

“Wastewater Pumps with Integrated Intelligence – The Next Pump Industry Breakthrough”

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**INTEGRATED, INTELLIGENT, FLEXIBLE,
RELIABLE, COST EFFECTIVE.**



**Introducing...
The world's first
wastewater pumping
system with
integrated
intelligence**

A new level of thinking to solve modern wastewater challenges...

Cost reduction is the most urgent priority.

Are you prepared to meet current and future wastewater challenges?

- **Aging infrastructure**
- **Global urbanization**
- **Increasing energy costs**
- **Increased need for sustainable solutions**

A new level of technology with unlimited possibilities

The first wastewater pumping system with integrated intelligence

Concertor™ capabilities:

- **Sensing operational conditions of its environment**
- **Adapting its performance in real time**
- **Providing feedback to pumping station operators**

Customer Challenges



**REDUCE
ENERGY
CONSUMPTION**



**IMPROVE
CLOG
RESISTANCE**



**REDUCE
UNPLANNED
MAINTENANCE**



**REMOTE
SUPERVISION &
COMMUNICATION**

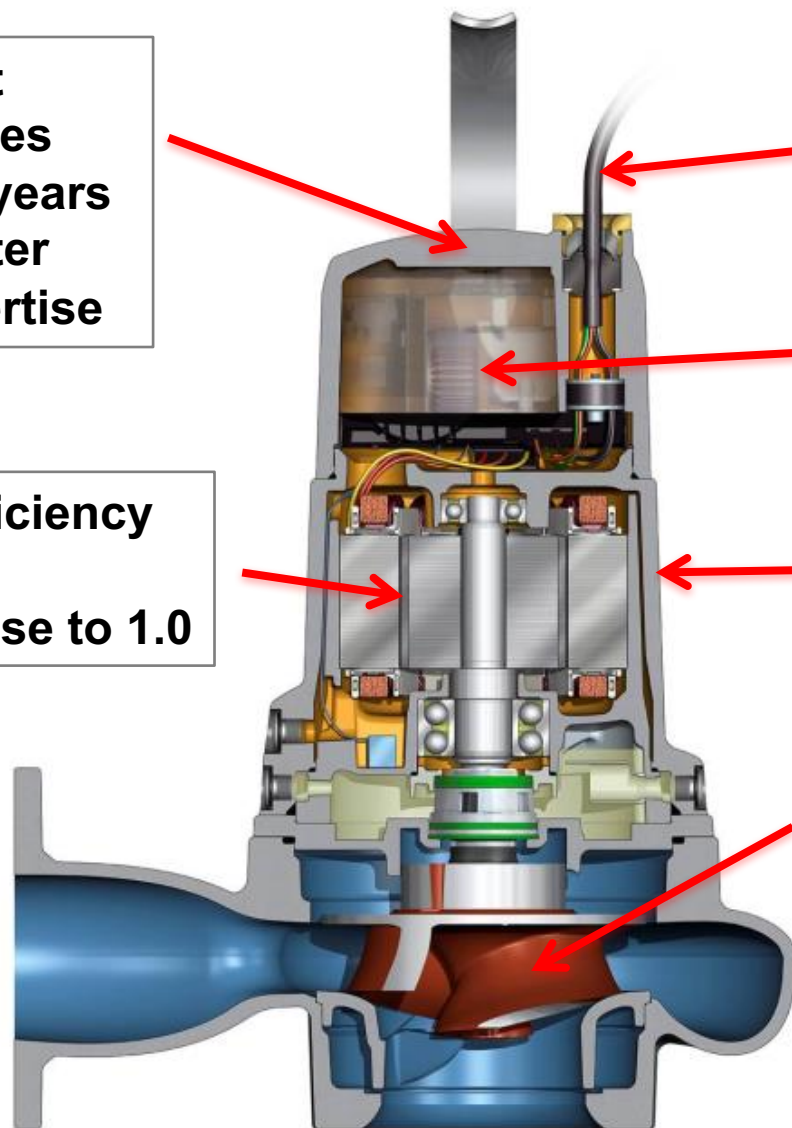


**ASSET
MANAGEMENT**



**LOWER
INVESTMENT
COSTS**

State-of-the-art Technology



Intelligent functionalities based on 100 years of wastewater pumping expertise

>IE4 Motor Efficiency
Power factor close to 1.0

Remote control capability

Integrated control system

Reduced from 100s of variants to less than 12

State-of-the-art N-hydraulic efficiency and reliability

Examples of Built-in Intelligence

Some major functions:

Self-adaptive energy minimizer function

Automatic adaption to different duty points

Built-in self-monitoring functionality

Constant power functionality

Pre-engineered with simple set-up wizard

Built-in sump and pipe cleaning function

Self-adjusting pump cleaning function

Performance - fine-tuned on-site or remotely



Gateway



Pump

Concertor 6000 Series

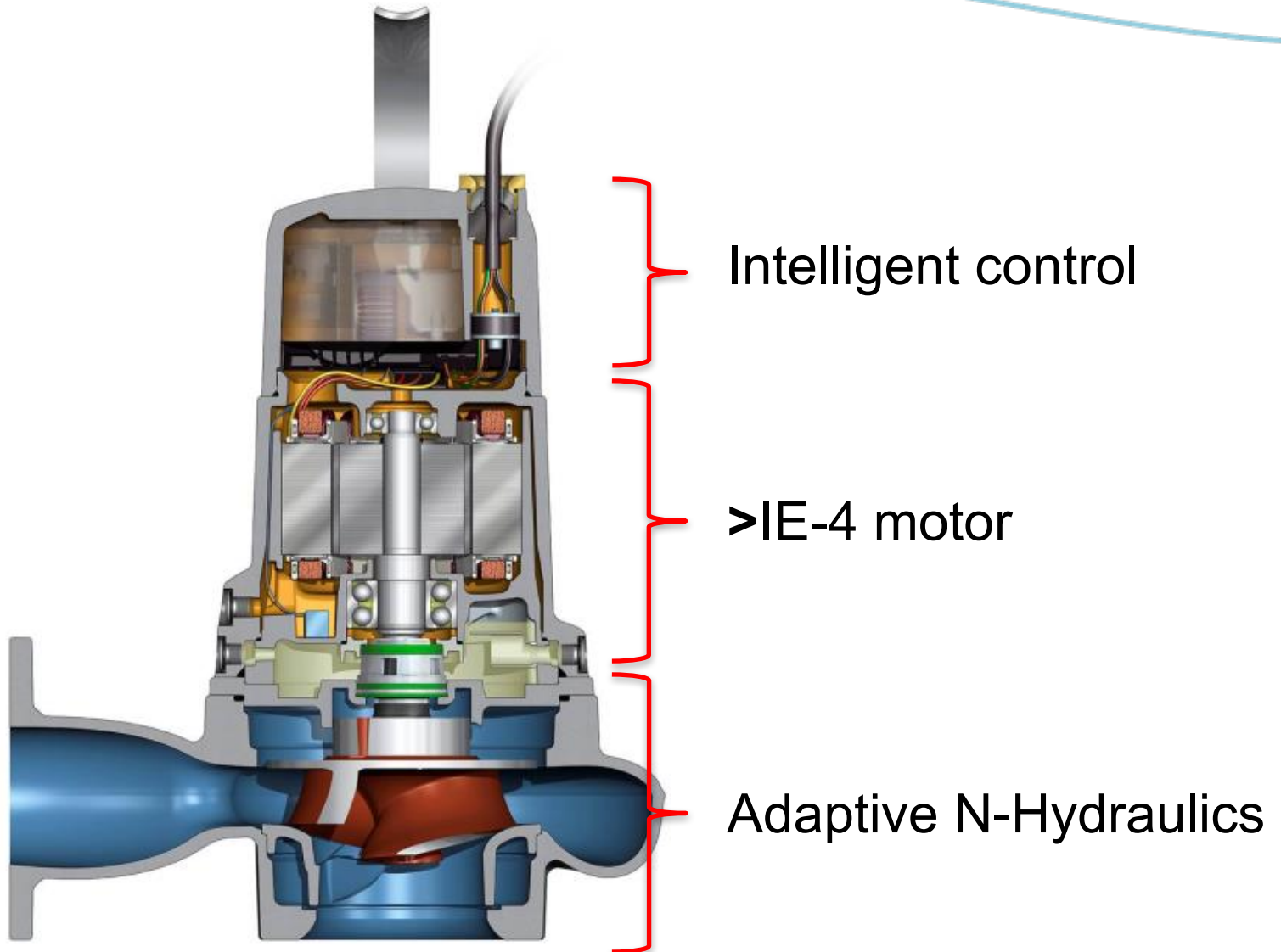
The Innovative Technology Continues...

- **6000 Series Concertor**
 - 3.0-hp / 5.0-hp / 7.5-hp / 10.0-hp ratings
- **A New Brand Category...**
 - Intelligent wastewater pumping category
 - Delivers optimal pumping performance
 - Reduces total cost of ownership
- **Three Main Components:**
 - 1. Integrated motor control
 - 2. >IE-4 electric motor
 - 3. N-Hydraulics with Adaptive operation



Concertor™ 6000 Series

3-main components



Motor Efficiency Comparison

Motor Efficiency Comparison Chart				
4-pole Motor Power	IE-2	IE-3	IE-4	>IE-4
	Standard	Premium	Super Premium	Concertor
3-hp	81.0%	86.4%	89.0%	>91.0%
5-hp	82.6%	87.4%	90.2%	>92.0%
7.5-hp	85.7%	89.2%	92.5%	>94.0%
10-hp	87.0%	90.1%	93.0%	>94.5%

Motor efficiency beyond super premium

Key Customer Values

Gateway



Efficient Asset Management

- *Inventory is reduced by up to 80%*

Trouble-free Pumping

- *Clog free operation and reduced vector call outs by up to 80%*

Pump



Energy Savings

- *Up to 70% energy savings compared to conventional pumps and controls*

Reduced Investment

- *Up to 50% smaller cabinets compared to direct online cabinets*

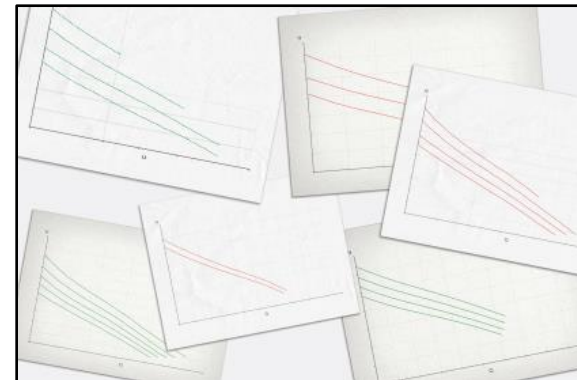
From complex selection... to one flexible solution

INVENTORY CAN BE REDUCED BY UP TO

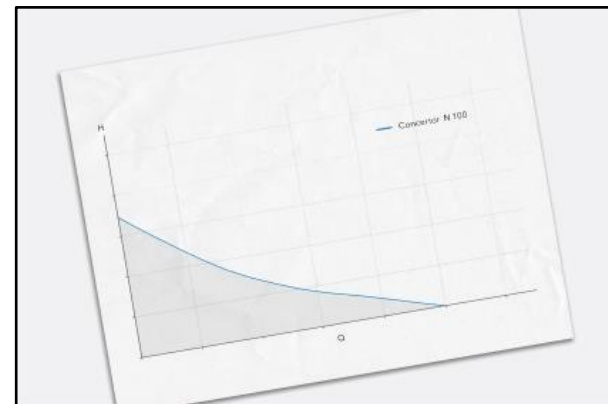
80%

DUE TO CONCERTOR'S FLEXIBLE PERFORMANCE

THAT WAS THEN...



