Inserts for Sewer Odor and Corrosion Control

MUNICIPAL SYSTEMS

Vortex Flow™
ODOR & CORROSION CONTROL

- Sewer Drop Structures
- Pumping Stations
- Forcemain Discharge

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We build tough products for tough environments®

IPEX

VORTEX FLOW™

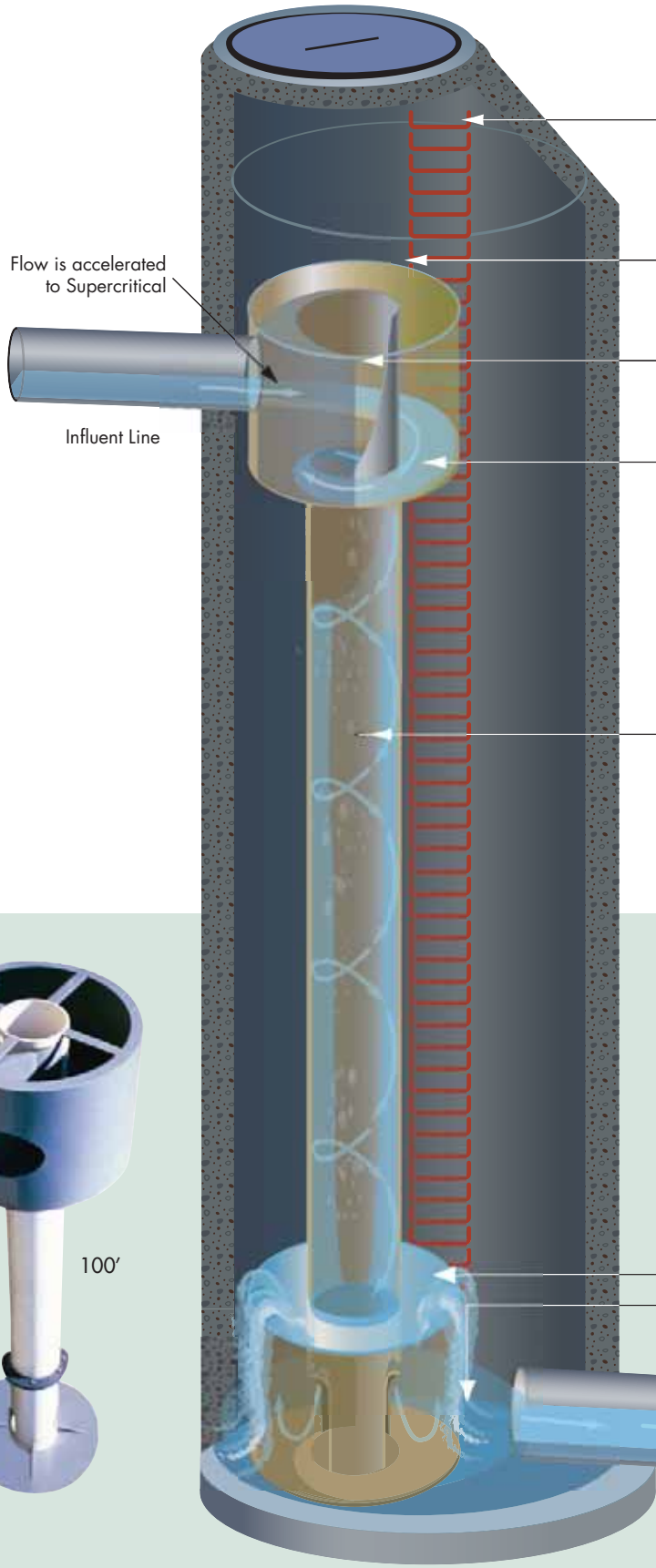
A SIMPLE SOLUTION FOR ODOR AND CORROSION CONTROL

Hydrogen sulfide (H_2S) 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.

