stamixco

Static Mixing Systems



Stamixco designs and manufactures a wide variety of static mixers (motionless mixers with no moving parts) for the continuous processing of polymers, liquids, gases and slurries. Our customers utilize our technology to solve operating issues relating to mixing, dispersion, reaction, heat transfer and the conditioning of fluid flow In front of low pressure drop process equipment and instrumentation. Stamixco views ourselves as a competent partner with our customers so they can realize their process improvement needs. Our many years of experience, knowhow and on-going research & development activities have made us a technology leader in our industry where we are owner-operated and internationally established. Our dual headquarter locations in Winterthur, Switzerland and New York, U.S.A. are staffed with highly competent engineers which assures local competency and service. In addition, we have sales representative and distributors in most major countries of the world. In summary, we continuously endeavour to design and supply solutions to our customer's needs which has resulted in many patented and proprietary products. Stamixco designs and manufactures a wide variety of static mixers (motionless mixers with no moving parts) for the continuous processing of polymers, liquids, gases and slurries. Stamixco views ourselves as a competent partner with our customers so they can realize their process improvement needs. Our many years of experience, know-how and on-going research & development activities have made us a technology leader in our industry where we are owner-operated and internationally established. In addition, we have sales representative and distributors in most major countries of the world. In summary, we continuously endeavour to design and supply solutions to our customer's needs which has resulted in many patented and proprietary products. **Flow Engineering Computational Fluid Dynamics (CFD):** This allows Flowtech and Stamixco to perform advanced 3-dimensional simulations of very complex flow conditions and optimize existing products and installations.

Flow Optimization via Physical Flow Models: In some instances, digital flow simulations are inadequate for achieving the most economical solution. In these instances, Flowtech designs and builds experimental flow models in 1:10 - 1:12 scale. These scale models are then operated with highly experienced pilot plant personnel and sophisticated measuring instrumentation to verify performance for scale-up.

Equipment Components: To optimize solutions to customers processing issues, Flowtech, in conjunction with Stamixco, design, test and fabricate key components such as static mixers, inlet nozzles and distributors, flow straightening components, control equipment and housings.



Injection Moulding

Injection Moulders' must deal with many different moulding tools, polymer types and formulations and colour additives and master batches. Production rate, yield and high quality products are key to their success. The probability of success is greatly increased by installing an SMN static mixer injection moulding mixing nozzle direct upstream the moulding-tool.

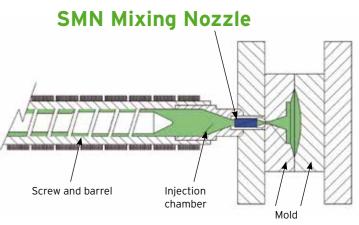
The Stamixco patented SMN mixing element geometry achieves excellent mixing results in a very short length. The high performance mixing elements homogenize the polymer melt during the injection process directly upstream of the mould. This homogenization is achieved by the con-

tinual division and recombination of the molten polymer as it passes through the geometric structure of the mixing elements. As a result, all additives and colorants and temperature and viscosity gradients created by the screw are mixed and evenly distributed just before entering the mould. The SMN Mixing Elements are extremely strong due to their monolithic cast construction where the mixing bars are joined to each other and to the external ring wall via a single molten metal pour.

Auxiliary components that can be mounted inside the SMN Mixing Nozzle housing include Filters and Cold-Start Grid Protection devices. All mixing elements and auxiliary components are standard and can be individually added or removed from the mixing nozzle as required.



