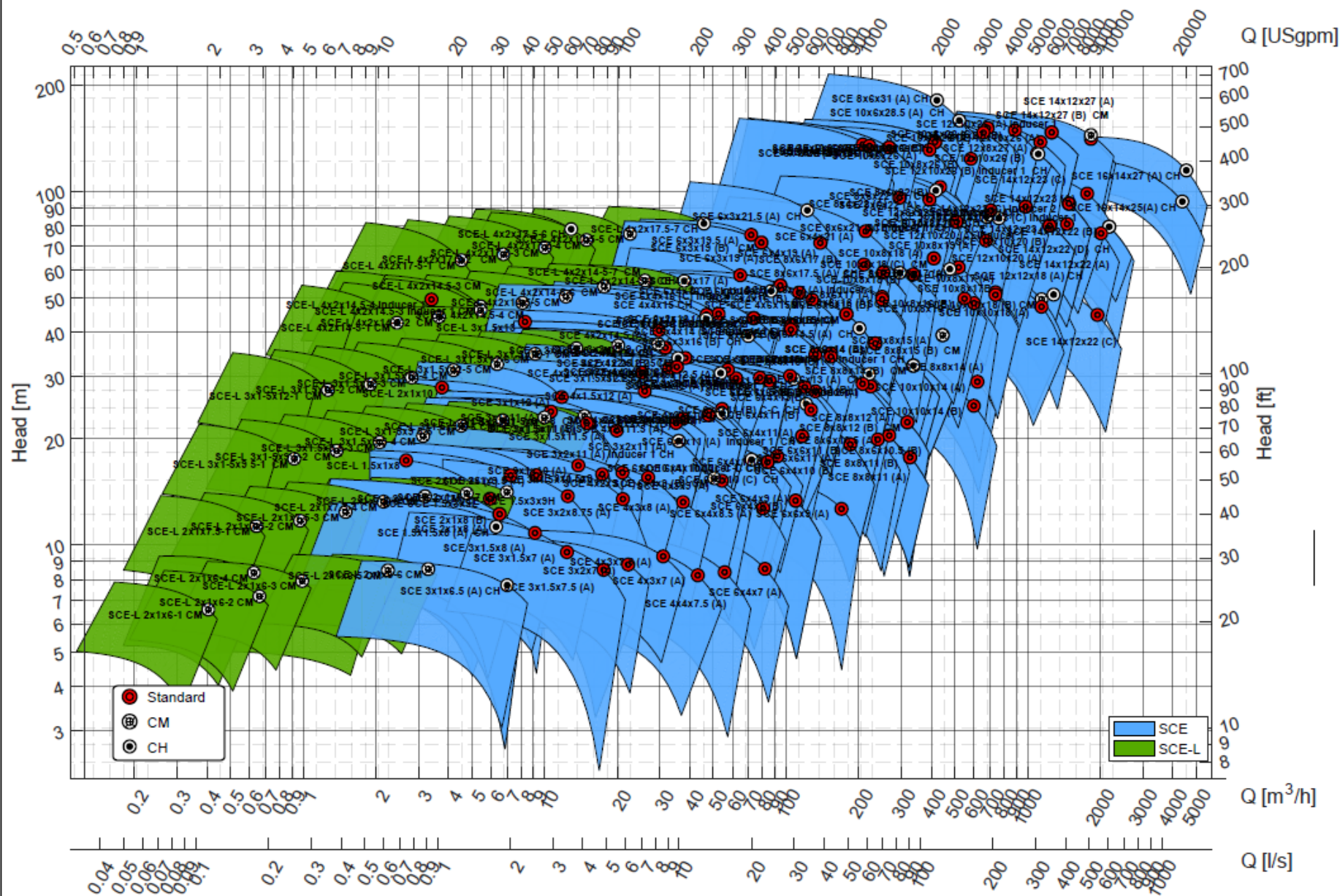
## Type OH2



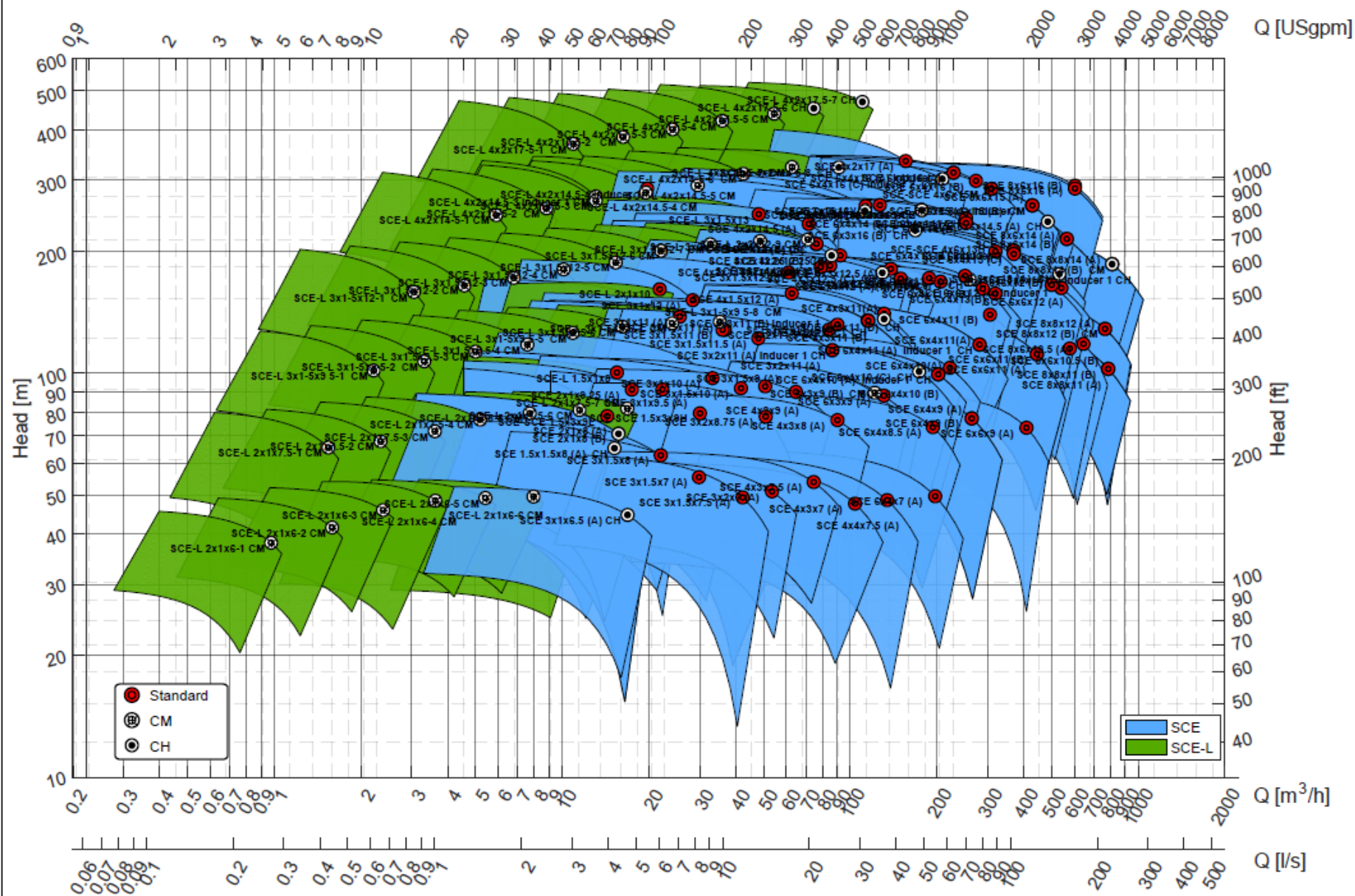
PARTS LIST		
ITEM	QTY	DESCRIPTION
102	1	VOLUTE CASING
161	1	CASING COVER
211	1	PUMP SHAFT
230	1	IMPELLER
330	1	BEARING BRACKET
360.1	1	BEARING COVER
360.2	1	BEARING COVER
411	1	JOINT RING
423.1	1	LABYRINTH RING
423.2	1	LABYRINTH RING
456	1	STUFFING BOX BUSHING
502	2	CASING WEAR RING
503	2	IMPELLER RING
638	1	CONSTANT LEVER OILER
642	1	OIL LEVEL SIGHT GLASS
644	2	LUBRICATING RING
673	2	VENT FILTER
831	1	VENTILATOR FAN
832	1	VENTILATOR CAP
922	1	IMPELLER NUT

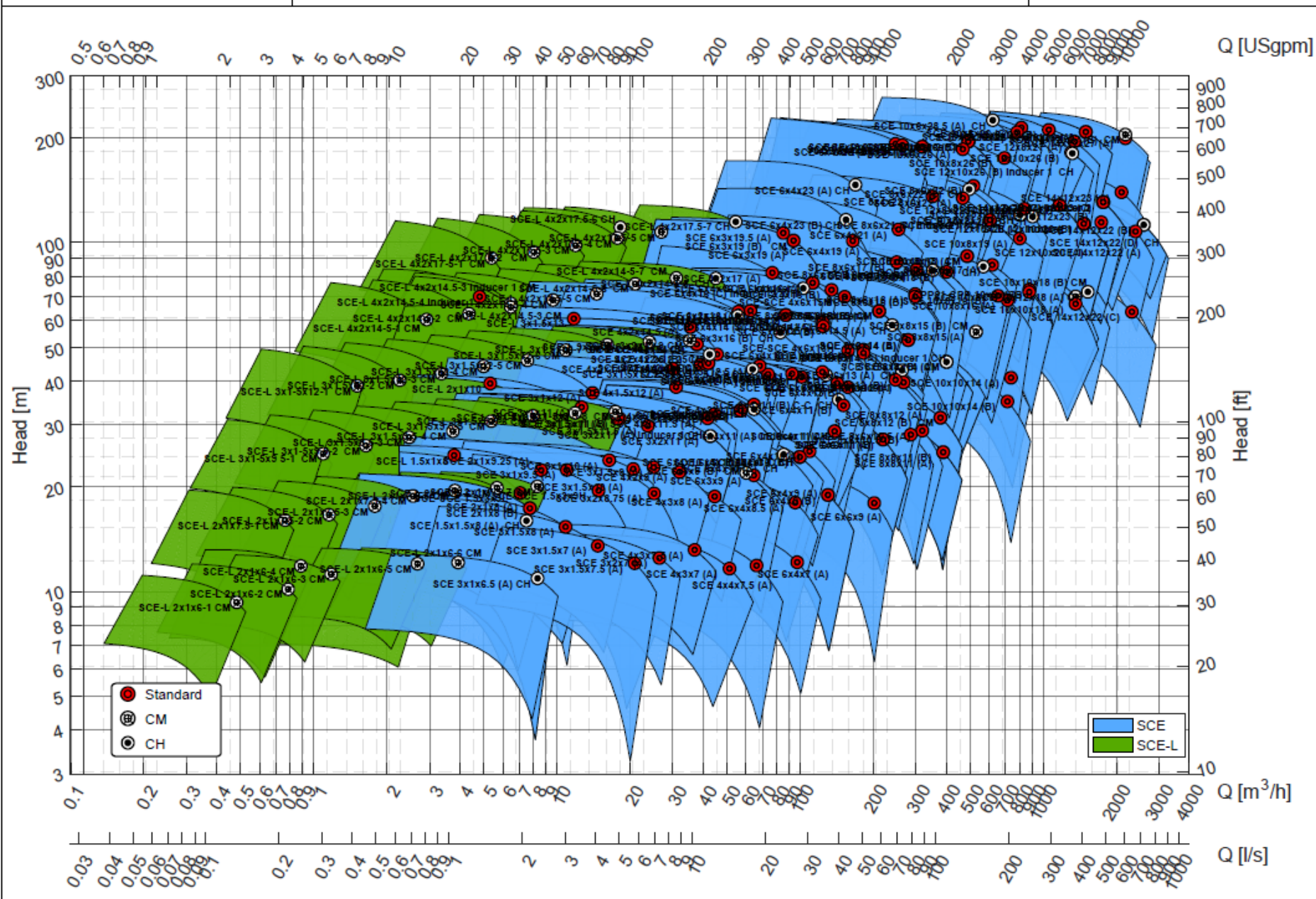










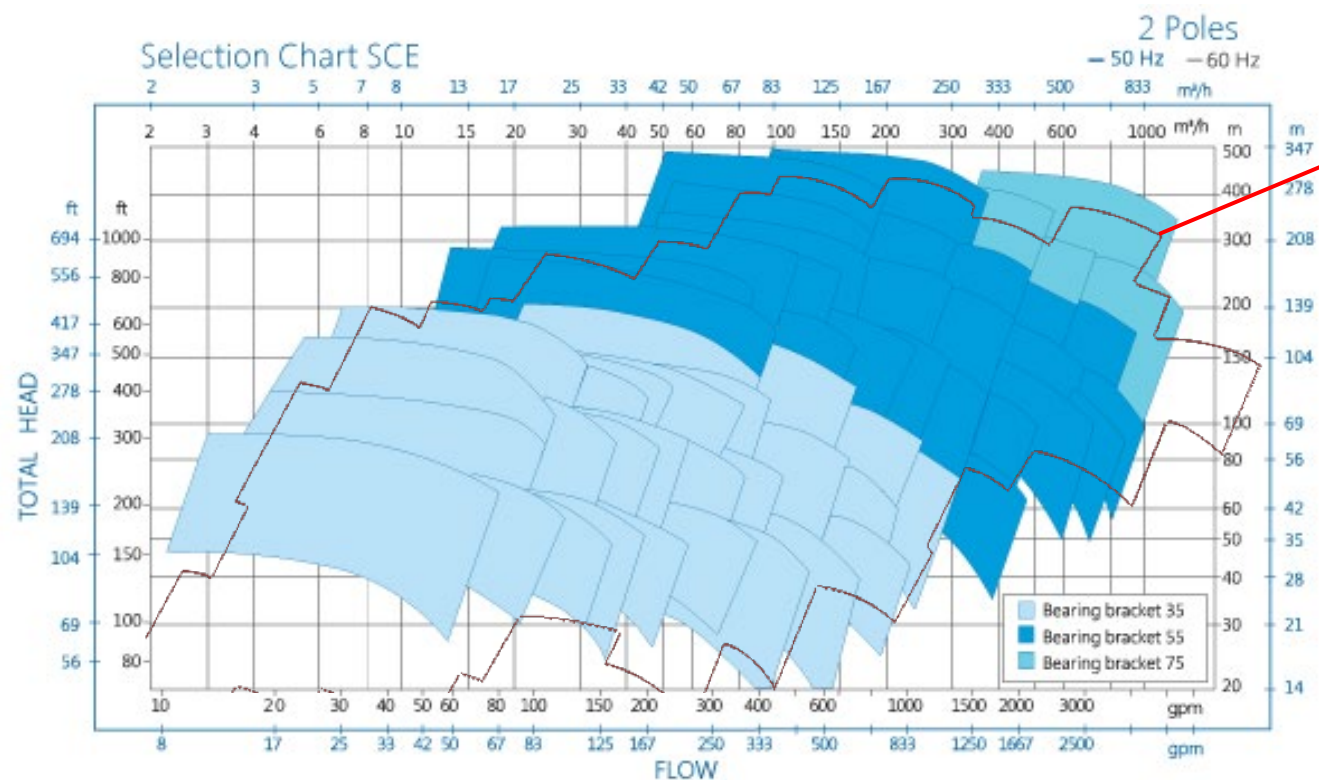
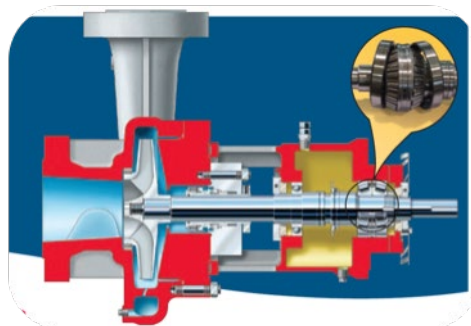




