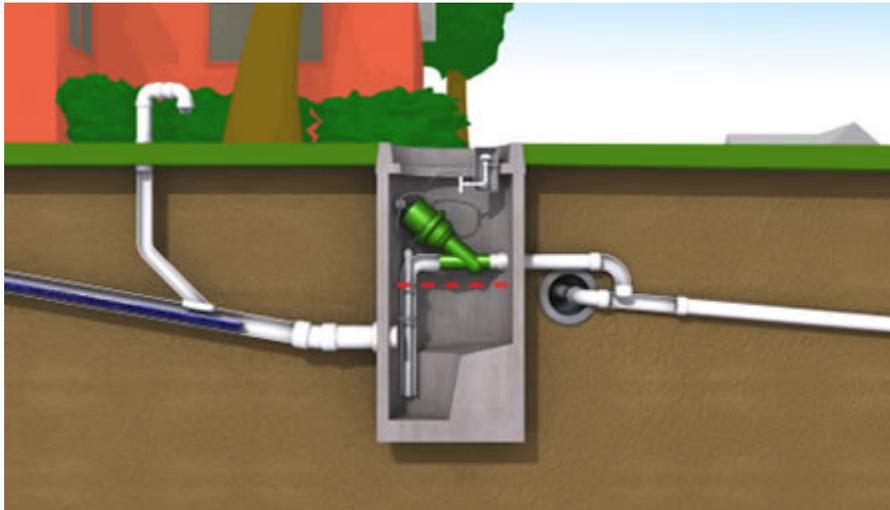


The Collection Chamber

The Collection Chamber connects the transit vehicle to the vacuum sewer system. Wastewater flows by gravity from four to six pickup points into a collection chamber. Located above the sump is a 90mm (3") vacuum interface valve which is pneumatically controlled and operated. As the sewage level rises in the sump, air trapped in the 50 mm diameter sensor pipe pushes on a diaphragm in the valve's controller, signalling the valve to open.



Sideview in concrete collection chamber

This occurs when 40 litres of sewage accumulates in the sump, taking a mixture of air and sewage into the vacuum mains. This mixture enters the mains at 4-6 metres per second liquid velocity which transports the sewage in the pit and any in the vacuum main quickly towards the vacuum pump station.

Collection chambers can be made out of a variety of materials, most commonly, concrete, PE, Fibreglass, or even stainless steel. Eurovac will supply a pit fully fitted out to meet local conditions.

Most operators and installer prefer the new EUROVAC PE chamber which comes fully fitted with the Eurovac valve and all fittings. As it is lightweight, installation is easier as is transportation. Operators prefer the new Eurovac chamber as the valve is located in a separate section ensuring that they come into no contact with the sewage at any point. This partitioning of the chamber also ensures that stormwater cannot enter the system via the lid of the chamber. (*Ask your Eurovac representative for details*)

Advanced monitoring at the collection pit can notify the operator and asset owner of a wealth of information about the system:

- Number of valve firings
- Information about Illegal connection of stormwater pipes or broken gravity lines with the property boundary
- Information on wear and tear on valve parts
- Operator warning of a problem with the valve

~



EuroVac Vacuum valve

The Eurovac Valve

The EUROVAC Valve is the latest in the evolution of the vacuum interface valve. Fully complying with EN1091 and with The Australian Standard AS 4310. The changes that have been made have come from not only our own operational experience with input from a number of experts around the world.



Eurovac Valve

EUROVAC VALVE

Features and Benefits

- 78 mm + internal diameter. More than 5 % greater flow area than competition's 3" valve, yet fits with standard 90 mm or 3" pipe.
- Superior Cv – Better through flow allowing less friction loss and more efficient systems.
- Colour coordinated tubing and tubing connections - provides correct assembly in the field by unskilled labour.
- Lower housing spigots with hose barbs – maintains tight, correct fit of tubing, eliminating hose disconnects and valve failure.
- Superior fusion welded, large threaded insert ring on wye body.
- Twice as strong as the competition. Not affected by severe water hammer. Standard rebuild components, compatible with existing systems parts.
- Revolutionary "Easy Clip" system to retain controller properly on valve. Positions and holds controller in only correct position and maintains vacuum seal between valve and controller. Eliminates vacuum leaks

