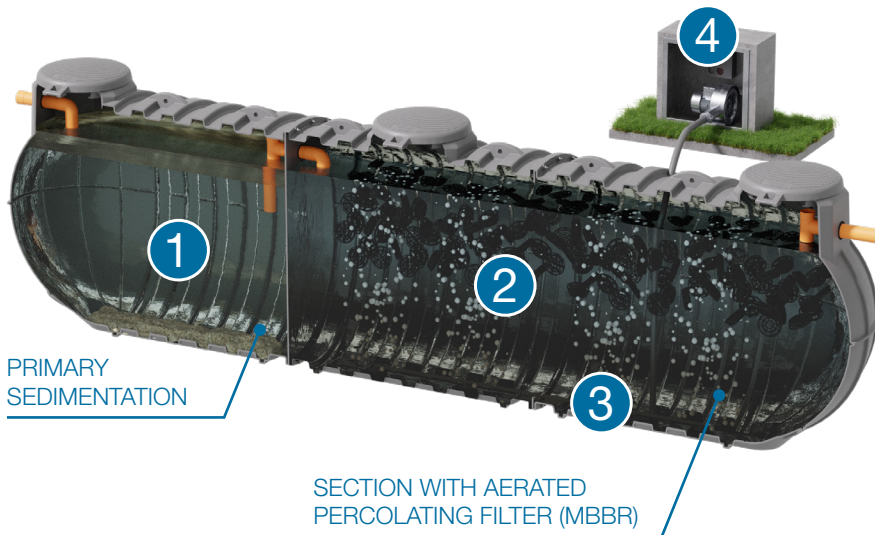


# BIOBLOK



## 1 SEDIMENTATION AND SLUDGE DIGESTION SECTION

stilling section where the effluent solids settle and accumulate at the bottom of the tank. The bacterial flora transforms the putrescible component of the sludge into inert sludge, carbon dioxide and water.

## 2 FILTER MEDIA

plastic bulk fill material with a large surface area that acts as a support on which the aerobic bacteria responsible for treating the effluent can develop

## 3 DIFFUSERS

in microbored rubber for uniform distribution of the air in the oxygenation section.

## 4 BLOWERS - COMPRESSORS

to blow air to the oxygenation section diffusers.

## INSTALLATION DIAGRAM



# SPECIFICATIONS

DEPURBLOK is the new range of one-piece treatment plants made up of modular tanks for underground installation (Infinitank, Minitank and Nanotank) used to provide a full treatment system for domestic and/or similar sewage (IFABLOK, ANABLOK, BIOBLOK).

## TECHNICAL CHARACTERISTICS

The BIOBLOK one-piece treatment plant consists of primary sedimentation and anaerobic sludge digestion in a septic tank and subsequent secondary adhered biomass aerobic digestion.

BIOBLOK is a biological reactor, more specifically it's a Moving Bed Biofilm Reactor (MBBR), inside which the micro-organisms that purify the effluent develop on the surface of special bulk fill material (filter media). The uniform distribution of the effluent through the filter guarantees maximum contact between the organic material to purify and the biological film covering the spheres making up the fill material. More specifically, the bacteria that grows and develops inside the aerobic percolating filter with top outlet consumes the organic load in the effluent in the presence of oxygen. The oxygen enters the tank continuously through the external compressor and is distributed by the diffuser plates.

## USE

Primary and secondary treatment of domestic sewage and similar.

## DAILY HYDRAULIC LOAD: 200 l/PE

Please note: it is possible to size the treatment plant according to different daily hydraulic loads.

