ECO FLEX™

INVERTER CONTROLLED BOOSTER SETS

FLOWFLEX

Jansen

POMPEN- & WATERTECHNIEK

Hoogeindsestraat 5
NL - 5447 PD Rijkevoort
Nederland
T : +31 (0) 485 - 371318
F : +31 (0) 485 - 371918
info@pompentechniek.nl
www.pompentechniek.nl

SMEDEGARD
Pumping Technology

reliable efficient quality

FLOWFLEXX Cold Water Booster Sets

The FlowFlexx range of single, twin and triple pump cold water booster sets utilise quality stainless steel single and multistage end suction pumps with a factory mounted frequency inverter unit for each pump. The speed of each pump is varied by means of the frequency inverter, enabling the pumps to operate in a cascade system. The control of each pump is via a pressure transducer installed in the discharge flow manifold. This relays a 4-20 mA signal to the inverter to vary the motor speed.

FlowFlexx booster sets are available single phase with a low water volt free contact or, three phase incorporating low water, run and common fault volt free contacts. As an optional extra the three phase sets are also available with RS485 connectivity. All units incorporate a high/low pressure alarm, dry run protection, auto change-over, fault history, protection against high/low voltage, over current, current surge, inverter overheat, communication error.

For ease of use and set up the FlowFlexx inverter drives have a digital interface. The display shows the output frequency, percentage of output, actual pressure, pressure setting, output current, transducer error, high/low pressure, low water, drive error.

Booster Set Selection

Once the required pressure and flow rates are known then the decision has to be made regarding the number of pumps preferred. Although a single pump may be seen to be the simplest option the importance of ensuring the water supply must be considered. For example, a hotel or hospital will almost certainly require a standby pump capable of supplying the full duty, this is referred to as duty/standby (D/S). The duty can also be shared amongst two or three pumps with or without a standby and this would then be referred to as duty/assist (D/A) or if three pumps are used duty/assist/standby (D/A/S). As the flow is divided between two or three pumps the pumps will be smaller. Additionally in cases where only a single phase 230-1-50 supply is available, then a two or three pump set may be the only option.

Equipment Details

Pumps

Horizontal end suction single/multistage. Three phase T.E.F.V 2900 rpm.

Pump Control Vessel

Suitable for 10 bar working pressure with E.P.D.M rubber diaphragm.

Manifolds

Piping is AISI 304 grade stainless steel (or AISI 316 to special order request). An option of copper pipework is available. Single pump modules use brass, bronze and stainless steel.

Features of the FlowFlexx

- *Frequency inverters with digital display*
- *Built in dry run protection*
- *Set mounted inverters*
- *All booster sets are complete with isolating and non return valves*
- *Pump control vessel fitted as standard*
- *IP55 enclosure with MCB's*
- *Stainless steel pumps with carbon-ceramic mechanical seals*
- *Single or Three phase options*
- *Single phase c/w low water cut-out volt free contacts*
- *Three phase c/w low water, run and common fault volt free contacts*

Optional Items

- *GaardExe™ SPM module (see page 4)*
- *EVSD Anti-Legionella device (see page 5)*
- *AVVA Anti Vaccum/Vent Air device (see page 5)*
- *Flexible pipe connectors*
- *Anti-vibration mounts*
- *Packaged sets assembled with integrated cold water break tanks that are WRc Cat 5 compliant*
- *IP66 control panel c/w door interlock isolator and all volt free contacts*
- *Three Phase Only - IP66 control panel c/w door interlock isolator, RS485 connection and all volt free contacts*

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Special Requirements

For example, space or access limitations. All sets can be dismantled and reassembled on site. In some instances it is possible we can build non-standard booster sets to suit a particular installation. Should this be a consideration then please contact Smedegaard to discuss your requirements.

Additional Items

Standby Transducer

The FlowFlexx range of booster sets are normally supplied fitted with a single master transducer. For those sets not fitted with the GaardExe module, it is possible to fit a transducer for each pump. The booster set always sense the pressure from the master transducer but, if this should fail, then the set will automatically switch to the standby transducer.

