

www.howden.com

PSI Prolew Inc.

975 Selkirk, Pointe-Claire
Québec, Canada H9R 4S4
Tél: (514) 697-7867
Fax: (514) 697-0057
www.psiprolew.com



PSI Prolew Inc.

3770A Laird Road, Unit 1,
Mississauga, ON L5L 0A7
Tel: (905) 820-6330
Fax: (905) 820-6338
www.psiprolew.com



Roots™ Wastewater Aeration Controls



Howden offers advanced aeration solution technology to the wastewater industry.

In 1931, the Roots-Connersville Blower Company became the first blower manufacturer to apply positive displacement blower technology to the wastewater process. Just five short years later, we were the first manufacturer to apply centrifugal blowers to the process.

With the 2015 acquisition of Roots Howden maintains a reputation for world-class efficiency, ingenuity, durability and reliability.

Today Howden Roots blower technology optimizes the performance of a wastewater aeration process by utilizing principles such as Flow Control and Most-Open-Valve, in combination with our proprietary control algorithm.

Howden's controls engineers across energy have hundreds of years experience in providing energy efficient controls. Proprietary control strategies for Dissolved Oxygen (DO) control include direct flow control and Most-Open-Valve (MOV) logic.



Roots' positive displacement blowers can be controlled with variable frequency drives to match air flow to process demands. The result is high process performance and low energy demand.



Packaged blower systems with factory integrated controls provide simplified installation, low noise and reliable operation.

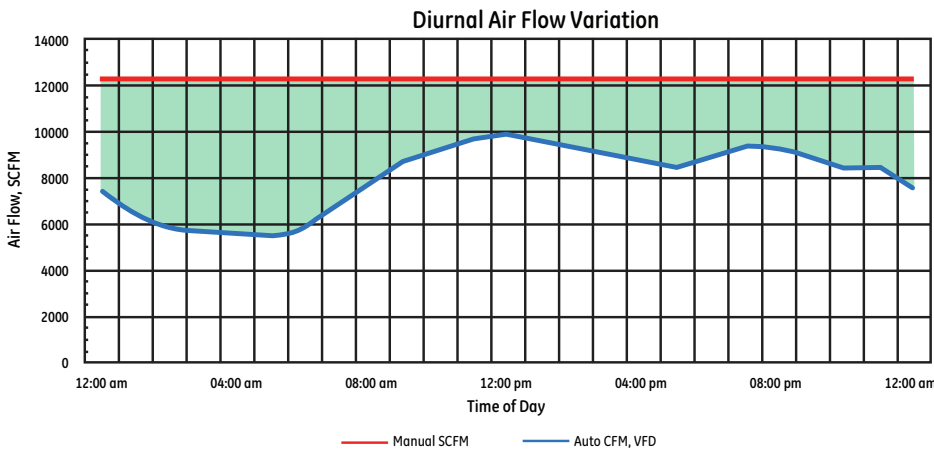
Why aeration controls?

- There are many reasons to add aeration controls:
- Stabilize the process
- Optimize the process conditions for nitrification/denitrification
- Reduce excess aeration, saving energy
- Reduce work load through automation

Process Efficiency

When trying to create an efficient aeration process, too often the focus is on the efficiency of the blowers. Newer technology has provided some improvements in blower efficiency, but we're only talking improvements of a few percentage points. Automated aeration controls can provide savings that are far greater than this, by reducing the major source of process inefficiency, namely excess aeration.