... THIS IS NOW



EFFICIENT ASSET MANAGEMENT

- Easier product selection
- Adjustable performance curves
- Fine tune remotely or on site
- Reduced backup inventory
- Easier spare part handling
- Reduced delivery lead times

N-6020.180 / .090



150mm/6"

Concertor N 150

High Volume



100mm/4"

Concertor N 100

Standard



80mm/3"

Concertor N 080

High Head

Rated power:

2.2 kW / 3.0 hp

3.7 kW / 5.0 hp

5.5 kW / 7.5 hp

7.3 kW / 10.0 hp

Input Frequency:

50 – 60Hz

Input Voltage:

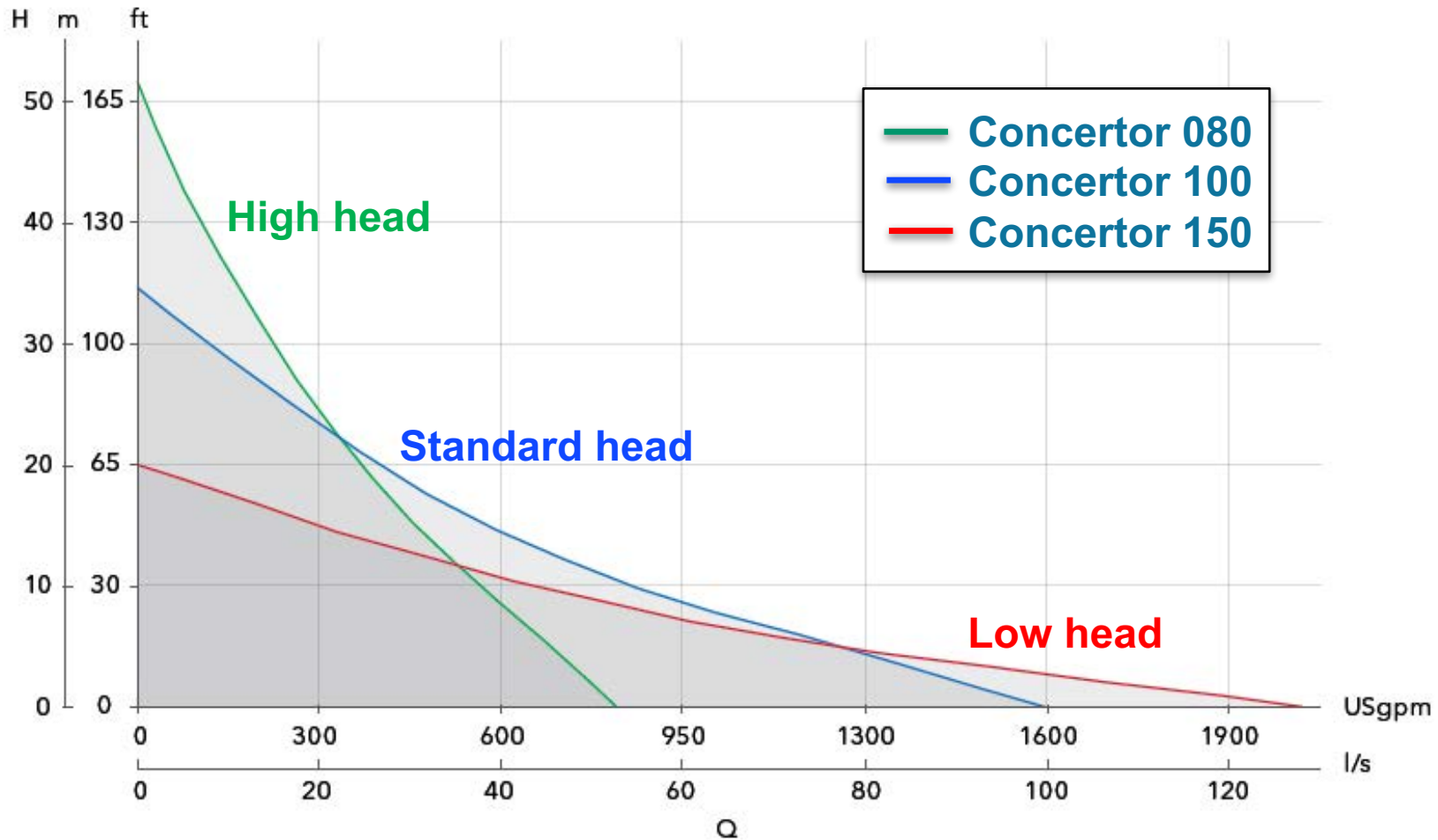
200-480 V

Phase:

3

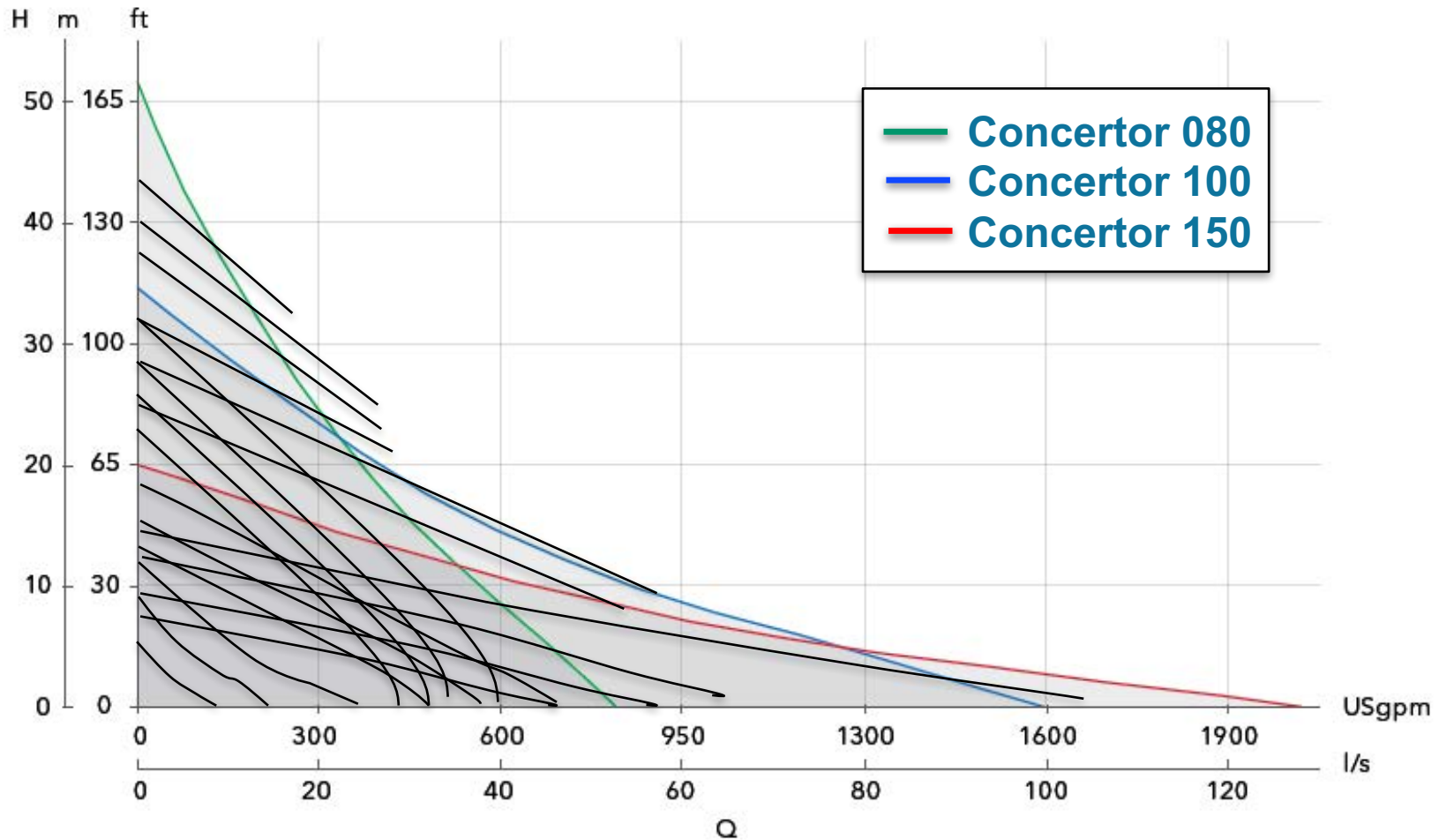
One (1) full-size impeller and three (3) volutes

Performance Range: 60 Hz



Performance Range: 60 Hz

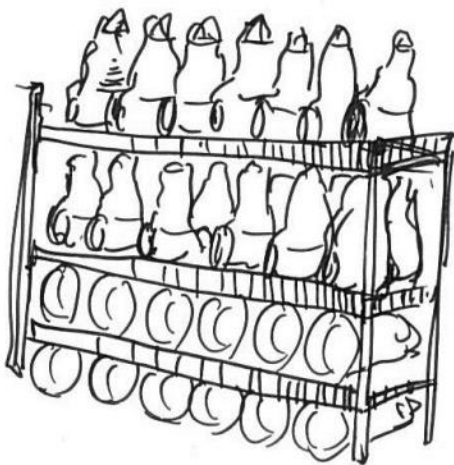
Comparison to impeller diameters



Efficient asset management

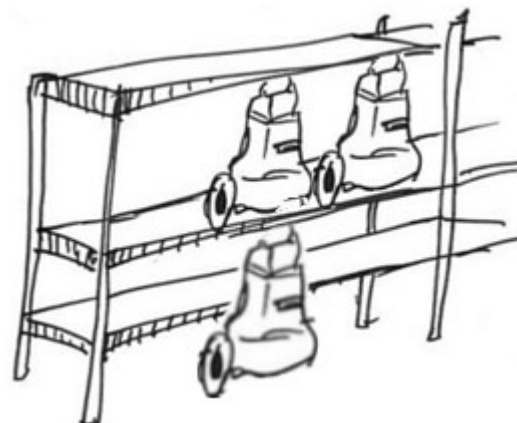
THAT WAS THEN...

Multiple versions of installed pumps and difficulty to select the right pump



... THIS IS NOW

Three solutions fit all demands from 3.0-hp to 10-hp



Simplified product selection & adjustable performance
Reduced need for backup inventory

Inventory can be reduced by up to 80%

From dirty troublemaker... to clean wet wells at all times

CLOG-FREE PUMPING OPERATION AND CLEAN
WET WELLS SAVE UP TO

80%

ON VACUUM CLEANING COSTS

TROUBLE FREE PUMPING

- Built-in sump and pipe cleaning
- Integrated pump cleaning function
- Self-cleaning hydraulics
- Self-monitoring functionality
- Self-tuning to preserve key components
- Electronics placed in stable submerged environment

THAT WAS THEN...



... THIS IS NOW



Trouble-free pumping

THAT WAS THEN...

Dirty sumps and unnecessary call-outs



... THIS IS NOW

Reduced unplanned maintenance, due to non-clogging, clean sump and pipes



**Clean wet wells & clog-free operation
Extended lifetime and increased reliability**

**Clog free operation and reduced vacuum cleaning call outs
by up to 80%**

From thirsty consumer... to smart energy saver

ENERGY SAVINGS OF UP TO

70%

COMPARED TO **CONVENTIONAL PUMPING SYSTEMS**

ENERGY SAVINGS

- Automatic self-optimizing
- Energy Minimizer
- State-of-the-art components
- Super Premium Efficiency, >IE4 motor
- Adaptive N-hydraulics
- Climate control savings

THAT WAS THEN...



