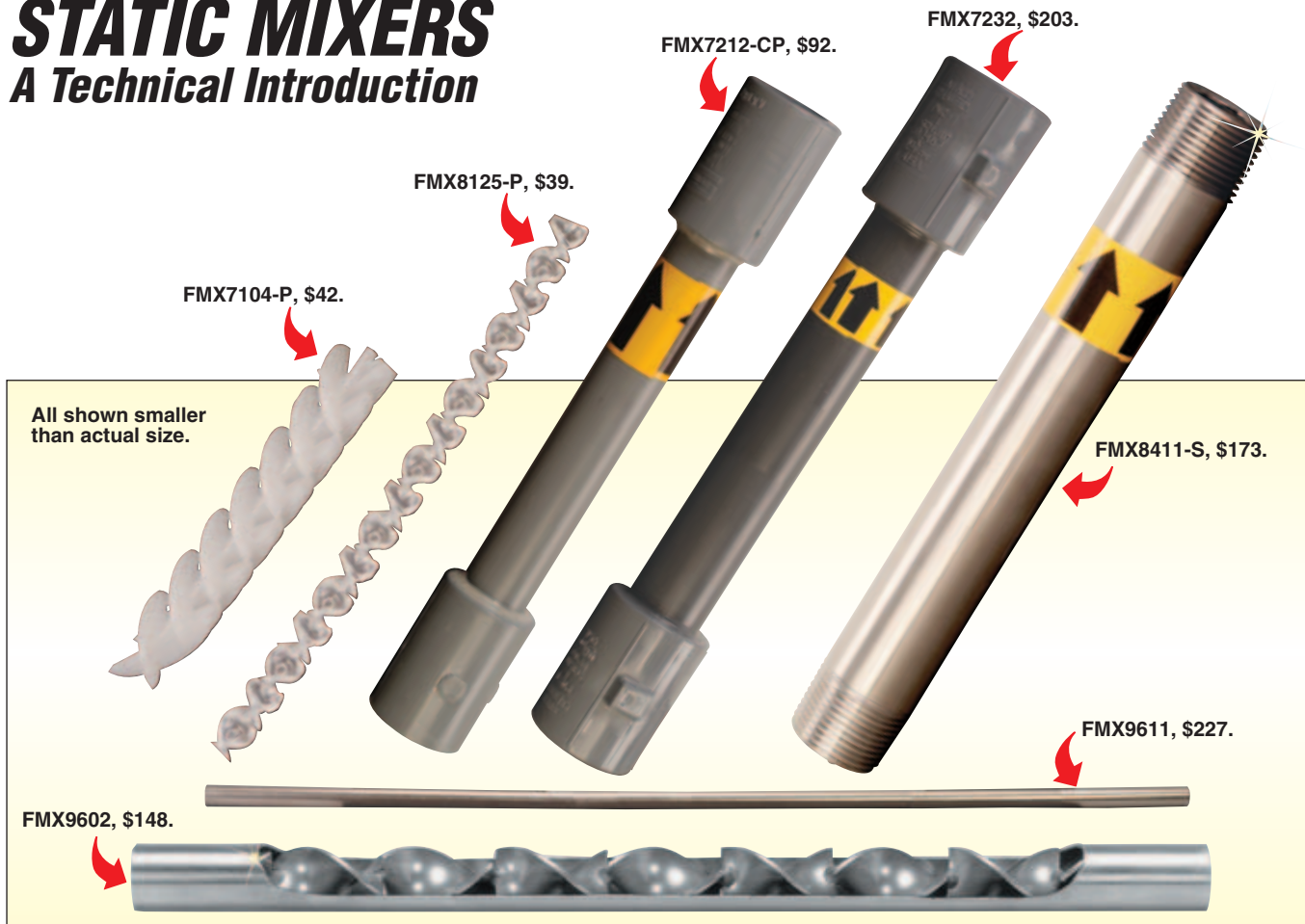


STATIC MIXERS

A Technical Introduction



SELECTION GUIDE

For each application, the designer must first determine the number of mixing sections required to achieve a complete mix. The guidelines below are based upon the Reynolds Number of your system. Also included are tables with some general application guidelines.

Next, the designer should select a diameter and/or a construction that will give the desired mixing performance without exceeding your system's maximum allowable pressure drop (see item 3 below).