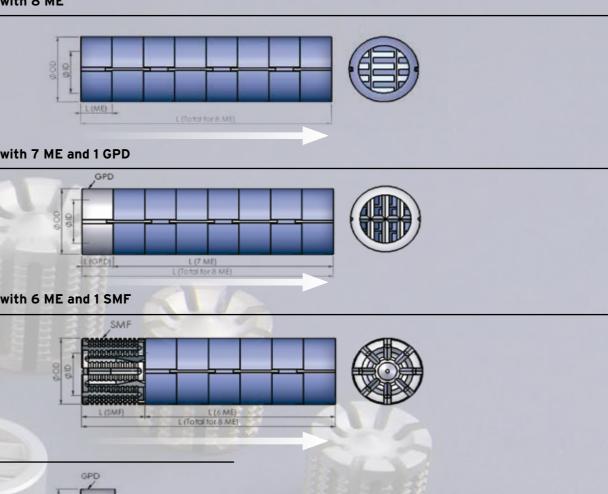
SMN-Mixing Nozzle with heater band and temperature Sensor



SMN Standard Mixing-Set with 8 Mixing Elements (ME)

Diameter	I.D. _{ME} (mm)	O.D. _{ME} (mm)	L (ME) (mm)	L (Total) (mm)	Weight (kg)
SMN-12-8	12	18	8	64	0,07
SMN-18-8	18	26	11,25	90	0,2
SMN-22-8	22	30	13,5	108	0,31
SMN-27-8	27	35	16,5	132	0,45
SMN-33-8	33	42	20	160	0,82
SMN-40-8	40	50	24	192	1,26
SMN-52S-8	52	62	31,5	252	2,45

SMN Mixing-Set with 8 ME



SMN Mixing-Set with 7 ME and 1 GPD

SMN Mixing-Set with 7 Mixing Elements (ME) and 1 Grid-Protection-Device (GPD)

Diameter	I.D. _{ME} (mm)	O.D. _{me} (mm)	L (ME) (mm)	L (Total) (mm)	Weight (kg)
SMN-18-7+1 GPD	18	26	11,25	90	0,21
SMN-22-7+1 GPD	22	30	13,5	108	0,32
SMN-27-7+1 GPD	27	35	16,5	132	0,47

SMN Mixing-Set with 6 Mixing Elements (ME) and 1 Filter (SMF)

Diameter	I.D. _{ME} (mm)	O.D. _{ME} (mm)	L (ME) (mm)	L (Total) (mm)	Weight (kg)
SMN-12-6+1 SMF	12	18	8	64	0,07
SMN-18-6+1 SMF	18	26	11,25	90	0,21
SMN-22-6+1 SMF	22	30	13,5	108	0,32
SMN-27-6+1 SMF	27	35	16,5	132	0,49
SMN-33-6+1 SMF	33	42	20	160	0,90
SMN-40-6+1 SMF	40	50	24	192	1,41

Grid-Protection-Device (GPD)

Diameter	I.D. (mm)	0.D. (mm)	L (GPD) (mm)	Fits to:	Weight (kg)
GPD-18	18	26	11,25	SMN-18	0,03
GPD-22	22	30	13,5	SMN-22	0,05
GPD-27	27	35	16,5	SMN-27	0,08
				TA VAT	-

Filter (SMF)

Diameter	I.D. (mm)	O.D. (mm)	L (SMF) (mm)	Fits to:	Weight (kg)
SMF-12	12	18	16	SMN-12	0,02
SMF-18	18	26	22,5	SMN-18	0,06
SMF-22	22	30	27	SMN-22	0,09
SMF-27	27	35	33	SMN-27	0,15
SMF-33	33	42	40	SMN-33	0,28
SMF-40	40	50	48	SMN-40	0,46

SMN Mixing-Set with 6 ME and 1 SMF GPD The SMN Mixing Nozzle consists of a mixing nozzle housing that holds the standard eight (8) SMN mixing elements (licen-SMF see of Bayer AG, Germany). The inlet side threaded adaptor connects to the injection moulding machine. The outlet side adaptor with nozzle tip connects to the mould. The entire mixing nozzle is heated by heater bands whose temperature is controlled by a thermocouple. Mixing Element assemblies only or complete Ready-to-Run Mixing Nozzles are available.

