



VACUUM PLUMBING SYSTEMS



MORRIS GROUP  
INTERNATIONAL



## Vacuum Plumbing for Laboratories, Clinics, Outpatient Surgical Centers and Medical Centers

A Versatile Engineered Plumbing and Waste Solution for  
Healthcare Design and Construction

## What is a vacuum plumbing system?

AcornVac Vacuum Plumbing Systems allow unlimited freedom and flexibility in building layout, design and construction by offering a plumbing system that uses vacuum to transport wastewater through an engineered drainage piping network before discharge to sanitary waste mains.

AcornVac Vacuum Plumbing operates on the principle of having a majority of the waste piping network under a continuous vacuum. AcornVac Vacuum Plumbing Systems offer architects and designers the freedom to locate plumbing fixtures "at will," allowing an open architectural environment, flexible space planning or solutions for plumbing renovation without disruption to floors below.

## Vacuum Plumbing: The Clean, Convenient, Cost Cutting Choice

Vacuum plumbing offers unique features and benefits that make it particularly well suited for health-care facilities such as outpatient surgical centers, clinics, medical offices, and other healthcare related facilities, such as medical laboratories. Here are some examples:

Features	Benefits
<p><b>Assists in Bacteria Containment</b></p>	<p>AcornVac contributes to a healthier, more sanitary environment in two ways:</p> <ul style="list-style-type: none"> <li>• Eliminates the bacteria laden flush plume from the toilet bowl.</li> <li>• Prevents wastewater piping leaks, significantly reducing contamination due to pipe failure.</li> </ul> <p>In both cases, the spread of bacteria is minimized, assisting with infection control efforts to reduce potential for hospital acquired infection.</p>
<p><b>Reduces Construction Costs</b></p>	<p>Vacuum plumbing reduces mechanical conflicts and problems associated with construction, leading to a faster installation with a lower overall cost.</p> <p>The vacuum waste piping network is typically smaller in diameter. Standard smaller diameter pipe and fittings, as well as the elimination of traditional vent stack requirements, reduce material and labor costs.</p> <p>Vacuum plumbing systems eliminate the need for costly systems used with gravity plumbing.</p> <p><b>For example, AcornVac can eliminate:</b></p> <ul style="list-style-type: none"> <li>• up to 70% of the materials and labor costs associated with vent stacks.</li> <li>• up to 60% of the cost of trenching.</li> <li>• 100% of costs associated with waste grinding/ pump stations.</li> </ul>
<p><b>Allows Greater Freedom in Plumbing Fixture Location</b></p>	<p>Vacuum waste piping can be installed horizontally or vertically because it does not require continuous slope. This allows flexibility in plumbing layout and design for both new construction and remodeling projects.</p>
<p><b>Reduces Maintenance Costs</b></p>	<p>Vacuum plumbing results in fewer waste line blockages thereby reducing costs associated with drainage piping maintenance.</p>
<p><b>Reduces Water Usage</b></p>	<p>The AcornVac toilet uses ½ gallon (2 liters) of water per flush. Water supply and sewage disposal costs are dramatically reduced. Sewer connection fees are also reduced.</p>

# How it Works: An Introduction to Vacuum Sewage and Plumbing Systems for Healthcare Facilities

**A Vacuum Drainage System consists of simple components that work as a system:**

## Toilets

The interface of atmospheric pressure at the toilet bowl and a constant vacuum pressure in the waste piping network provides a highly efficient flush, using only ½ gallon of water. When the push button is activated, the Extraction Valve opens, allowing atmospheric pressure to push toilet waste into the vacuum piping and toward the vacuum center. A water valve is simultaneously activated, allowing the toilet to be rinsed and refilled.

