

- Qualify for Green Building Incentive Programs and Rebates
- Achieve LEED Certification
- Sustainable Water Conservation and Energy Efficiency
- Reduced Environmental Impact
- Lower Electric and Water Utility Costs
- Long-Term Economic Returns



**Technologic 5500**



**Technologic 502**

# 70VS Variable Speed Pressure Boosters

CONFIGURABLE WITH EITHER TECHNOLOGIC® 5500 OR TECHNOLOGIC® 502 PUMP CONTROLLERS

# Variable Speed vs. Constant Speed Pressure Boosting: How To Choose?

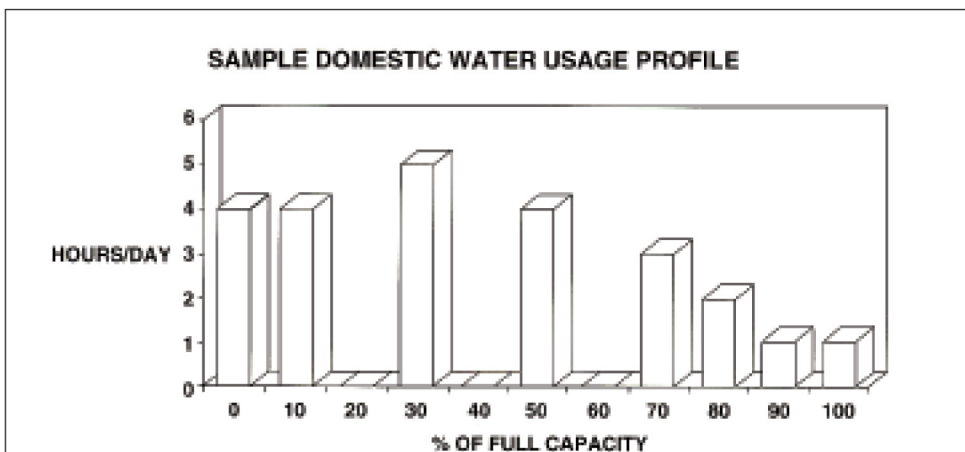
## How Variable Speed Pumping Pays off

A pump is predictable in the way it reacts to system demand. As the demand fluctuates, the pump rides back and forth on its curve. A drop in demand causes the pump to ride back on its curve and, consequently, generate more pressure. In a pressure booster system, this additional pressure is absorbed by the pressure reducing valve. The net result is a waste of energy.

Variable speed pumping allows us to precisely match the discharge pressure of the pump to the actual system requirement. This significantly reduces the amount of pressure absorbed by the PRV. In some cases, the PRV can even be eliminated.

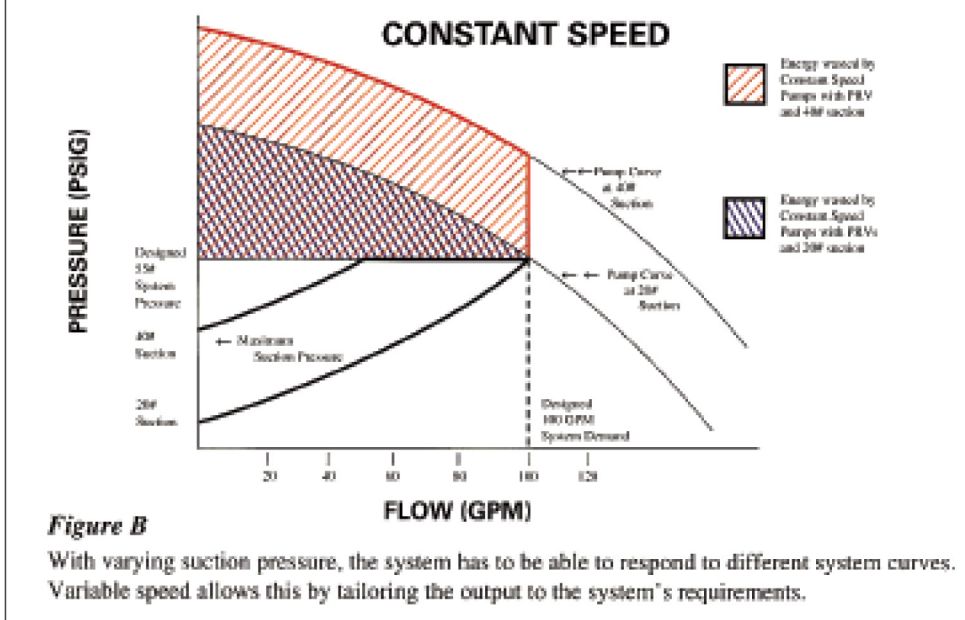
In Figure B, the system is designed to provide 55 PSIG at the discharge header. The red and blue diagonal lines represent the excess pressure generated by the constant speed pumps. This is the pressure that must be absorbed by the PRV's. We can also refer to this area as the "Variable Speed Zone". The area represents the energy saved by operating at reduced speeds. By varying the speed of the pump(s), we can operate at any point along the bottom edge of this area. That allows us to generate only as much pressure as the system requires. Since energy consumption of a centrifugal pump varies as the cube of speed, we can reduce our power consumption by 27% by merely reducing pump speed to 90%. Most variable speed boosters are capable of meeting demand at significantly less than 90% speed so your actual savings may be even greater.