Choice of SMN Mixing Element Size:

Seven (7) standard mixing element assembly sizes are available that cover the operating range of very small to very large commercial injection molding machines. The size of mixing nozzle to be installed depends on the polymer volumetric flow rate and viscosity of the melt. To perform accurate design calculations, polymer melt rheology information is required (shear rate vs. viscosity at operating conditions and MFI).

SMF-Filter:

- Protects the mixing elements, nozzle tip, hot runner system and tooling from clogging and damage when processing regrind material by filtering unwanted solids (e.g. aluminium metal parts, pebbles, staples, etc.) in the polymer melt that a magnetic separator does not catch. - Holds back partially melted pellets until melted.

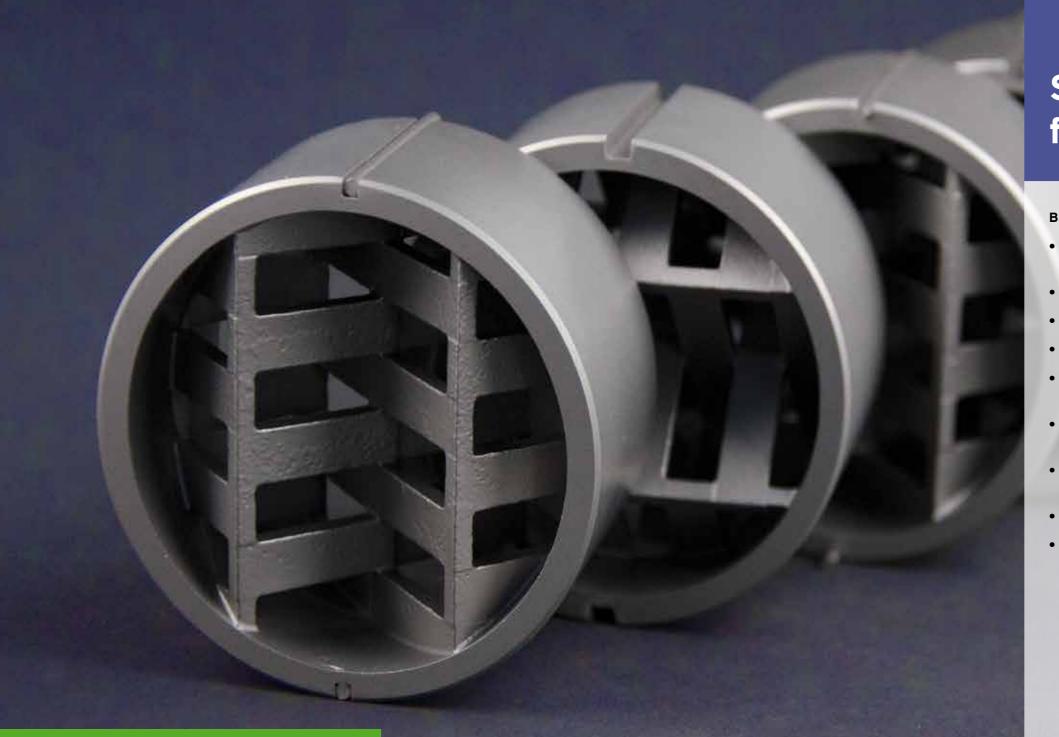
GPD Grid-Protection-Device:

- Protects the SMN static mixing elements from possible damage due to a "Cold Start" event when a slug of unmelted polymer under high pressure strikes the face of the mixing elements and damages them. The GPD is extremely strong and prevents unmelted polymer from striking the mixing elements.