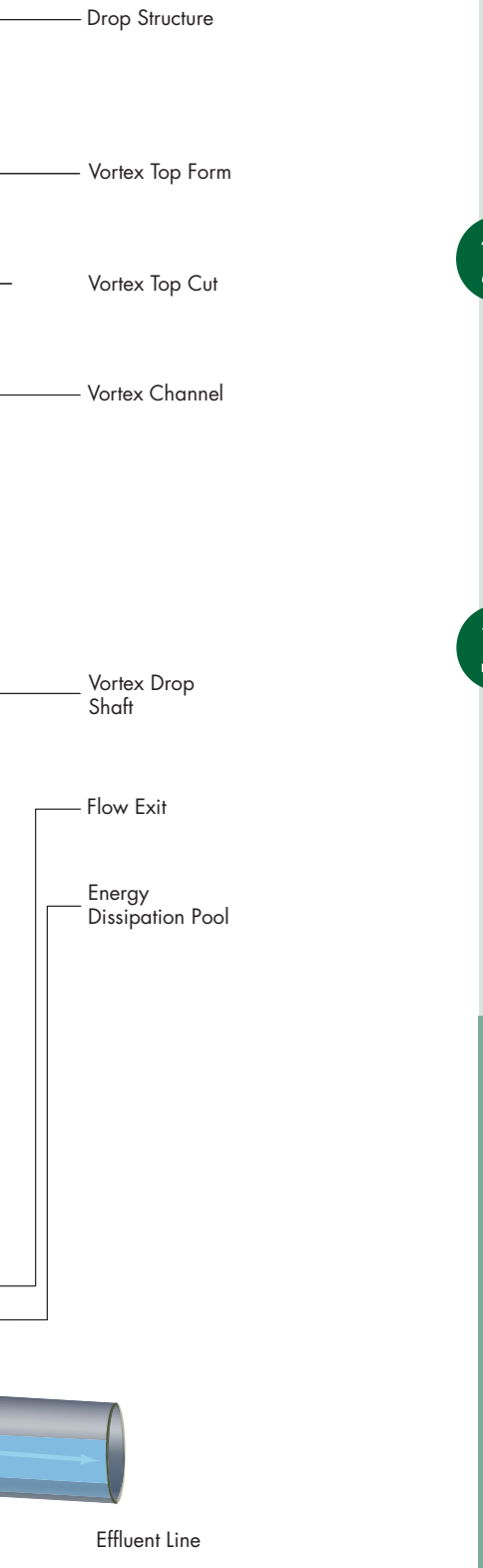
In addition, land developers can save hundreds of thousands of dollars in excavation costs in areas where conventional drop structures are not allowed.



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.

REDUCED EXCAVATION COSTS AND LONG TERM

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 (H_2S) emissions from forcemain discharges can literally eat through a concrete drop manhole. By oxidizing dissolved H_2S, 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 lo
system odor and cor
cost that requires n
definitely recommen

Frank A. Badinski, C.E.T.,
Asset Management Coordin
Regional Municipality of Yo
NAAPI Chair;
NASTT Great Lakes St. Law

SAVINGS

ng-term solution to our sanitary rrosion problems. It is a one-time o ongoing maintenance.I would nd this product.”

ator,
rk;

vrence and Atlantic Canada Vice-Chair.

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.*

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

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

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.*

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.

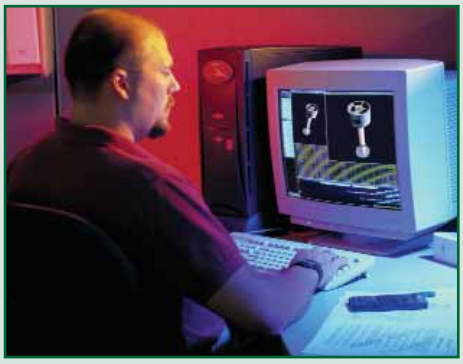
STEP 2: CONCEPTUAL DESIGN
IPEX designs the unit based on the Design Information Form.
IPEX provides conceptual drawings for the project.
IPEX provides an engineering estimate.

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.



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.

DESIGN INFORMATION FORM

Complete this form and fax it back to us at (905) 403-1124.

