About IPEX
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, PVC-O, ABS, PEX, FR-PVDF, NRIPP, FFPRP, HDPE, PVDF and PE pipe and fittings (1/2” – 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. and distributed in the United States by IPEX USA LLC. Vortex Flow™ is a trademark of IPEX Branding Inc.

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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, VFIs 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.

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.

A SIMPLE SOLUTION FOR ODOR AND CORROSION CONTROL

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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. Influent lines as small as 0.3MGD to 120MGD. The insert can be installed in a standard manhole without restricting access for maintenance.

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.
Finally, we have a long-term solution to our sanitary system odor and corrosion problems. It is a one-time cost that requires no ongoing maintenance. I would definitely recommend this product.

**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.

- **Barometric Loop**
  - A barometric loop is an area where a forcemain is brought up out of the ground to improve the hydraulic profile of the system. Sometimes referred to as a "gooseneck" due to its appearance as it rises up out of the ground, barometric loops can be used to slow the flow down and improve flow characteristics at a force main discharge.

**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.

- **REDUCES 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 reduces 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.

**APPLICATIONS**

- **Manholes, Chambers and Forcemains**
  - 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.

**REDUCED EXCAVATION COSTS AND LONG TERM SAVINGS**

**Frank A. Badinski, C.E.T., Asset Management Coordinator, Regional Municipality of York; NAAPI Chair; NASST Great Lakes, St. Lawrence and Atlantic Canada Vice-Chair.**
PRODUCTION

Fabrication of a 60 MGD Vortex unit, Austin, Texas.

Hydrostatic testing of a large Vortex unit.

Shipping from fabrication plant, direct to site.

INSTALLATION

Offloading a Vortex Top Form.

A uniquely flanged Vortex, Vancouver, British Columbia.

Vortex with a flanged entrance, Manassas, Virginia.

Second effluent line at bottom, branching from the EDP to direct flow, Sarnia, Ontario.

Strapping detail on Vortex unit, Buckeye, Arizona.

Securing Vortex Flow unit, Burlington, Kentucky.

Stainless steel straps and epoxy painted walls for additional layer of corrosion protection, Charlotte, NC.

Vortex Flow operating in a pumping station wet well, Jacksonville, Florida.

Vortex Flow Insert reducing H2S concentration levels, Camden County, New Jersey.

UNIQUE INSTALLATIONS

Barometric loop for reduction of velocity and energy dissipation at the WWTP – Newburgh, IN.

Dual influent lines with twin clockwise and counter-clockwise flow Vortex units – Davidson, NC.

Structure with multiple Vortex units at different influent elevations and flow rates – Austin, TX.

Vortex installed in 5 million gallon CSO storage tank adjacent to WWTP – Port Angeles, WA.
The City of St. Robert, Missouri made the decision to install a new state-of-the-art sewer system. The goal was to use fewer lift stations and more gravity-based linear feet in order to move 50% of the city’s sewage. “The new system has 13,000 linear feet of 16” sewer main and 25% of it is gravity-based,” stated Jeff Medows of C.M. Archer Group. “We have reduced the city’s lift stations to just two and that’s better for the people of St. Robert. The upside of this is the greater portion of your line you have gravity-based, the less maintenance you’ll have,” Medows said.

However, the challenge of a gravity-based system is how to oxygenate the sewage and control odor and corrosion. The cost of adding chemicals – $140,000 in the first year and $35,000 annually, would negate any cost savings achieved by eliminating the pumps. Public Works Foreman Steve Long had recalled seeing an alternative device, the Vortex Flow Insert. “I saw this system in a magazine that I picked up at a conference,” Long said. “It’s gravity-driven.” A Vortex Flow Insert uses the wastewater’s own flow energy to suppress the turbulence which releases the noxious gases. By installing one Vortex Flow unit, the municipality was able to save the money it would have spent on adding chemicals to manage the H2S emissions.

The system features a 32” top form with a 6’ drop and is designed for a peak flow of 3.17 MGD. “It’s a new green technology,” Medows said. “It’s the first one in the state of Missouri. None other like it.”
Complete this form and fax it back to us at (905) 403-1124.

Name  Title  Dept.
Company  Address
City  State  Zip Code
Phone  Fax  E-mail
Project Name  Project Location (City, State)  Owner Name
Engineer  Bid Date  Construction Launch Date

Drop Structure Information
See depiction of a typical drop structure layout and to answer questions 2 – 6.
1. New or Existing Drop Structure  □ NEW  □ EXISTING  □ WET WELL
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
(Provide us with the flow rate the Vortex will initially experience and also the estimated build out flow rate.)
1. Flow Type  □ GRAVITY  □ FORCEMAIN
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. Pump rate capacity of all pumps (if applicable) __________________ MGD | m³/h
10. Expected Build Out Time Frame __________________ YEARS

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 __________________ %
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