Sectional model of a SMN Mixing Nozzle

Model range of standard SMN Mixer-Sets



Static Mixers for Extrusion

BENEFITS

- of temperature and viscosity
- Reduced colorant and additive usage
- Streak free product
- Improved admixing of regrind material
- Uniform melt flow in the die reduces time needed for die adjustment
- Improves foam cell size and cell distribution uniformity in foamed products
- Improved surface quality and mechanical characteristics
- Less wastage
- Stabilizes the entire extrusion process

Static Mixers for Extrusion applications are often called "Melt Blenders". They are installed directly upstream of the die. They homogenize the polymer melt just before forming the end product in the die. Differences in temperature and concentration of colorants and additives are equalized. By this mixing process, polymer melt viscosity differences are reduced to a minimum and thus the polymer flow behavior is optimized. At the same time, colorant spots and streaks are eliminated. This homogenization is achieved by the continuous division and recombination of the molten polymer when pushed through the geometric structure of the mixing elements

Applications:

Sheet

• Pipe

• Extrusion

Blow Molding

• Rod & Tubing

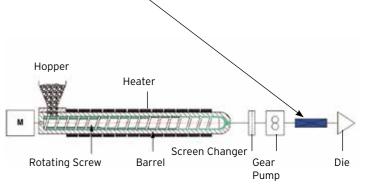
- Blown Film
- Foam sheet
- Profile extrusion
- Co-extrusion • Wire & Cable
 - Coatings
 - Fiber extrusion & monofilaments



Melt Blender Set SMB-R

• Homogenous melt with equal distribution

SMB Melt Blender



SMB-R Melt Blender Set with 8 Mixing Elements

SMB-R-25-8

SMB-R-32-8

SMB-R-48-8

SMB-R-60-8

SMB-R-75-8

SMB-R-90-8

SMB-R-115-8

SMB-R-140-8

SMB-R-175-8

SMB-R-200-8

SMB-R-225-8

SMB-R-250-8

Diameter

25/32 - 8

40/48 - 8

50/60 - 8

65/75 - 8

80/90 - 8

100/115 - 8

125/140 - 8

25/32 - 4

40/48 - 4

50/60 - 4

65/75 - 4

80/90 - 4

100/115 - 4

125/140 - 4

Diameter

48

60

75

90

115

140

175

DN 200 - 400

Diameter

16 - 125

I.D., (mm)

20

27

40

52

66

80

102

126

154

175

200

225

25

41,5

52

68

82

103,5

129.5

D (Bore) (mm)

25

42

52

68

82

103,5

129.5

D (Bore) (mm)

42

52

68

82

103.5

129,5

155

D (Bore) (mm)

on request

SMB-GX-4 Melt Blender Rod with 4 GXM Mixing Elements

SMB-GXS-8 Melt Blender Rod with 8 Mixing Elements

SMB-GXS-4 Melt Blender Rod with 4 Mixing Elements

0.D., (mm)

25

32

48

60

75

90

115

140

175

200

225

250

24,7

40,6

50,7

66,5

80

101,2

126.2

24,7

40,6

50,7

66,5

80

101,2

126.2

41,3

51,8

66,5

80,2

101,5

126,2

153,5

D (Mixer) (mm)

on request

D (Mixer) (mm) Da (Ring) (mm)

D (Mixer) (mm) Da (Ring) (mm)

12,5

16

24

30

37,5

45

57,5

70

90

102,5

115

130

32,0

48,0

60,0

75,0

90,0

115,0

140.0

32,0

48,0

60,0

75,0

90.0

115,0

140.0

48,0

60,0

75,0

90,0

115,0

140,0

175,0

Da (Ring) (mm)

on request

Special Cast with 8 rings Weight (kg)

0,17

0,3

1,75

3,25

4,85

10,4

16.3

42,5

64

85

110

Weight (kg)

0,16

0,45

0.8

1,6

2,8

5,4

10.5

Weight (kg)

0,1

0,3

0,6

0,9

1,8

3,8

6.0

Weight (kg)

auf Anfrage

auf Anfrage auf Anfrage

auf Anfrage

auf Anfrage

auf Anfrage

auf Anfrage

auf Anfrage

Weight (kg)

-

Machined in stainless steel

Welded in stainless steel

1.1

L (Total) mm)

100

128

192

240

300

360

460

560

720

820

920

1040

L (Total) mm)

138

211

268

351

435

528

684

L (Total) mm)

