avac

VACUUM PLUMBING SYSTEMS

Supermarkets

A Versatile Engineered Plumbing and Waste Solution

Hotels

Correctional Centres

Educational Buildings

Office Buildings

Shopping Malls

Hospitals

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Who We Are

Avac Australia Pty Ltd designs, engineers, manufactures and markets environmentally friendly plumbing and waste collection, conveyance and disposal systems.

Avac has the expertise and knowledge to deliver a state-of-the-art, reliable, cost effective and versatile plumbing system that is engineered to fit almost any building type for renovation and new construction projects.

The Avac solution minimises the use of fresh water for toilet flushes. This in turn contributes to a smaller water and sewage footprint for any building. At the same time, Avac's versatile plumbing system delivers the ultimate freedom of piping layout and works with drainage from condensate, grey water and sanitary sources.

What We Do

Our skilled personnel, professional design, and high quality technical solutions can help solve difficult wastewater engineering problems. Our versatile plumbing system employs vacuum to resolve many of the installation concerns and costs of other plumbing systems. We take into account our customer's needs in the design process to deliver a plumbing system that works with minimal site disruption, requires less space, is cost effective for the application and addresses environmental concerns.

We are the people to call when there is a difficult project or design situation. We have the broad experience in not only design but also the hands-on operation, maintenance and troubleshooting of systems. We will be there from the beginning to the end; from design to operation. Our technical support staff are available to assist with the vacuum plumbing system operation any time that it is needed.

Service

Our decades of experience have resulted in the creation of the most advanced products and designs in the market today. The Avac R&D team ensures that we stay on the cutting edge of vacuum technology with both products and design. We offer turn-key and custom systems. Our expertise is in designing and supplying the right plumbing system for the application at hand.

With installations nationally, Avac's design engineers, installers and project managers have been involved in a large variety of projects, each with different types of environmental and engineering challenges.

All of our customers are assisted with a professional training program with the purchase and installation of an Avac Plumbing System, as well as, periodic inspections during installation, commissioning and operational training.

In addition to the above services, we offer continuing education courses, seminars and presentations.

The Company

Avac Australia Pty Ltd is an Australian company that pioneered the use of land based vacuum drainage system in Australia and New Zealand in the 1990's. With offices in Brisbane, Sydney, Melbourne and Auckland, it is sister company to RBA Group, with a 40 year history of service to the construction industry in Australia/NZ. The group supplies:

- Stainless Steel Engineered Plumbing Fixtures and Accessories
- Drinking Fountains, Water Coolers and Chillers
- Access Doors
- Emergency Eyewashes, Combination Showers and Drench Showers
- Tankless/Instantaneous Water Heaters
- Plumbing and Drainage Products
- Electronic Water Mangement Systems
- Washroom Equipment & Accessories
- Commercial Tapware

Avac's Engineering, Research & Development and Manufacturing complex is located in Meadowbrook, (Brisbane) in QLD.

Contact us with your design and product questions. We can help you with your versatile plumbing systems (VPS).

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Avac Australia Pty Ltd
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Brisbane
Melbourne
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rba
RBA family of companies

New Construction and Renovation Solutions

The Versatile Plumbing Solutions for Renovation and New Construction Challenges

The versatility of the Avac System makes it the first choice in renovation and new construction projects. With our system there are installation cost savings, material cost savings, water use savings and sewage discharge savings. Some of the major applications include:

Institutional Construction	Commercial Construction
Healthcare Facilities	Supermarkets & Grocery Stores
Educational Buildings	Hotels
Correctional & Detention Centres	Office Buildings

Because the vacuum system waste piping can be routed vertically or horizontally, we can place your plumbing waste system anywhere you want it!

The versatility and cost savings of a vacuum system is of particular value in tenant construction – notably shopping centres, airports and medical office buildings.

Renovation Construction/Historical Buildings

The Avac System can be of tremendous benefit in the renovation of historical buildings in which both mechanical design and preservation of the existing structure must be taken into consideration.

Construction Benefits of Vacuum Plumbing

• **Renovation and Historical Projects** – Accommodates restrictive site and structural concerns, no trenching or cutting of slab. The piping system provides flexibility in plumbing fixture layout and building design.

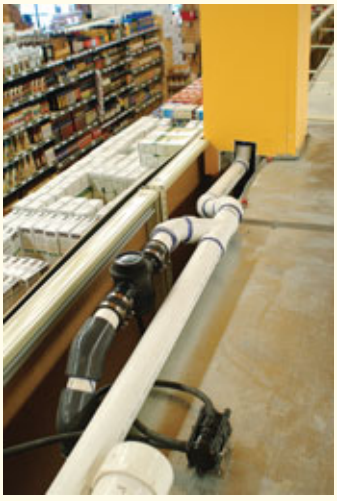
• **Renovations** – Installation is quick and easy. It can be performed after-hours, eliminating customer inconvenience and liability issues. Since the plumbing is done within the envelope of the building there is no washed out concrete slab or rain delays. There is no cutting into the existing electrical, refrigeration or sewer lines.


Floor Free of Patches


Over-head Piping

• **Open Architectural Design** – Enhances space utilisation as it requires less space to install. The piping system is typically installed overhead with other mechanical or electrical systems. It eliminates the need to provide vent and waste stacks, thus reducing material and labour costs.

• **Versatile** – The piping system uses a smaller diameter pipe than gravity waste systems, yet it can accommodate a range of waste types and flow rates. With a vacuum system, changing the piping connection to go in a new direction is simple and allows for last minute design changes.


Versatile Design

• **Facility Use** – Allows existing buildings to be developed when traditional systems are cost prohibitive, due to:
• Structural limitations such as a post tension slab;
• Restrictive site issues like bedrock, inappropriate inverts, or a historical building categorisation; or
• Embedded contaminant in the floor or slab similar to asbestos or other pollutants.

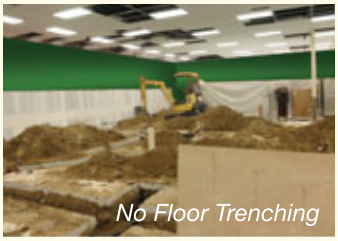

Eliminates Main Line Back-ups

• **High Water Table** – Since waste is pushed by air pressure, shallow but long piping runs are possible. This eliminates or minimises the need for dewatering and trench stabilisation which may be required in areas with high water tables or unstable soil conditions.

• **Fixture Placement** – In an existing building plumbing fixtures and refrigeration systems can be relocated or added to any part of the building. The space can be adapted to new occupant or design needs. Turn any space into valuable space with a versatile plumbing system!

Cost Savings Benefits of Vacuum Plumbing

• Time
Time equals money.


No Floor Trenching

• Construction Costs
Eliminates or significantly reduces potential floor cutting and saves weeks in the overall construction cycle.

• Post Tension Slab or Structural Slab Renovation
Eliminates the costly expense of having to x-ray the slab to find specific locations that are free of cables where a hole or trench could be cored for piping or waste pipe connection.

• Water Savings – Reduces potable water consumption for toilets by as much as 68% and reduces sewage waste discharge with a 1.8 litre toilet flush.

• Installation Materials and Labor – Labour and material costs are reduced since the installation is generally above ground and smaller diameter water and waste piping are used. The costs associated with vent stack piping and expensive roof penetrations are also eliminated. The above-ground installation saves construction or renovation time and labour. On renovation work, the savings can be substantial depending on the size of the existing facility and the length and depth of trenching required for gravity waste pipe tie-in. Typical savings are 30% and in some cases much higher.

• Other Cost Saving Benefits:

- Eliminates problems with miss-location of floor drain stub-ups, floor sinks and cleanouts.
- Minimises cost impact and work required for engineering or design changes.
- Can significantly reduce sewage (variations) fees.
- Minimises customer inconvenience and increases safety for staff and customers when used in commercial retail project renovations.
- Minimises any potential plumbing renovation impact on lower level tenants in multi-story buildings.
- Vacuum drainage equipment can be capitalised, depreciated and taken with the owner if the business is relocated.

Did You Know: In a recent comparison for an average size correctional facility, the cost impact of the vacuum system compared to gravity was approximately $30 per square metre. When projected water savings were taken into account, the payback on the additional cost was less than five years.

Flexibility to Move and Add Refrigeration

Did You Know: Depending on the depth of the sanitary sewer and the distance to a point of connection with existing sewer service, the cost of gravity waste pipe trenching can be expensive – in some instances over $700 per lineal metre. After less than 35 lineal metres at this rate, an Avac system can provide a cost saving solution!

Service and Maintenance Benefits of Vacuum Plumbing

• **Reliable** – With hundreds of installations, small and large, worldwide, our systems have a proven track record of providing reliable and efficient performance.

• **Low Maintenance** – The vacuum interface components have been tested to well over one million cycles without failure. These components have no regular preventive maintenance requirement.

• **Plumbing Issues** – The operational dynamics of a vacuum system results in fewer main-line blockages, reducing maintenance cost and disruptions.

Health, Safety and Welfare Benefits of Vacuum Plumbing

• **Indoor Air Quality** – Since there is no waste line trenching required, issues associated with concrete dust or asbestos abatement are eliminated and a healthier, safer environment can be maintained on renovation projects.

• **Maintain the Existing Slab** – No open trenches during the installation of the system, eliminates construction safety issues.

No Open Trenches

• **Environmental** – A vacuum toilet uses only 1.8 litres of water per flush. This provides significant savings in the water supply and sewage disposal costs. These features may contribute to Green Star credits.

• **Safety** – Designed to provide complete redundancy on all primary Vac Centre components. This includes dual collection tanks and multiple pumps.

• **OSH Compliance** – Reduces compliance issues as there are no open trenches and the project can be open to the public.