System Vessel

For systems with rapidly varying demands and especially where rapid action valves are in use then the inclusion of a system buffer vessel to prevent momentary pressure fluctuations may be advisable. Although the vessel size may be governed by the system, for FlowFlexx sets we generally advise the use of a 60 litre vessel. These vessels are supplied loose for installations on site.

60Hz

The entire range is available with 60Hz motors, should this be required then please contact Smedegaard to confirm the pump sizing.

Condensation

The risk of damage caused by condensation can be guarded against by the use of a heating element and/or ventilation fan in the control panel and also heating elements in the pump motors.

IMPORTANT - PUMP SELECTION

All the pump curves shown on page 9 relate to single pump duties, not multiple pump complete booster set duties.

For multiple pump applications it is necessary to decide if a standby pump is to be used. In cases where a standby pump is utilised then divide the set duty by the number of pumps required to meet the specified flow rate of the booster set.

For example if a duty/assist/standby unit is required and the booster set duty has a flow rate of 4 litres per second divide this by two which equals 2 litres per second and choose the pump curve relative to this which in the case would be the Series 20.

The pressure requirement is always a constant, so if 4 bar is required then the pump model is the Series 2040.

In order to establish full model reference please refer to the model identification chart on the bottom of pages 6, 7 and 8.

The example detailed here of a three pump booster set in three phase power supply would give a model identification of FlowFlex 2040/3T. With the surge protection module required it would add the letters SPM(or G for GaardExe) after the T(or S for single phase).

GAARDEXE™ Surge Protection Module (SPM)

Hydraulic shock may be experienced on the initial start up of a booster set or, as the booster set re-starts after a power failure. Also, a failure of the water supply to the booster set can have the same effect. The surge may be caused by the excessively quick filling of the system or, if the system is already full and free of air, then the sudden re-start of a pump may cause a shock wave. The effect of this can be severe including the parting of pipe joints and subsequent water damage to the building.

A method of air venting*(1)* is necessary to allow the filling of a system and an anti-vacuum*(2)* valve may also be considered to aid drainage for maintenance and to prevent a vacuum in the event of water loss. However, these measures alone will not prevent hydraulic shock damage.

Smedegaards' answer to the problem of hydraulic shock is the GaardExe SPM. This module is suitable for use with booster sets with up to 6 pumps and either single or three phase (a neutral is required for 3 phase sets).

On start-up, when the power is re-instated after a power failure or in the case of low water and the water supply has been re-established, the GaardExe SPM takes over the control of the booster set. One pump is enabled, any other duty/standby pumps are disabled. The enabled pump is pulsed for a preset time at preset intervals and the sytem pressure is monitored until the Change-Over pressure is reached. The booster set then takes over control and operates as normal. The settings are system dependant and, on larger systems, it is possible to operate mulitple pumps to achieve the same result. If, after a re-start, the system pressure is near to maximum then the GaardExe will allow the booster set to operate fully without an excessive wait.

Though normally set to zero, the minimum set pressure is adjustable, as are the pump settings time. At any time the GaardExe can be disabled to allow the booster set parameters to be altered in the normal way.

The GaardExe can be operated in two modes:

Transfer Mode

As the booster set returns to normal operation the GaardExe is disabled until it is next required.

Simulator Mode

The GaardExe maintains control of the booster set and provides extra features such as an High/Low pressure alarm. If the 'Cross-Over' pressure is not reached in a set time then an alarm is signalled and, if required, the booster set can be disabled. This, as well as the Excessive Run Time Protection may be used for leak detection. Both features can be disabled. In order to enable the break tank to fill for a period of time before allowing the set to re-start. The fill timer can be set to disable the booster set. Additionally it can also be used to prevent rapid pump cycling.

Run/Failsafe

The GaardExe can be set/wired in Failsafe mode in which case, if the power to the GaardExe fails or/ the GaardExe develops a fault then the Booster set is disabled. In Run mode the booster set will operate even if the GaardExe is disabled.

Additional Features

- *Audible alarm*
- *Optional plug in 7 relay telemetry board*
- *Optional 3 (switch relays) relay board*
- *Error display*
- *Service due reminder with contact telephone number*

It is a condition of the warranty validation that booster sets fitted with the GaardExe module are commissioned by Smedegaard.

