“The Noise Control Experts”

Steam Vent Silencers
Gas Blowdown Silencers
I/C Engine Exhaust Systems
Gas Turbine Exhaust Systems
HRSG Stack Silencers
Compressor Inline Silencers

And More...
Who is Fluid Kinetics?

- 37 years of technical expertise… and counting
- Ability to customize
- Fastest turn-around time in the industry
- Manufacturing capability and excellent product quality

Fluid Kinetics (FK), the noise control expert, is a premier supplier of silencers in the U.S. and abroad. Our product line includes blowdown, vent and exhaust silencers, and pulsation dampeners spanning several industrial applications.

Fluid Kinetics is a company you can count on! From its inception in 1969, FK has worked to build a reputation around quality and reliability. Even after over 37 years of quality solutions to the power, petrochemical and pulp & paper markets, we remain focused on delivering exceptional customer service and products that are engineered for a lifetime of service. We provide prompt progress updates and support for any questions you might have.

In 2003, Fluid Kinetics was acquired by CCI, the world’s leading manufacturer and supplier of severe service control valve solutions. CCI is part of IMI - a dynamic international company delivering innovative engineering solutions to customers around the globe (www.imiplc.com). IMI businesses share a common goal - to convert their industry knowledge and market insight into customized, engineered solutions that create customer advantage and value.

Fluid Kinetics and CCI invest heavily in research and development. Such advanced research gave birth to FK’s new, lightweight EVO silencer backed by patented technology. In 2005, a new patent was approved for a flexible joint design for use in steam venting applications. FK is staffed by a dedicated team of engineers who pay close attention to detail and craft each product to your specific applications. All our products are custom designed to the specific operating conditions at your site.

Our mission is to be the world leader in meeting the noise control needs of our customers through excellence of products and services.

Our goal is to provide on time delivery of products. Internal audits show that we meet this goal more than 95% of the time.
Blowdown/Vent Silencer [Models BOS and EVO]

In a safety relief system, the primary release of noise energy occurs at the open stack exit. The BOS and EVO silencers are installed either within the stack or at the stack outlet to intercept this noise before it escapes into the environment. FK’s blowdown silencers combine both dissipative and reactive noise reduction technologies in a highly efficient design. The result is attenuation you can count on for the long-term.

Features

- Varying degrees of required noise reduction for the release of high pressure gas and steam into the atmosphere.
- Custom-built and designed to fit the conditions at individual customer sites.
- Relative to its size, the EVO silencer provides dramatic improvements in acoustic performance and its design offers significant reduction in overall silencer height and weight.
- Our silencers can be installed conventionally at the stack outlet or even between the valve and vent stack. We are not limited to any configuration!
- Modular designs that are very portable and easy to install.
- Available with several customizable options including bellows seals [SBS], joints, ducts and transition elbows.

Typical Applications

- Safety Relief Valve Systems.
- Compressor Station Blowdown.
- Auxiliary Steam Vent.
- Steam Ejector Discharge.
- Air Compressor Vents.
- Boiler Blowdown.
- Process Vents.
- Start-up Vents.
- Piping Cleanout Blowdown.
**Gas Turbine/HRSG Exhaust Silencer [Model CTS]**

FK’s CTS silencers provide the required attenuation for predominant, very high frequency noise. The rugged silencer panel is designed to treat noise in the aggressive service conditions of turbine exhaust.

**Features**

- Modular acoustic panel with no welded or bolted joints that could be vulnerable to thermal cycling.
- Free expansion structural design.
- Operates at low pressure drop thereby ensuring minimal back pressure to your turbine system. This maintains the efficiency of your turbine.
- Easy to install slot and key design.
- For smaller systems, the CTS comes in cylindrical panels.

**Typical Applications**

- Simple Cycle Power Generation.
- Heat Recovery Steam Generators (HRSGs).

**I/C Engine Exhaust Silencer [Model EES]**

FK’s EES silencer provides a custom-designed, reliable solution to the pulsation and noise problems caused by internal combustion engines.

**Features**

- Equipped with reactive chambers specifically tuned to the rpm of your engine. This practice is borne out of our quest for optimum performance.
- Optional ‘burst disks’ as a preventive measure against engine backfire. Best utilized during start-up or as an additional safety precaution.
- Optional ‘absorptive section’ for additional attenuation. This absorptive section will effectively control any anticipated higher frequency noise in addition to the low frequency noise typically generated by an I/C engine and will be embedded within the exhaust portion of the silencer.