75

115

144

190

230

282

348

L (Total) mm)

auf Anfrage

L (Total) mm)

Special Cast with integrated stiffeners

Special Cast with integrated stiffeners

-

20

30

35

42

53

63

68

20

30

35

42

53

63

68

30

35

42

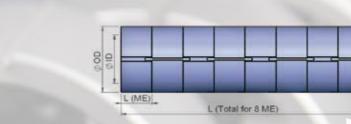
53

63

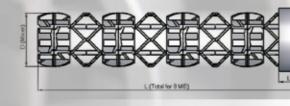
68

L (Ring) (mm)

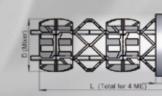
Melt Blender SMB-R



Melt Blender SMB-GXS-8



Melt Blender SMB-GXS-4



Melt Blender SMB-GX-4



Melt Blender SMB-H



Mixing Quality

The optimum melt polymer quality for extrusion installations is when at each location inside the polymer melt volume a uniform distribution of colorant, additives and melt temperature is measured. Using the Stamixco SMB Melt Blender with 8 mixing elements assures that the homogeneity of the melt is improved by a factor 5-6 or more. Payback time of Melt Blender installations are short and often less than 2-4 months.

SMB-H Melt Blender Rod with 6-9 Mixing Elements

Helical Mixing Elements L/D= 1.5 or L/D= 1.0

The SMB-R mixing elements are extremely strong due to their monolithic cast construction where the mixing bars are joined to each other and to the external ring wall via a single molten metal pour. The size of the melt blender is a function of flow rate and viscosity of the polymer melt. To perform accurate design calculations, the polymer rheology is required (shear rate vs. viscosity at operating conditions and MFI).

on request on request



SMB-GXS Melt Blenders as casted unit with integrated stiffeners (middle and right) in comparison with welded SMB-GX Melt Blender (left)



Bayer Licence

Stamixco Patent

Stamixco Patent

Melt Blender Housing with heater bands and sensors



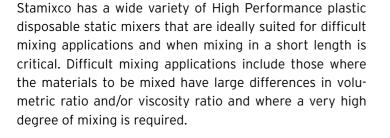


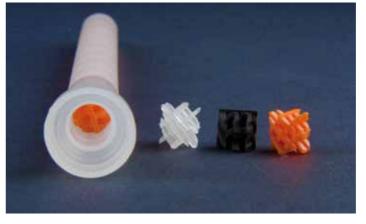
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Plastic Disposable **Static Mixers**

BENEFITS

- The X-Grid plastic disposable static mixers are the only High-Performance designs in the marketplace.
- Flexible number of mixing elements
- High Performance X-Grid static mixers can provide the identical mixing of the industry standard helical static mixer in a much shorter length. In addition, they can mix materials that are impossible to mix with helical static mixers.
- Smaller Mixer Volume: Reduces product waste

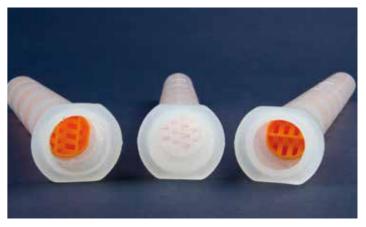




Stamixco X-Grid Mixer GXP as disposable mixer







Inside view of Stamixco GXF-21 disposable mixer

X-Grid Disposable Mixer GXF-10

	Material Mixer	Color	Diameter Mixing Elements (mm)	Number of Mixing Elements	Length Pipe (mm)
GXF-10-6 (Mixing Pipe)	Polypropylen	orange	ME-Inside-	6	115
GXF-10-9 (Mixing Pipe)	Polypropylen	orange	Diameter = 10	9	155
GXF-10-12 (Mixing Pipe)	Polypropylen	orange	ME-Outside-	12	192
GXF-10 (ME only)*	Polypropylen	orange	Diameter = 11.8	8 Rings = 2 ME	13,7

GXF-10

GXF-21



The Stamixco patented GXF plastic disposable static mixer is available in 10 mm diameter plastic housings with 6, 9 and 12 mixing elements. These foldable mixing elements can also be installed inside of metal pipe and tubing with inside diameter of 12 mm. They are used for processing small flow rates in difficult meter-mix-dispense applications such as adhesives, varnishes, urethanes, sealants and liquid silicone rubber (LSR), etc.

