



I Application

INOXPA's MIX type blenders have been designed specifically for mixing low or high viscosity liquid products for the food, cosmetics, pharmaceutical and chemical industries. For this reason, they are built with sanitary finish.

They are classified into five units with their respective agitator. The MIX-1 has a central anchor type agitator, the MIX-2 has a turbine with Cowles disc on the central shaft, the MIX-3 is equipped with a central blade type agitator, and the MIX-4 has both a central anchor type agitator and a radial agitator with Cowles disc. The MIX-5 is equipped with a counter-rotating agitator and a bottom-of-the-tank mixer.

I Principle of operation

The unit includes a sealed tank where the mixing is performed by means of a central agitator (and a radial agitator, if necessary). The lid has an opening which is used for inspection and material loading, the diameter of which is in correspondence with the capacity of the unit. Furthermore, the lid also holds the agitator, with or without lifting mechanism. The agitator speed is controlled by an electronic variable speed drive.

The unit includes a rotary lobe, progressive cavity or centrifugal pump to transport the product from the tank to the exterior or to an intense agitation system, of a disperser, emulsifier, or solid-liquid mixer type.

The system also includes an auxiliary loading and additive premixing tank.

All this equipment is arranged as a single block assembly that is electrically interconnected and ready to operate when connected to the required ancillary services.

The entire unit is mounted on a base plate which incorporates the electrical panel.

Available optional accessories are a raw material feed pump, a liquid ring vacuum pump, and a CIP cleaning system.



I Materials

Areas in contact with the product	AISI 316 (EN 14404)
Other areas	AISI 304 (EN 14301)
Interior surface finish	Bright polish with sanitary finish
Exterior surface finish	Matt

I Design and features

The basic equipment includes a tank, a lid, an agitator or agitators, and a lifting system for the lid with its respective agitator .
 The entire assembly is made with TRI-CLAMP type connections.
 The motors and electrical panels are available in IP-55.

Tanks

The tanks are available in the following standard capacities: 50, 100, 150, 200, 300, 500, 1.000, 2.000, 3.000, 4.000 and 6.000 useful litres.

The tank is designed to accept the addition of a heating or cooling system based on an insulated thermal chamber system. The heat transfer medium can be direct steam, hot water or a thermal heating fluid. The cooling medium can be the local water supply or a glycol/water mixture. It is possible to add an automatic temperature control system, programmable according to the process.

The tanks can work at atmospheric pressure and are designed to work under pressure and in vacuum: - 1 to 0.5 bar.
 The maximum working pressure of the double thermal chamber is 3 bar as standard.

The tanks include a lid with an opening which is used for inspection and material loading. The lid also holds a centrally mounted agitator and, if necessary, one or more radially mounted agitator . Furthermore, the lid also houses a sight glass, a light source, and additional ports for raw material charging and ancillary services.

Agitators

ANCHOR TYPE (in the MIX-1 unit):

The anchor type agitator is specially designed for liquid or low viscosity products (max. 1.000 cps) that require slow stirring under heating or cooling.

The agitation system consists of an anchor with an optional assembly of scrapers and a current deflector depending on the selected anchor type. This system achieves a more homogeneous mix. The deflecting system is provided with a temperature sensor to measure temperature in the middle of the product.

The scrapers come into contact with the tank wall to prevent product adherence and to promote the transfer of heat and cold to the rest of the product since the product does not stick to the wall. The system can be operated without scrapers if required by the product and the process.

This system can be used to process the following products or similar:

- Liquid sauces without chunks such as soy sauce (Shoyu), Worcestershire sauce, Tabasco sauce, etc.
- Liquid sauces with chunks such as brown sauce, vinaigrette, etc.
- Low viscosity sauces without chunks such as ketchup, brava sauce, barbecue sauce, bechamel sauce, etc.
- Low viscosity sauces with chunks such as almond sauce, Mexican sauce, etc.



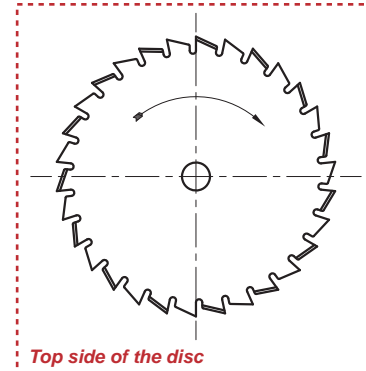
TURBINE WITH COWLES DISC (in the MIX-2 unit):

The Cowles turbine is specially designed for liquid products with dispersed solids, or for very viscous products (max. 10.000 cps) under heating or cooling.

The Cowles disc has been thoroughly tested and optimised in such a way that in its current form, it is well established in many stirring applications and especially in dispersion.

The shaft-mounted Cowles turbine is made of electrolytically polished stainless steel AISI 316-L, with diameters ranging from 80 to 650 mm, and incorporates a quick removal system for replacement or cleaning.

This turbine comprises a circular disc with a central fixing and mounting bore, and features a toothed contour which is bent in such a way that it rotates in the direction shown in the diagram.

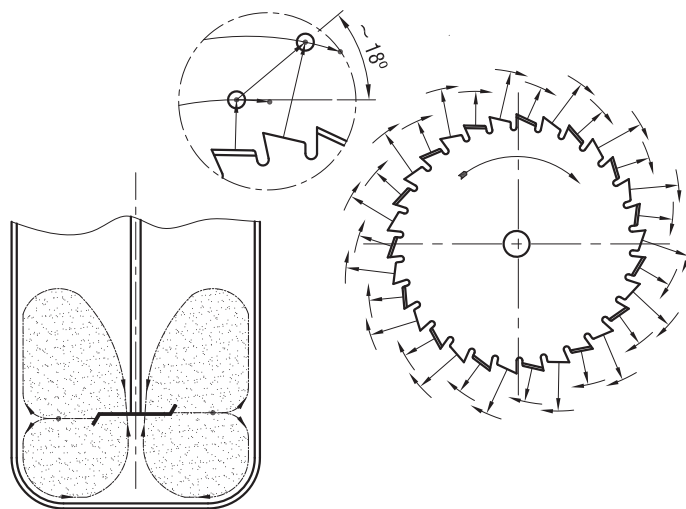


Top side of the disc

When the Cowles disc rotates, it sucks the product through the upper and lower sides of the disc and releases it outwardly at high speed through the bent teeth on the upper and lower sides in a tangential direction. This product collides approximately at a ¼ of the distance, with reference to the diameter of the disc, with the flow rotating in circumferential direction, and in the meeting point, a shear between the product ejected from the disc and the circumferentially flowing product to achieve maximum mixing efficiency.

With liquids, the system's power requirements are low but it increases as the viscosity increases.

The operation of the agitator is shown in the sketch.



The upper vortex decreases or increases depending on the speed of the disc, but there is no need to physically see the teeth on the disc. The ideal mixture is achieved when the vortex reaches the disc without being visible, i.e. directly attached to the shaft holding the disc. This is achieved by varying the disc speed.

If we operate at the correct speed, we ensure that the bottom of the tank is virtually wiped clean by the product itself, never leaving sediments on it.

In the specific case of liquid gas mixtures with suspended solids, we can provide advice on the required disc speed.

In premix tanks it is advisable to stir at a speed of 600 rpm for 30 minutes on average, and in the case of dissolution tanks with a waiting period and recirculation for filling applications, the agitator should operate as long as necessary at 100 or 150 rpm in order to avoid vortex formation, charging the product with static electricity, or heating it.

At the time of discharging the premixed products in the tank, the agitator can work at 450 rpm.

This system can be used to process the following products or similar:

- Liquid sauces without chunks such as soy sauce (Shoyu), Worcestershire sauce, Tabasco sauce, etc..
- Liquid sauces with chunks such as brown sauce, vinaigrette, etc.
- Very viscous sauces such as guacamole, cocktail sauce, mayonnaise, aioli, etc.



BLADE TYPE (in the MIX-3 unit):

The blade type agitation is specially designed for medium viscosity products that require intense stirring (max. 5.000 cps) under heating or cooling.

It is provided with a deflector to prevent the product from rotating and thus achieve a more homogeneous mixture.

This system can be used to process the following products or similar:

- Low viscosity sauces without chunks such as ketchup, brava sauce, barbecue sauce, bechamel sauce, etc.
- Low viscosity sauces with chunks such as almond sauce, Mexican sauce, etc.

ANCHOR AND TURBINE WITH COWLES DISC (in the MIX-4 unit):

This unit combines an anchor type agitator without blades with a Cowles disc for highly viscous products with solids dispersion (max 500.000 cps). Being able to vary the speed of the agitator and also to combine them means that they can be adapted to changes in product density throughout the process. It is possible to work under hot or cold conditions.

This system can be used to process the following products or similar:

- Very viscous sauces such as guacamole, cocktail sauce, mayonnaise, aioli, etc.

COUNTER-ROTATING AGITATION (in the MIX-5 unit):

The counter-rotating agitation system consists of two main elements: an anchor incorporating two arms with welded inclined blades -all removable-, rotating in one direction and pushing the material upward, and a central shaft with inclined blades, which rotates in the opposite direction to the anchor, pushing the product downward. All the blades have holes to facilitate the flow of the product.

The structure of the anchor is made in round tube for easy cleaning and to reduce weight. The two arms are fitted with scrapers that act against the walls and the bottom of the boiler, preventing any of the products being mixed from sticking and eliminating the possibility of overheating of the product on the walls.

The anchor and the central shaft each have an independent geared motor, both of which are driven by a frequency converter to adjust the speed as required at any specific moment in time.

This type of agitator achieves homogeneous mixtures, avoiding the entrainment of air into the product and maintaining a uniform temperature. This system can be used to process the following or similar products:

- Creams, ointments, pates, etc.

Pumps

The pump extracts the product from the tank through its discharge port and transfers it to the final product extraction point, or transports it to a disperser or emulsifier type intense stirring system. All this is performed using TRI-CLAMP type sanitary grade connections and tubing to proceed to the recirculation or discharge of the processed product.

Depending on the process, three types of sanitary pumps are available for discharging and transferring the product: a rotary lobe pump, a screw pump, or a centrifugal pump.

The SLR rotary lobe pump can pump products containing delicate solids without damaging them, especially when using wedge lobes, due to the special design of the latter.

The Kiber helical screw pump can also pump products containing particles or chunks without destroying them. Because of its design it is self-priming and reversible.

Both are adequate to handle all types of fluids, both low and high viscosity, and are FDA-certified.

The Hyginox SE centrifugal pump is built in stainless steel and has a shrouded motor. The pump is not reversible by simple inversion of the direction of rotation. The direction of rotation is clockwise when viewed from the rear part of the motor.



Mixers

Depending on the application, a disperser, an emulsifier or a bottom-of-the-tank mixer may be required.

The in-line mixer ME-4000 has a compact rotor-stator design. The product is sucked through the inlet and pushed by the rotor through the openings of the stator. When passing through these slots, the product is mechanically sheared, the particles are sheared by the rotor. Finally, the product stream is hydraulically sheared again when leaving through the stator slots at high speed.

The disperser model is selected in accordance with the tank capacity. ME-4101, ME-4105, ME-4110 or ME-4125.

In contrast to the disperser, where the product is subjected to shearing only when it is driven by the impeller through the slots of the stator, the ME-8110 multitooth emulsifier features several concentric rows of teeth. The product enters through the centre of the mixer and is driven radially outward through the radial channels between the rotor and the stator teeth. The product is sheared as it passes through each row of teeth. The emulsifier applies more shear than the ME-4100 mixer.

Both are constructed in stainless steel, the areas in contact with the product are in AISI 316L quality and the rest in AISI 304 steel. Owing to its sanitary design and easy cleaning by CIP, this emulsifier is suitable for the food, pharmaceutical and cosmetics industries.