... THIS IS NOW



Reduced energy consumption

THAT WAS THEN...

High energy consumption.



... THIS IS NOW

Drastically reduced energy consumption.



Automatic self-optimization
Total efficiency improvements

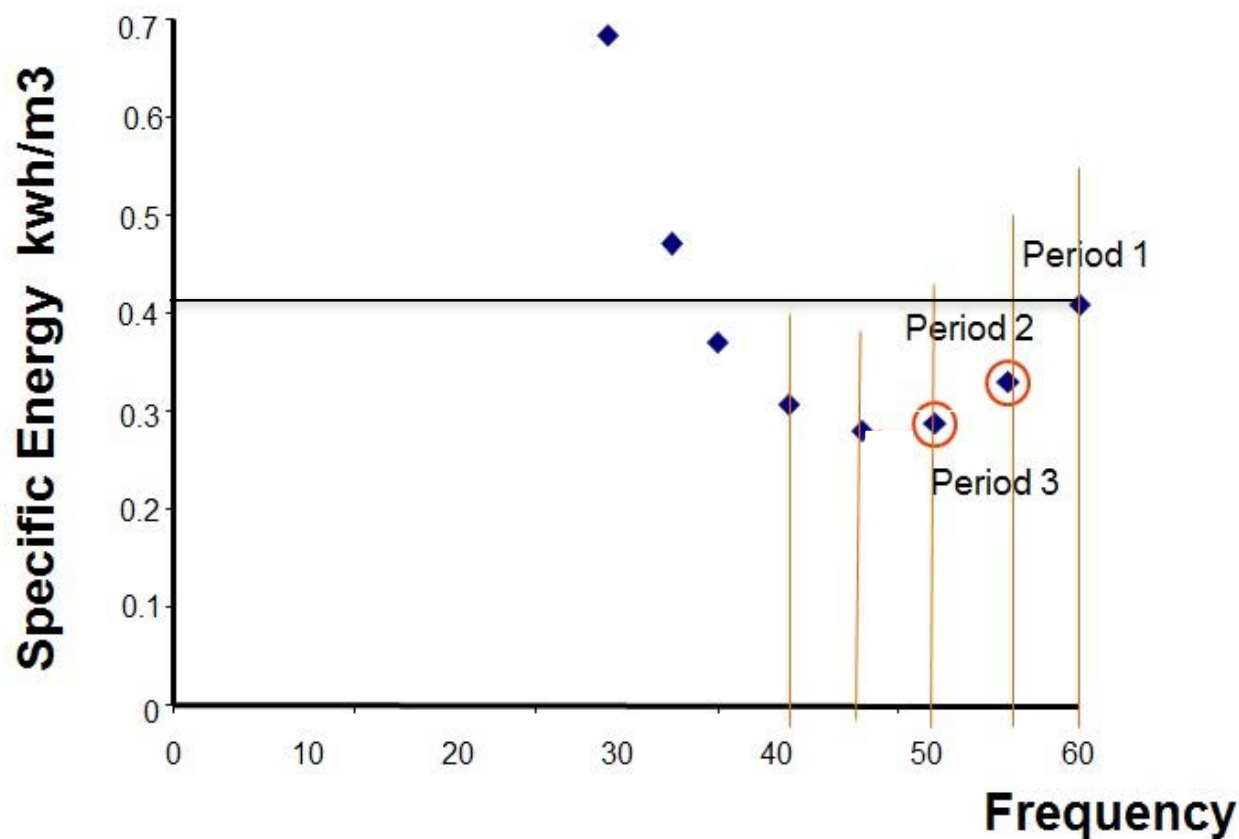
Up to 70% energy savings

Concertor™ Functionality

FUNCTION	RESULT
Energy minimizer	Cost savings with reduced energy consumption.
Pump cleaning	Cost savings due to resolved clogging if it occurs.
Sump cleaning	Cleaner sump with less odor, reduced labor and maintenance costs. No need to pump down and manually clean sump
Pipe cleaning	Periodic full-speed operation reduces sedimentation in the force main leading to extended service requirements and reduced maintenance costs.
Pump and drive protection	Sets alarm output when temperature is too high or if pump leakage occurs
Soft start and stop	Smoother and gentler running of the pump

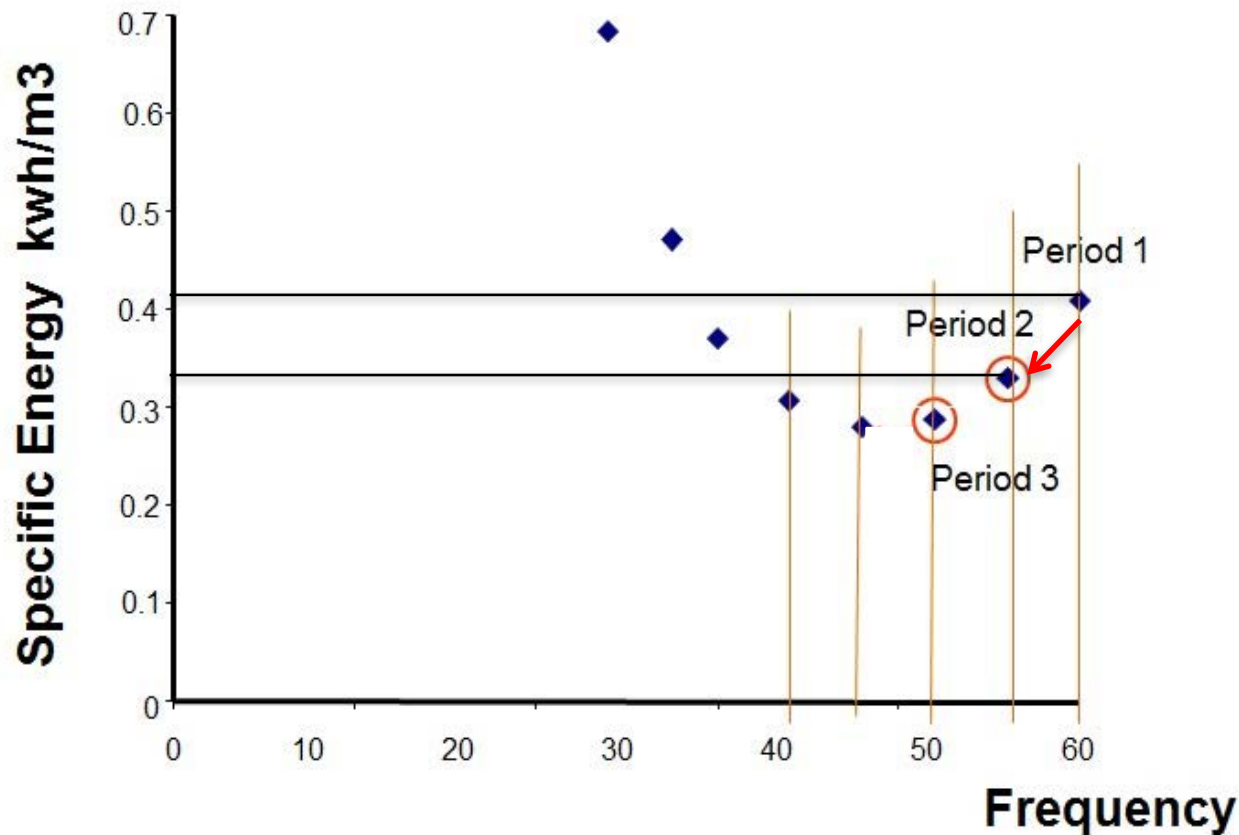
Energy Minimizer Function (1)

Energy Minimizer



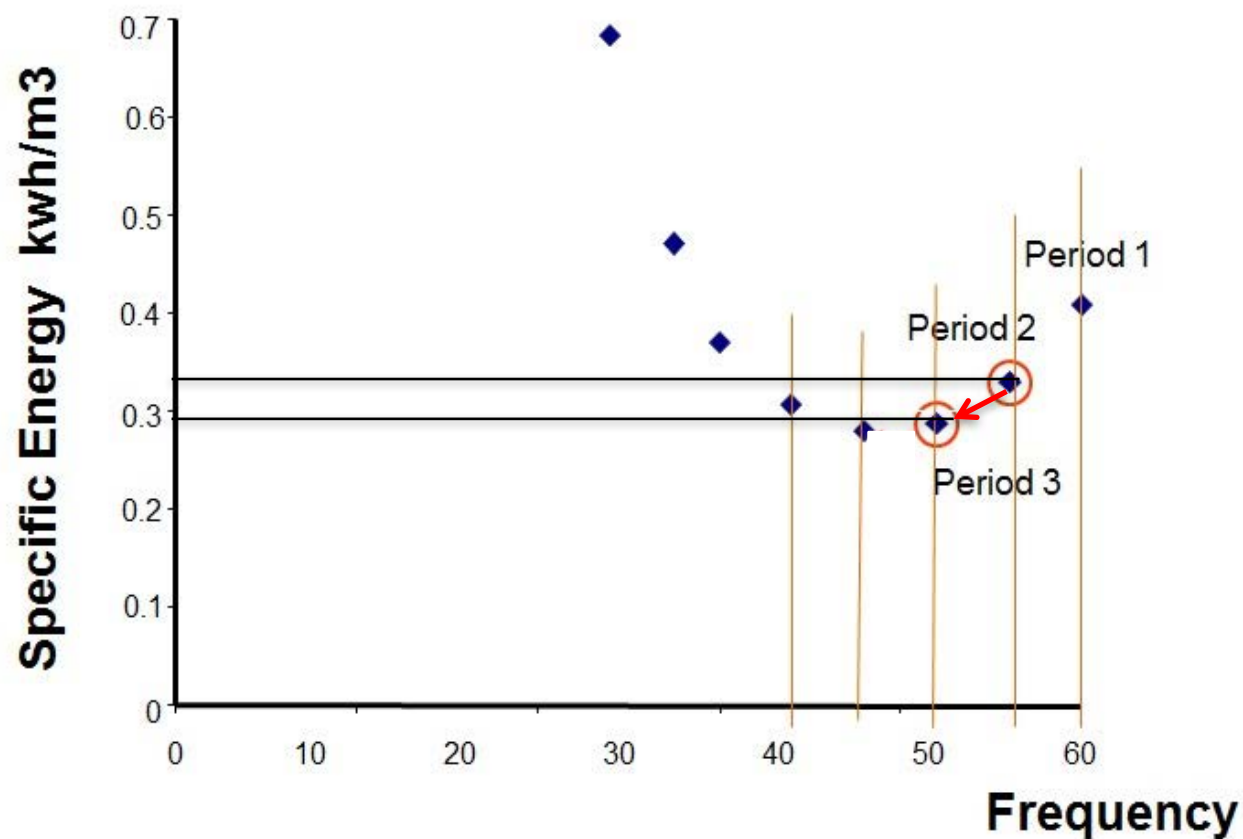
Energy Minimizer Function (2)

