Hydro Vortex Drop™ Shaft

Turning Water Around ...®

Hydro Vortex Drop™ Shaft

The Hydro Vortex Drop™ Shaft, is a self activating energy dissipation system with no moving parts, designed to safely drop water or sewage from virtually any height in order to protect the infrastructure from noise, vibration, and damage.

Odor & Corrosion Control

The Hydro Vortex Drop™ Shaft has a specially designed air intake component (Air Switch) that enables air to be continually drawn through the downdraft as flows spiral down the drop pipe ensuring that air is entrained in the wastewater to oxidize odorous gases thereby preventing the release of noxious gases that would otherwise cause odor and corrosion problems. The Air Switch also allows the to operate in the Air Entrainment Mode over a wider range of flows than conventional drop shafts.

This in combination with the low pressure core, excellent flow control and mixing capabilities of Hydro's unique Energy Dissipation Unit also ensures complete intermixing and re-entrainment; leading to further rapid oxidation of any odorous compounds.

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Erosion Control

The Hydro Vortex Drop™ Shaft is specifically designed to minimize erosion and damage of your expensive structures. Using the latest computational fluid dynamics backed up with good old fashioned physical testing, the destructive forces associated with cavitation and water hammer have been eliminated.

Cost Savings

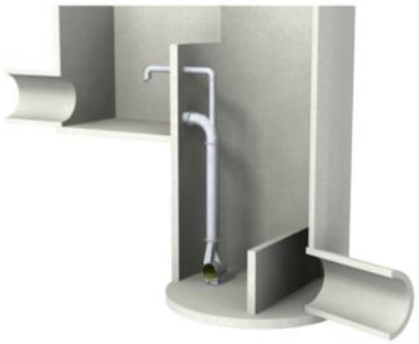
The Hydro Vortex Drop™ Shaft can often be easily retrofitted into an existing chamber and its integrated access and small pipe sizes reduce excavation cost, shaft diameters and the need for a separate access shaft. The system also benefits from a compact and simple to construct inlet chamber with no complicated curves or benching required.

Small Pipe Sizes

Traditional vortex drop shaft designs require an air core to operate safely and prevent damages associated with water hammer. The Hydro Vortex Drop™ Shaft uses a unique Air Switch to enable a safe transition into the full pipe mode where it can operate at maximum capacity without the need for an air core. This allows it to accomodate as much as three times the flow of a traditional solution in the same pipe size.

Integrated access.

Prefabricated stainless steel construction.



Adaptable design solution.

Construction

The Hydro Vortex Drop™ Shaft is constructed from durable and corrosion resistant stainless steel. Furthermore the inlet bend, reducer and Energy Dissipation Unit are treated with an Irathane coating to protect them from wear and ensure an extremely long component life.

Installation

The Hydro Vortex Drop™ Shaft is easy to install as it does not require complicated concrete work or approach channels. All components are prefabricated and use bolted connections, minimizing the installation time and cost.

Easy Access

The fully enclosed nature of the Hydro Vortex Drop™ Shaft allows access to the base of the drop structure in the same chamber as the flow. This aids any maintenance commitment and simplifies visual inspection.