The tank can be equipped with a high performance bottom-of-the-tank mixer designed to shearing solids, emulsion and homogenisation.

The standard skid is provided with a standard INOXPA ME-6100 mixer adjusted to every skid.

Solid-liquid blender

Mixing unit for solid dissolutions consisting of a body and a centrifugal pump impeller, both vertically mounted. Its operation consists in the introduction of the liquid at high velocity into the main body, creating a vacuum in the centre of the impeller that causes the suction of solids. The solids feed can be adjusted by means of a valve situated at the bottom of the hopper. It features a hygienic design, easy assembly and disassembly by clamp connections, and the possibility of cleaning and disinfecting without dismantling the equipment.

Options

ATEX protection for motors and electric panels.

It is possible to add a centrifugal or lobe pump for charging liquid or viscous raw materials.

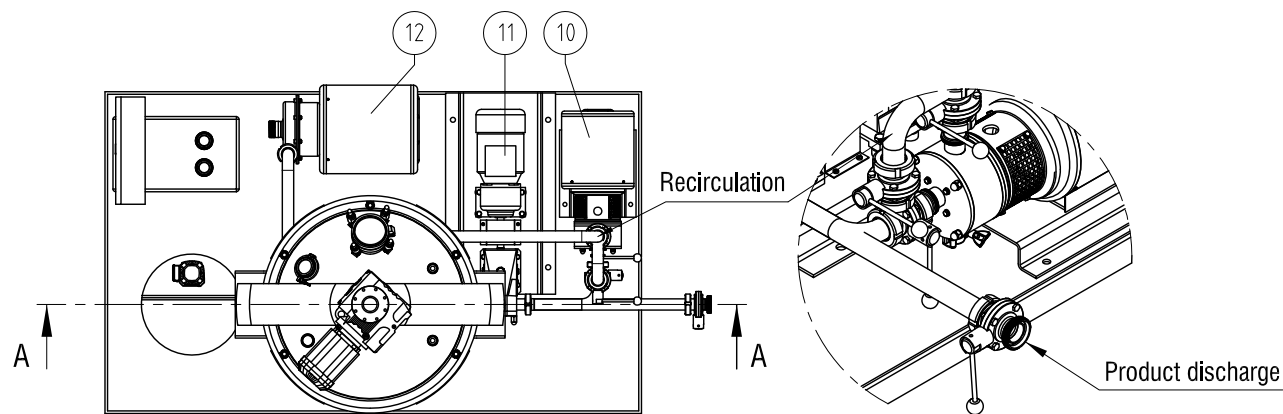
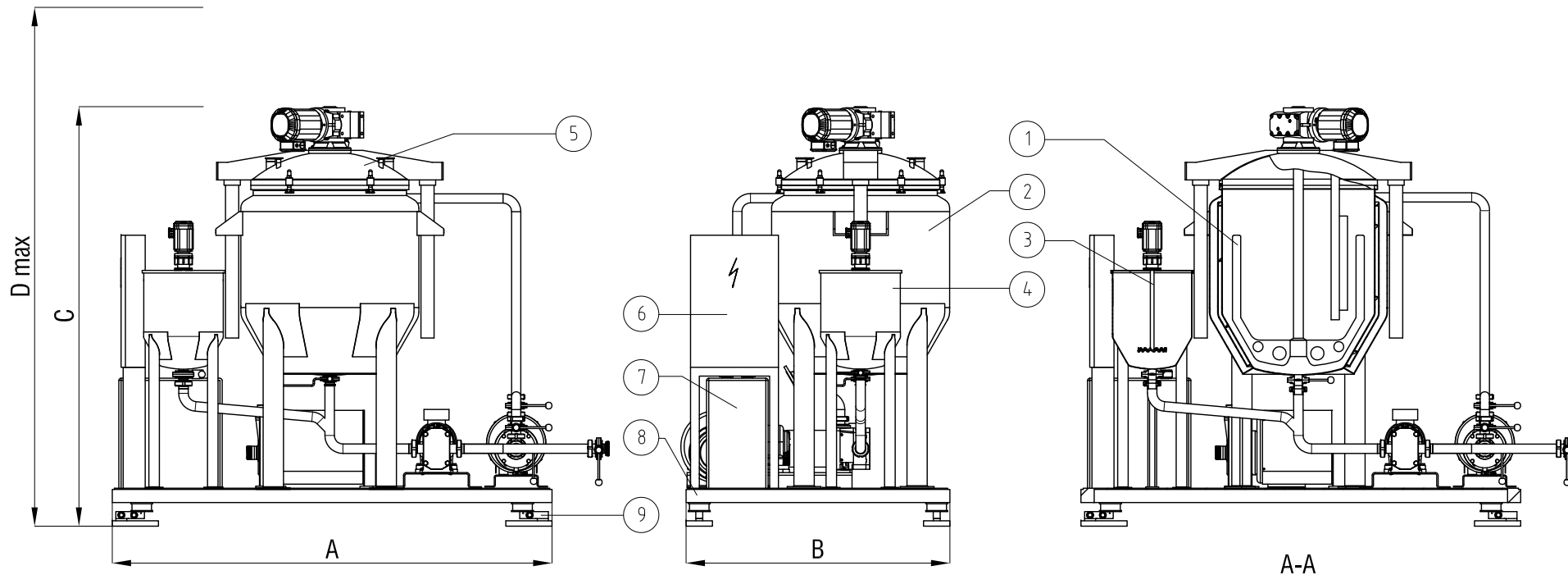
It is possible to include vacuum generation equipment complete with a liquid ring type vacuum pump and pressure control.

This system can include a manually operated weighing system mounted on load cells for the charging and discharging of products.

A secondary mixing unit can be included to add additives like dyes, preservatives, etc. to the product. It consists of a small capacity tank (50 to 500 useful litres) with dual chamber for heating or cooling. It is equipped with a agitator with Cowles disc mounted on a flat lid. It includes a flow control valve for product discharge. The unit is connected to the suction pipe of the mixer or of the solid-liquid blender in order to add the additives required to complete each individual mixture.

On the MIX-5 blender it is possible to replace the auxiliary tank with a melting vat equipped with a blade type agitator and a deflector baffle.

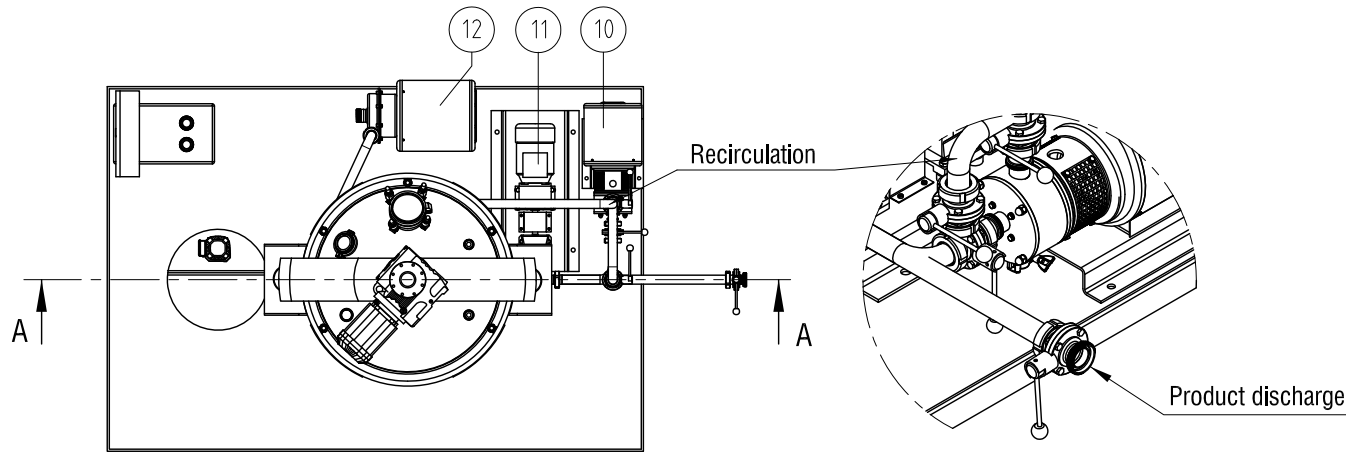
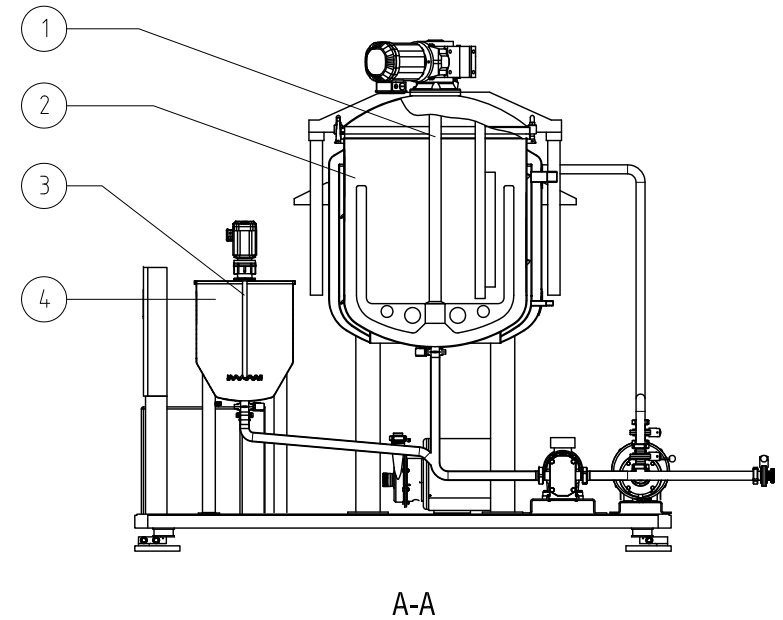
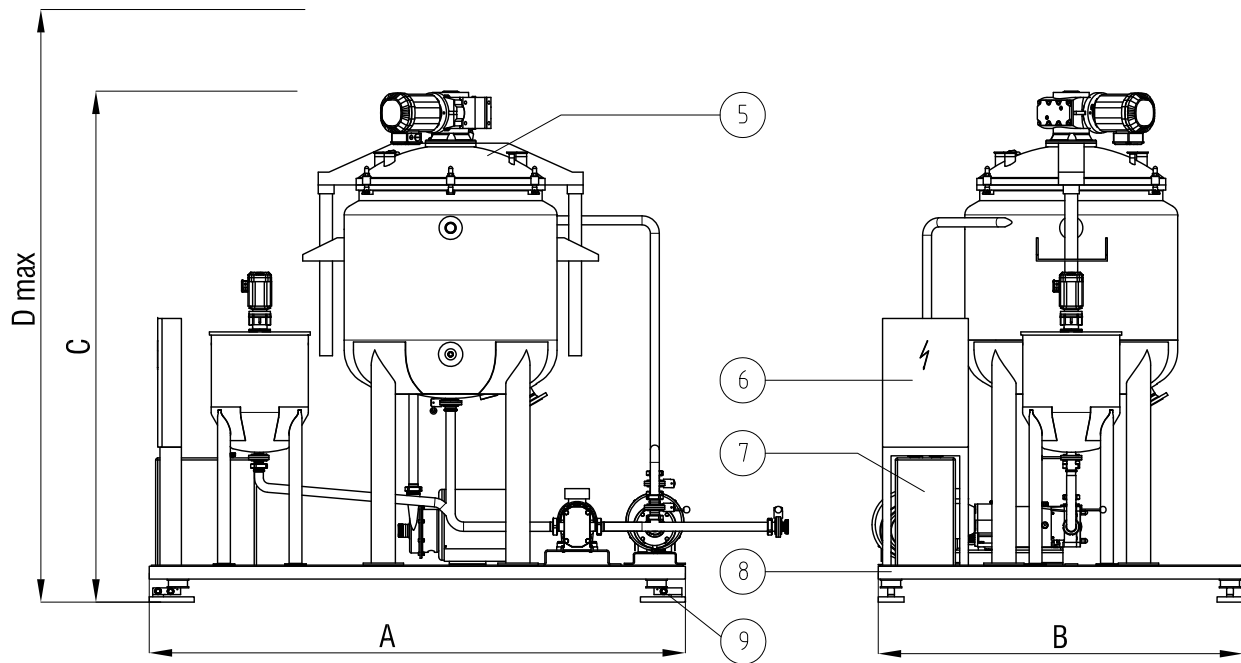




