Inserts for Sewer Odor and Corrosion Control

- Sewer Drop Structures
- Pumping Stations
- Forcemain Discharge

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We build tough products for tough environments®
Hydrogen sulfide (H₂S) gas and other odorous gases are a fact of life with sanitary sewer drop structures. When these gases become airborne, they not only generate complaints from the neighborhood, but also impact air quality and cause corrosion within the sewer system. Municipalities spend millions on various forms of odor and corrosion control, yet many of these methods are only partially successful and require a considerable amount of maintenance and chemicals.

A new solution for municipalities is the IPEX Vortex Flow Insert (VFI), a revolutionary technology for eliminating odorous emissions and minimizing corrosion in vertical sewer drops. With no moving parts and requiring no maintenance, VFI's have delivered significant cost savings in installations across North America.

The VFI’s patented spiral flow design eliminates odorous and corrosive gases in a unique way. It uses the wastewater’s own flow energy to suppress the turbulence which releases noxious gases. The spiral flow creates a downdraft which traps airborne gases and forces air into the sewage flow to oxidize odorous gases. By installing a Vortex drop structure, municipalities can save thousands of dollars in monthly chemical feed, air-phase treatment and maintenance costs.

In addition, land developers can save hundreds of thousands of dollars in excavation costs in areas where conventional drop structures are not allowed.

BUILT-TO-SPEC FOR ANY SIZE

Manholes, chambers and pumping stations are built in a variety of sizes. For that reason, IPEX custom designs and custom builds every Vortex Flow Insert. The Vortex drop height can be as little as 5 feet or more than 100 feet tall. Shop drawings are prepared and submitted to the customer, and each phase of the project is tightly-controlled to ensure the project's success.

IPEX VFIs are sized based on the peak flow that the unit is required to handle. The insert can be installed in a standard manhole without restricting access for maintenance.
HOW IT WORKS

1. VORTEX TOP FORM
   The wastewater flows into the Vortex Top Form which directs the flow around a channel of decreasing radius. At the same time, the Vortex channel slopes downward to accelerate the wastewater to a supercritical velocity.

2. VORTEX DROP SHAFT
   Once the flow is channeled into the smaller Drop Shaft, the velocity and centrifugal forces generated within the VFI cause the flow to hug the inside walls of the Vortex Drop Shaft. This spiraling flow creates a negative air core, which draws airborne gases down the Drop Shaft to the Energy Dissipation Pool. Frictional forces created within the Vortex Drop Shaft assist in dissipating the fluid energy.

3. ENERGY DISSIPATION POOL
   The flow exit is submerged in the Energy Dissipation Pool at the bottom of the Vortex. Air and gases drawn down the air core are forced back through the wastewater and are re-entrained into the flow. This significantly increases the dissolved oxygen concentration in the wastewater, and the re-entrained odorous compounds are then quickly oxidized.

WINNER OF THE APWA TECHNICAL ACHIEVEMENT AWARD

The American Public Works Association presents Technical Innovation Awards to designers of devices, processes or systems that benefit public works by serving the public and protecting the environment. Dr. Eugene Natarius, creator of the Vortex Drop Structure, received an award for his revolutionary design. Since then, units have been installed in cities across North America including municipalities in Ontario, California and Ohio.
While Vortex Flow Inserts leave manholes and pumping stations smelling better, they can also make a land developer’s job easier and less costly. Due to the odor and corrosion problems of conventional drop structures, many municipalities have banned them altogether. Until now, the only alternative available to land developers was to install sewers with a gradual grade to trunk sewers deep underground, a practice which can cause the cost of excavation to skyrocket.

But by installing Vortex Drop Structures (drop structures with Vortex Flow Inserts), land developers can now comply with municipality concerns and save thousands, if not millions, in excavation costs. No wonder developers across North America are taking advantage of this revolutionary technology.

