

Aspamet

**EQUIPMENT FOR
ENVIRONMENT PROTECTION**



MIXERS

**SUBMERSIBLE MIXERS
RECIRCULATION PUMPS
VERTICAL MIXERS
SUPPORTING STRUCTURES
CONTROL SYSTEMS**

ABOUT OUR COMPANY

ASPAMET company was established in 1992. The enterprise is composed of two separate divisions: Foundry located in Rajsko, near Town of Oświęcim and Division of Equipment for Environment Protection settled in Mazańcowice, close to City of Bielsko-Biała. The distance between these two plants is equal to approximately 30 km. Both of our factories are located in the South of Poland, amid beautiful, scenic landscape of Beskid Mountains.

The Foundry has a capacity to offer a wide range of high quality casts made of such materials as: cast iron, spheroid cast iron, alloy cast iron and cast steel. Our products are widely used in manufacturing of pumps, mixers, reducers and many other parts and components of machines and technological devices applicable in food, chemical, cement industry and many other industrial areas.

Division of Equipment for Environment Protection offers a huge range of submersible and vertical mixers of different types for diversified applications. Using casts made of grey cast iron, stainless cast steel and acid-proof cast steel we produce submersible mixers equipped with both laminate and stainless steel propellers. Our mixers are perfect for water treatment plants as well as for many other applications such as agriculture, chemical, food and power industry.

Our employees are our strength, the majority of our team is composed of people with vast, over 20 years experience concerning designing and manufacturing of submersible mixers.

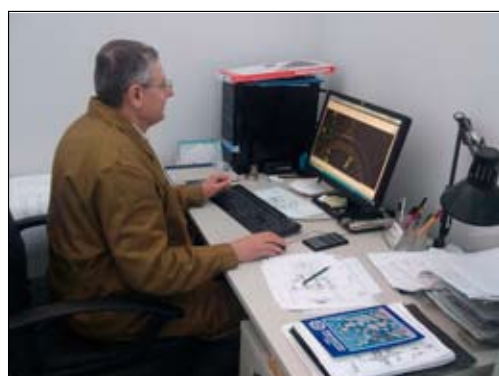
Our mixers are designed and manufactured with aid of the best technological tools and solutions. Our products are purposed for operating in very challenging and aggressive environment. For this reason our mixers' design and implemented materials have to be of very high quality.

We established ongoing cooperation on regular basis with advisors from technological universities. Our products are designed in CAD programs and geometry of our propellers is determined in advanced simulation tools.

What makes that our products stand out among other companies is our unique know-how solutions. Propellers of our mixers are entirely produced as one-piece cast. It is a huge advantage upon welded propellers because in this way a diversified thickness of blades can be achieved. Measurements of thrust and flow confirm that values reached by new casted propellers have significantly improved comparing to welded propellers of similar geometry. In standard our propellers are made of stainless cast steel. Upon customer request we make also acid-proof cast steel propellers.

In case of mixers purposed for demanding duties we prepare bodies as one-piece entirely made of stainless cast steel or acid-proof cast steel. This is very significant difference while comparing with other products on the market. In general quite popular is design made of cast iron and just covered with stainless steel shell.

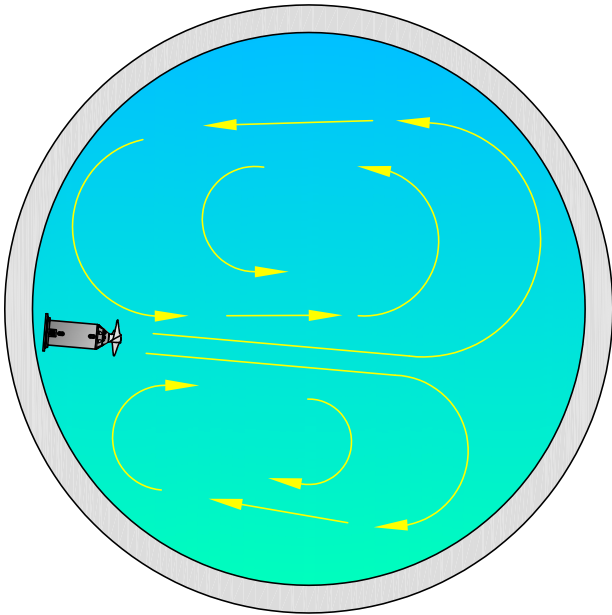
We apply only high quality materials. Mixers design is of modular concept which helps to reduce costs of repair and long terms service.



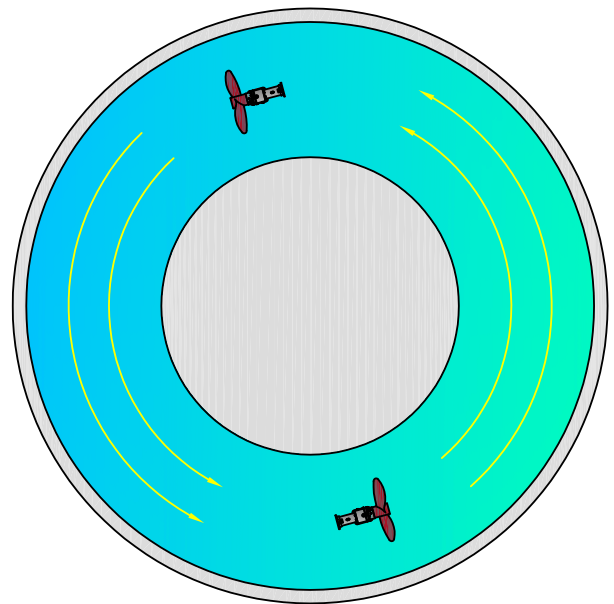
MIXERS APPLICATIONS

Submersible mixers are widely used in applications where due to requirements of technological process, it is necessary to effectively mix and create uniformed substances. They are also used for preventing residues from forming within a tank or provoking horizontal flow. Selection of the right mixers is a complicated process. It requires a lot of specialised knowledge and know-how, that can be obtained only through years of experience. On the basis of tanks' dimensional drawings provided by a Customer and information about technological process, we choose the best suited size of the mixers, that with the proper positioning guarantee optimal flow creation within a tank.

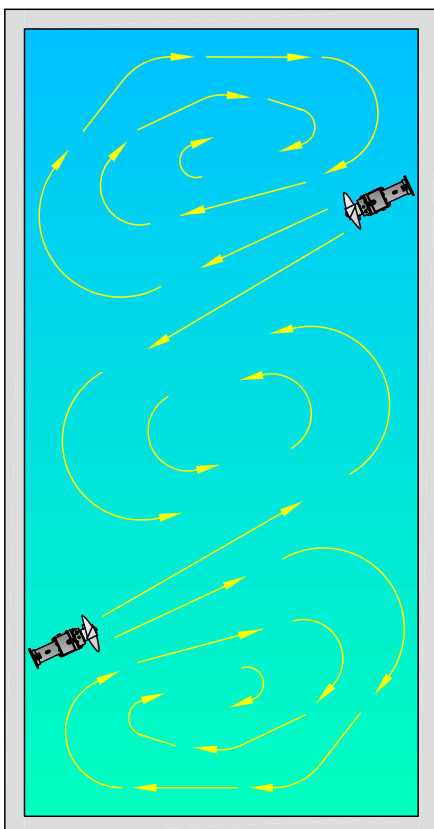
Small circular basin, single mixer.



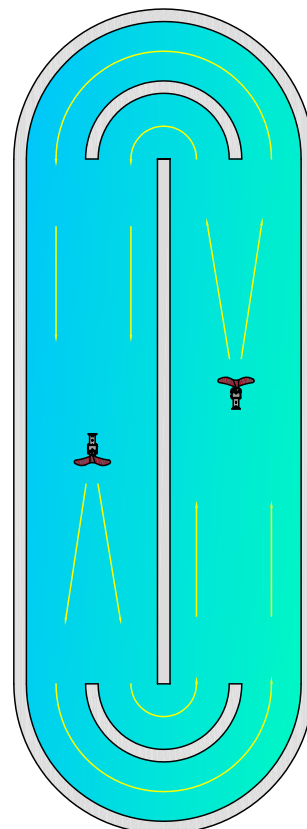
Ring-shaped basin, two cooperating mixers.



Rectangular basin, two cooperating mixers.