(1)(2)Smedegaard AVVAGaard is designed for this purpose. See page 5 for details.

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Jansen Pompentechniek T: +31(0)485-371318 E: info@pompentechniek.nl

AVAGAARD Anti-Vacuum/Vent Air Device - Optional Add On

Trapped air in a boosted water system may result in rapid and large pressure variations which, as well as causing excessive noise, may also create leaks and other damage in the pipe work due to water hammer. Also, in the event of water loss, for instance during maintenance or a power failure, it is vital to prevent a vacuum forming within the system. Such a vacuum will be a major contributory factor in the occurrence of water hammer and will certainly increase the severity of any resultant damage. This damage can include the catastrophic failure of pipe joints and subsequent water damage. It should also be noted that air venting will be required during the filling of the system.

Smedegaards' answer to prevent a vaccum forming and to remove air from the system is the AVVAGaard, a combined anti-vacuum, vent air valve. This should be fitted at all points within a system, typically the tops of risers, where air may be trapped.

Whilst it can be said that the AVVAGaard will prevent some causes of water hammer and may well alleviate some of its affects, it is not the total answer. Especially in larger systems, further added protection may be required. For this added protection and peace of mind, Smedegaard can also offer the GaardExe Surge Protection Module, see page 4.

EVSD Anti-legionella Control - Optional Add On

Advantages of the Expansion Vessel Safety Device

- *The EVSD signals the circumstances under which the Legionella bacteria could thrive and sustain themselves*
- *When an alarm is generated, this might also be an indication of a technical failure or an incorrectly adjusted installation*

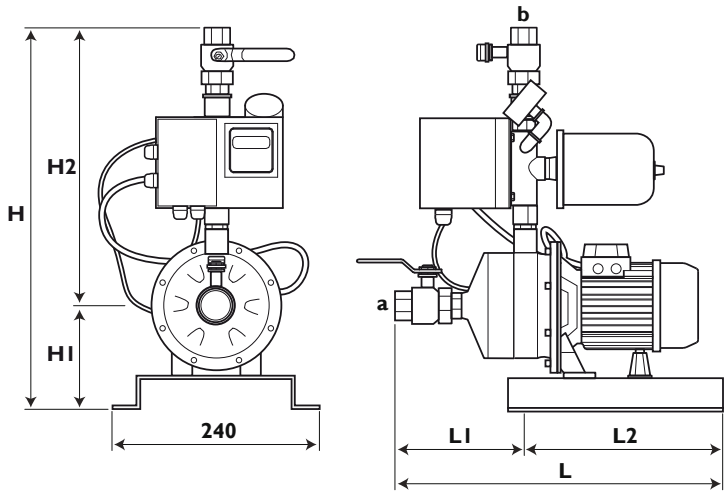
The risk of growth of Legionella, the bacterium that causes Legionnaire's Disease, increases when drinking water is stagnant for longer periods. In a booster system a leaking membrane tank or an incorrectly adjusted booster system can be a potential threat to the quality of drinking water. This is especially true in rooms with an average ambient temperature above 25 °C as the risk is then elevated.

Easy Control for Every Situation

To control water quality in booster systems, Smedegaard offers the EVSD, which detects the refreshment of water by registering the filling and consequently, the draining of the membrane tank. When water fails to move in and out of the expansion vessel then a signal is sent to the Building Management System, alternatively an acoustic or optical alarm can be generated. By means of a reset button on the EVSD-Control module, the signal can be cancelled. Optionally, the booster set may be switched off through its control panel.

** In certain countries regulations state that the membrane tank must be filled and emptied 30 times per 24 hours. Check your local regulations.*

FLOWFLEX Mini Single Pump Booster Set



To select the FlowFlexx Mini, refer to the pump performance curves on page 9.

