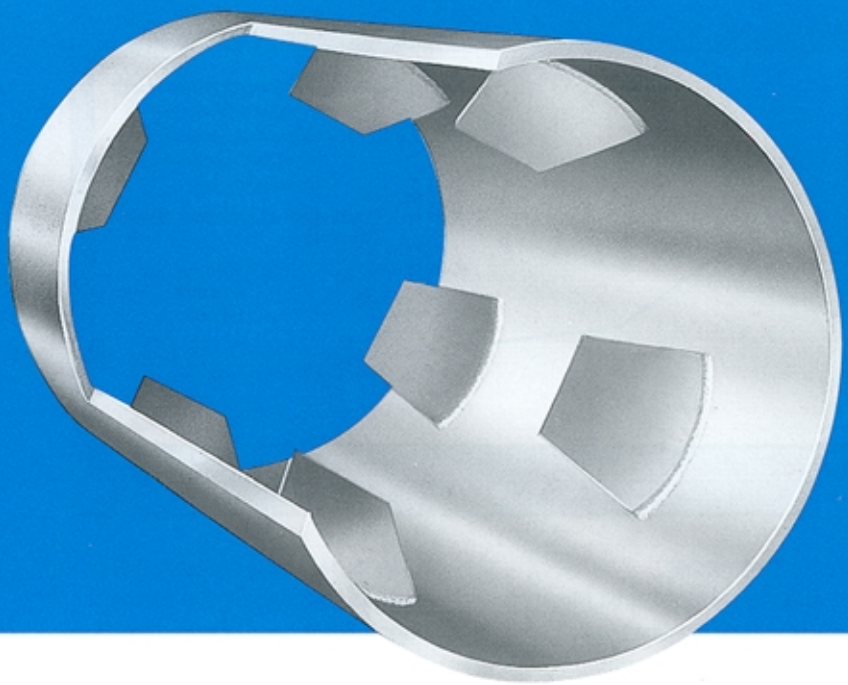
Kenics

HEV High Efficiency Static Mixer



Chemineer's latest technology brings you the newest design in static mixers. The patented Kenics High Efficiency HEV Static Mixer gives you pressure drops drastically lower than any other static mixer available today and can be applied to any turbulent flow mixing problem regardless of line size or shape.

Typical applications for the HEV include all low viscosity liquid-liquid blending problems, as well as gas-gas mixing. It is offered in unlimited sizes and mixes in the shortest possible pipe length for applications having space restrictions.

HEV Technology

University studies of turbulence led to the understanding of fluid flow phenomena that made the development of the HEV Static Mixer possible. Years of research have gone into defining the patented element geometry parameters to maximize conversion to fluid energy into efficient mixing. The length, width, and attack angle of the HEV mixing elements have been optimized for mixing performance while limiting pressure drop.

To create mixing action the mixing element must impart momentum to the fluid stream. The level to which this momentum is converted to effective mixing versus wasted turbulence determines the mixer efficiency. Because the HEV is configured to promote a "natural" mixing pattern, the redirection of the flow stream results in virtually no loss of pumping energy. The benefit you gain is minimum pressure loss and significant energy savings compared to static mixers using more disruptive-type mixing elements.

The HEV mixing element consists of special patented trapezoidal tabs mounted at an acute angle relative to the downstream surface of the mixer housing. As the process stream strikes the base of the tab, it is deflected up the angled incline creating a pressure gradient between the upstream and downstream surfaces of the tab. This pressure differential causes the fluid to flow around the opposite sides of the tab generating alternating tip vortices having their axes of rotation oriented in the direction of the main fluid flow. The alternating rotations of the tip vortices induce vigorous cross-stream mixing which results in rapid uniformity of the process components.

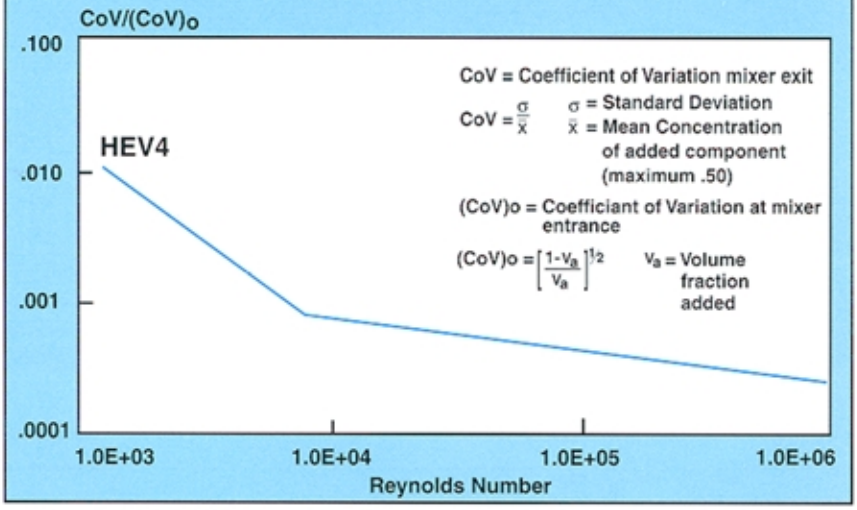
Full-scale mixing tests have confirmed the performance of the HEV and have resulted in highly accurate equations for predicting uniformity levels. These equations evaluate various parameters such as side-stream ratio and injection techniques that are influential to the process performance of the mixer. Control of these parameters allows the HEV to be applied with complete certainty.

