



**micromix**

**industrial mixers**



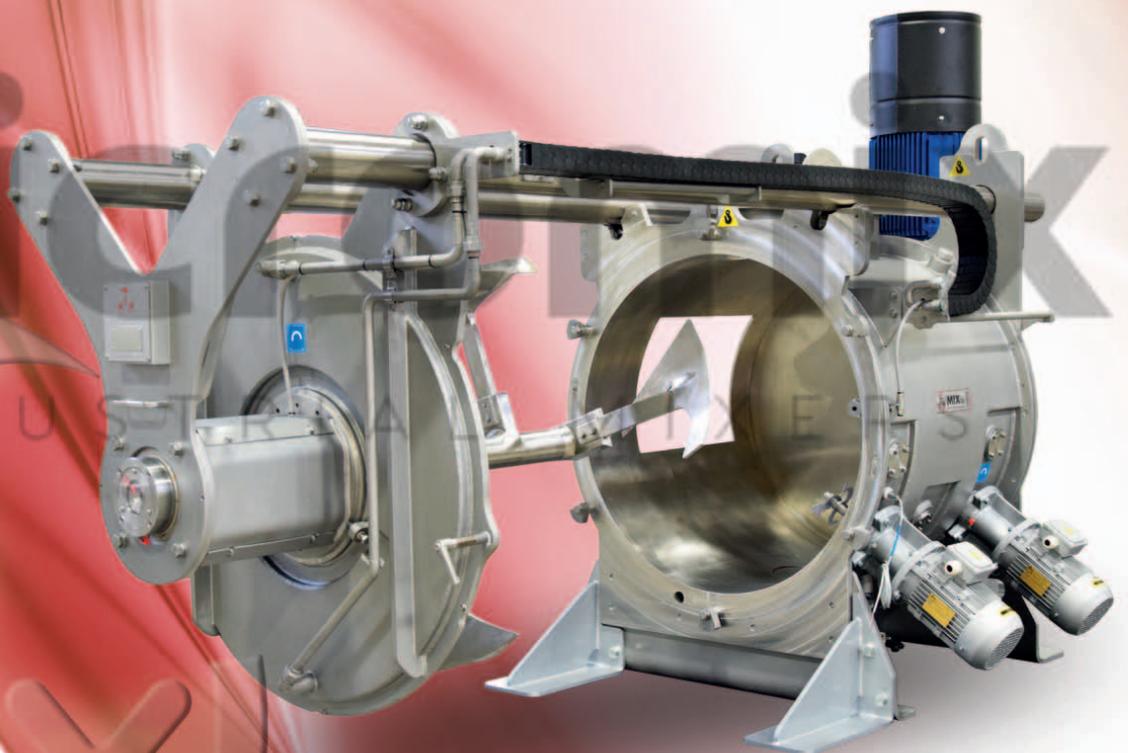
**MIX S.r.l.**

MIXING SYSTEMS AND  
COMPONENTS FOR PLANTS

[www.mixitaly.com](http://www.mixitaly.com)

# Mixing Division

Industrial Mixers



# Quality and Innovation

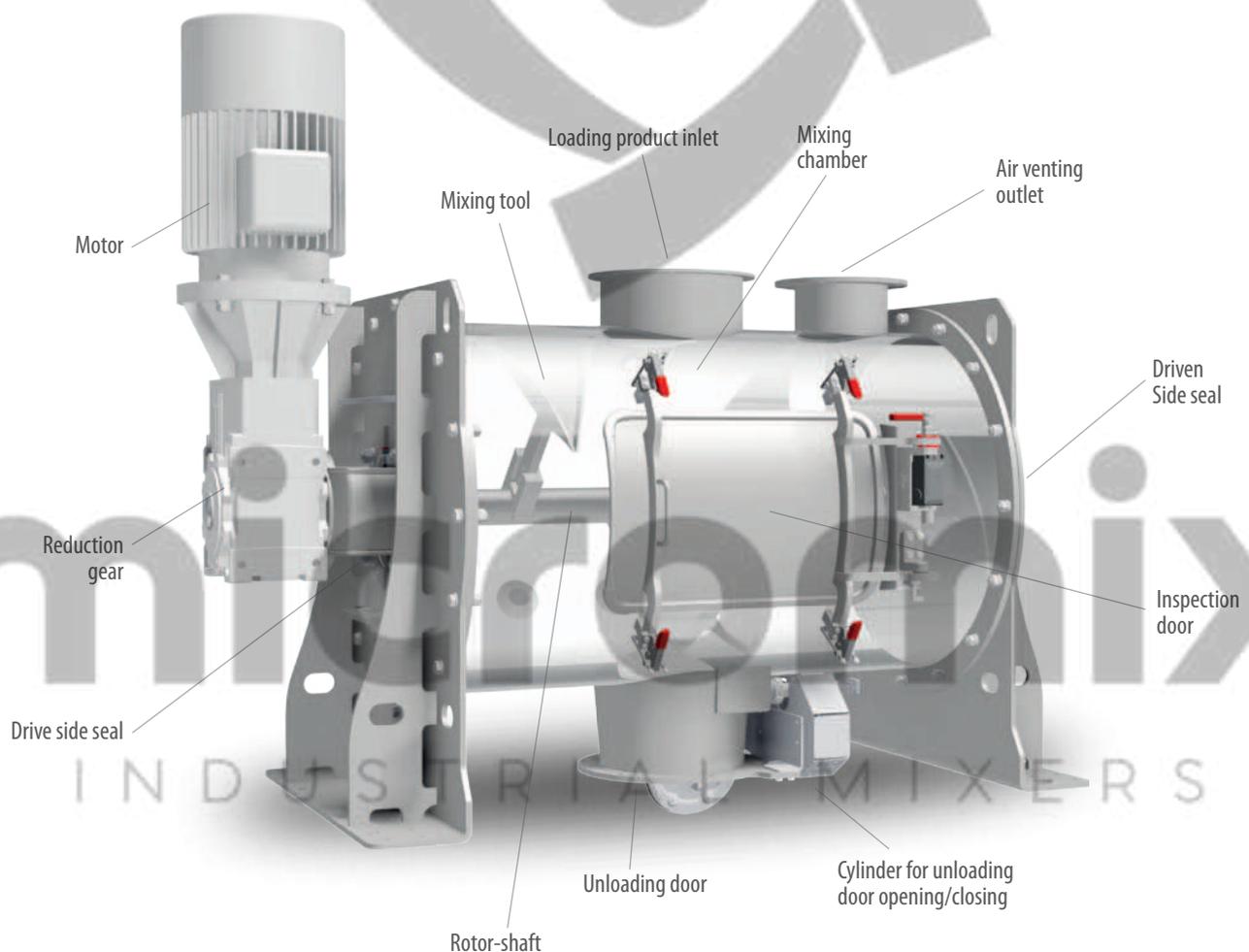
## MIX PRODUCTS AND SOLUTIONS

- Laboratory mixers, from 2 to 75 liters
- Industrial mixers from 75 to 13.000 liters
- Big industry mixers from 13.000 to more than 50.000 liters

suitable for processes in batches or continuous processes, with different mixing tools (ploughshares, paddles, ribbon) and with other optional components

**Construction material:** AISI 304(L) - AISI 316(L) - AISI 316(Ti), carbon steel, wear-resistant steel.

**Industry application:** Foodstuff, Chemical-Cosmetic, Construction, Ecology, Industrial, Laboratory-Pilot Machinery, Animal feed.



