Stormwater360

Vortechs™

Design, Operation and Maintenance Guidelines

INTRODUCTION

This document, and the information within, are provided to be used only as a guide. This document is intended to provide general information for the operation and maintenance of the Vortechs® device ("the product"). This document is not intended to be comprehensive health and safety guidelines for the operation and/or maintenance of the Vortechs® device, which are the responsibility of the owner of the device.

Users of this document are encouraged to consult professional advice before taking any course of action related to information, ideas or opinions expressed in this document.

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Nothing in this document should be construed as an expressed warranty or an implied warranty of Merchantability or fitness for any particular purpose.

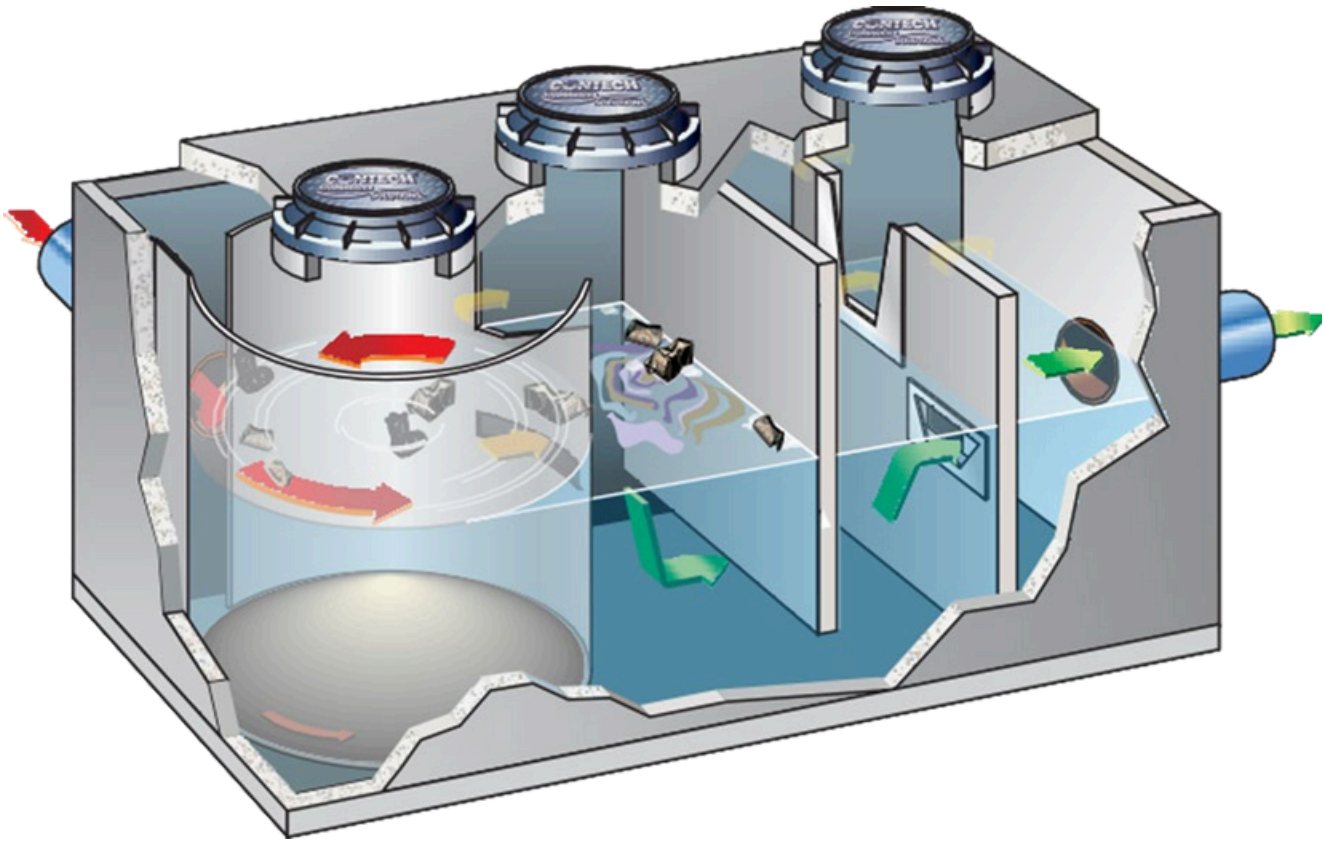

Figure 1. Vortechs® system

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**Nothing in this catalogue should be construed as an expressed warranty or implied warranties, including the warranties of merchantability and of fitness for any particular purpose.*

SECTION A Site Specific Details

This section is to be filled out by the asset owner following installation of Vortechs® devices. For assistance in filling out this form please contact our Maintenance Manager via 0800 STORMWATER. Please return completed forms via email to maintenance@stormwater360.co.nz.