Healthier Environment

• **Health Hazards** – Creates a cleaner environment and reduces the health hazards associated with gravity drainage. Since the piping system is maintained under a continuous vacuum, waste water and debris is drawn into the system, not out, eliminating any issue or concern with waste piping leaks.

• **Health Authorities** – The system reduces any health risks associated with sewage waste line back-up at the fixture. Because toilets flush by drawing air into the toilet bowl, there is no splash or flush plume during the flush cycle.

Potential GBCA Credits Associated with an Avac Vacuum Plumbing System:

• **Water Use Reduction –** Increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems. Employ strategies that in aggregate use less water than the water-use baseline calculated for the building. Use high-efficiency fixtures water closets and urinals.

• **Innovative Wastewater Technology** – Reduce generation of wastewater. Reduce potable water use for building sewage conveyance by 50% through the use of water-conserving fixtures such as water closets and urinals.

• **Building Reuse** – Extend the lifecycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials, manufacturing and transport. Consider reuse of existing, previously occupied buildings, including structure, envelope and elements. Upgrade components that would improve energy and water efficiency.

• **Innovation in Design** – To be awarded points for exceptional performance above the requirements set by the GBCA Green Building Rating System.
Apply strategies or measures that demonstrate a comprehensive approach and quantifiable environment and/or health benefits.

Why Vacuum Plumbing is the Environmental Choice

A typical vacuum system can reduce potable water consumption for toilets by 68 percent with a highly efficient vacuum flush toilet requiring only a 1.8 litres per flush. Of the many benefits vacuum plumbing offers, the water and waste treatment savings are one of the most important features of this technology. The water savings can be thousands of dollars and gigalitres of water savings per year for larger applications.

Did you know: A 500 person commercial office building that is serviced by a single vacuum centre and 1.8 litre per flush vacuum toilets will save over 1 million litres per year, compared to conventional low flush toilets.

Project Can Be Completed in a Confined Space with Little Disruption to Facility

What is a Vacuum Plumbing System?

Vacuum plumbing systems are simple and viable alternatives to underground piping that uses the combined energies of vacuum pressure and gravity for the collection, conveyance and disposal of waste through a piping network that can be routed above ground.

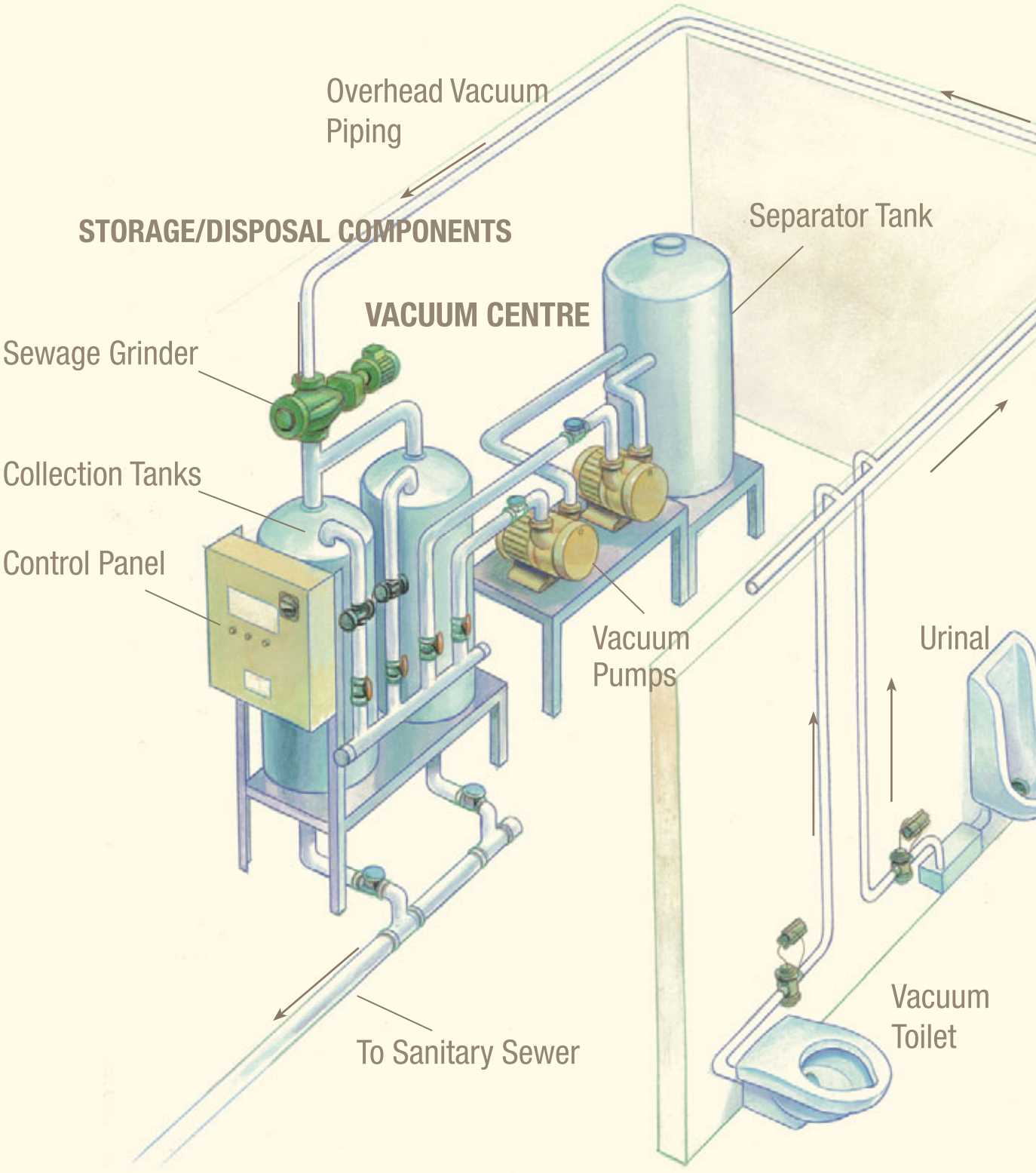
Vacuum drainage operates on the principal of having a majority of the plumbing system under a continuous vacuum. Hundreds of vacuum drainage systems are in operation around the world and are accepted by most code authorities. In addition, many local and state plumbing codes have also accepted vacuum plumbing as an approved alternative for a variety of waste types including condensate, grey water, sanitary waste and grease waste.

When to Choose an Engineered Vacuum Plumbing System

While a vacuum plumbing system can be used on virtually any project, certain design and construction conditions may make it the most cost effective solution available.
Here are some examples:

Conditions	Select Vacuum	Select Conventional
Proven technology	•	•
Conventional and low volume flush toilets	•	•
No space restrictions, site issues, water saving requirements or cost concerns		•
Limited amount of cutting, trenching and digging to tie into existing sanitary sewer		•
Renovation construction/reuse of existing space in which there is limited existing points of connection to sanitary sewer and a moderate amount of waste line trenching is required	•	
Open architecture – with limited existing or available mechanical space – vacuum reduces space needed for waste piping	•	
Post tension or structural slab – vacuum eliminates cost of x-ray and trenching	•	
Restrictive site issues, bedrock, unstable soil, high water table, inappropriate inverts – vacuum waste piping is routed overhead	•	
Imbedded contaminates in the floor or slab, such as asbestos or other pollutes – no need to disrupt existing slab – vacuum waste piping is routed overhead	•	
Lack of as built documentation for structures in which there is concern for buried services	•	
Available water and sewage service – vacuum flush toilets require 68% less water per flush and can offer opportunity for reduced sewage impact fees	•	
Reduced maintenance – vacuum waste systems reduce main line blockages	•	
Concern for soil contamination – vacuum waste systems eliminate waste exfiltration	•	

Components of a Typical Vacuum System



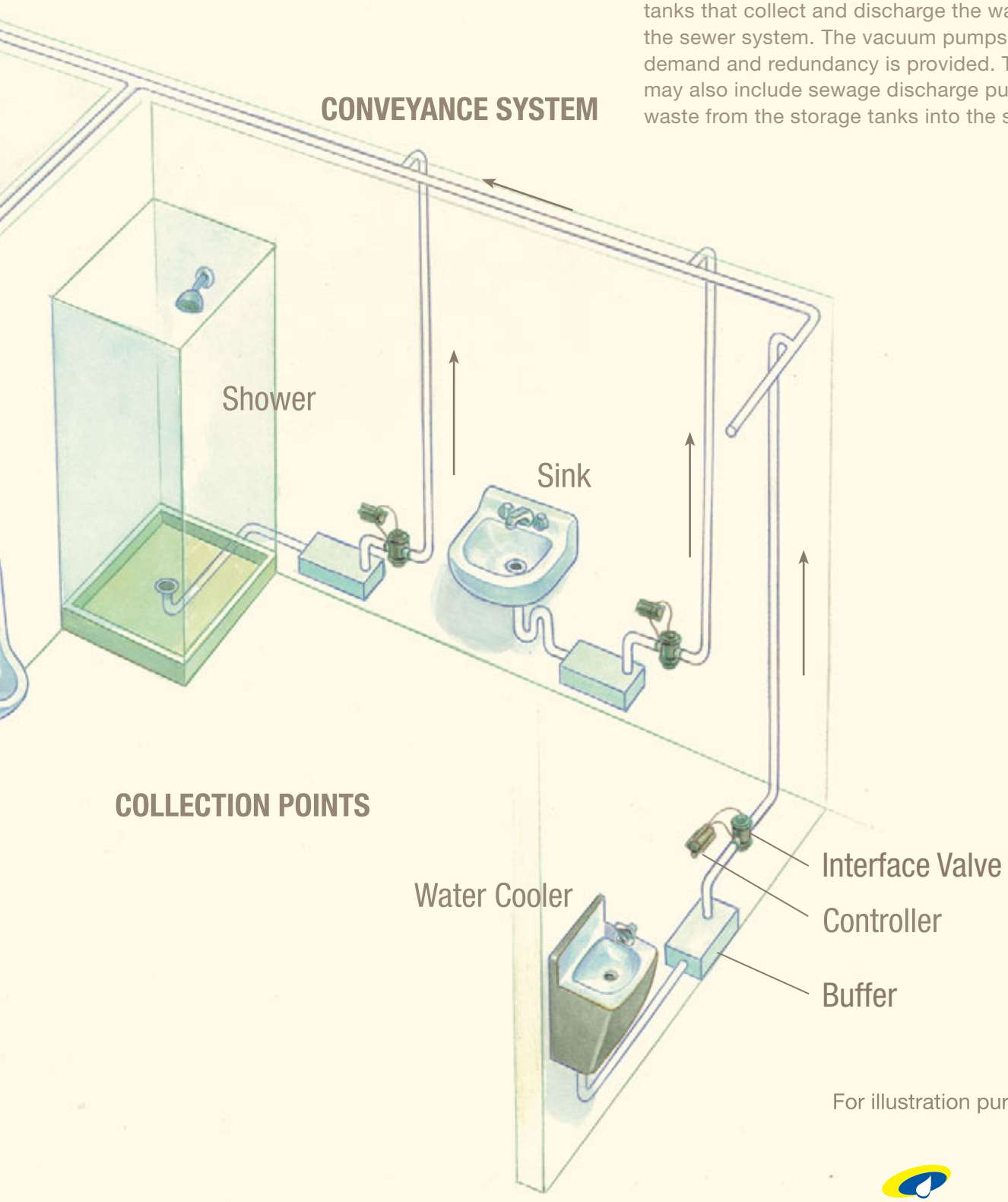
How it Works: An Introduction to Vacuum Sewage and Plumbing Systems