# Certification

## The company's management system complies with the standards:

**ISO 9001** - certificate for quality management

**ISO 14001** - certificate for environmental health management

**ISO 45001** - certificate for the management of health and safety of the employers

## Conformity with European Directive 2006/42/CE:

- partly completed machinery, together with **DECLARATION OF INCORPORATION**, according to Section B, Annex II, part 1 industrial series (range of industrial mixers)

- Complete machinery, together with a **DECLARATION OF INCORPORATION** (range of laboratory machines)

## Upon request, MIX mixers can also comply with:

- ATEX directive **2014/34/UE**

- Declaration for contact with food, according to **1935/2004/CE** and **2023/2006/CE**

- Directive **PED 2014/68/UE**

Additionally they may also be accompanied by CERTIFICATION of TÜV SÜD:

**TÜV IT 15 ATEX 055 X** - EU-type examination certificate

**TÜV IT 15 ATEX 062 Q** - Notification of quality assurance

**TÜV IT 21 ATEX 099 X** - EU-type examination certificate for reactors and dryers



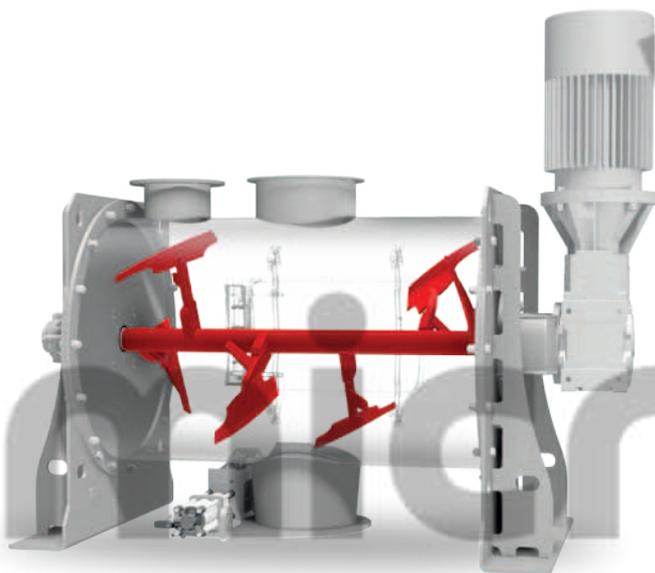
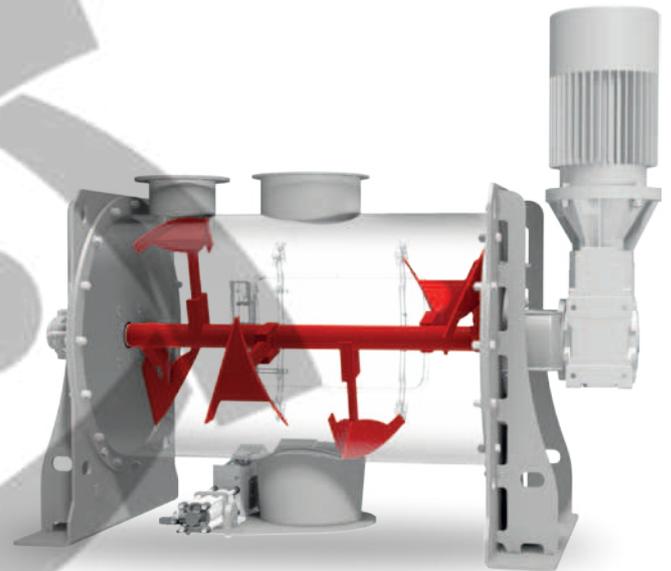
# Mixing Tools

The rotor shaft with tools, can be a single block obtained by welding, radially fixed at both ends and axially fixed only on the drive side, or the tools can be bolted to the rotor shaft with special self locking bolts. The rotor shaft has a suitably dimensioned structure, according to the products and the process planned. The specific shape of the tools is conceived to obtain the required mixing, homogenisation, granulation, aeration, depending on the mixed products.

**DEPENDING ON THE DIFFERENT PRODUCTS TO BE MIXED, THE FOLLOWING MIXING TOOLS ARE PROVIDED:**

## **PLOUGHSHARE**

Are composed by two symmetrical plough-shaped faces. The space between the two faces is closed with a specially shaped metal sheet to prevent the wedging of the product. This tool works on the principle of mechanical fluidisation (centrifugal whirling of the products) and obtains excellent mixing quality in a very short time.

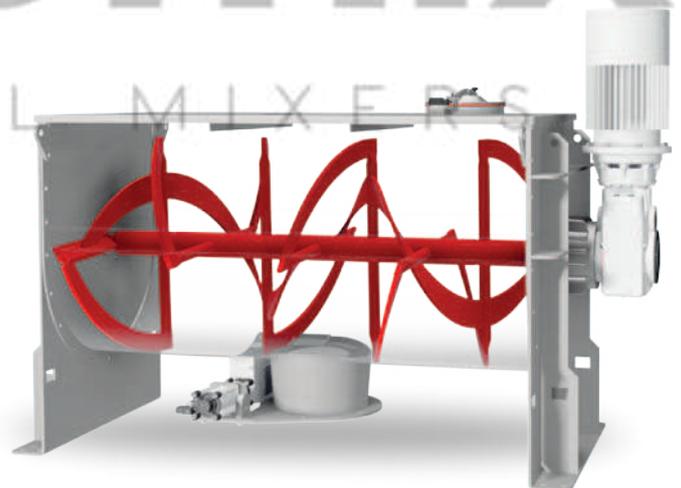


## **MIX PADDLE**

Mix Paddles require a longer mixing time than ploughshare, but are easier to clean, paddles are normally used with pastes and moist or sticky products.

## **SCREW (RIBBON)**

The fourfold screw ribbon is used for non intensive and gentle mixing or to keep the product agitated to avoid lumps. It is used also to homogenise different batches obtained with ploughshare or paddle intensive mixers in a single batch.



INDUSTRIAL MIXERS

# Operation

The MIX mixers are designed to meet the specific customer requirements.

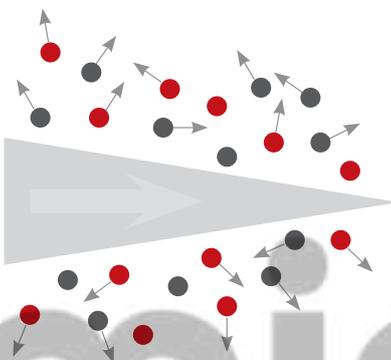
- **Blender:** Mixing of different products in powder, granules, fibres and pastes, with possibility for liquid injection, optimizing the homogeneity of the mixture and ensuring the process control and repeatability of the result.
- **Homogenizer:** to maintain the homogeneity/fluidity of the mixture and avoiding demixing and agglomeration.
- **Granulator:** to granulate the powder particles, by adding the appropriate amount of liquid.
- **Heater/Cooler:** to control the temperature of the mixture
- **Dryer:** to dry the moist product (powder and pastes)
- **Reactor:** to favor and control a chemical reaction between products, with different pressures
- **Sterilizer:** to sterilize a product with high temperatures and pressures

## EXCLUSIVE PROJECT FUNCTIONAL TO THE PROCESS

The need to obtain processes with high mix homogeneity, with controlled and consistent quality, able to satisfy the different market demands, both for known and innovative products, has inspired the MIX technicians to design a range of machines with different compliance, responding to the specific needs of each individual process.

Depending on the processed raw materials and the needs of the customer, the MIX technicians will choose the best method of mixing.

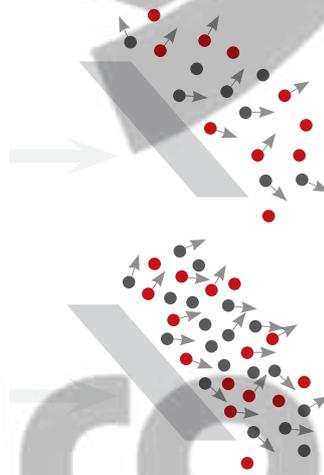
### PLOUGHSHARE



#### THE PRINCIPLE OF THREE-DIMENSIONAL MECHANICAL FLUIDISATION

The ploughshare horizontal mixer works on a principle of "Three-Dimensional Mechanical Fluidisation" (centrifugal whirling of the products). This is done with the use of the Ploughshare-shaped mixing tools that cause high turbulence with the result of a rapid and precise interpenetration / homogenisation of the various mixing components (regardless of their physical characteristics)

### PALAMIX



#### THE PRINCIPLE OF MIXING DEPENDING ON THE SPEED

The horizontal mixers with PalaMix tools behave like a ploughshare mixer or like a belt mixer, depending on the speed of rotation:

- High speed of rotation: it works on the principle of "Mechanical Fluidification" (ploughshare mixer).
- Low speed of rotation: it works on the principle of mixing by thrust (belt mixer).