Energy Minimizer



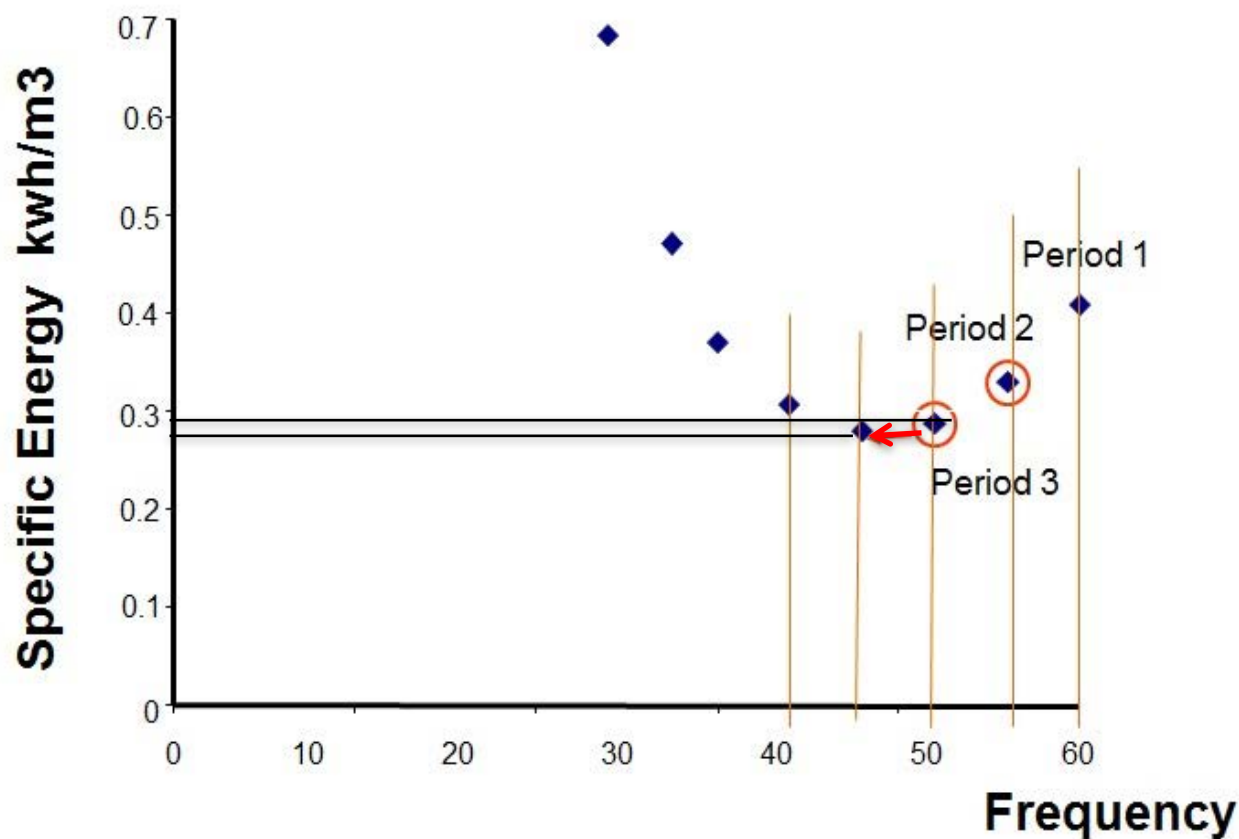
Energy Minimizer Function (3)

Energy Minimizer



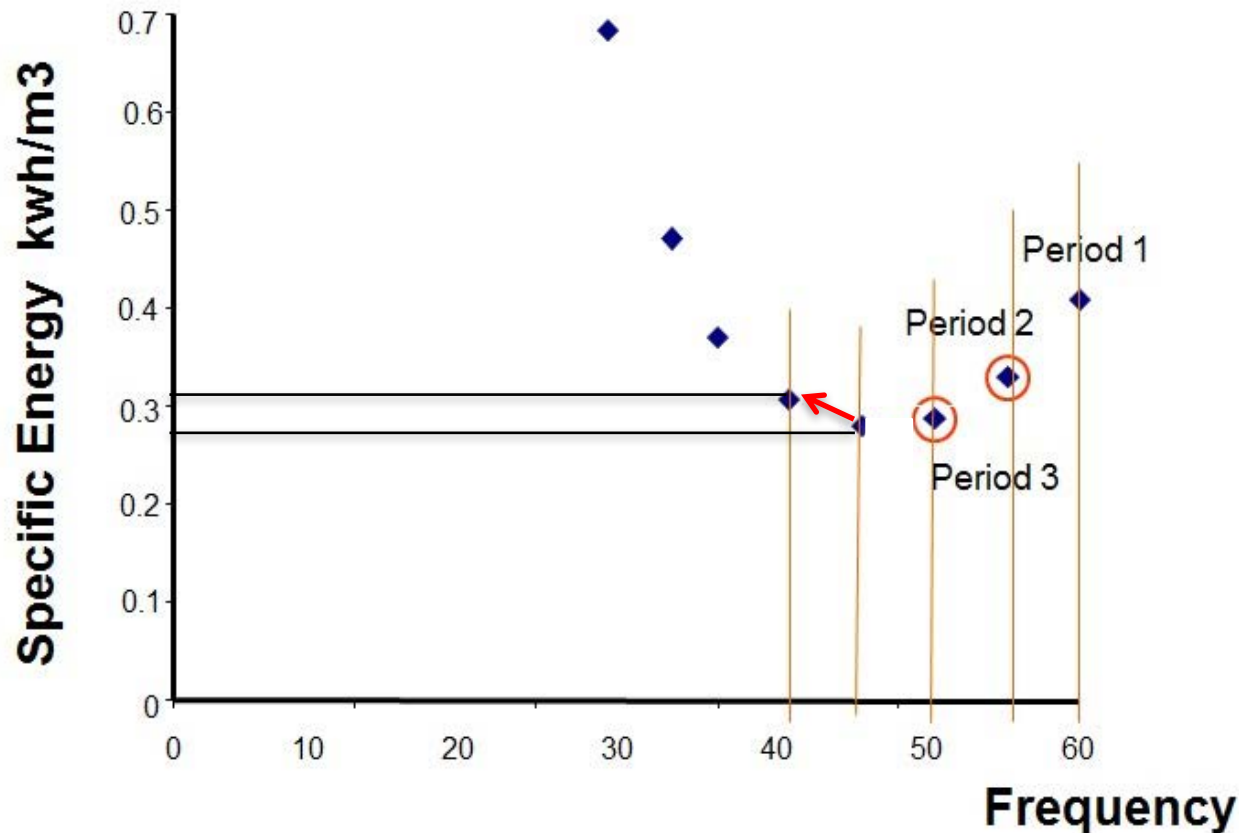
Energy Minimizer Function (4)

Energy Minimizer



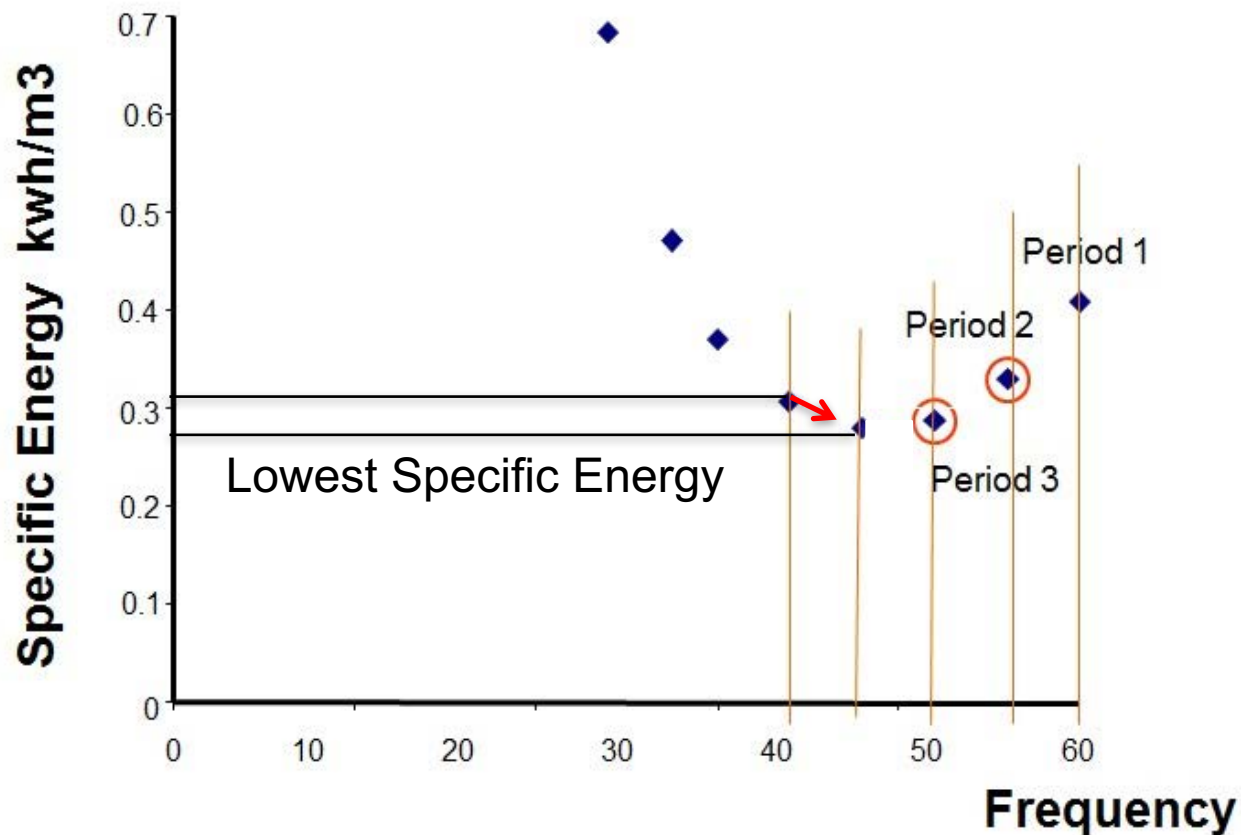
Energy Minimizer Function (5)

Energy Minimizer



Energy Minimizer Function (6)