X-Grid Disposable Mixer GXF-21

	Material Mixer	Color	Diameter Mixing Elements (mm)	Number of Mixing Elements	Length Pipe (mm)
GXF-21-9 (Mixing Pipe)	Polypropylen	orange/white	ME-Innen-	9	305
GXF-21-12 (Mixing Pipe)	Polypropylen	orange/white	durchmesser = 21	12	385
GXF-21-15 (Mixing Pipe)	Polypropylen	orange/white	ME-Aussen-	15	465
GXF-21 (ME only)*	Polypropylen	orange/white	durchmesser = 23.8	4 Ringe = 1 ME	26,7

X-Grid Disposable Mixer GXP

	Material Mixer	Color	Diameter Mixing Elements (mm)	Number of Mixing Elements	Length Pipe (mm)
GXP-9.4-20 (Mixing Pipe)	Polypropylen	orange/white	9,4	20	232
GXP (ME only)*	Polypropylen	orange/white	9,4	1	9,4
GXP (ME only)*	PA66 Glass fibers	black	9,4	1	9,4

X-Grid Disposable Mixer GXR

	Material Mixer	Color	Diameter Mixing Elements (mm)	Number of Mixing Elements	Length Pipe (mm)
GXR (ME only)*	PA66 Glass fibers	black	Inside Diameter = 21 Outside Diameter = 29.7	4 Rings = 1 ME	26,4

Helical Disposable Mixer

	Material Mixer	Color	Diameter Mixing Elements (mm)	Number of Mixing Elements	Length Pipe (mm)
HT-10-4.8-8,16,24,32,48	Mining Elementer	white	4,8	8, 16, 24, 32 o. 48	68 bis 231
HT-10-6.3-8,16,24,32,48	Mixing Elements: POM, Acetal	white	6,3	8, 16, 24, 32 o. 48	91 bis 336
HT-10-8.0-18,24,32		white	8	18, 24 o. 32	179 bis 293
HT-10-9.3-12,18,24,30,40,60,64	Pipe: Polypropylen	white	9,3	12, 18, 24, 30, 40, 60 o. 64	141 bis 611
HT-10-12.7-12,18,24,30,36		white	12,7	12, 18, 24, 30 o. 36	172 bis 424
Big-Helicals 34.7-4 (ME only)*	ME: Polypropylen	white/orange	34.7	4 er Stangen	110

⁶ ME = Mixing Elements only without Mixing Pipe

Helical Plastic Disposable Static Mixers are not always able to create acceptable mixing results. Stamixco High Performance X-Grid plastic disposable static mixers deliver much better mixing results in a short length and with lower mixer volumes. Comparing the Medium Performance Helical static mixer to the High Performance X-Grid static mixer, the X-Grid static mixer provides up to 60% shorter mixing length and volume to reach the same mixing quality.

Stamixco offers a wide range of High Performance X-Grid static mixers made in various plastics for solving most difficult mixing applications. Mixing applications that cannot be solved with Medium Performance Helical mixers can be solved with High Performance X-Grid static mixer Models GXF, GXP or GXR.



nections at the outlet.