### FOUR RIBBON



#### THE PRINCIPLE OF MIXING BY MOVEMENT

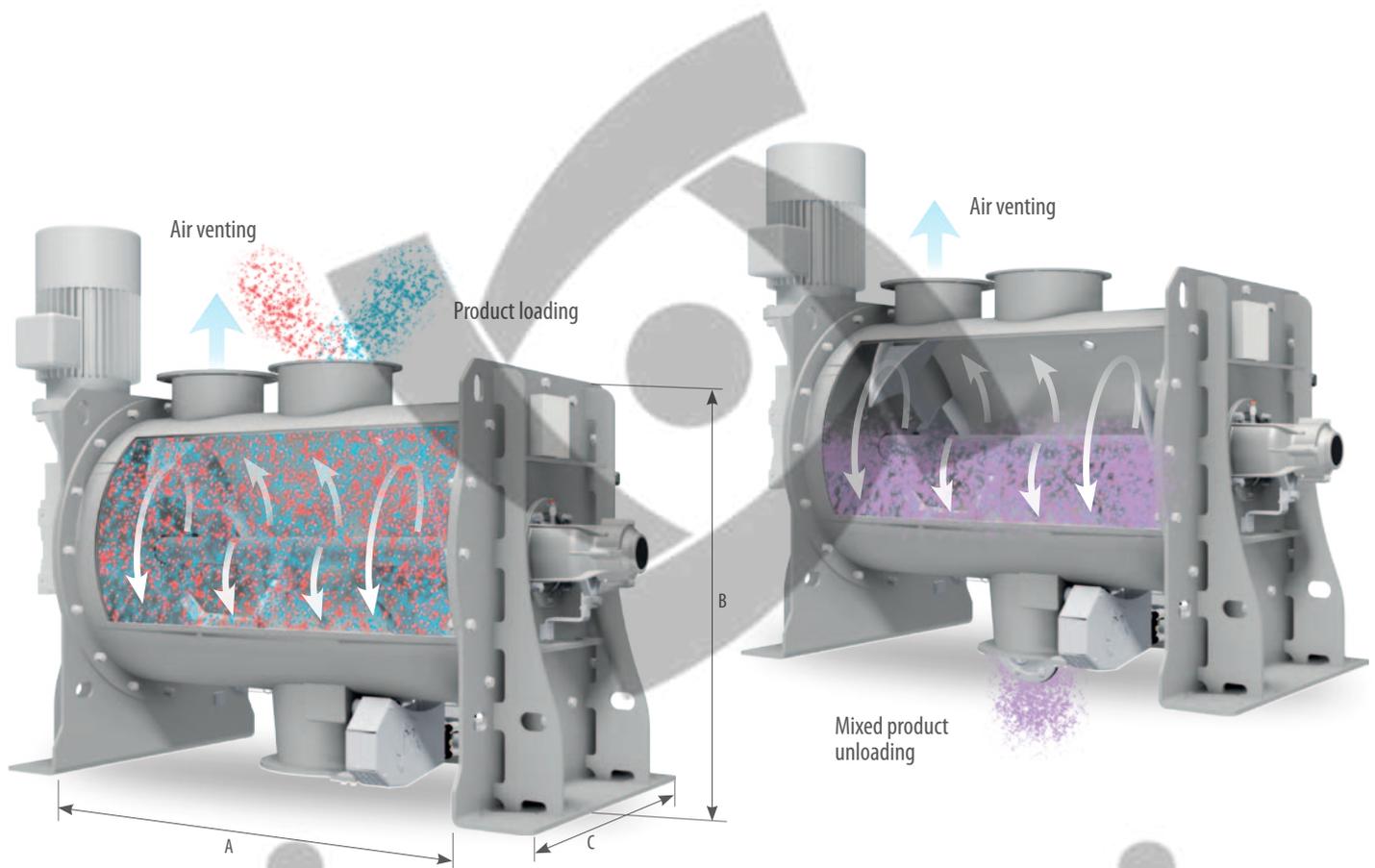
The horizontal mixers with quadruple ribbon helix are based on the principle of mixing "4 opposing flows".

The rotor shaft is equipped with a pair of major helices and a pair of minor helices, that create a movement of opposing flows, which penetrate each other.

## MIXING OF BATCHES WITH PLOUGHSHARE OR PALAMIX TOOLS

For processes in “batch”, which means discontinuous, the simplified production sequence consists of:

- air venting outlet is always open, releasing the air into a filter, or preferably in slight depression;
- loading of the product, while the unloading port is closed;
- mixing, while the unloading port is closed and the loading port closed or open, if it is connected to a closed feeding hopper;
- unloading of the mixture, through the open unloading port



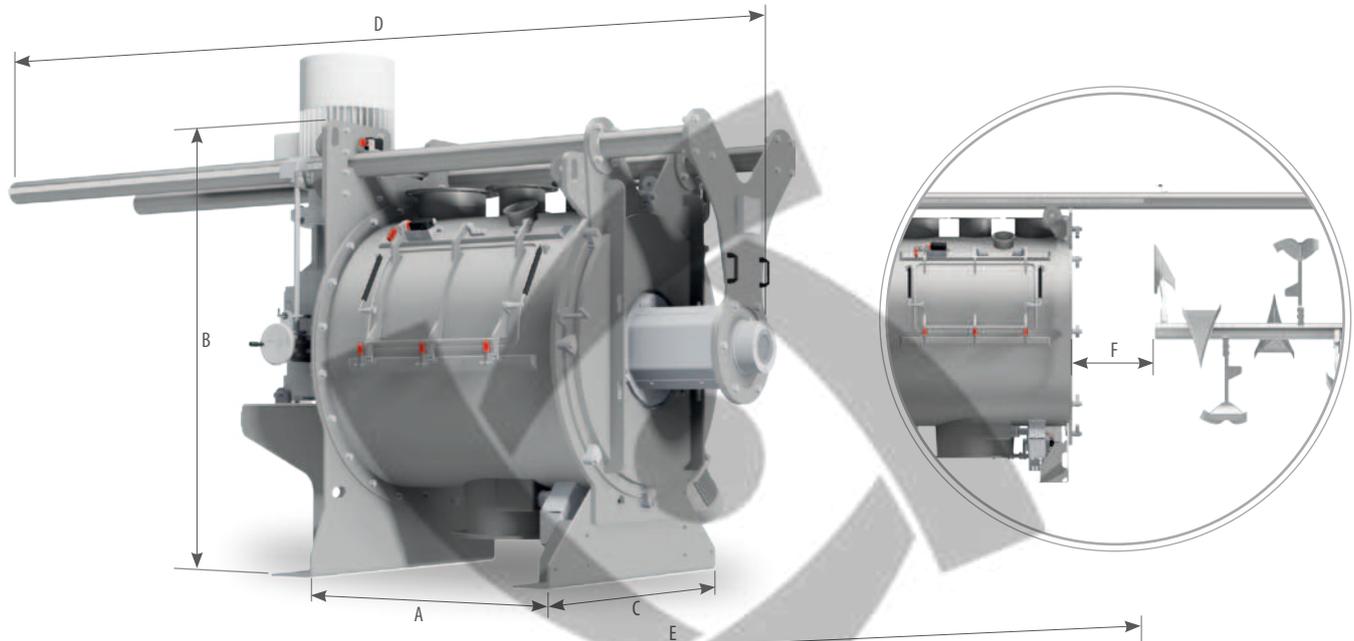
STD.	ATEX	TYPE	USEFUL WORK CAPACITY IN LITRES		A	B	C
			Minimum	Maximum			
N-	A-	MX.0075	10	65	750	710	510
N-	A-	MX.0150	20	125	1000	790	590
N-	A-	MX.0300	30	220	1000	950	770
N-	A-	MX.0420	50	330	1500	950	770
N-	A-	MX.0600	60	430	1250	1115	930
N-	A-	MX.0850	90	600	1750	1115	930
N-	A-	MX.1200	130	850	1750	1300	1090
N-	A-	MX.1700	160	1100	2250	1300	1090
N-	A-	MX.2400	260	1750	2000	1660	1450
N-	A-	MX.3400	320	2200	2500	1660	1450
N-	A-	MX.4800	500	3400	2500	1990	1780
N-	A-	MX.7000	700	4800	2400	2420	2100
N-	A-	MX.9500	1000	7000	3500	2420	2100
N-	A-	MX.H130	1300	9000	4500	2420	2100
N-	A-	MX.H160	1600	11000	4700	2580	2300
N-	A-	MX.H200	2000	13600	5000	2740	2460
N-	A-	MX.H260	2700	18000	5800	2900	2620
N-	A-	MX.H320	3300	22000	5500	2980	2940
N-	A-	MX.H400	4200	28000	7000	2980	2940