1. Calculate the Reynolds Number. Use the diameter given in the charts. If both inside and outside diameters are supplied, use the inside diameter

$$RE = \frac{3157 \times Q \times S}{D \times MU}$$

2. Select a model based on the Reynolds Number.

FMX7000 Series Mixers:

Reynolds No.	No. of Elements
800 to 1000	14
>1000	7

Typical Application	No. of Elements
Ozone Absorption	7
pH Control	7
Gas/Gas Blending	7
Dilution of Chemicals	7
Polyelectrolyte Dilution	14

FMX8000 Mixers:

Reynolds No.	No. of Elements
<10	24 to 32
10 to 500	16 to 24
500 to 2000	8 to 16
>2000	4 to 8

Typical Application	No. of Elements
1-1 Epoxies	24
Urethanes/Elastomers	32
Urethane Foam	16
In-line Aeration	8
Admixing of Additives	8

3. Determine the Pressure Drop

Laminar Flow:
Reynolds Number < 500

$$DP = Q \times MU \times L$$

Turbulent Flow:
Reynolds Number > 500

$$DP = Q^2 \times S \times T$$

Note: If the pressure drop across the mixer exceeds its maximum rating, a modular mixer is required. For example, if a 24-element FMX8300 mixer is required and the pressure drop exceeds the 250 psi rating, we recommend coupling two 12-element mixers in series.

Symbols

RE = Reynolds Number—
Dimensionless

Q = Flow rate in Gallons/Minute

S = Specific Gravity—
Dimensionless

MU = Viscosity in Centipoise

D = Diameter in Inches

DP = Pressure Drop in psi

L = Laminar Factor—
See Mixer Tables

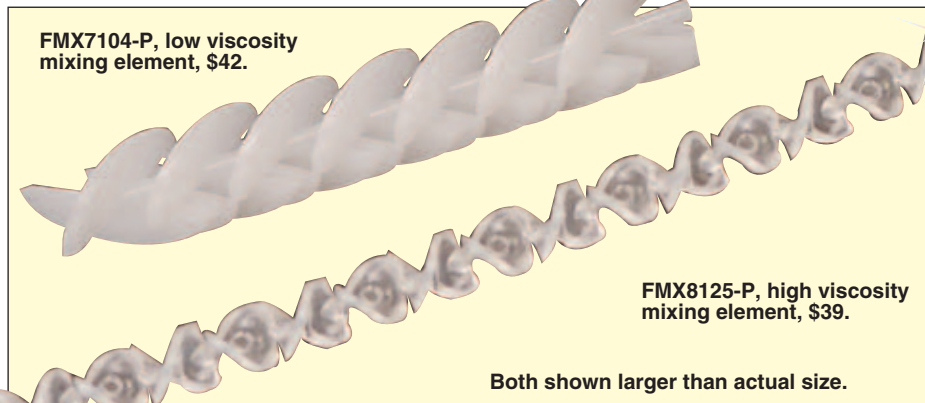
T = Turbulent Factor—
See Mixer Tables

MIXING ELEMENTS

FMX7100/8100 Series
Starts at
\$16



The FMX7100 and FMX8100 series mixing elements are injection molded in one operation to ensure low cost with excellent quality. The FMX7100 series are specifically designed for low viscosity applications. The FMX8100 plastic spiral elements were developed for adhesive and sealant and other high viscosity mixing applications. The leading and trailing edges of the FMX8000 mixers are "Knife Edged" so that the unit flushes clean with less solvent—no flat leading edges to accumulate material.



Polyacetal is completely inert to most common solvents, such as MEK acetone, and methylene chloride for use in the Adhesive and Insulation industries. Its maximum service temperature is 250°F. Polyacetal is not recommended for service with bases or acids. Polypropylene has

excellent chemical resistance and a maximum service temperature to 200°F. Metal or plastic tubing may be used to house the mixing sections. However, to achieve maximum performance, the sections must fit snugly inside the tube. Accepted tolerance is no more than 2% greater than the mixer diameter.

MOST POPULAR MODELS HIGHLIGHTED!

