



METALCHEM-WARSZAWA
SPÓŁKA AKCYJNA

PROPELLER MIXERS



USER MANUAL

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1. Destiny

Submersible mixers for medium mixing are mainly used in wastewater treatment plants. They are designed to set in motion the liquid, to unify its composition, prevent sedimentation, cause a specific flow direction and liquid circulation in reservoirs, ditches and canals. They are also often used in wastewater aeration chambers as a support for intensification of oxygen absorption.

2. Scope of application

1. The parameters of the pumped liquid should not exceed the values given below:
 - Temperature max. 40 ° C
 - Density max. 1150 kg / m³
 - Solid content max. 5% (special execution for 8% on demand)
 - Hydration of the liquid min. 95%
2. To ensure proper operation of the mixer it is required to immerse the axis of the propeller - min 800mm; for version P, with a stream amplifier: min 500mm.
3. The mixers are not suitable for working in flammable and dangerous liquids.
4. The use of mixers in swimming pools or reservoirs, in which there may be persons who even have only partial contact with the liquid (e.g. for recreational purposes) is excluded.

In cases of application of mixers in conditions deviating from the parameters given above, please contact the manufacturer.

3. Technical description

- 3-blade propeller mixers manufactured by METALCHEM-WARSZAWA are characterized by high hydraulic efficiency and have the ability to self-cleaning.
- All mixers can be additionally equipped with a shield ring reinforcing the hydraulic mixing effect.
- Direct drive motor with pole number from 4 to 8, for continuous operation S1, class F windings has a temperature limiter in three phases of the stator windings and a humidity switch. This eliminates the possibility of engine damage if overloaded or moisture gets inside.
- The motor is sealed with a double mechanical seal in the oil chamber.
- Submersible mixers are designed for operation in liquids with a maximum temperature of 40 °C, when submerged to a depth up to 10m.
- The standard mixer is equipped with a cable a 10m long with neoprene cover.