**NOTE:** Height expressed in mm, if not specified otherwise. The company MIX reserves the right to make changes without prior notice. All sizes shown are approximate. The values are intended with tolerances resulting from normal production fluctuations. In special cases, and for precise values, our written confirmation is required. On request it is possible to supply mixers with many product inlets.

## MIXING OF BATCHES WITH PLOUGHSHARE OR PALAMIX TOOLS WITH EXTRACTABLE ROTOR SHAFT

The solution with a completely extractable rotor shaft on sliding support arms allows the operator easy access to every point inside the mixing chamber, allowing a complete cleaning of the mixer, the rotor shaft and the mixing tools.

This solution is optimal for use in sectors where the cleaning of the mixer with every change of recipe is of utmost importance.



STD.	ATEX	TYPE	USEFUL WORK CAPACITY IN LITRES		A	B	C	D	E	F
			Minimum	Maximum						
N-	A-	MX.0076	10	65	500	1050	590	2160	2200	600
N-	A-	MX.0151	20	125	550	1180	770	2480	2500	
N-	A-	MX.0301	30	220	1000	1180	770	3350	3410	
N-	A-	MX.0421	50	340	1000	1300	930	3350	3600	
N-	A-	MX.0601	60	420	850	1470	1090	3100	3310	
N-	A-	MX.0851	90	570	1150	1630	1090	3740	3990	
N-	A-	MX.1201	130	880	1000	2130	1450	3660	4050	
N-	A-	MX.1701	160	1150	1300	2030	1450	4200	4520	
N-	A-	MX.2401	250	1650	1200	2100	1780	4400	4600	
N-	A-	MX.3401	320	2200	1600	2190	1720	5000	5500	
N-	A-	MX.4801	500	3300	1650	2370	2100	5100	5500	
N-	A-	MX.7001	700	4500	2250	2450	2100	6300	6900	

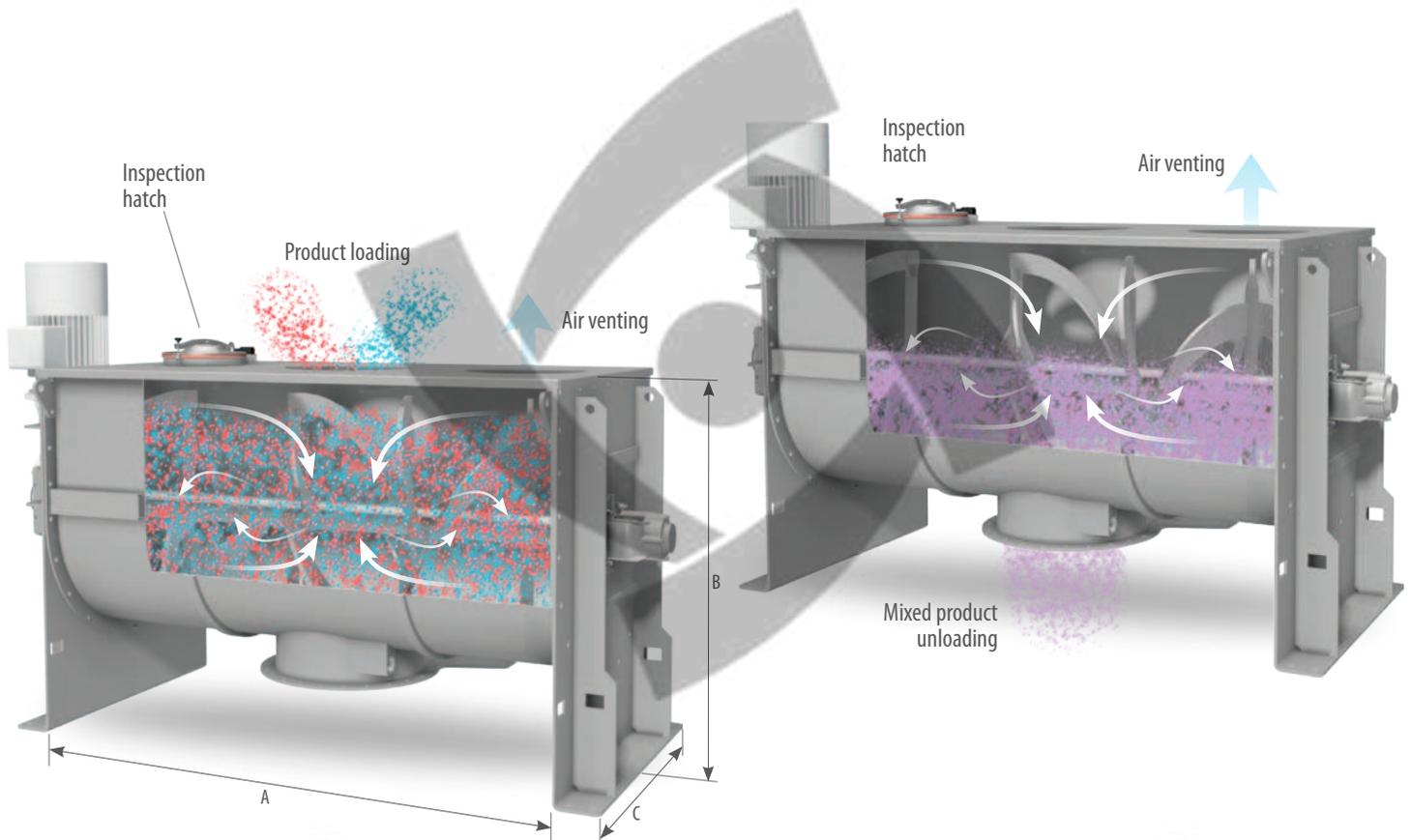
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# MXN Four ribbon

## MIXING OF BATCHES WITH 4-RIBBON-MIXERS

For processes in «batch», which means discontinuous, the simplified production sequence consists of:

- air venting outlet is always open, releasing the air into a filter, or preferably in slight depression;
- loading of the product, while the unloading port is closed;
- mixing, while the unloading port is closed and the loading port closed or open, if it is connected to a closed feeding hopper;
- unloading of the mixture, through the open unloading port