A Vacuum Drainage System consists of three basic components:

1. Collection Points – Typical sanitary and grey water collection points include toilets, sinks, showers, urinals, and drinking fountains. Typical condensate collection points consist of refrigeration coils, service coolers and freezers as well as frozen and refrigerated food display cases.

2. A Conveyance System – The vacuum drainage piping network can be routed where most convenient including overhead or through voids in ceiling spaces. This allows for transport of waste from its point of origin to the vacuum generating station.

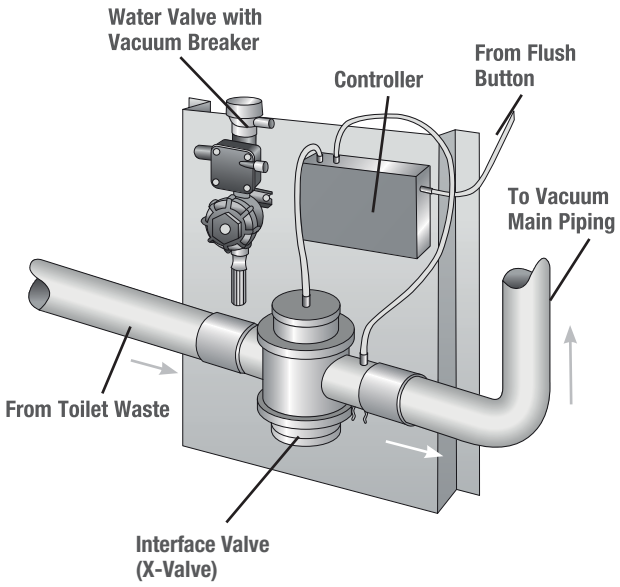
3. Storage/Disposal Components – A vacuum generating station [Vac Centre] includes the vacuum pumps that create a vacuum in the piping and storage tanks that collect and discharge the waste into the sewer system. The vacuum pumps run only on demand and redundancy is provided. The Vac Centre may also include sewage discharge pumps that pump waste from the storage tanks into the sewer.

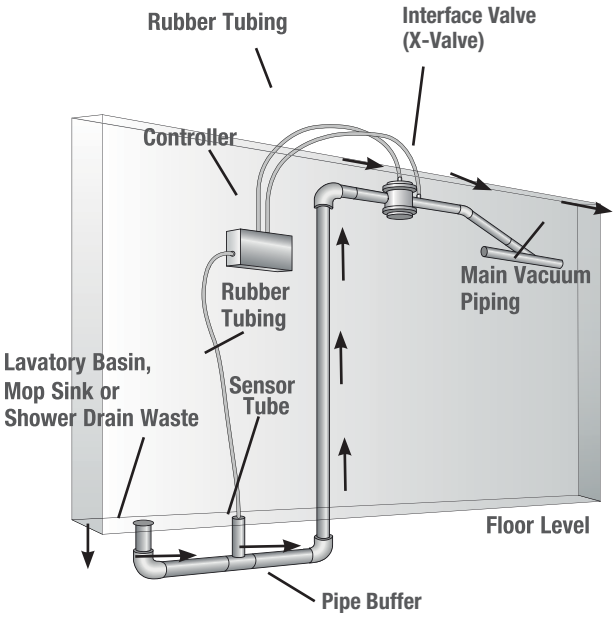


For illustration purposes only

avac Vacuum Plumbing Systems

Toilet Flush and Drainage





Grey Water Drainage

There are three primary components in a vacuum plumbing system:

a) Vacuum Interface Valves and Intermediate Waste Collection Points
b) Conveyance System – The Vacuum Waste Piping Network
c) Vacuum Generating, Waste Collection and Disposal Components

Vacuum Interface Valves and Intermediate Waste Collection Points

The vacuum interface components allow waste to be introduced into the vacuum waste piping network and transported to the vacuum centre. These components include a normally closed Interface Valve, which separates the vacuum in the piping from atmospheric pressure surrounding the fixture, and a Controller, which operates the Interface Valve.

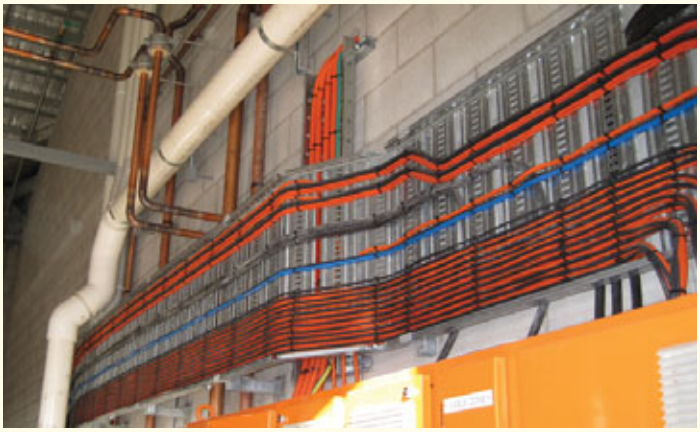
The water closet Interface Valve is connected to the waste outlet, separating the toilet from the piping network. When the flush valve is activated, the Controller opens the Interface Valve, allowing atmospheric pressure at the toilet bowl to push waste through the waste outlet, through the Interface Valve and into the waste piping. Because air is used to transport wastewater, no water is required to initiate the flush cycle. The Controller also activates the flush water valve for rinse and re-fill of the bowl. The opening and closing of the Interface Valve is precisely controlled so that all waste is completely removed from the bowl.

Since only 1.0-1.8 litres of water per flush is required, Avac toilets provide a significant reduction in water use and sewage output. The reduced water requirement also allows water supply line sizing to be significantly smaller than that required for flush valves. In addition, conventional waste venting is not required.

In the case of urinals, flushing sinks and any other non-flushing fixture, the waste drainage process is similar, but typically includes the use of an intermediate waste collection point or Buffer. As waste drains from the fixture, it is temporarily collected at the Buffer. As waste fills the Buffer, a signal is detected by the Controller which opens the Interface Valve. This causes air to enter the Buffer, mixing with the waste and transporting the resultant emulsion into the piping network.

Conveyance System – The Vacuum Waste Piping Network

The vacuum waste piping or conveyance system is a closed piping network that is typically maintained under a continuous vacuum pressure of 55 – 65 kPa and is generally fabricated out of standard pressure rated PVC, Copper, High Density Polyethylene, Stainless Steel or other smooth bore, non-porous material. The piping network consists of “risers” or “droppers” which transport the collected waste vertically from the point of origin to horizontal mains and branches leading to the Vac Centre. Much like conventional waste piping, the mains and branches are typically installed with a slope toward the Vac Centre allowing the movement of waste to be assisted by gravity. However, unlike conventional waste piping, a continuous slope to the Vac Centre does