# Benchmark

## Ruhrpumpen vs Flowserve

Benchmark

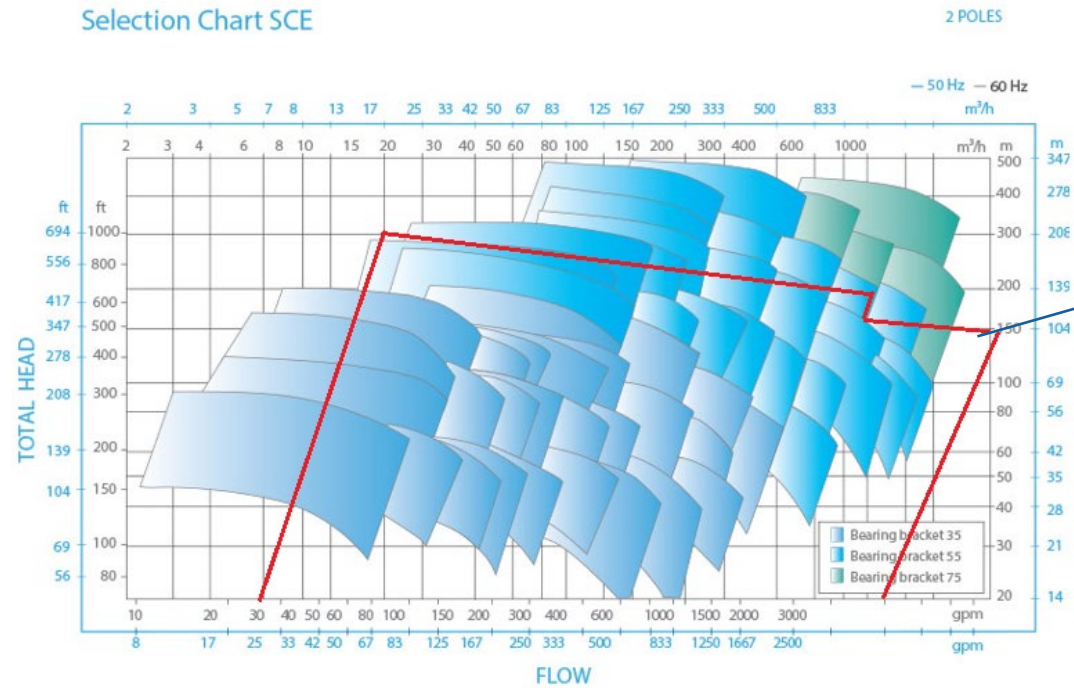




# Benchmark

## Ruhrpumpen vs Sulzer

Benchmark



Sulzer

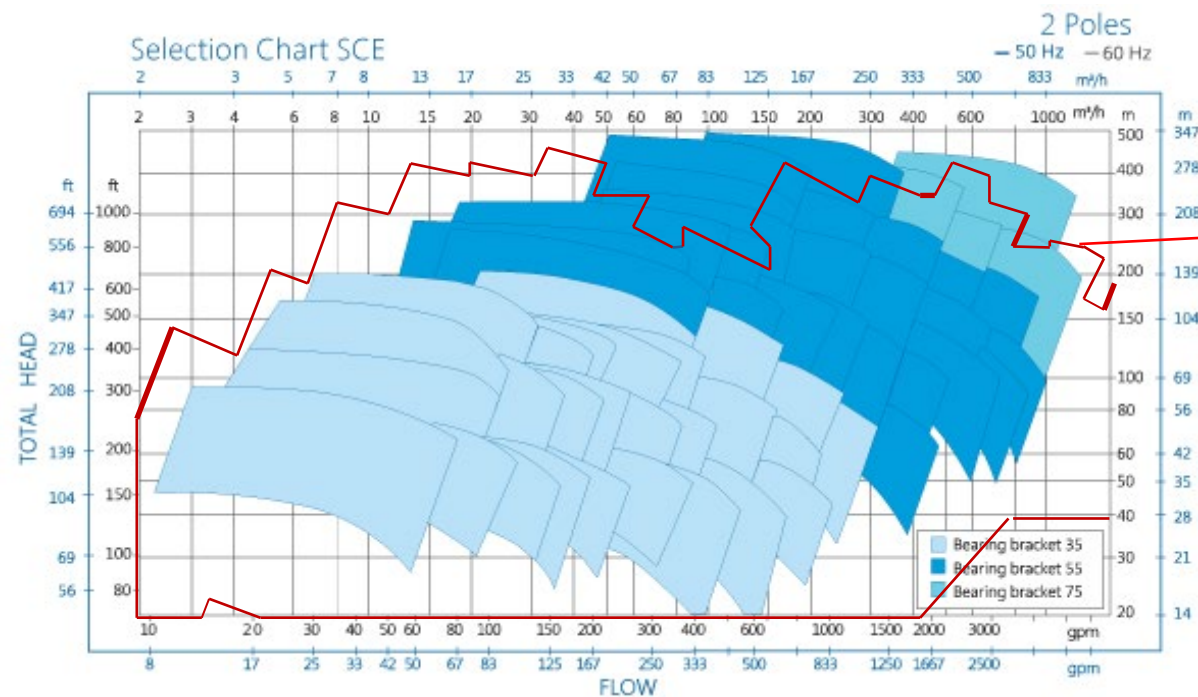
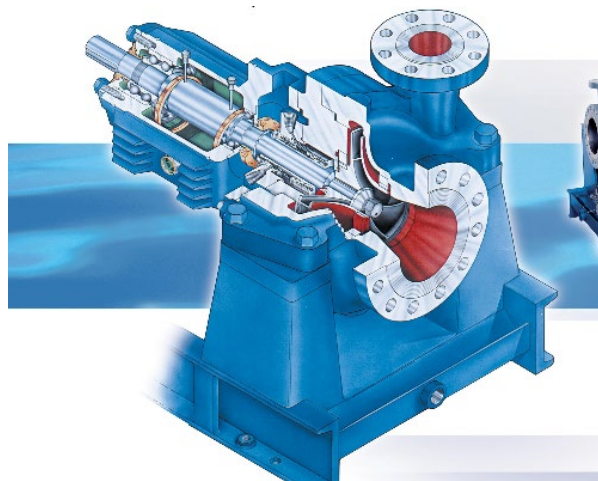
- Optional triple row thrust bearing and roller radial bearing
- Optional high pressure casing



# Benchmark

## Ruhrpumpen vs Goulds

Benchmark



Goulds

[http://www.gouldspumps.com/ittgp/medialibrary/goulds/website/Products/3700/3700\\_reader\\_spreads.pdf?ext=.pdf](http://www.gouldspumps.com/ittgp/medialibrary/goulds/website/Products/3700/3700_reader_spreads.pdf?ext=.pdf)





# Do you have enough $NPSH_A$ ?

- You have established that the pump flow and head falls within the general range for most vendors of OH2 Pumps
- But do you have enough NPSH available?
- Use this simple NPSH/Nss Calculator to check.
- (A copy of this calculator will be sent to all participants when we send out the copy of this Session's slides.)



# NPSH / Nss Calculator

$$N_{SS} = N_{(RPM)} Q_{(BEP \text{ Full Dia})}^{0.5} / NPSH_{(BEP \text{ Full Dia})}^{0.75}$$
$$N_{SS(Metric)} = N_{SS(US)} \times 1.16 \text{ (m}^3/\text{hr, m, rpm)}$$

Is there a commercially available pump to meet your NPSH requirement?

Enter rated flow, available NPSH, and pump speed below (in the units of your choice).

The calculator will calculate the Suction Specific Speed (Nss) of the theoretical pump that will meet your requirements with a 1m (3ft) NPSH margin.  
If you see a Nss value at or below 11,000 (US units) or 12,760 (metric units) then there is probably a pump that will meet your needs  
If not, try a lower speed (e.g 1450rpm instead of 2950rpm)  
If the Nss is still too high, increase the NPSHA until you DO find a theoretical pump

ENTER DATA ↓	
Flow m3/hr	200
NPSHA (M)	5
RPM	2960

ENTER DATA ↓	
Flow (USGPM)	1100
NPSHA (FT)	25
RPM	3550

## Theoretical Nss of a pump to do this duty with a 1m (or 3ft) NPSH margin

Single Suction Pump		Single Suction Pump	
m3/hr,m,rpm units	14800	USGPM,Ft,RPM units	11591
USGPM,Ft,RPM units	12759	m3/hr,m,rpm units	13445

Try a slower speed or increase the NPSH available

Try a slower speed or increase the NPSH available

Double Suction Pump		Double Suction Pump	
m3/hr,m,rpm units	10465	USGPM,Ft,RPM units	8196
USGPM,Ft,RPM units	9022	m3/hr,m,rpm units	9507

SUCCESS! There is probably a suitable double suction pump for your NPSH condition

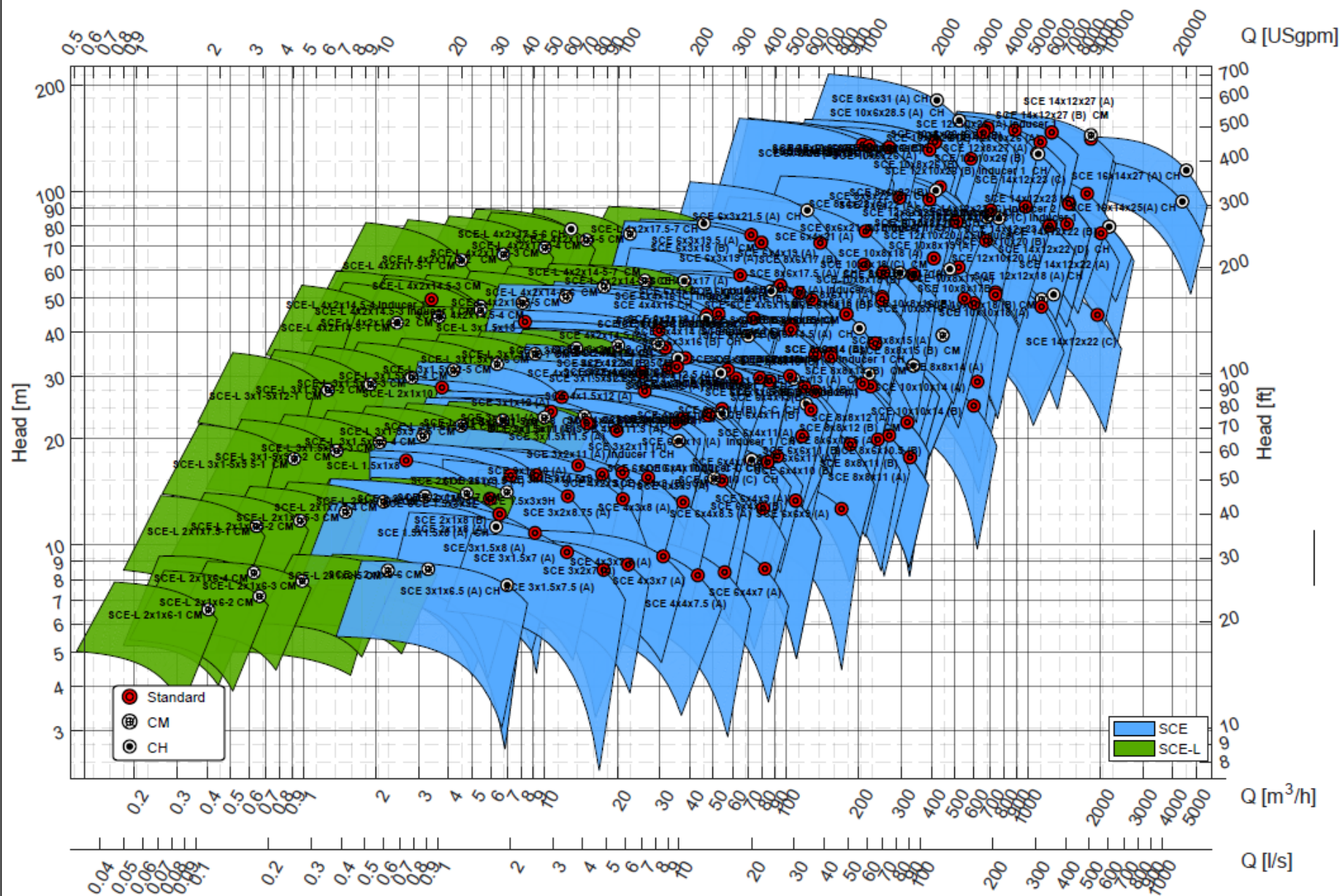
SUCCESS! There is probably a suitable double suction pump for your NPSH condition



# Do you have enough $NPSH_A$ ?

So your options are:-

- Is there a 4 Pole OH2 selection available?





# Do you have enough $NPSH_A$ ?

So your options are:-

- Is there a 4 Pole OH2 selection available
- Can you find a bit more  $NPSH_A$ ?





# N<sub>ss</sub> Calculator

## NPSH / Nss Calculator

$$N_{SS} = N_{(RPM)} Q_{(BEP \text{ Full Dia})}^{0.5} / NPSH$$

Is there a commercially available pump to meet your NPSH requirement?

Enter rated flow, available NPSH, and pump speed below (in the units of your choice).

The calculator will calculate the Suction Specific Speed (Nss) of the theoretical pump that will meet your requirements with a 1m (3ft) NPSH margin.  
If you see a Nss value at or below 11,000 (US units) or 12,760 (metric units) then there is probably a pump that will meet your needs  
If not, try a lower speed (e.g 1450rpm instead of 2950rpm)  
If the Nss is still too high, increase the NPSHA until you DO find a theoretical pump

ENTER DATA ↓	
Flow m3/hr	200
NPSHA (M)	6
RPM	2960

ENTER DATA ↓	
Flow (USGPM)	1100
NPSHA (FT)	25
RPM	3550

### Theoretical Nss of a pump to do this duty with a 1m (or 3ft) NPSH margin

Single Suction Pump		Single Suction Pump	
m3/hr,m,rpm units	12519	USGPM,Ft,RPM units	11591
USGPM,Ft,RPM units	10792	m3/hr,m,rpm units	13445

SUCCESS! There is probably a suitable single suction pump for your NPSH condition

Try a slower speed or increase the NPSH available

Double Suction Pump		Double Suction Pump	
m3/hr,m,rpm units	8852	USGPM,Ft,RPM units	8196
USGPM,Ft,RPM units	7631	m3/hr,m,rpm units	9507

SUCCESS! There is probably a suitable double suction pump for your NPSH condition

SUCCESS! There is probably a suitable double suction pump for your NPSH condition



# Do you have enough $NPSH_A$ ?

So your options are:-

- Is there a 4 Pole OH2 selection available
- Can you find a bit more  $NPSH_A$ ?
- Is there a BB2 pump available?
- BUT before going to BB2 I do need to address another alternative to the OH2 which is the vertical in-line type OH3

# General Description

## SPI In-Line Vertical Pumps

- Vertical In-line pump - Fully API610 compliant
- Flexible Coupling
- Driver is usually mounted on support integral to the pump.
- Fully enclosed, balanced, one-piece design impeller
- Back pull-out design, without lifting the motor or suction and discharge pipework
- Flanged suction and discharge on common centerline casing
- Bearing housing (3 sizes) integral with the pump to absorb all pump loads
- D and C Motors



SPI
1.5 X 1.5 X 8
2 X 2 X 7
2 X 2 X 10
2 X 2 X 12
3 X 3 X 7
3 X 3 X 9 A
3 X 3 X 9 B
4 X 4 X 8
4 X 4 X 9
3 X 3 X 12
3 X 3 X 15
4 X 4 X 12
4 X 4 X 15
6 X 6 X 10
6 X 6 X 12
6 X 6 X 15
8 X 8 X 10
8 X 8 X 12
8 X 8 X 15
12 X 10 X 20
6 X 20

Capacity	450 m <sup>3</sup> /h	2,000 US GPM
Head	200 m	656 ft
Temperature	-50°C to 450 °C	-58°F to 842 °F
Pressure	80 bar	1160 psi



