

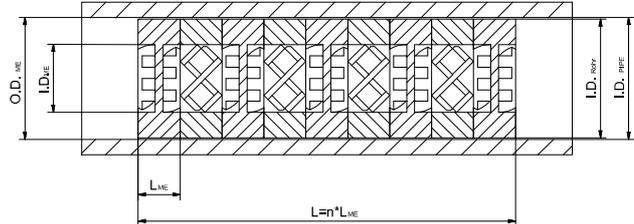
StaMixCo Mixer LMXR for Adhesives and High Viscous Fluids



Mixing element LMXR (licensee of BAYER AG)



Mixing of epoxy resins in an empty pipe and in an mixer LMXR



Cross-Section of LMXR Mixer

Applications

- Mixing/dispersing of high viscosity 2-component adhesives such as poly sulfide, silicone, epoxy resin
- For general laminar flow mixing/dispersing of viscous liquids with liquids of similar or very different viscosity or with gases

Mixer characteristics

The LMXR mixing unit is used for mixing adhesives and other high viscosity fluids. It consists of LMXR static mixing elements mounted inside an housing. Each mixing element (see top-left photo) is made of crossing bars cast to the body of a ring and to each other which results in a monolithic structure that is virtually indestructible. The inlet and outlet of each mixing element comes to a point (edges have a shape like the ridge of a roof) to achieve streamlined flow conditions (no dead spots). This mixing structure is excellent for mixing/dispersing liquids of similar or very different viscosity.

Design of the mixer for a specific application is based on customer requirements. These include degree of mixing required, component volumetric flow ratio, viscosity ratio, system pressure, allowable pressure drop, maximum allowed length, etc. The below table specifies the LMXR mixing unit's dimensions as well as the number of mixing elements required for a specific application.

The LMXR mixing elements are removable from the housing. Because the mixing elements are virtually indestructible, they can be pressed out of the housing, cleaned and reinstalled.

Number of LMXR mixing elements required for laminar flow

| Volumetric Ratio Component A : B | Viscosity Ratio Component A : B | Coarse mixing (80% of Perfect Mix) (CoV = 0.2) | Good Mixing (95% of Perfect Mix) (CoV = 0.05) | Excellent Mix (99% of Perfect Mix) (CoV = 0.01) |
|----------------------------------|---------------------------------|--|---|---|
| 1 : 1 | 1 - 100 | 7 | 13 | 20 |
| 9 : 1 | 1 - 100 | 12 | 18 | 25 |
| 99 : 1 | 1 - 100 | 17 | 23 | 30 |

CoV = variation coefficient of mixed material

* The number of mixing elements required is approximate. They can vary depending on the viscosity behaviour of the fluids to be mixed. The above recommendations are valid only for fluids that are soluble in each other in every ratio throughout the operating range.

If the viscosity ratio of Component A : B is larger than 100 : 1, the number of mixing elements noted in the above table must be increased as follows:

| Viscosity Ratio A : B | >100 - 300 | >300 - 1'000 | >1'000 - 3'000 | >3'000 - 10'000 |
|--|------------|--------------|----------------|-----------------|
| Additional mixing elements LMXR required | 5 | 6 | 7 | 8 |

Pressure Drop Calculations

Δp [bar] = K x total flow rate [m³/h] x viscosity of the mixture [Pas] x number of elements LMXR

For coefficient K: see table below "Dimension of the mixing elements LMXR"

Dimension of the mixing elements LMXR

| Type | I.D. ME | O.D. ME** | LME | K | Mixing Unit Supply Options a) <u>Ready for Use</u> ME, Housing, end connections. b) <u>Mixing Elements Only</u> ME machined to diameter specified by customer with standard positioning device. c) <u>Unmachined Mixing Elements</u> ME O.D. not finished. To be machined by customer. |
|----------------|---------|-----------|-------|-----------------------------------|---|
| | mm | mm | mm | (m ³ Pa) ⁻¹ | |
| LMXR-12 | 12 | 16 – 20 | 8.0 | 2.79 | |
| LMXR-18 | 18 | 22 – 26 | 11.25 | 0.560 | |
| LMXR-20 | 20 | 24 – 28 | 12.25 | 0.408 | |
| LMXR-22 | 22 | 26 – 30 | 13.5 | 0.307 | |
| LMXR-27 | 27 | 31 - 35 | 16.5 | 0.166 | |
| LMXR-33 | 33 | 37 – 42 | 20.0 | 0.0908 | |
| LMXR-40 | 40 | 44 – 50 | 24.0 | 0.0510 | |

** Range within which the O.D. of the mixing element can be adjusted to the I.D. of the mixer pipe

K = coefficient for calculation of pressure drop across the mixer

ME = mixing element

Additional information about the mixing elements

Material: AISI 316 S.S. stainless steel or on request also in 1.4542 / 17-4 PH (A 630) S.S.

Max allowed pressure drop: 100 bar/ME at 20 °C
 Note: don't exceed the maximum allowable operating pressure of the housing/mixer pipe should not be exceeded!

Housings: - pipes with ends prepared for welding, threads, or flanges are available on request.
 - special housing designs on request

Other Technical Data Sheets available:

- E_TB002-R2 StaMixCo Mixer LMXR for Polyol / Polyurethane Processing
- E_TB003-R2 StaMixCo Mixer LMXR for Liquid Silicone Resin Applications (LSR)

Comparison of the mixing efficiency

Basis: Equal number of layers formed in the mixer according to published layer formation laws

2 Mixing elements LMXR (each L/D ~0.6 with 8 bars across diameter = standard) corresponds to:

- **1 mixing element SMX** (L/D = 1 with 8 bars across diameter = standard)
- **~1 1/3 SMX/4 mixing elements** (L/D = 1 with 4 bars across diameter)
- **3 helical mixing elements** (L/D = ~1.5 = standard)

Therefore, **16 LMXR mixing elements** corresponds to **8 SMX mixing element** or to **~11 SMX/4 mixing elements** or to **24 helical mixing elements**