## Lavatories, Showers, Scrub Sinks and Sterilizing Equipment

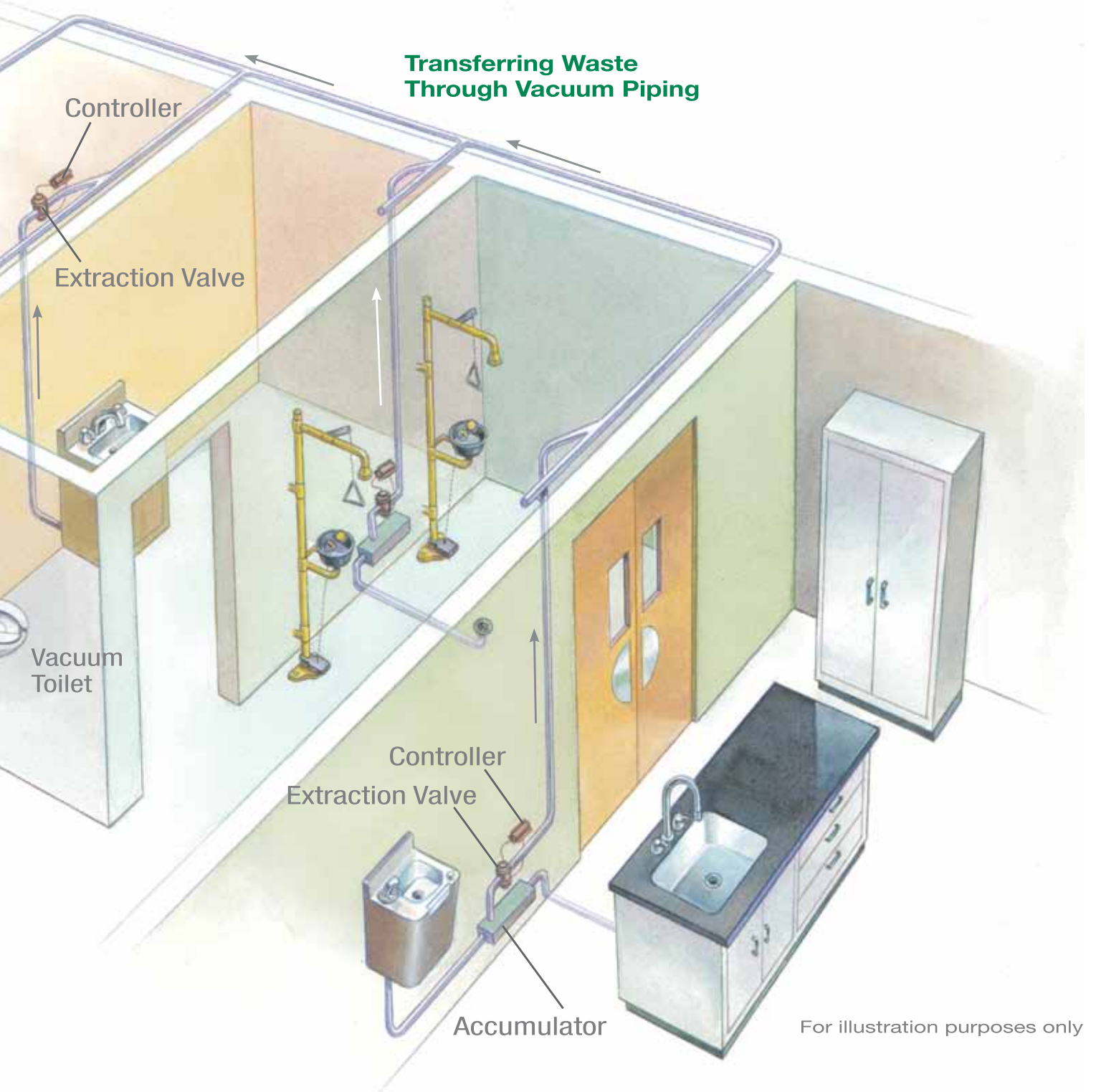
Wastewater from plumbing fixtures flows via gravity into an Accumulator (collection point), typically located behind or below the equipment. When the waste reaches a pre-determined level in the Accumulator, the controller automatically opens the normally closed Extraction Valve, allowing the vacuum to evacuate the collected waste into the vacuum piping network for delivery to the Vacuum Center. Overhead piping can be routed where convenient in the ceiling space or across an entire facility in shallow trenching. AcornVac's vacuum plumbing solutions can easily accommodate special equipment found in most medical facilities, such as scrub sinks and autoclaves.