12	Centrifugal pump
11	Rotary lobe pump
10	In-line emulsifier
9	Load cells for the weighing equipment
8	Base platform
7	Vacuum pump
6	Electric panel
5	Lid with automatic lifting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Anchor agitator
Number	Definitions

MIX-1
 Standard mixing and dispersion skids
 Anchor-type agitator and deflecting system
 (Agitator - Option 01)

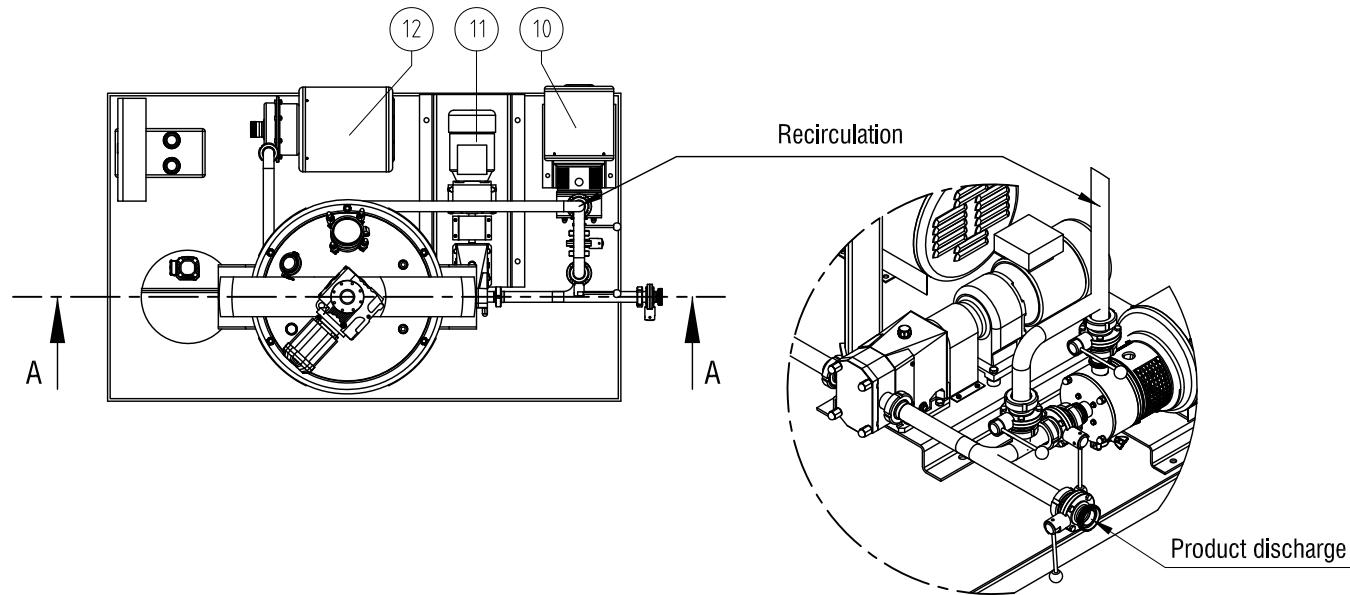
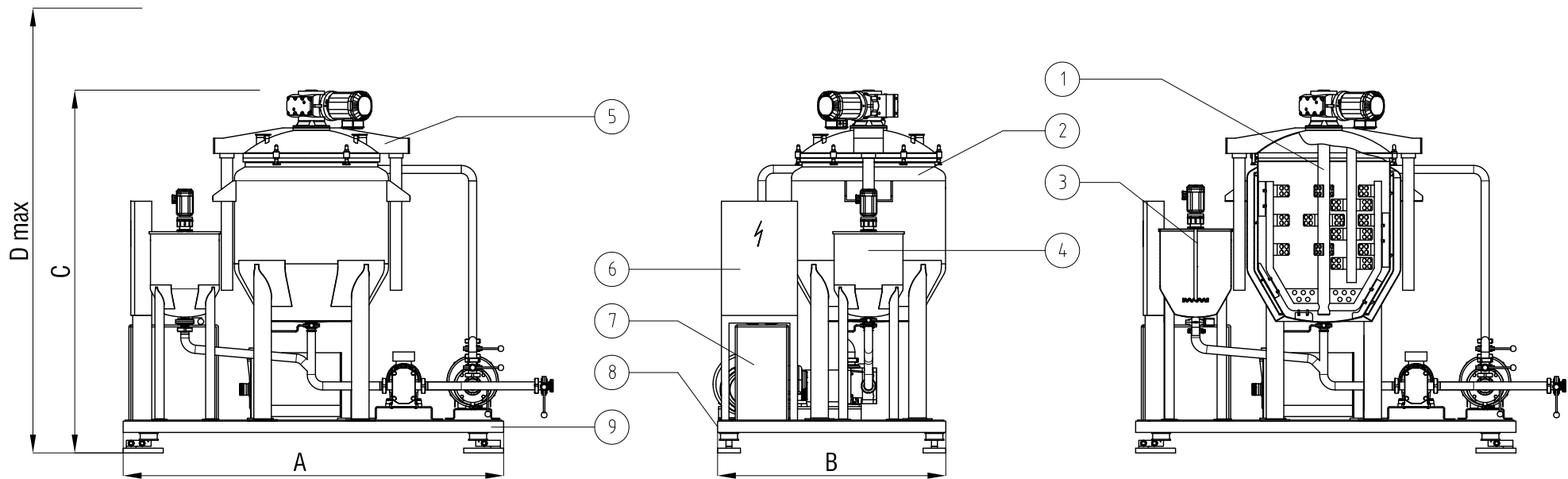
Model	MIX-1.50	MIX-1.100	MIX-1.150	MIX-1.200
Useful volume	50	100	150	200
A	2000	2000	2000	2000
B	1200	1200	1200	1200
C	1990	1990	1990	1990
D max	2590	2590	2590	2590



12	Centrifugal pump
11	Rotary lobe pump
10	In-line emulsifier
9	Load cells for the weighing equipment
8	Base platform
7	Vacuum pump
6	Electric panel
5	Lid with automatic lifting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Anchor agitator
Number	Definitions

MIX-1
Standard mixing and dispersion skids
Anchor-type agitator and deflecting system
(Agitator - Option 01)

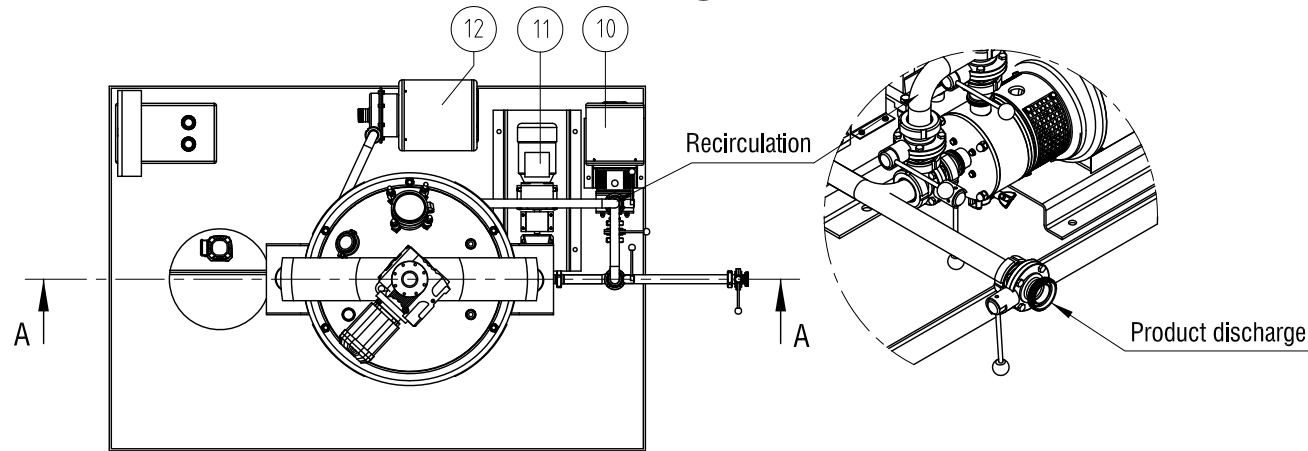
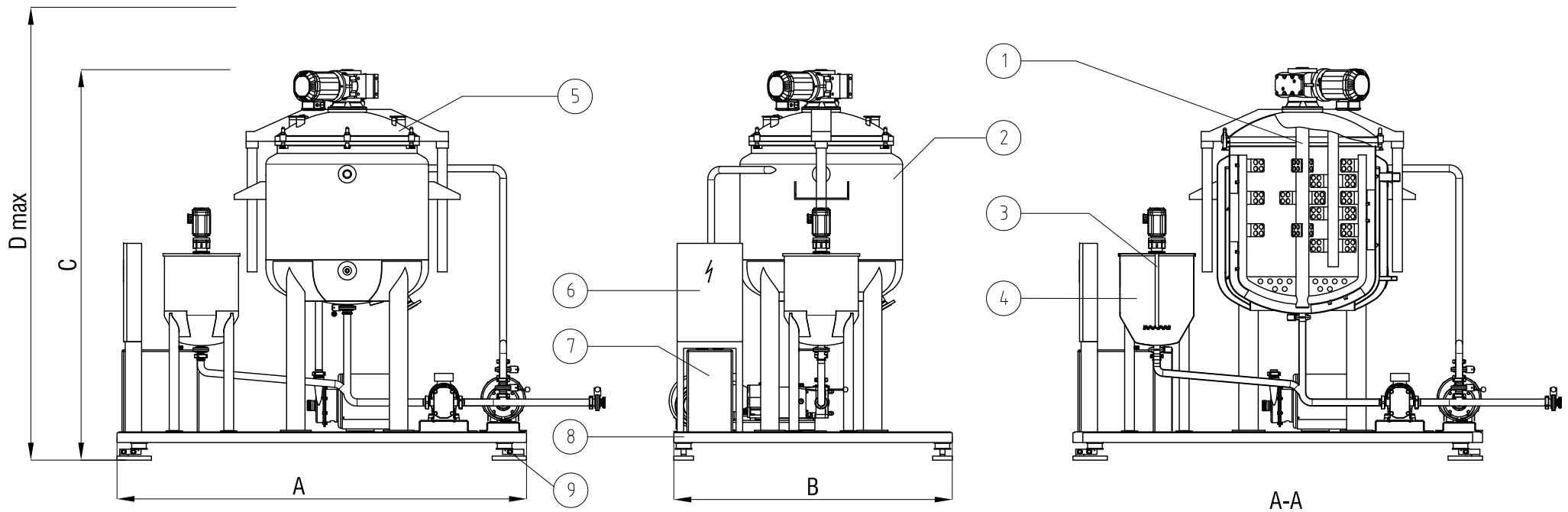
Model	MIX-1.300	MIX-1.500	MIX-1.1000	MIX-1.2000	MIX-1.3000	MIX-1.4000	MIX-1.6000
Useful volume	300	500	1000	2000	3000	4000	6000
A	2300	2300	2500	2500	2800	2800	2800
B	1500	1500	1500	1500	1800	2000	2000
C	2300	2350	2600	3000	3500	3800	4300
D max	3200	3250	3600	4300	5000	5300	6100