Flexible Design

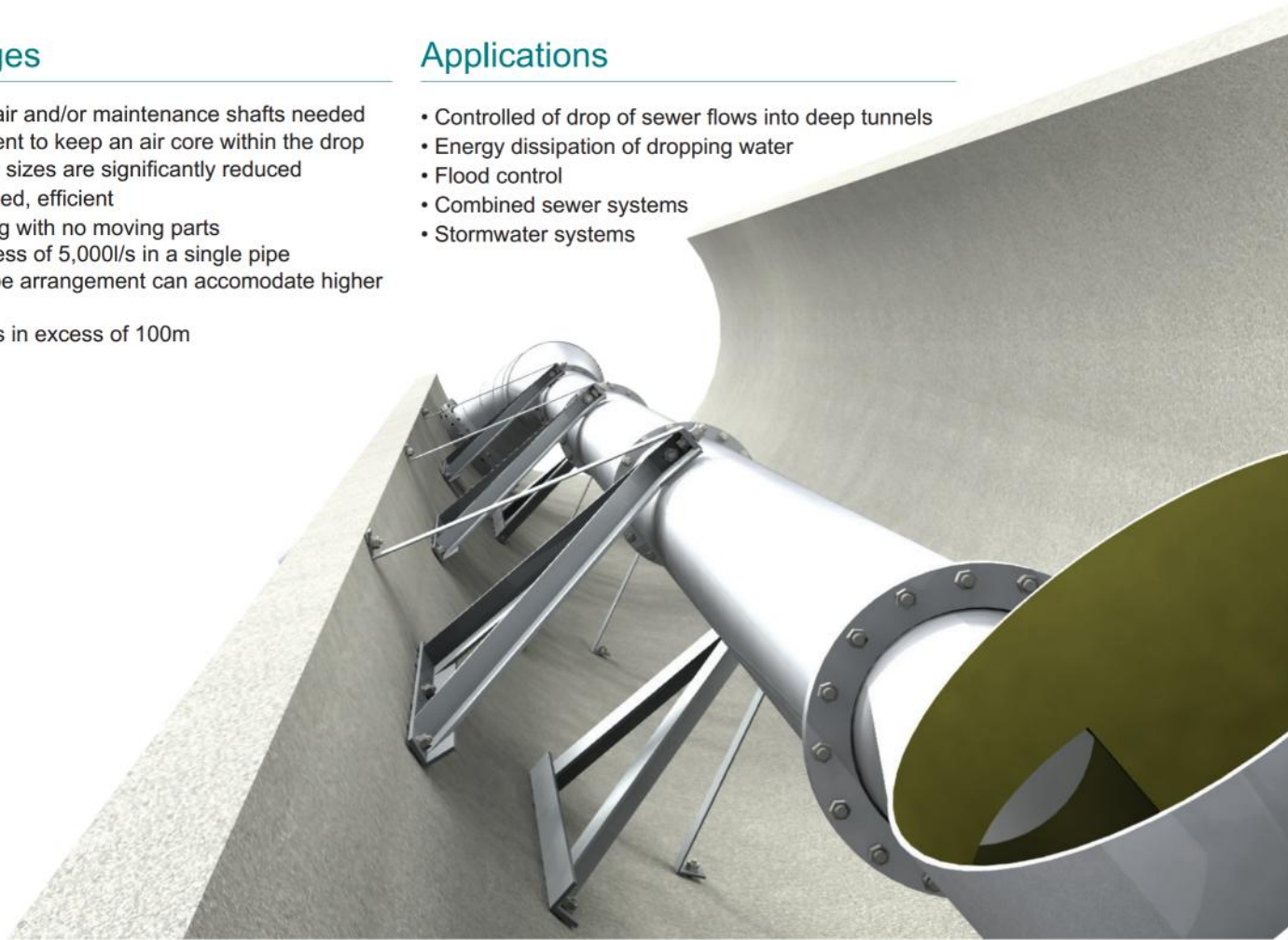
The Hydro Vortex Drop™ Shaft is ultimately configurable and can be designed to suit either the smallest flow or the longest drop. It's compact nature means that two or more shafts can be fitted into the same chamber further enhancing its versatility and ensuring best solution can be found for each installation.

Advantages

- No auxillary air and/or maintenance shafts needed
- No requirement to keep an air core within the drop pipes so pipe sizes are significantly reduced
- Safe, controlled, efficient
- Self-activating with no moving parts
- Flows in excess of 5,000l/s in a single pipe
- A multiple pipe arrangement can accomodate higher flow rates
- Vertical drops in excess of 100m

Applications

- Controlled of drop of sewer flows into deep tunnels
- Energy dissipation of dropping water
- Flood control
- Combined sewer systems
- Stormwater systems



Hydro-Brake® Drop

Hydro International

Safely convey water or sewage while protecting infrastructure from damage, vibration, odour and noise.

Hydro-Brake® Drop is a self-activating conveyance and flow control system that dissipates the energy of dropping water, enabling customers to convey water from great heights while preventing the damage and nuisance effects associated with falling water.

Using vortex technology to minimise erosion, corrosion, noise and odour, only Hydro-Brake® Drop benefits from over thirty years of vortex flow control expertise.

Applications

- Flood control.
- Sanitary and combined sewer (CSO) systems.
- Stormwater conveyance.
- Deep tunnel drainage and sewerage systems.
- Industrial water conveyance.

Performance

- Maximum flow: 5,000 l/s (in a single unit). Multiple pipe arrangements can accommodate higher flow rates.
- Maximum drop height: 100 m.
- No auxiliary air and/or maintenance shafts are needed.

Materials

- Stainless steel.
- The inlet bend, reducer and Energy Dissipation unit are additionally treated with a protective coating to protect against wear.

Benefits

Drop large amounts of water safely

With Hydro-Brake® Drop flows of up to 5,000 l/s can be transferred safely through drop heights of up to 100 m. The use of multiple pipes can accommodate even higher flow rates.

Minimise erosion damage

Hydro-Brake® Drop has been designed using the latest computational fluid dynamics to minimise erosion and other kinetic damage to expensive or important structures. Rigorous real-world testing has confirmed that the destructive forces associated with cavitation and water hammer have been eliminated.

Control odour and corrosion

Hydro-Brake® Drop incorporates a specially designed air switch that draws air through the pipe continuously as water flows through the system. This entrains air in the water, oxidising odorous gases and preventing the release of noxious gases that could otherwise cause odour and corrosion problems.