Energy Minimizer

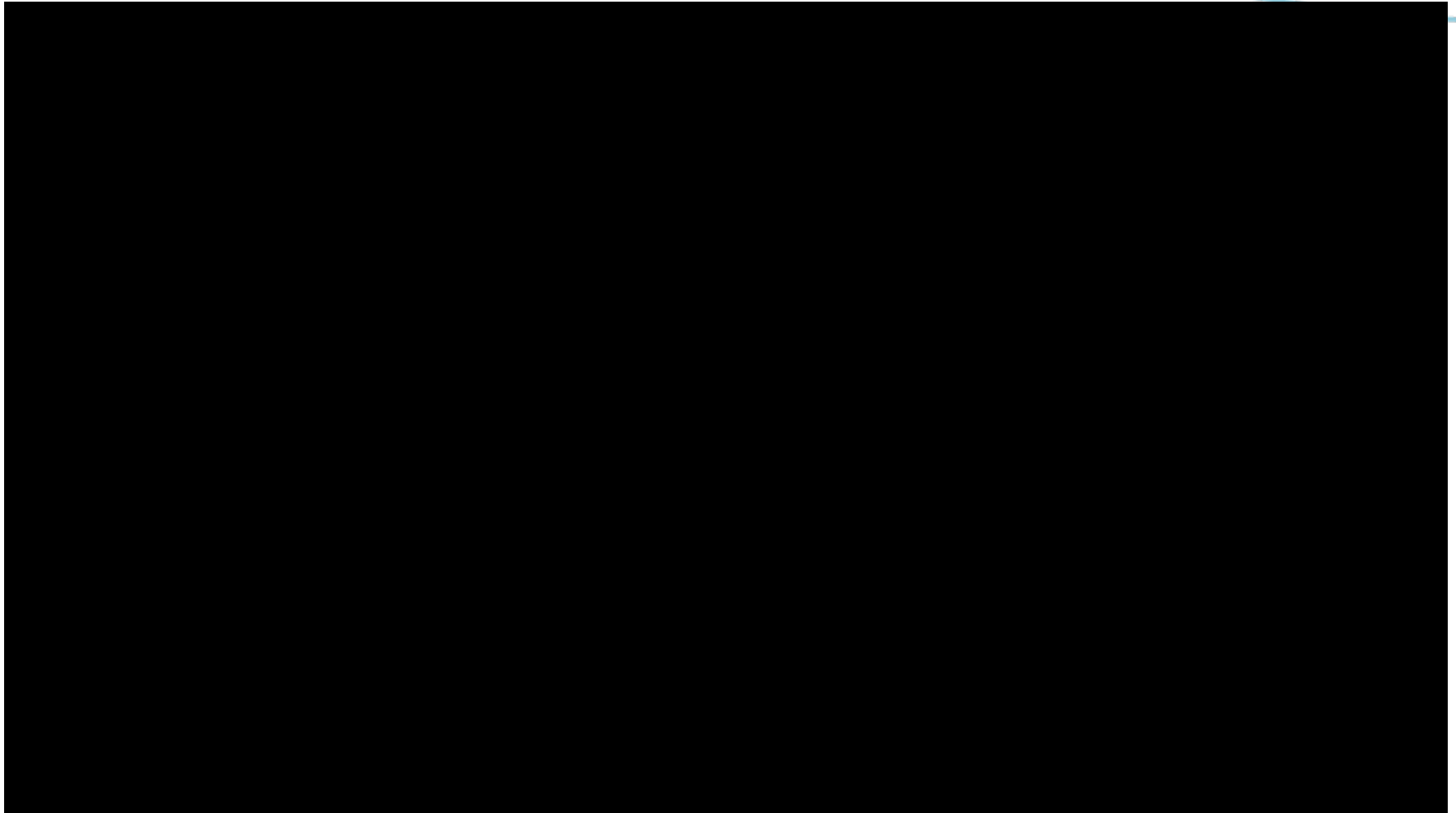


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Pump and drive protection	Sets alarm output if temperature is too high or if pump leakage occurs
Soft start and stop	Smoother running of the pump, lower inrush current minimizes stress on stator, shaft and bearings and minimizes water hammer

Adaptive N-Hydraulics

High-speed film: 3-in pump / 2.2-hp



Concertor™ Functionality

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From bulky equipment... to small, smart and safer controls

CONCERTOR CAN REDUCE THE SIZE OF CABINETS UP TO

50%

COMPARED TO CONVENTIONAL CABINETS

REDUCED TOTAL INVESTMENT

- Pre-engineered as total solution
- Factory configured and tested
- Smaller and simplified cabinet design
- User-friendly installation wizard
- Built-in supervision and monitoring functions
- No need for climate control equipment
- No high current switching, less heat, safer panels, less breakdowns, zero electrical maintenance

THAT WAS THEN...



... THIS IS NOW



Reduced investment costs

THAT WAS THEN...

Big cabinets and complex control solutions.



...THIS IS NOW

Significantly smaller footprint with easier installation and more functionality.



**Smaller, straightforward , safer cabinets
Simple setup for an advanced system**

Up to 50% smaller cabinets compared to traditional direct on line

What is in a typical P.S. electrical cabinet?

- Controller
- HMI
- Switch disconnectors
- Contactors
- Circuit breakers
- Motor protection
- Current transformers
- Power measuring
- VFDs or starters
- A/C
- Fans and filters
- Level signals
- Back-up relay
- Modem
- 12V Battery backup