# SPI Selection Chart

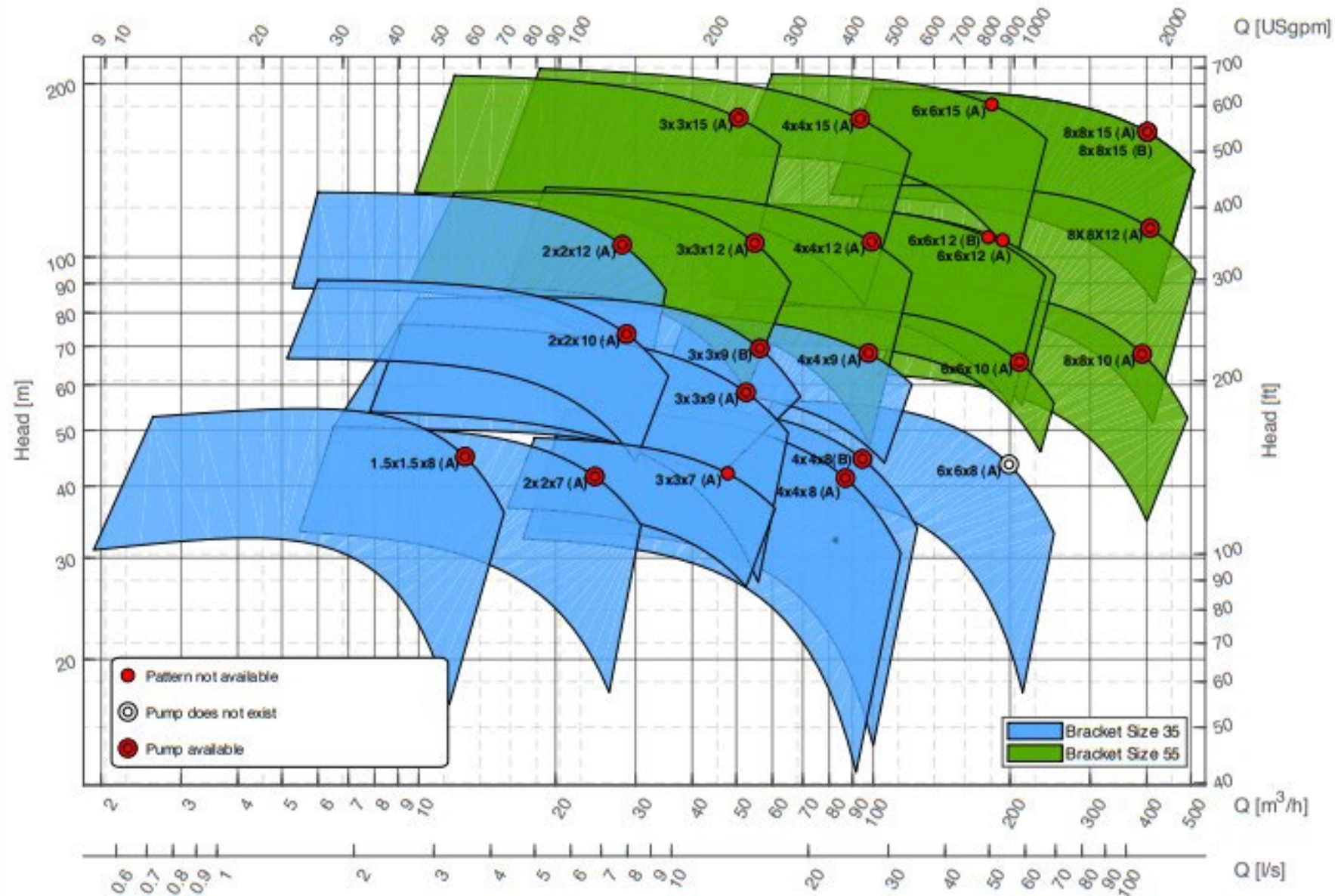
## 2 poles - 50Hz

Drawn by: AMJ

Date: 21-Aug-2018

Drawing: 51046200001

Version: 01







# SPI Selection Chart

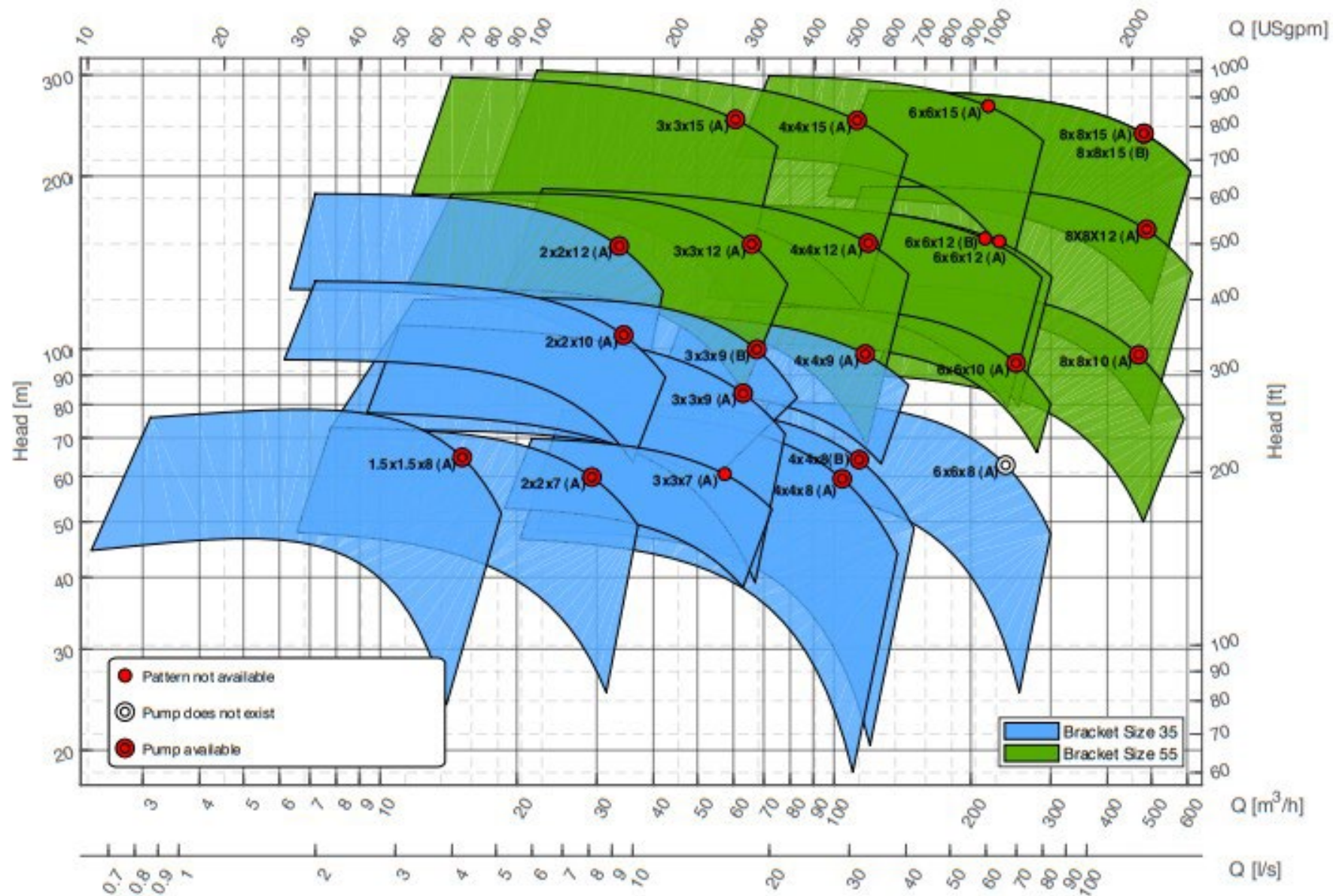
## 2 poles - 60Hz

Drawn by: AMJ

Date: 21-Aug-2018

Drawing: 51046200003

Version: 01





# Advantage of OH3 SPI line over OH2

Vertical Inline Pump Design eliminates the need for an expensive base-plate and saves valuable floor space.

## Advantages of OH3 vs OH2

- Reduces footprint
- Saves in platform, FPSO deck cost
- Reduces installed weight vs OH2 systems
- Do not require grouting

## Disadvantages of OH3 vs OH2

- Accessibility for maintenance
- Higher NPSHR
- Smaller hydraulic range coverage



**LESS SPACE REQUIREMENT**



# Type BB2

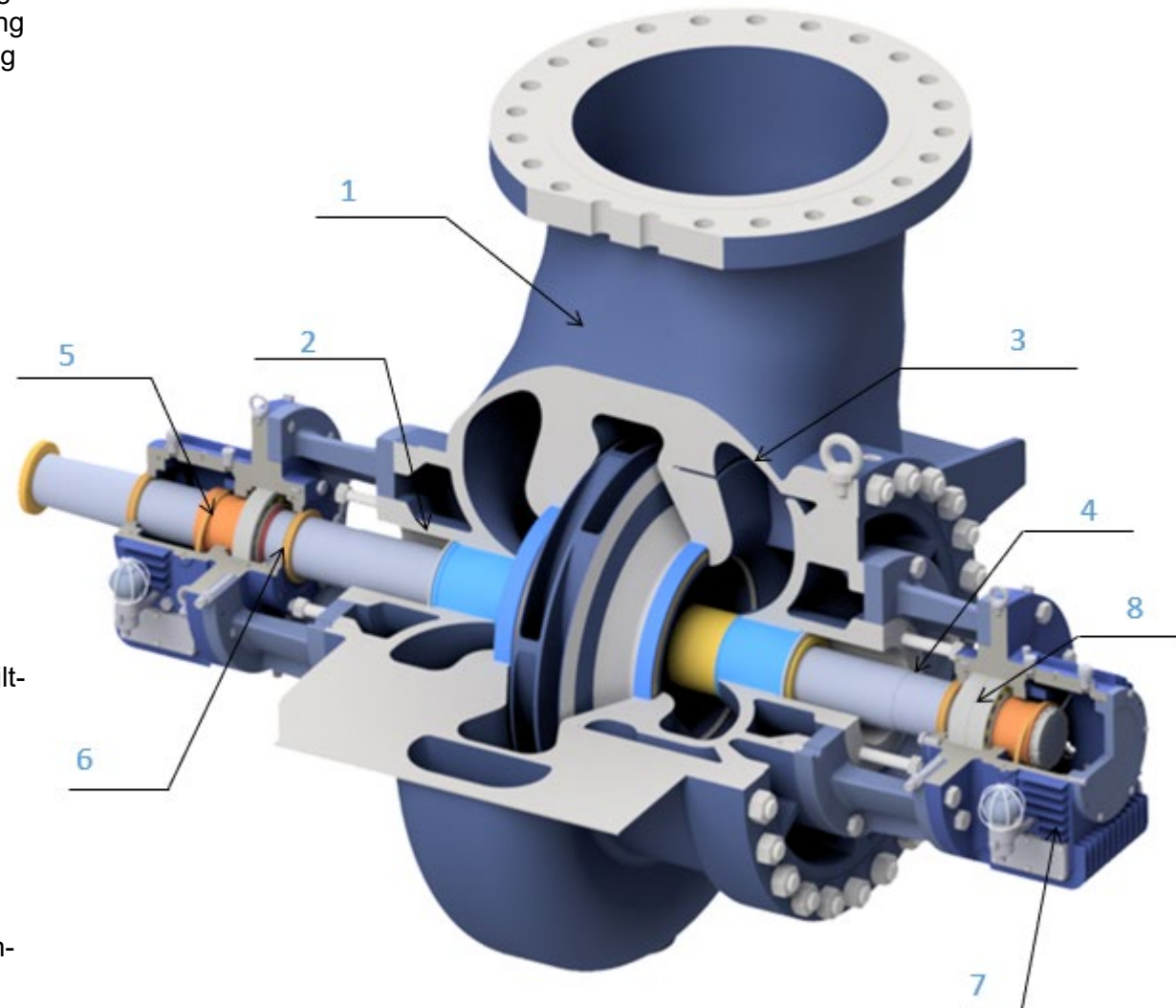




# Pump Type BB2

Full API Compliant

- 1 Heavy duty, dual volute, centerlined supported, radial split casing designed to reduce the effects of piping loads, thereby maximizing the life of bearings, seals and wear rings. The single cover casing minimizes alignment problems.
- 2 Wide dimensioned shaft sealing chamber fitting for all commercially available designs (single, dual unpressurized and pressurized mechanical seal).
- 3 Dynamically balanced, double suction impeller minimizes thrust problems, reduces NPSH requirements and provides smooth operation for longer mechanical seal and bearing life.
- 4 Between bearing, stiff shaft design reduces shaft deflection for longer bearing and mechanical seal life
- 5 Positive positioned oil rings assure complete oil penetration into the bearing without foaming and thereby extend bearing life. Provisions for oil mist lubrication are standard design.
- 6 Labyrinth flingers at each end of the bearing housing provide built-in protection of the lubrication against contamination
- 7 Standard finned cooling inserts reduce bearing temperatures on hot services and lengthen bearing life. The insert is made of corrosion-resistant materials to handle the most difficult cooling liquids.
- 8 Optional bearing designs and lubrication systems can be custom-fit to application. Pressure lubrication systems to API 610 or 617 are available.





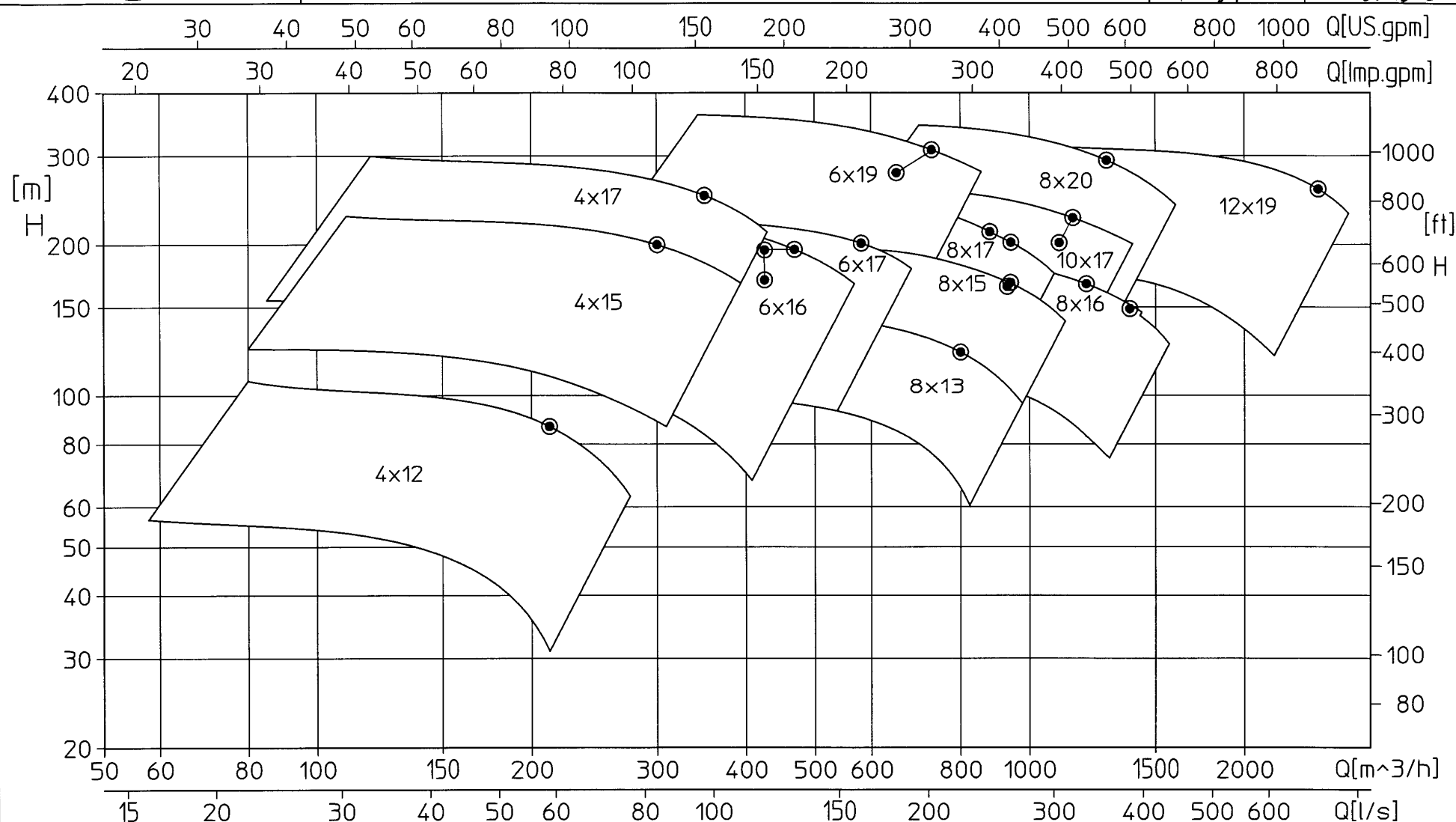


BB2 50Hz 2 Pole



# BB2 Selection Chart J n=2960 1/min

LT 1398.00	Stand:10.03
Gez.: Kölling	Dat.: 10.10.03
Gepr.: <i>H</i>	Dat.: 27.10.03





# Do you have enough $NPSH_A$ ?

So your options are:-

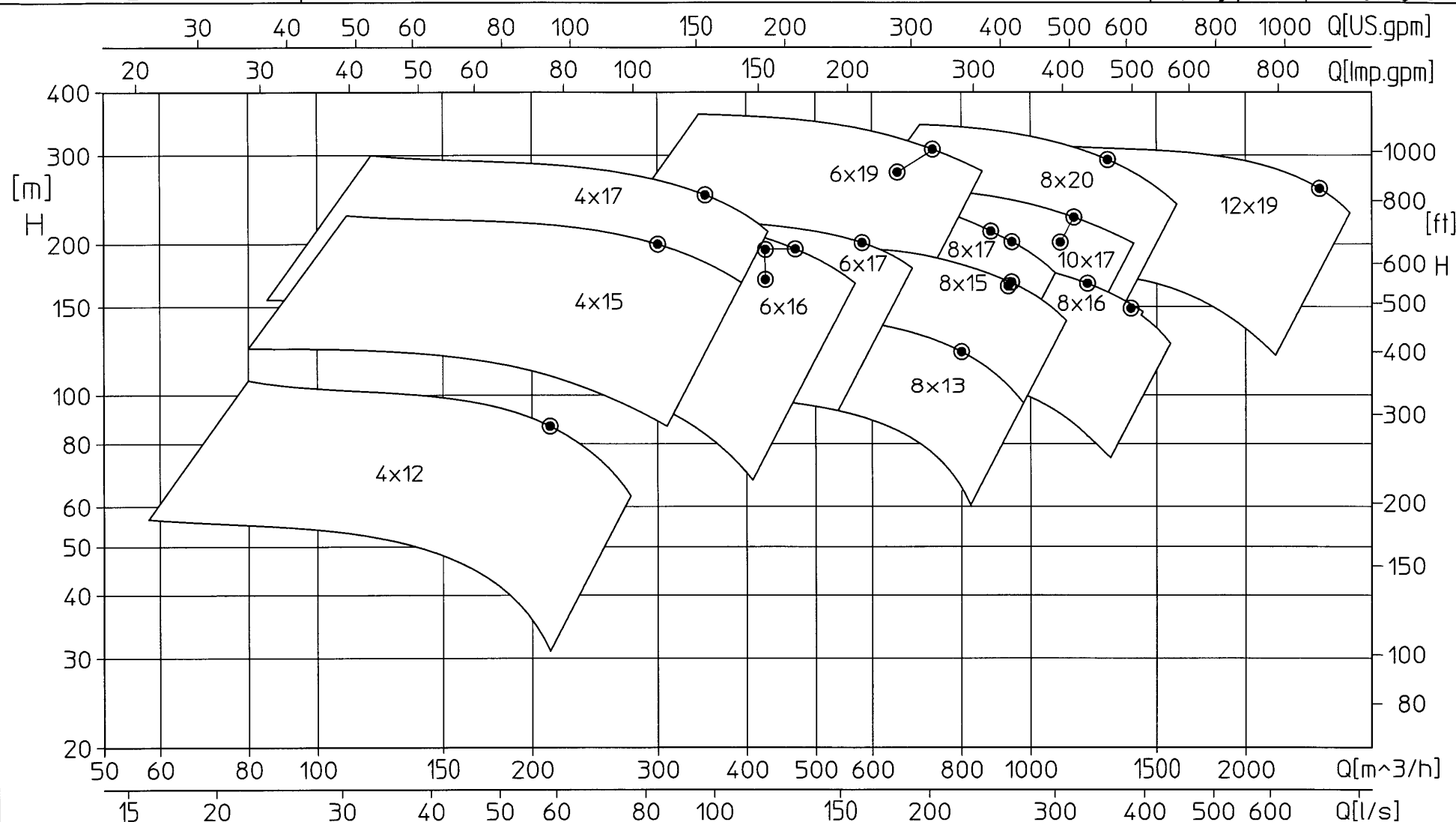
- Is there a 4 Pole OH2 selection available
- Can you find a bit more  $NPSH_A$ ?
- Is there a BB2 pump available?
- Is an inducer acceptable?
- Is a higher  $N_{ss}$  impeller acceptable?
- Select a VS6 Pump (vertical barrel pump, low  $NPSH_R$ )
- DON'T Select a 3 stage BB3 and lose the project!