**Typical Applications**

- Exhaust from internal combustion engines.
- Gas pipeline compressor stations.
- I/C engines for power generation plants.
Reactive Compressor Silencer [Model RCS]

This positive displacement compressor/blower silencer provides high performance flow path pulsation and noise control at constant rpm. The RCS is also very well suited for high amplitude, low frequency pulsations in critical environments with stringent noise control requirements.

In cases where the blower uses a liquid injection sealing/cooling system, our RCS silencer can be designed with an added water and mist separating function.

Features

- Maximum performance with minimal impact on blower efficiency.
- A unique reactive design that provides effective pulsation control at the blower’s fundamental frequency.
- Time-tested design that features a tuned series of reflective internal obstructions to filter undesirable pressure pulsations from the flow stream.

Typical Applications

- Lobe type blowers used in air reduction plants.
- Positive displacement compressors.

Control Valve Silencer [Model CVS]

Noise is a common control valve problem and it can sometimes get out of hand under severe conditions. For expert control valve noise reduction; turn to FK’s CVS with exceptional noise control - up to 50dB reduction!

Each CVS silencer has a diffuser drilling pattern selected to provide a reshaped noise spectrum and optimum back pressure for the valve. The packed section is designed so that slot width and length can be varied to provide the correct attenuation of the diffuser noise spectrum.

Features

- Built to withstand the high pressure and high noise level downstream of pressure control valves.
- The combination of reactive and absorptive technologies makes for the ultimate weapon against control valve noise.
- Includes a high performance diffuser.
- May be used in conjunction with standard trim valves to eliminate the need for costly, maintenance-prone quiet trim valves.
- Pressure vessel construction.
Compressor Inline Silencer [Model CIS]
The CIS silencer is an absorptive type silencer, designed for the short acoustic wave lengths produced by centrifugal and axial compressors. (For lower speed, positive displacement compressors, see model RCS.)

Sound absorption takes place in the interstices of the carefully configured glass fiber packing within the CIS. The packing is designed so that its resistance matches the characteristic resistance of the gas being handled.

Features
- The custom sized inline silencer is designed to treat the broad spectrum noise created by centrifugal and axial compressors while specifically addressing the peak at blade passing frequency.
- Its packing is protected by a triple layer sandwich of fiberglass cloth and stainless steel screen to prevent loss into the gas stream.
- Pressure vessel construction.

Typical Applications
- Inlet or outlet of high speed dynamic compressors.

Gas Diffuser Silencer [Models GDS and GDI]
High pressure drop across a valve creates excessive noise as well as deterioration of some valve components. The gas diffuser is a reactive type silencer that helps protect the human ear and valve components by sharing this pressure drop.

These diffusers can be used in place of a more expensive valve trim to achieve a less noisy environment.

Features
- Designed to control excessive inline valve noise.
- Shares pressure drop with the valve thus substantially reducing noise and wear.
- Can be installed immediately downstream of the system [model GDI, GDS] or at the system discharge to the atmosphere [GDV].

Typical Applications
- Can be used in conjunction with any control valve.
Hush Pup Vent Silencer [Model HPS]

The HUSH PUP is a non-packed, reactive silencer that expands incoming flow in order to create a frequency shift and consequently reduce vent noise. By careful design, this reduction can equal the overall quieting effect of older packed silencers. This simple, yet effective silencing concept has been tested and proven in over 4,000 applications as a component part of FK’s line of vent silencers.

Features

- Effective silencing in non-critical applications.
- Will provide a 15 to 20 dB reduction on most vent applications (See Model EVO for more critical silencing).
- Designed like a pressure vessel, its inlet diffuser can be subjected to high pressure, high impact flow with no problems.
- Provides years of non-maintenance, trouble free service.

Typical Applications

- Steam relief valve discharge.
- Air compressor, gas plant, and product dump vents.
- Boiler blowdown lines.