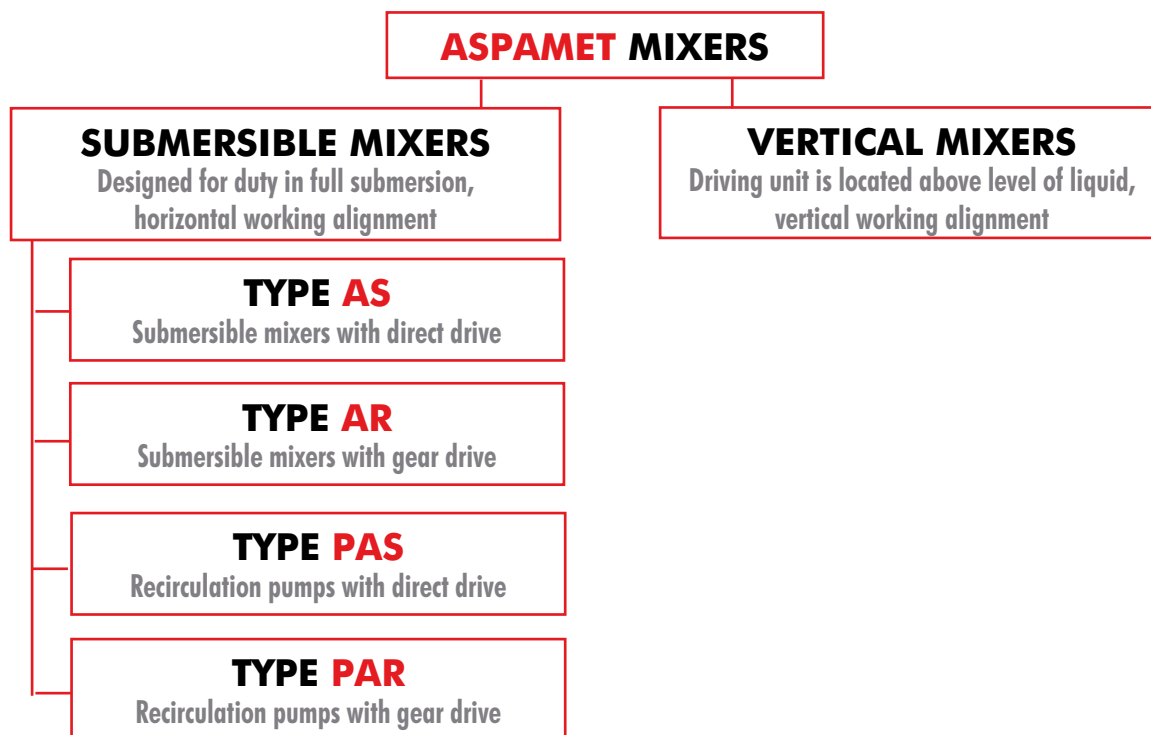


Two-channel, oval-shaped basin, two cooperating mixers.



OVERVIEW OF MIXERS

The family of basic ASPAMET mixers is composed of the following groups:



Our mixers are suitable for application in many diversified sectors, such as environmental protection (water treatment plants), agriculture, food industry, chemical industry, power industry and many others.

Standard versions of our mixers are featured with case made of high quality grey cast iron, having a strong resistance against corrosion. Additionally, our mixers are protected against harsh working environment by means of multilayer, double component epoxy coating. Upon customer request, for special applications, ceramic cover as an outer layer can be applied. For the most demanding duty conditions we offer versions entirely made of stainless or acid-proof cast steel.

Submersible mixers can be divided into two main groups: mixers with direct drive (type AS) and mixers with integrated gear drive (type AR). AS mixers are characterized by smaller dimensions of propellers and much higher values of revolutions per minute than mixers with gear drive (type AR). For this reason mixers of AS type are recommended to prevent from sedimentation and not allow for forming of scum on surface. Mixers featured with bigger propellers and lower values of revolutions per minute, generally speaking, are more friendly for biological processes, which take place within big oxygen or anaerobic reactors at water treatment plants.

Pumping mixer (which are widely known under the name of recirculation pumps) are perfectly suitable for applications that require forwarding great deal of volume of liquid at relatively low difference in pressures between tanks.

Vertical mixers perform very well in applications where, due to tanks geometry, there is not enough space for installation of submersible mixers. Sometimes application of vertical mixers is better in terms of hydraulic force generated. In case of very aggressive environment vertical mixers are characterized, generally, by longer life-span and durability, because driving unit is located above level of liquid and only shaft with propeller stays in submersion.

Choosing of the right mixer for an exact purpose can be difficult for a customer. That is why a team of our engineers and technologists is always available on our customers request. We can choose proper mixers for each application on basis of provided documentation of tank and description of technological process. The right selection is achieved by means of dedicated calculation methods on basis of our longstanding experience. The most important information that should be provided with request for quotation include: drawings of the tank, process description and any other additional technical requirements.

TYPE AS

SUBMERSIBLE MIXERS WITH DIRECT DRIVE

OVERVIEW

Submersible mixers of group AS are designed as machines with propeller directly mounted at a shaft of multi-pole electric motor. In the result a robust, compact and relatively light item comes to existence. Purposed for duty in submersion it has a wide range of applications. Besides waste water treatment plants mixers of this type are applied in agriculture, at drinking water stations, in chemistry and in many other industrial areas where exploitation conditions frequently are quite unfriendly.

Due to a small propeller diameter and high propeller velocity thrust generated by agitators of group AS has a quite big strength but at the relatively short distance and within the relatively narrow cross-section of flow volume. The shape of the agitated flow and its range can be additionally modified by means of dedicated jet-ring.

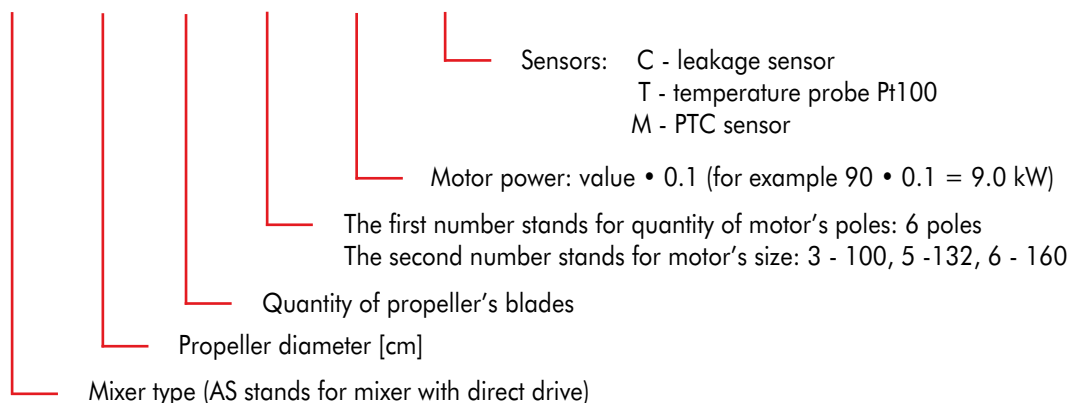


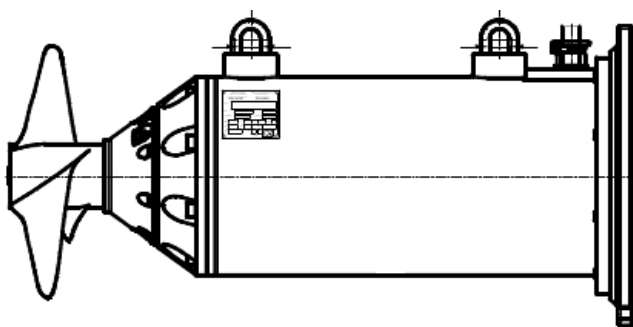
Mixers with direct drive are usually applied for small technological basins or for tanks with difficult, complicated geometry. By means of these machines a detailed, perfect blending of so called „dead zones“ areas, for instance in tank corners, can be done. Correctly located mixers of AS type make possible a precise and efficient mixing of especially small chambers, sludge wells or pump stations and therefore they are perfect everywhere if only the intensive and strong action is required.

The undisputable advantage of direct drive mixers is the fact that due to a small diameter of propellers and related lightness of guide systems they are suitable for relatively shallow tanks. Therefore, with different versions of body and in several options of propellers, AS agitators can be applied for mixing of pig or cow manure or for other aggressive mediums as well.

DESIGNATION

AS . 37 . 2 . 65 . 90 . CTM





SIZES

Submersible mixers with direct drive, type AS, are manufactured with stainless cast steel propellers of diameters varying from 220 mm to 480 mm, featured with two or three blades, motor power from 0,75 kW to 11,0 kW, propeller revolutions from 1450 rpm to 475 rpm. Upon special Customer's request we manufacture submersible mixers with motor power up to 34 kW, 720 rpm.

Mixer model	Propeller diameter [mm]	Quantity of blades	Noumber of motor poles	Motor size	Motor power [kW]	Frequency [Hz]	Motor rated current [A]
AS.22	220	2, 3	4	3	2,2	50	4,8
					3,0	50	6,6
					4,0	50	9,2
AS.30	300	2, 3	6	3	1,5	50	3,9
					1,8	50	4,5
					2,2	50	5,9
			4	5	5,5	50	11,0
					7,5	50	14,6
					9,2	50	18,5
					11,0	50	22,0
			6	5	3,0	50	6,8
					4,0	50	8,6
					5,5	50	11,8
					7,5	50	16,2
			8	3	0,75	50	2,3
					1,1	50	3,4
			8	5	2,2	50	5,5
					3,0	50	7,3
					4,0	50	9,7
AS.37	370	2, 3	6	5	3,0	50	6,8
					4,0	50	8,6
					5,5	50	11,8
					7,5	50	16,2
			8	5	2,2	50	5,5
					3,0	50	7,3
					4,0	50	9,7

All technical and operating parameters presented in this catalog are subject to change due to technical development.