# BB2 Selection Chart J n=2960 1/min

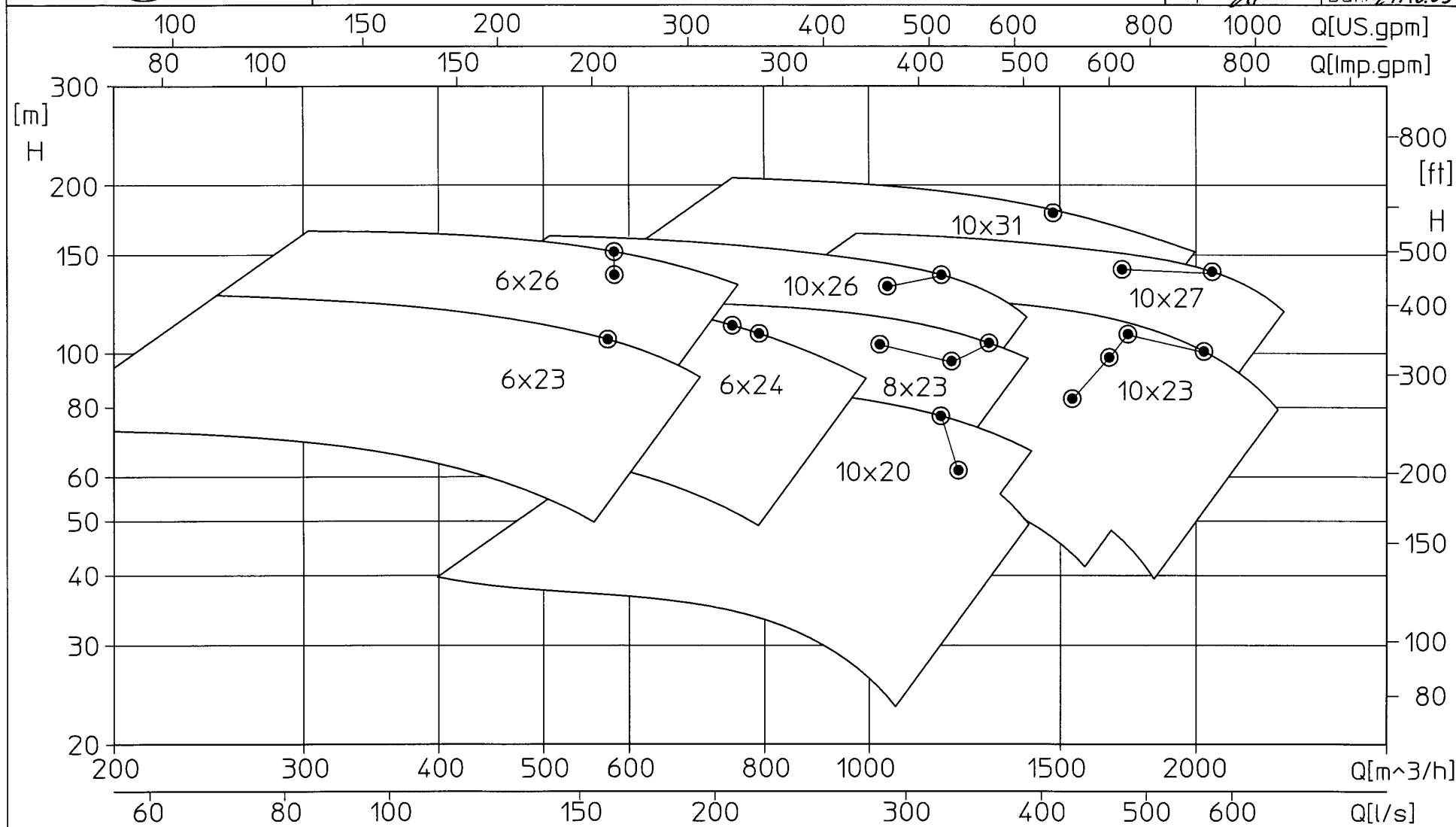
LT 1398.00	Stand:10.03
Gez.: Kölling	Dat.: 10.10.03
Gepr.: <i>H</i>	Dat.: 27.10.03





# BB2 Selection Chart J n=1480 1/min

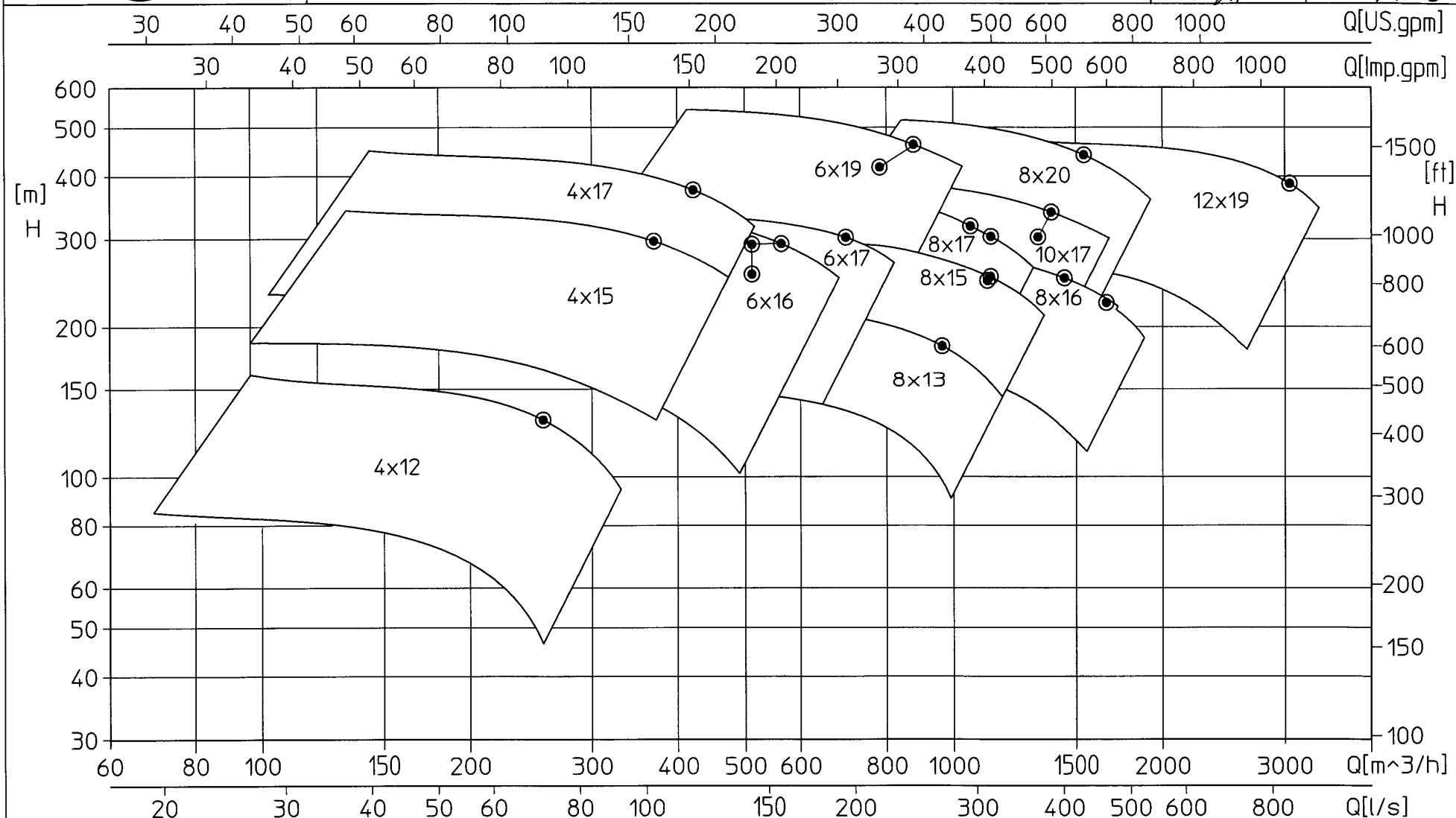
LT 1401.00	Stand:10.03
Gez.: Kölling	Dat.: 21.10.03
Gepn: <i>Hi</i>	Dat.: <i>27.10.03</i>





# BB2 Selection Chart J n=3560 1/min

LT 1399.00	Stand:10.03
Gez.: Kölling	Dat.: 20.10.03
Gepr.: <i>Hi</i>	Dat.: 27.10.03



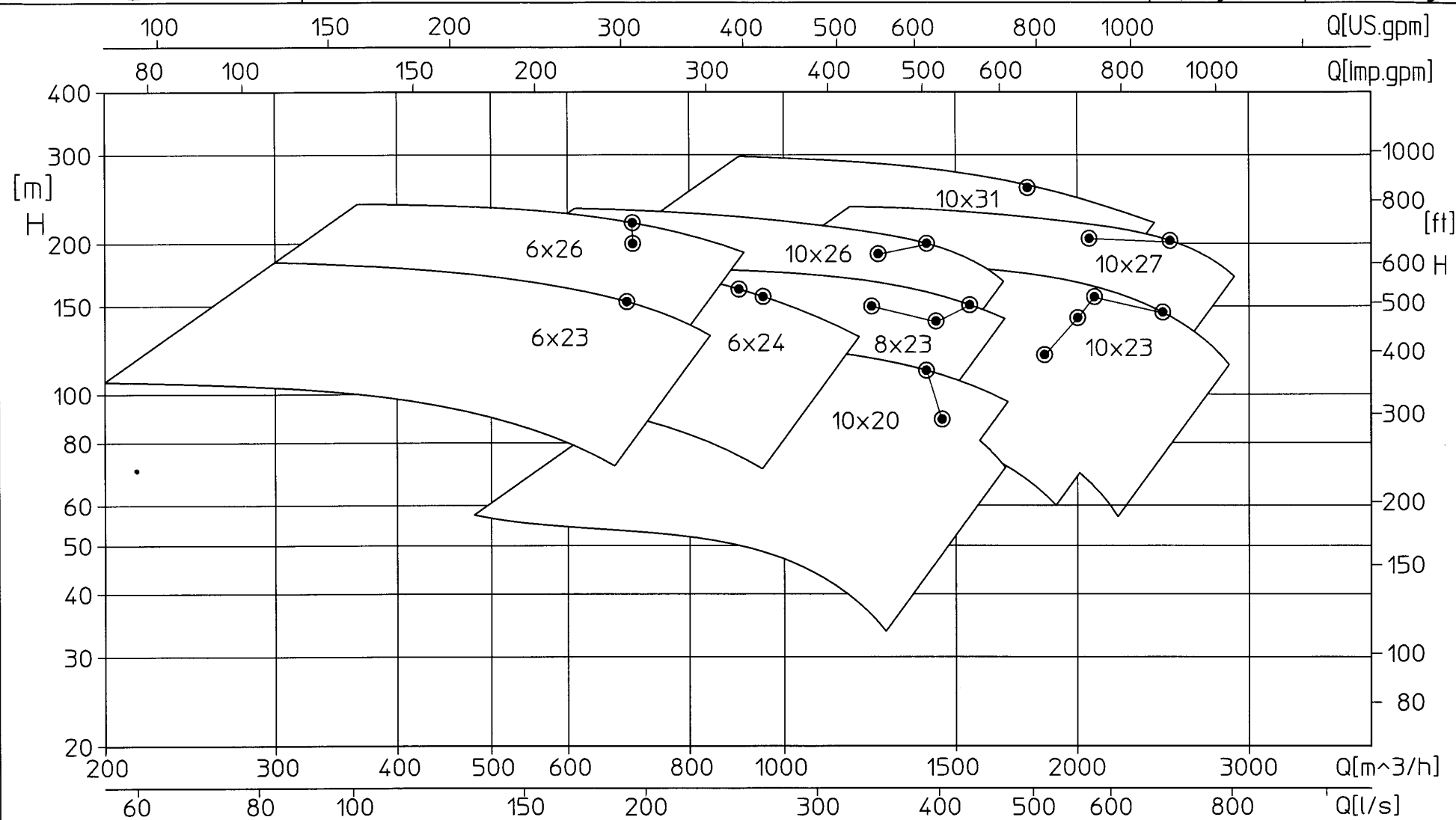


BB2 60Hz 4 Pole



# BB2 Selection Chart J n=1780 1/min

LT 1400.00	Stand:10.03
Gez.: Kölling	Dat.: 21.10.03
Gepr.: <i>Hi</i>	Dat.: <i>27.10.03</i>

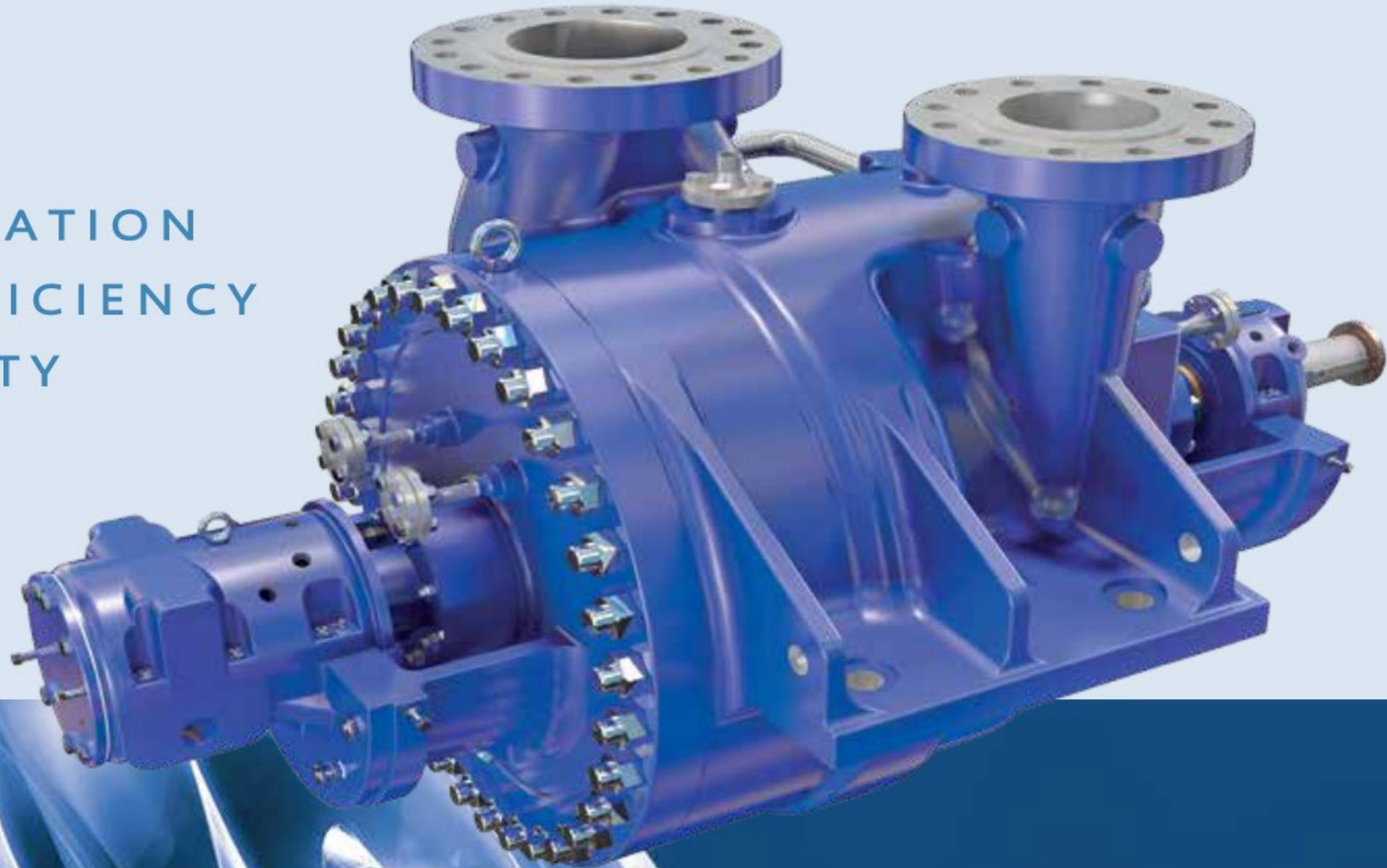






# BB2- 2 Stage Pumps

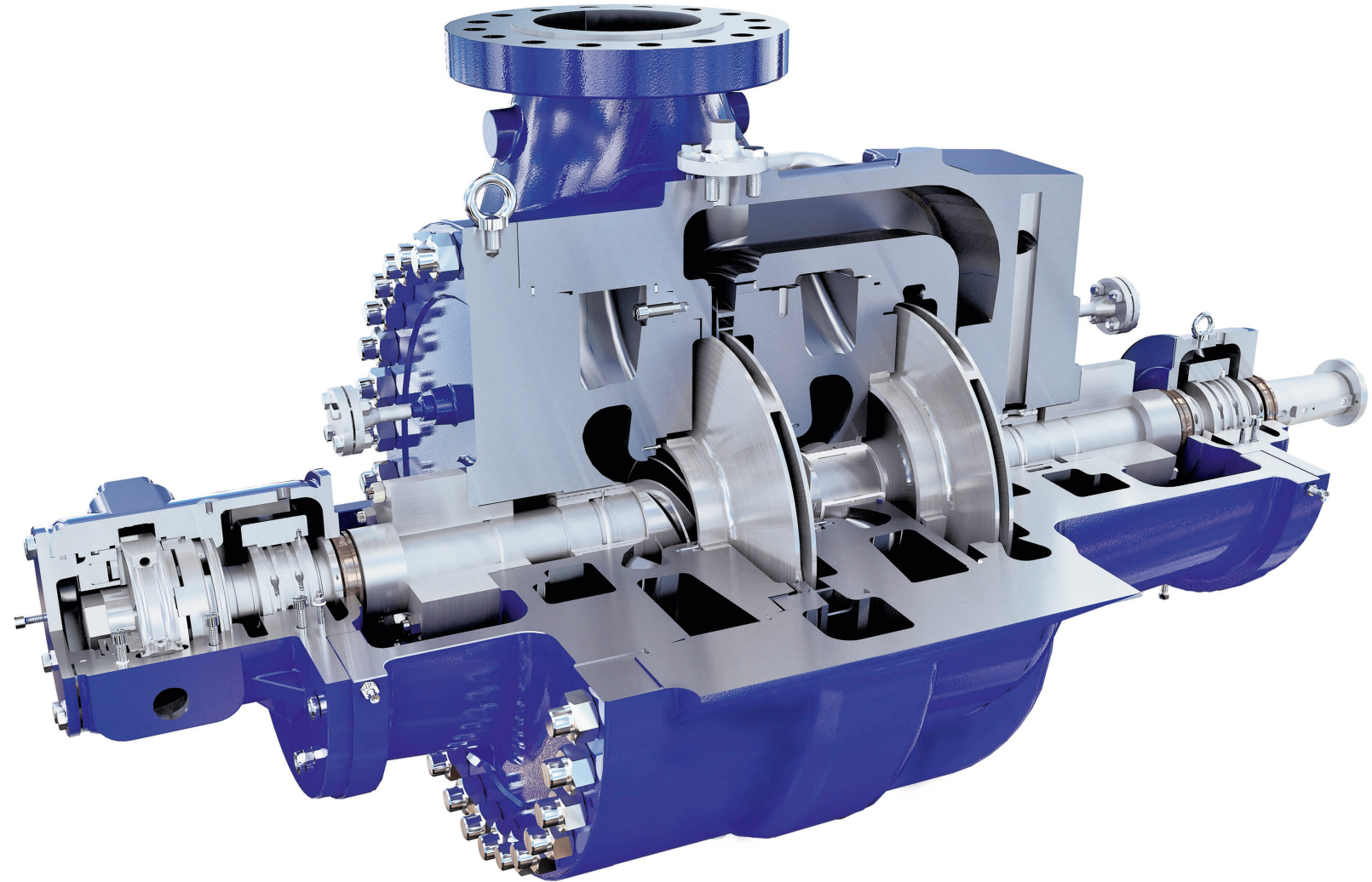
INNOVATION  
EFFICIENCY  
QUALITY





# BB2- 2 Stage Pumps

Available in Single Suction and Double Suction 1<sup>st</sup> Stage construction.