Silencers

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<thead>
<tr>
<th>Noise Source</th>
<th>Required Attenuation</th>
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<tr>
<td></td>
<td>Max (40-50dBA Reduction)</td>
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<tr>
<td>HRSG/Gas Turbine</td>
<td>CTS</td>
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<tr>
<td>Engine Exhaust</td>
<td>EES</td>
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<tr>
<td>Compressor</td>
<td>CIS⁺</td>
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<tr>
<td>Blower</td>
<td>RCS</td>
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<tr>
<td>Inline Valve or Orifice</td>
<td>CVS⁺⁻</td>
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<tr>
<td>Vent</td>
<td>EVO*</td>
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* Offers Pressure drop sharing with equipment  + Pressure Vessel Construction

The above table is intended as a guide. We recommend talking to one of our engineers before making a decision.
Customize your silencer your way with a variety of options

Since all FK silencers are fully customizable, you have the flexibility of choosing which orientation best fits your site. Below are some examples:

**We can custom design any configuration!**

- Standard Vertical Orientation
- Horizontal Orientation
- Standard Weather Hood
- Vertical Discharge Weather Hood
- Skirt Support
- Saddle Support
- Standard Single Inlet
- Side Inlet
- Multiple Inlets
- Horizontal Discharge
- Vertical Discharge
- Inlet Expansion Joint
- Bird Screen
- Special Materials
- Variety of Coatings and Colors
- Timed Blowdown
- Removeable Inlet Nozzle
- Inspection Ports or Manways, Cleanout Blinds

**Silencer Bellow Seal [Model SBS]**

If you are looking for more cost effective options to absorbing thermal expansion, look no further than FK’s Bellow Seals. This value-added feature integrates a low-pressure expansion joint within the silencer as an alternative solution to large thermal growth problems in interconnected vent piping.

**Features**

- Easily absorbs thermal movements from daily boiler activity predictably and inexpensively.
- Simplifies the piping stress analysis process.
Liquid Pulsation Dampener [Model PDS]

FK’s pulsation dampeners are inline devices specifically designed to eliminate pulsation and reduce maintenance in power pump discharge lines. All power pumps produce pulsation, some of which could be severe enough to cause problems depending on the system variables.

Generally used on multi-plunger pumps having a discharge pressure over 500 psi, FK’s PDS reduces discharge pressure pulsation by approximately 75%.

Features
- Completely liquid filled with no moving parts means no need for maintenance or gas charging. Imagine never having to think about vibration again!
- Has a unique spherically shaped inline design that can withstand up to 6000 psi pressure.
- Can handle oil or water at varying discharge pressures.

Typical Applications
- Positive displacement pumps.

Suction Stabilizer [Model SSC]

On many power pump systems, suction conditions are far from ideal with cavitation and entrained gas problems. FK’s SSC Stabilizer offers protection against these and more while making up for pressure head and ensuring smooth pump operation.

Features
- Installed directly at the pump suction in the upstream line.
- Built for long-term service so no need to replace parts.
- Easy to install with pre-labeled nozzles.
- Only minimal maintenance required.

Hydraulic Acoustic Filter [Model AFC]

Positive displacement pumps such as gear, piston, and screw pumps create undesirable pulsations at their discharge. FK’s acoustic filter attenuates such pressure pulsations.

Features
- No moving parts, no gas charging.
- Supplied with customer’s choice of material and end connections.
How does FK deliver quality, custom-built solutions again and again?

Our mode of operation is simple really. We listen to exactly what you need and the specific requirements of your site, then we provide a personalized quote that incorporates this as well as our professional recommendations. Finally we optimize the silencer design to provide the best engineering solution.

The computerized design system used to size FK’s silencers is a result of hundreds of tests run on prototype silencers and silencer/valve combinations. This testing is further supplemented by experience in building over 5000+ silencers. The result is solutions you can depend on and excellence in noise control.

Our manufacturing facility is certified for ASME, U, R and S stamps.

Each of our operators make their utmost effort to build quality into each and every product that comes out of our factory. A vast majority of FK business comes from repeat customers who enjoy the quality of our products and services.

With deliveries to Asia, Africa, Europe, The Americas, and Australia, Fluid Kinetics is continually providing noise control solutions globally.

We are aware that sometimes not all the specs are readily available and about the only thing predictable is change - change in project requirements, deadlines, even specs. That’s ok with us because we are committed to you and ensuring that your silencer is designed to your exact specification.

We stand behind the quality of our products; talk to one of our engineers today, we are only a phone call away.
FK Client Portfolio

FK has built a reputation for quality, reliable products and service, earning itself a burgeoning customer base!

<table>
<thead>
<tr>
<th>Client Name</th>
<th>Another Client Name</th>
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<tbody>
<tr>
<td>Air Liquide</td>
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