12	Centrifugal pump
11	Rotary lobe pump
10	In-line emulsifier
9	Load cells for the weighing
8	Base platform
7	Vacuum pump
6	Electric panel
5	Lid with automatic lifting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Anchor agitator
Number	Definitions

MIX-1
 Standard mixing and dispersion skids
 Anchor-type agitator and central deflecting system with blades
 (Agitator - Option 02)

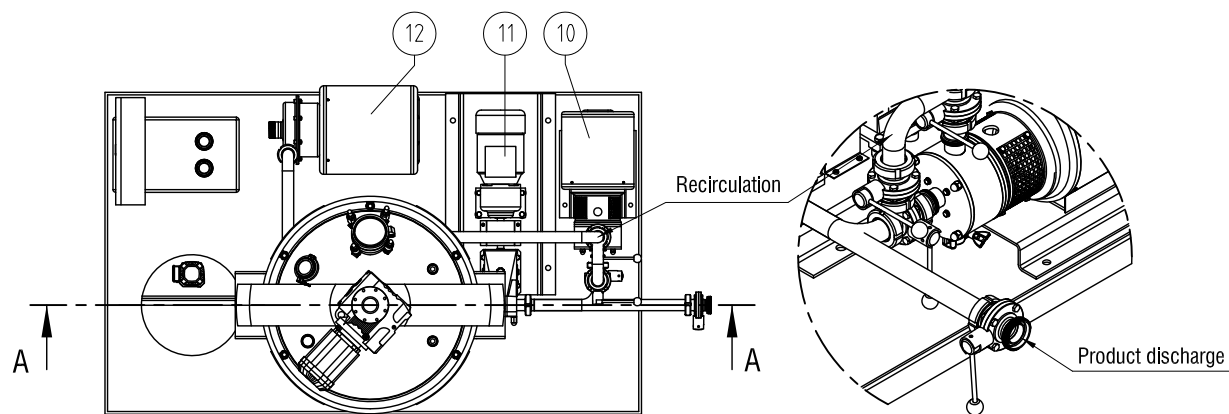
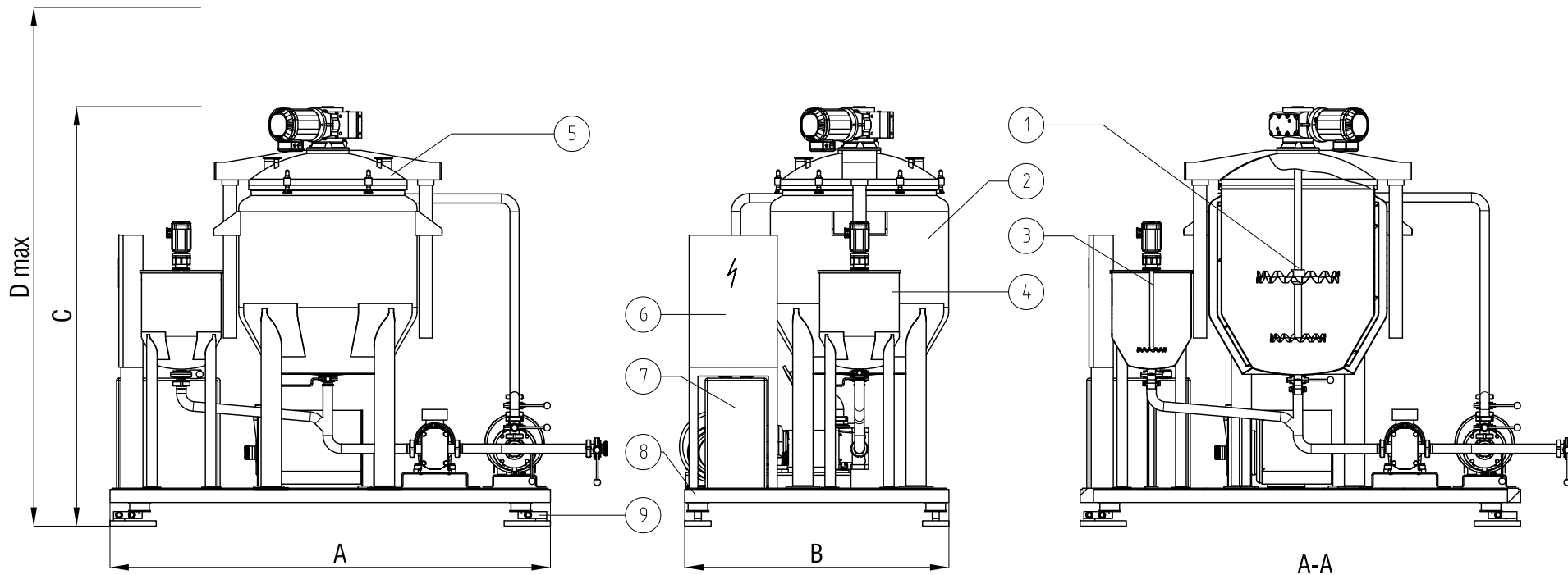
Model	MIX-1.50	MIX-1.100	MIX-1.150	MIX-1.200
Useful volume	50	100	150	200
A	2000	2000	2000	2000
B	1200	1200	1200	1200
C	1990	1990	1990	1990
D max	2590	2590	2590	2590



12	Centrifugal pump
11	Rotary lobe pump
10	In-line emulsifier
9	Load cells for the weighing equipment
8	Base platform
7	Vacuum pump
6	Electric panel
5	Lid with automatic lifting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Anchor agitator
Number	Definitions

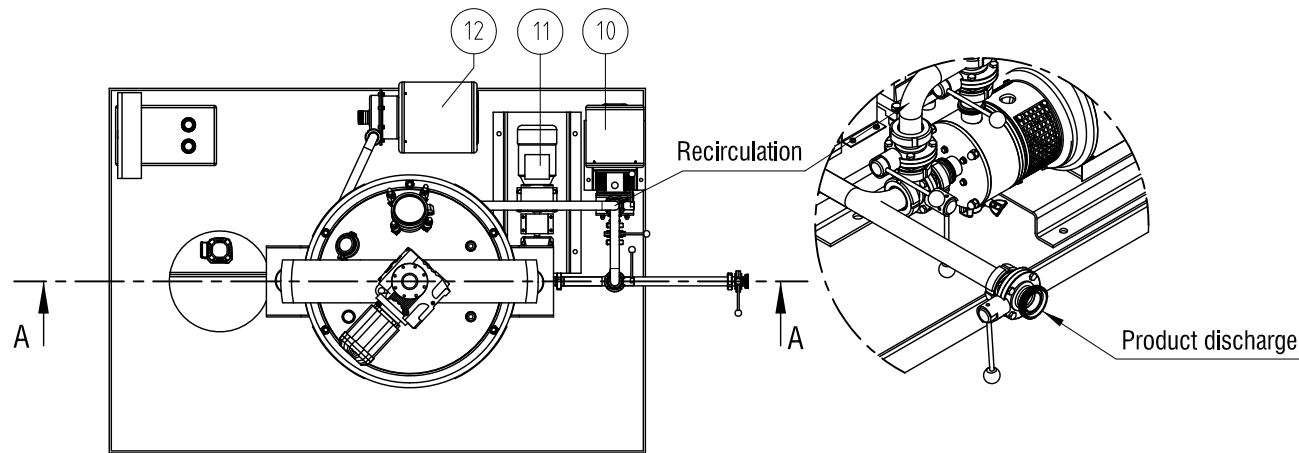
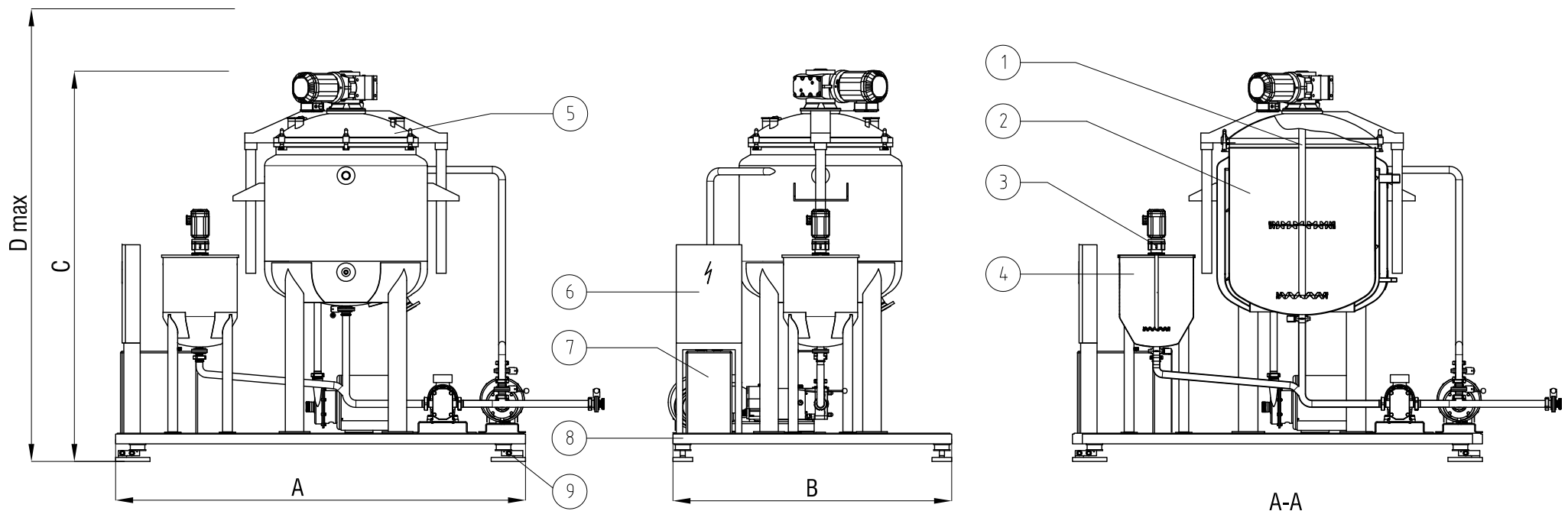
MIX-1
 Standard mixing and dispersion skids
 Anchor-type agitator and central deflecting system with blades
 (Agitator - Option 02)

Model	MIX-1.300	MIX-1.500	MIX-1.1000	MIX-1.2000	MIX-1.3000	MIX-1.4000	MIX-1.6000
Useful volume	300	500	1000	2000	3000	4000	6000
A	2300	2300	2500	2500	2800	2800	2800
B	1500	1500	1500	1500	1800	2000	2000
C	2300	2350	2600	3000	3500	3800	4300
D max	3200	3250	3600	4300	5000	5300	6100



12	Centrifugal pump
11	Rotary lobe pump
10	In-line emulsifier
9	Load cells for the weighing equipment
8	Base platform
7	Vacuum pump
6	Electric panel
5	Lid with automatic lifting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Agitator with double Cowles type disk
Number	Definitions

