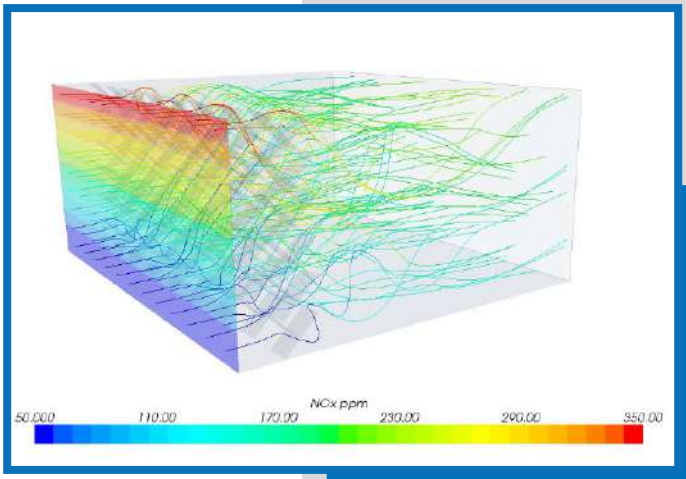
Static Mixers

Optimize SCR system performance with Fuel Tech's proven mixing capabilities

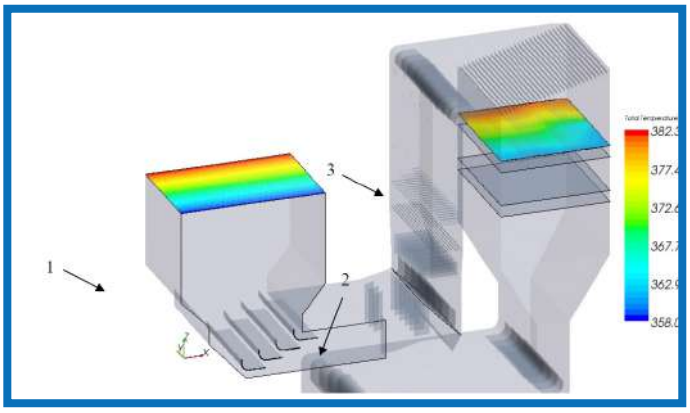
Static mixers are used in a wide variety of applications, including air pollution control, material processing and wastewater handling systems where deviations in process or product conditions need to be minimized. Fuel Tech is rapidly becoming a leader in the design and supply of mixing technology for the power generation industry, particularly for Selective Catalytic Reduction (SCR) process applications in which the consistency of flue gas velocity, temperature and ammonia-to-NO_X distribution at the catalyst face can greatly impact system performance.



CFD Model of Static Mixer

Generally, static mixers can be used for mixing regions of low and high temperature flue gas, regions of low and high concentrations of flue gas components, and regions of low and high concentrations of particulate in flue gas.

The most common application of static mixers is in SCR systems, where mixers are used to mix temperature, velocity and NO_X maldistributions ahead of an Ammonia Injection Grid (AIG), as well as sometimes mixing ammonia (NH_3) downstream of the AIG. Other applications include the mixing of sorbents for mercury control and mixing of chemical components for optimal reactions.



Mixing temperature maldistributions upstream of an SCR.

Mixers are available in a wide variety of materials for your specific application needs:

- Carbon Steel
- High Alloyed Steels
- Titanium
- Plastics
- Reinforced Fiberglass

Static Mixer Design

- Maximizes mixing efficiency
- Minimizes pressure loss
- Reduces mixer materials of construction

Proven performance of combining computational fluid dynamics and experimental (physical) modeling when required

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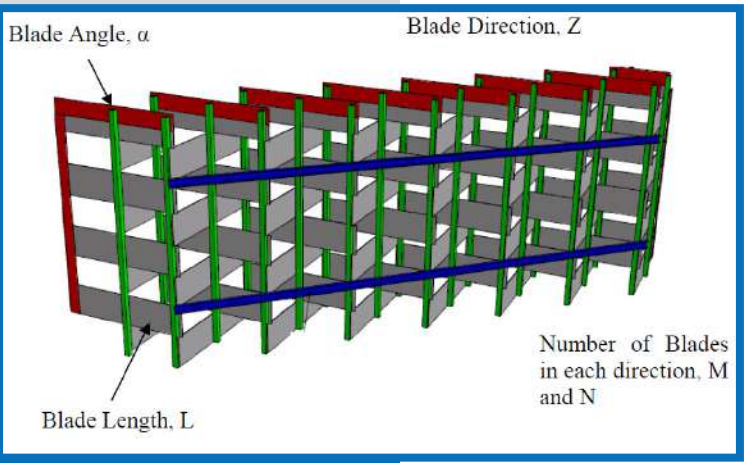
Static Mixers

Static Mixers are utilized in many processes to enhance performance by redistributing fluid velocities, temperatures and chemical species. These mixers use static mixing elements, which are geometrically defined devices installed in the stream of one or more media. The media are mixed by the fluid dynamics generated by the streaming media and the motionless static mixing elements. Our static mixers have been used in applications to enhance material injection mixing, reduce reaction time, reduce temperature gradients, improve velocity distributions and ash distributions. Fuel Tech's proprietary mixer design, known as the HI-TEC (Homogenous and Isotropic Turbulent Energy Cascade) Static Mixer, is custom engineered using Computational Fluid Dynamics modeling for every application to provide the optimal balance of mixing with minimal pressure losses.



X-type static mixer, with design parameters

Our experience in designing and supplying the HI-TEC Static Mixer as a turnkey solution includes design analysis, fabrication drawings and installation instruction. In-house testing and design keeps customer costs to a minimum.

Performance Features:

- Flow Correction
  - Velocity
  - Chemical Species
  - Temperature
- Enhance Material Injection Mixing
- Reduce Reaction Time
- Reduce Temperature Gradients
- Improve Velocity and Ash Distribution

The Process

We begin the mixer design process by analyzing the customer's flue gas train arrangement and understanding the customer's objectives. Next, Fuel Tech engineers develop the computational and process models that will provide predictions as to the performance of a design. Our engineers perform optimization of the static mixer geometry, linking the various models and objectives to hone in on the mixer arrangement that provides the "optimal" design per the minimization and maximization of the objective functions.

The Fuel Tech Advantage

Fuel Tech's mixers are a cut above the competition. We design each application from the ground up, considering the unique constraints and objectives of each new project because no two systems are the same. We utilize experimental (physical) modeling as well as computational fluid modeling to establish performance guarantees for our customers.

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