# SEWAGE TREATMENT EFFICIENCY

The BIOBLOK one-piece treatment plant (installed as shown in the diagram at page 110 ) ensures that the concentrations of the final effluent are:

**≤160 mg/l**  
COD

**≤40 mg/l**  
BOD<sub>5</sub>

**≤80 mg/l**  
SS

But also ensures these final concentration according to the number of PE indicated in PE T4 column of the table at page \_\_\_

**≤100 mg/l**  
COD

**≤20 mg/l**  
BOD<sub>5</sub>

**≤25 mg/l**  
SS

All these parameters are respected if the inlet wastewater have the following characteristics (typical concentrations of domestic sewage):

**≤600 mg/l**  
COD

**≤300 mg/l**  
BOD<sub>5</sub>

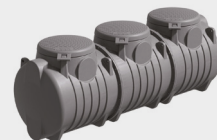
**≤400 mg/l**  
SS

# BIOBLOK

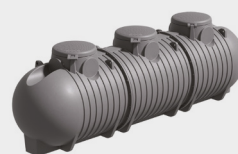
# MODEL



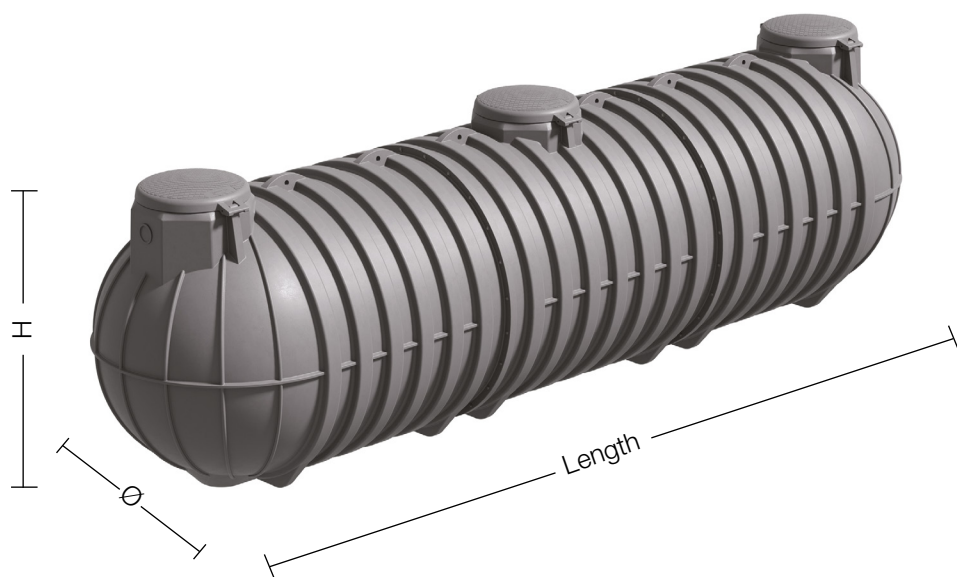
NANOTANK (NT)



MINITANK (MT)



INFINITANK (IT)