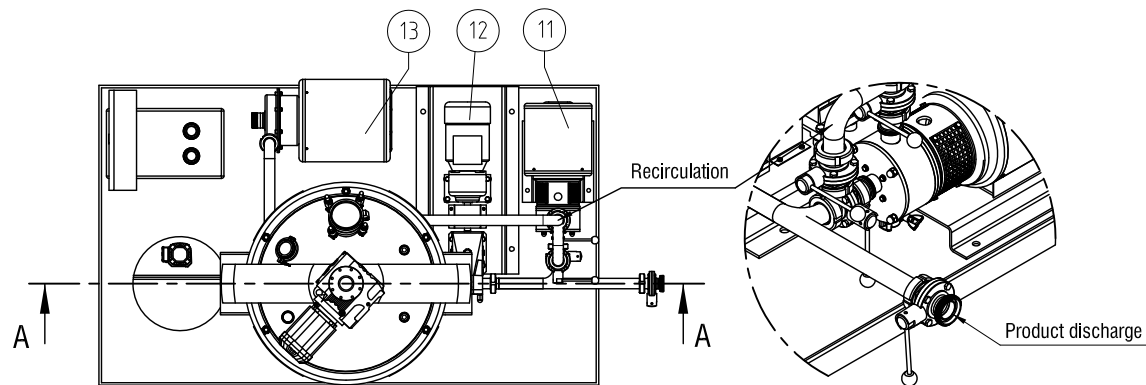
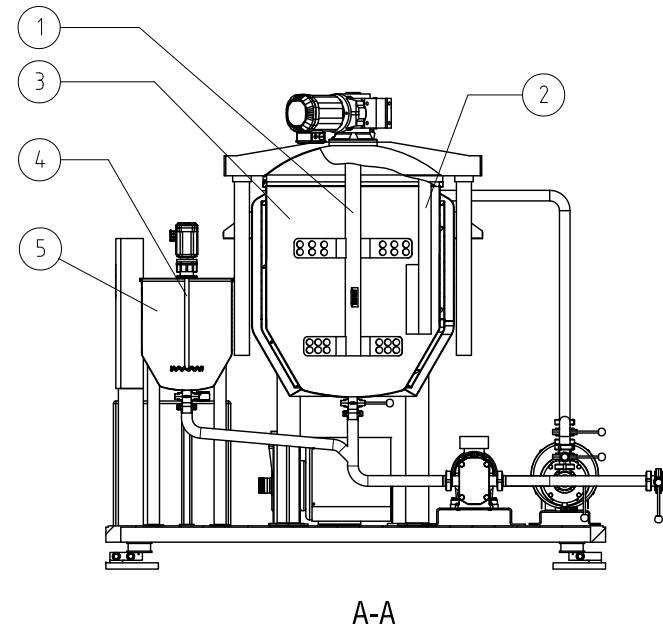
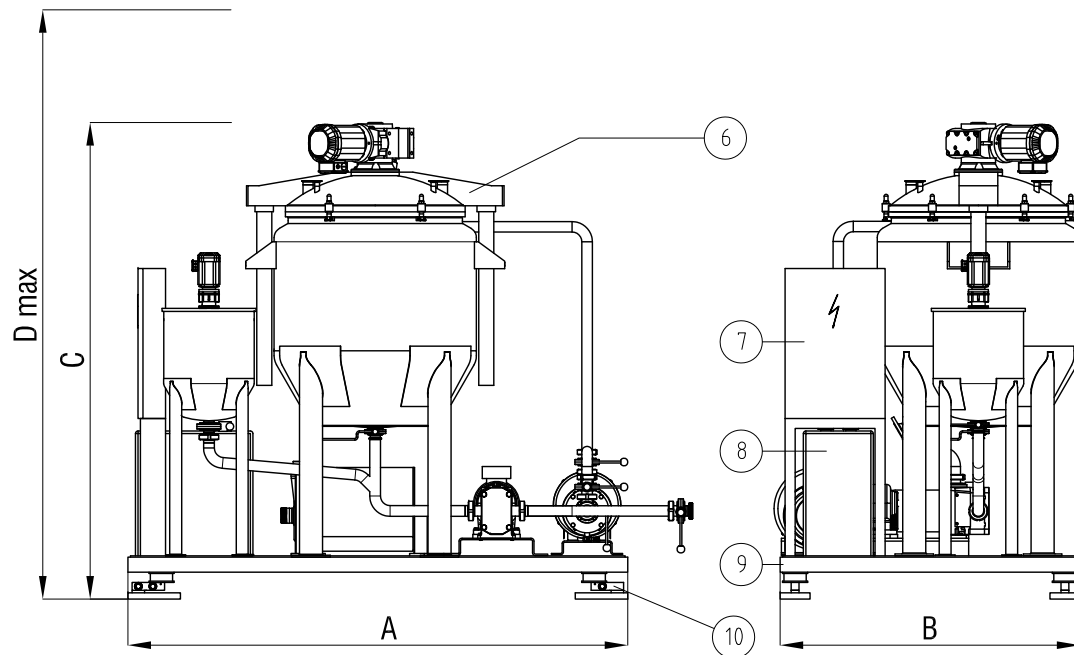
Model	MIX-2.50	MIX-2.100	MIX-2.150	MIX-2.200
Useful volume	50	100	150	200
A	2000	2000	2000	2000
B	1200	1200	1200	1200
C	2200	2200	2200	2200
D max	2800	2800	2800	2800



12	Centrifugal pump
11	Rotary lobe pump
10	In-line emulsifier
9	Load cells for the weighing equipment
8	Base platform
7	Vacuum pump
6	Electric panel
5	Lid with automatic lifting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Agitator with double Cowles type disk
Number	Definitions

MIX-2
 Standard mixing and dispersion skids
 Agitator with double Cowles type disk

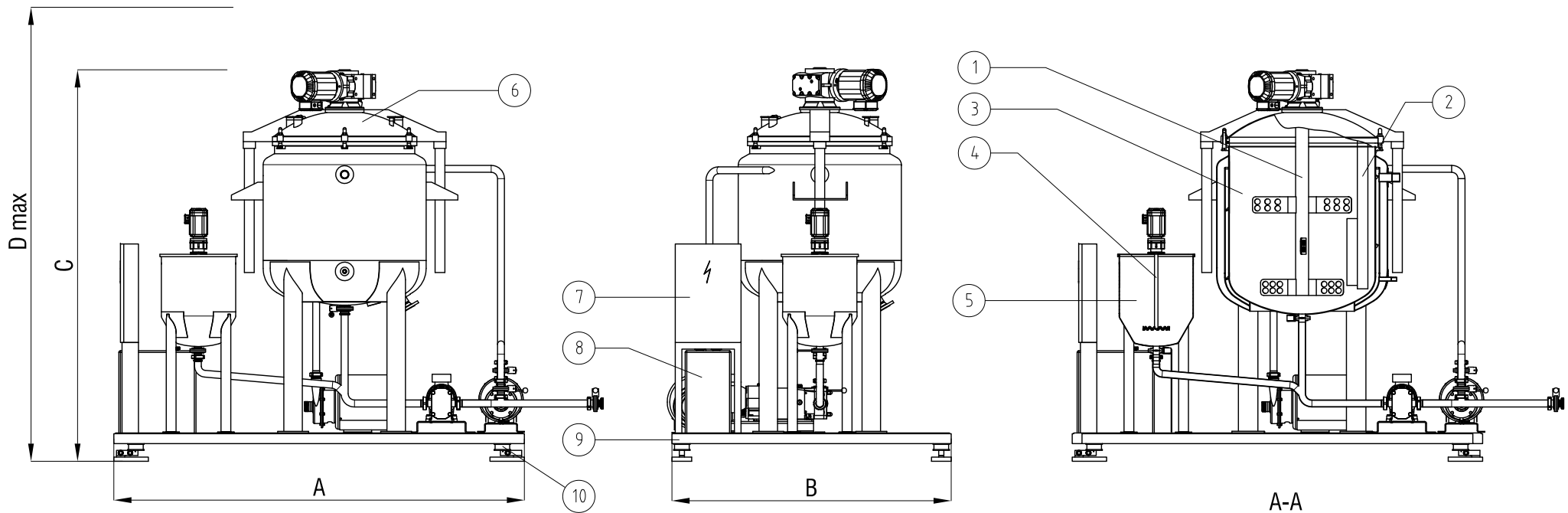
Model	MIX-2.300	MIX-2.500	MIX-2.1000	MIX-2.2000	MIX-2.3000	MIX-2.4000	MIX-2.6000
Useful volume	300	500	1000	2000	3000	4000	6000
A	2300	2300	2500	2500	2800	2800	2800
B	1500	1500	1500	1500	1800	2000	2000
C	2550	2600	2850	3250	3750	4050	4550
D max	3450	3500	3850	4550	5250	5550	6350



13	Centrifugal pump
12	Rotary lobe pump
11	In-line emulsifier
10	Load cells for the weighing equipment
9	Base platform
8	Vacuum pump
7	Electric panel
6	Lid with automatic lifting system
5	Auxiliary tank
4	Auxiliary agitator
3	Main tank
2	Deflecting system
1	Agitator with central shaft with blades
Number	Definitions

MIX-3
Standard mixing and dispersion skids
Agitator with central shaft with blades

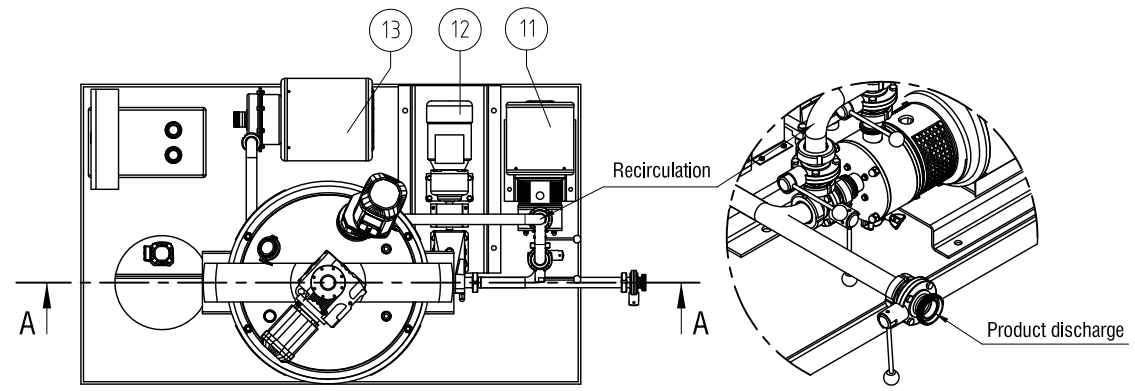
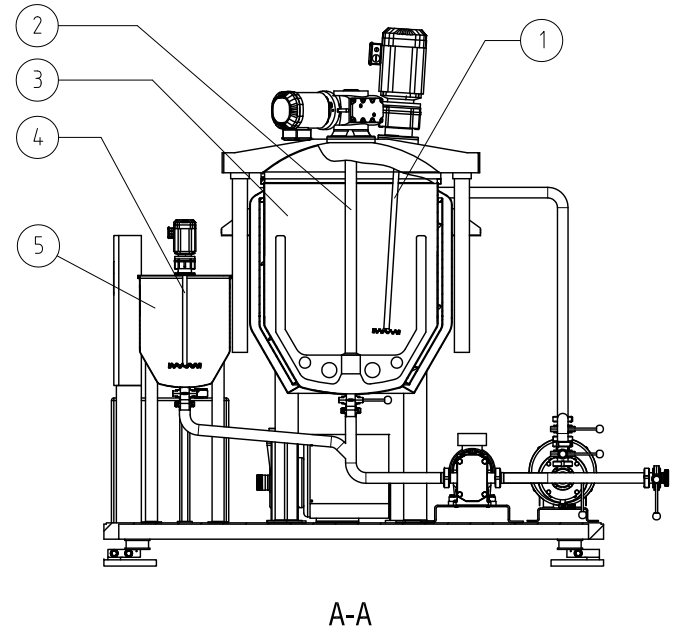
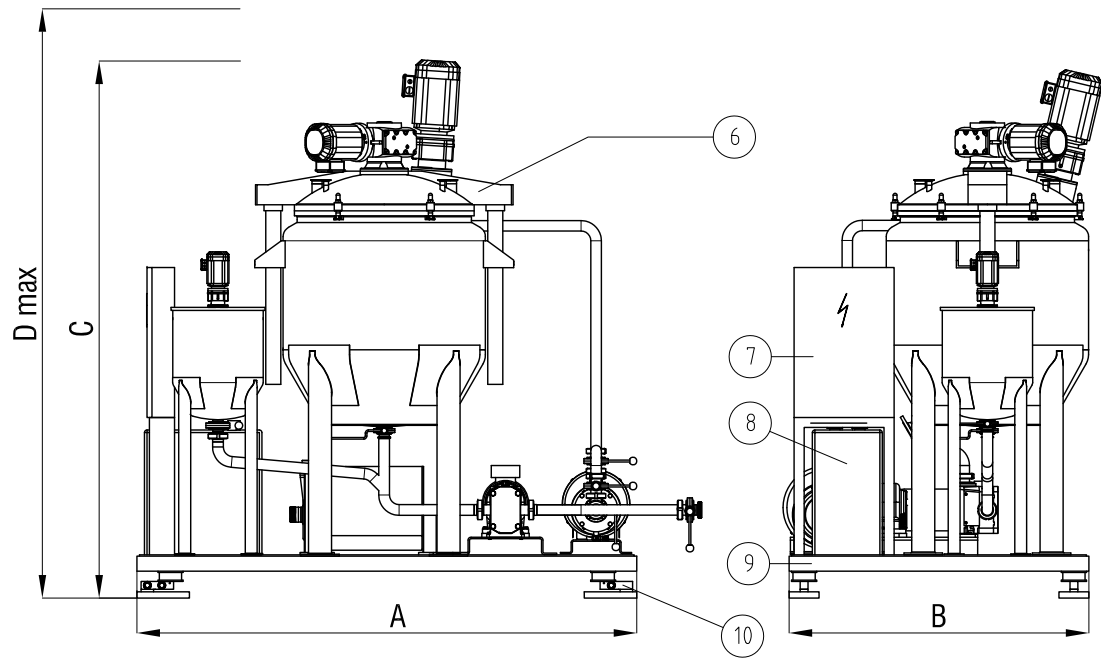
Model	MIX-3.50	MIX-3.100	MIX-3.150	MIX-3.200
Useful volume	50	100	150	200
A	2000	2000	2000	2000
B	1200	1200	1200	1200
C	2200	2200	2200	2200
D max	2800	2800	2800	2800