Contact your local B&G Representative if you're ready to enter the "VARIABLE SPEED ZONE".



**Figure A**

A building's domestic water usage varies during the course of a day. This graph depicts a typical commercial building load profile during the course of a day with constant suction pressure.



**Figure B**

With varying suction pressure, the system has to be able to respond to different system curves. Variable speed allows this by tailoring the output to the system's requirements.

## TYPICAL PAYBACK IN YEARS

### INDIVIDUAL PUMP HORSEPOWER

COST OF ELECTRICITY	INDIVIDUAL PUMP HORSEPOWER					
	5HP	7.5HP	10HP	15HP	20HP	25HP
\$.02/kWh	11.8	11.5	11.2	7.9	6.8	6.2
\$.04/kWh	5.9	5.8	5.6	3.9	3.4	3.1
\$.06/kWh	3.9	3.8	3.7	2.6	2.3	2.1
\$.08/kWh	3.0	2.9	2.8	2.0	1.7	1.6
\$.10/kWh	2.4	2.3	2.2	1.6	1.4	1.2
\$.12/kWh	2.0	1.9	1.9	1.3	1.1	1.0
\$.14/kWh	1.7	1.6	1.6	1.1	1.0	0.9
\$.16/kWh	1.5	1.4	1.4	1.0	0.9	0.8
\$.18/kWh	1.3	1.3	1.2	0.9	0.8	0.7
\$.20/kWh	1.2	1.2	1.1	0.8	0.7	0.6
\$.22/kWh	1.1	1.0	1.0	0.7	0.6	0.6

Primary factors in payback analysis are the cost of electricity, voltage available and the load profile. The chart to the left depicts the average payback for various electricity costs. The payback is based on duplex pressure boosters for a building with a load profile shown in Figure A.

For an in-depth analysis of domestic water pressure booster systems, refer to Xylem Fluid Handling's TEH-1096 Design Manual.

## 70VS PRESSURE BOOSTER SYSTEMS

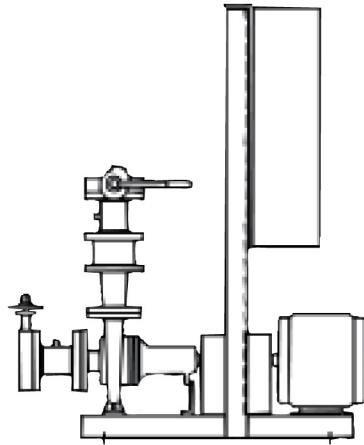
70VS packages are designed to provide low initial cost and the outstanding reliability you've come to expect from Xylem Bell & Gossett. All are designed for simple installation requiring only suction & discharge piping connections and a single input power connection. Realizing the space constraints of the modern equipment room, we've designed the 70VS Series to occupy a minimal amount of floor space. Standard features on all 70VS units include:

- Technologic™ (Pump Control Panel)
- Choice of PRV or check valve on pump discharge
- UL listed
- Low suction pressure cut out
- Pump isolation valves
- Thermal relief system
- No-Flow shutdown
- High system pressure alarm

With a choice of three configurations and capacities from 40 GPM all the way up to 2000 GPM or more, the 70VS has the flexibility to meet the requirements of most pressure booster systems.