Data Table (All dimensions are in millimetres)

Model	L	L1	L2	H	H1	H2	a Inlet	b Outlet	kW	FLC		Weight (approx.)
										1 Phase	3 Phase	
1015	433	168	265	669	136	533	11/4"	1"	0.37	3.4	1.4	17
1020	433	168	265	669	136	533	11/4"	1"	0.55	5.0	2.0	18
1025	433	168	265	669	136	533	11/4"	1"	0.75	5.6	1.9	20
1030	470	202	268	669	136	533	11/4"	1"	0.75	6.0	1.7	22
1035	470	202	268	669	136	533	11/4"	1"	0.9	7.0	2.5	22
1040	470	202	298	684	148	533	11/4"	1"	1.1	8.1	3.2	24
1050	470	202	298	684	148	533	11/4"	1"	1.5	10.0	4.0	26
2015	433	168	265	669	136	533	11/4"	1"	0.55	4.6	1.85	19
2020	433	168	265	669	136	533	11/4"	1"	0.9	6.9	2.6	20
2030	460	195	265	669	148	533	11/4"	1"	1.5	9.3	4.0	21
2035	495	202	293	669	136	533	11/4"	1"	1.1	8.3	3.2	23
2040	495	202	293	669	136	533	11/4"	1"	1.5	10.2	4.2	25
2045	508	202	306	681	148	533	11/4"	1"	2.2	12.4	5.1	31
3015	433	168	265	669	136	533	11/2"	1"	0.9	6.3	2.5	33
3025	460	168	292	669	136	533	11/2"	1"	1.5	10.2	4.3	19
3030	460	168	292	681	148	533	11/2"	1"	1.8	13.3	5.0	23
3040	509	202	307	681	148	533	11/2"	1"	2.2	14.8	6.1	26

Model Identification

FlowFlexx 20 30/T Mini G/CP

- IP66 Control Panel, IP55 Enclosure
- GaardExe, SP Module
- Three Phase(T) or Single Phase(S)
- Nominal Pressure (i.e 3.0 Bar)
- Nominal Flow Per Pump (i.e 2.0 l/s)
- Booster Set Range

(see page 9 for pump curves and selection)

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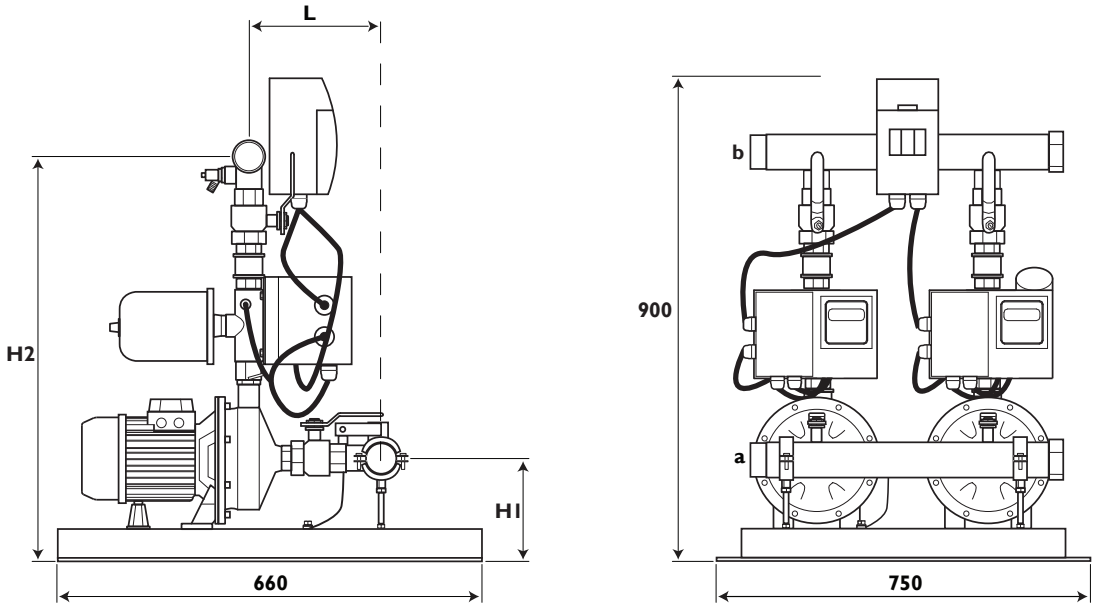
FLOWFLEXX Midi Twin Pump Booster Set



To select the pump duty, refer to the pump performance curves on page 9.