13	Centrifugal pump
12	Rotary lobe pump
11	In-line emulsifier
10	Load cells for the weighing equipment
9	Base platform
8	Vacuum pump
7	Electric panel
6	Lid with automatic lifting system
5	Auxiliary tank
4	Auxiliary agitator
3	Main tank
2	Deflecting system
1	Agitator with central shaft with blades
Number	Definitions

MIX-3
 Standard mixing and dispersion skids
 Agitator with central shaft with blades

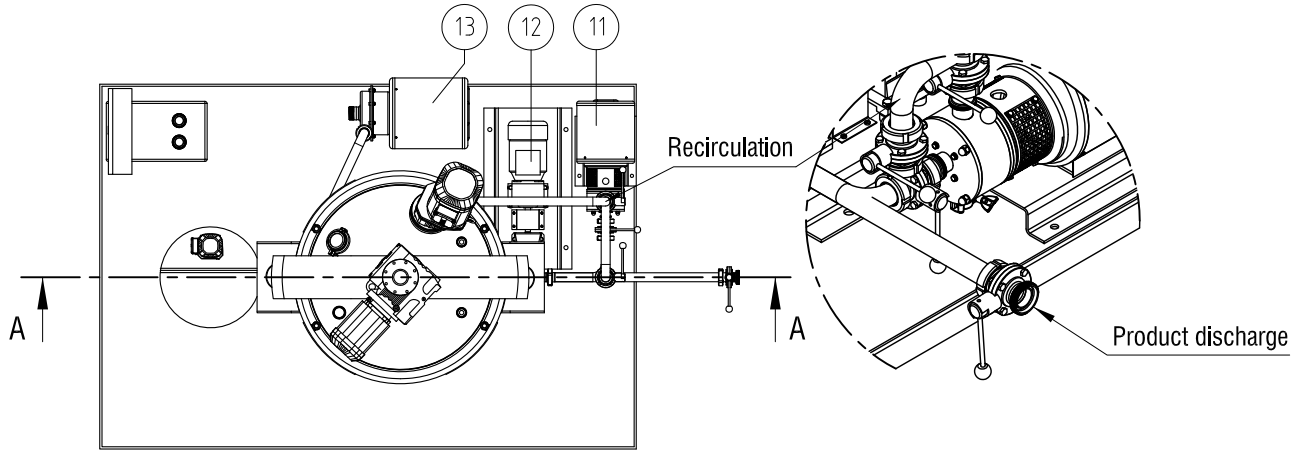
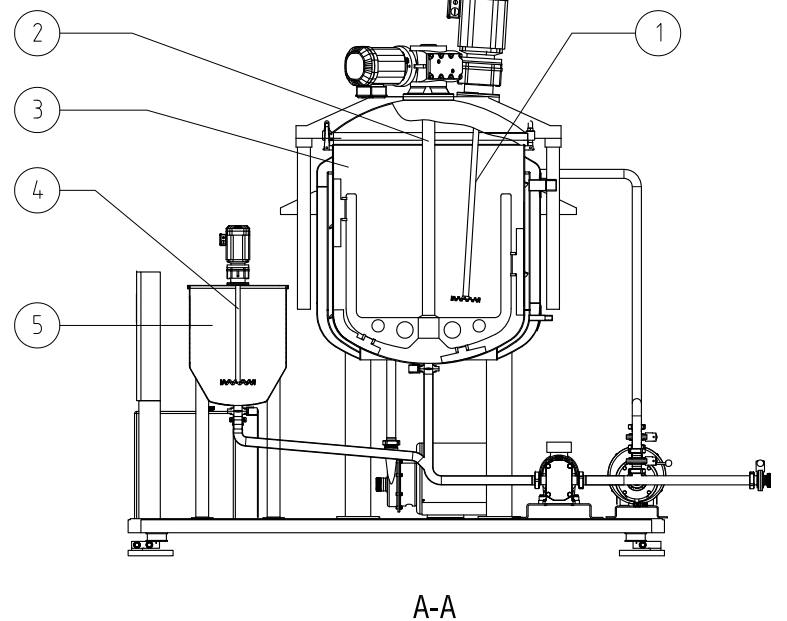
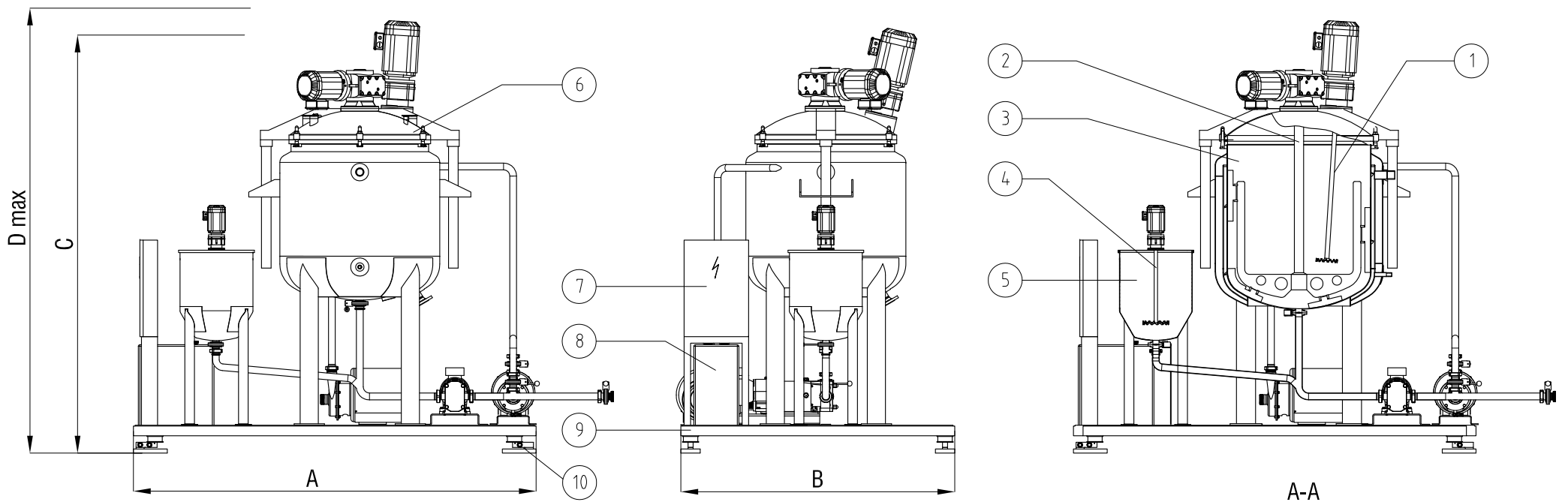
Model	MIX-3.300	MIX-3.500	MIX-3.1000	MIX-3.2000	MIX-3.3000	MIX-3.4000	MIX-3.6000
Useful volume	300	500	1000	2000	3000	4000	6000
A	2300	2300	2500	2500	2800	2800	2800
B	1500	1500	1500	1500	1800	2000	2000
C	2380	2430	2580	2980	3480	3780	4180
D max	3280	3330	3580	4280	4980	5280	5920



13	Centrifugal pump
12	Rotary lobe pump
11	In-line emulsifier
10	Load cells for the weighing equipment
9	Base platform
8	Vacuum pump
7	Electric panel
6	Lid with automatic lifting system
5	Auxiliary tank
4	Auxiliary agitator
3	Main tank
2	Anchor agitator
1	Cowles type agitator
Number	Definitions

MIX-4
 Standard mixing and dispersion skids
 Anchor and shaft with Cowles type disk

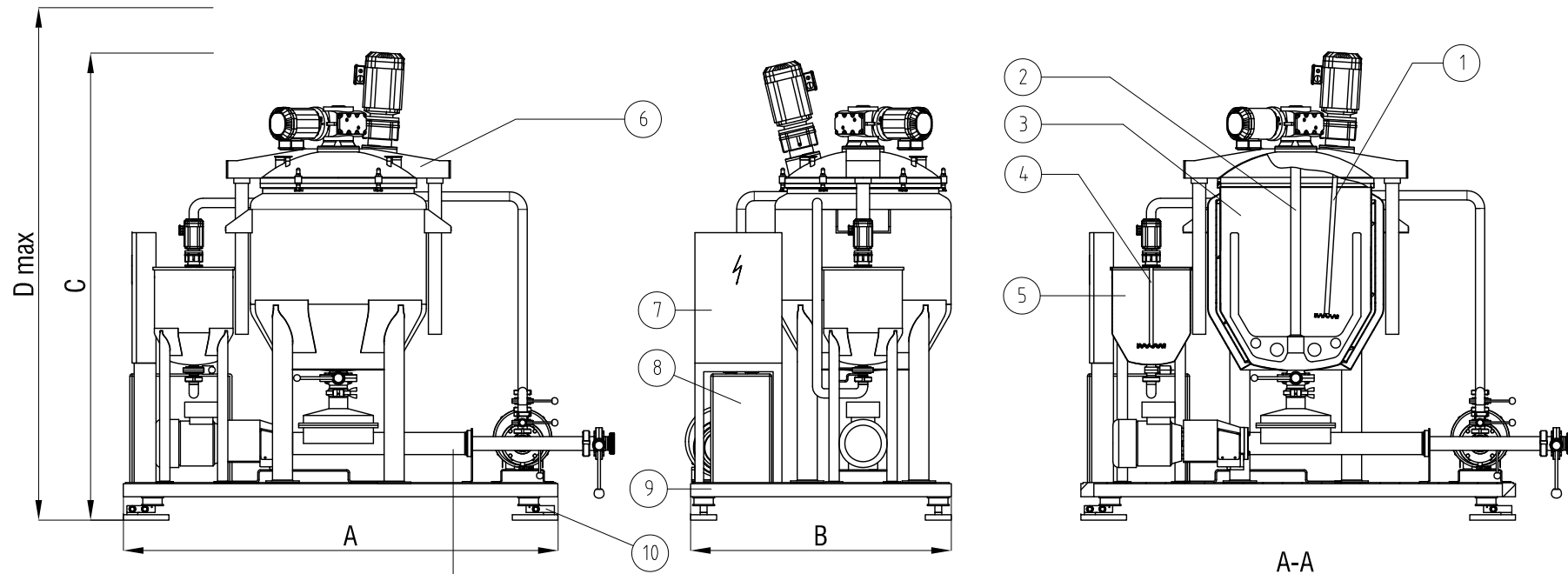
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Useful volume	50	100	150	200
A	2000	2000	2000	2000
B	1200	1200	1200	1200
C	2200	2200	2200	2200
D max	2800	2800	2800	2800