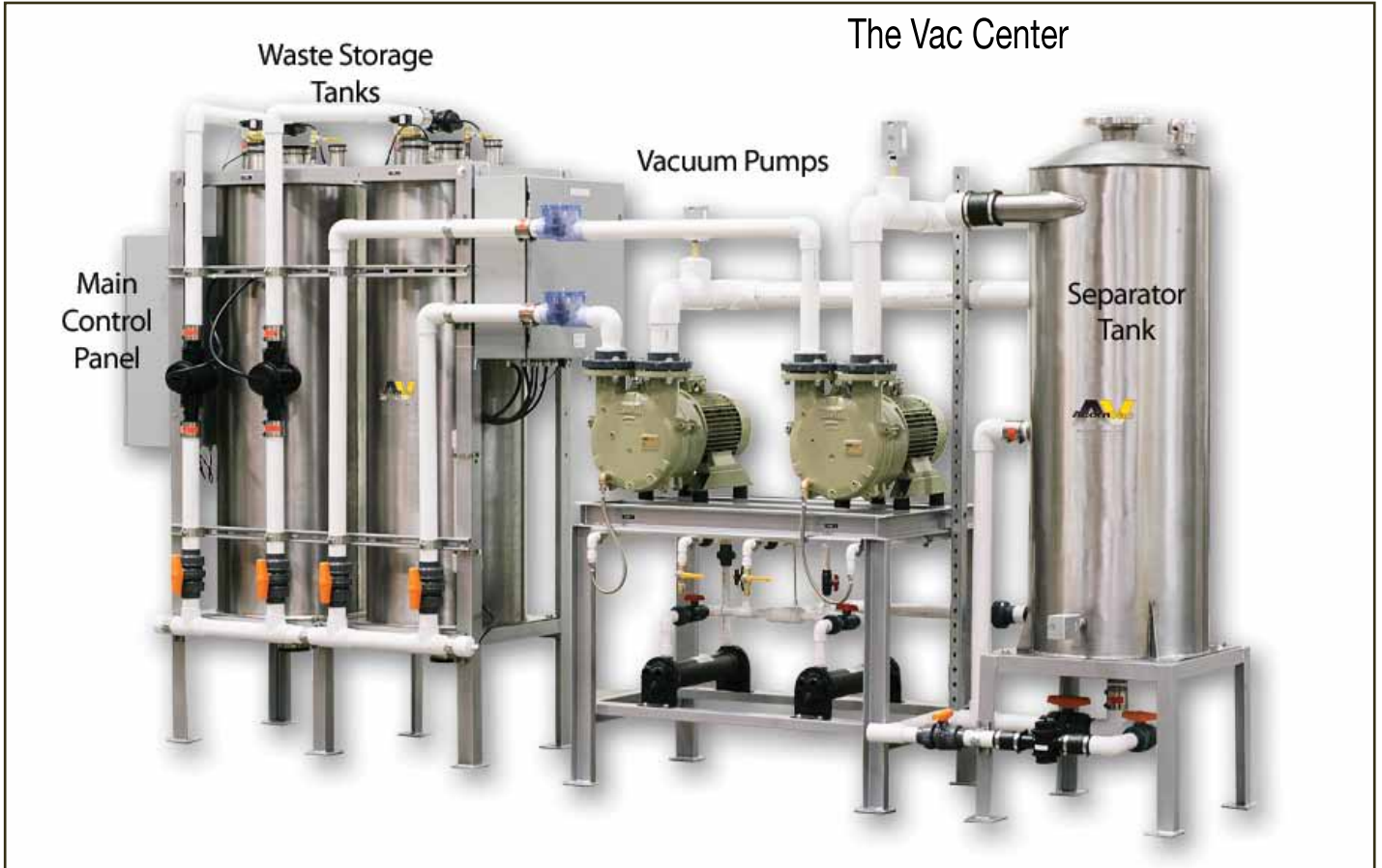
## Vacuum System

The Vacuum Center includes vacuum pumps, waste collection tanks and controls that automate the operation of the system. Waste is delivered from fixtures and equipment to the vacuum center waste collection tanks via the vacuum piping network, where it is temporarily held before discharge to sanitary sewer mains or waste treatment facilities. The vacuum system may also include sewage grinding and discharge pumps to pump waste from the collection tanks into the sewer.