Data Table (All dimensions are in millimetres)

Model	H1	L	H2	a	b	kW	FLC		Weight (approx.)	
				Inlet	Outlet		1 Phase	3 Phase	1 Phase	3 Phase
1015	156	211	729	2"	2"	0.37	3.4	1.4	59	62
1020	156	211	729	2"	2"	0.55	5.0	2.0	61	64
1025	156	211	729	2"	2"	0.75	5.6	1.9	64	67
1030	156	211	729	2"	2"	0.75	6.0	1.7	67	70
1035	156	245	729	2"	2"	0.9	7.0	2.5	68	71
1040	168	245	741	2"	2"	1.1	8.1	3.2	73	76
1050	168	245	741	2"	2"	1.5	10.0	4.0	77	80
2015	156	211	729	2"	2"	0.55	4.6	1.85	61	64
2020	156	211	729	2"	2"	0.9	6.9	2.6	65	68
2030	168	245	671	2"	2"	1.5	9.3	4.0	71	74
2035	156	245	729	2"	2"	1.1	8.3	3.2	71	74
2040	156	245	729	2"	2"	1.5	10.2	4.2	74	77
2045	168	245	741	2"	2"	2.2	12.4	5.1	87	90
3015	156	220	729	2"	2"	0.9	6.3	2.5	93	96
3025	156	220	729	2"	2"	1.5	10.2	4.3	66	69
3030	168	220	741	2"	2"	1.8	13.3	5.0	75	78
3040	156	254	729	2"	2"	2.2	14.8	6.1	77	80

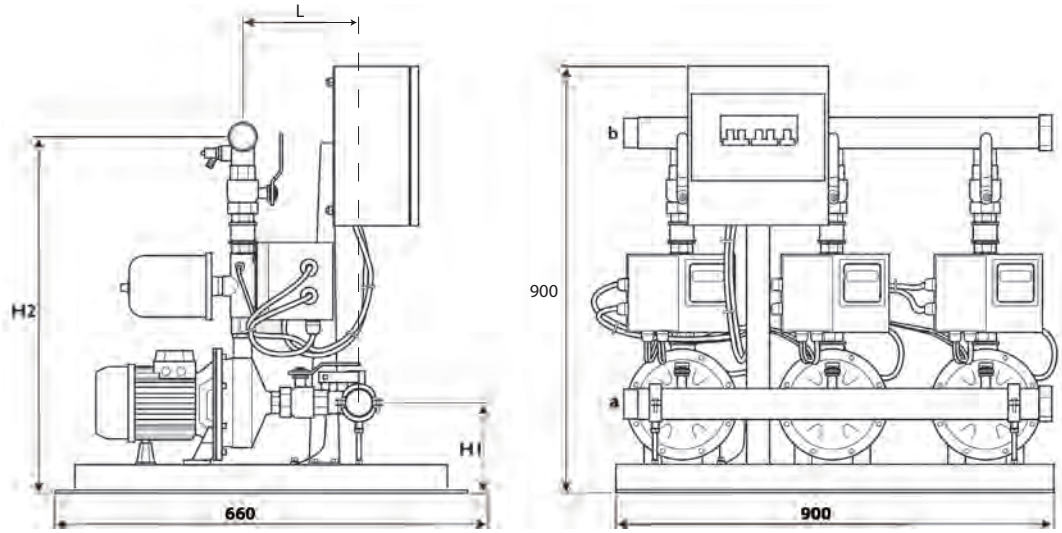
Model Identification

FlowFlexx 20 30/T Midi G/CP

- Booster Set Range
- Nominal Flow Per Pump (i.e 2.0 l/s)
- Nominal Pressure (i.e 3.0 Bar)
- Three Phase(T) or Single Phase(S)
- GaardExe, SP Module
- IP66 Control Panel, IP55 Enclosure

(see page 9 for pump curves and selection)

FLOWFLEXX Maxi Triple Pump Booster Set



To select the pump duty, refer to the pump performance curves on page 9.