To Order (Specify Model Number)							
Model No.	Price Package of 10	Diameter	Elements	Length	Factors		Material
					L	T	
Low Viscosity Mixing Elements							
FMX7103-AC	\$16	0.300 in	7	1.4 in	0.18	8.74	Polyacetal
FMX7103-P	40	0.300 in	7	1.4 in	0.18	8.74	Polypropylene
FMX7104-AC	20	0.432 in	7	2.5 in	0.06	2.18	Polyacetal
FMX7104-P	42	0.432 in	7	2.5 in	0.06	2.18	Polypropylene
FMX7106-AC	32	0.685 in	7	4.2 in	0.015	0.276	Polyacetal
FMX7106-P	51	0.687 in	7	4.2 in	0.015	0.276	Polypropylene
FMX7109-AC	44	0.903 in	7	5.3 in	0.0066	0.092	Polyacetal
FMX7109-P	78	0.906 in	7	5.3 in	0.0066	0.092	Polypropylene
FMX7113-AC	61	1.375 in	7	8.0 in	0.0018	0.0172	Polyacetal
FMX7113-P	103	1.380 in	7	8.0 in	0.0018	0.0172	Polypropylene
FMX7120-AC	97	2.040 in	5	9.0 in	0.0003	0.0018	Polyacetal
FMX7120-P	136	2.050 in	5	9.0 in	0.0003	0.0018	Polypropylene
High Viscosity Mixing Elements							
FMX8112-AC	\$16	0.125 in	12	1.3 in	1.29	328.7	Polyacetal
FMX8112-P	34	0.125 in	12	1.3 in	1.29	328.7	Polypropylene
FMX8118-AC	17	0.187 in	16	2.5 in	0.5152	104.7	Polyacetal
FMX8118-P	36	0.187 in	16	2.5 in	0.5152	104.7	Polypropylene
FMX8124-AC	17	0.250 in	16	4.0 in	0.216	35.7	Polyacetal
FMX8125-P	39	0.251 in	16	4.0 in	0.216	35.7	Polypropylene
FMX8137-AC	21	0.370 in	12	3.9 in	0.048	4.27	Polyacetal
FMX8137-P	43	0.373 in	12	3.9 in	0.048	4.27	Polypropylene
FMX8149-AC	31	0.498 in	12	5.1 in	0.0192	1.23	Polyacetal
FMX8150-P	51	0.500 in	12	5.1 in	0.0192	1.23	Polypropylene

Ordering Examples: FMX7104-P, polypropylene low viscosity mixing elements, package of 10, \$42. FMX8125-P, polyacetal high viscosity mixing elements, package of 10, \$39.



ALL-PLASTIC STATIC MIXER ASSEMBLIES



Sizes:
3/8" to 2"
diameter

FMX7200 Series

OMEGA® FMX7200 Series mixers are designed for efficient turbulent-flow mixing at low pressure drop. Ideal for admixing water/wastewater treatment chemicals, polymer dilution, and other low-viscosity applications. Mixing elements consist of a series of polypropylene baffles, and are mounted in a PVC housing with FNPT ends. CPVC and clear PVC housings available.

FMX7200 Series
Starts at
\$86



The FMX7200 Series is an effective answer to your mixing requirements. Operating in-line, with no moving parts, these mixers blend and disperse treatment chemicals into waste water streams. Compared to competitive mixers, its unique baffling design ensures complete mixing in a shorter length and lower pressure drop.

The FMX7200 Series is easily installed in new or existing process lines. They are available in pipe sizes from 3/8" to 2" diameter. Construction materials include PVC, and CPVC.

FMX7200 Series mixers are specially designed for waste water treatment, mixing additives, pH control, and polyelectrolyte dilution. These all-plastic mixers combine PVC or CPVC pipe with polypropylene internals. Certain sizes feature clipped sections, which eliminate sharp crevices where material can accumulate and plug up the mixer. Polypropylene has excellent chemical resistance to most acids and bases. The maximum service temperature of a standard FMX7200 Series mixer is 60°C (140°F) with PVC housing, 82°C (180°F) with CPVC housing.

SPECIFICATIONS

Section: Polypropylene Non-Removable
Housing: PVC or CPVC;
schedule 80 up to and including 1";
schedule 40 for 1 1/4" and 2"

FMX7212-CP (NPT threaded model), \$92, shown smaller than actual size.



FMX7232 (NPT threaded model), \$203, shown smaller than actual size.

Pressure Limitations

Pipe Size	psig @ 24°C (75°F)
3/8"	850
3/4"	690
1"	630
1 1/4"	260
2"	200

MOST POPULAR MODELS HIGHLIGHTED!