Waste Piping Can Be Routed Over-head, Horizontally

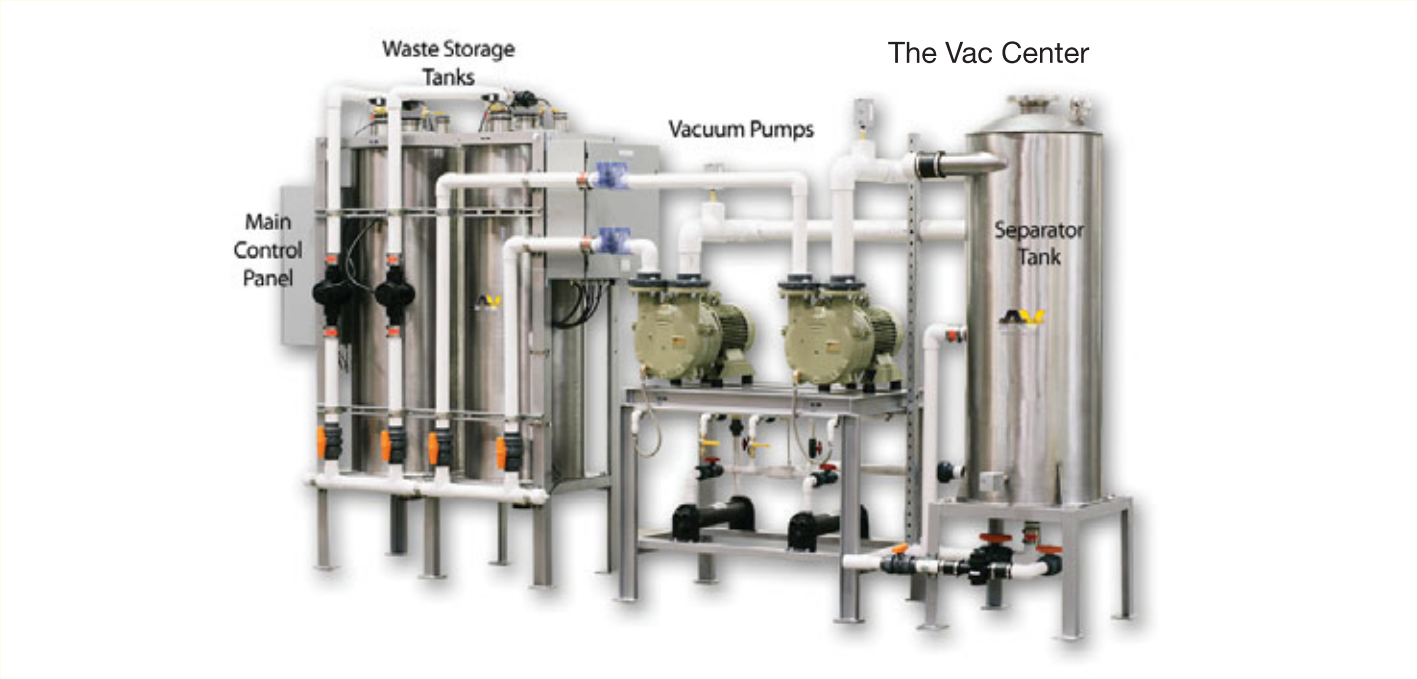
not need to be maintained. The vacuum waste piping network can be offset to recover grade, which allows the piping network to route horizontally over long distances in very shallow space. In addition, the vertical or horizontal piping can be easily offset to route around obstacles in it's pathway toward the Vac Centre. This feature can provide a significant benefit to the designer and installer when mechanical space is limited or when a conventional waste piping network can't be readily accommodated or installed.

Vacuum Generating, Waste Collection and Disposal Components – The Vacuum Centre

Commonly referred to as the "Vac Centre", the vacuum generating station includes vacuum pumps to create a continuous vacuum pressure within the piping network, and storage tanks that collect and discharge the waste, typically into the facilities sewer main. In the case of sanitary waste, the Vac Centre waste storage tanks are directly connected to sanitary sewer waste lines. Vacuum systems which provide drainage for greasy waste from food storage, display, or food preparation utility sinks are designed to allow for drainage from Vac Centre waste collection tanks into grease interceptors, while vacuum systems processing condensate and grey water typically drain to a sanitary sewer, but can be routed for reuse in toilet flushing etc.

The vacuum waste piping network is directly connected to the Vac Centre waste storage tanks. Waste travels under vacuum pressure from the fixture, through the piping network and into the Vac Centre waste storage tanks, where it is temporarily held before discharge to sanitary waste lines or treatment equipment. Operation of the vacuum pumps and waste collection tanks is fully automated by controls provided with the Vac Centre. The size of the vacuum pumps and waste collection tanks are determined by the total and potential future waste loads. In all cases, the Vac Centre waste collection tanks and vacuum pumps are always selected and designed to provide redundant capacity.

The Vac Centre controls automate the operation of the vacuum pumps which run only on demand as required to restore vacuum pressure to the waste collection tanks and piping network. Optional features allow remote visibility of the system operating status as well as visibility and control of individual valve operation.



Avac Products and Services
We Can Assist You through the Entire Construction Process

Design • Construction • Operations • Maintenance

All Avac valve components are manufactured in the USA. The system is supported through our nationwide support network. We offer direct assistance with system design, sizing, code approval, plan review, installation training, site visits, system start-up and commissioning.

We Are Committed to Service

Our Championship Vacuum Plumbing Products Series

Avac is pleased to offer the Championship Vacuum Plumbing Series for smaller applications. The Championship Series vacuum centres are tailored for projects with limited drainage requirements. They are designed to provide a fast and practical drainage solution for most retrofit, remodel and new construction environments.

The Championship Series eliminates the requirement for costly saw cutting and trenching for renovation projects requiring drainage where no immediate access to conventional underground sanitary waste lines exist, and allows projects to be completed in a fraction of the time.

What is best about the Championship Series is that it provides a framework for system sizing and application. Our systems are competitively priced to provide a cost saving alternative to conventional plumbing fixtures and equipment. These systems can be installed practically anywhere to supply drainage - even at remote locations in an existing building. They are great for tenant applications, big box retailers and distribution centres.

Championship Series Products	Descriptions						
	Collection Tanks	Vacuum Pumps				Capacity*	
System and Series Numbers	Qty	Volume Litres/ tank	Type	Qty	kW	Maximum “LPV”	Maximum Continuous Flow
AVAC3100-121	1	115	Liquid Ring	1	1.5	20	20 LPM
AVAC3100-221	2	115	Recirculating Liquid Ring	2	1.5	35	55 LPM
AVAC3101-221	2	115	Recirculating Liquid Ring	2	2.25	55	55 LPM
AVAC3200-221	2	230	Recirculating Liquid Ring	2	3.75	75	115 LPM
AVAC3300-331	3	230	Recirculating Liquid Ring	3	3.75	95	230 LPM

*The maximum capacity of each system is based on maximum load point value or “LPV” (see chart above) and maximum continuous flow rate.

After Sales

Planning

Avac offers comprehensive coordination with the consultant engineers and owner during the design phase of the project to assist system sizing, piping layout, and specification development. This includes a review of the scope of the project and drainage requirements, the creation of installation details and recommendations to the consultants for piping layout.

Construction and Commissioning

Avac can help the contractor coordinate the commissioning of all areas of the system, along with diagnostic evaluation and recommendations for resolution of any areas of concern to ensure a functional and efficient installation.

Installation

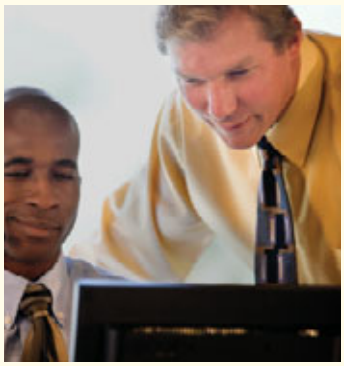
Avac offers installation training for the installing contractor, covering system dynamics and proper installation requirements, supplemented by periodic inspection of the installation with detailed eporting regarding completion and correction of any installation deficiencies.

Training, Support and Follow-up

Avac offer on-site training for facility maintenance staff, this will include an overview of the vacuum system, and comprehensive training in basic maintenance and trouble shooting.

Service

Avac delivers technical support through our Sales Engineering and Technical Services Departments. Our staff and representatives are available to facility maintenance personnel for telephone consultation on an ongoing basis. We have offices in Brisbane, Sydney, Melbourne and Auckland with trained contractors in other regions.



Championship Vacuum Plumbing Products Series

Selecting the Right System

To select an appropriate Vacuum Center, you need to know the following:

- The type of equipment requiring drainage,
- The collective load point value (LPV) of the fixtures and equipment requiring drainage
- Maximum anticipated continuous flow in litres per second, from all drainage combined.

If you need assistance, please contact Avac's Sales Engineering Department at 1300 123 451 or by email at info@avac.com.au. You can find us on the web at www.avac.com.au.

Load Point Value	Project Data (Fill in the Blank)		
Fixture Type	LPV per Fixture	Quantity of Fixture Type	Total Item Value (Multiply Quantity By LPV Value)
Vacuum Toilet; 1.8 LPF	7		
Urinals	3		
Hand Wash Basin	1		
Floor Drains	5		
Mop or Utility Sink	5		
Multiple Bay Prep Sinks	10		
Misting Systems	1		
Refrigerated Case Equipment	.5		
AC Units	4		
		Total Project Load Points Value	

Sizing Your Champion

1. Calculate the total fixture load requirement by adding the total point value for all equipment requiring vacuum drainage.

2. Refer to the Maximum LPV in the table on page 16 to select the appropriate system.

3. Calculate the continuous flow rate for all fixtures combined. To do this, consider the normal use of the fixtures and equipment. Add the anticipated litres per second flow from all fixtures that might require drainage at the same time.