13	Centrifugal pump
12	Rotary lobe pump
11	In-line emulsifier
10	Load cells for the weighing equipment
9	Base platform
8	Vacuum pump
7	Electric panel
6	Lid with automatic lifting system
5	Auxiliary tank
4	Auxiliary agitator
3	Main tank
2	Anchor agitator
1	Cowles type agitator
Number	Definitions

MIX-4
Standard mixing and dispersion skids
Anchor and shaft with Cowles type disk

Model	MIX-4.300	MIX-4.500	MIX-4.1000	MIX-4.2000	MIX-4.3000	MIX-4.4000	MIX-4.6000
Useful volume	300	500	1000	2000	3000	4000	6000
A	2300	2300	2500	2500	2800	2800	2800
B	1500	1500	1500	1500	1800	2000	2000
C	2550	2600	2750	3300	3800	4100	4500
D max	3450	3500	3750	4600	5300	5600	6240

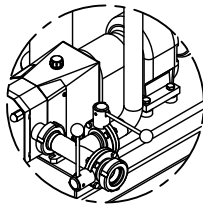
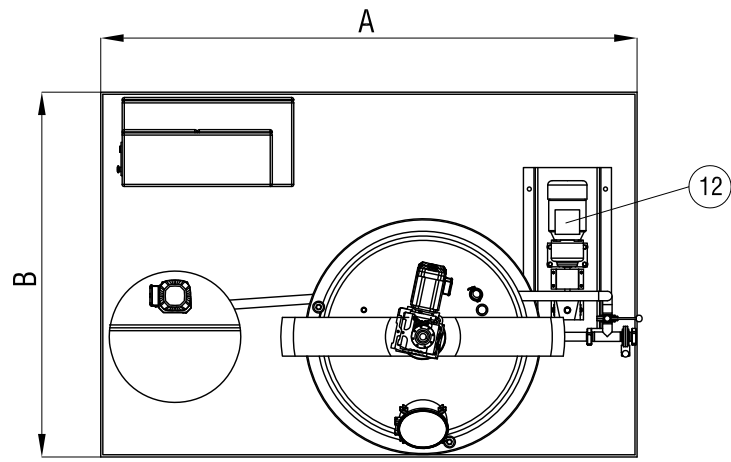
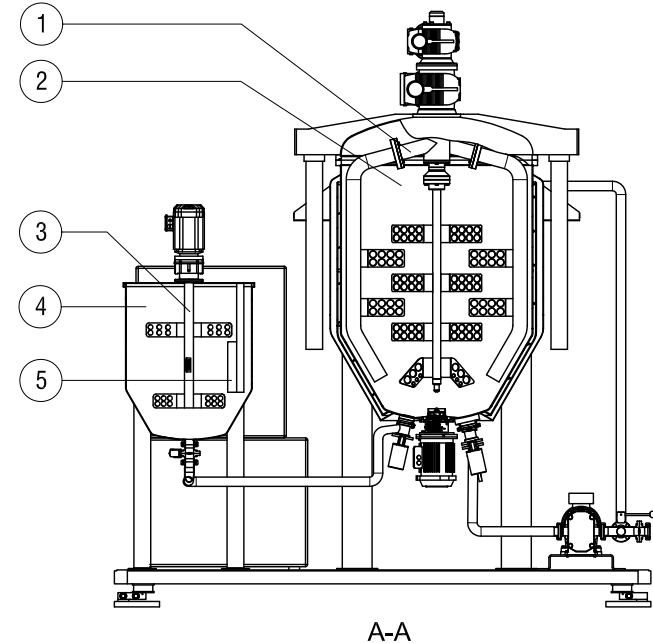
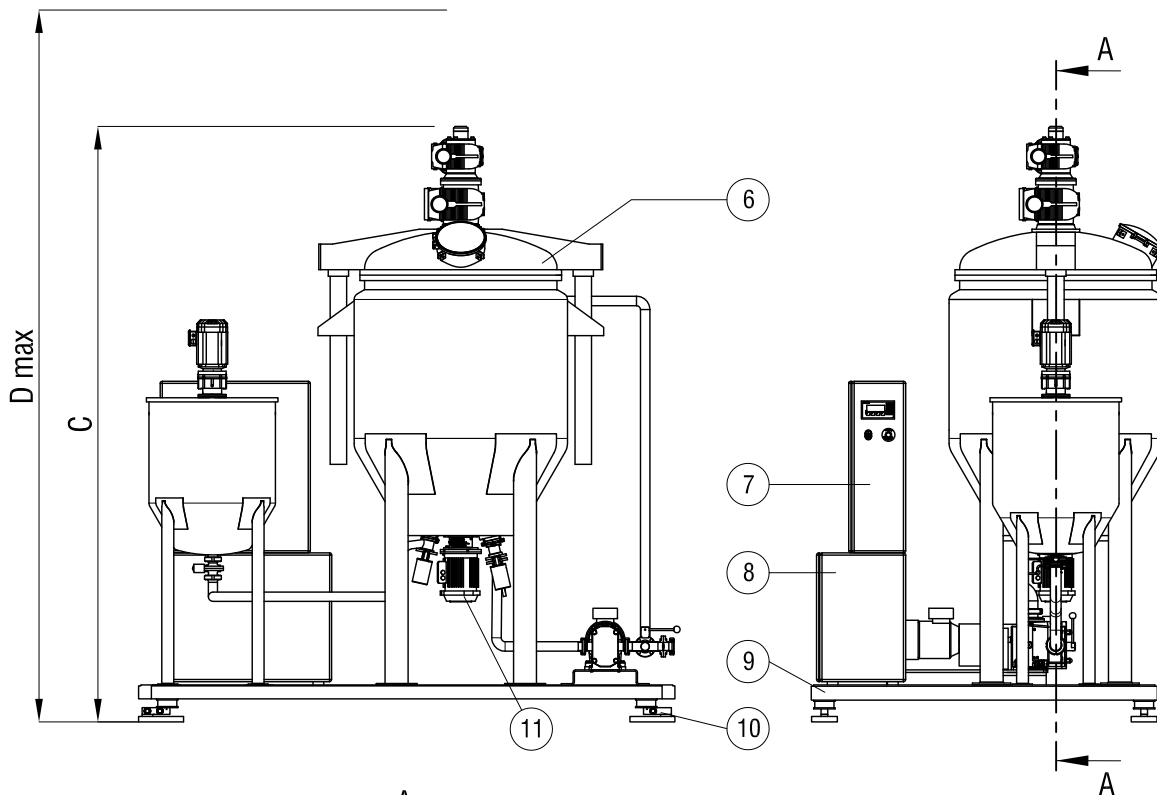


13	Centrifugal pump
12	Kiber helical screw pump
11	In-line emulsifier
10	Load cells for the weighing equipment
9	Base platform
8	Vacuum pump
7	Electric panel
6	Lid with automatic lifting system
5	Auxiliary tank
4	Auxiliary agitator
3	Main tank
2	Anchor agitator
1	Cowles type agitator
Number	Definitions

MIX-4

Standard mixing and dispersion skids
Anchor and shaft with Cowles type disk
with Kiber helical screw pump

Model	MIX-4.50	MIX-4.100	MIX-4.150	MIX-4.200	MIX-4.300	MIX-4.500	MIX-4.1000	MIX-4.2000	MIX-4.3000	MIX-4.4000	MIX-4.6000
Useful volume	50	100	150	200	300	500	1000	2000	3000	4000	6000
A	2000	2000	2000	2000	2300	2300	2500	2500	2800	2800	2800
B	1200	1200	1200	1200	1500	1500	1500	1500	1800	2000	2000
C	2200	2200	2200	2200	2550	2600	2750	3300	3800	4100	4500
D max	2800	2800	2800	2800	3450	3500	3750	4600	5300	5600	6240



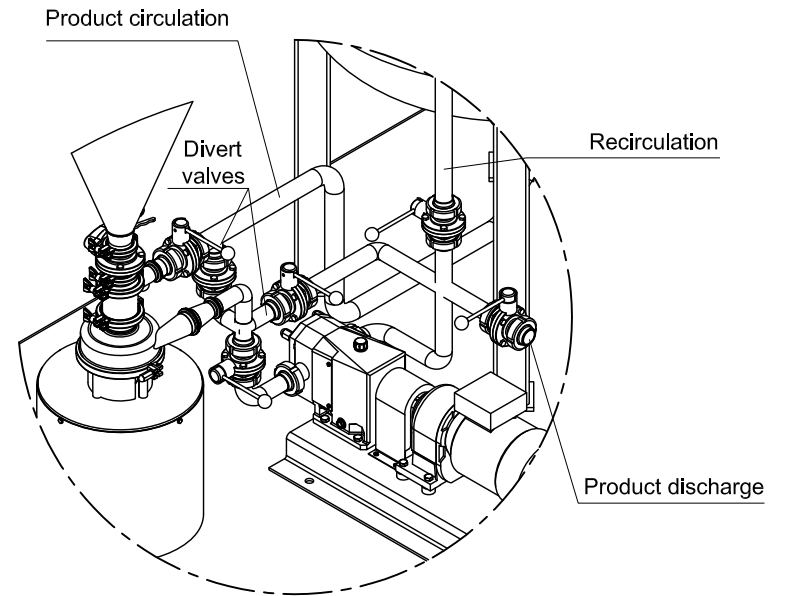
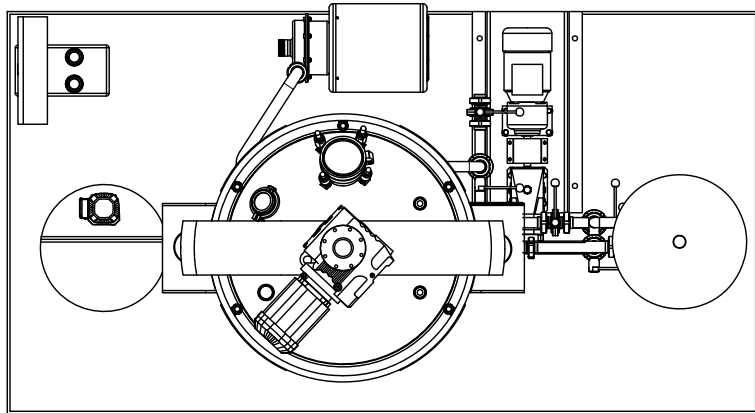
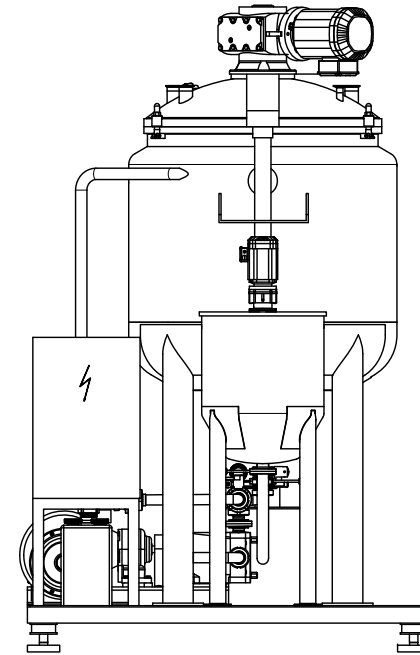
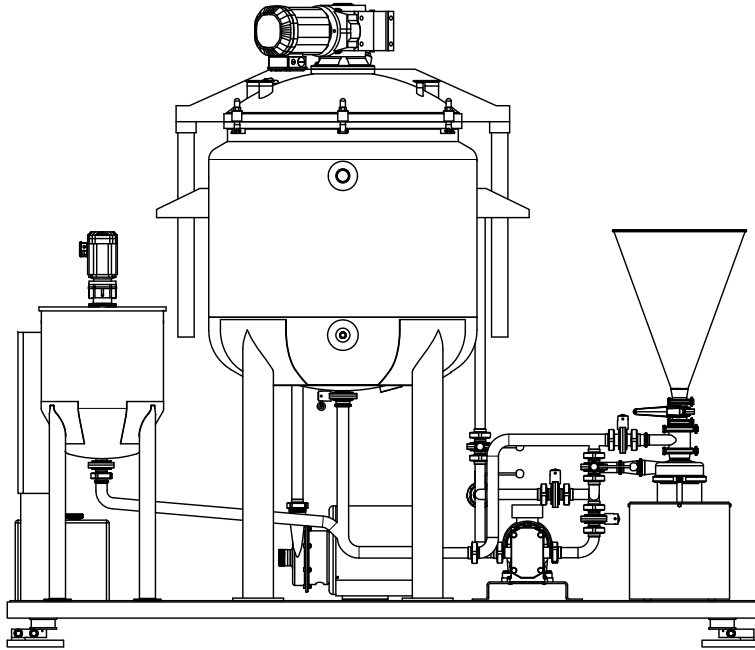
Detailed view product discharge