To Order (Specify Model Number)

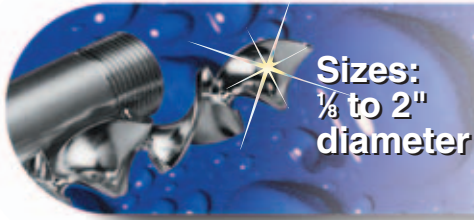
Model Number (PVC)	Price	Model Number (CPVC)	Price	Dia. (")	No. of Elements	Ends FNPT (")	Length mm (in)	Factors	
								L	T
FMX7211	\$86	FMX7211-CP	\$132	0.432	7	3/8"	112 (4.4)	0.18	7.6
FMX7212	92	FMX7212-CP	155	0.432	14	3/8"	173 (6.8)	0.36	15.2
FMX7221	97	FMX7221-CP	155	0.687	7 clipped	3/4"	178 (7.0)	0.015	0.24
FMX7222	106	FMX7222-CP	179	0.687	14 clipped	3/4"	267 (10.5)	0.03	0.48
FMX7231	109	FMX7231-CP	191	0.906	7 clipped	1"	208 (8.2)	0.0066	0.08
FMX7232	118	FMX7232-CP	203	0.906	14 clipped	1"	320 (12.6)	0.013	0.16
FMX7241	128	—	n/a	1.38	7 clipped	1 1/4"	262 (10.3)	0.0018	0.015
FMX7242	151	FMX7242-CP	298	1.38	14 clipped	1 1/4"	445 (17.5)	0.0036	0.03
FMX7251	142	FMX7251-CP	310	2.05	5	2"	287 (11.3)	0.0003	0.0016
FMX7252	165	FMX7252-CP	381	2.05	10	2"	490 (19.3)	0.0006	0.0032

Comes complete with PVC housing and PVC 150# Van Stone SlipON flanged ends, internal mixing elements are CPVC material.

Ordering Example: FMX7212, 3/8" FNPT, 14 clipped elements, \$92.

ALL STAINLESS STEEL STATIC MIXERS

With Optional PFA-Coated Elements



Sizes:
1/8" to 2"
diameter

FMX8400 Series

OMEGA FMX8400 Series mixers offer efficient mixing of low or high viscosity fluids at low pressure drop. Also ideal for two-phase (gas-liquid) mixing and blending of gases. Elements consist of a series of left and right helixes fabricated from 316SS. 304SS housing is corrosion-resistant, designed for high pressure and high temperature service. MNPT ends ensure easy installation.

FMX8441S
Starts at
\$117



FMX8400 Series pipe mixers feature 304 SS piping (schedule 40 nominal) with 316 SS elements. For routine maintenance, the elements can be pushed out and cleaned.

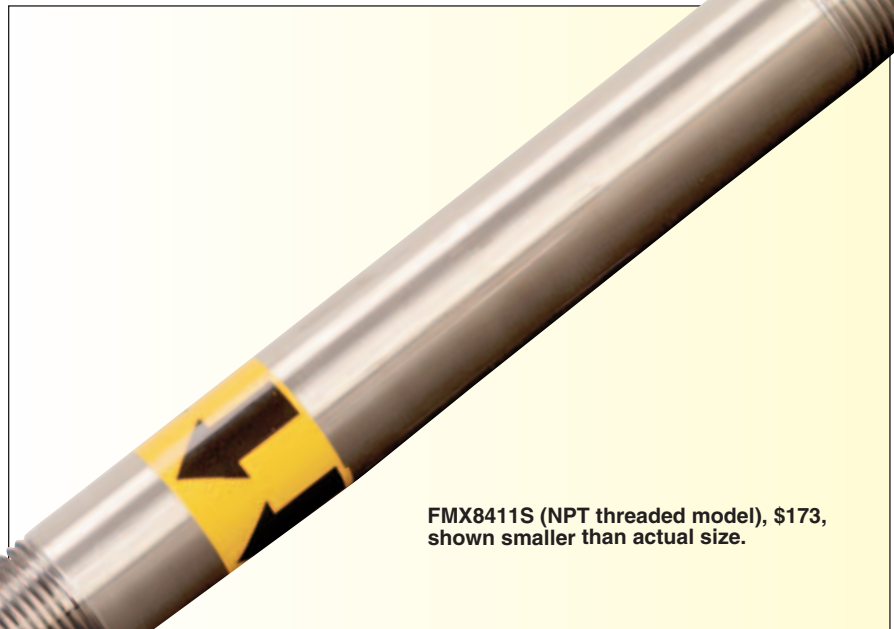
The leading and trailing edges of the mixers are "knife edged" to flush clean with less solvent, having no flat leading edges to accumulate material.

The FMX8400 Series consists of effective motionless mixers. When combined with metering pumps, these mixers replace expensive treatment tanks and dynamic mixers. Consider these advantages: zero maintenance, low cost, easy installation, and low energy consumption.