Manual vs. Automatic Flow Control



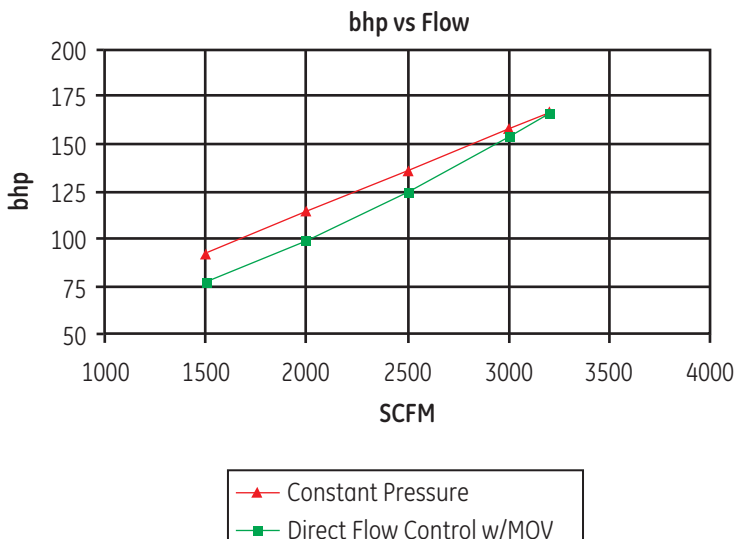
Manual Flow Control is set to provide adequate aeration at expected Peak Load. Since the plant rarely sees the projected Peak Load, power can be wasted by excess aeration a majority of the time as illustrated by this graph.

Process stability and sustainability

Reducing excess aeration can offer energy savings and can help improve the efficiency of certain treatment processes. Fluctuating and excessive DO levels in the Return Activated Sludge can, for example,

greatly affect the efficiency of a denitrification process. With a properly designed aeration control system, the sustained performance of your processes can be optimized, while maintaining process stability

Direct Flow Control w/MOV vs Constant Pressure



Direct Flow Control with Most-Open-Valve logic minimizes system pressure. Lower pressure reduces the power consumption of the aeration blowers. A typical reduction in power can be as much as 15 percent at reduced flow.

Control Solutions

Roots Controls – available as integral system with Roots aeration blowers and solutions.