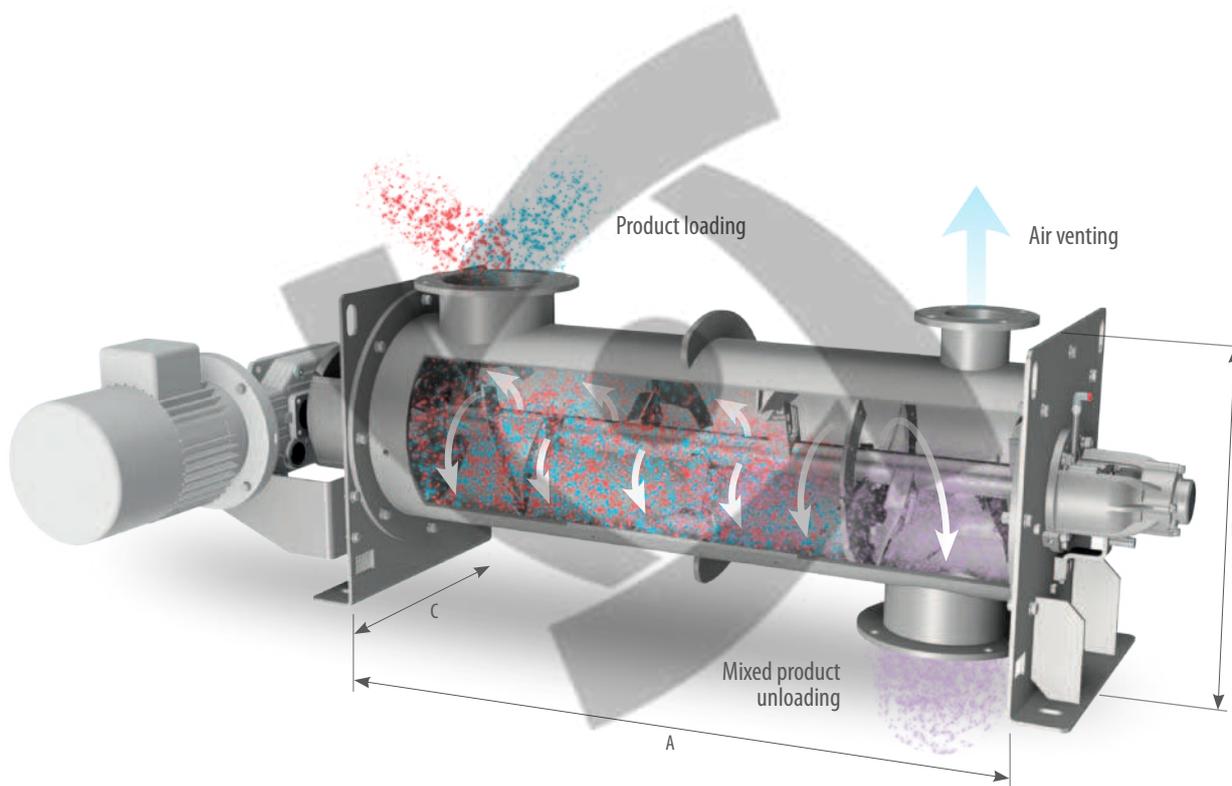


STD.	ATEX	TYPE	USEFUL WORK CAPACITY IN LITRES		A	B	C
			Minimum	Maximum			
N-	A-	MXN0150	80	135	1000	730	540
N-	A-	MXN0300	150	260	1250	850	660
N-	A-	MXN0420	250	450	1400	930	740
N-	A-	MXN0600	310	550	1800	930	740
N-	A-	MXN0850	440	780	1400	1200	960
N-	A-	MXN1200	630	1120	2000	1200	960
N-	A-	MXN1700	900	1550	2800	1200	960
N-	A-	MXN2400	1260	2200	2500	1450	1170
N-	A-	MXN3400	1840	3200	2500	1630	1390
N-	A-	MXN4800	2560	4450	3500	1630	1390
N-	A-	MXN7000	3370	6000	3000	2100	1700
N-	A-	MXN9500	5130	9000	4500	2100	1700
N-	A-	MXNH130	6500	11500	4000	2450	2100
N-	A-	MXNH160	8200	14400	5000	2450	2100
N-	A-	MXNH200	10700	18800	5000	2710	2360
N-	A-	MXNH260	12500	21800	5800	2710	2360
N-	A-	MXNH320	15500	27000	6200	2870	2520
N-	A-	MXNH400	20000	35000	7000	2980	2680

**NOTE:** Height expressed in mm, if not specified otherwise. The company MIX reserves the right to make changes without prior notice. All sizes shown are approximate. The values are intended with tolerances resulting from normal production fluctuations. In special cases, and for precise values, our written confirmation is required. On request it is possible to supply mixers with many product inlets.

## CONTINUOUS MIXING WITH PLOUGHSHARE OR PALAMIX TOOLS

For continuous process the machine can be described as an open system. The production sequence consists of a flow of product that enters from the loading inlet, is mixed and exits from the unloading outlet. Therefore, both ports are always open. However, it must be understood that the quality of the finished mixture depends on the time spent in the mixing chamber and the volume of product being processed.



STD.	ATEX	TYPE	Flow rate in m <sup>3</sup> /h filling 50% residence time 60"	A	B	C
N-	A-	MX.0075	2,8	750	580	510
N-	A-	MX.0150	4,7	1250	580	510
N-	A-	MX.0300	9,5	1750	665	590
N-	A-	MX.0420	14,5	1500	845	770
N-	A-	MX.0600	19,4	2000	845	770
N-	A-	MX.0850	26,5	1750	1015	930
N-	A-	MX.1200	37,8	2500	1015	930
N-	A-	MX.1700	48,9	2250	1200	1090
N-	A-	MX.2400	76,1	3500	1200	1090
N-	A-	MX.3400	96,6	2500	1530	1450
N-	A-	MX.4800	135	3500	1530	1450
N-	A-	MX.7000	211	3500	1850	1780
N-	A-	MX.9500	304	3500	2210	2100
N-	A-	MX.H130	390	4500	2210	2100
N-	A-	MX.H160	480	5500	2210	2100
N-	A-	MX.H200	600	6000	2350	2300
N-	A-	MX.H260	780	6600	2500	2460
N-	A-	MX.H320	960	7000	2650	2620
N-	A-	MX.H400	1200	7000	2980	2940

**NOTE:** Height expressed in mm, if not specified otherwise. The company MIX reserves the right to make changes without prior notice. All sizes shown are approximate. The values are intended with tolerances resulting from normal production fluctuations. In special cases, and for precise values, our written confirmation is required. On request it is possible to supply mixers with many product inlets.

# Reactor - Dryer

This type of machine is used in processes where it is needed:

- To modify the working pressure of the mixing chamber
- To change the temperature of the processed product and/or the mixing chamber

## REACTORS

Reactors are machines in which chemical reactions take place between 2 or more substances (solids, pastes or liquids) and by interacting with each other create a new substance.

## DRYERS

The dryers are machines used to extract the moisture present in the processed material.

Through the heat exchanger on the mixing chamber it is possible to heat the processed product.



### Why vary the pressure of the mixing chamber?

Varying the pressure at which the process takes place affects the behavior of the raw materials mixed inside the chamber by modifying the reactions in progress and the time taken to produce them.

If the process takes place with positive pressure, the reactions tend to be more energetic, thus reducing the duration of the process. If the process is carried out with negative pressure, it is possible to extract liquids, such as solvents, at lower temperatures than the same process carried out under atmospheric pressure.

### Why vary the temperature of the mixing chamber?

The heat exchanger can be used for multiple purposes:

- to provide energy to the reaction process carried out in the reactor, stimulating the reaction
- to remove energy to the reaction process carried out in the reactor, controlling the exothermic reaction (in case of very energetic and fast reactions)
- to provide energy to the product in order to stimulate the evaporation of the moisture.

Each reactor/dryer is designed and built to meet the demands of the specific process.  
This is possible thanks to specific tests carried out at the **MIX EXPERIENCE LAB «MEL»**

# Accessibility

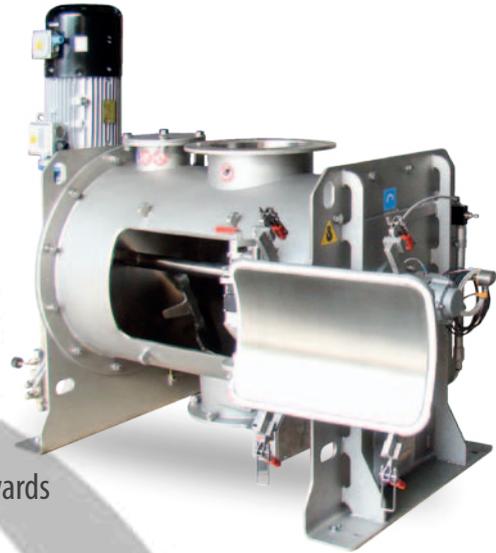
## INSPECTION DOOR

All mixers with ploughshare or Palamix tools are equipped with 1 or more side doors, which are used to access the mixing chamber for cleaning and/or maintenance operations.