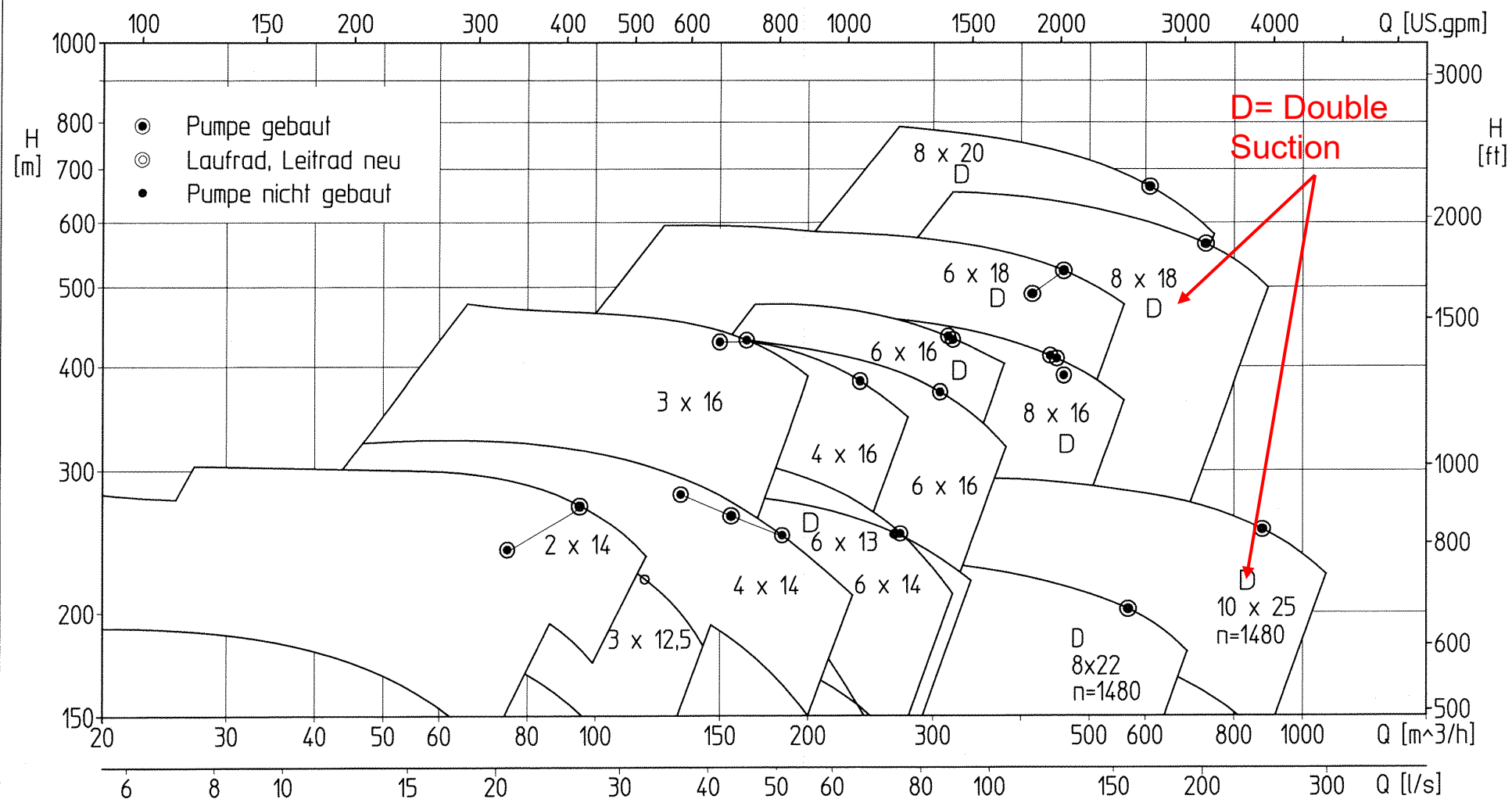


## BB2 - 2 Stage



Selection Chart RON  $n = 2960 \text{ 1/min}$

Stand: 07.17	LT 1285.39
Gez.: Kölling	Datum: 05.07.17
Gepr.: <i>U</i>	Datum: <i>6.7.17</i>



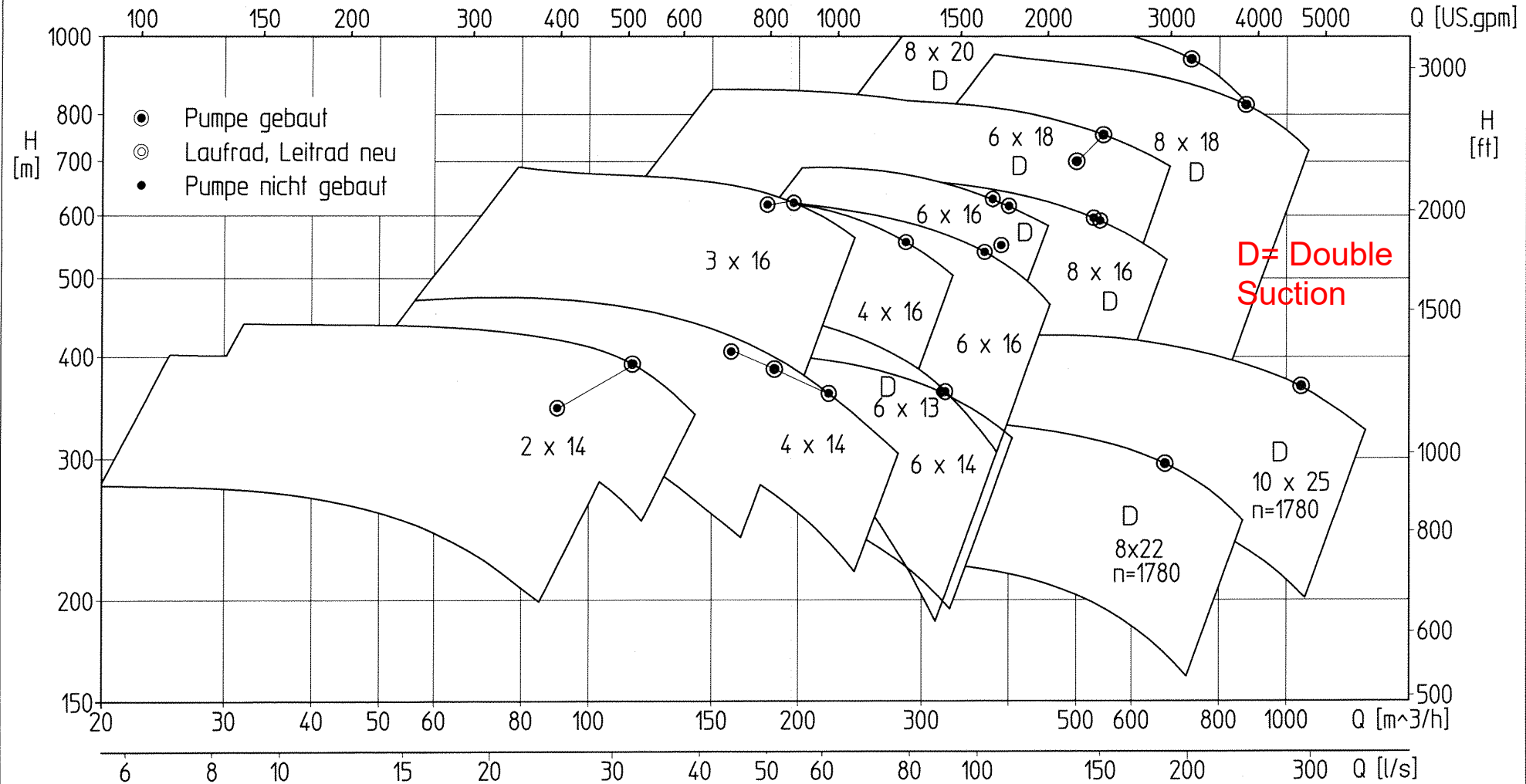


## BB2 - 2 Stage



Selection Chart RON  $n = 3560 \text{ 1/min}$

Stand: 05.17	LT 1369.59
Gez.: Kölling	Datum: 08.05.17
Gepr.: <i>h.</i>	Datum: <i>9.5.17</i>

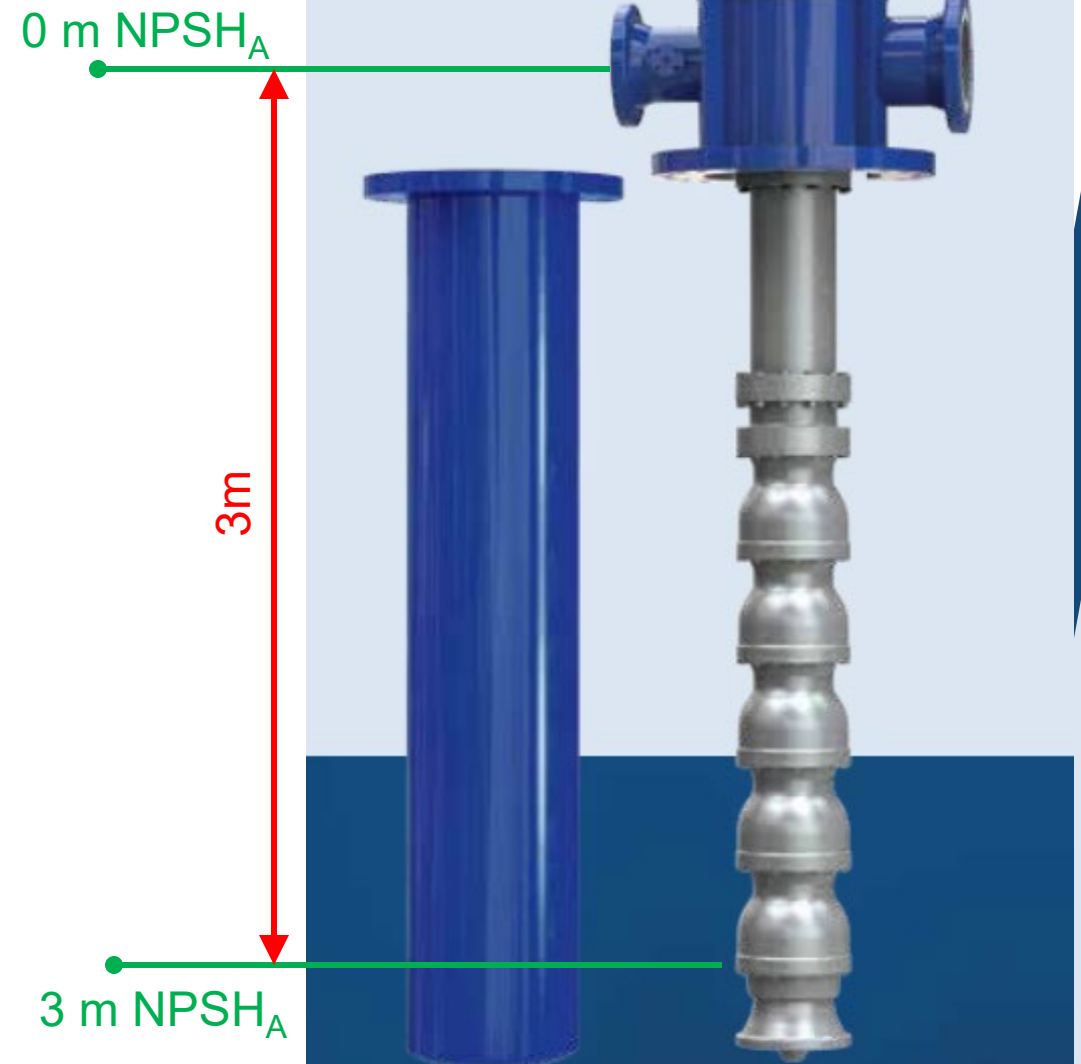


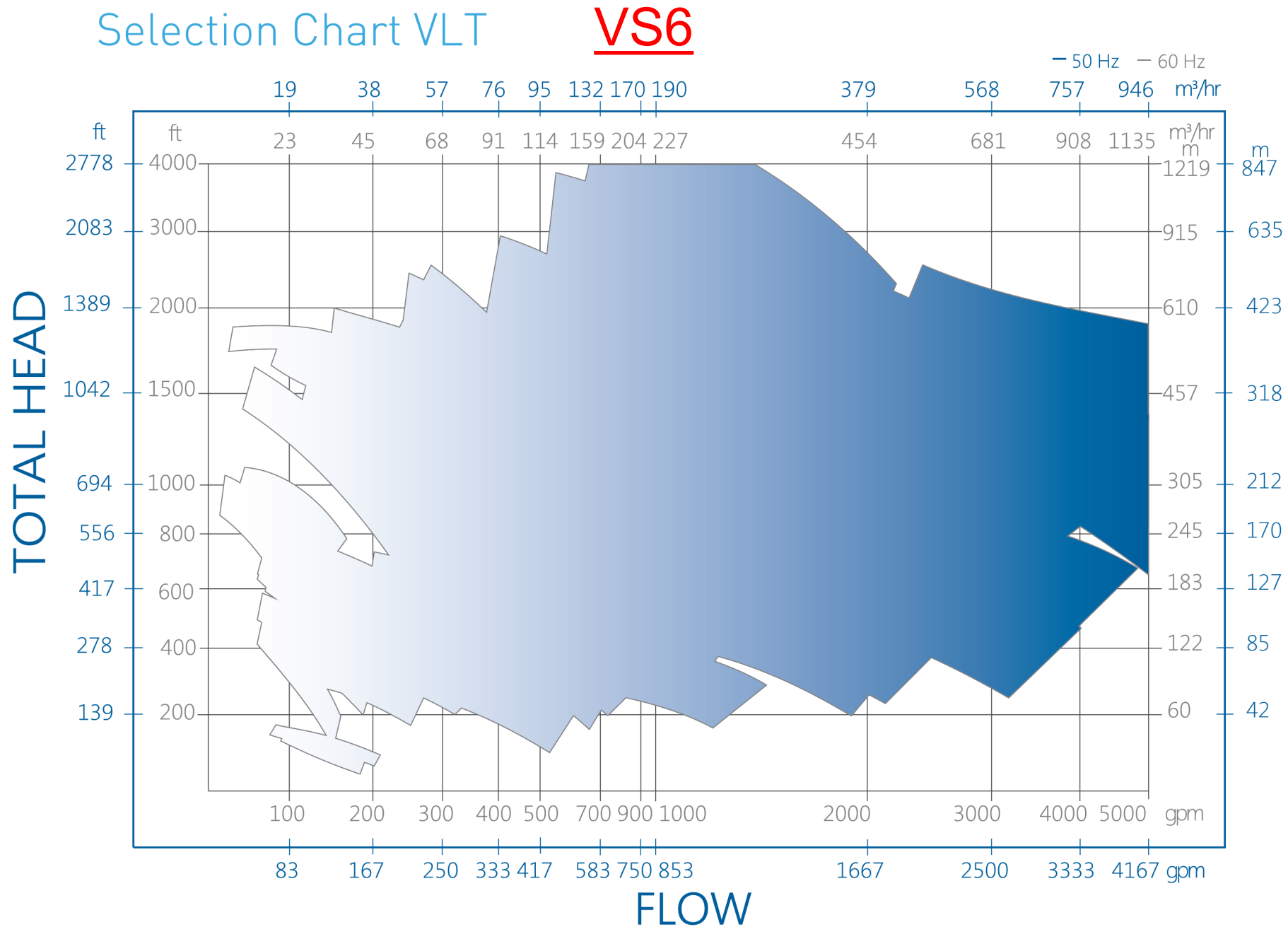


# VS6 Pumps – Zero NPSH<sub>R</sub>

## The Spacesaver and Costsaver

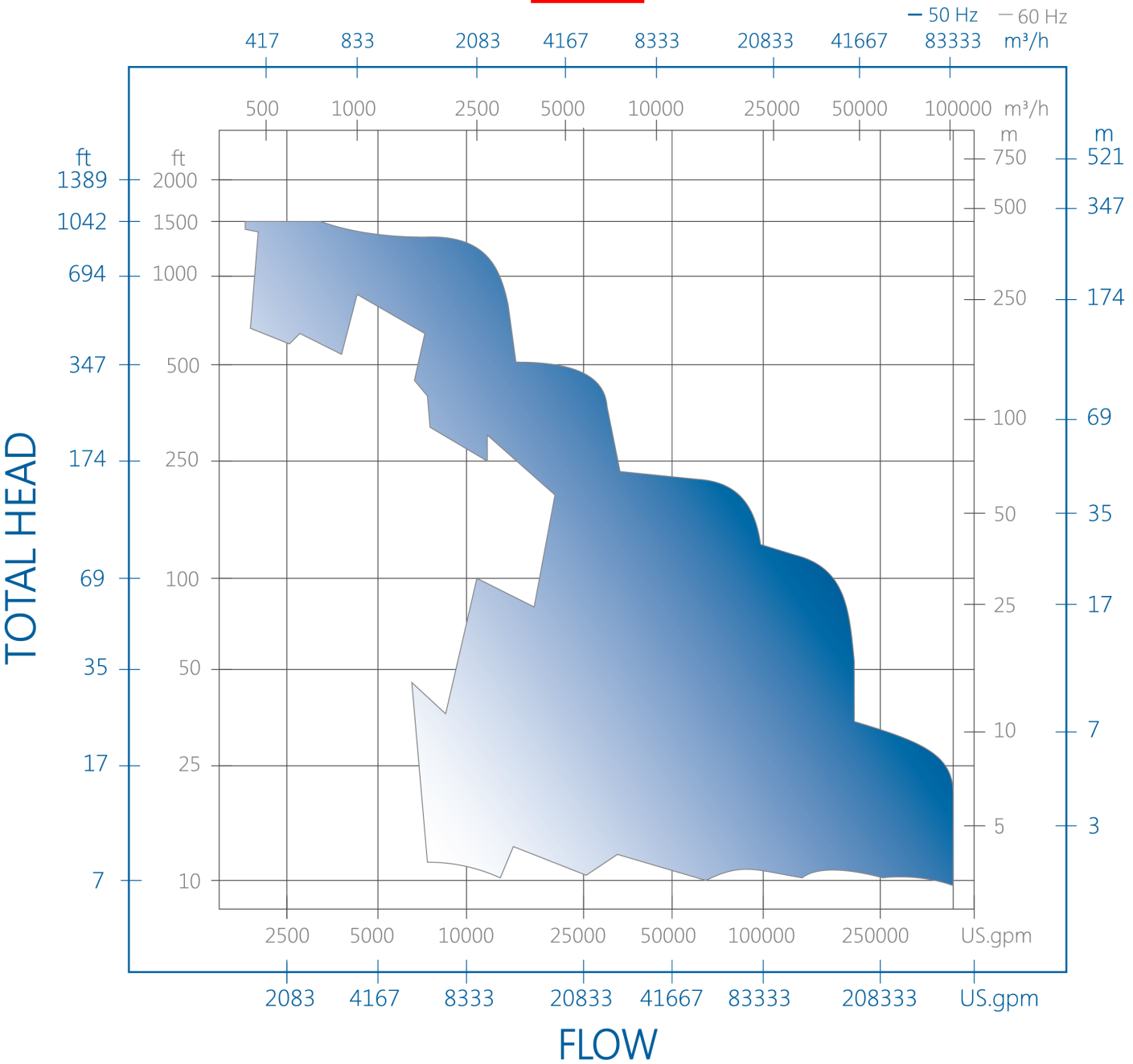
- You've looked OH2 pumps and at BB2 pumps and you still have an NPSH problem
- Not just an NPSH saver but a space saver too. Around 20% of the floorspace of the equivalent BB2
- And a cost saver too. Less expensive than the equivalent BB2
- One seal, one sealing system
- Once you can persuade your civil engineers to dig a hole you are saving all the way.