Project Name:

Project Address:

Resource Consent Number:

Building Consent Number:

Consent/Site Owner:

Consent/Site Owner Address:

Table 1; Summary of Installed Devices:

Stormwater360 Reference #	Device Model	Catchment Area (m^2)	Estimated Maintenance Frequency (Months)
			12 Months
			12 Months

SECTION B As Built Drawings

This section is to be filled out by the asset owner following installation of Vortechs® devices. For assistance in filling out this form please contact our Maintenance Manager via 0800 STORMWATER. Please return completed forms via email to maintenance@stormwater360.co.nz.

The following as-built drawings are to be provided to Stormwater360 to include within this section;

As-Built Drawings	Supplied
Site Plan shown location of each Vortechs® Device	YES / NO
Catchment Plan for each Vortechs®	YES / NO
Long-section drawings of site pipe network	YES / NO
Product Drawing (To be supplied by SW360)	YES / NO

SECTION C Operation

Basic Operation:

The Vortechs® System is a hydrodynamic separator designed to enhance gravitational separation of floating and settling material from stormwater flows. Stormwater flows enter the unit tangentially to the grit (swirl) chamber, which promotes a gentle swirling motion. As polluted water circles within the grit chamber, pollutants migrate toward the centre of the unit where velocities are the lowest. The majority of settleable solids are left behind as stormwater exits the grit chamber through two apertures on the perimeter of the chamber. Next, buoyant debris and oil and grease are separated from water flowing under the baffle wall due to their relatively low specific gravity. As stormwater exits the system through the flow control wall and ultimately through the outlet pipe, it is relatively free of floating and settling pollutants.

Over time a conical pile tends to accumulate in the centre of the unit containing sediment and associated metals, nutrients, hydrocarbons, and other pollutants. Floating debris and oil and grease form a floating layer trapped in front of the floatables baffle wall. Accumulation of these pollutants can easily be accessed through manholes over each chamber. Maintenance is typically performed through the manhole over the grit chamber.