Each hatch has the following features

- reconstructing the mixing chamber
- quick release hooks
- electric safety lock with manual release
- removable gasket for thorough cleaning
- «BOOK» movement (from size 0300 onwards)

On request, opening from the bottom upwards or from the top downwards



## TOP COVER

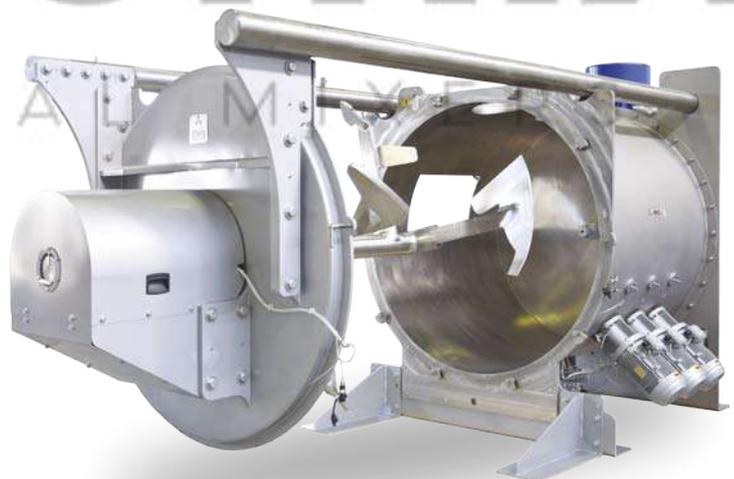
The ribbon mixers, with «U» shaped chamber, can be supplied with partial or complete opening top cover or with side doors.

The cover layout is defined according to the customer's needs regarding loading methods and accessibility for cleaning.

## EXTRACTABLE SHAFT

Solution that guarantees complete accessibility to the mixing chamber and the rotor shaft.

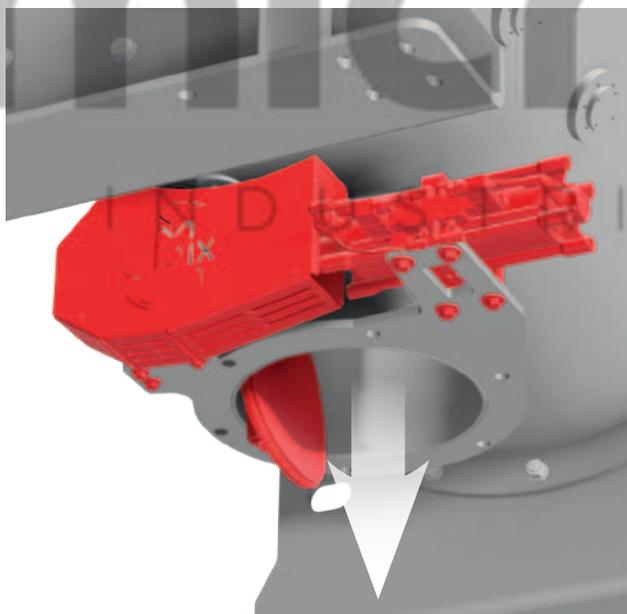
Used in all plants where cleaning is a fundamental aspect of the production process.



# Batch mixer discharge ports

## ROUND UNLOADING DOOR

The door rebuilds the circular shape of the mixing chamber, preventing the formation of areas where the product remains unmixed. The particular profile of the small, self cleaning gasket guarantees the perfect seal even with sticky products such as oxides for pigments, sugar and flour with fats. The movement is carried out by an electropneumatic cylinder.



## DISCHARGE ON THE FULL LENGTH

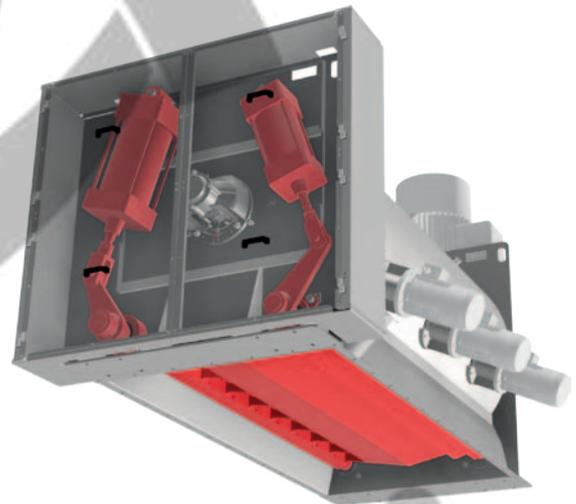
The closed door reconstructs the circularity of the mixing chamber, avoiding the formation of areas of unmixed product.

### FULL LENGTH UNLOADING, 60° OPENING

The movement of the door and the locking reinforcement, is achieved through the operation of two electropneumatic cylinders.

### FULL LENGTH UNLOADING, 15° OPENING

The movement of the closing door is achieved by the operation of one electropneumatic cylinder.



Big bomb door

Total discharge



Main door

Closing reinforcement

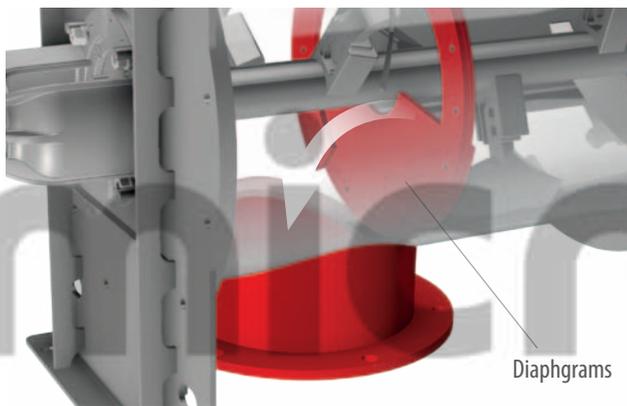
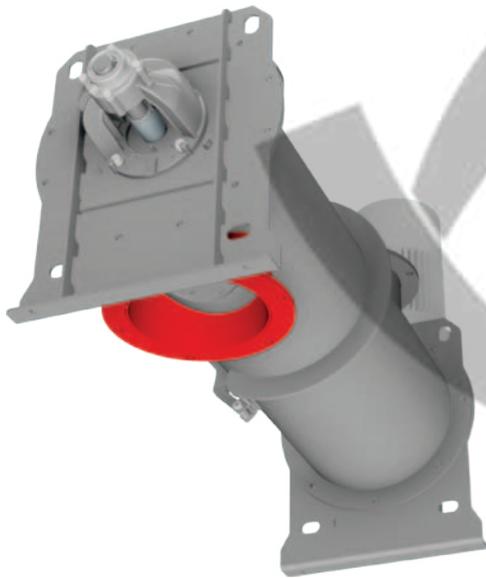


Main door

# Continuous mixer discharge ports

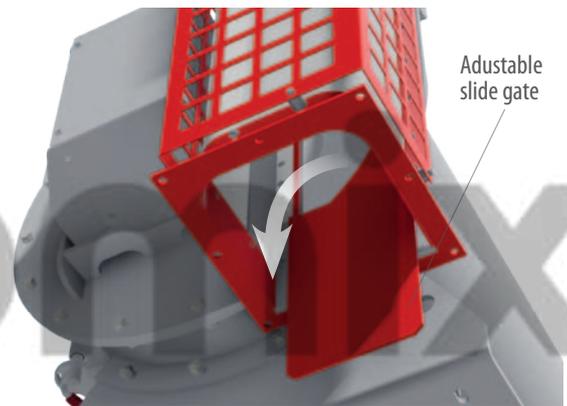
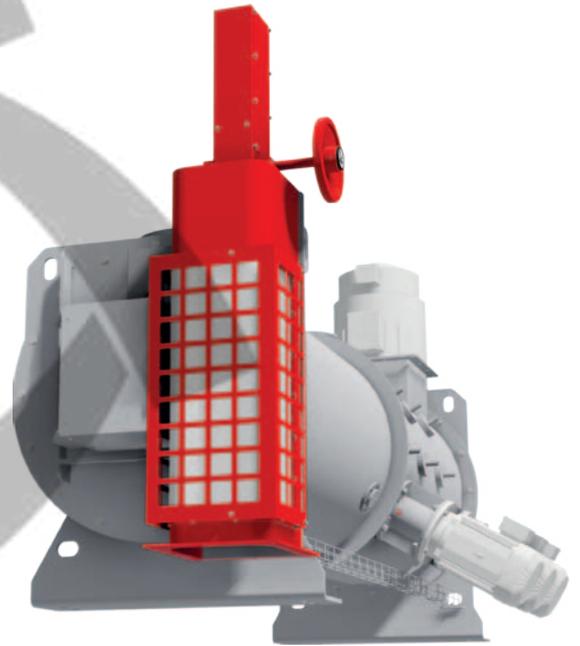
## VERTICAL DISCHARGE WITH DIAPHRAGM

Mixers with vertical discharge port are equipped with an adjustable diaphragm, bolted to the mixing chamber. By changing the geometry of the diaphragm (made of several sectors), it is possible to vary the time the product remains in the mixing chamber.