Data Table (All dimensions are in millimetres)

Model	H1	L	H2	a	b	kW	FLC		Weight (approx.)	
				Inlet	Outlet		1 Phase	3 Phase	1 Phase	3 Phase
1015	156	219	737	2½"	2½"	0.37	3.4	1.4	87	91
1020	156	219	737	2½"	2½"	0.55	5.0	2.0	90	94
1025	156	219	737	2½"	2½"	0.75	5.6	1.9	95	99
1030	156	219	737	2½"	2½"	0.75	6.0	1.7	129	133
1035	156	253	737	2½"	2½"	0.9	7.0	2.5	131	135
1040	168	253	741	2½"	2½"	1.1	8.1	3.2	138	142
1050	168	253	741	2½"	2½"	1.5	10.0	4.0	140	144
2015	156	219	737	2½"	2½"	0.55	4.6	1.85	117	121
2020	156	219	737	2½"	2½"	0.9	6.9	2.6	123	127
2030	168	253	671	2½"	2½"	1.5	9.3	4.0	134	138
2035	156	253	737	2½"	2½"	1.1	8.3	3.2	131	135
2040	156	253	737	2½"	2½"	1.5	10.2	4.2	136	140
2045	168	253	741	2½"	2½"	2.2	12.4	5.1	155	151
3015	156	228	737	2½"	2½"	0.9	6.3	2.5	120	124
3025	156	228	737	2½"	2½"	1.5	10.2	4.3	126	130
3030	168	228	741	2½"	2½"	1.8	13.3	5.0	134	138
3040	156	262	737	2½"	2½"	2.2	14.8	6.1	143	148

Model Identification

FlowFlexx 20 30/T Maxi G/CP

- IP66 Control Panel, IP55 Enclosure
- GaardExe, SP Module
- Three Phase(T) or Single Phase(S)
- Nominal Pressure (i.e 3.0 Bar)
- Nominal Flow Per Pump (i.e 2.0 l/s)
- Booster Set Range

(see page 9 for pump curves and selection)

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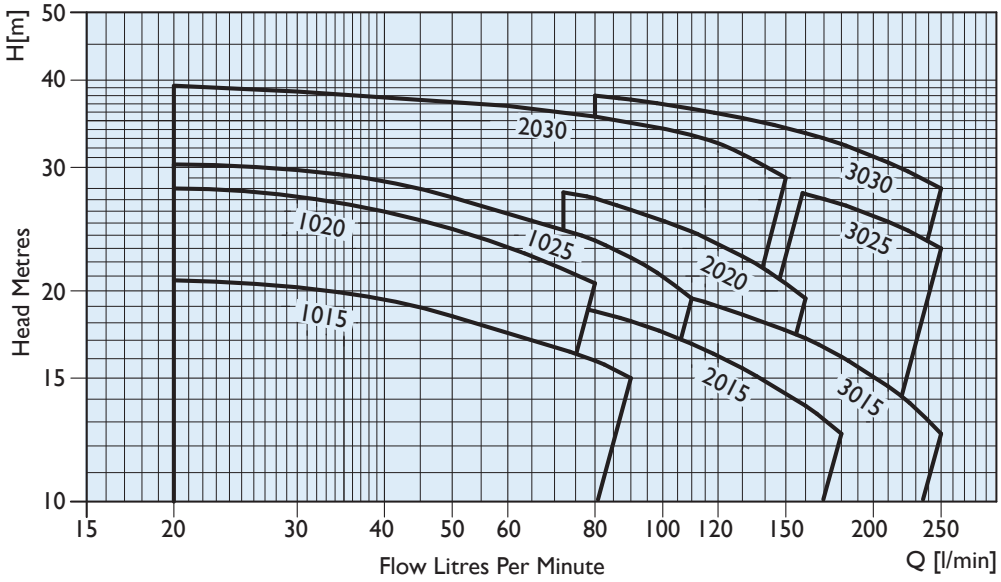
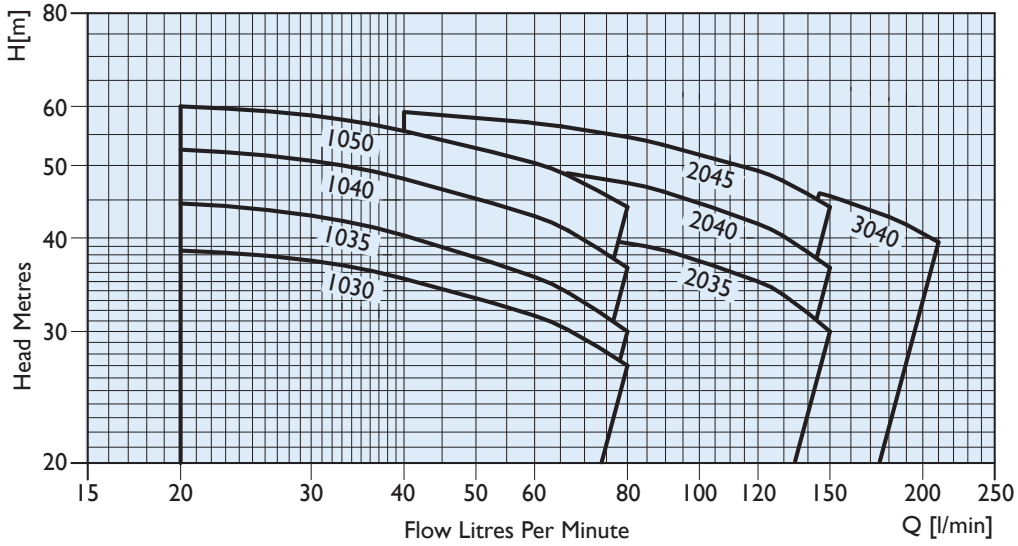
FLOWFLEX Individual Pump Performance Curves