**HOW VORTEX FLOW CAN SAVE MUNICIPALITIES MONEY**

**REDUCED CORROSION EXTENDS SEWER LIFE**

Hydrogen sulfide (H₂S) emissions from forcemain discharges can literally eat through a concrete drop manhole. By oxidizing dissolved H₂S, a Vortex Flow Insert in a municipal sewer drop can significantly reduce concrete and metal corrosion, extending sewer life and saving the municipality money.

**ELIMINATES ODOR TREATMENT COSTS**

By increasing dissolved oxygen levels in wastewater and oxidizing sulfides and other odorous compounds, the use of a Vortex Flow Insert in a drop structure eliminates the need for costly chemical injection, high-maintenance biofilters and air scrubbers.

**IMPROVES WASTE WATER QUALITY**

Because a Vortex drop structure reduces the odorous and corrosive elements in the flow, a Vortex Flow Insert, installed upstream of a treatment plant, can actually improve wastewater quality prior to treatment, reducing treatment costs at sewage plants.

**REDUCED MAINTENANCE COSTS**

The use of a Vortex drop structure eliminates the corrosion of concrete and metal sewer components, dramatically reducing municipal maintenance costs of manholes and sewers.

“Finally, we have a long system odor and corrosion cost that requires no definitely recommend...”

Frank A. Badinski, C.E.T., Asset Management Coordinator, Regional Municipality of York, NAAPi Chair, NASTT Great Lakes St. Law
APPLICATIONS

Steep Grade Sewers – Vortex Flow can dissipate the flow energy of water running down a steep grade, reducing the flow’s discharge speed.

Pumping Station Wet Wells – A Vortex drop structure can minimize gas emissions from pumping station wet wells.

Manholes, Chambers and Force mains – Wherever you have a drop from one pipe to another, Vortex drop structures can transform drop manholes from potential maintenance problems into effective aeration devices that control odor and corrosion.

Turbine Discharges – By dramatically reducing the flow energy of water through turbine discharges, Vortex Flow helps to reduce the environmental disturbance when the flow is released into rivers and lakes.

SAVINGS

"...a long-term solution to our sanitary erosion problems. It is a one-time ongoing maintenance. I would recommend this product.

Lawrence and Atlantic Canada Vice-Chair."
TYPICAL PROJECT FLOW FOR A VORTEX FLOW INSERT

**STEP 1: DESIGN INFORMATION FORM**
Customer provides a completed Design Information Form to IPEX which assists IPEX engineers in developing a conceptual design.

**STEP 2: CONCEPTUAL DESIGN**
IPEX designs the unit based on the Design Information Form. IPEX provides conceptual drawings for the project. IPEX provides an engineering estimate.

**STEP 3: DIMENSION SIGN-OFFS**
Once the project has been bid and IPEX has received the purchase order from an approved IPEX municipal distributor, IPEX will send Dimension Sign-Offs to the Project Engineer and Contractor to verify that all the data is correct.

**STEP 4: DETAILED DESIGN**
Upon receiving the completed Dimension Sign-Offs, IPEX design engineers will begin the Detailed Design process.

**STEP 5: FABRICATION**
Once the Detailed Design has been completed, the fabrication of the Vortex unit will commence.

**STEP 6: SHIPMENT & INSTALLATION**
Once the fabrication process has been completed, the Vortex will be shipped to the jobsite along with a full set of detailed installation instructions.

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**RECOGNIZED AS A NEW AND INNOVATIVE PRODUCT BY THE U.S. EPA**
The U.S. Environmental Protection Agency (U.S. EPA) is charged by Congress with protecting the nation’s land, air, and water resources. In the July 2006 publication, *Emerging Technology for Conveyance Systems – New Installations and Rehabilitation Methods* (EPA Report: 832-R-06-004) the Vortex Flow Insert was recognized as a new and innovative product.
Complete this form and fax it back to us at (905) 403-1124.