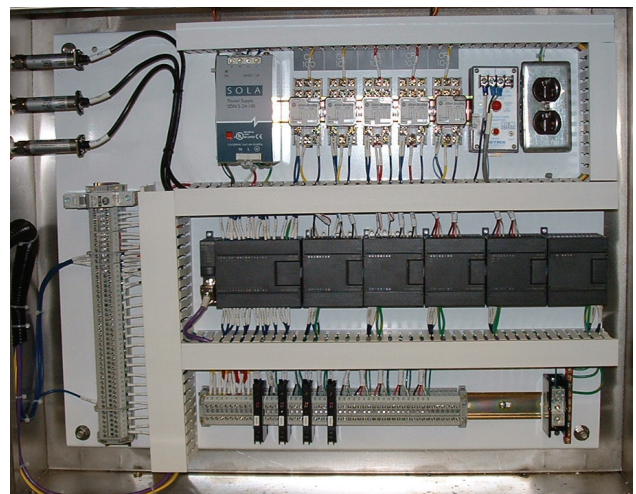
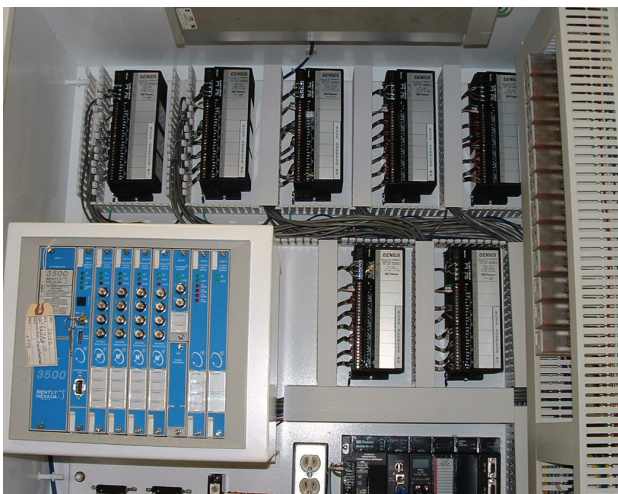
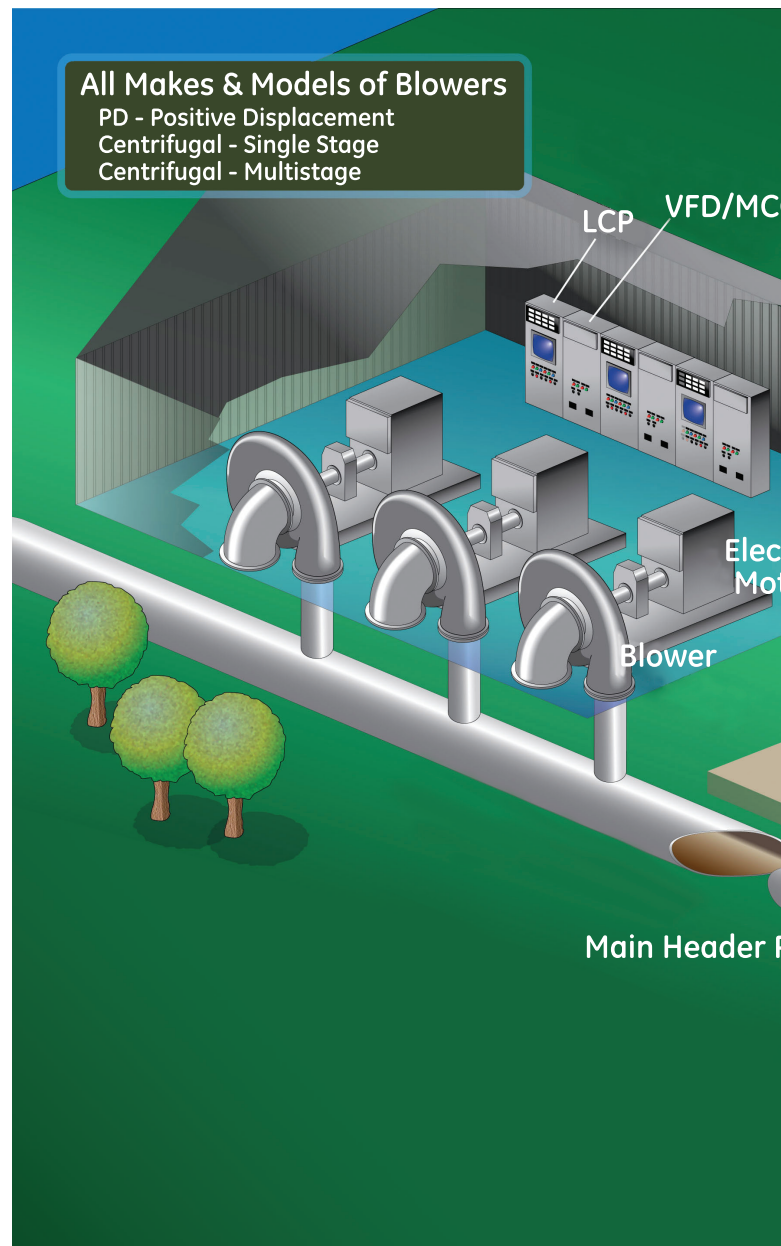
Wastewater OEMs – can take advantage of including our controls with their equipment for enhanced system performance.

Revamp – extends aeration system life and optimizes performance by replacing obsolete controls with advanced standard or customized control systems and solutions to meet your needs.

Upgrades – reduce energy consumption and optimize performance of your aeration system by adding specialized controls, for example, DO and MOV. Retrofit systems are available for combinations of blowers and aeration processes.

Performance Service – regular scheduled on-site service and equipment inspection, system tuning and optimization.

Application Engineering – site review and inspection for energy audits, data analysis, savings projections, recommendations, system and solution design.