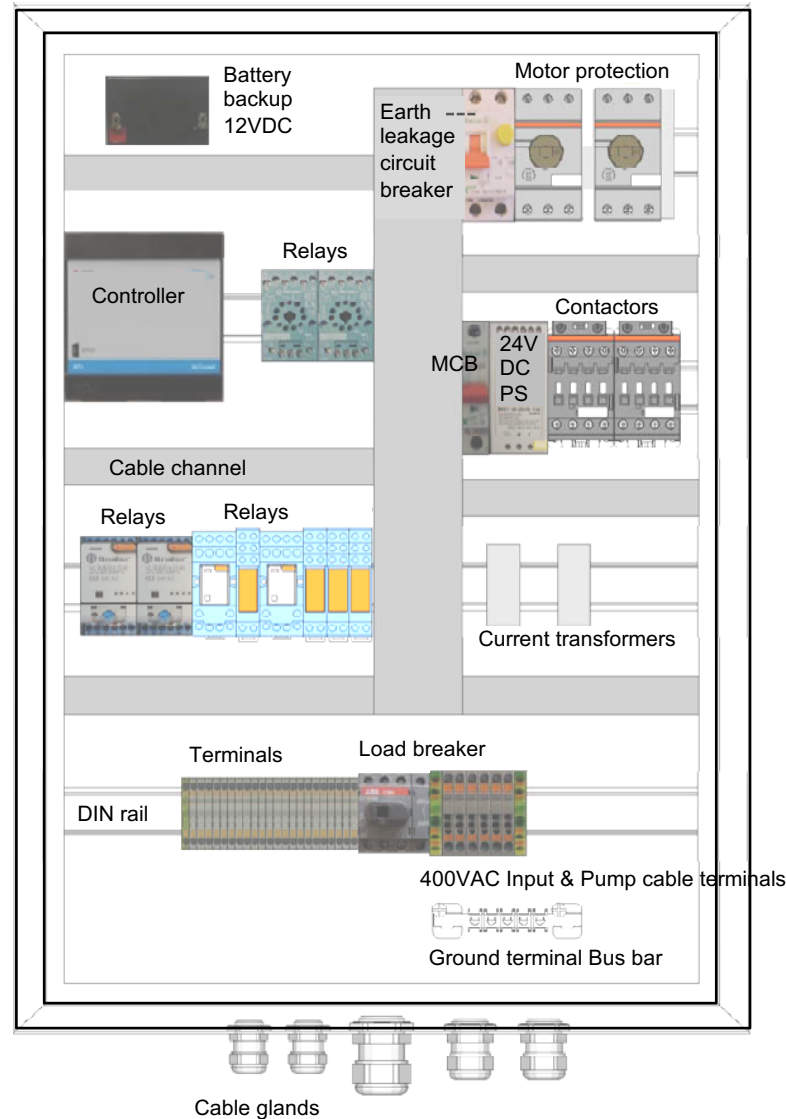


Typical P.S. panel

2 x 10-hp pumps

DOL starting

**Note: Add ventillation
for southern
installations**



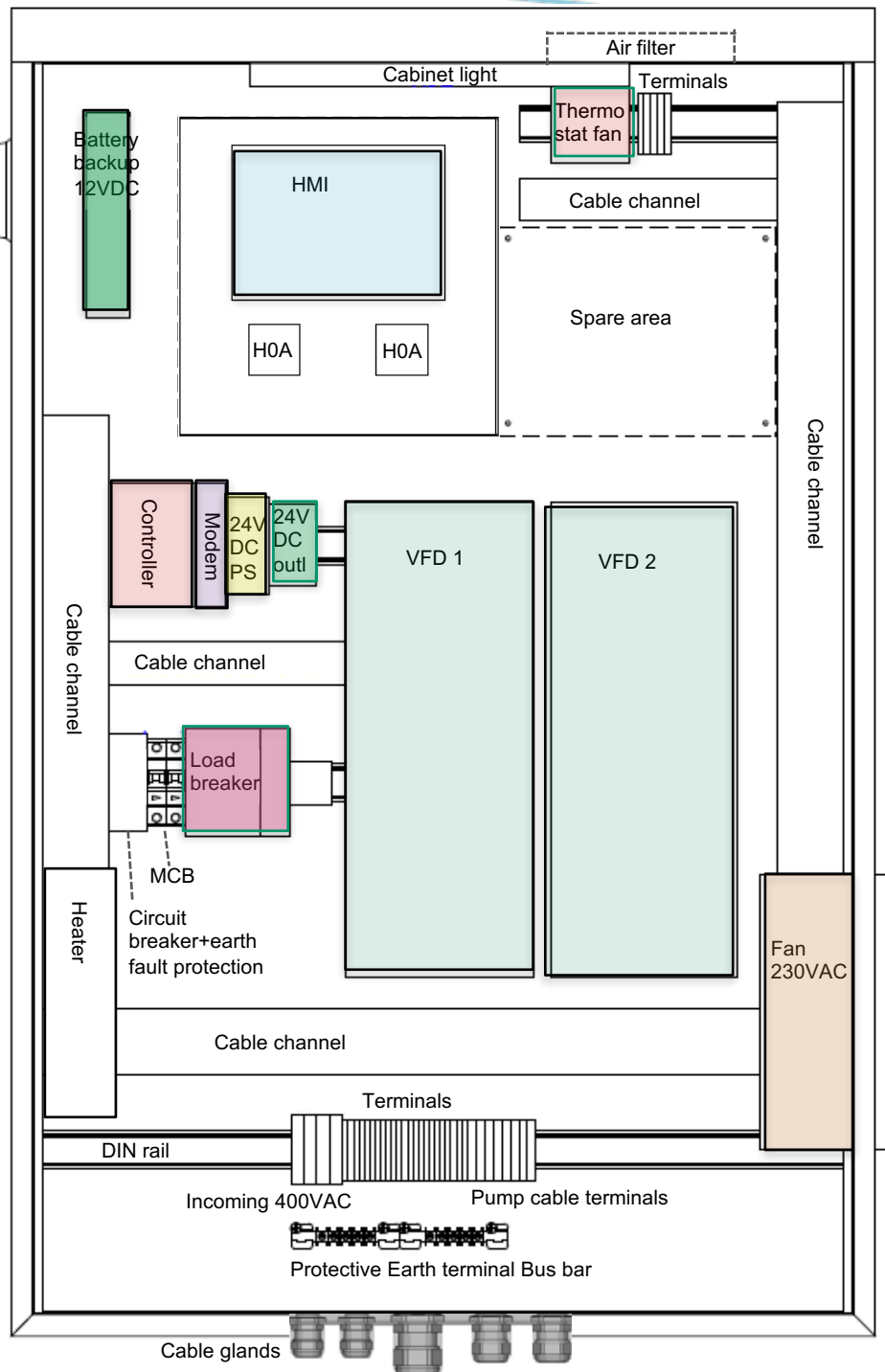
Typical panel

2 x 15-hp pumps

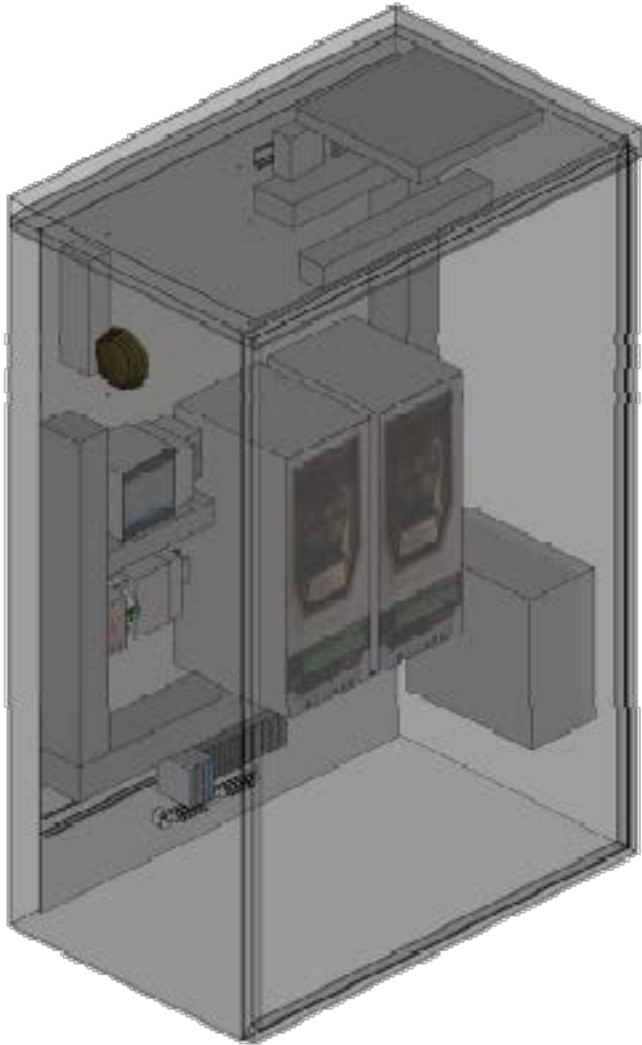
VFD control

Note: Add A/C for
southern
installations

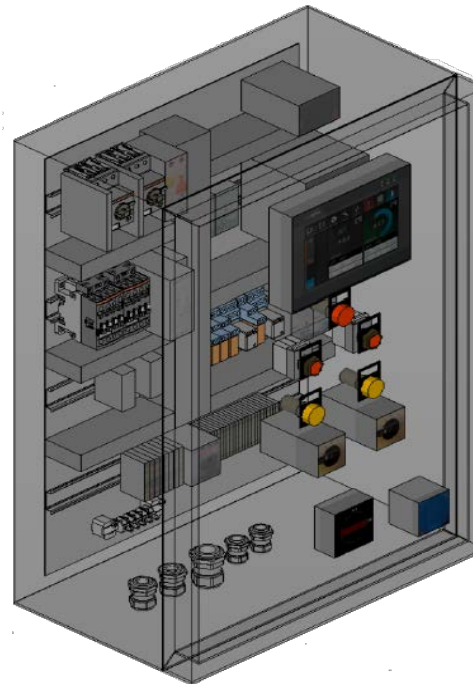
GSM
antenna



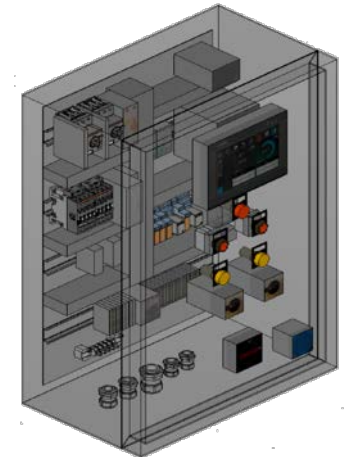
Typical electrical panel size comparison



2-pump VFD



2-pump DOL



2-pump Concertor™

Communication Language Protocol

Modbus TCP



Modbus RTU



AquaCom



DNP-3



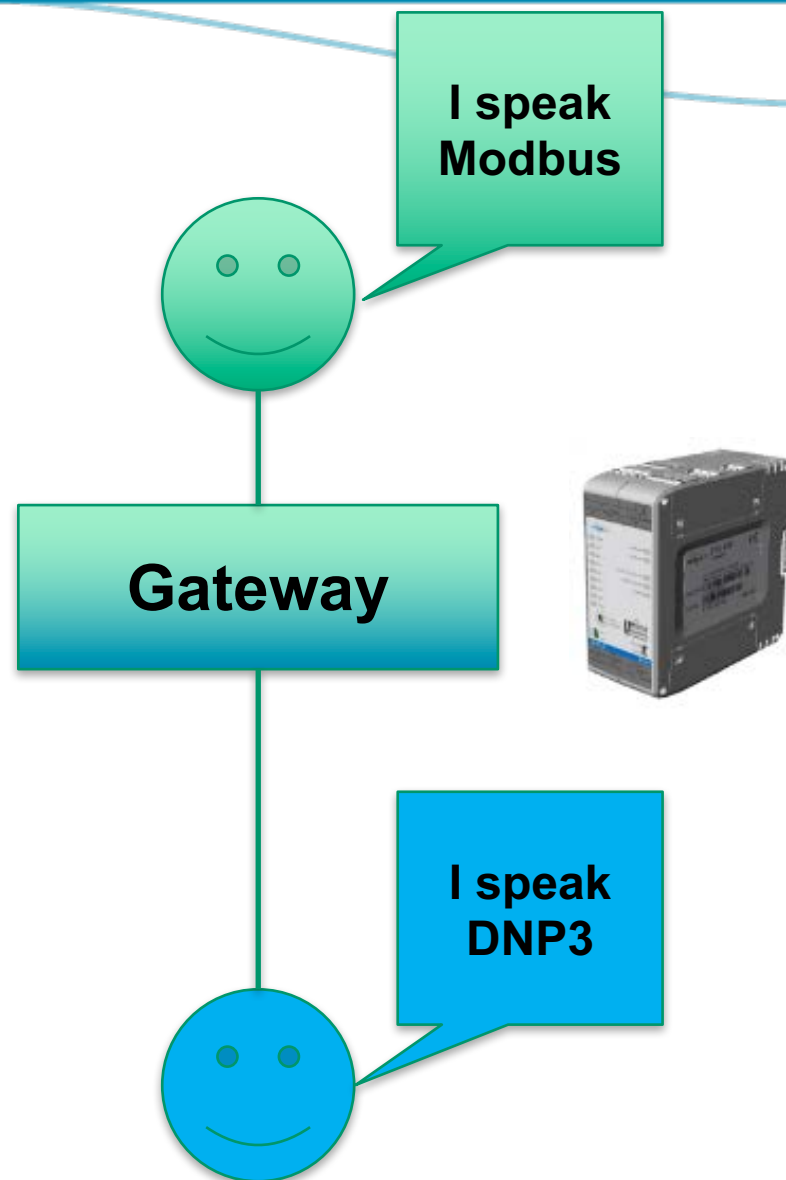
Gateway

Gateway device

When two units do not talk the same language / protocol, a gateway is used.

The gateway works as a translator, converting information from one protocol into another.

Its normally a small device but, it's the software inside that makes the translation.



One Scalable System

	Concertor™ XPC	Concertor™ DP	Concertor™ EA	Concertor™ N
Easy product selection	* * *	* * *	* * *	* * *
Reduced inventory	* * *	* * *	* * *	* * *
Flexible on-site operation	* * *	* * *	* * *	* *
Small-size cabinets	* * *	* * *	* *	*
Clog-free pumping	* * *	* * *	* * *	* * *
Energy savings	* * *	* *	*	*
Increased reliability, extended lifetime	* * *	* *	* *	* *
Compact installation with fewer components	* * *	* *	*	*
Free-up engineering and installation time	* * *	* *	*	*
Clean wet-wells	* * *			

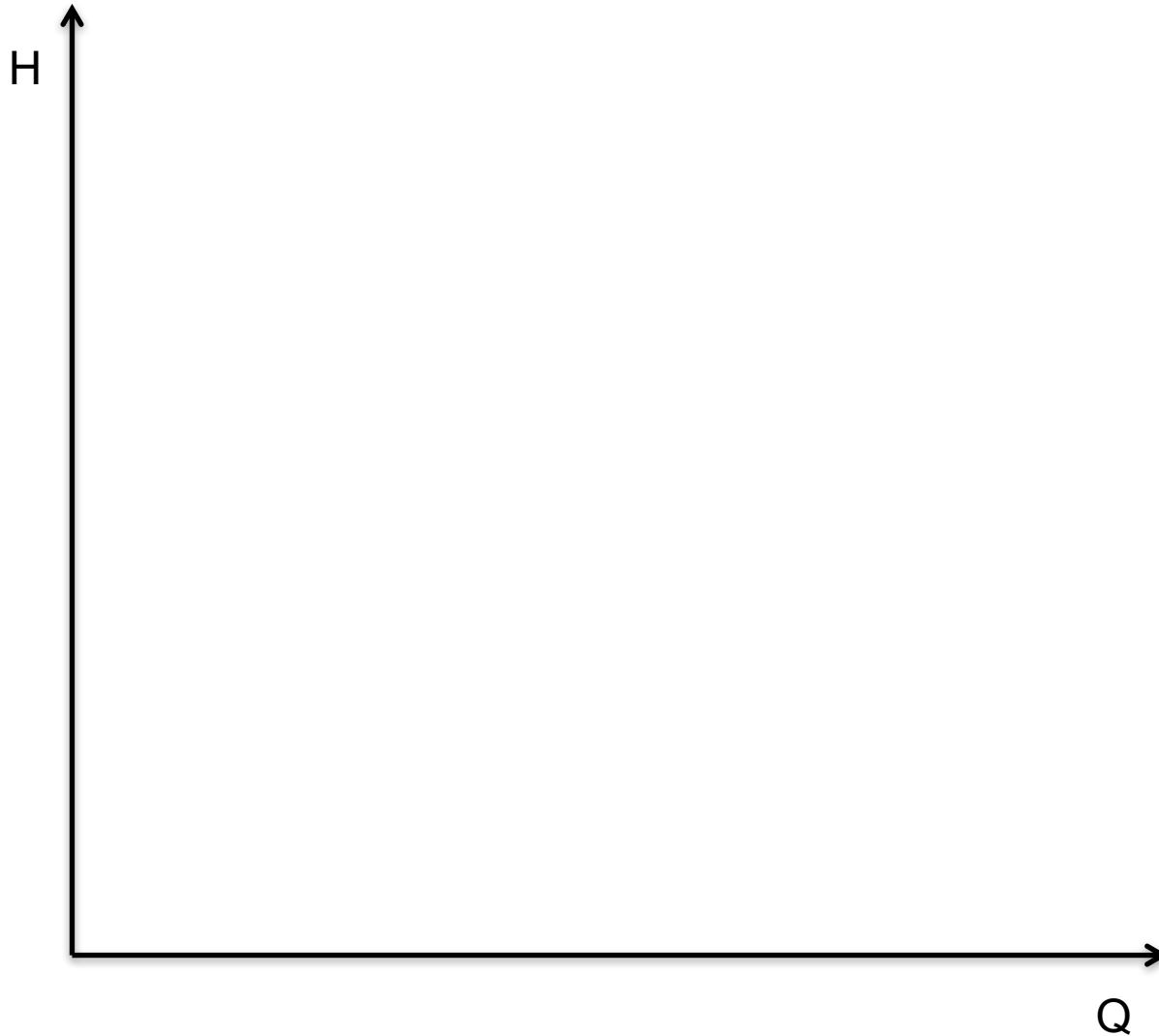
Concertor™ benefits compared to single vane impeller pump systems