## FRONT UNLOADING DOOR

The front unloading outlet with slide valve has been designed to adjust the time the products remains inside the mixing chamber.

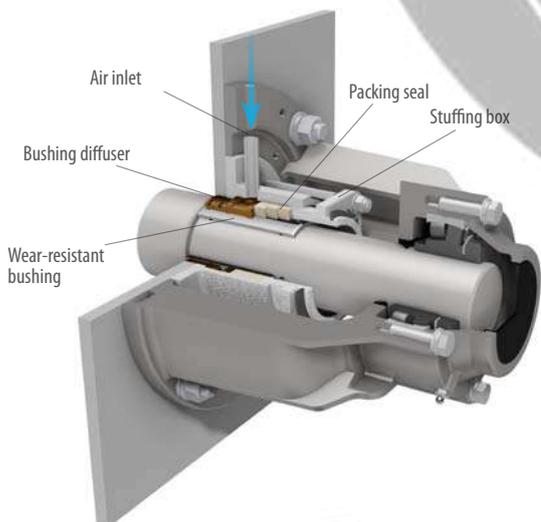
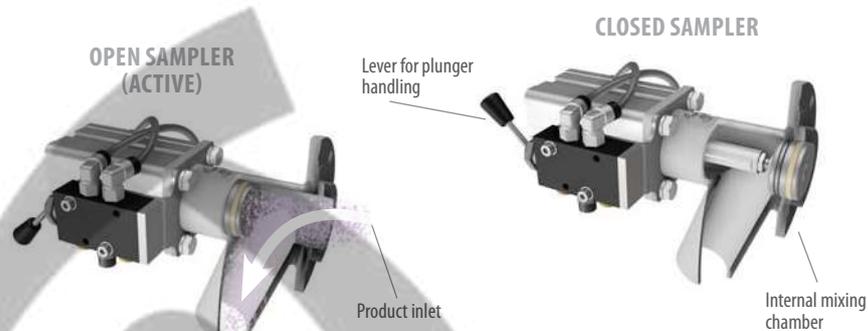


# Process-specific solutions



## 1 SAMPLER

The Pneumatic sampler system allows samples to be collected; during the mixing phase, while the rotor shaft is running. The sampler, with easy and repetitive operations, is installed on the head of the mixer, avoiding the formation of product settling areas.



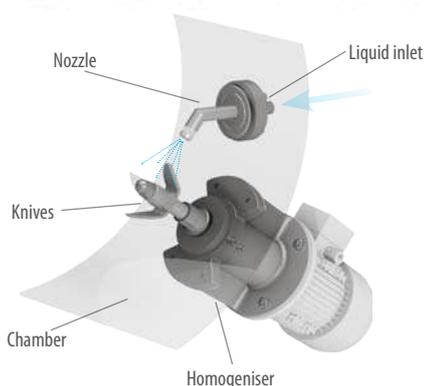
## 2 MIX SEAL

The MIX seals of the rotor shaft have the following components: a solid base in cast iron, wear resistant bushing on the rotor shaft, synthetic or self-lubricated packing, air flushing (dehumidified air or inert gas), stuffing box made of two half-bodies in aluminium or stainless steel for easy maintenance. For special processes also non-flushed seals are possible, for example mechanical seals or solutions with grease.

## 3 CHOPPERS

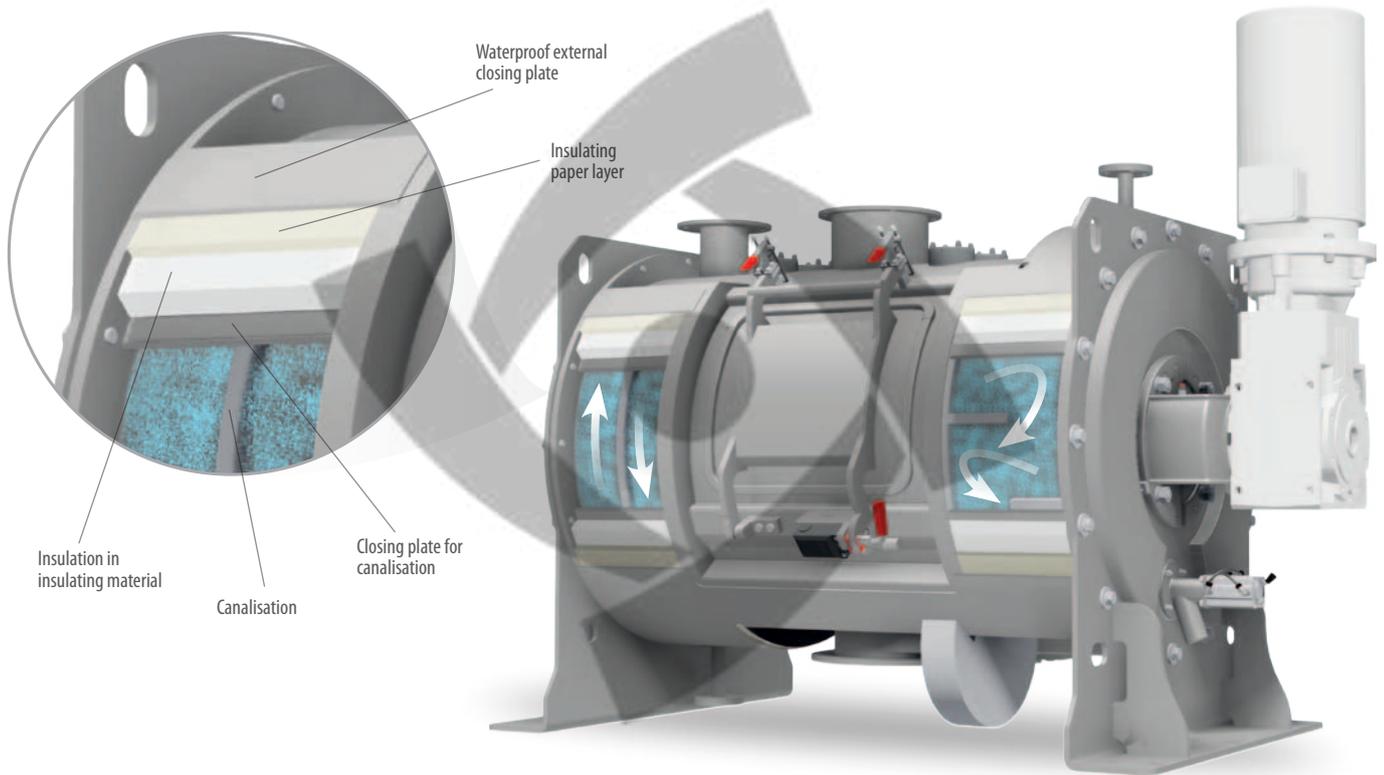
## 4 LIQUID INJECTION SYSTEM

Side mounted choppers are equipped with high speed rotating blades that facilitate the homogenisation of different products, reducing the mixing time and breaking any lumps. Liquid Injection has the function to add products inside the mixer and to facilitate the elimination of powder and the granulation process.