Single Stage



Twin Stage



PUMP SELECTION

The pump curves shown above relate to single pump duties, for duty/assist operation the flow rate can be double or tripled for duty/assist/assist. The pressure, relative to flow, is measured at the set, the pressure and flow rate experienced at the point of use may be adversely affected if the pipework is inadequately sized. For multiple pump applications it is necessary to decide if a standby pump is to be used. In cases where a standby pump is utilised then divide the set duty by the number of pumps required (discounting the standby pump) to meet the specified flow rate of the booster set.

For example if a duty/assist/standby unit is required and the booster set duty has a flow rate of 200 litres per minute divide this by two which equals 100 litres per minute and choose the pump curve relative to this flow and pressure requirement, so if 3 bar is required then the pump model is either the 2030 (1.5kW) or the 2035 (1.1kW). In order establish the full model reference please refer to the bottom of pages 6, 7 and 8. The example detailed here of a three pump booster set in three phase power supply would give a model identification of either a FlowFlexx Maxi 2030T or a FlowFlexx Maxi 2035T.

It can be seen from the pump graphs that the duties of certain models overlap. The data tables give the kW for each model and we would normally suggest using the lowest kW motor to meet the requirement.

Other Smedegaard ECO FLEX™ Inverter Control Booster Sets

EXEFLEX

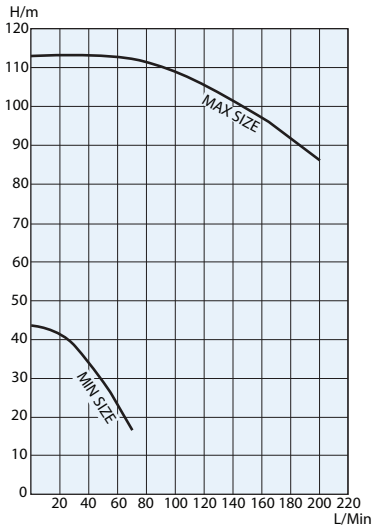
- Complete Range of Booster Sets
- Flow Rates up to 160 l/s
- Pressures up to 15 bar
- Single, Twin and Multiple Pump Sets
- Built in Dry Run Protection
- Pump Mounted Inverters
- Digital Interface on all units

Jansen
POMPEN- & WATERTECHNIEK

Hoogeindsestraat 5
NL - 5447 PD Rijkevoort
Nederland
T : +31 (0) 485 - 371318
F : +31 (0) 485 - 371918
info@pompentechniek.nl
www.pompentechniek.nl

