

stamixCO Heat Exchanger Product Bulletin

This is a Temporary Brochure – Final Brochure in progress

Heat Exchanger Static Mixers



Figure #1: Multi-tube (top) and monotube (bottom) Heat Exchanger static mixers.

StaMixCo manufactures static mixer heat exchangers for enhancing heat transfer in laminar flow applications. They are used for both the heating and cooling of viscous materials.

Monotube Heat Exchangers

A monotube heat exchanger is best for small flow rates where a single tube filled with static mixing elements processes the entire flow rate.

Multi-tube Heat Exchangers

A multi-tube heat exchanger is best for large flow rates with multiple tubes in parallel. Each tube is filled with static mixing elements.

Principles of Operation

The flow of viscous materials in pipes and tubes is normally laminar. In this laminar flow regime in an empty tube (Figure #2), there is virtually no mixing/exchange (radial mixing) of material between the inside pipe wall and the bulk fluid traveling in the center of the tube.

When cooling or heating viscous materials in an empty tube, this laminar flow profile dramatically impedes heat transfer. Static mixing elements, when inserted into the tube processing viscous materials will exchange wall and bulk fluid material and enhance heat transfer by a factor of 3 to 6 depending on the type of static mixing element used, the tube size and process conditions.

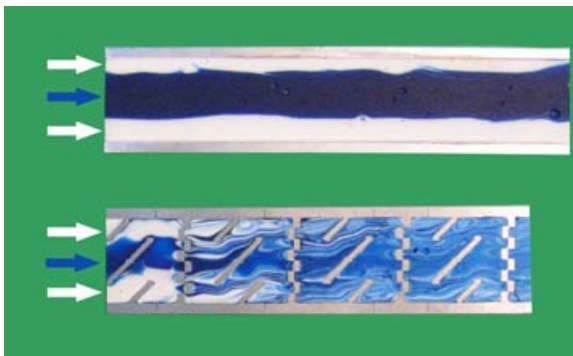


Figure #2: Laminar flow in an empty tube (top) and through an X-Grid type static mixer (bottom)

Advantages of Static Mixer Heat Exchangers

- Compact volume with small space requirements
- Short residence time
- Plug flow characteristics ensure narrow residence time distribution of product flow
- Simultaneous mixing, reaction and heat transfer

Types of Static Mixing Elements Suitable for Viscous Heat Transfer

There are three (3) fundamental types of static mixing elements that are used for enhancing heat transfer in laminar flow applications. Each design has specific advantages and disadvantages depending on process requirements. They are described below.

Type GX Heat Transfer Static Mixer



Figure #3: Type GX static mixer

The GX static mixer provides the greatest amount of heat transfer in laminar flow applications. This results in heat exchanger units of very short length.

The GX mixing elements are generally used in monotube and multi-tube configurations in tubing sizes 1" - 6" diameter.

Type GXL Heat Transfer Static Mixer



Figure #4: GXL static mixer

The GXL static mixer has the same fundamental X-Grid crossing bar structure as the GX static mixer (Figure #3), but is a more open structure with a gentler angle of the mixing plates relative to the pipe axis.

The GXL design is generally used in both monotube and multi-tube heat exchanger configurations where the tubing size varies from 3/4" - 3" diameter.

Type HT Heat Transfer Static Mixer



Figure #5: Type HT static mixer

The HT helical twist static mixer, with alternating right-and-left twist bowties, will generally be the most cost effective design for a heat exchanger where heat transfer is the only requirement. Additional process requirements such as mixing and residence time distribution may require the use of GX or GXL static mixers.

The HT helical twist design is generally used in both monotube and multi-tube heat exchanger configurations where the tubing diameters are 1" and smaller.

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**A young company with over 50 years of
accumulated experience in mixing technology.**

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