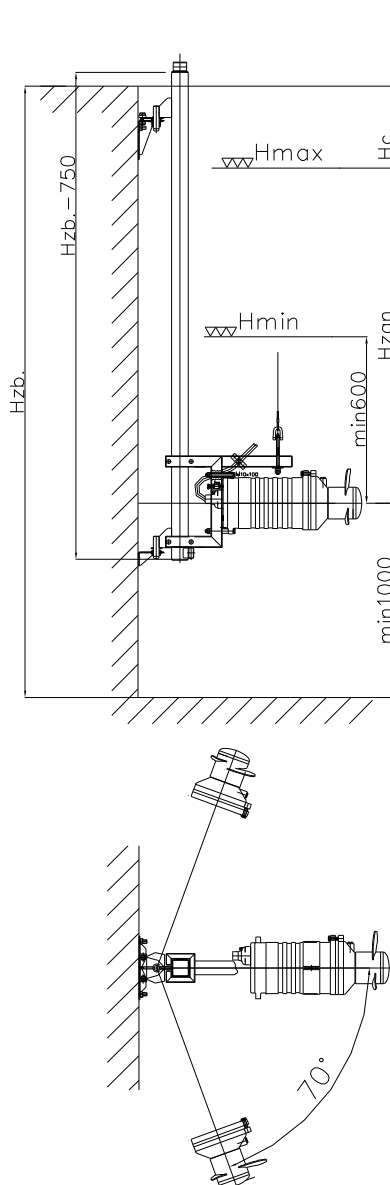


3.1. Installation sets

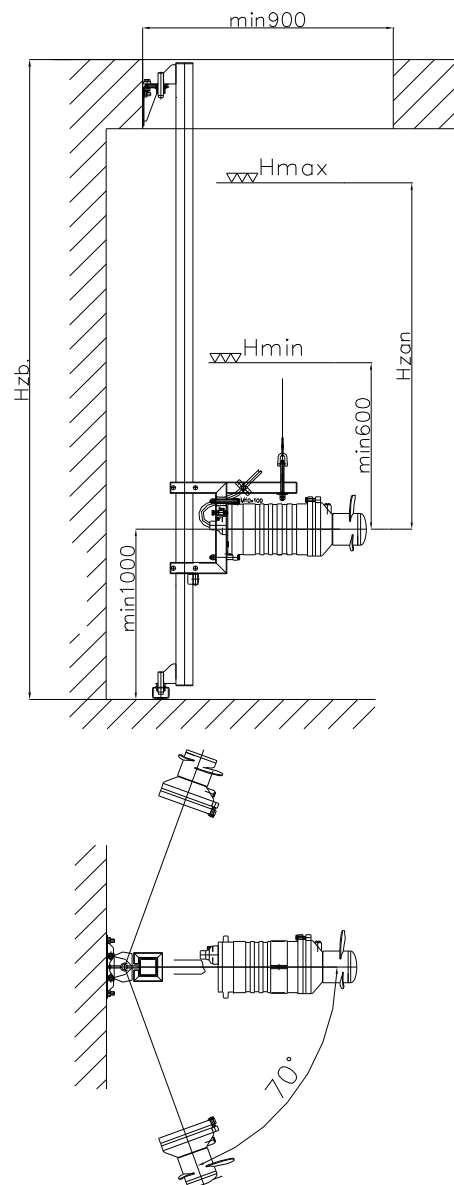
In order to adapt to the diverse needs of customers, various installation versions of mixers in tanks are offered:

- MZNP installation set - used in open tanks fixed pivoting to the vertical wall enables setting the direction of the stream
 - in the horizontal plane: $\pm 70^\circ$
- MZNPD installation set - used in covered or open tanks with piers mounted pivotally to the vertical wall of the mounting hatch or platform and to the bottom of the tank allows setting the direction of the stream
 - in the horizontal plane: $\pm 70^\circ$