12	Rotary lobe pump
11	Bottom-of-the-tank mixer
10	Load cells for the weighing equipment
9	Base platform
8	Cabinet for valves and components
7	Electric panel
6	Lid with automatic lifting system
5	Deflecting system
4	Auxiliary tank
3	Auxiliary agitator
2	Main tank
1	Counter-rotating agitator
Number	Definitions

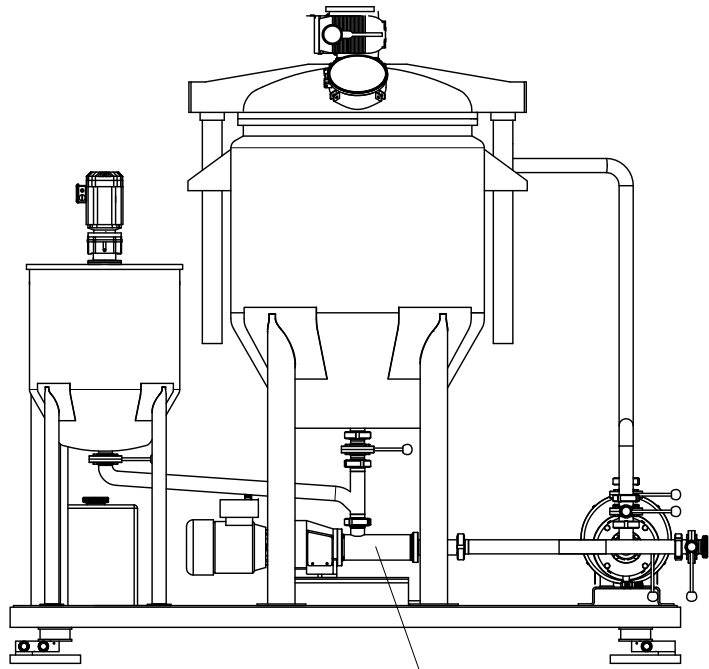
MIX-5

Standard mixing and dispersion skids
Counter-rotating agitator

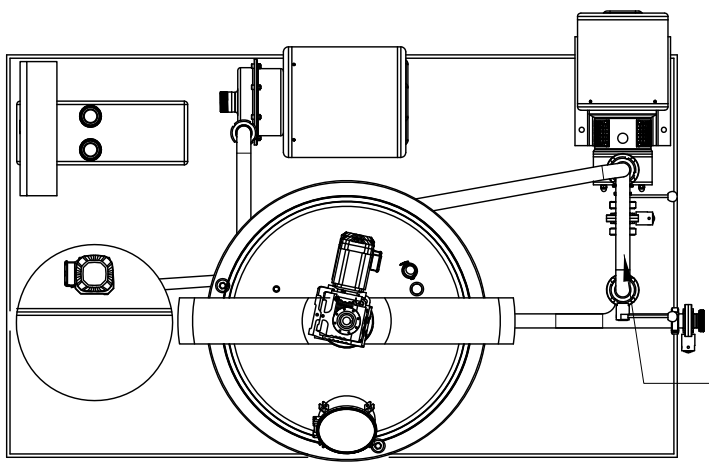
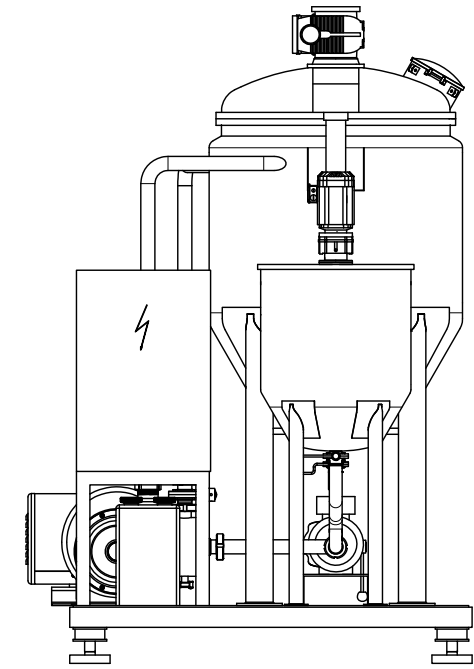
Model	MIX-5.50	MIX-5.150	MIX-5.200	MIX-5.500	MIX-5.1000
Useful volume	50	150	200	500	1000
A	2500	2500	2500	2500	2500
B	1700	1700	1700	1700	1700
C	2280	2600	2600	3080	3500
D max	2780	3200	3200	4000	4500



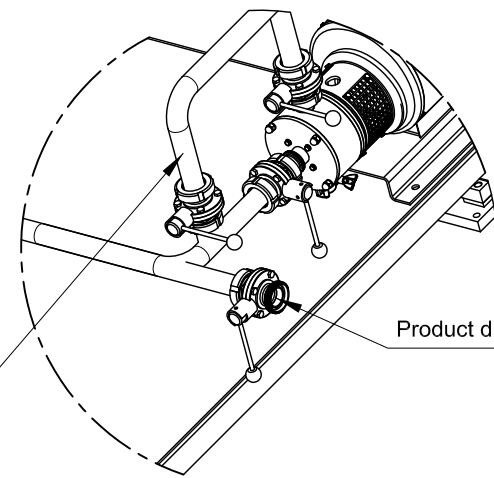
MIX with solid-liquid blender
(general view)



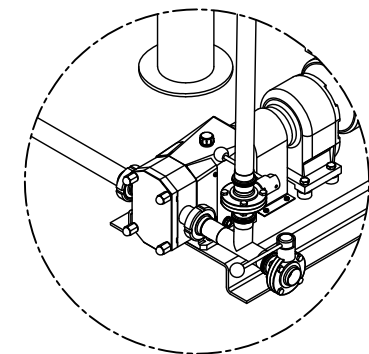
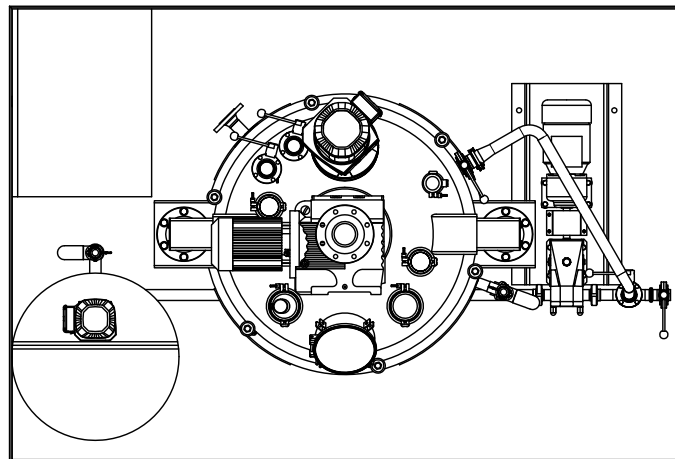
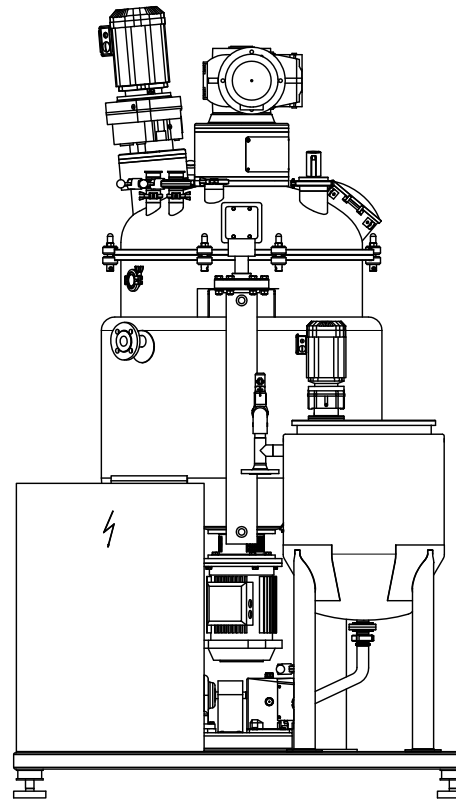
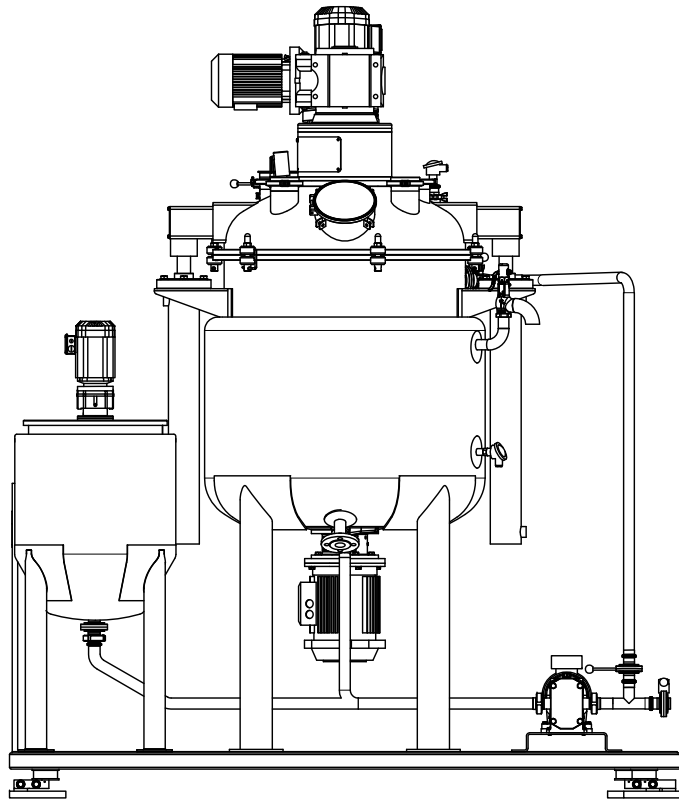
Kiber helical screw pump position



Recirculation



Product discharge



Detailed view
Product discharge

MIX skid with a bottom-of-the-tank mixer
instead of an in-line emulsifier
(Optional component for MIX-1, MIX-2, MIX-3 and MIX-4)