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

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 I m
3) Ground Elevation _____ ft I m
4) Manhole Floor Elevation _____ ft I m
5) Influent Line Elevation _____ ft I m
6) Effluent Line Elevation _____ ft I 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 I m^3/h
3) Today's Average flow – Dry Weather _____ MGD I m^3/h
4) Today's Peak flow – Wet Weather _____ MGD I m^3/h
5) Build Out Peak flow – Dry Weather _____ MGD I m^3/h
6) Build Out Avg. flow – Dry Weather _____ MGD I m^3/h
7) Build Out Peak flow – Wet Weather _____ MGD I m^3/h
8) Expected Sewage Velocity _____ FPS I m/s
9) Expected Build Out Time Frame _____ YEARS
10) Pump rate capacity of all pumps (if applicable) _____ MGD I m^3/h

Influent Line Information

1) Influent line material _____
2) Influent line nominal diameter _____ in I mm
3) Influent line outer diameter _____ in I mm
4) Influent line inner diameter _____ in I 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

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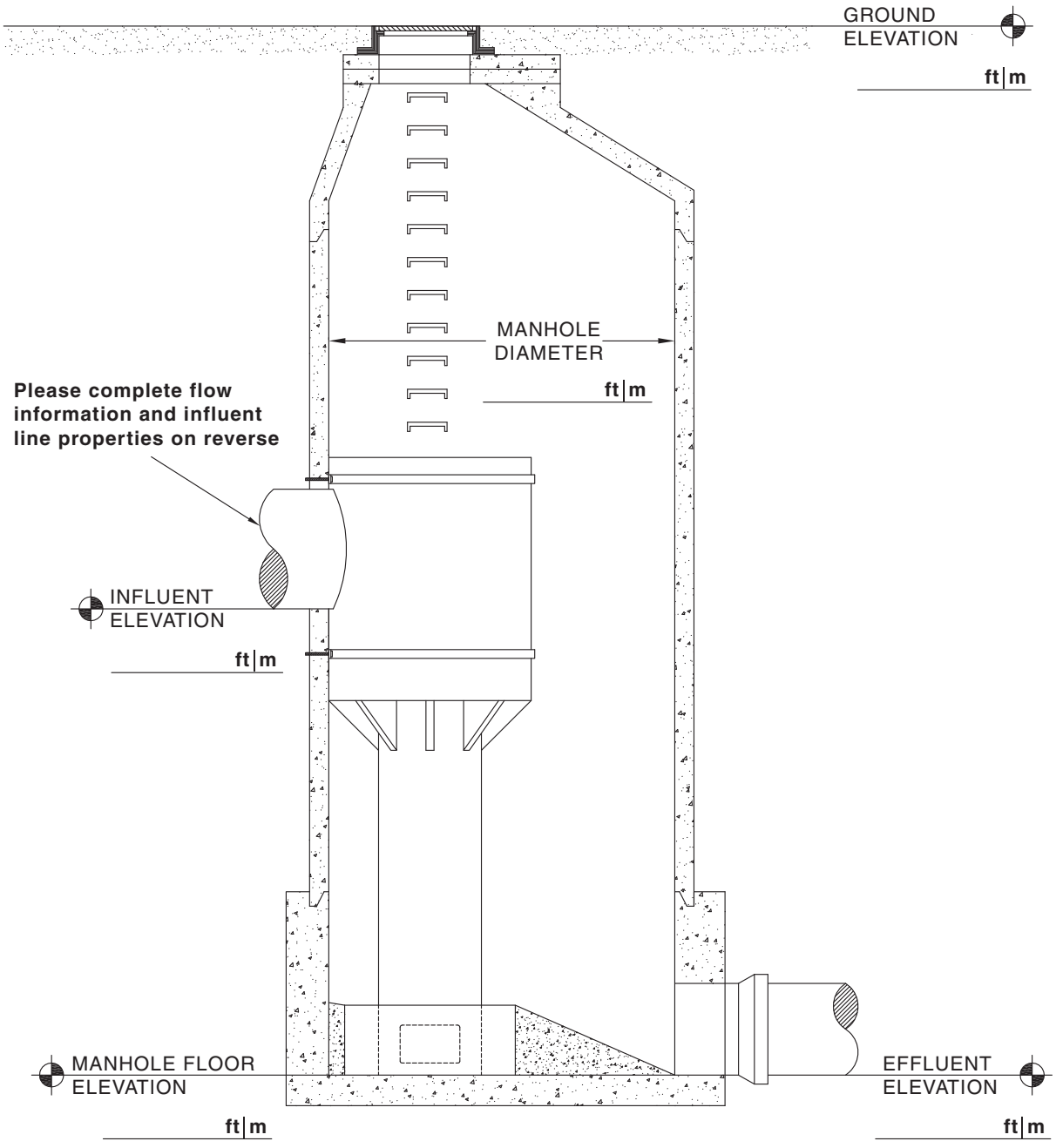
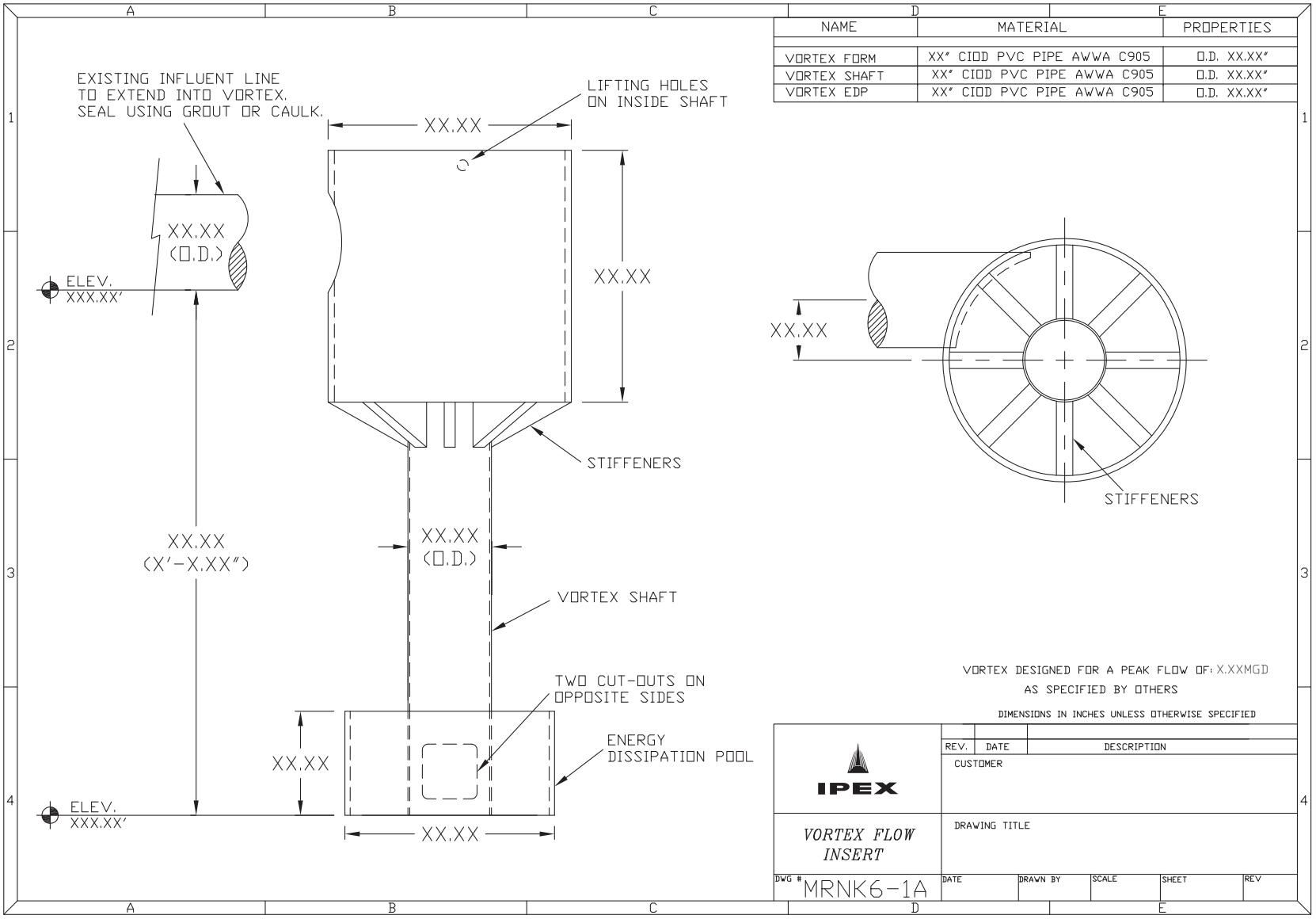
VORTEX FLOW INSERT

DESIGN INFORMATION





CONCEPTUAL DRAWING

VORTEX FLOW

IT'S A SIMPLE WAY TO ELIMINATE SEWER ODOR EMISSIONS

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 H_2S
concentration levels,
Camden County, New Jersey.

SALES AND CUSTOMER SERVICE

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

www.ipexinc.com

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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