GXR-P

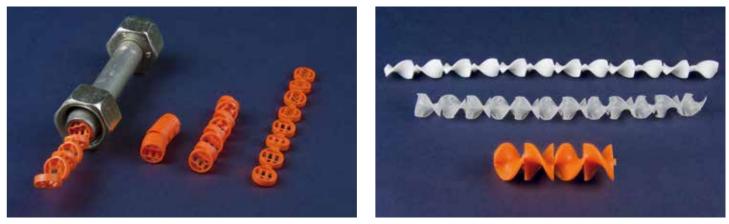


The Stamixco patented GXR-P plastic static mixing elements have support rings around the mixing element structure and are available in a 29.7 mm outside diameter and 21 mm inside diameter in 50% glass filled Nylon PA66 material. They are used for high pressure and temperature applications and are normally installed inside of high pressure metal tubing. As with all High Performance X-Grid static mixers, they are used for processing difficult mixing applications where the materials to be mixed have large differences in volumetric and viscosity ratios as in many liquid silicone rubber (LSR) applications.

Helical



The Helical static mixer is the industrial standard mixing geometry for plastic disposable applications. The Helical mixer is available in a very wide range of diameters, number of mixing elements (ME) and configurations. Standard materials of construction are Acetal (POM) for the mixing elements and Polypropylene for the housing. The Helical static mixer is best suited for easy to moderate difficulty mixing applications. It is also available in large diameters up to 34.7 mm.



Stamixco foldable GXF X-Grid Mixing Elements

The Stamixco patented GXF-21 plastic disposable static mixer is available in a large diameter of 21 mm in a plastic housing with 9, 12, and 15 mixing elements. These large diameter units can be connected with standard bell connections, flanges, 3/4" NPT threaded connections at the inlet and 1/2" NPT threaded con-

The GXP plastic disposable static mixer is available in a 9.4 mm diameter in 50% glass filled Nylon PA66 and Polypropylene construction. The GXP is used for difficult meter-mix-dispense applications. Standard plastic housings are available with 20 mixing elements. Also available are special high pressure plastic housings that hold 6 mixing elements with a maximum operating pressure of 100 bar. These plastic housings can be connected in series via ring fittings M18 X1.5 mm.

Top:

Stamixco Special Helical made in PTFE Center: Helical Mixer rod with diameter 24 mm made in POM Bottom: Big size Helical Mixer rod with diameter 34.7 mm made in PP.



Based on our many years of experience in designing and fabricating static mixers, Stamixco static mixers are used in a wide variety of applications. Depending on parameters such as volumetric and viscosity ratios, density and concentration of the materials to be mixed, the ideal mixing geometry is selected. Issues to consider include: are the fluids

soluble in each other or do they need to be dispersed?; are the gases to be processed soluble in the liquid processed and in what ratios? Examples are turbulent gas mixing for flue gas cleaning units or ozonisation in water treatment plants. The experience of Stamixco guarantees the best solutions in both laminar and turbulent flow applications.





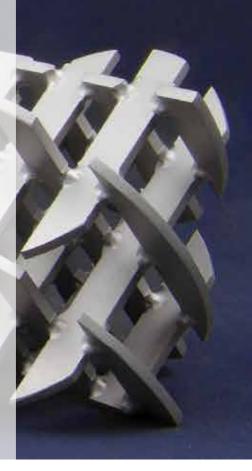


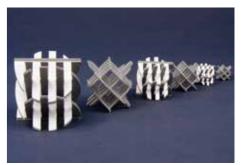
Stamixco Stainless Steel GXM X-Grid Mixer rods down to 10 mm diameter

• Controlled, equal mixing over entire

• Continuous processing operations

• Short residence time distribution





Selection of Stamixco standard GXM-X-Grid Mixing Elements

Stamixco Experience in Static Mixing Technology

Static Mixers are efficient, accurate and powerful tools Based on the specific application, different static mixer dewhen used in continuous processes where they homogenize fluids with no moving parts. Pumps or blowers are used to deliver the components to be mixed at the desired volumetric flow rates and to also supply the pressure energy required for mixing.

signs and housings are possible. Typical end connections are flanges, threaded ends, compression rings, welding ends, etc. The Mixing elements can be welded to the housing inside diameter or can be removable. Various metal and plastic materials are used.