Typical applications include laminar or turbulent blending, liquid/gas contacting, and enhanced heat transfer. The mixing process is modular: the more difficult the application, the greater the number of elements required.

FMX8400 Pressure Limitations

Pipe Size (in)	psig @ 24°C (75°F)
1/8	8750
1/4	8500
3/8	7250
1/2	7250
3/4	6000
1	4500
1 1/2	3000
2	2500



FMX8411S (NPT threaded model), \$173, shown smaller than actual size.

MOST POPULAR MODELS HIGHLIGHTED!

To Order (Specify Model Number)

Model No. 316 SS Elements	Price	ID (in)	No. of Elements	Ends MNPT	Length (in)	Factors	
						L	T
FMX8441S	\$117	0.28	6	1/8	2.7	0.0588	6.1
FMX8442S	156	0.28	12	1/8	5.4	0.1176	12.2
FMX8451S	127	0.37	6	1/4	3.7	0.0237	1.9
FMX8452S	169	0.37	12	1/4	7.0	0.0474	3.8
FMX8461S	136	0.51	6	3/8	5.0	0.0092	0.55
FMX8462S	180	0.51	12	3/8	9.5	0.0184	1.1
FMX8481S	158	0.64	6	1/2	5.7	0.0049	0.22
FMX8482S	213	0.64	12	1/2	11.0	0.0098	0.44
FMX8411S	173	0.80	6	3/4	7.7	0.0023	0.04
FMX8412S	231	0.80	12	3/4	14.7	0.0046	0.08
FMX8413S	219	1.06	6	1	9.5	0.001	0.024
FMX8414S	292	1.06	12	1	18.5	0.002	0.048
FMX8415S	311	1.61	6	1 1/2	14.0	0.0002	0.004
FMX8416S	432	1.61	12	1 1/2	27.2	0.0004	0.008
FMX8421S	377	2.07	6	2	17.5	0.0001	0.0013
FMX8422S	510	2.07	12	2	34.5	0.0002	0.0026

Ordering Example: FMX8411S, 316 SS element mixer, \$173.