* Better

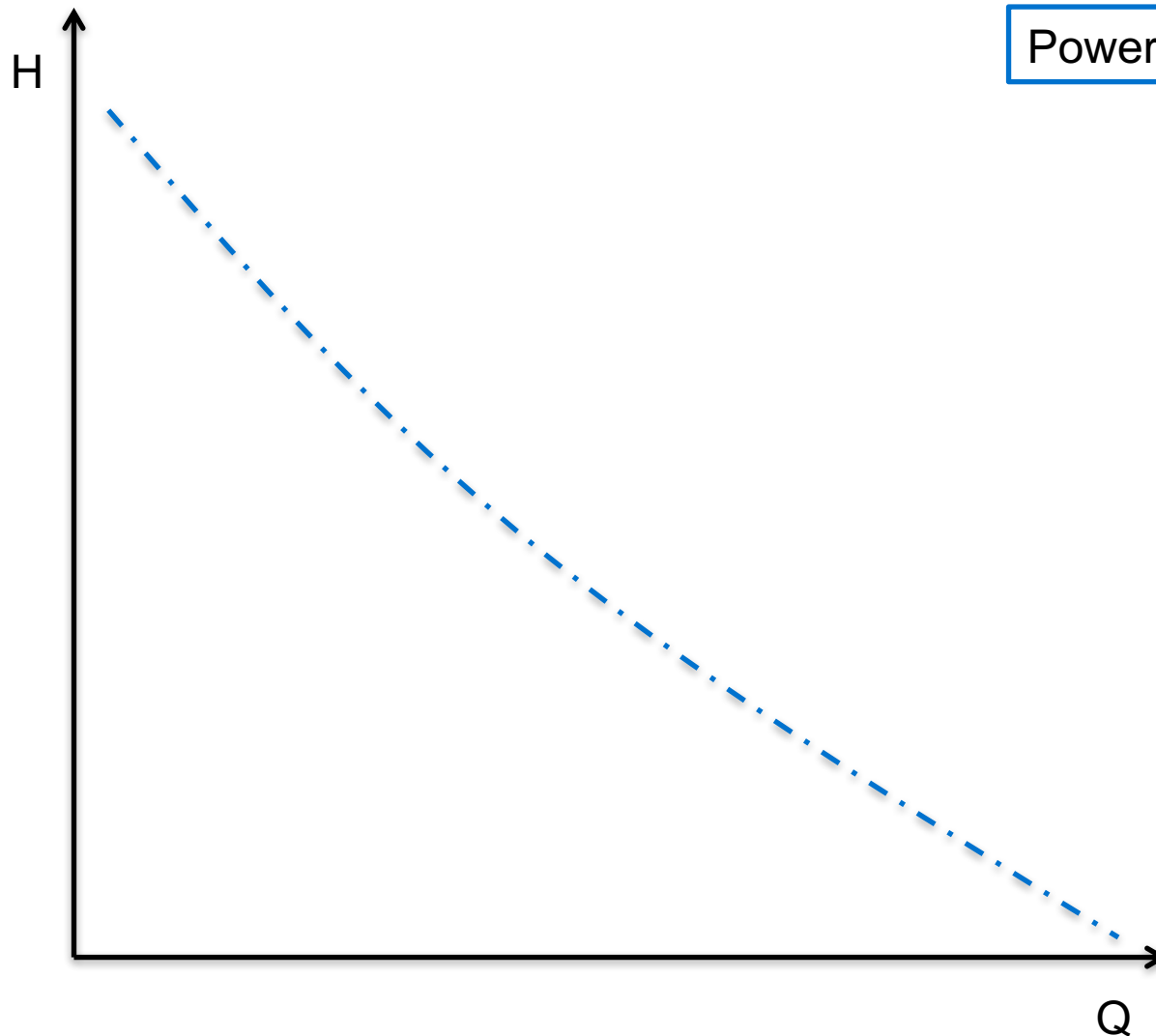
** Significantly better

*** Best possible

Intelligent pump curves

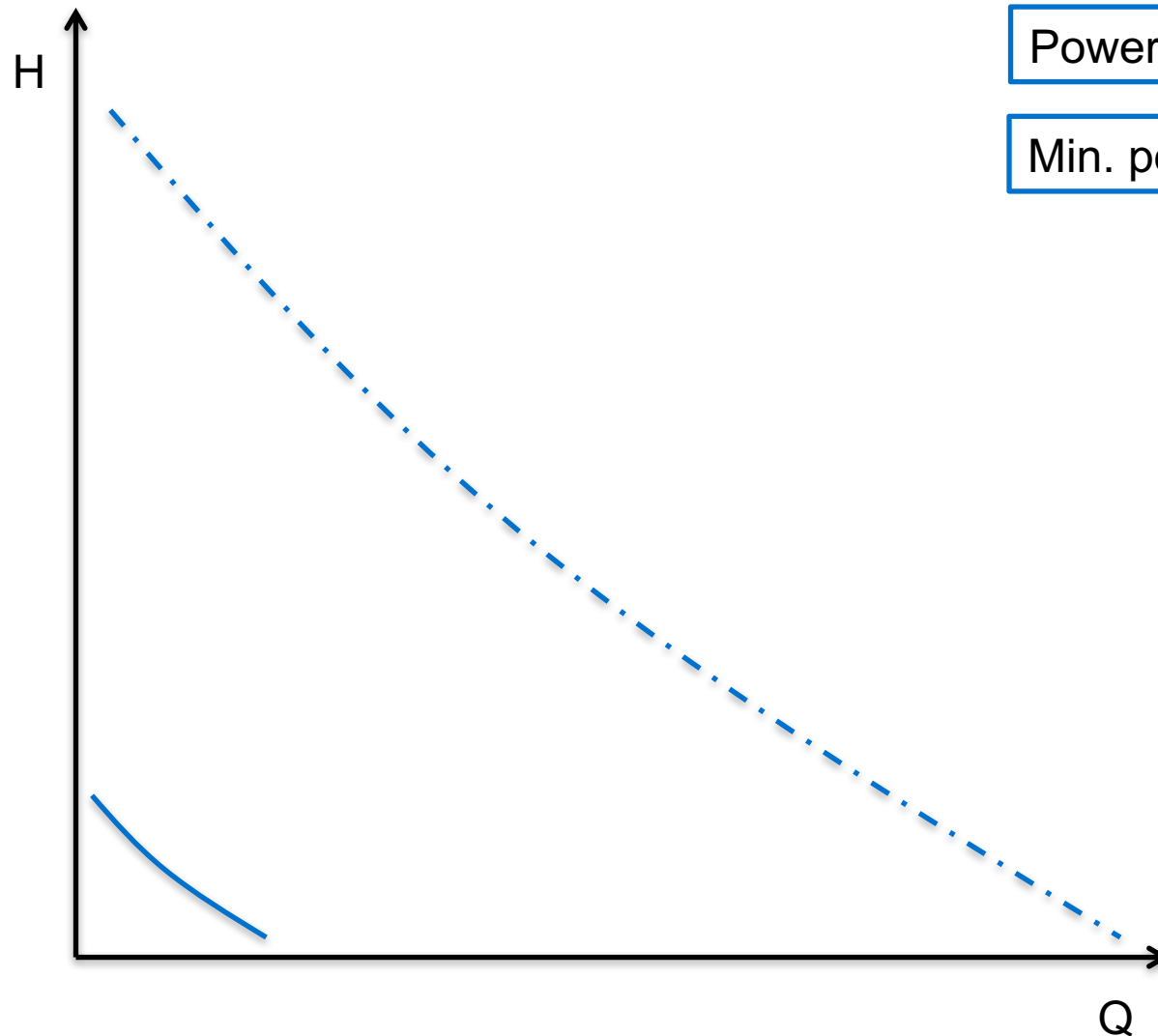


Pump curve at rated power

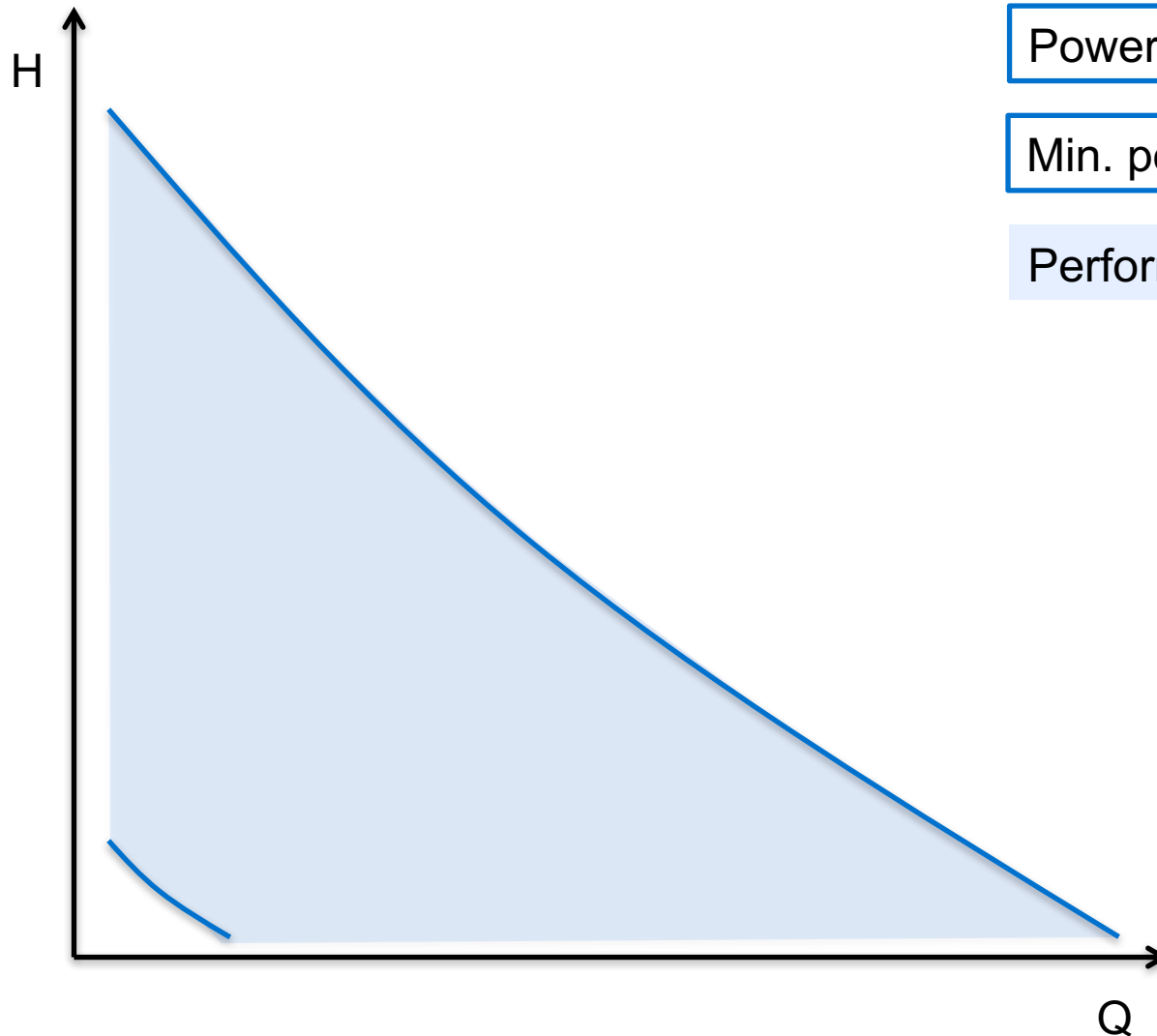


Power limit (10-hp)