An Example of Sizing Your Champion:

A stocking and distribution warehouse with men's and women's bathrooms

Load Point Value	Project Data		
Fixture Type	LPV per Fixture	Quantity of Fixture Type	Total Item Value (Multiply Quantity By LPV Value)
Vacuum Toilet; 1.8 LPF	7	3	21
Urinals	3	1	3
Hand Wash Basin	1	2	2
Floor Drains	5	2	10
Mop or Utility Sink	5	1	5
Multiple Bay Prep Sinks	10	0	0
Misting Systems	1	0	0
Refrigerated Case Equipment	.5	0	0
AC Units	4	0	0
		Total Project Load Points Value	**41**

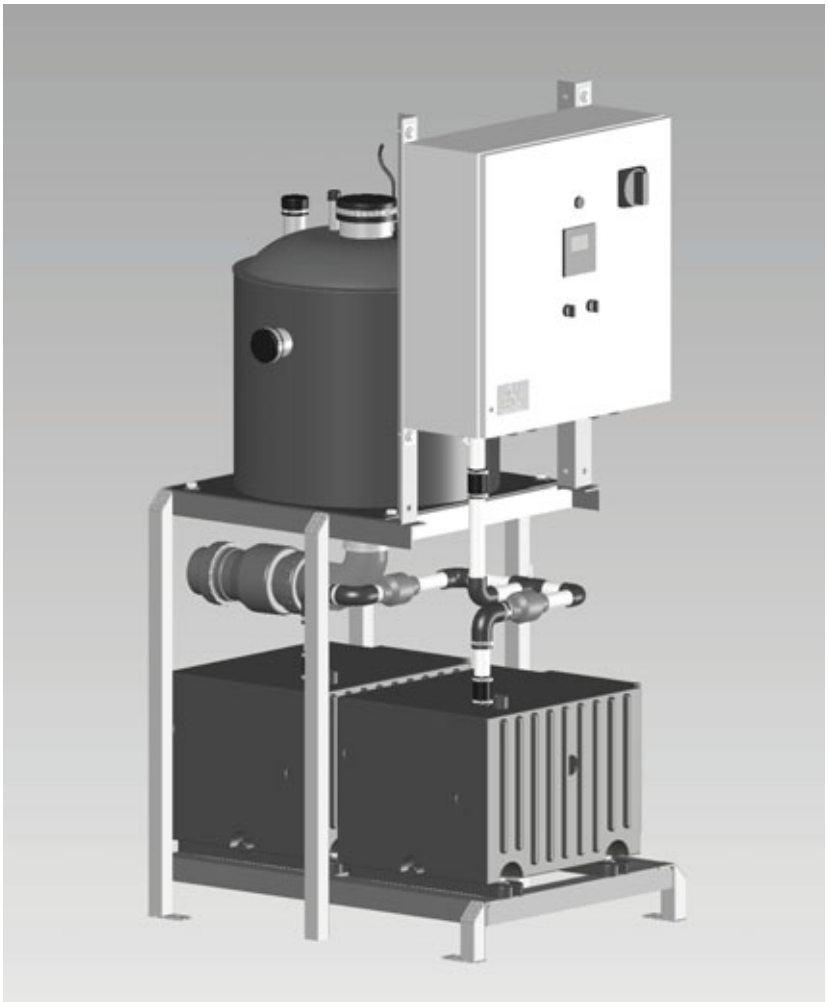
In this example, the total Load Point Value is 41. This point value indicates AVAC3101-221, from the Championship Series Products table – provided that the anticipated continuous in-flow rate from all fixtures combined does not exceed 55 Litres per minute. If the anticipated continuous in-flow rate exceeds 55 Litres per minute, then select the system rated for 115 Litres per minute.

Championship Series Products	**Descriptions**						
	Collection Tanks	**Vacuum Pumps**				**Capacity***	
System and Series Numbers	Qty	Volume Litres/ tank	Type	Qty	kW	Maximum "LPV"	Maximum Continuous Flow
AVAC3101-221	2	115	Recirculating Liquid Ring	2	2.25	55	55 LPM

*The maximum capacity of each system is based on maximum load point value or "LPV" (see chart above) and maximum continuous flow rate.

If the anticipated continuous in-flow rate exceeds the product offering within the Championship Series, please contact Avac's Sales Engineering Department at 1300 123 451 or +61 2 8567 0345, or by email at info@avac.com.au. You can find this calculator and other product details on the web at www.avac.com.au.

Championship Series
AVAC3100-121



Descriptions						
Collection Tanks	**Vacuum Pumps**				**Capacity***	
Qty	Volume Litres/ Tank	Type	Qty	kW	Maximum "LPV"	Maximum Continuous Flow
1	115	Recir-culating Liquid Ring	2	1.5	20	20 LPM

*The maximum capacity of each system is based on maximum load point value or "LPV" and maximum continuous flow rate.

Product Description

Single frame factory assembled vacuum centre consists of a single 115 litre Type 304 stainless steel waste collection tank, two 1.5 kW recirculating water sealed liquid ring vacuum pumps and a PLC driven automatic control panel.

Features:

- Compact Design:
  1040mm Long x 700mm Wide x 1800mm Tall

- System Weights:
  - Dry: 300kg
  - Wet: 475kg

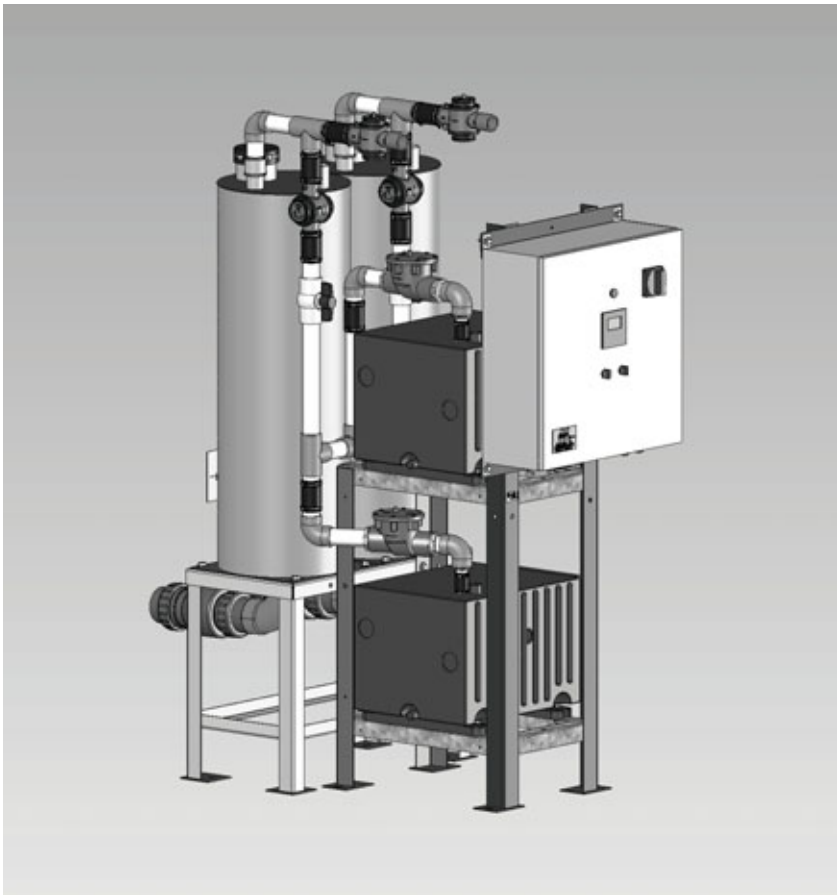
- 115 litre Type 304 stainless steel waste collection tank has DN50 pipe size side waste inlet connection and DN80 swing check waste outlet connection.

- Dual 1.5 kW vacuum pumps each have a DN15 water supply inlet for pump water jacket fill float valve and a DN15 overflow outlet. Pump water is fully recirculated through a cooling system requiring no continuous water supply.

- Industrial grade panel has PLC driven automation control of vacuum pumps and waste collection and discharge cycles. Panel includes a main disconnect, an alarm light, HOA switches, and an operator interface with digital display which shows vacuum system pressure and alarm status.

- Available 3-Phase 50 Hz Voltages:
  - 415 VAC – 7 FLA

Championship Series
AVAC3100-221



Descriptions						
Collection Tanks	Vacuum Pumps				Capacity*	
Qty	Volume Litres/ Tank	Type	Qty	kW	Maximum "LPV"	Maximum Continuous Flow
2	115	Recir-culating Liquid Ring	2	1.5	35	55 LPM

*The maximum capacity of each system is based on maximum load point value or "LPV" and maximum continuous flow rate.

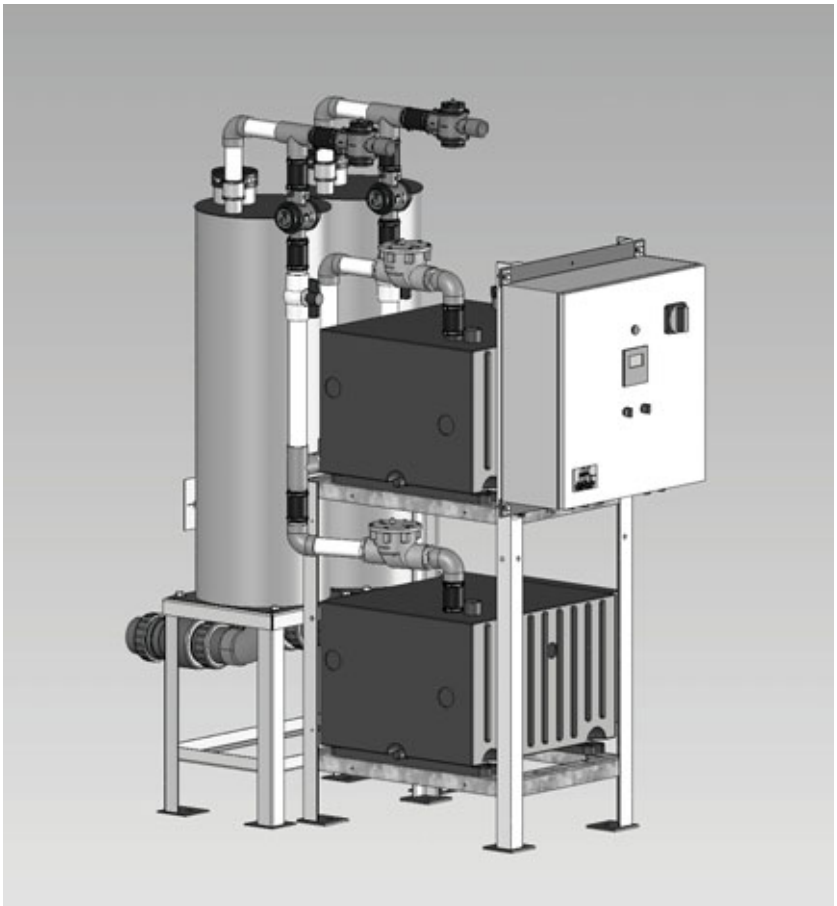
Product Description

Fully redundant factory assembled vacuum centre consists of one frame having two 115 litres Type 304 stainless steel waste collection tanks bolted to second frame having two 1.5 kW recirculating water sealed liquid ring vacuum pumps and a PLC driven automatic control panel.