Selection Chart VMT VS6





# **Axially Split Pumps BB1 & BB3**

**Pipeline Pumps**





# Axially Split Pumps BB1 & BB3

## Limitation from API610 on use of axially split pumps

- 6.3.9 Unless otherwise specified, pumps with **radially split** casings are required in services for any of the following conditions:
  - a) **pumping temperature of 200 C (400 F)** or higher (a lower temperature limit should be considered if thermal shock is probable);
  - b) liquids with a **relative density of less than 0,7** at the specified pumping temperature;
  - c) liquids at a rated **discharge gauge pressure above 10 MPa (100 bar; 1450 psi)**.
- Axial split casings have been used successfully beyond the limits given above, generally for off-plot applications at higher pressure or lower relative density (specific gravity). The success of such applications depends on the margin between design pressure and rated pressure, the manufacturers experience with similar applications, the design and manufacture of the split joint, the user's ability to correctly remake the split joint in the field. The purchaser should take these factors into account before specifying an axial split casing for conditions beyond these limits.
- For an excellent article by Simon Bradshaw on this subject, follow this link
- <https://www.linkedin.com/pulse/thngs-api-610-got-wrong-part-5-simon-bradshaw/>



INNOVATION  
EFFICIENCY  
QUALITY



# ZM I to III

Axially Split Case, Heavy Duty  
API 610 Process Pump (BB1)