FEATURES OF STANDARD VERSION OF AS MIXERS:

- Propellers' geometry guarantees maximum efficiency while maintaining energy consumption on low level; self-cleaning design, special shape of blades prevents solid particles from settling down;
- Propellers entirely made as one-piece stainless steel cast; casting technology allows us to produce propellers featured with diversified thickness of blades, which significantly improves generated thrust; propellers are available in two versions: with two or three blades;
- Two independent leakage sensors located in motor chamber and cable terminal case; due to its arrangement sensors guarantees detection of even smallest quantities of liquid; related electronic modules allows to switch off mixer immediately;
- Three bimetal thermo-contacts, located at each of motor's phases; contacts stop the motor if temperature limit equal to 145° C is exceeded; winding of the motor covered with double insulation layer of class F;
- Electronic modules cooperating with leakage and temperature sensors; purposed for installation within control cabinet which should be located on the platform. Each electronic module is composed of controller and power feeder. Electronic modules collect signals from sensors and send appropriate information to central control system;
- Mixer's body and covers made of grey cast iron, covered with multilayer epoxy coating; strong resistance against corrosion;
- Double mechanical SiC/SiC seals, located in buffer chamber filled with oil; effectively protects mixer against leakage from the front side;
- Labyrinth and lip seals protect the double mechanical seal against bad impact caused by solid particles; significantly improve mixer's life-span and malfunction-free period;
- All static connections sealed by means of O-rings packs, additionally assured with Loctite sealant;
- Power cable of 10 m length, made of special materials, capable for long operation in submersion, even in aggressive environment;
- Cable gland providing total leak tightness and protecting cable against being accidentally pulled out;
- Solid design guarantees high mechanical durability and long-term, malfunction free exploitation under any conditions;
- Oil plugs in the buffer chamber are featured with stainless steel inlets immersed in cast iron, it prevents from formation of corrosion pockets;
- Lifting plugs located in the body of mixer are made of stainless steel.

AVAILABLE OPTIONS OF AS MIXER:

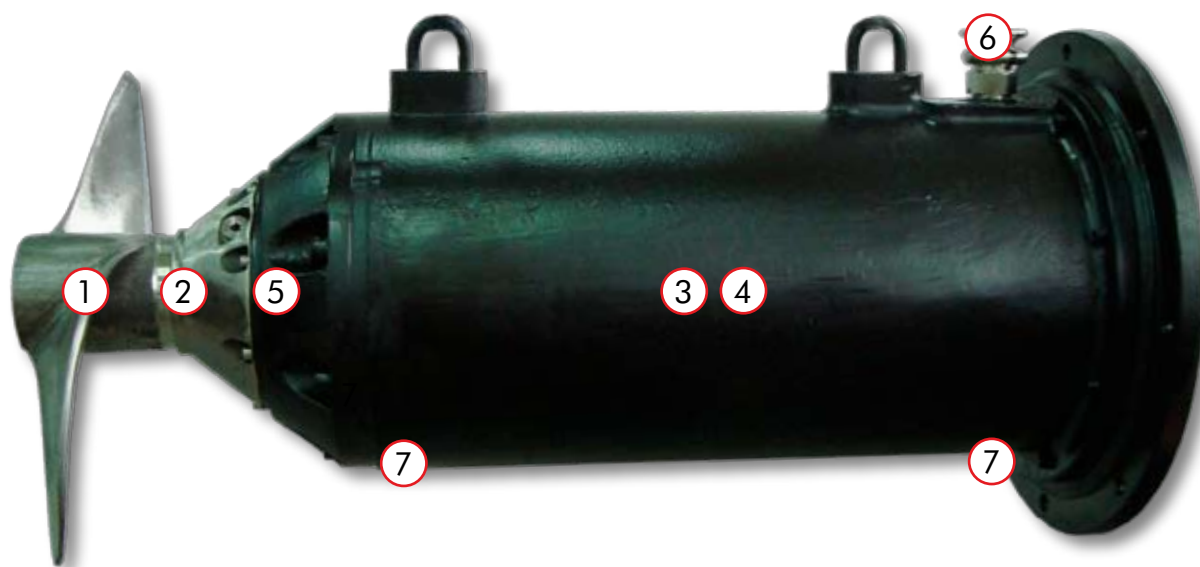
- Mixer's body and covers as one-piece casts made of stainless or acid-proof cast steel, perfect for operation in particularly aggressive and harsh environment as well as for every application where the highest quality is required;
- Propellers made as one-piece, acid-proof steel casts;
- Outer layer made of paint with ceramic additions, characterized by strong mechanical wear resistance;
- Additional temperature probe Pt100 located at one of stator's phases, purposed for reading current value of motor's windings temperature;
- Additional PTC sensors, providing the same functionality as thermo-contacts;
- Motors with insulation of class H;
- Control cabinet for installation around mixer, composed of control and power elements; it can be used both for manual mixer's control and for acting as a part of central control system;
- Mixers are made for the following power sources 380V, 60Hz; 400V, 50Hz; 460V, 60Hz;

All our mixers fully comply with mandatory standards and regulations.

In case of untypical request please consult ASPAMET engineer.

AS MIXERS: KEY ELEMENTS

- 1 PROPELLER** Self-cleaning design. Two or three blades. Made as one-piece stainless steel cast. Special geometry and diversified thickness of blades, achieved thanks to casting technology. Guarantees higher values of generated thrust and capacity than in case of welded propellers, featured with constant thickness of blades. All our propellers are statically and dynamically balanced.
- 2 SHAFT** Provides direct power transmission between electric motor and propeller. Made as one-piece element entirely of stainless steel featured with magnetic properties – we have eliminated necessity for merging shaft from two elements: carbon steel with magnetic properties within motor area and stainless steel in outer environment contact area.
- 3 BODY** Solid and durable design. Guarantees absolute leakage resistance, protection class IP68. Standard version made of grey cast iron containing stainless steel insets. Covered with multilayer, double component epoxy coating. Optionally, coating can be made of paint with ceramic additions. Special versions made entirely of stainless or acid-proof cast steel - this is big difference and advantage over competitive products, because almost all of them have body made of grey cast iron, and just external layer is coated with cover made of stainless steel.
- 4 MOTOR** Energy-efficient model. Windings covered with double insulation layer. Protected from overheating by means of bimetal contacts located at each of motor phases. Optionally mixer can be equipped with additional Pt100 probe for taking real time measurements of current windings temperature. Optionally there can be installed also additional PTC sensors, providing the same functionality as thermo-contacts.



- 5 SEALINGS** Double mechanical SiC/SiC seal secures mixer against a leakage from the front side. Located in buffer chamber filled with oil. Mechanical seal is protected against wearing caused by solid particles by means of system composed of labyrinth and lip seals. All static connections between elements of mixer's body sealed by means of O-rings, additionally secured with Loctite sealing. Due to this system a long term, malfunction free period of operation in submersion can be achieved.
- 6 POWER CABLE** The cable made of special materials, featured with strong resistance against external factors. Suitable for long-term operation in submersion within harsh environment. Special cable gland guarantees total leakage resistance of mixer. Firm grip eliminates chances that cable is accidentally pulled out. Standard cable length is 10 m.
- 7 LEAKAGE DETECTION SYSTEM** Standard version of mixer is equipped with two independent leakage sensors, appropriately arranged in motor chamber and cable terminal case. Integrated part of leakage detection system is composed of electronic modules purposed for installation within control cabinets located in close distance from mixer. The system enables detection of early stages of leakage, reveals even the smallest quantities of liquid, and allows maintenance service to be carried out before any serious damage happens.

TYPE AR

SUBMERSIBLE MIXERS WITH GEAR DRIVE

OVERVIEW

Equipped with reducer mixers of type AR are used to provoke a circulation of waste water in tanks, channels, oxidation ditches of different size and shape at considerably vast distance. Medium or slow propeller speed enables homogenization of the sewage and prevents from sedimentation. Together with mixing and keeping water in flow mixers speed up chemical and physical processes such as gas dispersion and dissolution of solids. Mixers of type AR are produced with laminate and stainless steel casted propellers. Depending on particular gear ratio the range of propeller velocities considerably varies which make possible a very accurate seizing of equipment according to requirement of process and tank geometry. Because of all these facts mixers with gear drive use to be applied at waste water plants in digestion chambers of different shape and size, in biological reactors, for example chambers where take place removal of phosphorus, in nitrification and denitrification tanks.



DESIGNATION

AR . 200 . 2 . 45 . 55 . CTM

- Mixer type (AR stands for mixer with direct drive)
- Propeller diameter [cm]
- Quantity of propeller's blades
- Verlocity - Revolutions per minute
- Motor power: value • 0.1 (for example 55 • 0.1 = 5.5 kW)
- Sensors: C - leakage sensor
T - temperature probe Pt100
M - PTC sensor



SIZES

Submersible mixers with reducer, type AR, are manufactured with stainless cast steel or laminated propellers of diameters varying from 580 mm to 800 mm, featured with two or three blades, motor power from 1,5 kW to 11,0 kW, revolutions from 200 rpm to 430 rpm.

Submersible mixers with reducer, AR type, are also manufactured with two-blades laminated propellers of diameters from 900 mm to 2500 mm, motor power from 1,5 kW to 11,0 kW, revolutions from 19 rpm to 320 rpm.

Upon special customer's request we manufacture mixers of motor power up to 18,5 kW.

Mixer model	Propeller diameter [mm]	Quantity of blades (steel or laminated propellers)	Revolutions range [rpm]	Motor size	Motor power [kW]	Frequency [Hz]	Motor rated current [A]
AR.58	580	2, 3	200 ÷ 400	3	1,5	50	4,2
					1,8	50	4,5
					2,2	50	5,9
					3,0	50	6,1
					4,0	50	8,2
			300 ÷ 500	5	5,5	50	10,4
					7,5	50	13,9
					9,2	50	16,8
AR.65	650	2, 3	150 ÷ 300	3	11,0	50	20,3
					5,5	50	10,4
					7,5	50	13,9
			300 ÷ 450	5	9,2	50	16,8
					11,0	50	20,3
					5,5	50	10,9
					7,5	50	14,6
					9,2	50	16,8
AR.80	800	2, 3	100 ÷ 250	3	11,0	50	20,3
					5,5	50	10,4
					7,5	50	13,9
			200 ÷ 350	5	9,2	50	16,8
					11,0	50	20,3
					5,5	50	10,4
					7,5	50	13,9
					9,2	50	16,8
					11,0	50	20,3

All technical and operating parameters presented in this catalog are subject to change due to technical development.