Features:

- Fully Redundant & Compact Design:
  1540mm Long x 810mm Wide x 1900mm Tall
- System Weights:
  - Dry: 300kg
  - Wet: 600kg
- Dual 115 litres Type 304 stainless steel waste collection tanks each have a DN50 pipe size top waste inlet connection and DN80 swing check waste outlet connection.
- Dual 1.5 kW vacuum pumps each have a DN15 water supply inlet for pump water jacket fill float valve and a DN15 over flow outlet. Pump water is fully recirculated through a cooling system requiring no continuous water supply.
- Industrial grade panel has PLC driven automation control of vacuum pumps and waste collection and discharge cycles. Panel includes a main disconnect, an alarm light, HOA switches and an operator interface with digital display which shows vacuum system pressure and alarm status.
- Available 3-Phase 50 Hz Voltages:
  - 415 VAC – 7 FLA

Championship Series
AVAC3101-221



Descriptions						
Collection Tanks	**Vacuum Pumps**				**Capacity***	
Qty	Volume Litres/ Tank	Type	Qty	kW	Maximum "LPV"	Maximum Continuous Flow
2	115	Recir-culating Liquid Ring	2	2.25	55	55 LPM

*The maximum capacity of each system is based on maximum load point value or "LPV" and maximum continuous flow rate.

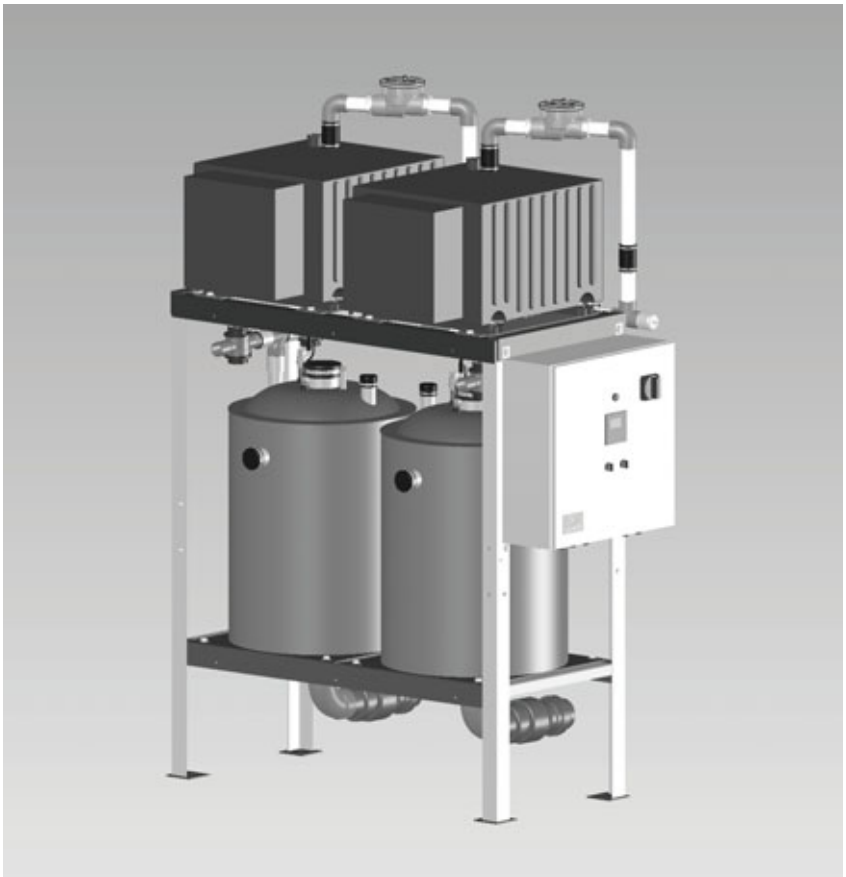
Product Description

Fully redundant factory assembled vacuum center consists of one frame having two 115 litre Type 304 stainless steel waste collection tanks bolted to second frame having two 2.25 kW recirculating water sealed liquid ring vacuum pumps and a PLC driven automatic control panel.

Features:

- Fully Redundant & Compact Design: 1650mm Long x 840mm Wide x 2000mm Tall
- System Weights:
  - Dry: 350kg
  - Wet: 650kg
- Dual 115 litres Type 304 stainless steel waste collection tanks each have a DN50 pipe size top waste inlet connection and DN80 swing check waste outlet connection.
- Dual 2.25 kW vacuum pumps each have a DN15 water supply inlet for pump water jacket fill float valve and a DN15 over flow outlet. Pump water is fully recirculated through a cooling system requiring no continuous water supply.
- Industrial grade panel has PLC driven automation control of vacuum pumps and waste collection and discharge cycles. Panel includes a main disconnect, an alarm light, HOA switches and an operator interface with digital display which shows vacuum system pressure and alarm status.
- Available 3-Phase 50 Hz Voltages:
  - 415 VAC – 12 FLA

Championship Series
AVAC3200-221



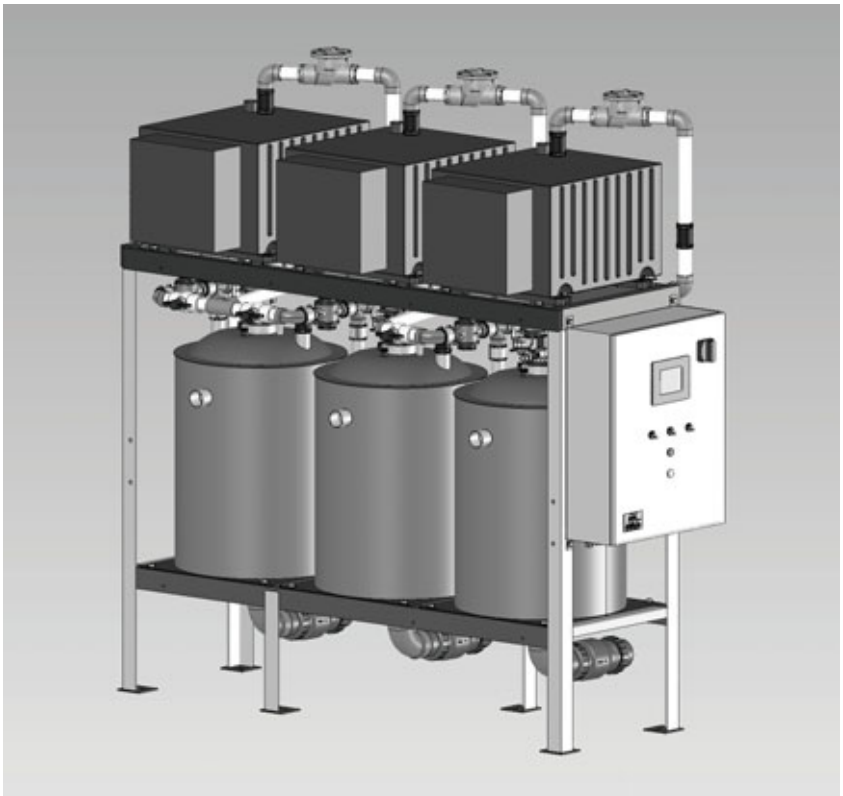
Descriptions						
Collection Tanks	**Vacuum Pumps**				**Capacity***	
Qty	Volume Litres/ Tank	Type	Qty	kW	Maximum "LPV"	Maximum Continuous Flow
2	230	Recir-culating Liquid Ring	2	3.75	75	115 LPM

*The maximum capacity of each system is based on maximum load point value or "LPV" and maximum continuous flow rate.

Product Description
Fully redundant single frame factory assembled vacuum centre consists of two 230 litre Type 304 stainless steel waste collection tank, two 3.75 kW recirculating water sealed liquid ring vacuum pumps and a PLC driven automatic control panel.

Features:
- Fully Redundant Design:
  1650mm Long x 915mm Wide x 2300mm Tall
- System Weights:
  - Dry: 450kg
  - Wet: 1050kg
- Dual 230 litre Type 304 stainless steel waste collection tanks each have a DN50 pipe size side waste inlet connection and DN80 swing check waste outlet connection.
- Dual 3.75 kW vacuum pumps each have a DN15 water supply inlet for pump water jacket fill float valve and a DN15 overflow outlet. Pump water is fully recirculated through a cooling system requiring no continuous water supply.
- Industrial grade panel has PLC driven automation control of vacuum pumps and waste collection and discharge cycles. Panel includes a main disconnect, an alarm light, HOA switches and an operator interface with digital display which shows vacuum system pressure and alarm status.
- Available 3-Phase 50 Hz Voltages:
  - 415 VAC – 20 FLA

Championship Series
AVAC3300-331



Descriptions						
Collection Tanks	**Vacuum Pumps**				**Capacity***	
Qty	Volume Litres/ Tank	Type	Qty	kW	Maximum "LPV"	Maximum Continuous Flow
3	230	Recir-culating Liquid Ring	3	3.75	95	230 LPM

*The maximum capacity of each system is based on maximum load point value or "LPV" and maximum continuous flow rate.

Product Description

High Capacity fully redundant single frame factory assembled vacuum centre consists of three 230 litre Type 304 stainless steel waste collection tank, three 3.75 kW recirculating water sealed liquid ring vacuum pumps and a PLC driven automatic control panel.