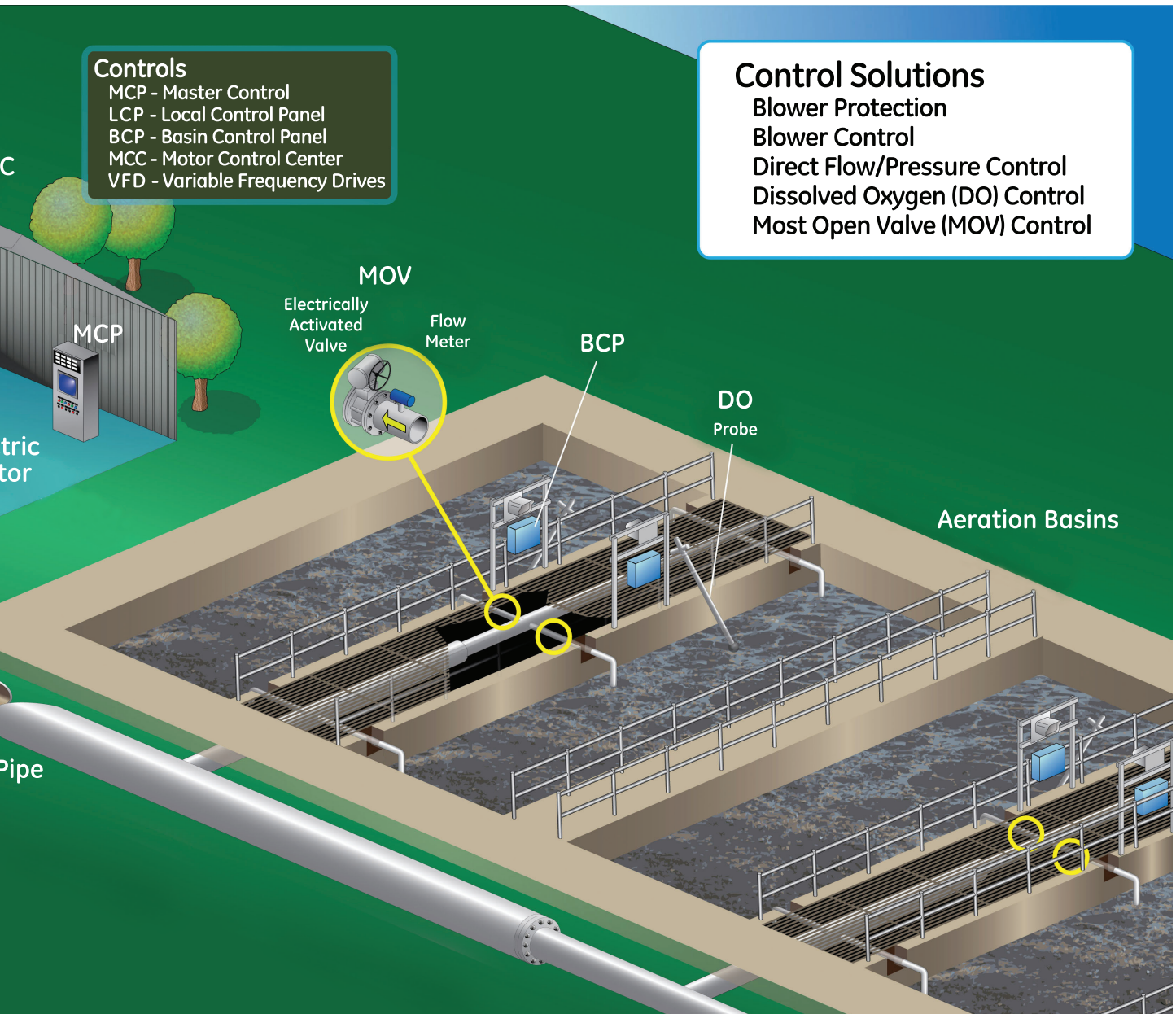


Controls

- MCP - Master Control
- LCP - Local Control Panel
- BCP - Basin Control Panel
- MCC - Motor Control Center
- VFD - Variable Frequency Drives

Control Solutions

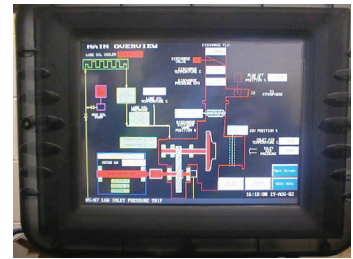
- Blower Protection
- Blower Control
- Direct Flow/Pressure Control
- Dissolved Oxygen (DO) Control
- Most Open Valve (MOV) Control



Selecting the Best

When you select Roots Blowers, Compressors and Controls for your wastewater aeration operations, you get high quality, robust, trusted and reliable technology and solutions.