Pump curve at minimum power



Performance field

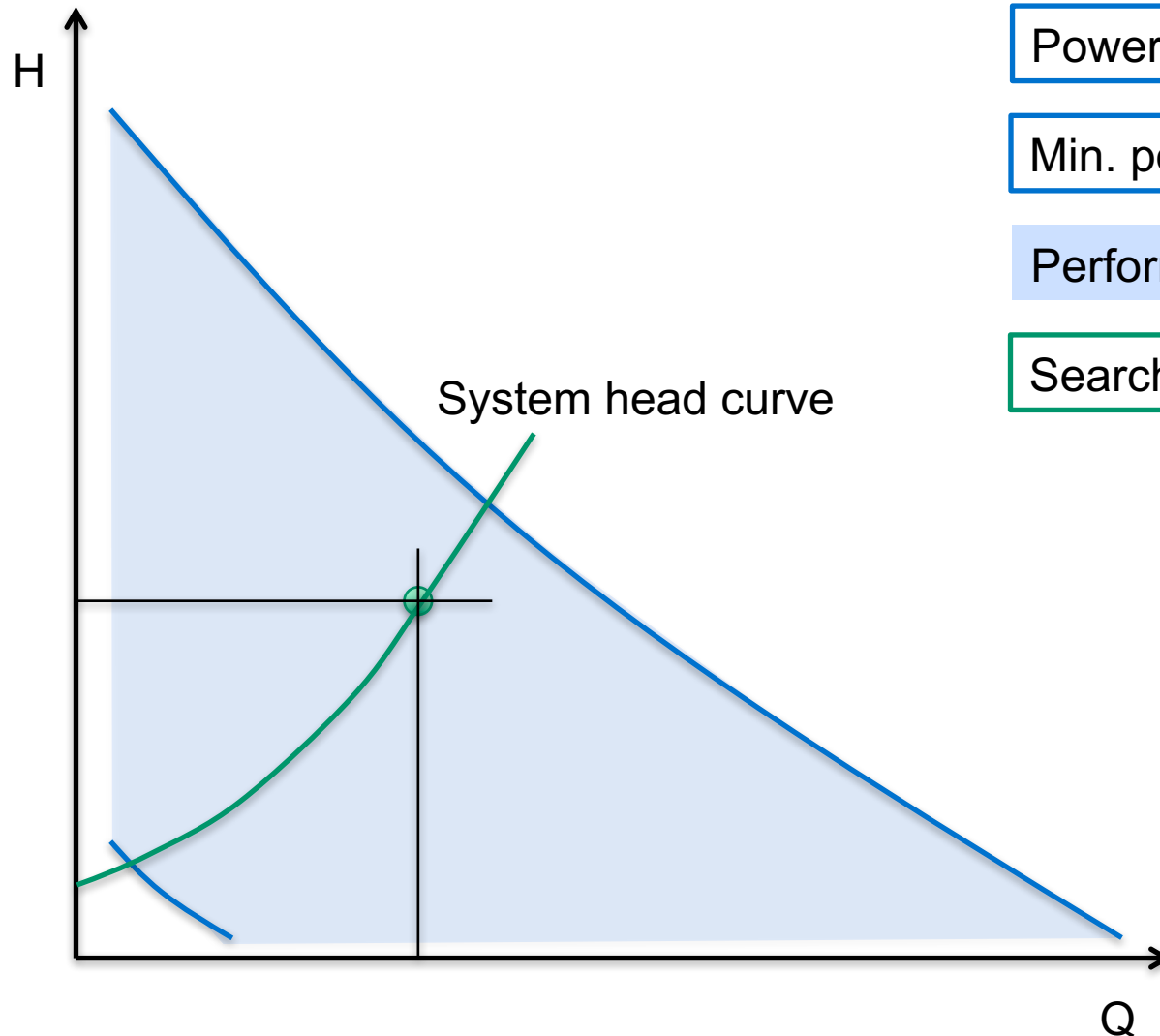


Power limit (10-hp)

Min. power (3-hp)

Performance field

Searched duty point



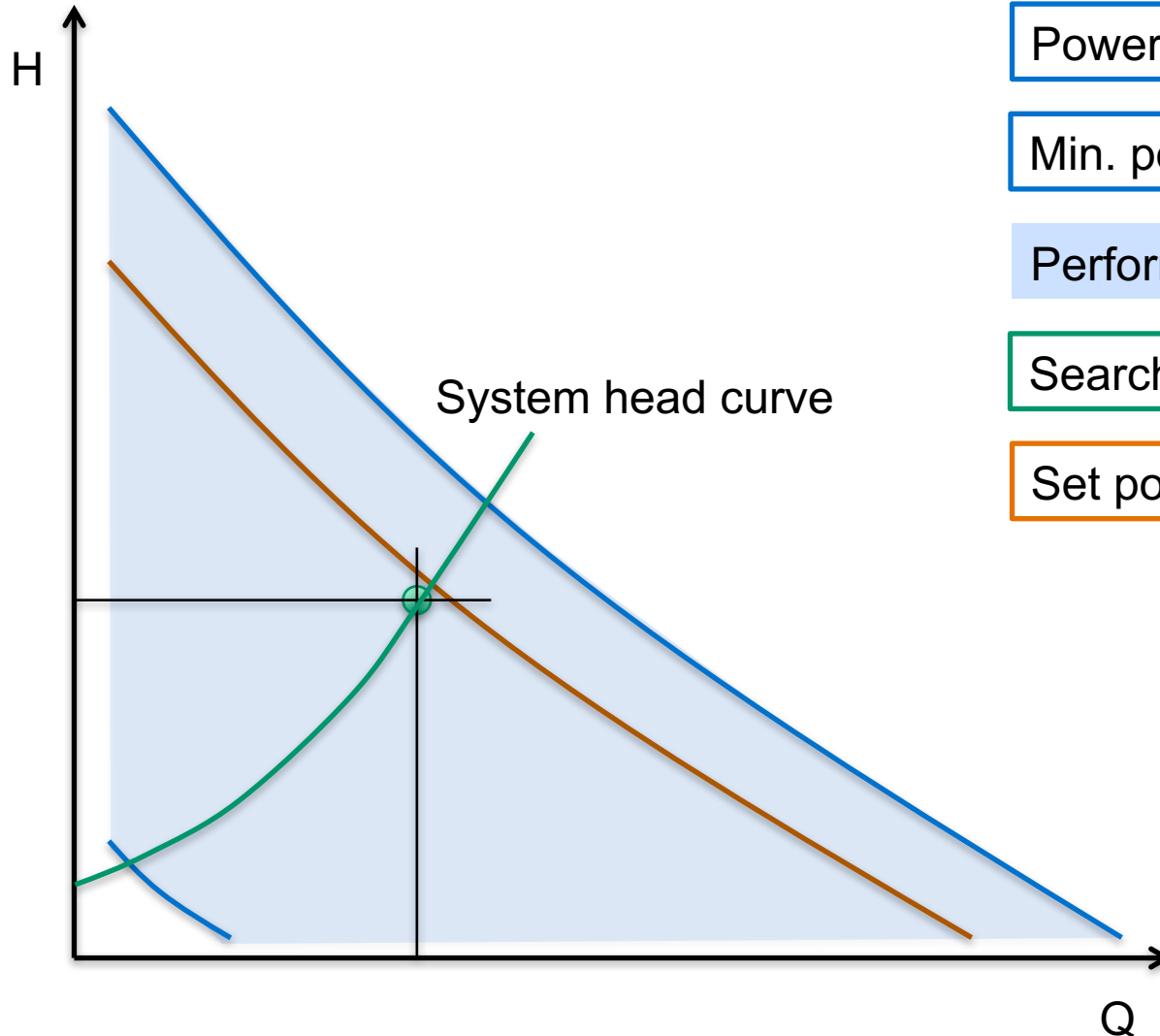
Power limit (10-hp)

Min. power (3-hp)

Performance field

Searched duty point

Pump curve at set power



Power limit (10-hp)

Min. power (3-hp)

Performance field

Searched duty point

Set power level (7.5-hp)

Field Proven Test installations around the world



- Wisconsin
- Washington
- Trino, Italy
- Fano, Italy
- Heathrow x2, UK
- Muscat, Oman
- Lomma, Sweden
- Louisiana
- North Dakota
- Pennsylvania
- Illinois
- Fröfjärden, Sweden
- Michigan
- New York
- Zagreb, Croatia
- Torenmolen, Netherlands
- Stavanger, Norway
- Zaragoza, Spain
- Voldum, Denmark
- UK
- Kungälv, Sweden
- Botkyrka, Sweden

Installations

	A	B	L	M	N	O	P	Q	R	Y	Z	AA	AB	AC	AD	
	Name	EU/US	Name of Location	Installed	Replaced pump	Replaced kWh/day	Ivan kWh/day	Replaced kW	Concertor™	Drive temp	Running days	Energy	Hours	Pump clean Jan11	Hivan/Hrepl	Saved energy
2	ARAGON	EU	Trino Vercelli, Italy	2015-09-09	NP3102		12	3,7	1	29	150	1800	1800	97	49%	51%
3	BALIN	EU	Fano, Italy	2015-09-02	3127	70	42	5,9	2,6	43	150	6300	2423	55	67%	33%
4	BILBO	EU	Norway	2015-10-09	Sulzer Effex		25		2	25	120	3000	1500	9		
5	BOROMIR	EU	Denmark	2015-11-06	Grundfos		29		2	17	90	2610	1305	102		
6	ELENDIL	EU	Heathrow	2015-09-25	3127		4	5,9	1,8	15	120	480	267	88	53%	47%
7	ELROND	EU	Oman	2015-09-15	3127MT (140)		10	7,5	1	33	120	1200	1200	2	30%	70%
8	FARAMIR	EU	Lomma, Swe	2015-06-24	Hidrostahl	15	7	4	1,3	15	210	1470	1131	23	55%	45%
9	FRODO	EU	Holland	2015-09-23	NP3127HT		24	5,9	2,4	21	120	2880	1200	139	64%	36%
10	GIMLI	US	Metairie, LA	2015-08-27	3127		11	7,5	1,6	37	150	1650	1031	413	41%	59%
11	GOLLUM	US	Manchester,WA	2015-08-11	Meyers		19	7,5	1,7	32	180	3420	2012	82	43%	57%
12	ISILDUR	US	Fond du Lac, WI	2015-07-21	3102.090-5660	11	4	3,7	2,4	17	180	720	300	29	87%	13%
13	MERRY	US	Fargo, ND	2015-08-13	3127	80	38	7,5	1,5	34	180	6840	4560	86	40%	60%
14	PIPPIN	US	Chester, PA	2015-08-04	NP3127		19	7,5	5	31	180	3420	684	243	89%	11%
15	ROSIE	US	Crystal Lake, IL	2015-07-20	3127		18	7,5	1,8	29	180	3240	1800	4	45%	55%
16	SAM	EU	Fröfjärden, Swe	2015-06-04	3127	13	6	5,9	1,4	17	240	1440	1029	63	45%	55%
17	SARUMAN	US	Lyon Township, MI	2015-07-22	3127 imp 488		0,4	7,5	2,1	18	180	72	34	0	50%	50%
18	TREEBEARD	US	Stony Brook, NY	2015-08-03	3127 imp 439		35	7,5	1,9	31	180	6300	3316	23	46%	54%
19	GANDALF	EU	Croatia	2016-01-14	3085					15	10	100	50	50		
20											2740	46842	25591	1508		46%



Customer feedback

**Pump
cleaning...
no clogging**

**Automatically
adapts to best
duty point and one
pump fits all**

**Sump cleaning =
no cleaning
trucks**

**Energy
minimizer
savings of
40-50% or more**

**My troublesome
P.S. is now my
best P.S.**

DC Water & Sewer Authority Partnership



Flygt Concertor by Xylem

*The world's first wastewater pumping system
with integrated intelligence*

Question and Answer Session

Thank you!

“Wastewater Pumps with Integrated Intelligence – The Next Pump Industry Breakthrough”

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Engineering Consultant