Cut Construction Costs

The Hydro-Brake® Drop can often be easily retrofitted into an existing chamber and its integrated access and small pipe sizes reduce excavation cost, shaft diameters and the need for a separate access shaft.

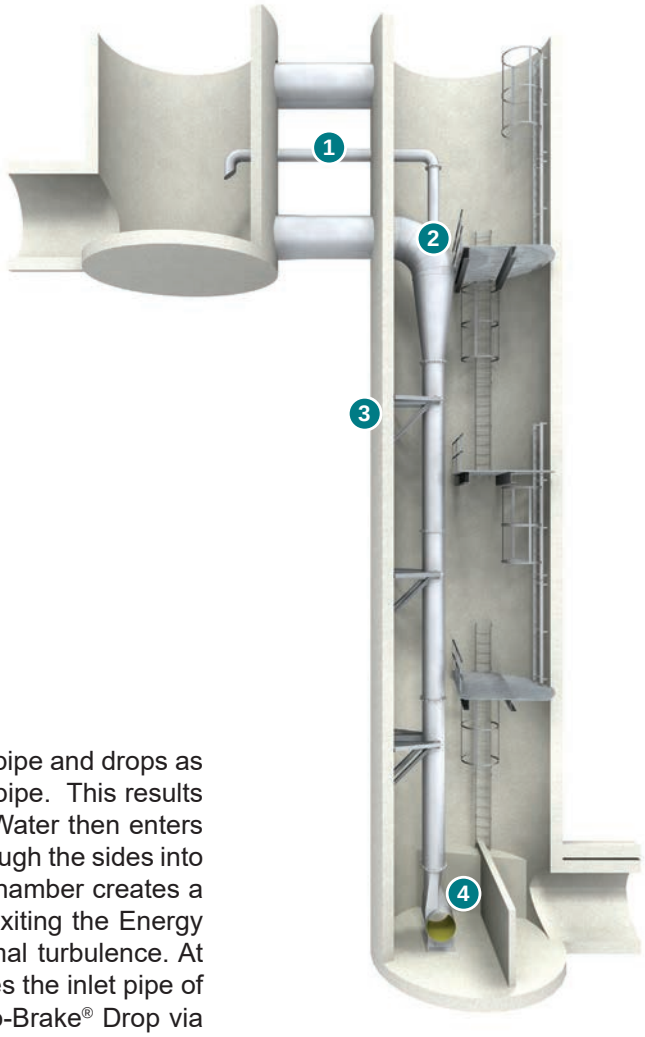
Key Components

1) **Air Switch** - Controls the amount of air entering into the falling flow from the Drop Pipe to eliminate 'glugging' and therefore the damaging effects of water hammer or hydraulic shock.

2) **Top Bend** - Safely transitions the flow into the vertical section of the pipe. A taper may be required depending on site circumstances.

3) **Drop Structure** - A full depth chamber housing the Drop Pipe, a control weir, maintenance access and the Outlet Structure.

4) **Energy Dissipation Unit** - Developed using the latest scientific techniques, this component is designed to disperse the energy created by the falling water in addition to effectively preventing erosion and controlling the onward flow.



How it Works

At low flow water passes through the Hydro-Brake® Drop inlet pipe and drops as a film, maintaining contact with the inside surface of the drop pipe. This results in the formation of a central air core through the drop pipe. Water then enters the top of the Energy Dissipation Unit and exits the system through the sides into the bottom of the drop chamber. A weir at the bottom of the chamber creates a stilling area to absorb the release of energy from the water exiting the Energy Dissipation Unit. This ensures a smooth operation with minimal turbulence. At increased flows, the water level in the inlet chamber submerges the inlet pipe of the Hydro-Brake® Drop. At this stage, air is fed into the Hydro-Brake® Drop via the Air Switch pipe, maintaining the stability of the air core and a smooth flow regime.

If the flow rate continues to increase the water in the upstream inlet chamber rises until it reaches the Air Switch, whereupon the system begins to enter the transition to Full Pipe Mode. At this stage any increase in flow has a much lower impact on the upstream water level due to the high flow capacity during Full Pipe Mode. The Air Switch pipe is designed to smoothly and efficiently regulate the transition phase, dosing the amount of air required to sustain the optimal flow conditions and eliminating any glugging or harmful vibrations until the Full Pipe Mode is reached completely and there is no more air flow through the system.

Maintenance

There are no moving parts and no replacement spares are required. The Hydro-Brake® Drop is self-activating and is controlled by the hydraulics of the system. Operator involvement should be no more than visual monitoring of the system.

Learn more

To learn more about how Hydro-Brake® Drop can help you to make better water management decisions, visit **hydro-int.com**, search **Hydro Drop Shaft** online or contact us:

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