installation set MZPN



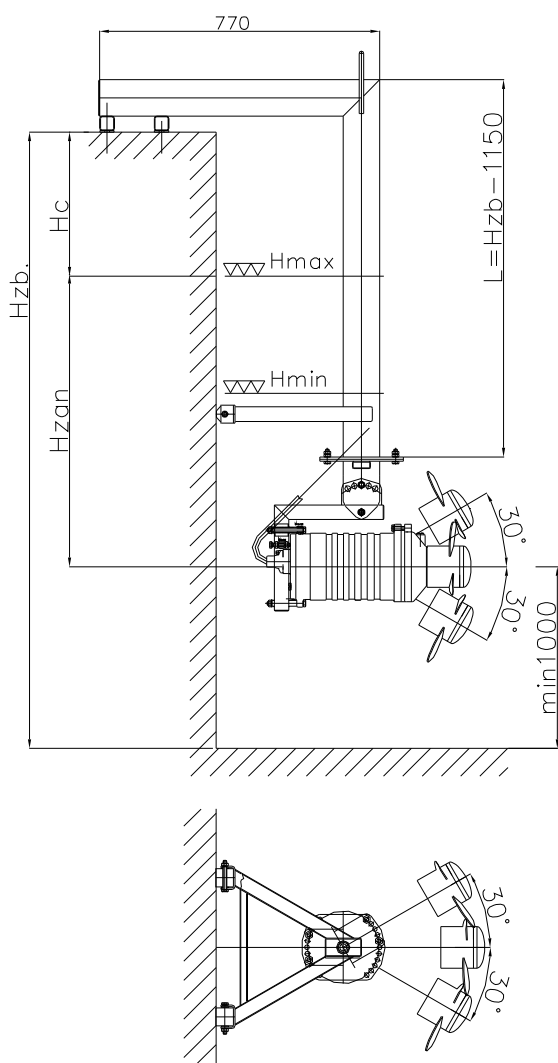
installation set MZNPD





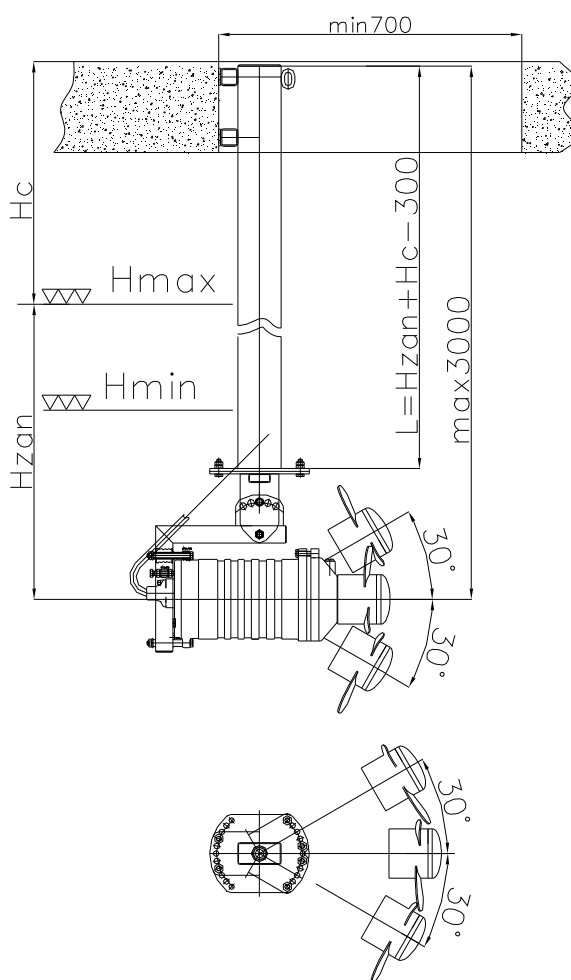
- MPN -H installation set used in open tanks rigidly attached to the horizontal wall of the tank's crown, it allows setting the direction of the stream
 - in the horizontal plane: $\pm 30^\circ$
 - in the vertical plane: $\pm 30^\circ$

installation set MPN-H



- installation set MPN -V used in indoor or open tanks with platforms rigidly attached to the vertical wall of the mounting hatch or platform allows setting the direction of the stream
 - in the horizontal plane: $\pm 30^\circ$
 - in the vertical plane: $\pm 30^\circ$

installation set MPN-V



MPN installation sets can also be installed in currently used tanks without the need to empty them during assembly.



3.2. *Technical data*

Mixer	Power [kW]	Current In[A]	Speed n [rpm]	Reaction force [N]	Weight [kg]
MM-404	4,0	9,4	1415	630	56
MM-404P	4,0	9,4	1415	770	62
MM-304	3,0	6,6	1415	450	54
MM-304P	3,0	6,6	1415	510	60
MM-226	2,2	5,9	930	390	53
MM-226P	2,2	5,9	930	470	59
MM-156	1,5	3,9	945	330	50
MM-156P	1,5	3,9	945	400	56
MM-116	1,1	2,9	945	190	61
MM-116P	1,1	2,9	945	230	67
MM-118	1,1	3,4	705	190	52
MM-118P	1,1	3,4	705	250	58

**Noise: When working in submersion, practically inaudible.
In each application, the mixer emits noise clearly smaller than 70 dB.**

4. Installation of mixers in the tank

The assembly of the mixers in the tank is so simple that users can do it on their own.

The installation set type MZNP is fastened by means of two hinged brackets attached to the tank wall (and to the bottom, MZNP set) by means of anchors. A mast (guide) is mounted on the hinges, after which the frame with the agitator installed on it is lowered into the working position.

The bottom hinge bracket should be mounted with a 5mm clearance in relation to the support plane of the lower spigot of the hinge, keeping the pivot coaxial in relation to the upper bracket.

To the bottom section of the power cable of the mixer motor are fastened 3 rope guides with the carabineers which should be fasten to the hoist's line.

In the working position of the mixer, the hoist carrying rope should be kept vertically together with the power cable connected to it. Too loose cable is exposed to damage by the propeller, therefore it is essential to keep it slightly taut.



Adjustment of the angle of the stream in the horizontal plane can be made steplessly after loosening the screws on the blocking cover of the upper guide bracket.

A hand crane of adequate load capacity is usually used for lowering and lifting the mixer.

The MPN-H and MPN-V type installation sets are fastened, via fasteners, to the structural elements of the tank as an integral unit. They can therefore be installed without the need to empty the tank. The bottom section of the power cable of the mixer motor should be fastened with self-locking bands to the support structure to a height of ~ 1.5 m.