**Collection of Wastewater Through Fixtures and Accumulators**





## AcornVac Prepackaged or Custom Designed Systems with Complete Turnkey Service

### Planning

We offer comprehensive coordination with the engineer of record and owner during the design phase of the project to assist in 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 for piping layout.

### Construction and Commissioning

We help 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

We offer comprehensive installation training for the installing contractor, covering system dynamics and proper installation requirements, supplemented by

periodic inspection of the installation with detailed reporting regarding completion and correction of any installation deficiencies.

### Training, Support and Follow-up

We offer on-site training for facility maintenance staff, including a complete overview of the dynamics of the vacuum system, and comprehensive training in basic maintenance and troubleshooting.

### Service

We offer technical support through our Sales Engineering and Technical Services Departments. Our staff and representatives are available to facility maintenance personnel for telephone consultation at no additional cost on an ongoing basis.



*“AcornVac was very helpful throughout the design process, providing the necessary design and specification input. The installation of the system went very smoothly.”*

Anthony Colacchia,  
M.E. Principal,  
Capital Engineering Consultants Inc.

## AcornVac Keeps Healthcare Facilities Healthier and More Sanitary While Saving You Money



### Benefits for the Healthcare Industry:

- 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.
- System piping and components are routed and accessible within one level of the building, providing further containment of wastewater and eliminating the possibility of contamination of other levels.
- The system contributes to a healthier, more sanitary environment, by eliminating the vaporization of water from the toilet bowl during a flush. This minimizes 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 placement or relocation of plumbing fixtures and equipment without disrupting the floors above or below and without concern for coordination with existing waste piping.
- Hazardous waste created by medical facilities can be disposed of in a closed system and treated prior to discharge so as not to contaminate wastewater going into the sewer system. Hazardous waste can be completely contained in the closed system for safe disposal at a later time using established safe practices for waste decontamination and disposal.



*“Essentially, AcornVac made it possible to do our project in confined space for a reasonable sum, and master control over wastewater from cradle to grave - an impossibility with gravity plumbing...Ninety-five percent of the work was done right within the space. A nice, neat package.”*

Jim Hudspath  
Project Manager  
Center for Medical Science

**“**We have hardly had any costs in maintenance. If something plugs up, it's right there at the fixture, making it easy to isolate and fix. **”**

Dean Barchacky  
Plant Manager, SVSP  
Soledad, California

## Maintenance of Piping Systems is Easy and Convenient with AcornVac

Every plumbing system requires maintenance in order to remain in optimal condition. AcornVac's plumbing systems offer several advantages over traditional gravity plumbing systems when it comes to system maintenance and fixing leaks.



### Traditional Gravity Plumbing Systems

Gravity waste piping is typically located underground or in the ceiling space of the floor below. Leaks in gravity waste piping allow wastewater to drip out of the pipe, creating a breeding ground for infectious material and pathogens and potentially making building occupants sick. Gravity plumbing leaks can go undetected for years, leading to costly repairs that can disturb occupants in every part of a building.



### AcornVac Vacuum Plumbing Systems

With an AcornVac Vacuum Plumbing solution, waste piping can be routed through overhead ceiling space, so finding and correcting vacuum system leaks is easily accomplished. If waste pipes in a vacuum plumbing system develop a leak, air leaks into the pipe — no wastewater escapes the system, leading to a more sanitary environment. Vacuum piping leaks are easily identified with automatic system alarms; since a leak will cause air to enter the system, it will also lead to frequent pump cycling. When this happens, an alarm will be triggered to let building maintenance know of the issue. When the leak is found, it can be repaired in the overhead structure, causing no disruption to building occupants.

## MORRIS GROUP INTERNATIONAL



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