Comparison of laminar mixing performance with colored epoxy resins over same mixing length



Mixer for ozonisation



GXM mixer for viscose chemical application



Acid dilution mixer



Picture left: Empty Pipe

Flow profile of laminar flow through empty pipe. It is clear visible that there is no mixing effect. Along the pipe wall an increasing dead-area is forming. This dead-area is colored in blue.

Picture middle: Static Helical Mixer

Laminar layer building and doubling of layers by each mixing element. Low mixing effect over given mixing length. Longer mixing length required.

Picture right: Static X-Grid Mixer GXM

Laminar layer building of each 8 multiplied layers per mixing element. Excellent mixing effect by shortest mixing length.

Application Examples:

- Plastic Processing
- 2-Component Adhesives
- Mixing of various chemicals
- Mixing of flocculent agents in water
- Temperature mixing of flue gas
- Gasification of liquids with ozone or oxygen
- Mixing of blowing agents into Polyol for insulation sheets
- Mixing of ammonia gas into flue gas

Flue gas mixer for denitrification unit



Ammonia mixer for power plant

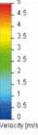


Sodium hydroxide mixer

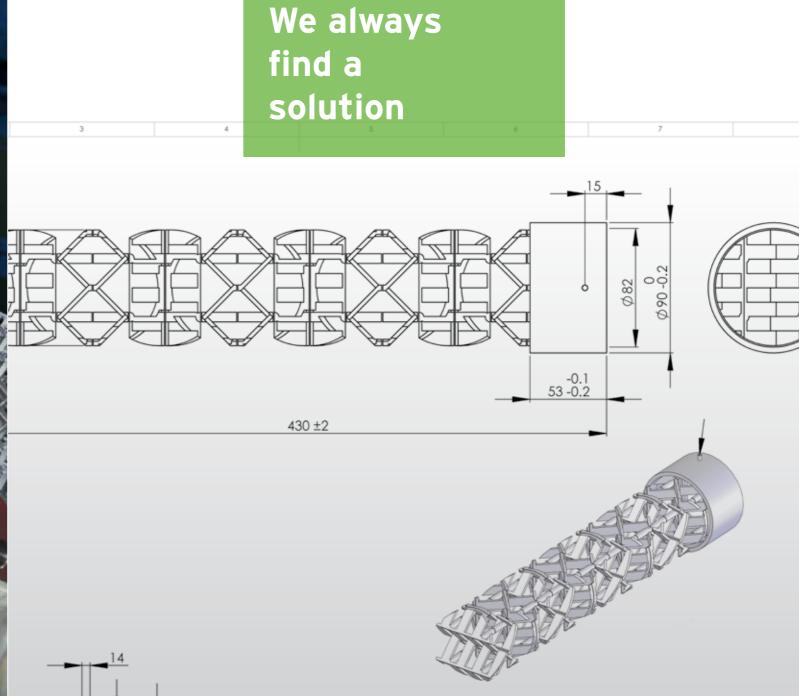




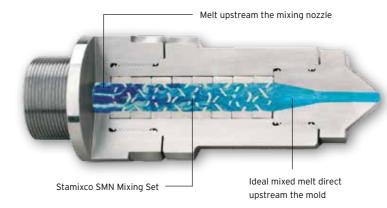
Numerical design and optimization of gas mixer with Computational Fluid Dynamics (CFD)



Swiss-Made Quality



Static mixers, regardless of the field of application, are required to withstand the process operating conditions. We consistently rely on high quality for our products. At Stamixco, this begins with the proper choice of the static mixer design and raw materials and continues through ongoing production checks that guarantee a consistent high quality product. Due to our comprehensive and thorough quality assurance program, we are able to offer reliable and durable static mixers - a fact confirmed again and again in discussions with long standing customers.



Our standard products cover the most frequent areas of application. We however continuously rely on consistent future developments to ensure that our customers can manufacture their products with increasing quality and efficiency. In some instances, standard products no longer suffice in solving a problem. Consult and ask us. We promise to apply our experience, skill and knowhow in order to offer you the best solution.

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