Mixer model	Propeller diameter [mm]	Quantity of blades (laminated propellers)	Revolutions range [rpm]	Motor size	Motor power [kW]	Frequency [Hz]	Motor rated current [A]
AR.90	900	2, 3	100 ÷ 170	3	1,5	50	3,9
					1,8	50	4,5
					2,2	50	5,9
					3,0	50	6,6
					4,0	50	9,2
			170 ÷ 250	5	5,5	50	10,4
					7,5	50	13,9
					9,2	50	16,8
					11,0	50	20,3
AR.120	1200	2, 3	60 ÷ 90	3	1,5	50	3,9
					1,8	50	4,5
					2,2	50	5,9
					3,0	50	6,6
					4,0	50	9,2
			90 ÷ 120	5	5,5	50	11,0
					7,5	50	14,6
					9,2	50	18,5
					11,0	50	22,0
AR.150	1500	2	50 ÷ 80	3	2,2	50	4,8
					3,0	50	6,6
					4,0	50	9,2
			80 ÷ 100	5	5,5	50	11,0
					7,5	50	14,6
					9,2	50	18,5
AR.170	1700	2	50 ÷ 65	3	2,2	50	4,8
					3,0	50	6,6
					4,0	50	9,2
			65 ÷ 85	5	5,5	50	11,0
					7,5	50	14,6
					9,2	50	18,5
AR.200	2000	2	35 ÷ 50	5	3,0	50	6,8
					4,0	50	8,6
					5,5	50	11,8
					7,5	50	16,2
AR.220	2200	2	35 ÷ 65	5	3,0	50	6,8
					4,0	50	8,6
					5,5	50	11,8
					7,5	50	16,2
AR.250	2500	2	30 ÷ 50	5	3,0	50	6,8
					4,0	50	8,6
					5,5	50	11,8
					7,5	50	16,2

All technical and operating parameters presented in this catalog are subject to change due to technical development.

FEATURES OF STANDARD VERSION OF AR MIXERS:

- Propellers' geometry guarantees maximum efficiency while maintaining energy consumption on low level; self-cleaning design, special shape of blades prevents solid particles from settling down;
- Propellers for smaller AR mixers (propeller diameter up to 900 mm) entirely made as one-piece stainless steel cast; casting technology allows us to produce propellers featured with diversified thickness of blades, this feature improves generated thrust significantly; propellers are available in two versions: with two or three blades;
- Propellers for bigger AR mixers made of synthetic resins reinforced with glass fibers; their advantage is very low weight, even in case of the biggest models of diameter up to 2500 mm; also mechanical hardness is very high; two blades;
- Two independent leakage sensors located in motor chamber and cable terminal case; due to its arrangement sensors guarantees detection of even smallest quantities of liquids; related electronic modules allows to switch off a mixer immediately;
- Three bimetal thermo-contacts, located at each of motor's phases; contacts stop the motor if temperature limit equal to 145° C is exceeded; winding of the motor covered with double insulation layer of class F;
- Electronic modules cooperating with leakage and temperature sensors; purposed for installation within control cabinets located around mixers. Each electronic module is composed of controller and power feeder. Electronic modules gather signals from sensors and send appropriate information to central control system;
- Helical reducer conveys power from motor to propeller; maintenance free model, bearings' durability calculated for 100.000 working hours;
- Mixer's body and covers made of grey cast iron, covered with multilayer, double component epoxy coating; strong resistance against corrosion;
- Mechanical SiC/SiC seal, located in buffer chamber filled with oil; effectively protects against leakage from the front side;
- Labyrinth and lip seals protects the double mechanical seal against bad impact caused by solid particles; significantly improve mixer's life-span and malfunction-free period; additional seals between reducer and motor's body;
- All static connections sealed by means of O-rings packs, additionally assured with Loctite sealant;
- Power cable of 10 m length, made of special materials, capable for long operation in submersion, even in aggressive environment;
- Cable gland providing total leak resistance and securing cable against being accidentally pulled out;
- Solid design guarantees high mechanical durability and long-term, malfunction free exploitation under any conditions;
- Oil plugs in the buffer chamber are featured with stainless steel inlets immersed in cast iron, it prevents from formation of corrosion pockets;
- Lifting plugs located in the body of mixer are made of stainless steel.

AVAILABLE OPTONS OF AR MIXERS:

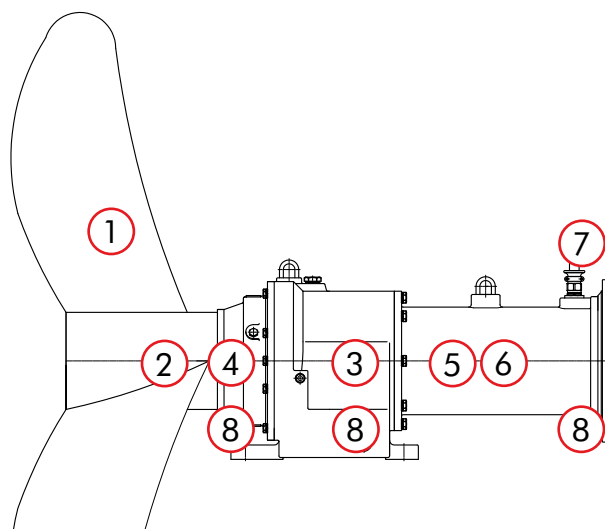
- Mixer's body and covers as one-piece cast made of stainless or acid-proof cast steel, perfect for operation in particularly aggressive and harsh environment as well as for every application where the highest quality is required;
- Propellers made as one-piece acid-proof steel casts;
- Outer layer made of paint with ceramic additions, characterized by strong mechanical wear resistance;
- Additional leakage detection probe in the buffer chamber just in front of the gear box;
- Additional temperature probe Pt100 located at one of stator's phases, purposed for reading current value of motor's wirings temperature;
- Additional PTC sensors, providing the same functionality as thermo-contacts;
- Motors with insulation of class H;
- Control cabinet for installation around mixer, composed of control and power elements; it can be used both for manual mixer's control and for acting as a part of central control system;
- Mixers are made for the following power sources 380V, 60Hz; 400V, 50Hz; 460V, 60Hz;

All our mixers fully comply with mandatory standards and regulations.

In case of untypical request please consult with ASPAMET engineer.

AR MIXERS: KEY ELEMENTS

- 1 PROPELLER** Self-cleaning design. For diameters up to 900 mm made as one-piece stainless steel cast. Two or three blades. Special geometry and diversified thickness of blades, achieved thanks to casting technology. Guarantees higher values of generated capacity and thrust than in case of welded propellers, featured with constant thickness of blades. For dimensions above 900 mm made from synthetic resins reinforced with glass fibers and covered with reinforced outer layer. These propellers are characterized by high mechanical abrasion resistance and low weight. Using this technology we are able to manufacture propellers of diameters up to 2500 mm. All our propellers are statically and dynamically balanced.
- 2 SHAFT** Provides power transmission between driving unit and propeller. Made of stainless steel.
- 3 REDUCER** Highly-efficient helical reducer. Conveys power from electric motor to propeller. Reducer chamber filled with well-matched oil, assures long-term, malfunction free operation. Case of reducer in standard version made of grey cast iron covered with multilayer, double component epoxy coating. Optionally coating can be made of paint with ceramic additions. Case of reducer in special versions entirely made of stainless or acid-proof cast steel.
- 4 SEALINGS** Mechanical SiC/SiC seal secures mixer against leakage from the front side. Located in buffer chamber filled with oil. Mechanical seal is protected against wearing caused by solid particles, presented in mixed substance, by means of system composed of labyrinth and lip seals. All static connections between elements of mixer's body sealed by means of O-rings, additionally secured with Loctite sealing. Due to this system a long term, malfunction free period of duty in submersion can be assured.
- 5 BODY** Solid and durable design. Guarantees absolute leakage tightness, protection class IP68. Standard version made of grey cast iron containing stainless steel insets. Covered with multilayer double component epoxy coating. Optionally coating can be made of paint with ceramic additions. Special versions made entirely of stainless or acid-proof cast steel - this is big difference and advantage over competitive products, because almost all of them have body made of grey cast iron, and just external shell made of stainless steel.
- 6 MOTOR** Energy-efficient model. Windings covered with double insulation layer. Protected from overheating by means of bimetal contacts located at each of motor phases. Optionally mixer can be equipped with additional Pt100 probe for taking real time measurements of current windings temperature. Optionally there can be installed also additional PTC sensors, providing the same functionality as thermo-contacts.
- 7 POWER CABLE** The cable made of special materials, featured with strong resistance against external factors. Suitable for long-term operation in submersion within harsh environment. Special cable gland guarantees total leakage tightness of mixer. Firm grip eliminates chances that cable is accidentally pulled out. Standard cable length is 10 m.
- 8 LEAKAGE DETECTION SYSTEM** Standard version of mixer is equipped with two independent leakage sensors, appropriately arranged in motor chamber and cable terminal case. Optionally there is possibility for third leakage detector installed in buffer chamber, before the reducer. Integrated part of leakage detection system is composed of electronic modules purposed for installation within control cabinets located around mixer. The system enables detection of early stages of leakage, reveals even the smallest quantities of liquid, and allows maintenance service to be carried out before any serious damage happens.