Features:

- High Capacity Fully Redundant Design: 2300mm Long x 915mm Wide x 2300mm Tall
- System Weights:
  - Dry: 650kg
  - Wet: 1500kg
- Triple 230 litre Type 304 stainless steel waste collection tanks each have a DN50 pipe size side waste inlet connection and DN80 swing check waste outlet connection.
- Triple 3.75 kW vacuum pumps each have a DN15 water supply inlet for pump water jacket fill float valve and a DN15 overflow outlet. Pump water is fully recirculated through a cooling system requiring no continuous water supply.
- Industrial grade panel has PLC driven automation control of vacuum pumps and waste collection and discharge cycles. Panel includes a main disconnect, an alarm light, HOA switches and an operator interface with digital display which shows vacuum system pressure and alarm status.
- Available 3-Phase 50 Hz Voltages:
  - 415 VAC – 30 FLA

Complementary Products

The Interface Valve
The interface valve is a normally closed device that separates the vacuum and the piping network from atmospheric pressures surrounding the buffer.

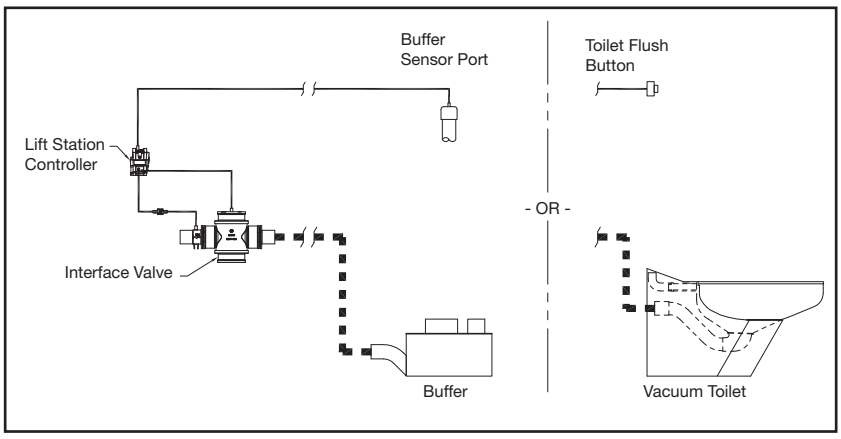
The Buffer
The buffer is a container that collects waste. It is directly connected to the waste outlets of a fixture, and collects waste via gravity. When the level in the buffer reaches a certain point the interface valve opens and the level is reduced via vacuum produced at the vacuum centre.

Avac Vacuum Waste System Toilets: Stainless Steel & Vitreous China toilets
The Avac Vacuum Toilet is made for ultra-efficient 1.8 litre per flush water usage with the Avac Vacuum Waste System. The toilets are elongated bowl design with wall water supply and wall waste outlet connections. Models offered are economical vitreous china, durable stainless steel or colour enhanced Enviro-Glaze powder coat finished stainless steel. Vitreous china vacuum toilets are configured for off-floor installations. Stainless steel vacuum toilets are configured for off-floor or on-floor installations.

Three Levels of Vacuum Valve Control and Activation to Enhance Water Management

Pneumatic Control • Master-trol® • Zone Control

AVAC Pneumatic Manual Valve Control System



Features:
- Low cost
- Vacuum powered – no electrical service required
- Pneumatic Controller includes manual activation button and adjustable valve control timing.

ADVANTAGES	DISADVANTAGES
No Electrical Power Required	No Visibility
Lowest Initial Cost	Limited Adjustability
	No Extra Functionality or Control

Product Description
The Avac pneumatic control system is a low cost alternative to vacuum valve operation and control. The system includes pneumatic controllers which are used to operate the waste interface valve. The valve controller is non-networked and is powered by vacuum pressure from the system, and thus requires no electrical service.

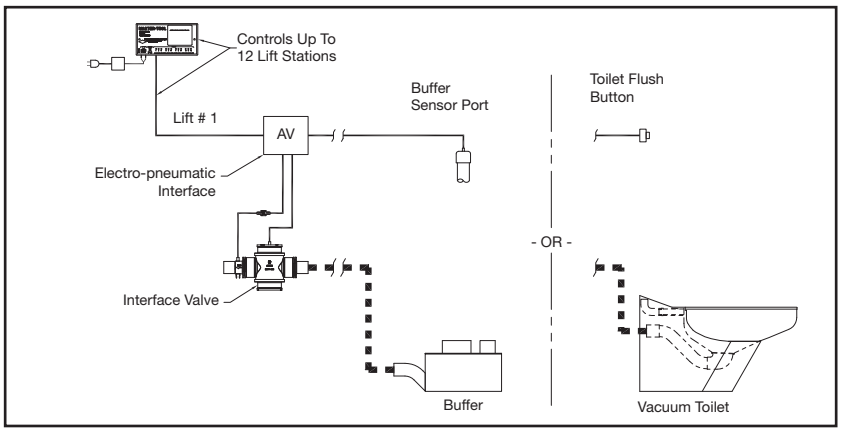
How it works:
When the flush pushbutton on a toilet is pressed or when a change in pressure occurs at the buffer, a pneumatic signal is received at the Controller. When this signal is received, the Controller uses vacuum from the system to open the waste interface valve for a pre-set period of time sufficient to remove the waste from the buffer or the toilet. Once the cycle is complete, the waste interface valve closes. The Pneumatic Controller includes a timing mechanism that can be field adjusted.

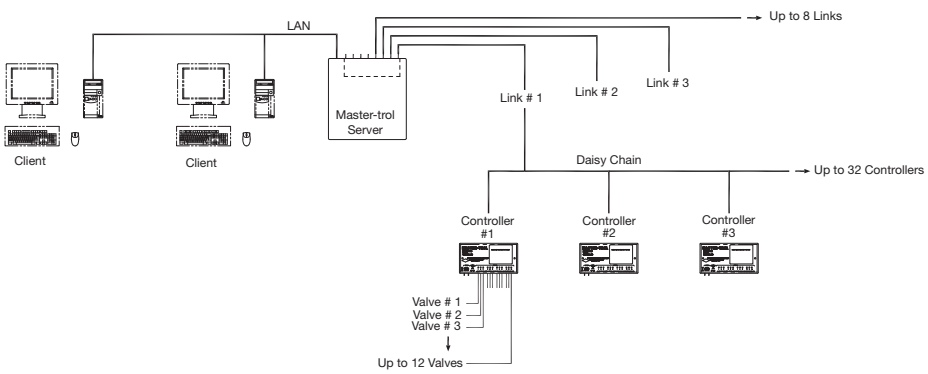
Avac Master-Trol® Electronic Valve Control System

Features:

- Provides additional security and control for prison projects - can be used to prevent floods or abuse of water and waste valves.
- Easy installation
- Assists in regulating water use in large facilities and contributes to overall reduction in water consumption.
- Complete control and visibility of up to 3,072 valves

ADVANTAGES	DISADVANTAGES
Inexpensive Electronic Valve Control	More Expensive Than Pneumatic Valve Control
Precise, Repeatable Valve Operation	Limited Networking Capability
Fail Safe Mode	Limited Programmable Features





Product Description

Master-Trol is an electronic valve management system that allows both control and monitoring of water supply and vacuum waste valve activity through a dedicated server and software. All valves are controlled via a 12-port valve controller. The Master-Trol server can also be tied to a local area network which allows for remote monitoring and control of valve activity.

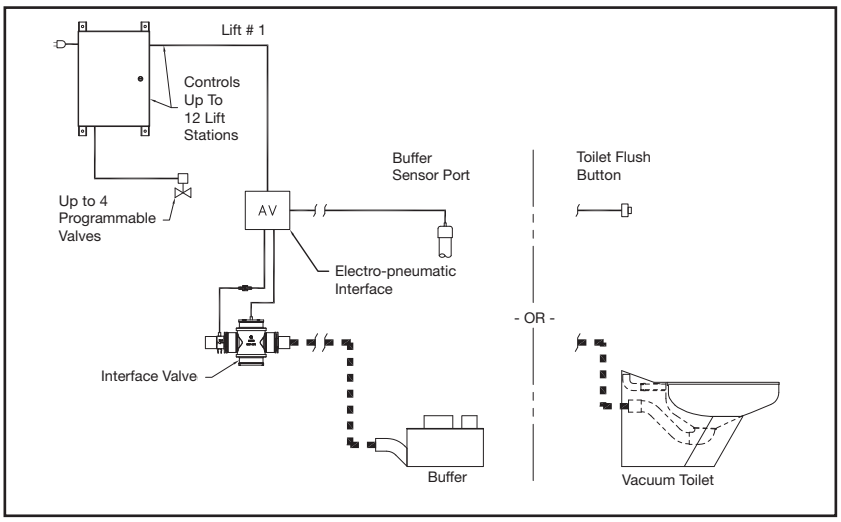
As an example, Master-Trol allows programmed valve operation limiting the number of flush valve activations within a given period of time and as well as limiting when and for how long a water faucet or shower is to remain active.

How it works:

When the pushbutton on the fixtures is pressed, a signal is sent to the Controller, where a microprocessor identifies the valve and scans for pre-programmed options such as lockout settings, and timing restrictions. The controller returns an activation signal to the controller signalling the solenoid operations valve, allowing valve operation.

“Versa-Link” is the communications network that allows for monitoring and adjustment of up to 3,072 valves from a single computer. The Versa-link network, can accommodate up to 8 independent links, each of which can accommodate up to 32 controllers. Each controller provides monitoring of up to 12 individual valves – examples include hot water, cold water, flush valve and waste interface valve.