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**Drop Structure Information**
*See reverse for a depiction of a typical drop structure layout and use to answer questions 2 – 6.*

1) **New or Existing Drop Structure**
   - NEW
   - EXISTING

2) Manhole Diameter ______ ft | m
3) Ground Elevation ______ ft | m
4) Manhole Floor Elevation ______ ft | m
5) Influent Line Elevation ______ ft | m
6) Effluent Line Elevation ______ ft | m
7) Comments on any unique details ____________________________________________________________

**Flow Information**
(Please provide us with the flow rate the Vortex will initially experience and also the estimated build out flow rate.)

1) Gravity, Forcemain or Wet Well
   - GRAVITY
   - FORCEMAIN
   - WET WELL

2) Today’s Peak flow – Dry Weather ______ MGD | m³/h
3) Today’s Average flow – Dry Weather ______ MGD | m³/h
4) Today’s Peak flow – Wet Weather ______ MGD | m³/h
5) Build Out Peak flow – Dry Weather ______ MGD | m³/h
6) Build Out Avg. flow – Dry Weather ______ MGD | m³/h
7) Build Out Peak flow – Wet Weather ______ MGD | m³/h
8) Expected Sewage Velocity ______ FPS | m/s
9) Expected Build Out Time Frame ______ YEARS
10) Pump rate capacity of all pumps (if applicable) ______ MGD | m³/h

**Influent Line Information**

1) Influent line material ___________________________
2) Influent line nominal diameter ______ in | mm
3) Influent line outer diameter ______ in | mm
4) Influent line inner diameter ______ in | mm
5) Slope of influent line ______ %

**Company classification:**
- Architect/Design Firm
- Builder/Developer
- Operator/Plant Maintenance
- Contractor
- Distributor/Wholesaler
- Engineering Firm
- Government
- OEM - Product(s) Manufactured: __________
- Utility
- Other: _____________________________________

**Product interests:**
- PVC Pressure Systems
- PVC Sewer Systems
- Irrigation Systems
- Piping Systems for Water and Waste Water Treatment Plants
- Sewage Force Mains
- Service Pipe and Compression Fittings
- Trenchless Piping Systems

**I would like:**
- PVC Pressure System Design
- PVC Sewer System Design
- Surge Pressures in PVC
- Installation Guide
- Longevity of PVC
- Hydraulics of PVC Pipe
- How PVC compares to other materials

**I would also like to know about other IPEX products:**
- Plumbing and mechanical piping systems
- Electrical or telecommunications piping systems
- Irrigation piping systems
- PE Electrofusion systems for gas and water
- Industrial piping systems
Please complete flow information and influent line properties on reverse.
IT’S A SIMPLE WAY TO ELIMINATE SEWER ODOR EMISSIONS

The Tree design is a registered trademark of Julius Sämann Ltd. and is used with permission.

• NO MORE COSTLY CHEMICAL INJECTION
• NO MORE HIGH-MAINTENANCE BIOFILTERS
• NO MORE AIR SCRUBBERS
• NO MORE MANHOLE SEALS

PRODUCTION

Fabrication of a 60 MGD Vortex unit
Austin, Texas.

Hydrostatic testing of a large Vortex unit.

Shipping from fabrication plant,
Mississauga, Ontario.
**INSTALLATION**

- Offloading a Vortex Top Form.
- A uniquely flanged Vortex, Vancouver, British Columbia.
- Vortex with a flanged entrance, Manassas, Virginia.
- Vortex Top Form to be secured to structure, Alexandria.
- Strapping detail on Vortex unit, Buckeye, Arizona.
- Securing Vortex Flow unit, Burlington, Kentucky.
- Vortex unit being strapped and adapted to inlet pipe.
- Vortex Flow operating in a pumping station wet well, Jacksonville, Florida.
- Vortex Flow Insert reducing H₂S concentration levels, Camden County, New Jersey.
SALES AND CUSTOMER SERVICE

Call IPEX Inc.
Toll free: (866) 473-9462

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About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, ABS, PEX, FR-PVDF and PE pipe and fittings (1/4" to 48")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

Vortex Flow™ is manufactured by IPEX Inc.

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A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.