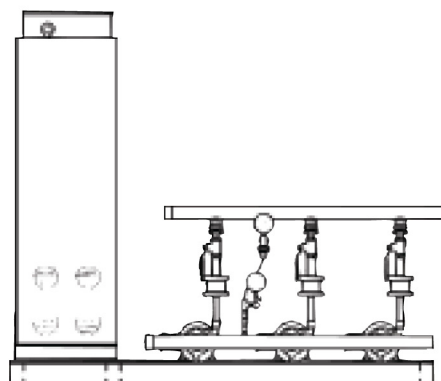
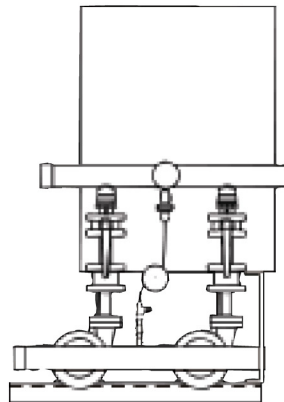
### 70VS Simplex

The Simplex is designed to provide the energy savings of variable speed pressure boosting at a cost that makes it an attractive choice for small facilities. Don't let its small size fool you—the 70VS Simplex is packed with features commonly found only on large multi-pump systems. With B&G's 1510 end suction pump and our rugged Technologic controller, the 70VS Simplex is ideal for many pressure booster applications. For light commercial applications, the MiniSpeed with 3530 pumps and our Technologic 502 controller provides a reliable yet economical solution.



### 70VS

The 70VS provides the added flexibility of up to four pumps and AFDs. This gives the Engineer the capability of sizing each pump for a 33% of total capacity or each pump for 50% of total capacity. Three 50% pumps allows you to have a redundant pump and drive combo so you can still meet your maximum demand even when one pump is down for maintenance. The 70VS is available with Type L copper through 6" and 304 stainless steel headers in sizes up to 10 inches.



# 70VS Variable Speed Pressure Boosters

- Custom-engineered pumping systems
- Serial Communications via most popular protocols
- Control logic developed exclusively for pumping applications

## 70VS Variable Speed Case Study

The Wastewater Treatment Plant in Galesburg, IL chose the Bell & Gossett system as an economical way to reduce Total Suspended Solids (TSS) concentrations, especially during high flow conditions when solids could wash out from the processes. The wastewater treatment plant in Illinois utilizing a tertiary treatment package from Xylem is reporting effluent concentrations of less than 5 mg/l.

The Galesburg plant itself has an average design flow of 11 million gallons daily (MGD), and peak design flow of 28 MGD. The Xylem package installed at this facility includes a DrumFilter and control system from Water & Wastewater (WWW); Flygt submersible lift station pumps; and a triplex 70VS booster pump system with a Technologic controller and variable frequency drives (VFDs) from Xylem Residential and Commercial Water (R&CW) division.

During normal filtration, no energy whatsoever is consumed by the system. Effluent flow is polished by the DrumFilters after leaving the final clarifiers with 17-micron filtering screen.

The Flygt variable speed submersible lift station pumps sequence on and off to match effluent flow feeding the DrumFilter system.

Only when a backwash cycle is initiated does the DrumFilter system use energy. The filtering process is not interrupted during the backwash cycle, which is when the 70VS system starts the lead pump by detecting a drop in the backwash line pressure.



A B&G Booster Package provides pressurized water during the DrumFilter Backwash sequence.

The system has the ability to sequence additional pumps as required to meet system demand and maintain the design pressure required to spray away the solids. The system in Galesburg was setup so that the third pump in the sequence was designated as a standby pump. The Technologic's automatic alternation of the lead pump balances the wear on each pump. In addition, the 70VS provides remote run and alarm status indication to the WWW monitoring and control system to ensure total system integration of the Xylem products.

The 70VS system with Technologic controls integrates seamlessly with the DrumFilter to provide an energy saving tertiary filtration solution. Benefits of the 70VS system include, 1) energy savings by most efficiently meeting system demand, 2) avoidance of motor damaging and energy wasting in-rush currents with the soft start capability of the VFDs, 3) precise pressure control with a single system setpoint, and 4) reliable B&G pump protection algorithms.



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