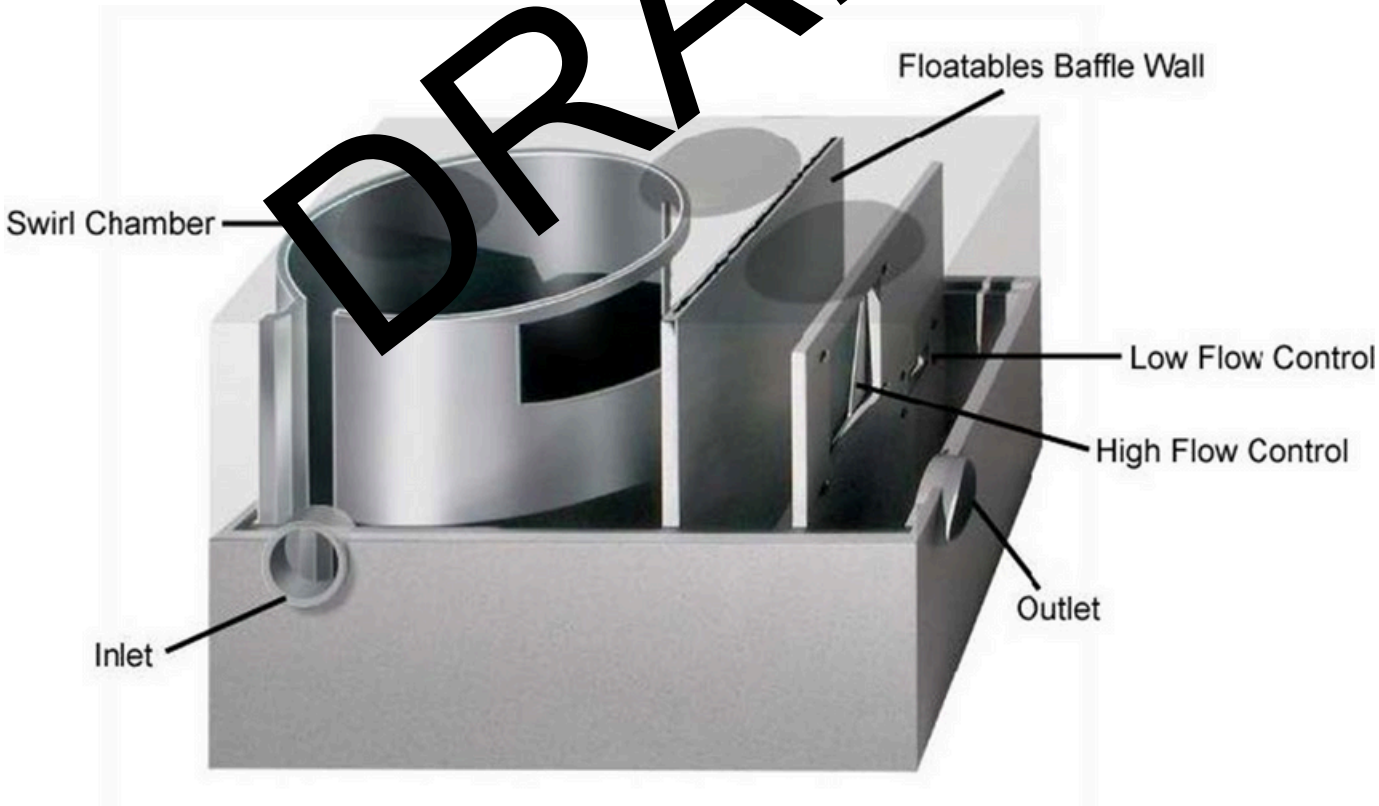

Figure 2. Components of the Vortechs®

SECTION D Maintenance

The Vortechs® System should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on-site activities than the size of the unit, e.g., unstable soils (construction sites) will cause the grit chamber to fill more quickly but regular sweeping will slow accumulation.

Inspection:

Inspection is the key to effective maintenance and is easily performed. Stormwater360 recommends ongoing 6-monthly inspections of the accumulated sediment. Pollutant deposition and transport may vary from year to year and inspections twice a year will help ensure that systems are cleaned out at the appropriate time. It is very useful to keep a record of each inspection. A simple form for doing so is provided.
The Vortechs® System should be cleaned when inspection reveals that the sediment depth has accumulated to within 150mm of the dry-weather water surface elevation. This determination can be made by taking 2 measurements with a stadia rod/sludge judge or similar measuring device: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. The system should be cleaned out if the difference between the two measurements is 150mm or less.

Note: To avoid underestimating the volume of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.

Cleaning:

Maintaining the Vortechs system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather. Cleanout of the Vortechs® system with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. If such a truck is not available, a "clamshell" grab may be used but it is difficult to remove all accumulated pollutants with such devices.
In installations where the risk of large petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads since they are usually cheaper to dispose of than the oil water emulsion that may be created by vacuuming the oily layer. Trash can be netted out if you wish to separate it from the other pollutants.

Accumulated sediment is typically evacuated through the manhole over the grit chamber. Simply remove the cover and insert the vacuum hose into the grit chamber. As water is evacuated, the water level outside of the grit chamber will drop to the same level as the crest of the lower aperture of the grit chamber. It will not drop below this level due to the fact that the bottom and sides of the grit chamber are sealed to the tank floor and walls. This "Water Lock" feature prevents water from migrating into the grit chamber, exposing the bottom of the baffle wall. Floating pollutants will decant into the grit chamber as the water level there is drawn down. This allows most floating material to be withdrawn from the same access point above the grit chamber.

If maintenance is not performed as recommended, sediment may accumulate outside the grit chamber. If this is the case, it may be necessary to pump out all chambers. It is a good idea to check for accumulation in all chambers during each maintenance event to prevent sediment build up there.
Manhole covers should be securely seated following cleaning activities, to ensure that surface runoff does not leak into the unit from above.

Vortechs® System – Inspection and Maintenance Log:

Model:			Location:		
Date:	**Water Depth to Sediment1:**	**Floatable Layer Thickness2:**	**Maintenance Performed:**	**Maintenance Personnel:**	**Comments:**

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. When the difference between the two measurements is 150mm or less, the system should be cleaned out.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of a spill, the system should be cleaned immediately.