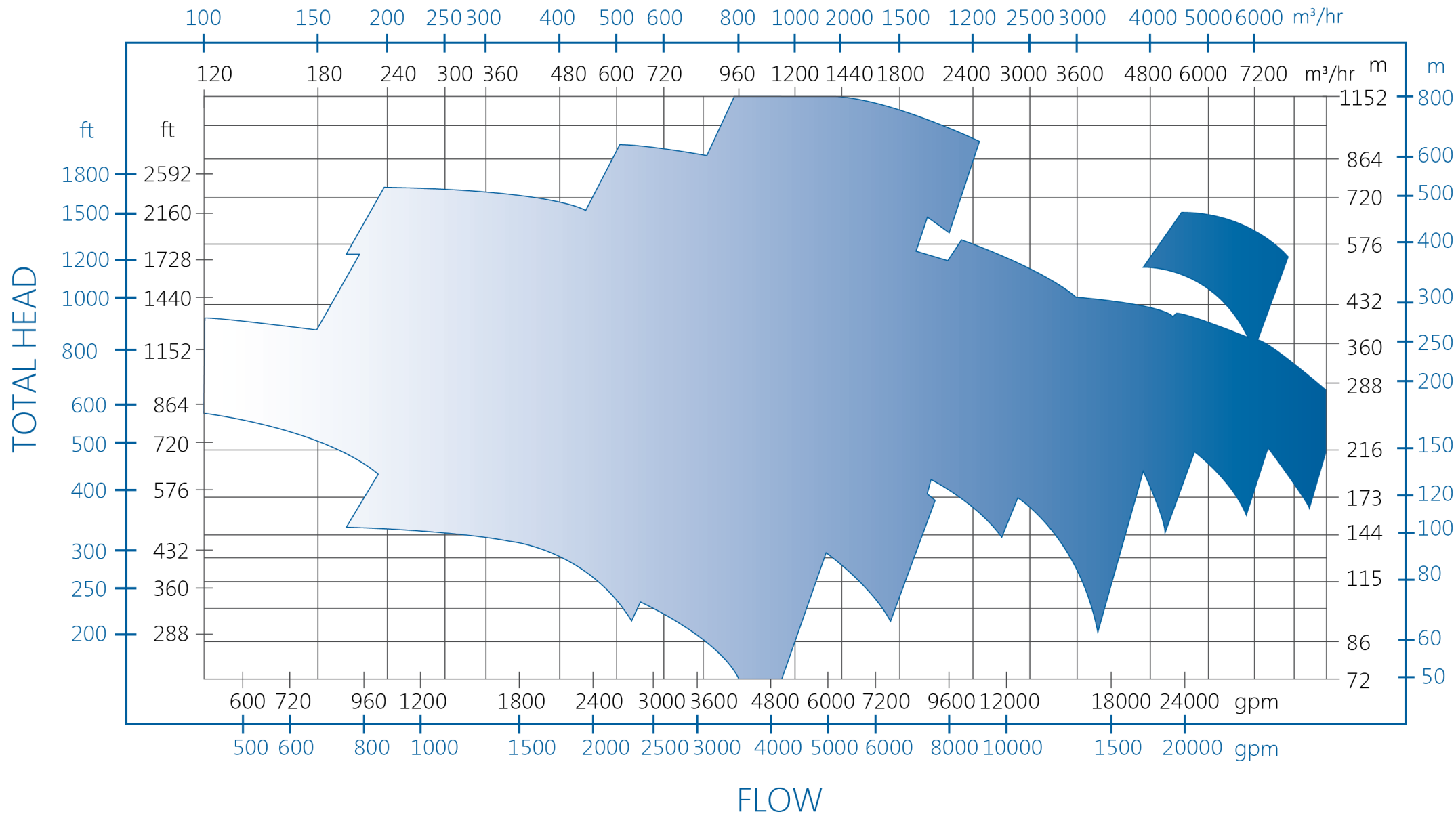


# Selection Chart ZM I

**BB1- B**

50 Hz 2 POLES 60 Hz

**BB1, 50 & 60 Hz, 2 Pole**





# Selection Chart ZM II

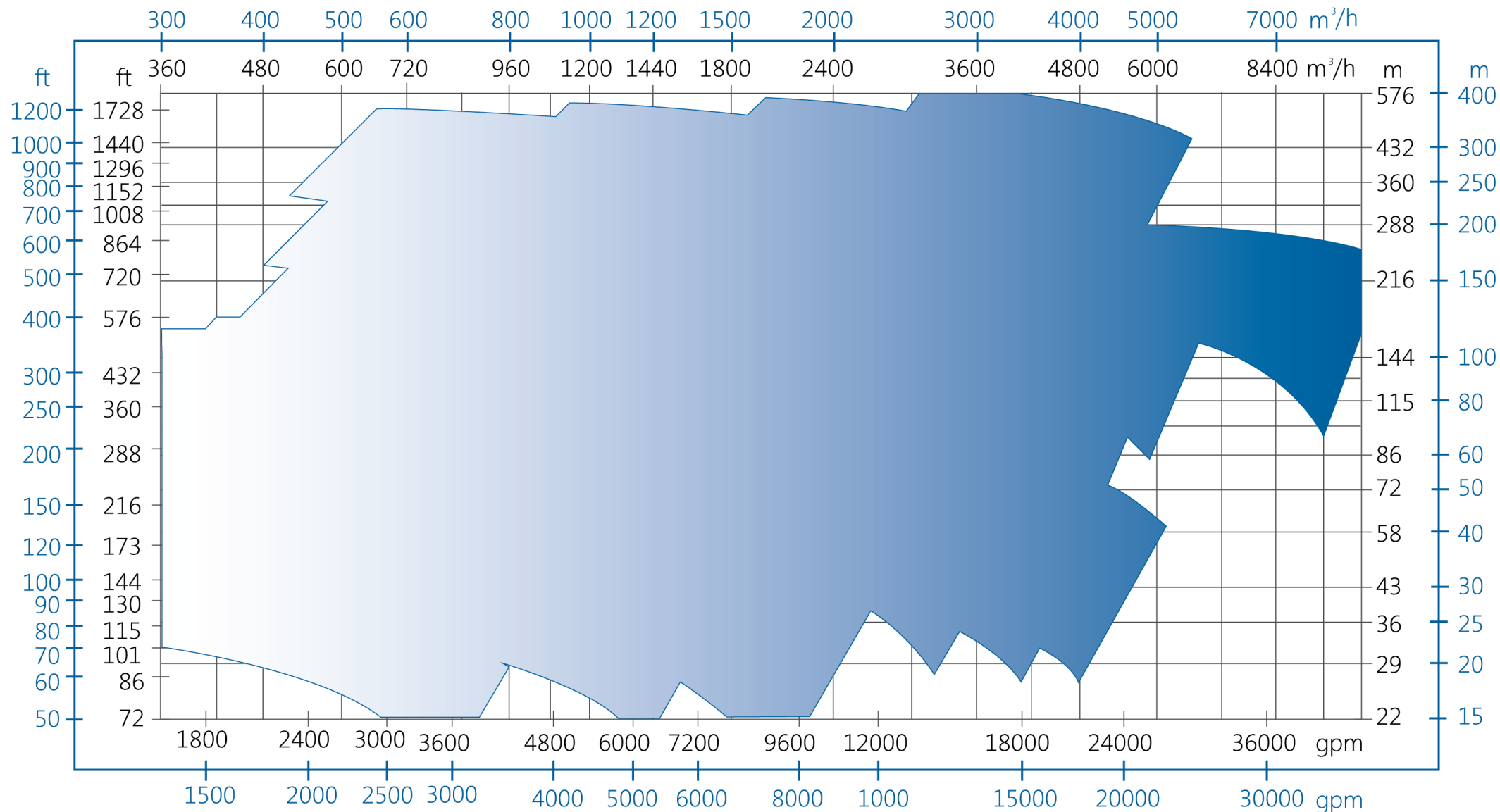
**BB1- B**

4 POLES

— 50 HZ — 60 HZ

**BB1, 50 & 60 Hz, 4 Pole**

TOTAL HEAD



FLOW



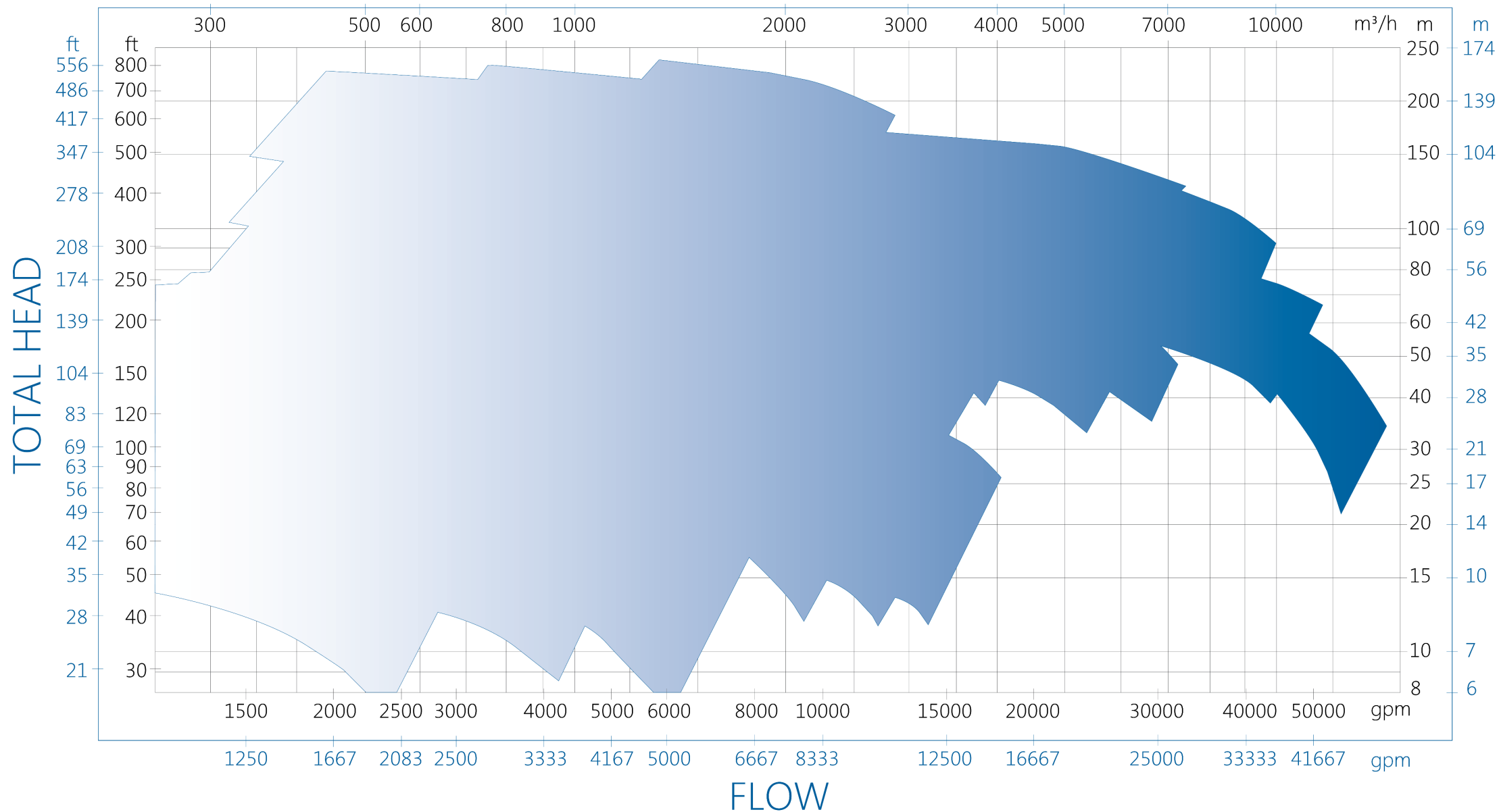


# Selection Chart ZM III

**BB1- B**

6 POLES  
50 Hz 60 Hz

**BB1, 50 & 60 Hz, 6 Pole**





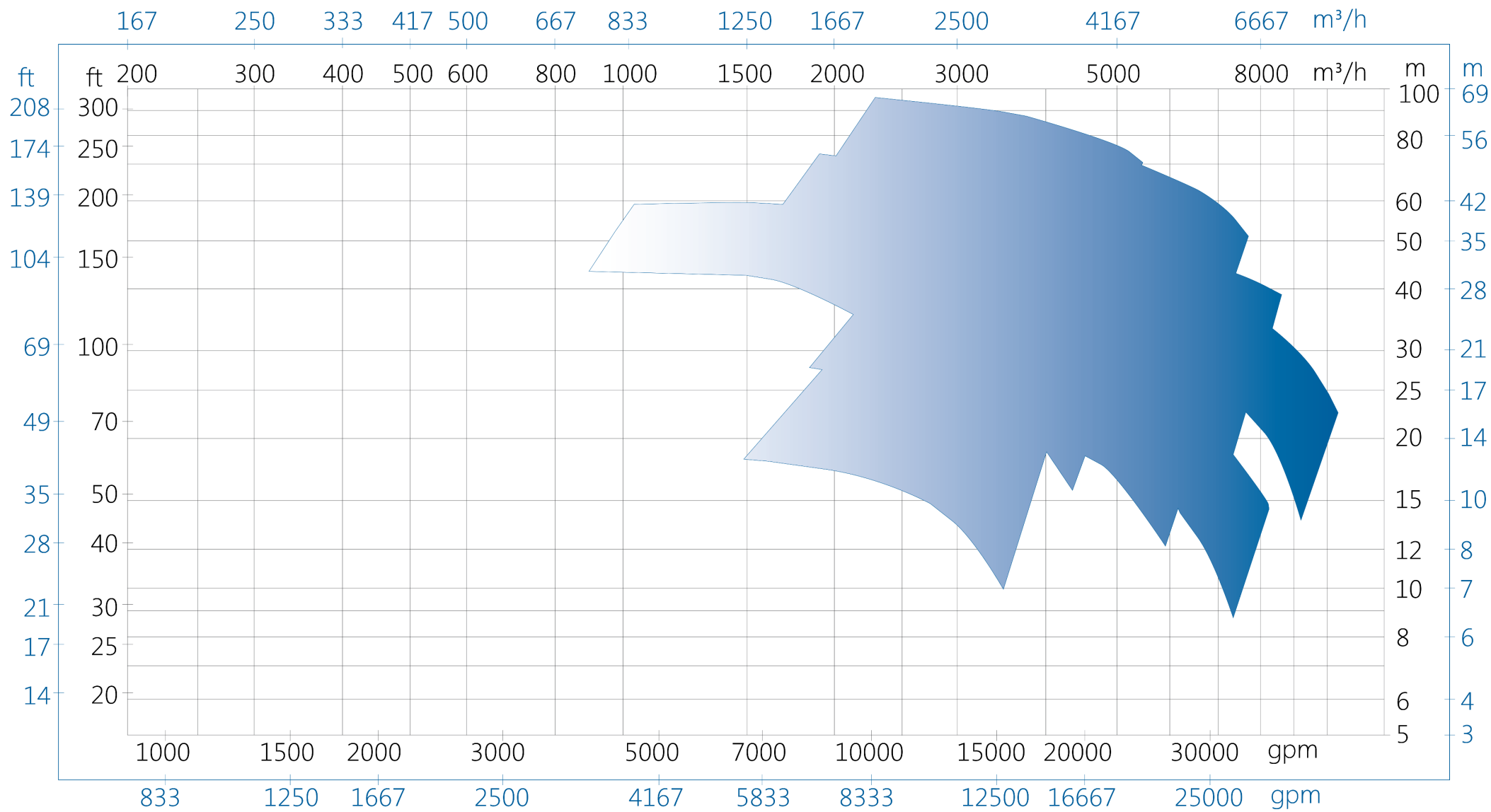
# Selection Chart ZM IV

**BB1- B**

8 POLES  
50 Hz 60 Hz

**BB1, 50 & 60 Hz, 8 Pole**

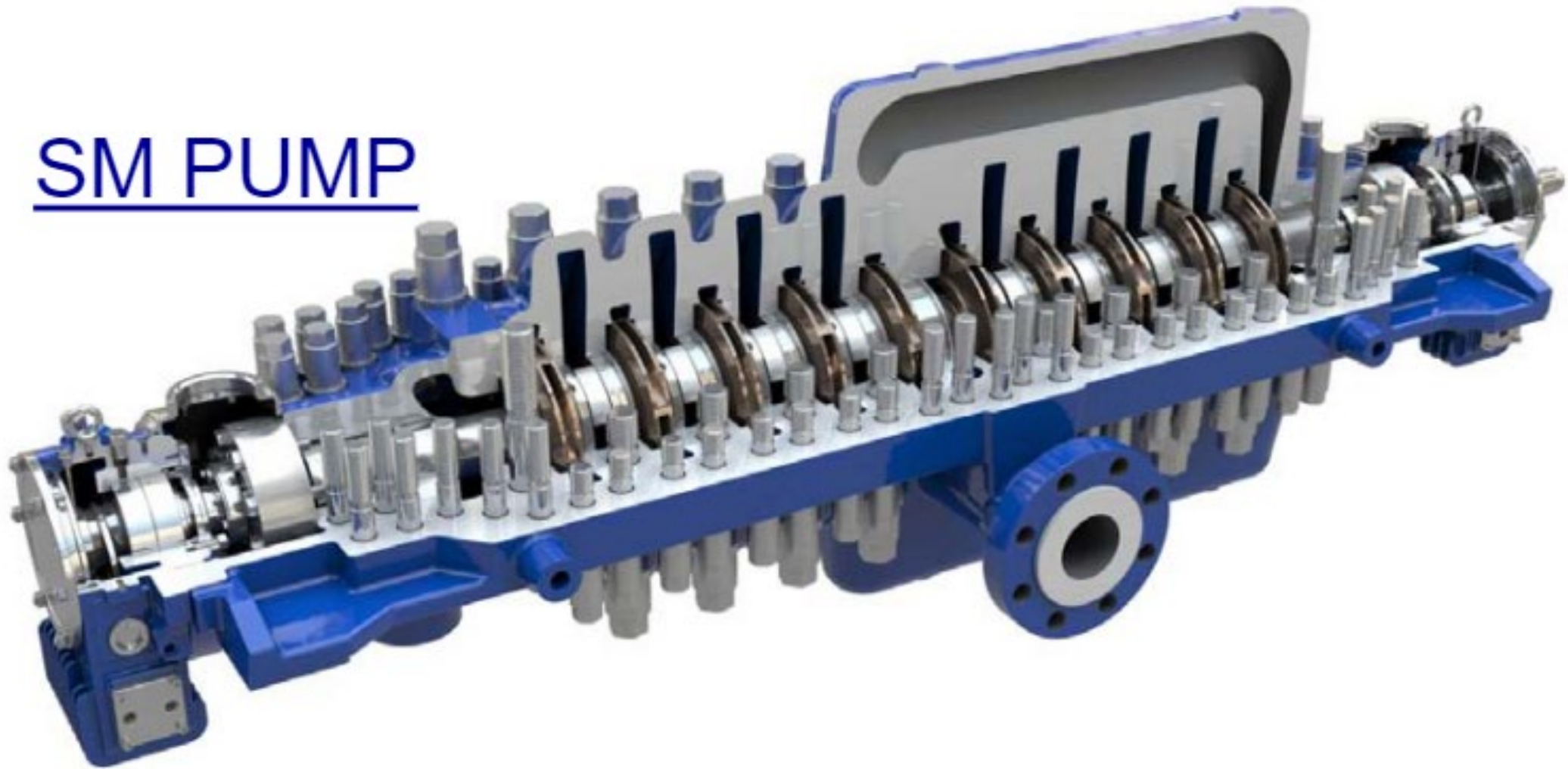
TOTAL HEAD



FLOW

# Axially Split Multistage Type BB3

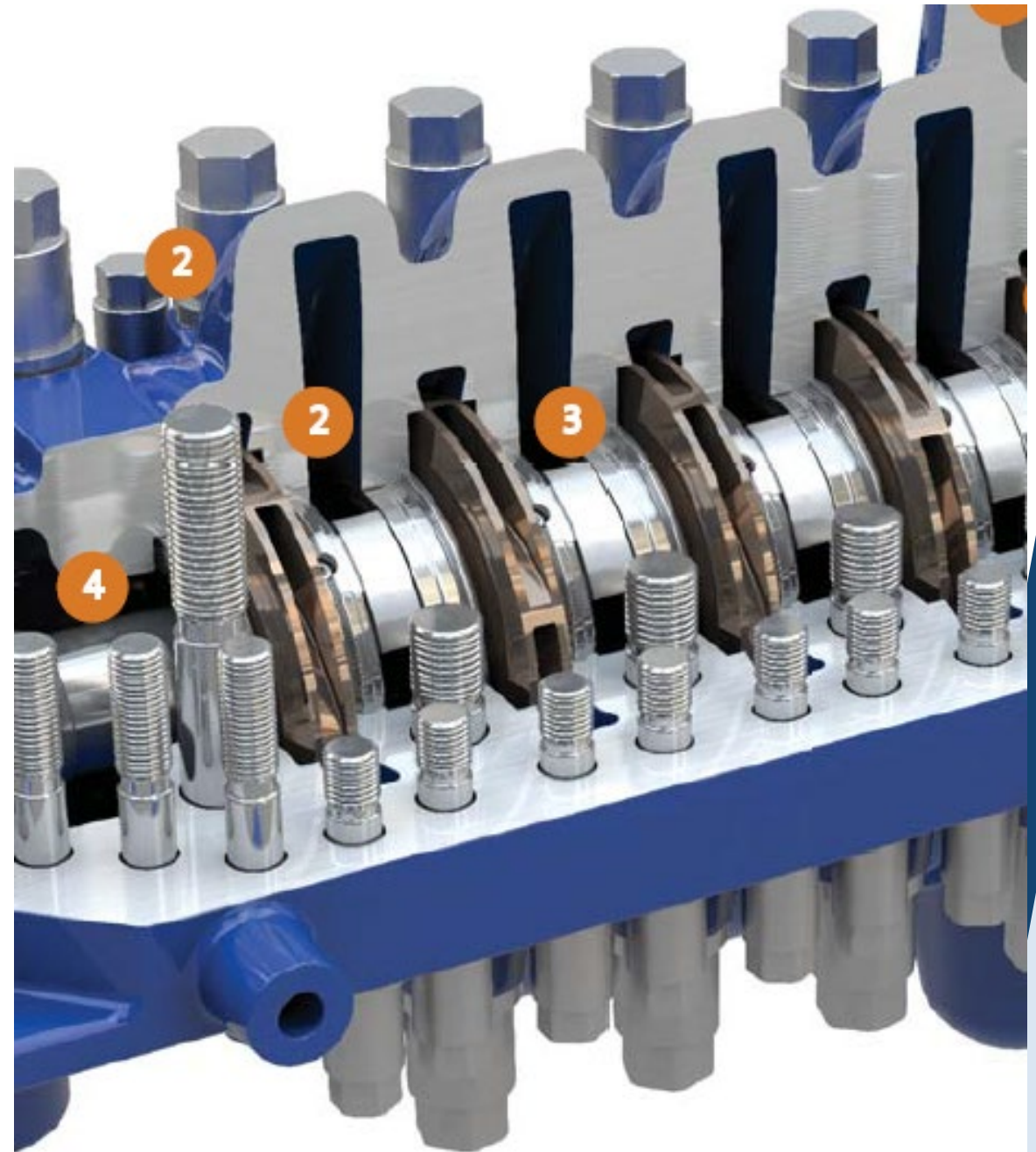
SM PUMP



# Axially Split Type BB3

Interstage Bolting ensures gasket compression in this area and prevents erosion caused by fluid washover.

It means this design is good for SG as low as 0.4 and pressures to 180 Bar.







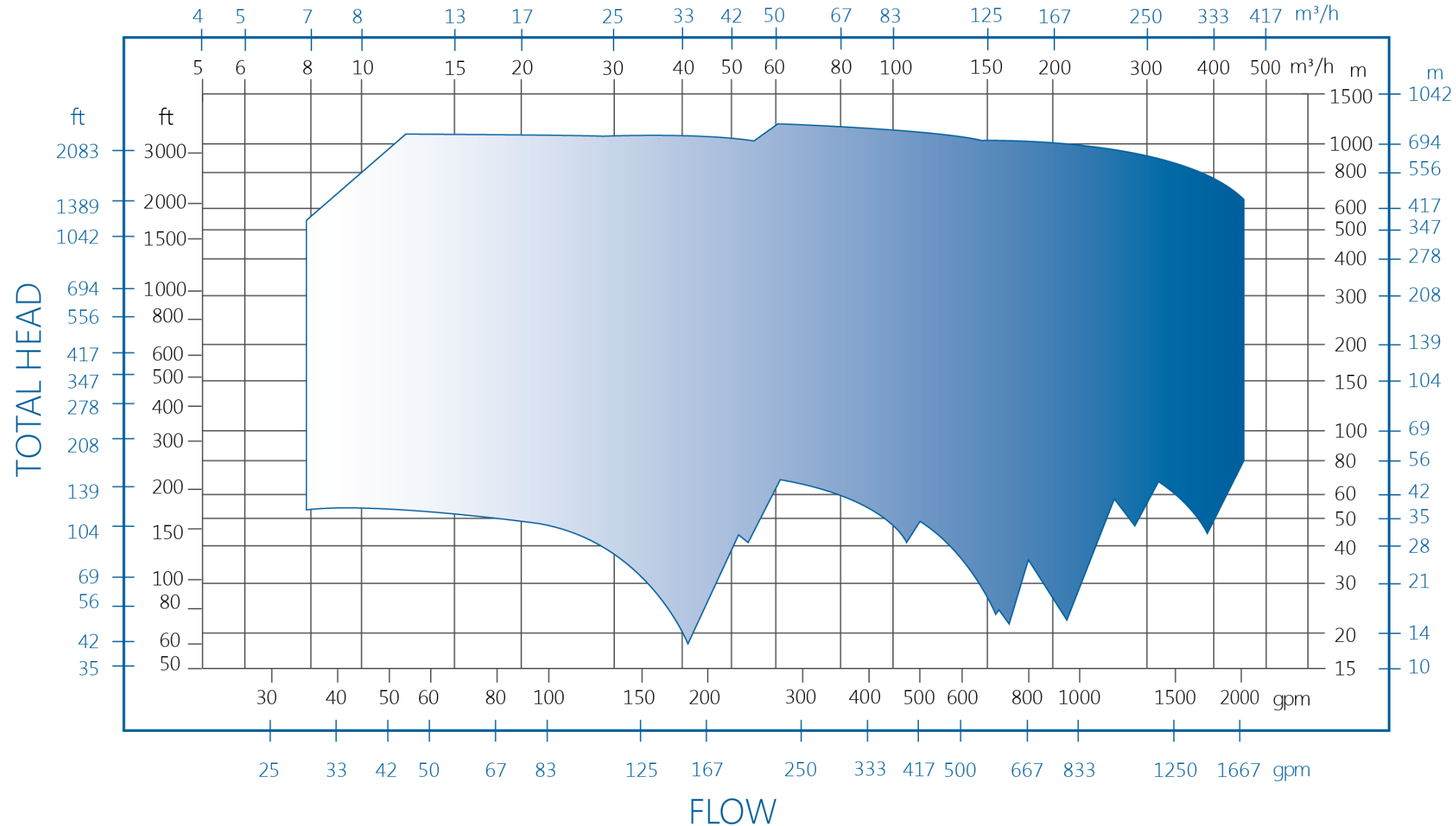
# Selection Chart JTN

**BB3**

2 Poles

— 50 Hz — 60 Hz

BB3 Smaller Sizes, 50 & 60 Hz, 2 Pole





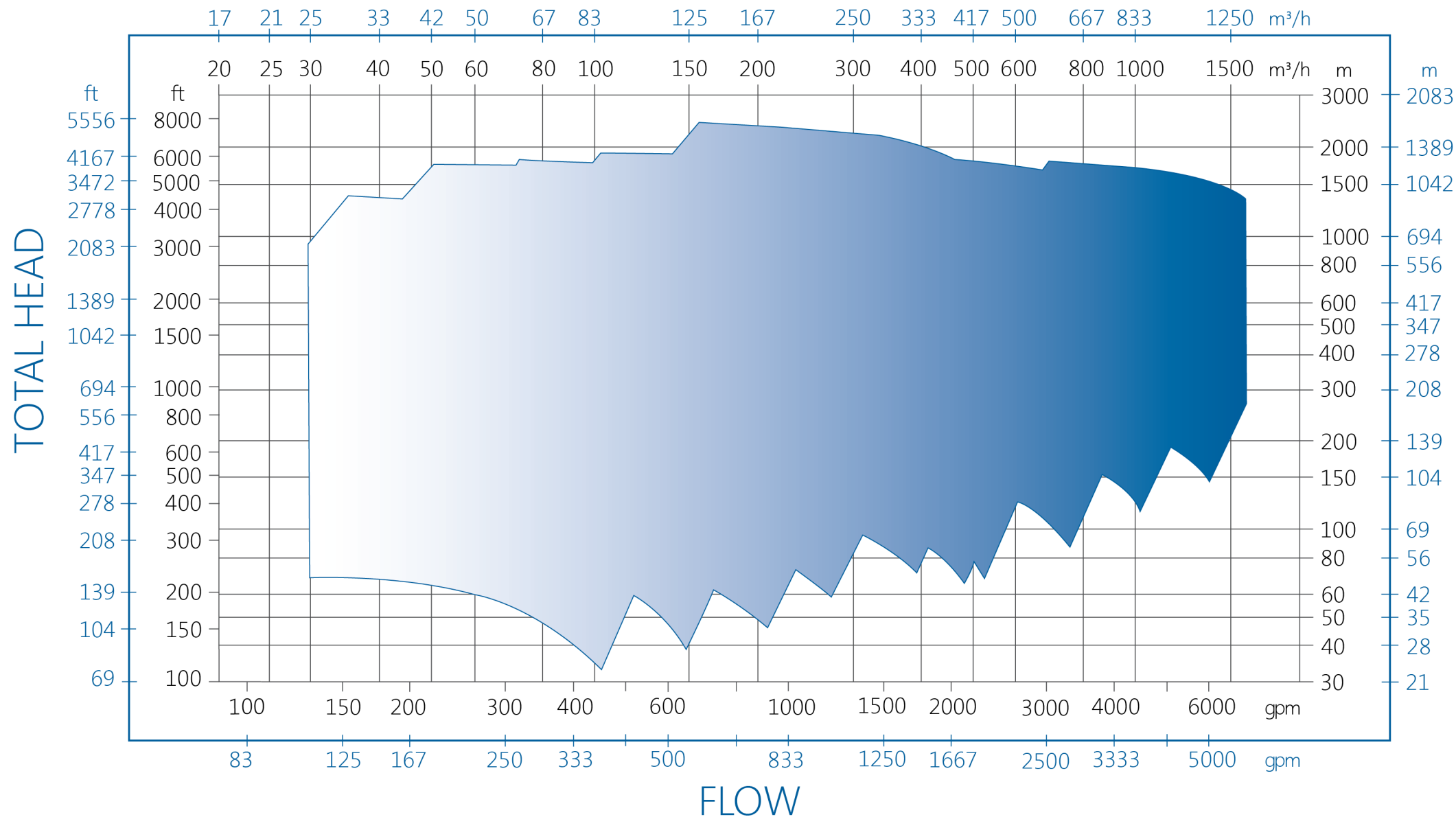


# Selection Chart SM/SMI

**BB3**

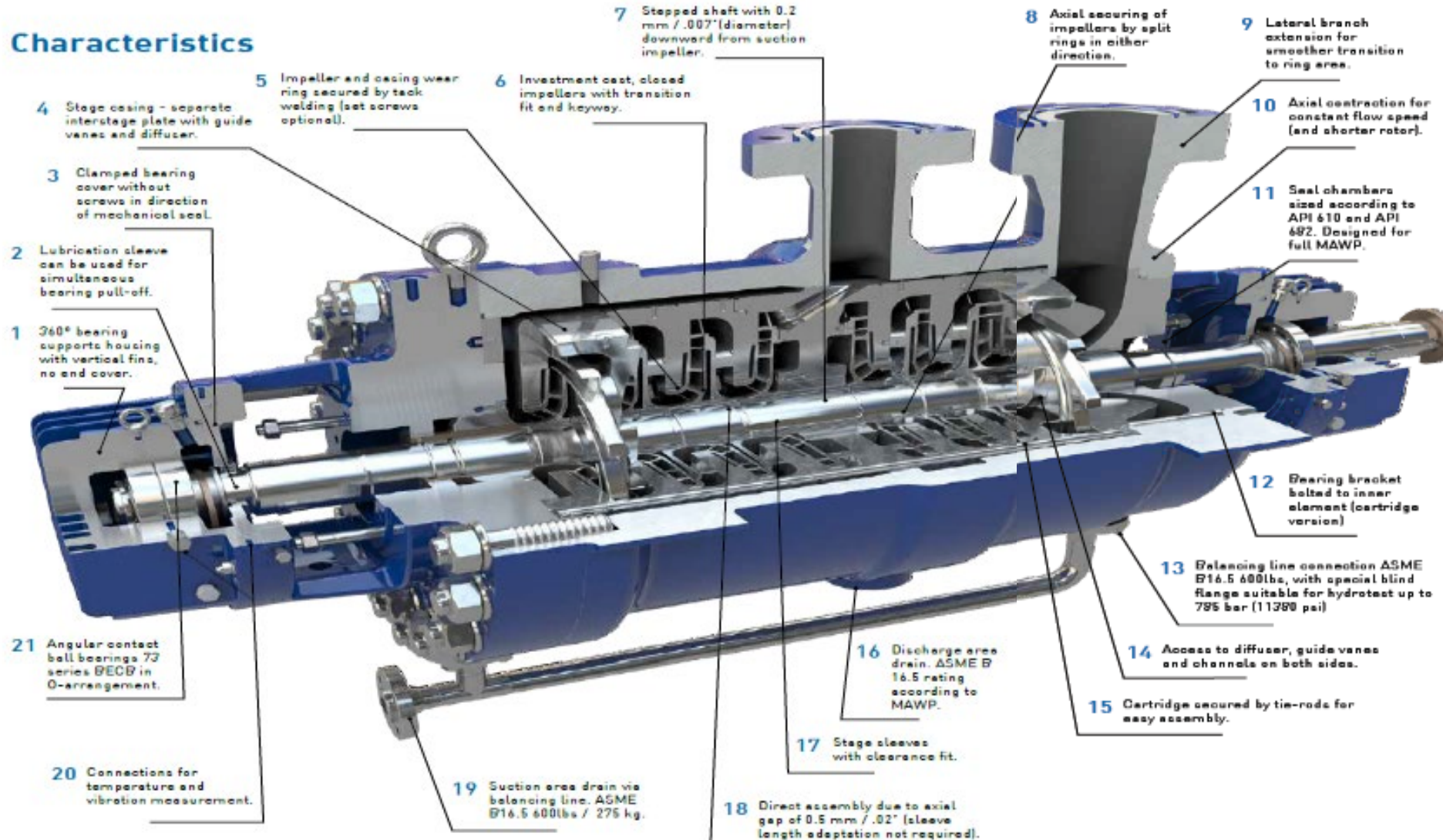
2 POLES  
(2960 / 3560 RPM)  
— 50 Hz — 60 Hz