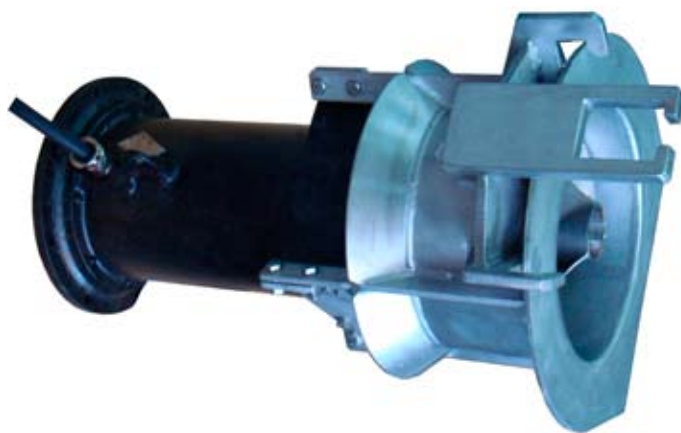
TYPES PAS, PAR

RECIRCULATION PUMPS WITH DIRECT DRIVE AND WITH REDUCER

OVERVIEW

These machines use to appear in literature sometimes as "pumping mixers" and elsewhere as "recirculation pumps". Both give a good idea about its nature. Design concept is very same as in case of submersible mixers however in terms of application recirculation pumps are complementary with traditional wet pumps. Recirculation pumps are usually used whenever there is a demand for efficient pumping of considerably large volume at relatively low head. Pressure produced by recirculation pumps, in contrast to traditional wet pumps, is not high. On the other hand its big advantage lays in a big range of capacity. This kind of equipment works much better than wet pumps with different kind of heavy mediums, as well.

Range of recirculation pumps produced by ASPAMET is divided into two groups: pumps with direct drive, type PAS and pumps with gear drive, type PAR. All models are prepared for connection with pipeline and on this purpose, equipped with connecting flange made of stainless steel. In order to protect against return flow of pumped water we can also install non-return valves, according to particular pipeline requirements.



DESIGNATION

PAS . 22 . 3 . 63 . 15 . CTM

- Sensors: C - leakage sensor
T - temperature probe Pt100
M - PTC sensor
- Motor power: value • 0.1 (for example 15 • 0.1 = 1.5 kW)
- The first number stands for quantity of motor's poles: 6 poles
The second number stands for motor's size: 3 - 100, 5 - 132, 6 - 160
- Quantity of propeller's blades
- Propeller diameter [cm]
- Mixer type (PAS stands for recirculation pump with direct drive)

PAR . 48 . 3 . 400 . 45 . CTM

- Sensors: C - leakage sensor
T - temperature probe Pt100
M - PTC sensor
- Motor power: value • 0.1 (for example 45 • 0.1 = 4.5 kW)
- Velocity - Revolutions per minute
- Quantity of propeller's blades
- Propeller diameter [cm]
- Mixer type (PAR stands for mixer with reducer)

SIZES

Pumping mixers of PAS and PAR type are manufactured with stainless cast steel propellers of diameters from 220 mm to 800 mm, motor power from 1,1 kW to 18,5 kW, efficiency from 0,02 m³/2 to 1,0 m³/s and head up to 1,8 m.

FEATURES OF STANDARD VERSION OF RECIRCULATION PUMPS OF TYPES PAS, PAR:

- Propellers' geometry guarantees maximum efficiency while maintaining energy consumption on low level; self-cleaning design, special shape of blades prevents solid particles from settling down;
- Propellers entirely made as one-piece stainless steel cast; casting technology allows to produce propellers featured with diversified thickness of blades, this feature improves generated thrust significantly; propellers are available in two versions: with two or three blades;
- Two independent leakage sensors located in motor chamber and cable terminal case; due to its arrangement sensors guarantees detection of even smallest quantities of liquid; related electronic modules allows to switch off a mixer immediately;
- Three bimetal thermo-contacts, located at each of motor's phases; contacts stop the motor if temperature limit of 145° C is exceeded; winding of the motor covered with double insulation layer of class F;
- Electronic modules cooperating with leakage and temperature sensors; purposed for installation within control cabinets located around mixers. Each electronic module is composed of controller and power feeder. Electronic modules collect signals from sensors and send appropriate information to central control system;
- Mixer's body and covers made of grey cast iron, covered with multilayer, double component epoxy coating; strong resistance against corrosion;
- Double mechanical SiC/SiC seal, located in buffer chamber filled with oil; effectively protects mixer against leakage from the front side;
- Labyrinth and lip seals protect the double mechanical seal against bad impact caused by solid particles; significantly improve mixer's life-span and malfunction-free period; additional seals between reducer and motor's body;
- All static connections sealed by means of O-rings packs, additionally assured with Loctite sealant;
- Power cable of 10 m length, made of special materials, capable for long operation in submersion, even in aggressive environment;
- Cable gland providing total leak tightness and securing cable against being accidentally pulled out;
- Solid design guarantees high mechanical durability and long-term, malfunction free exploitation under any conditions;
- Connecting flange made of stainless steel, for easy assembly to pipeline;
- Oil plugs in the buffer chamber are featured with stainless steel inlets immersed in cast iron, it prevents from formation of corrosion pockets;
- Lifting plugs located in the body of mixer are made of stainless steel.

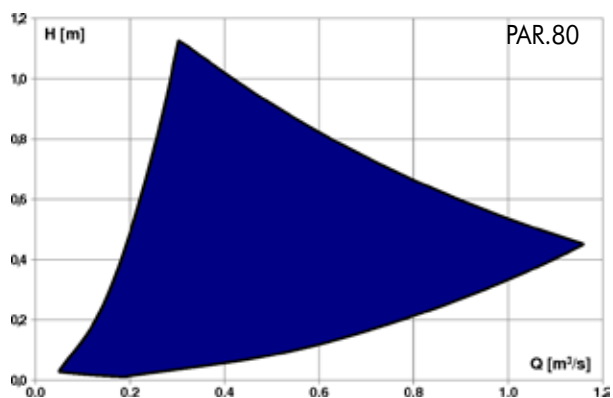
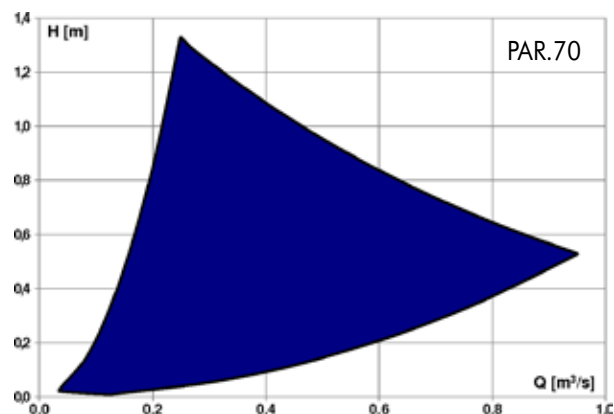
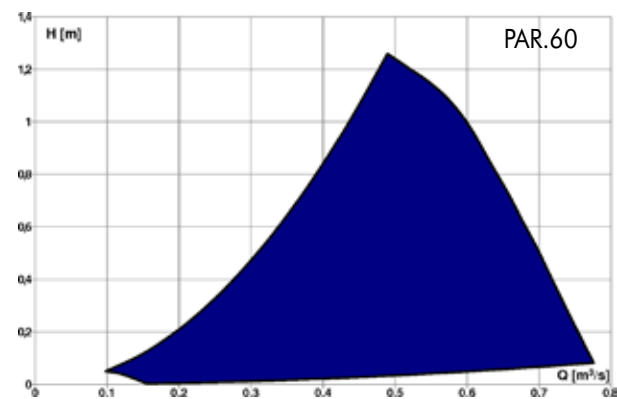
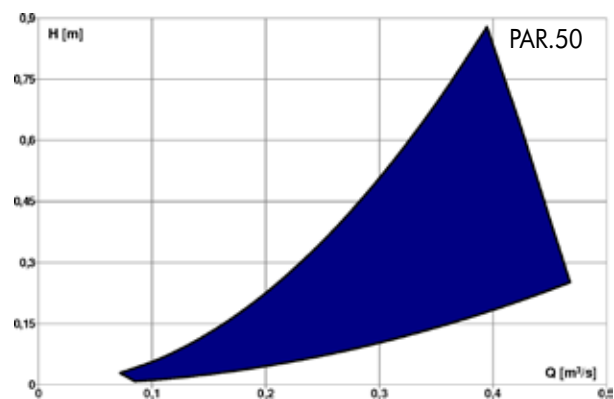
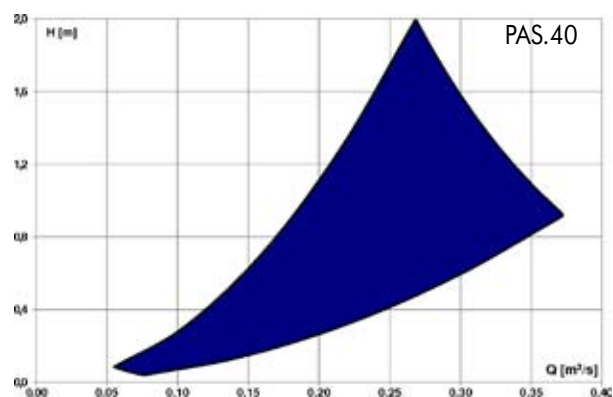
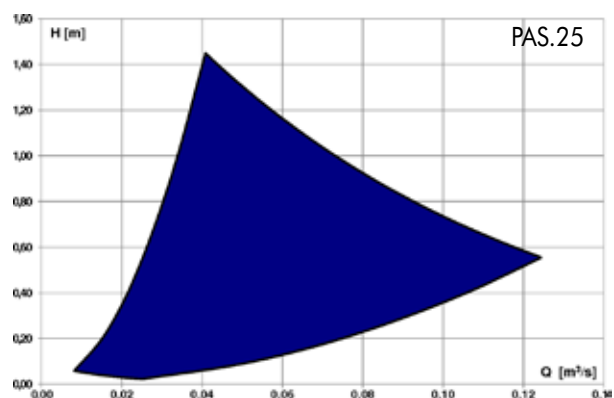
AVAILABLE OPTIONS OF MIXERS TYPE PAS, PAR:

- Mixer's body and covers as one-piece casts made of stainless or acid-proof cast steel, perfect for operation in particularly aggressive and harsh environment as well as for every application where the highest quality is required;
- Propellers made as one-piece acid-proof steel casts;
- Outer layer made of paint with ceramic additions, having strong mechanical wear resistance;
- Additional temperature probe Pt100 located at one of stator's phases, purposed for reading current value of motor's wirings temperature;
- Additional PTC sensors, providing the same functionality as thermo-contacts;
- Motors with insulation of class H;
- Control cabinet for installation around mixer, composed of control and power elements; it can be used both for manual mixer's control and for acting as a part of central control system;
- Mixers are made for the following power sources 380V, 60Hz; 400V, 50Hz; 460V, 60Hz;
- Upon special Customer's request we manufacture pumping mixers with motor power up to 34 kW, operating parameters, it is: efficiency and rising height due to Customer's request.

All our mixers fully comply with mandatory standards and regulations.



PUMPING MIXERS PERFORMANCE CHARACTERISTICS



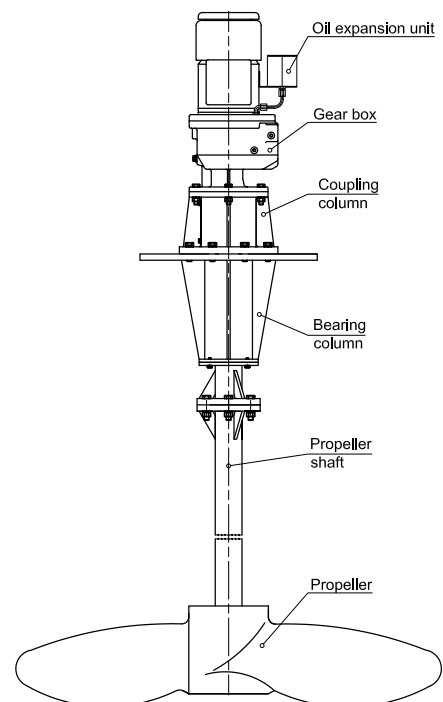
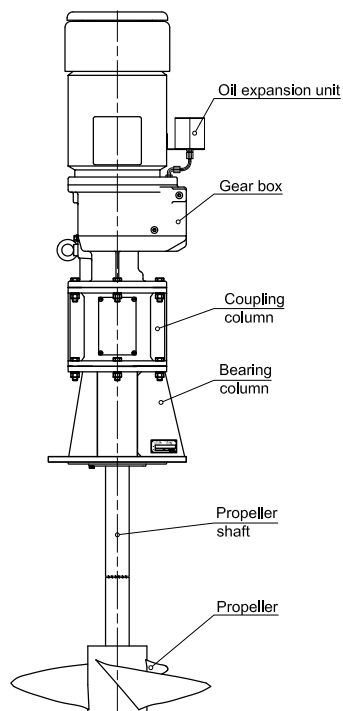
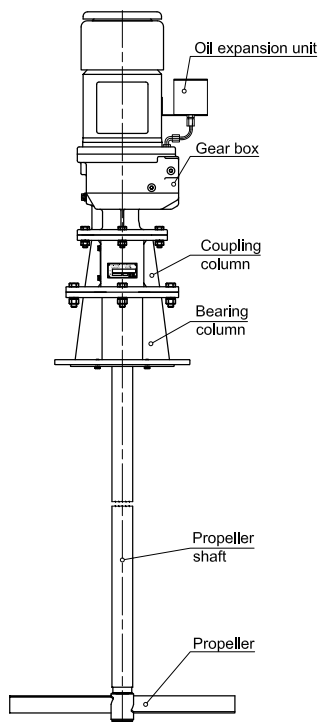
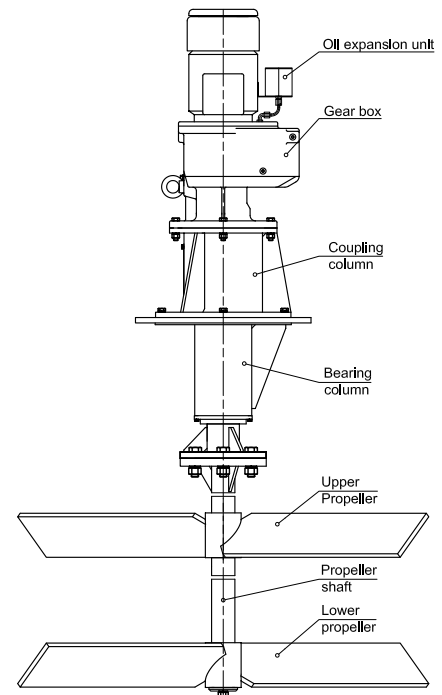
VERTICAL MIXERS

Vertical mixers can be perfect alternative for submersible mixers everywhere, where due to lack of space, very aggressive medium, or particular requirements of technological process submersible application would be impossible or non cost-effective. They are perfect for many industrial branches, like chemical industry, food industry, water treatment plants, agriculture and many others.

While operating in normal working position, only a part of shaft and propeller is submersed in mixed substance. Driving unit, consisting of electric motor and reducer is located above liquid's level. In this way mixer's life span can be lengthen significantly. Vertical mixers are usually fixed to bridges, tank's roofs or special floating platforms.

Mixer's shaft and propeller are available in various material versions. Selection of proper shape and size of propeller depends on technological requirements.

On basis of individual consultations it is possible to design a non-standard construction, suited for customer's needs.



CONTROL SYSTEMS

Reliability and safety

Submersible mixers are designed for operation beneath surface, often in harsh environment, while surrounded by liquid, aggressive substances. This kind of duty conditions makes visual checking of mixer very difficult. Our mixers are equipped with extended detection and signalling systems, purposed for real time monitoring and instant detection of every malfunction. Control systems enable to undertake all necessary maintenance and repair works before any serious damage happens.

TIGHTNESS CONTROL

Appropriately arranged leakage sensors allow detection of even smallest quantities of liquid, pointing to the beginning of leak. Early detection enables to launch service immediately.

Standard versions of our mixers are equipped with two leakage sensors, located in motor's chamber and cable terminal box. In case of mixers with gear drive (AR type) it is possible to build-in an additional, third leakage sensor within buffer chamber.

Our electronic modules are relevant part of tightness control system. The modules are purposed for installation within control cabinets. Their goal is to monitor sensors located in a mixer - if a leakage is detected the appropriate signal is sent to mixer operating control system, shutting it down immediately.

Electronic module is available in two installation versions: the first is composed of two parts - control circuits and power feeder and the second is complete compact design, all circuits in one unit. Both versions are suitable for installation on standard DIN rail.

TEMPERATURE CONTROL

Electric motors, installed in our mixers, as standard are featured with double insulation layer of F class (temperature resistance for insulation of F class is equal to 155° C).

The system for monitoring of motor's wirings temperature consists of three bimetal thermo-contacts located at each of motor phases. If the temperature limit is exceeded, thermo-contacts gets open, this signal is immediately received by electronic module. Relevant alarm is reported, mixer is shut down instantly.

Optionally, mixer can be equipped with additional temperature probe Pt100 located at one of stator's phases, purposed for reading of current value of motor's wirings temperature.

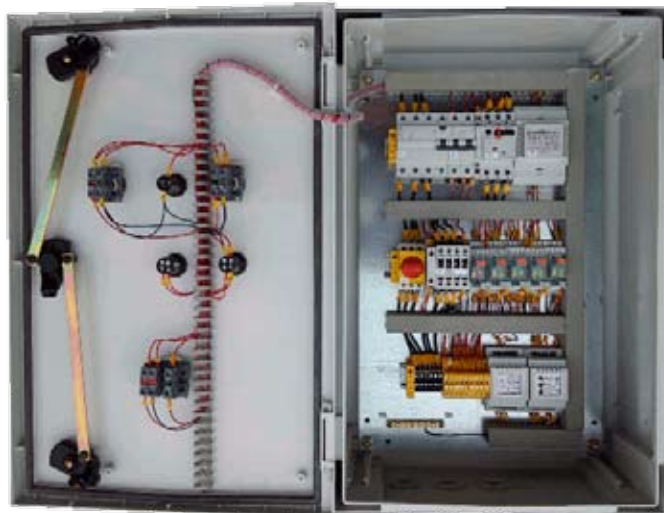
In case of special requirements there is possibility to install additional PTC sensors at each of motor phases. These sensors provide the same functionality as thermo-contacts.