Avac Zone Control System



Features:

- Individual electronic controller does not require dedicated power source or battery; power for valve control is provided by the Zone Control Panel (ZCP).
- Valve open time is optimised to ensure maximum operational efficiency of the entire system or manual over-ride to a fixed duration
- Data recording is provided which captures all valve activity for future review and programmed operation adjustment
- Fail-safe logic, designed to monitor ongoing lift activity and automatically implement corrective measures in the event of irregular valve operation

ADVANTAGES	DISADVANTAGES
Precise, Repeatable Valve Option	More Expensive than Master-trol® Valve Control
Optimize Waste Interface Valve Operation - Minimize Pump Runtime	
Expanded Fail Safe Operation	
High Speed Networking	
All Valves/Functions Visible and Adjustable at Vac Center	
Historical Data	
Web Access	
Auto Alarm Notification	

Product Description

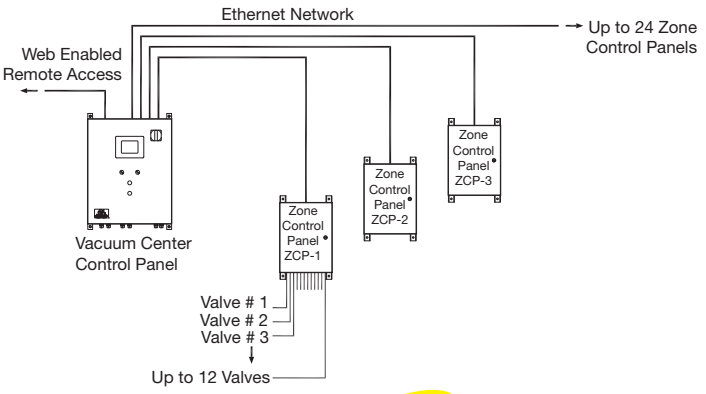
Avac Zone Control is a fully networked electronic valve control system that allows complete visibility and control of individually addressed vacuum waste interface valves and ancillary or special purpose valves used for water supply shut off, flush, rinse or temperature control. Control and communication with individual valves is facilitated through system ZCP, which provide 24VDC power and control function for valves servicing up to 12 individual vacuum lifts. The entire system is designed to accommodate a maximum of 23 Zone Control Panels, or 276 individually addressed vacuum valves and 92 ancillary valves.

The Zone Control System includes local area network communication with all valves which allows them to be remotely monitored and controlled in real time, either from the vacuum centre, or remote locations and building monitoring systems or networks. The system includes “fail-safe” logic, which is designed to monitor ongoing vacuum valve activity and automatically implement corrective measures in the event of irregular valve operation to ensure continuous waste drainage.

How it works:

Each ZCP monitors a fixture for a signal which is created automatically, or by pressing a button. When that signal is received, the ZCP opens a normally closed interface valve to remove the waste from the fixture and transport it to the vac centre. The duration the interface valve is open is precisely controlled and optimised to minimize operation of the vacuum pumps. Each ZCP also provides control activation for up to four programmable ancillary valves associated with the waste interface valve and used to facilitate waste drainage.

Examples include flush valves, rinse valves, temperature control and shut off valves.



avac Vacuum Plumbing Systems

Benefits for Institutional Construction

Prisons • Gaols • Correctional Centres
Designed to Fit Most Any Construction Challenge

- Direct connection of multiple toilets into the same waste stack is eliminated, thereby preventing inmates from passing contraband between cells.
- Vacuum toilets eliminate cell-to-cell communication that inmates often use to create “planned plumbing chaos” by organising large “group flushes” that are typical for gravity drainage systems.
- The operational dynamics of a vacuum plumbing system result in fewer main line blockages, reducing maintenance cost and disruption. When toilet blockages do occur, they are easily located at the fixture, rather than within the waste line. This feature allows staff to easily identify inmates who routinely try to vandalise the plumbing system, promoting significantly improved security and control.
- Individual cells or groups of cells can be “turned off” prior to a security sweep to prevent contraband or other incriminating evidence from being flushed away.
- Vacuum flush toilets do not splash during the flush cycle, significantly reducing the spread of bacteria within the facility, promoting a healthier environment for staff and prison populations.

Installations:
Woodford Correctional Centre Australia
Wacol Mens Australia
Brisbane Womens Australia
Gatton Australia
Maryborough Australia
Lotus Glenn Correctional Centre Australia

Benefits for Food Service Industry

Supermarkets • Convenience Stores • Delicatessens
Designed to Fit Most Any Construction Challenge

- Vacuum drainage systems eliminate the need for underground drainage piping in the sales area.
- Vacuum drainage systems allow existing buildings with limited drainage to be developed for supermarket use when traditional trenching and underground piping upgrades are cost prohibitive because of site or structural conditions such as post tension slab, bed rock, asbestos, high water tables, etc.
- Because trenching is eliminated, store remodel activities are less expensive, safer, more sanitary, and take less time.
- New construction projects can be completed faster, saving construction costs and allowing a facility to be brought online in a more timely fashion. Often, projects can be completed during inclement weather because the facility can be closed before the weather conditions prohibit construction.
- Vacuum drainage systems work in concert with the new “open” architectural store environment where electrical and refrigeration services are brought to display cases from overhead. Drainage can now follow these services, allowing for unprecedented flexibility in store layout.
- Vacuum drainage systems are completely adaptable to last minute merchandising changes.
- Vacuum drainage systems easily accommodate seasonal display requirements.
- Vacuum drainage systems create a cleaner environment and reduce health hazards associated with gravity drains.
- Vacuum drainage equipment can be capitalized and taken with the owner if the facilities are abandoned.

Installations:
Coles
Woolworths
IGA
Target Corporation
Wal-Mart
Trader Joe’s Company

Benefit for Health Care Facilities
Laboratories • Clinics • Medical Centres
Designed to Fit Most Any Construction Challenge

- A vacuum toilet uses only 1.8 litres of water per flush. This provides a significant savings in water supply and sewage disposal costs. These features may contribute to “green building” interests.

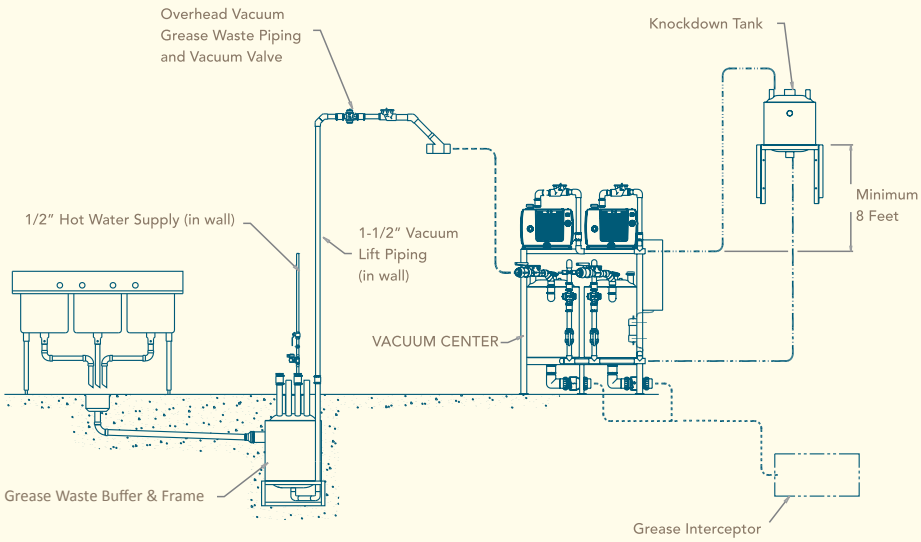
- Creates a cleaner environment and reduces the health hazards associated with renovation in an open facility. The operational dynamics of a vacuum plumbing system prevent waste ex-filtration, ensuring that contaminants stay within the waste piping network. The system dynamics also benefit the facility by reducing main line blockages, resulting in lower maintenance cost and operational disruption.

- The system contributes to a healthier, more sanitary environment, by eliminating the vaporisation of water from the toilet bowl during a flush. This minimises the spread of bacteria around the toilet fixture and within the facility.

- Vacuum provides a solution for routing waste piping through congested, space restricted areas. Because vacuum waste piping can be installed overhead and easily routed around existing mechanical, electrical or structural elements, it facilitates the relocation of plumbing fixtures and equipment without impacting floors below, and without concern for coordination with existing waste piping.

Installations:
Sutter Novato Medical Clinic * Achieved LEED Certification *
Salt Lake City Olympic Medical Clinic University of Utah

Grease Waste Transport System
Designed to Fit Most Any Construction Challenge



Transportation of grease waste effluent from source to interceptor has long been an issue for anyone that creates or works with conventional grease waste plumbing systems. Avac has developed an effective, reliable mode of transportation that conveniently integrates conventional fixtures or floor drains and routes grease waste through a vacuum waste piping network located above grade or slab for direct drainage to a more conveniently located grease interceptor. The system virtually eliminates problems with conventional grease waste line clog and coagulation as well as placement, maintenance coordination and problems associated with local grease traps.

Vacuum Grease Transport Systems are simply a viable alternative to underground piping that use the combined energies of vacuum pressure and gravity for the transport of grease waste effluent through an above piping network that can be routed above grade.

Vacuum drainage systems offer a number of benefits for a grease waste transport system:

- Vacuum transport systems eliminate the need for costly underground grease drainage piping in the sales area on renovation projects.
- Vacuum grease waste drainage replaces point-of-use grease interceptors from the food area with under-slab or above grade Vacuum Grease Buffer(s). This eliminates the odour associated with regular maintenance and cleaning.
- The drainage piping network servicing a vacuum transport system can be installed vertically or horizontally, providing flexibility in layout and building design, thus the Vacuum Grease Buffer and grease interceptor can be placed anywhere in the building.
- The operational dynamics of a vacuum transport system result in significant reductions in grease waste build up in the waste piping network when compared to conventional gravity piping.
- Vacuum drainage systems work in concert with the new “open” architectural store environment where electrical and refrigeration services are brought to display cases from overhead. Grease waste piping within the store can now follow these services, allowing for unprecedented flexibility in store layout.
- Vacuum drainage systems are completely adaptable to last minute merchandising changes.
- New construction projects can be completed faster, providing a construction cost savings and allowing a facility to be brought online in a more timely fashion.

avac

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