Adjustments of the angle of the stream in the vertical and horizontal planes are made using the appropriate fixing holes in the tilt lock plates and the rotation plate.

5. Electrical connection of the agitator motor

- remove the protective cover from the cable end and check that it is dry (it is not allowed to dip the tip in sewage or water)
- make sure that the power supply voltage corresponds to the one indicated on the nameplate
- to guarantee proper motor protection, the lines marked "1" and "2" in the control system of the power supply and control switchgear should be connected in such a way that in the case of opening the circuit (1-2) the automation system disconnects the pump.



NOTE: If "1" and "2" leads are not connected or improperly connected, as a result of which the mixer motor will be damaged (motor windings will be burned due to moisture or current overload), the warranty for the pump will no longer be valid.

- connect the cable ends marked to the power box to obtain the desired direction of rotation of the mixer.
- check the rotation direction of the agitator motor: place the mixer on a hard surface so that the propeller can not touch any obstacle and activate for approx. 2 sec. The right direction of rotation is counter-clockwise when looking at the agitator from the propeller's front.



6. Safety rules

1. Use only lifting equipment with adequate load capacity to operate the agitators. Minimum crane lifting capacity: 1.5 kN.
2. Do not use the power cord to lift or transport the agitator
3. Do not allow for dry work (without full immersion)
4. Do not put your hands or other objects when the agitator is connected to the mains
5. Before carrying out any activities related to the maintenance, cleaning or moving of the mixer, disconnect the power supply.
6. All mains connections and earthing must be carried out by qualified personnel (an authorized electrician).
7. If you need to disconnect the power cord, protect the free end of the cable from the weather (for example, rain) to prevent moisture from entering the engine interior.
8. Do not use the mixers not in accordance with the intended purpose and scope of application.
9. As additional protection against electric shock, install a differential switch in the power supply and control switchgear
10. When moving the mixer, protect the power cable against mechanical damage and moisture to the terminal.
11. It is unacceptable to use agitators in the environment of flammable and dangerous liquids and in pools or reservoirs in which persons may be present.
12. Notwithstanding the rules set out above, general provisions on work safety apply.
13. Read and understand these operating instructions before assembly and commissioning
14. It is unacceptable to operate the mixer by unauthorized persons who have not read this instruction manual.

7. Operation service of mixers

In the initial period of operation, it is recommended the daily control of the work of mixer (in continuous operation), for a period of at least one week from start-up, paying attention to whether there is excessive noise or vibration of the mixer. The mixer should work calmly and without vibrations.

In the further period of use, inspections should be carried out at least once a month.

In the case of unjustified changes in the work parameters of the mixer, it is necessary to review and possibly overhaul.



7.1. Technical overview of the mixers

During the first 3 months of commissioning, carry out an inspection every month and in the further phase every three months, however, not less than 1000 working hours.

During the technical review, check:

- there is no increased noise or vibration of the agitator
- whether there is an increased current consumption
- disconnect the agitator from the power supply, hoist it to the surface and if it is necessary to clean the propeller hubs from impurities.
- check the oil condition

7.2. Oil condition monitoring

For replacement or refilling use white paraffin oil: ONDINA 934 or FINAVESTEN A360B.

The amount of oil to replace: 0.7 dcm³.

- place the agitator flat so that the oil chamber plug points vertically downwards
- clean the plug from the outside
- place a clean container under the pump
- unscrew the cap slowly to cause decompression in the oil chamber and pour the oil into the prepared vessel
- check the oil state: clean oil can be used again, milk-colored oil or mixed with water should be replaced / if the amount of water in the oil is large or occurs in short intervals
- water content in oil is allowed up to 30% for the period between the review / slight penetration of water into the oil is a normal phenomenon and even desirable

If the amount of water in the oil is high, it indicates the wear of the mechanical seal and it is recommended to replace the seals in an authorized repair shop.

Repairs of the mixers, connected with the necessity of disassembly, is carried out by the producer both during the warranty period and post-warranty period, i.e. "Metalchem-Warsaw" or a service authorized by the manufacturer. It is unacceptable to dismantle the mixer by the user himself.

The user can only disassemble the propeller himself to clean it from contamination and check the condition of the blades.