FALFLEX

- Compact space saving wall mount design
- Electronic variable speed pump control
- Twin pump duty/assist and duty/standby
- Flow rates up to 3 l/s per pump
- Pressures up to 10 Bar
- Low noise



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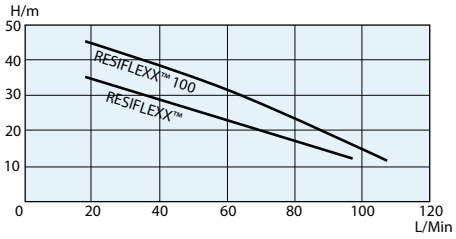
BOOST FLEX

- Break tank package
- Suitable for all WRc Categories
- Wall mounted or free standing
- Single or twin pump option
- Inverter controlled
- Rapid refresh rate

RESIFLEX

- Compact design
- Electronic variable speed pump control
- Insulated break tank for potable water
- Type AF Air Gap
- Low water pump protection
- Sealed lid with screened vent



CHEWFLEX

- Break Tank Packages
- WRc Type AB and Category 5 compliant
- Standard 20 litres - 5000 litres
- Flow rates up to 160 l/s
- Pressure up to 40 bar
- Inverter controlled
- Insulated or uninsulated tanks

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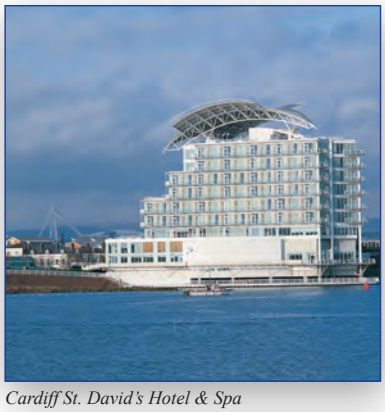
Copenhagen Bispebjerg Hospital



Cardiff St. David's Hotel & Spa

Paris Grand Louvre

Moscow Vorobyovy Gory

Stockholm Waterfront

Bilbao Airport

There are millions of Smedegaard pumps in operation all over the world.
A few examples of our installations are:

National Bank, Copenhagen
Glostrup Hospital, Denmark
KPMG Canary Wharf, London
Attunda Courthouse, Sweden
Saughhall Primary School, Cheshire
The King's Palace, Morocco
Tesco Stores (Throughout UK)
Bilbao Airport, Spain
Bokenäs Resort & Conference Centre, Sweden
Honda UK HQ, Slough
MFH Quartiersüberbauung Gland, Switzerland
Chelsea FC Training Ground, London
Te Papa Museum, New Zealand
Stockholm Waterfront, Sweden
Arsenal Emirates Stadium, London
Donstroi Buildings, Moscow
St. Davids Hotel & Spa, Cardiff
Poole Hospital, England
Gamla Ullevi Stadium, Göteborg
The Grand Louvre, Paris

University of Exeter, England
Palacio de la Zarzuela, Madrid
Halmstad Arena, Sweden
Highfield Primary School
Whole Foods, Kensington
Carlsberg Breweries, Copenhagen
The Globe Theatre, London
World Culture museum Gothenburg, Sweden
Turnberry Hotel, Troon (2009 Open Golf Venue)
Red Cross Building, Oslo
H M Prison Morton Lane, England
Roskilde Hospital, Denmark
Ringhals Power Plant, Sweden
Birmingham Retirement Village, England
Waitrose, UK (John Lewis partnership)
Bispebjerg Hospital, Copenhagen
Akzo Nobel, Sweden
UWE University, Bristol
Cadbury's Berkley Square, London
Wyke Regis Junior School, Dorset

Smedegaard Pumps Ltd
United Kingdom
Tel. +44 (0)1278 458 686
Fax +44 (0)1278 452 454
info@smedegaard.co.uk
www.smedegaard.co.uk

T. Smedegaard A/S
Denmark
Tel. +45 43 96 10 28
Fax +45 43 63 17 66
info@smedegaard.dk
www.smedegaard.dk

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