Control circuits for temperature monitoring are build-in the same electronic modules as control circuits for leakage monitoring.

CONTROL CABINET

Full-scale control cabinet, water tightness of IP54 class. Purposed for installation on site in close distance from mixer.

Notice: In case any other control systems are required, please contact our engineer.



SUPPORTING STRUCTURES AND ACCESSORIES

Easy instalation and convenient operation

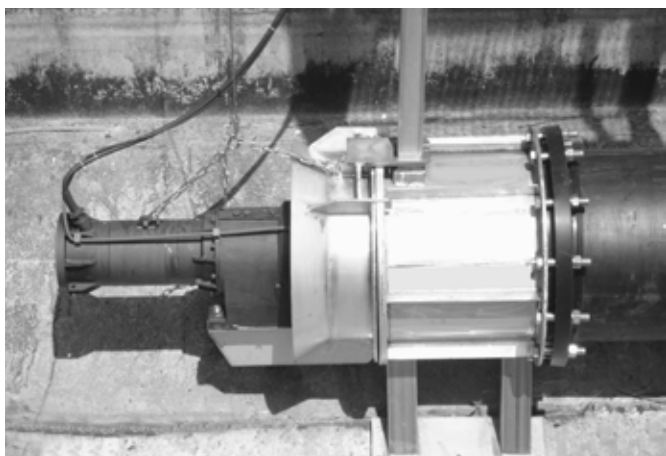
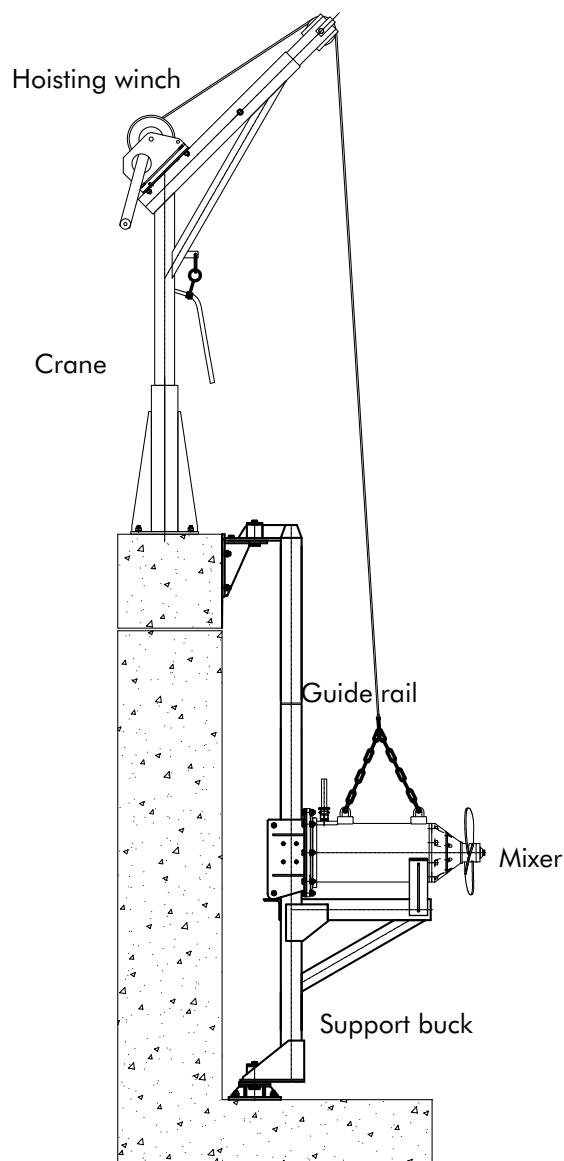
Supporting structures are steel made elements. They are essential addition to submersible mixers. The function of supporting structure is to keep a mixer in proper position during operation, and to enable mixer's descending/lifting from the tank.

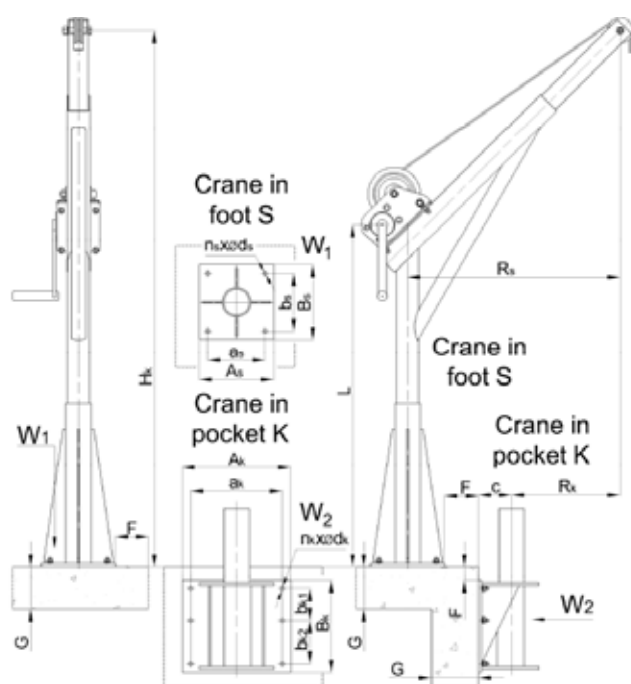
The following components can be marked out in our supporting structures: guide rail - backbone of supporting structure; support buck - for mixer entrenching, it secures working position; sledge - connects mixer with guide rail; crane with hoisting winch - enables lifting/descending of mixer; assembly accessories: bases, brackets and others.

Supporting structures are suited for particular type of mixer. Each construction is available in rotational and stationary version. Our structures come in three basic material versions: made of stainless steel AISI 304, acid-proof steel AISI 316, galvanized carbon steel and others according to customer's request.

All our supporting structures are attuned for exact tanks. On basis of tank's geometry dimensions and information about technological processes, we can determine supporting structure length, optimal assembly way and installation spot.

If a supporting structure made by other manufacturer is already installed on site, on basis of its dimensions we can prepare modified sledge to be delivered with our mixer. In this way customer can make use of the old structure.

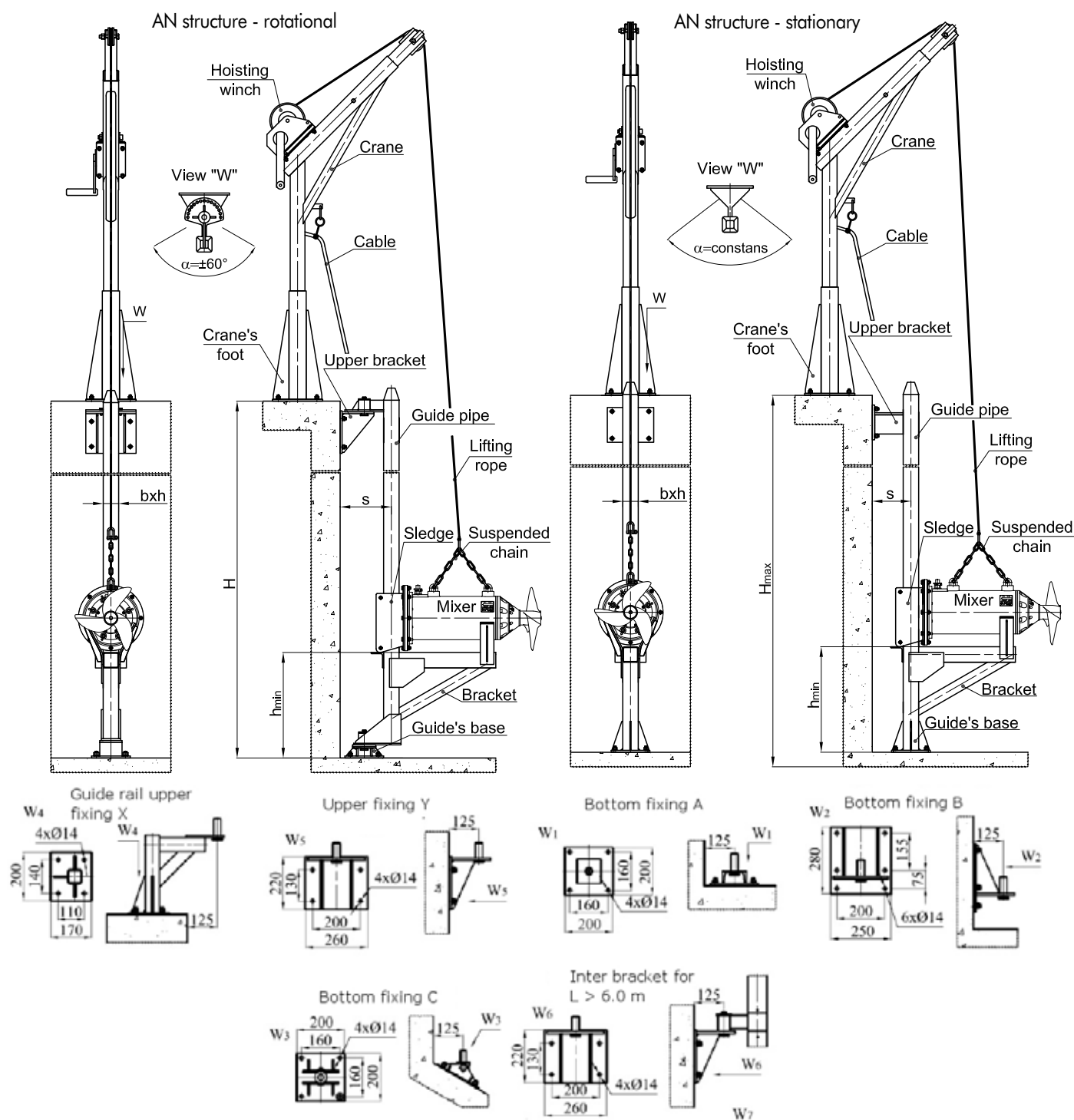




Crane with hoisting winch - purposed for mixers's lifting and descending along the supporting structure. Available in two versions, standalone or integrated with supporting structure. Made of the following materials: galvanized steel, stainless steel AISI304, acid-proof steel AISI316.