Uniformity Criteria

Comprehensive testing of the HEV mixer using tracer injection techniques has quantified its mixing performance. Multi-point sampling probes were utilized to generate stream uniformity data. Statistical analysis applied to this data resulted in the equations that predict mix quality as a function of the inlet and outlet coefficient of variation (CoV_o and CoV, respectively). By knowing the inlet stream conditions any desired level of uniformity can be achieved by adjusting the design of the HEV.

U.S. Patent No. 4, 929,088. Other patents pending

Typical Mixing Performance of HEV



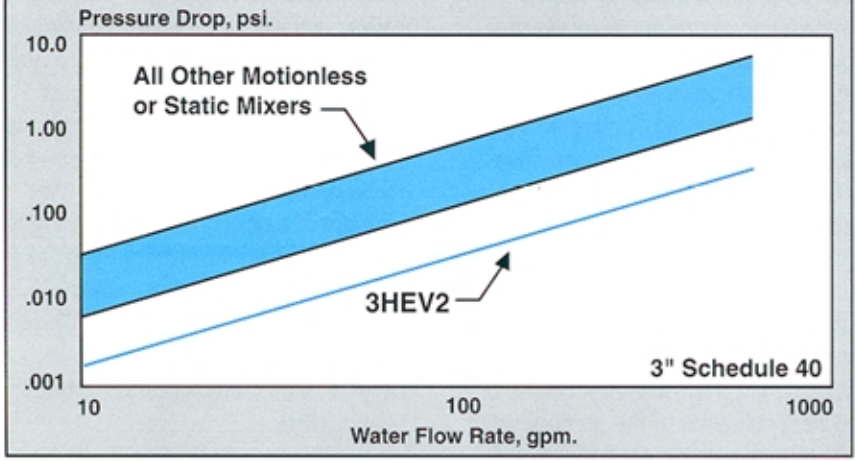
Process Performance

You can adapt the HEV Static Mixer to most turbulent flow applications without having to upgrade pump capacity. Another great advantage is its ability to be used effectively in non-circular ducts. The extremely low pressure drop and high mixing efficiency make the HEV ideal for low pressure gas phase blending situations or applications with severe space restriction.

The model HEV Static Mixer produces complete stream uniformity through controlled vortex action generated by its unique mixing elements. The patented element geometry takes advantage of the naturally occurring vortices induced by the element edges. **This highly effective flow field provides uniform blending while limiting mixer length to less than 1-1/2 pipe diameters.**

The mixing elements' low angle of attack minimizes non-productive disruption to the fluid stream which results in reduced drag and pressure drop. **Pressure losses are 75% less than conventional static mixers for the same degree of blending.** The extremely low profile of the HEV mixing element also maintains maximum open flow area and reduces fouling tendencies.

Pressure Drop Comparison for Equivalent Blending Performance



HEV Features

Standard HEV Static Mixers are available in pipe diameters up through 72". However, the mixing element design allows fabrication in virtually any size. This unlimited size capacity makes it easily adaptable to applications using large ducts, channels, or stacks up to 20 feet in diameter. The high efficiency design makes space limitations cease to be a problem. Standard materials of construction include all metals and FRP. Other materials are available on a custom basis.

The Kenics HEV Static Mixer provides installation flexibility that has not been available in the past. While conventional mixers are generally confined to circular cross sections, the HEV Static Mixer can easily be configured to square, rectangular, or 3 sided ducts. It's adaptable to open channels or ditches typically found in water treatment systems.

HEV Configurations

Mixer Shape	Application Area
• Round	• General CPI • Water & Waste Treatment
• Square/ Rectangle	• Gas Processing • HVAC • Stack Gases
•3 Sided Channel	• Water & Waste Treatment

The Kenics HEV Static Mixer brings proven static mixer technology to applications that had previously been handled by guesswork. Contact your Chemineer sales representative to learn more about how the Kenics HEV Static Mixer can benefit you.

Chemineer, Inc.
A Unit of Robbins & Myers, Inc.

125 Flagship Drive, North Andover, MA 01845
Telephone (978) 687-0101Fax (978) 687-8500

For the nearest sales office
call *1-800-643-0641*

Visit our Website at www.chemineer.com
www.kenics.com

5M ST 3/99-811 Printed in U.S.A