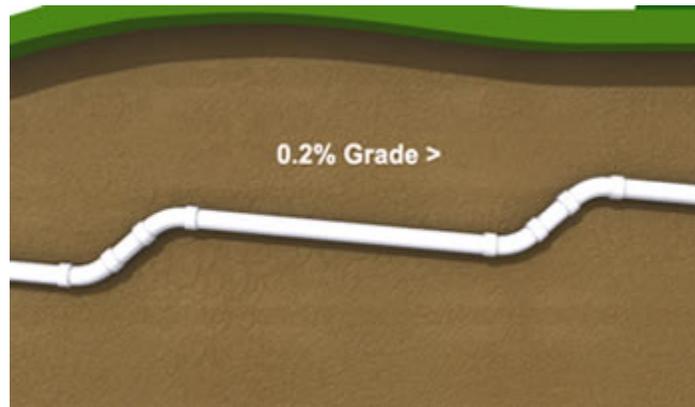
EUROVAC Controller

Features and Benefits

- Unique 3 bolt design allows more uniform assembly tension of body parts and ease of assembly.
- Simplified “one way” assembly pins allowing only correct assembly of main body components. Virtually eliminates improper assembly of main controller parts.
- Superior foot design creates less vacuum leaks.
- Utilizes revolutionary “Easy Clip” mounting clip, causing correct location of controller to the valve with simple on/off assembly.
- Colour coordinated spigots aiding in easy and correct installation of tubing.

Eurovac Vacuum Mains

- Vacuum mains are installed in narrow trenches in a stepped profile for level and uphill transport. Vacuum mains follow the natural surface for downhill transport. The stepped profile keeps the mains shallow and is designed to ensure that sewage will not block the pipe when the sewage rests. Lifts minimise trench depth. A lift is simply two 45-degree elbows and a straight piece of pipe. Sewage will lie at these low spots until other valves upstream open.



Grade Required

- Vacuum lines are slightly sloped (0.2%) towards the collection station. Unlike gravity sewers that must be laid at a minimum slope to obtain this scouring velocity, vacuum mains can be laid with a flatter slope since a high scouring velocity is a feature of vacuum sewage transport.
- Vacuum mains are of a smaller diameter than gravity mains for a given flow because they are designed to operate with higher velocities and under two phase flow conditions, this provides for more efficient fluid transport and also maintains the pipe in a much cleaner condition than gravity. The vacuum mains are PE PN 10 or PVC Class 9 or Class 12.
- In general, a potential vacuum loss is associated with every lift. This limits the length of each vacuum line to about 3 to 5 km in flat terrain. Elevation changes can extend or

reduce this range. Longer distances are possible depending on local topography and the design of the system.

- The size of the vacuum mains, the shallow depth of construction and the speed at which installation occurs all reduces our impact on the environment and reduces our carbon footprint. If a break ever occurred in a vacuum main, no contamination occurs as the negative pressure does not allow any sewage to leak into the environment. A break will also be quickly alerted to the operators as the vacuum pumps running time will increase. Residents will not be inconvenienced as a rare break is easy to find and repair. If our pipework was 5-10 metres deep as with a gravity sewer this would be far more difficult.
- Gone are the days when operators need to enter the sewer pipes or worry about gas buildups or rats or snakes in the system.

Eurovac Vacuum Pump Station

The vacuum station essentially sucks the sewage and air to a central point and then pumps the sewage to its intended location. The vacuum station has duty and standby vacuum pumps that create a vacuum in the vacuum sewer lines and an enclosed collection tank. When the vacuum mains deliver sewage and air to the pump station, Sewage pumps transfer the sewage from the collection tank through a rising main to the treatment plant or gravity network. Available packaged vacuum stations consisting of two or more vacuum pumps, two sewage pumps, a collection tank and controls. Packaged vacuum pump stations arrive at the job site pre-piped, pre-wired and factory tested to minimise construction cost.



Vacuum Pump Station

Vacuum pumps typically run 2 to 3 hours each per day depending on the design approach and don't need to run continuously since the vacuum interface valves are normally closed. As sewage enters the system, driven by air at atmospheric pressure, the system vacuum will slowly decrease from -70kPa to -50kPa. The vacuum pumps are sized to increase the system vacuum from -50kPa to -70kPa in three minutes or so. The two non-clog sewage pumps are each sized for peak flow. Energy consumption can be calculated at the design phase for a particular project.

The collection tank is usually mild steel or stainless steel and is sized according to flow with typical sizes ranging from 3.8 to 15 cubic meters. The incoming vacuum lines connect individually to the collection tank, effectively dividing the system into zones.

Monitoring at the pump station can alert operators to a number of things.

- Long pump hours or a low vacuum alarm suggesting a blockage in a vacuum valve in the reticulation or a break in the vacuum main.
- High alarms for the tank to notify of problems with the discharge pumps
- Pump faults calling for service to vacuum or sewage pumps
- Information for asset owners about pump efficiencies as well as air/liquid ratios to assist with power saving
- The pump station building can vary considerably depending on the type of project. It can be designed to fit in with other houses in the areas or if in an industrial area could be placed inside a container. In some projects the pump station has been put completely underground.



Pump Station skid