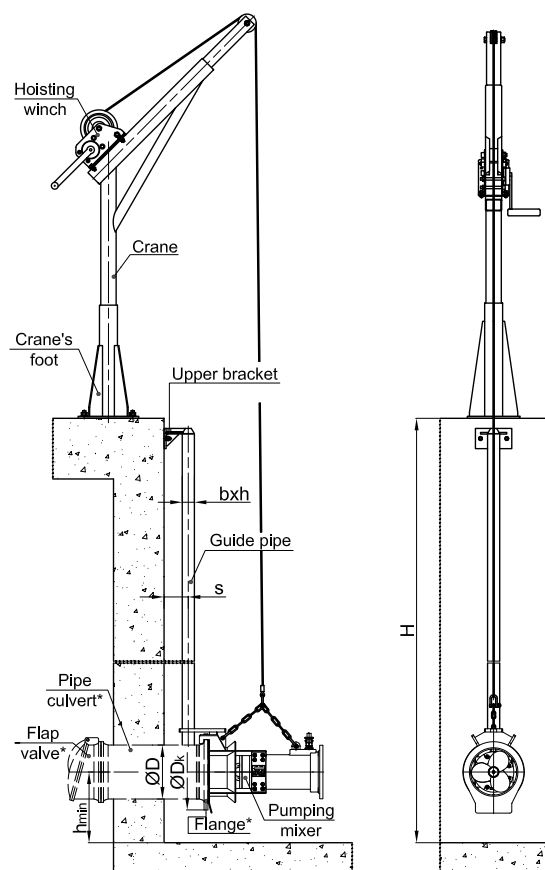
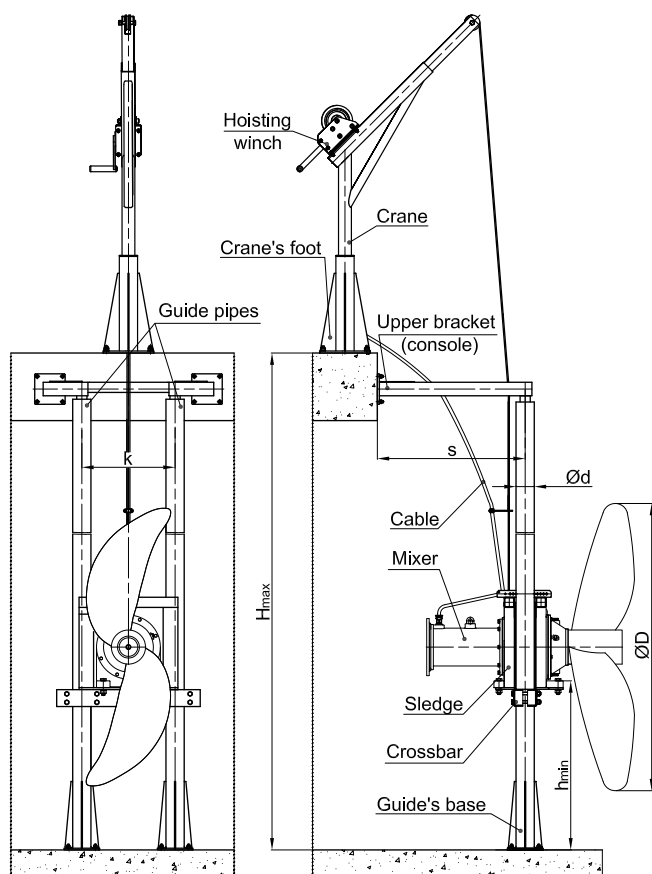
Lifting crane			
Model	Lifting capacity [kg]	Fixing	
		Foot	Pocket
ZS15	150	Yes	Yes
ZS25	250	Yes	Yes
ZS40	400	Yes	Yes

All technical and operating parameters presented in this catalog are subject to change due to technical development.



Supporting structure type AN - purposed for submersible mixers of type AS and AR; a mixer moves along single guide rail of square section. During operating thr mixer is settled on the bracket. Available in rotational and stationary versions. Made of the following materials: galvanized steel, stainless steel AISI304, acid-proof steel AISI316.

Supporting structure type AN						
Model	b x h [mm]	H [mm]	h _{min} [mm]	l [mm]		Crane
				$\alpha = \pm 60^\circ$	$\alpha = const.$	
AN60	60 x 60	6000	500	255	180	ZS15
AN80	80 x 80	6000	600	265	200	ZS15
AN100	100 x 100	6000	900	265	200	ZS25
AN120	120 x 120	6000	1500	265	200	ZS40



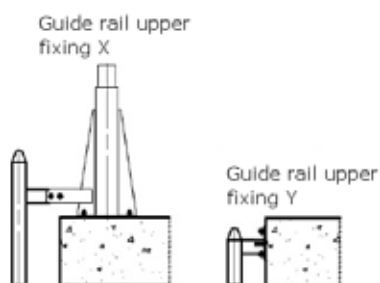
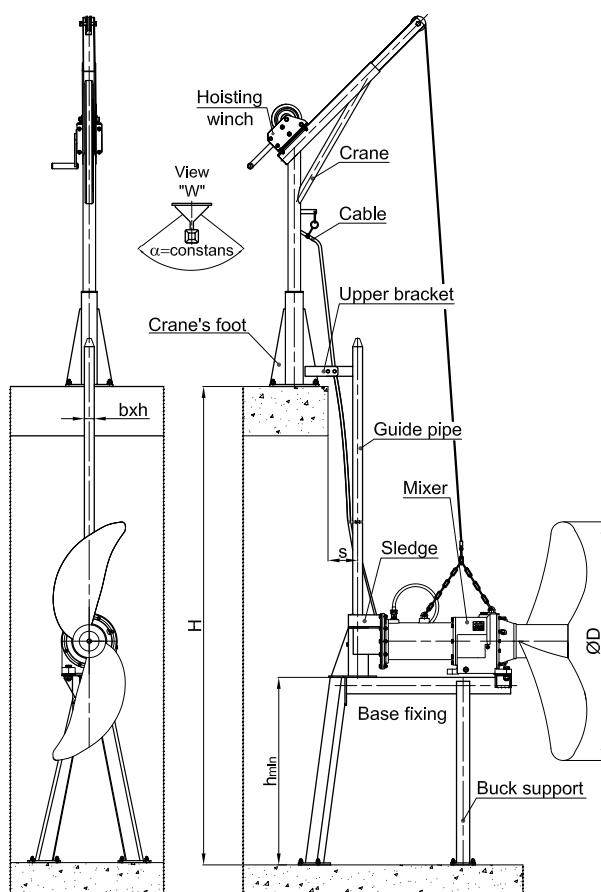
Supporting structures type AD - purposed for submersible mixers of AR type; a mixer moves along two guide rails of round section. During operating the mixer is secured on the bracket. Made of the following materials: galvanized steel, stainless steel AISI304, acid-proof steel AISI316. The distance between rails: 552 mm.

Supporting structures type ANP - purposed for submersible mixer of type PAS and PAR; mixers are connected with guide rails by means of special handling, integrated with mixer's ring. During operating a mixer is secured on the pipeline flange. Made of the following materials: galvanized steel, stainless steel AISI304, acid-proof steel AISI316.

Supporting structure type AD						
Model	b x h [mm]	H [mm]	h _{min} [mm]		D [mm]	Crane
			for propellers of dimension	value of h		
AD	108	6000	900 - 1200	850	875	ZS25, ZS40
			1500 - 2000	1250		
			2200 - 2500	1500		

Supporting structure type ANP					
Model	b x h [mm]	H [mm]	h [mm]	d [mm]	Crane
ANP60	60 x 60	6000	400	180	ZS25
ANP80	80 x 80	6000	0,5 x fi + 300	180	ZS25, ZS40

All technical and operating parameters presented in this catalog are subject to change due to technical development.



Supporting structures type AW - purposed for submersible mixers of type AS and AR; a mixer moves along a single guide rail of round section. During operating a mixer is secured on the bracket. Made of the following materials: galvanized steel, stainless steel AISI304, acid-proof steel AISI316.

Supporting structure type AW						
Model	b x h [mm]	H [mm]	h _{min} [mm]		l [mm]	Crane
			for propellers of dimensions	value of h		
AW50	50 x 50	6000	480 - 800 900 - 1200	625 825	255	ZS15
AW60	60 x 60	6000	1200 - 2000 2200 - 2500	1140 1500	265	ZS15

ASPAMET Siuta Andrzej
Division of Equipment for Environment Protection
Mazańcowice 840
43-391 Mazańcowice, Poland
Export Department phone: +48 795 506 424
export.bielsko@aspamet.pl
www.aspamet.pl

ASPAMET Siuta Andrzej
Headquaters, Foundry
Rajsko, ul. Przemysłowa 4E
32-600 Oświęcim, Poland
phone: +48 33 843 06 53
biuro@aspamet.pl