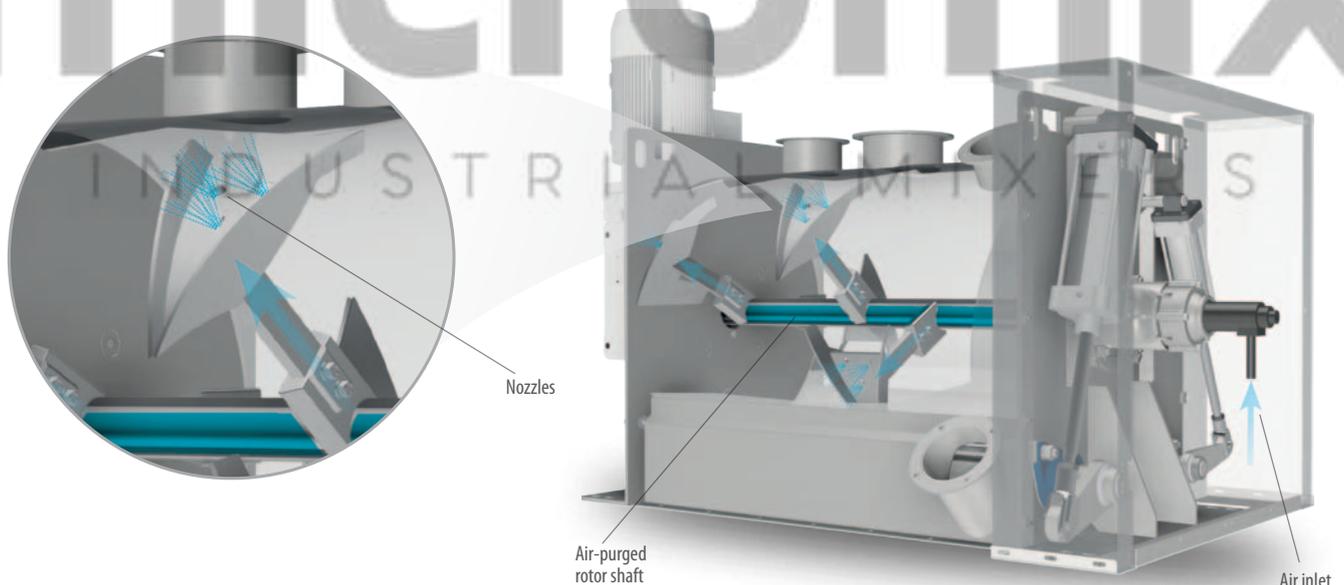
## HEAT EXCHANGER

MIX heat exchanger has a very high performance thanks to the heating / cooling fluid that is directly in contact with the mixing chamber. The exchange fluid: glycol water, cold water, hot water, hot oil, steam, is used to add or release heat from the product being mixed, resulting in its heating, cooling or drying. In the reactors, the heat exchange allows the chemical and physical reactions to be controlled, accelerating or delaying them.



## PNEUMATIC CLEANING OF THE MIXING CHAMBER

This system, protected by an Italian patent, injects compressed air inside the mixing chamber, while the rotor shaft is running. The nozzles, installed on the back of the ploughshares project the air against the wall of the mixing chamber, making the product to detach from the mixer walls. The combination of pneumatic cleaning system with the full length unloading door allows a very high degree of cleaning of the machine, after unloading, without operator intervention.



MIXING SYSTEMS AND  
COMPONENTS FOR PLANTS



QUALITY  
SERVICE  
TECHNOLOGY  
INNOVATION

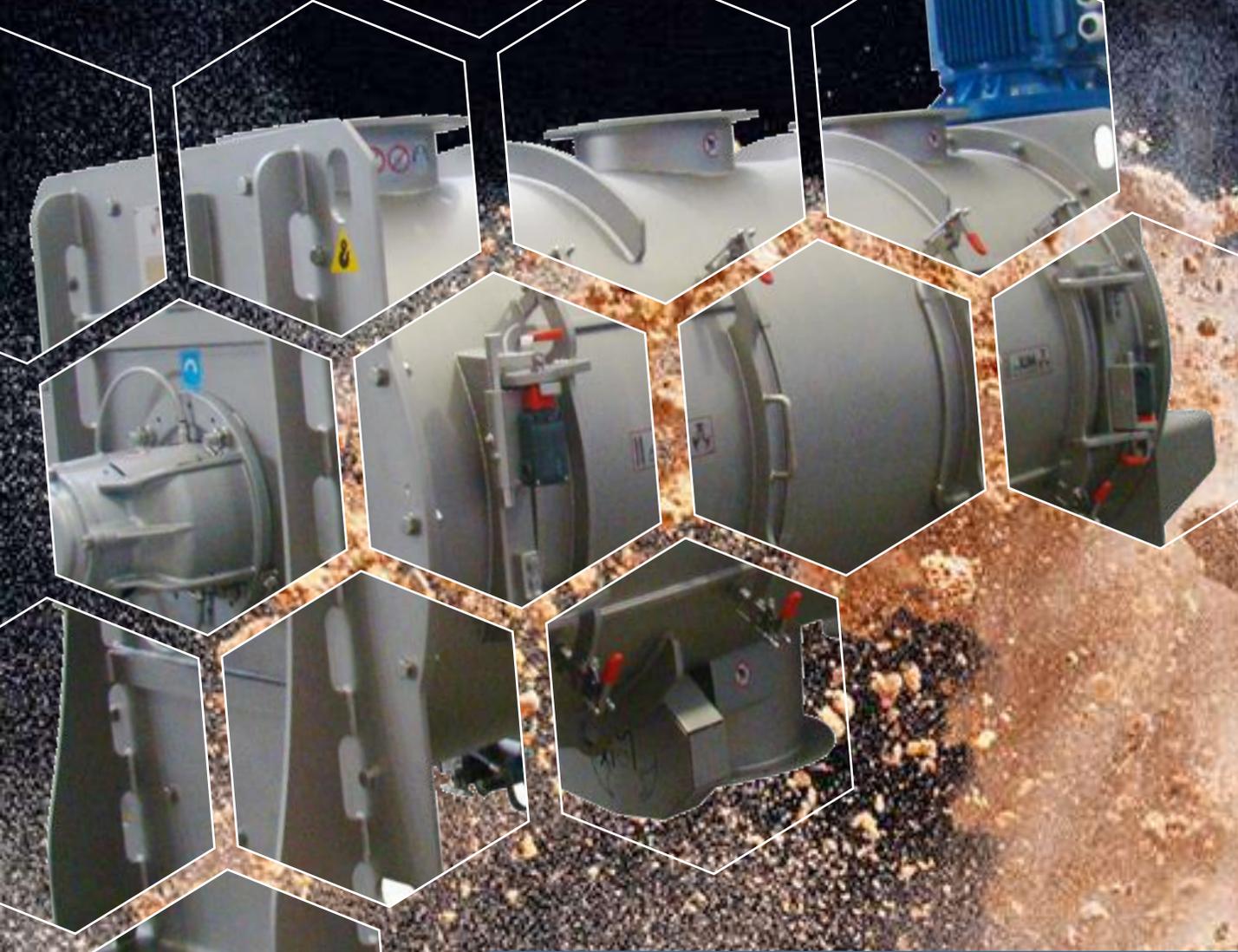
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INDUSTRIAL MIXERS



**MIX S.r.l.** - 41032 CAVEZZO (MO) - Via Volturmo, 119/A - ITALY  
Tel. +39 0535.46577 - Fax +39 0535.46580 - [info@mixitaly.com](mailto:info@mixitaly.com)



**Your local trusted partner:**

**INDUSERV FILTEX S.R.L.**

Sibiu, 51/75 Nicolae Iorga Street,  
Sibiu County, RO 550387, Romania

+40 (0) 369 809 889  
office@micromix.ro

+40 (0) 753 811 889  
dan.codin@induserv.ro



**micromix**