**BB3 Larger Sizes, 50 & 60 Hz, 2 Pole**



# Double Case Pump Type BB5

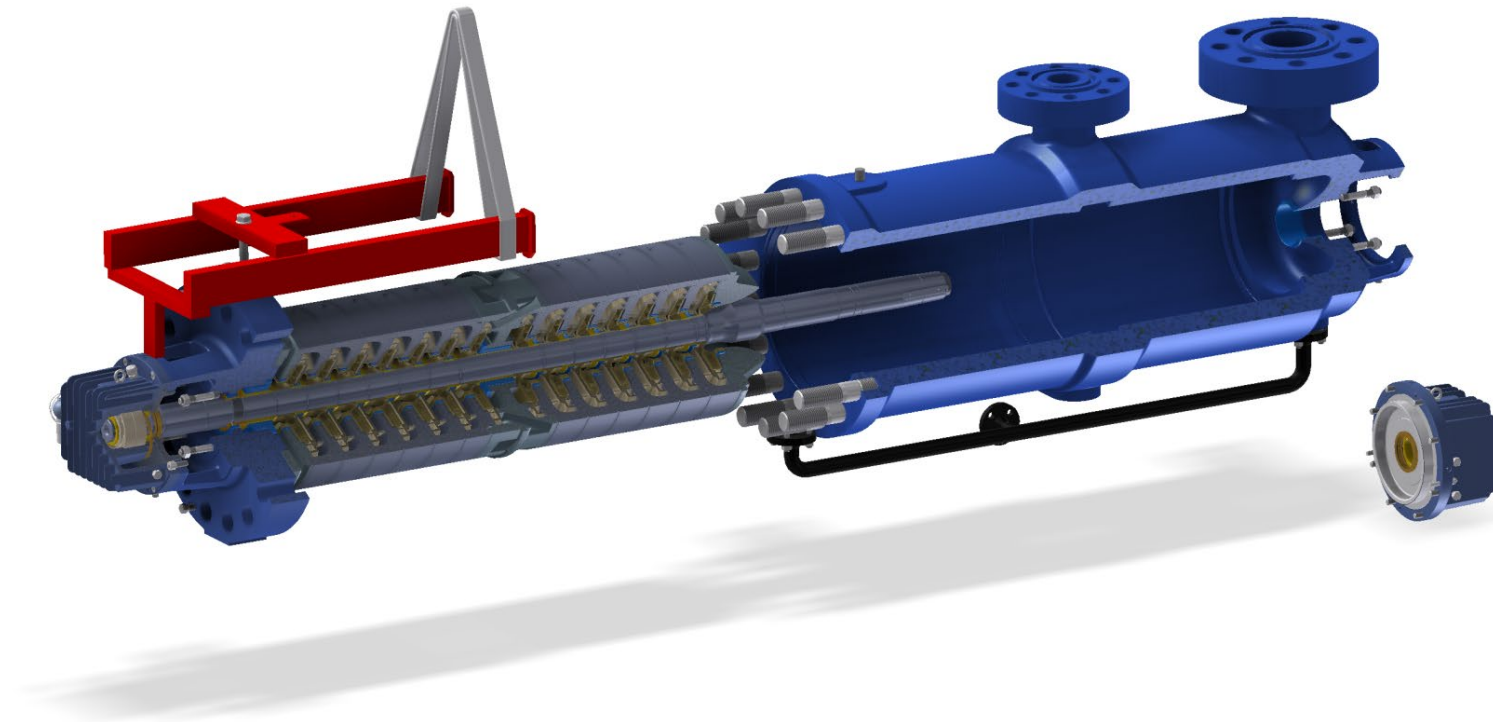
## Characteristics





# Double Case Pump Type BB5

Pull-out Design





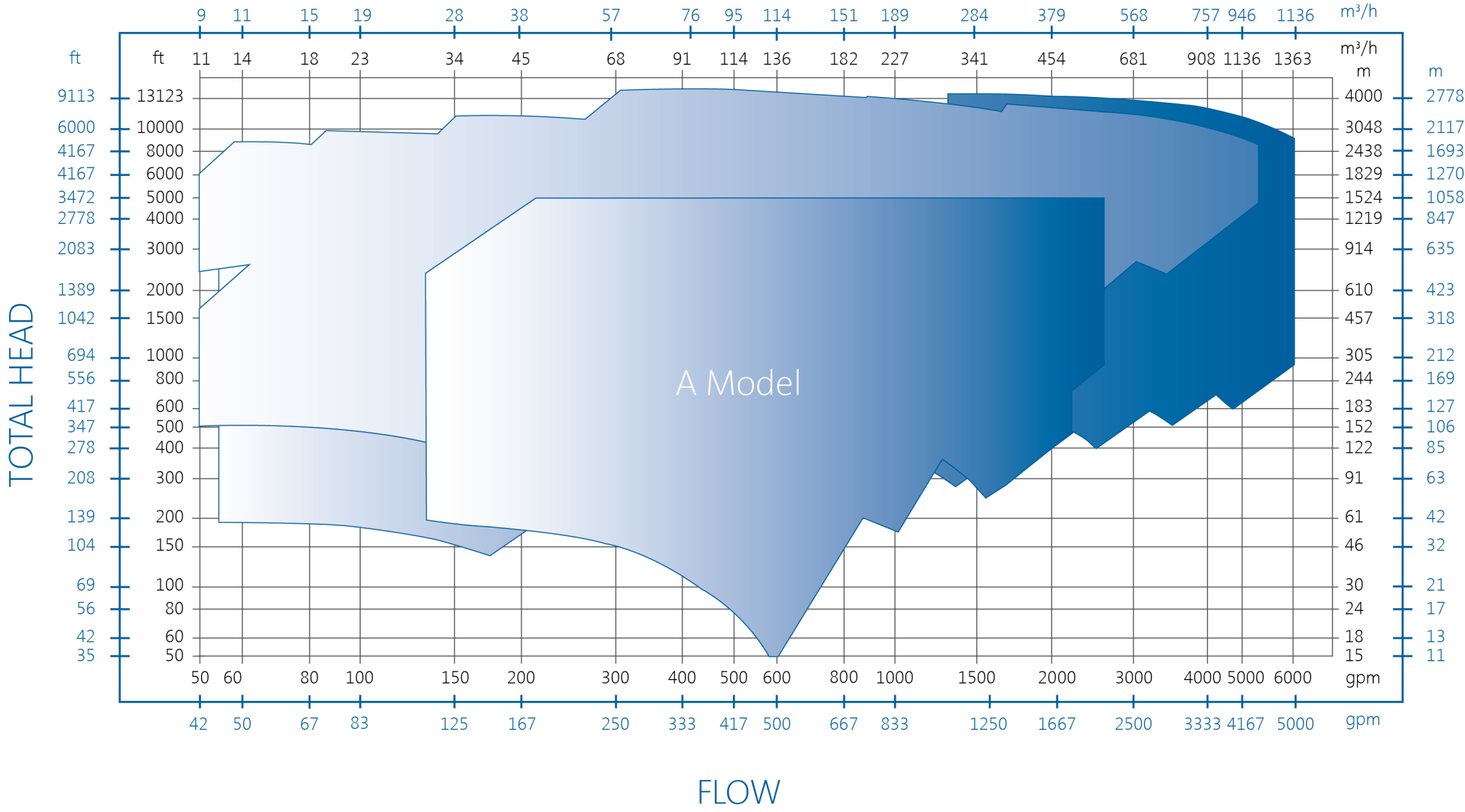
SELECTION CHART A-LINE

**BB5**

**BB5, 50 & 60 Hz, 2 Pole**

2 POLES

— 50 Hz — 60 Hz





## Coming Attractions ☺

### “Comparison of API610 12th and 11th Editions”

Thurs 14<sup>th</sup> March – 08.00 (UK GMT) (Eastern Hemisphere) & 17.00 (UK GMT) (Western Hemisphere)

*API 610 12th Edition has been around for a couple of years now and is being referenced in more and more end user/client specifications*

*The session will look at the KEY FEATURES of, & MAJOR CHANGES between 12th & 11th Editions of API610.*

*Aimed at Process and Mechanical Engineers and Consultant Engineers specifying pumping equipment as well as Applications & Sales Engineers selecting and quoting them.*





*Specialist for Pumping Technology*

**Q & A**

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[marketing@ruhrpumpen.com](mailto:marketing@ruhrpumpen.com)

# RUHRPUMPEN AT A GLANCE

**VERTICAL  
INTEGRATION**

**SALES  
OFFICES IN  
+35 COUNTRIES**

**MANUFACTURING  
FACILITIES  
IN 10 COUNTRIES**

**+70 YEARS  
OF EXPERIENCE**

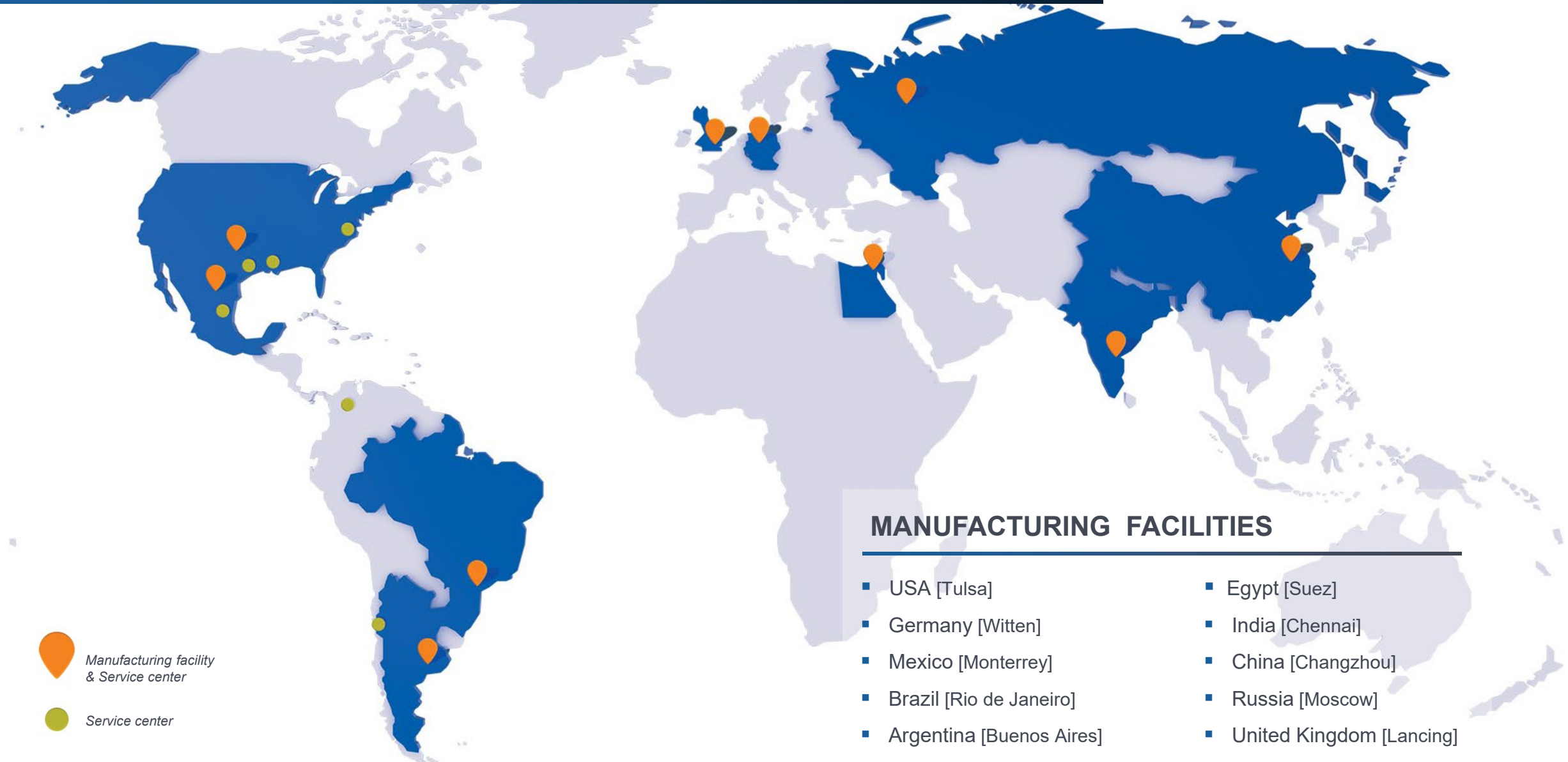
**+2,000  
EMPLOYEES**

**15 SERVICE  
CENTERS**

**+70,000 PUMPING SOLUTIONS INSTALLED WORLDWIDE**



# A GLOBAL COMPANY



# MARKETS WE SERVE

Our commitment to create innovations that offer reliable solutions to our customers allow us to provide a complete range of pump systems to support **core markets** as:







# OUR PUMP LINES

Ruhrpumpen offers a broad range of highly engineered and standard pumping products that meet and exceed the requirements of the most demanding quality specifications and industry standards.

Our pumps can handle head requirements as high as 13,000 ft (4,000 m) and capacities up to 300,000 gpm (68,000 m<sup>3</sup>/hr). Moreover, our pump designs cover temperatures from cryogenic temperatures of -310 °F (-196 °C) up to 752 °F (400 °C).



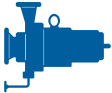
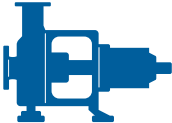





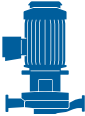
## Products include:

- Single Stage Overhung Pumps
- Between Bearings Pumps
- Horizontal Multi-Stage Pumps
- Vertical Multi-Stage Pumps
- Vertical Mixed Flow & Axial Flow Pumps
- Positive Displacement Pumps
- Full Range of Industrial Pumps
- Submersible Pumps
- Magnetic Drive Pumps
- Decoking Systems
- Packaged Systems
- Fire Systems





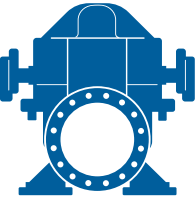




# OVERHUNG PUMPS

CATEGORY	RP MODEL	DESIGN STANDARD	
Sealless Magnetic Drive Pumps	<b>CRP-M / CRP-M-CC</b>	ISO 2858 & 15783 HI design (OH11)	
	<b>SCE-M</b>	API 685	
Foot Mounted OH1 and General End Suction Pumps	<b>IPP</b>	HI design (OH1)	
	<b>CPP / CPP-L</b>	HI design (OH1) ANSI B73.1	
	<b>CPO / CPO-L</b>	HI design (OH1) ANSI B73.1	
	<b>CRP</b>	HI design (OH1) ISO 2858 & 5199	
	<b>GSD</b>	HI design (OH0)	
	<b>SHD / ESK / SK / SKO SKV / ST / STV</b>	HI design (OH1)	
	<b>SWP</b>	HI design (OH3A)	
Centerline Mounted	<b>SCE</b>	API 610 (OH2)	
Vertical In-Line Pumps	<b>SPI</b>	API 610 (OH3)	
	<b>IVP / IVP-CC</b>	HI design (OH4 / OH5)	
	<b>IIL</b>	HI design (OH5) Dimensionally compliant with ANSI B73.2	
	<b>SPN</b>	API 610 (OH5)	











# BETWEEN BEARING PUMPS

CATEGORY		RP MODEL	DESIGN STANDARD	
1 and 2 stage	Axially split	<b>HSC / HSD / HSL HSR / ZW</b>	HI design (BB1)	
		<b>HSM</b>	HI design (BB3)	
		<b>ZM / ZMS ZLM / ZME</b>	API design (BB1)	
	Radially split	<b>HVN / J</b>	API design (BB2)	
		<b>RON / RON-D</b>	API design (BB2)	
Multi-stage	Axially split	<b>SM / SM-I</b>	API design (BB3)	
		<b>JTN</b>	API design (BB3)	
	Radially split <i>single casing</i>	<b>GP</b>	API design (BB4)	
	Radially split <i>double casing</i>	<b>A LINE</b>	API design (BB5)	





# VERTICAL PUMPS









CATEGORY		RP MODEL	DESIGN STANDARD	
Single casing	Diffuser	VTP	HI & API 610 (VS1)	
		VCT	HI & API 610 (VS1)	
		HQ	HI & API 610 (VS1)	
		VLT	HI & API 610 (VS1)	
	Volute	DSV / DX	HI & API 610 (VS2)	
	Discharge through column – Axial flow	VAF	HI & API 610 (VS3)	
Double casing	Separate discharge line	VSP / VSP-Chem	HI & API 610 (VS4)	
	Diffuser	VLT / VMT	HI & API 610 (VS6)	
	Volute	DSV / DX	HI & API 610 (VS7)	
Submersible pumps		SMF	HI design (OH8A)	
		VLT-Sub / VTP-Sub	HI design (VS0)	







# SPECIAL SERVICE PUMPS

CATEGORY	RP MODEL	DESIGN STANDARD	
Pitot tube pumps	COMBITUBE	HI design	
Reciprocating pumps	RDP	API 674 ISO 13710	
Vertical turbine generator	VTG	HI design (VS6)	
Barge	LS BARGE	HI design	
Floating dock pumps	ZVZ	HI design	
	LVZ	HI design	
Cryogenic pumps	SVNV	-	
	VTG Cryogenic	-	
	VLT Cryogenic VLTV	-	
Pre-packaged fire pump systems	Fire systems incorporate pumps, drivers, control systems and pipework in a single container. They can be skid mounted, with or without enclosure and supplied with electric motor or diesel engine.		
		NFPA-20-850 UL and FM approved components	