The combination of energy efficiency, improved process performance and quality will deliver a low total cost of ownership.



Roots Wastewater Controls offer:

Energy Savings

- Save 25% to 40% compared to manual control
- Reduce consumption and demand charges
- Assistance in obtaining utility rebates
- Most Open Valve control
- Minimize system pressure
- Coordinate aeration demand and blower supply air flows

Direct Flow Control

- Eliminate pressure control loops
- Simplified tuning
- Increased stability
- Reduce energy consumption 5% to 10%

Variable Speed Control

- Positive displacement blowers
- Multistage centrifugal blowers
- Single stage centrifugal blowers
- Combine with variable diffuser vanes for optimum efficiency

Direct Valve Position Control

- Eliminate 4-20 mA positioners
- Reduce equipment and wiring costs
- Reduce calibration and maintenance

Application Engineering

- Design assistance
- Analysis of existing operations
- Savings calculations
- Simple and complex processes
- Single basin, multiple basin, and individual grid control

Service Contracts

- Preventive maintenance
- System monitoring and tuning
- On site field service

Energy Reduction Opportunities

- Integrated aeration systems
- Aeration process and blower control
- Blower control and protection

- Communications with SCADA systems
- Revamp
- Blower optimization and rebuilds
- Use existing controllers and field devices
- Upgrade existing control logic wastewater OEMs
- Blower and control packages
- Integrate with OEM processes

Technology Options

- IntelliView[®] process controller
- PLCs (various)
- Direct flow control
- Dissolved Oxygen (DO)
- Most Open Valve (MOV)
- Pressure control
- Direct valve control
- Efficient application specific control algorithms
- Variable speed control

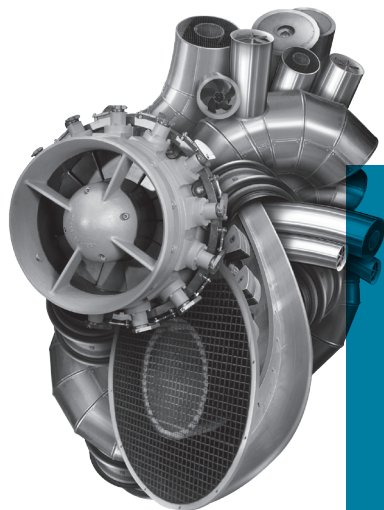


Roots H-Multistage and Single Stage centrifugal compressors combined with Roots Controls deliver performance and reliability. Control options include inlet guide vanes, variable speed drives (VFDs), variable diffuser vanes, dual vane control, and variable speed with variable diffuser vane

Howden Roots positive displacement blowers and standard factory package blowers serve the wastewater industry with efficiency and reliability.

Roots centrifugal compressors are a mainstay in the industry by offering:

- Reliability. Our single- or multi-stage compressor packages meet a broad spectrum of customer performance requirements offering a low cost of maintenance.
- Efficiency. System design and integral controls help deliver performance and low energy costs.
- Experience. Engineering and project management experience gained from thousands of installations and process applications.
- Support. Roots Blowers dedicated support teams and global network of factory-trained service representatives help you maintain up-time.



At the heart of your operations

Howden people live to improve our products and services and for over 160 years our world has revolved around our customers. This dedication means our air and gas handling equipment adds maximum value to your operations. We have innovation in our hearts and every day we focus on providing you with the best solutions for your vital operations.



Howden Roots

Howden Roots
900 W. Mount St.
Connersville
Indiana
USA
47331

Tel: +1 765 827 9200
Web: www.howden.com

Revolving Around You™

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