L-X

L

STAINLESS TUBE AND SPIRAL SANITARY MIXERS

FMX9600 Series
Starts at

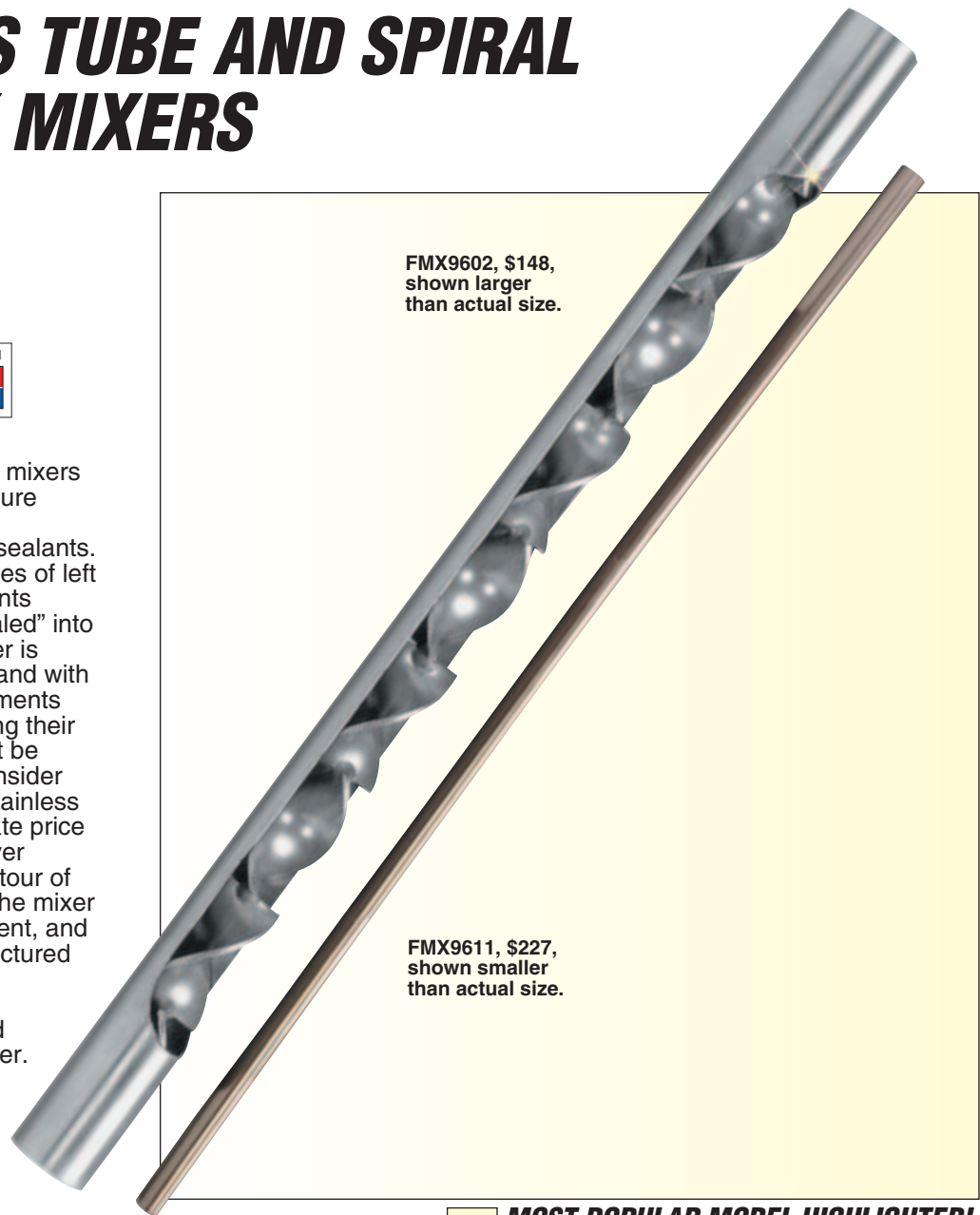
\$148



The FMX9600 Series spiral mixers are designed for high-pressure applications such as two component adhesives and sealants. The mixers consist of a series of left and right hand spiral elements which have been "edge-sealed" into a tube. The spiral tube mixer is available in four diameters and with 15 to 32 elements. The elements have been microbrazed along their complete length and cannot be removed from the tube. Consider the advantages of this all-stainless steel assembly: the moderate price offers significant savings over competitive mixers, the contour of the elements ensures that the mixer flushes clean with less solvent, and the tube mixers are manufactured with heavy walled tubing, which resists warpage during furnace cleaning and increases the life of the mixer.

SPECIFICATIONS

Elements: 316 stainless steel, non-removable
Housing: 304 stainless steel with plain ends



FMX9602, \$148, shown larger than actual size.

FMX9611, \$227, shown smaller than actual size.

MOST POPULAR MODEL HIGHLIGHTED!

To Order (Specify Model Number)									
Element				Housing					
Model No.	Price	Diameter mm (in)	Mixing Elements	Length cm (in)	Outside Dia. mm (in)	Pressure Limitation		L Factor to Calc. Pressure Drop	
						psi@300°F	bar@150°C		
FMX9602	\$148	2.87 (0.113)	21	15.24 (6.00)	4.75 (0.187)	6900	476	2.470	
FMX9603	156	2.87 (0.113)	27	19.05 (7.50)	4.75 (0.187)	6900	476	3.180	
FMX9604	149	4.75 (0.187)	21	17.78 (7.00)	6.35 (0.250)	4200	290	0.540	
FMX9605	165	4.75 (0.187)	27	23.50 (9.25)	6.35 (0.250)	4200	290	0.700	
FMX9606	179	4.75 (0.187)	34	29.21 (11.50)	6.35 (0.250)	4200	290	0.880	
FMX9607	152	7.42 (0.292)	21	27.94 (11.00)	9.53 (0.375)	3600	248	0.084	
FMX9608	168	7.42 (0.292)	27	35.56 (14.00)	9.53 (0.375)	3600	248	0.110	
FMX9609	186	10.62 (0.418)	15	30.18 (11.88)	12.70 (0.500)	2800	193	0.036	
FMX9610	204	10.62 (0.418)	21	41.61 (16.38)	12.70 (0.500)	2800	193	0.050	
FMX9611	227	10.62 (0.418)	32	62.87 (24.75)	12.70 (0.500)	2800	193	0.077	

Comes complete with plain ends. The elements are edge sealed to the housing to handle the mixing of high pressure or highly viscous materials. Elements are 316 SS and the housing is 304 SS.

Ordering Examples: FMX9602, spiral mixer, \$148.

FMX9611, spiral mixer, 10.62 mm (0.418") diameter, \$227.

Recommended Reference Book: Pump Handbook, ME-0341, \$135. See Section Y for Additional Books





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