# BIOBLOK

| Item         | Model      | Length mm | Ø mm | H mm | IH mm | OH mm | Ø I/O mm | Ispez. mm | Extension 1 (optional) | Sedimentation Vol. l | Filter Vol. l | Blower  | PE  | PE T4 |
|--------------|------------|-----------|------|------|-------|-------|----------|-----------|------------------------|----------------------|---------------|---------|-----|-------|
| NTSEARA2000  | nanotank   | 2350      | 1150 | 1329 | 960   | 940   | 125      | 2x600     | PP77                   | 910                  | 910           | HP60    | 6   | 4     |
| NTSEARA3000  | nanotank   | 3425      | 1150 | 1329 | 960   | 940   | 125      | 2x600     | PP77                   | 910                  | 1820          | HP80    | 10  | 7     |
| NTSEARA4000  | nanotank   | 4500      | 1150 | 1329 | 960   | 940   | 125      | 2x600     | PP77                   | 1820                 | 1820          | HP80    | 14  | 10    |
| NTSEARA5000  | nanotank   | 5575      | 1150 | 1329 | 960   | 940   | 125      | 2x600     | PP77                   | 1820                 | 2730          | HP150   | 18  | 13    |
| MTSEARA6000  | minitank   | 3870      | 1550 | 1710 | 1420  | 1400  | 125      | 2x600     | PP77                   | 2780                 | 2780          | HP200   | 24  | 16    |
| MTSEARA9000  | minitank   | 5520      | 1550 | 1710 | 1420  | 1400  | 125      | 2x600     | PP77                   | 2780                 | 5560          | HP302SF | 35  | 23    |
| ITSEARA11000 | infinitank | 4420      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 5000                 | 5000          | HP302SF | 40  | 27    |
| MTSEARA12000 | minitank   | 7180      | 1550 | 1710 | 1420  | 1400  | 125      | 2x600     | PP77                   | 5560                 | 5560          | HP302SF | 46  | 30    |
| ITSEARA13000 | infinitank | 5010      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 5000                 | 7000          | HP302SF | 50  | 35    |
| ITSEARA15000 | infinitank | 5620      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 7000                 | 7000          | HP302SF | 58  | 38    |
| ITSEARA18000 | infinitank | 6680      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 5000                 | 12000         | HP402SF | 65  | 45    |
| ITSEARA20000 | infinitank | 7270      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 7000                 | 12000         | HP402SF | 75  | 50    |
| ITSEARA22000 | infinitank | 7880      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 7000                 | 14000         | HP402SF | 80  | 56    |
| ITSEARA25000 | infinitank | 8940      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 12000                | 12000         | HP402SF | 90  | 60    |
| ITSEARA28000 | infinitank | 9530      | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 12000                | 14000         | HP402SF | 100 | 70    |
| ITSEARA30000 | infinitank | 10140     | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 14000                | 14000         | HP402SF | 110 | 74    |
| ITSEARA33000 | infinitank | 11200     | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 12000                | 19000         | HP502SF | 122 | 80    |
| ITSEARA35000 | infinitank | 11790     | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 12000                | 21000         | HP502SF | 132 | 90    |
| ITSEARA36000 | infinitank | 12400     | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 14000                | 21000         | HP402SF | 140 | 100   |
| ITSEARA40000 | infinitank | 13460     | 2100 | 2200 | 1870  | 1850  | 160      | 2x600     | PP77                   | 19000                | 19000         | HP502SF | 150 | 112   |



PE. = population equivalent; Ø= diameter; H= height; IH= inlet pipe height; OH= outlet pipe height; ØI/O= inlet/outlet pipe diameter.

## TECHNICAL SECTION – DEPURBLOK

### TECHNICAL CHARACTERISTICS – PRIMARY SEDIMENTATION

Septic tanks constitute a reliable device for the primary treatment of sewage. The treatment systems are passive, extremely stable, simple and inexpensive. They are used, above all, for treating domestic sewage from small communities. The configuration of the tank forces the sewage to pass through the liquid mass contained in it. The slowing down of the flow allows sedimentable solids and substances of specific weight less than that of the water to separate. Furthermore, an anaerobic fermentation process is triggered with the resulting **solubilisation and synthesis of part of the suspended solids**. In this way, the effluent leaving the tank is conditioned, i.e. it has a limited concentration of solids, transformed for the most part into dissolved and colloidal solids.

Septic tanks are nothing more than **stilling tanks** in which the following processes take place:

- **separation** of sedimentable solids, coarse material, sands/grits, oils and greases present in the sewage;
- reduction of a fraction of the accumulated organic substances by **decomposition**;
- accumulation and prolonged **storage** of the separated materials.

Compartmentation, i.e. the division of the system into chambers, significantly influences the efficiency of the treatment process. With this configuration, a large part of the suspended solids accumulate in the first compartment and only pass to the next chamber with great difficulty. Compartmentation is particularly effective when high levels of treatment are to be reached, particularly in terms of reducing suspended solids. Septic tanks are sized to achieve a high purification performance and to obtain liquefaction of the sludge, reducing its formation and thus minimising disposal costs.

### USE AND MAINTENANCE – PRIMARY SEDIMENTATION

An excessive accumulation of putrescible material at the bottom of the tank can cause **uncontrolled anaerobic digestion** phenomena, leading to an over-production of biogas and the development of malodorous emissions. Furthermore, the reduction in the volume available in the digestion compartment and the excessive production of gas bubbles will cause the settled material to rise, thus causing **deterioration** in the quality of the treated effluent.

For this reason, according to the loads feeding the tank, between 1 and 4 inspections a year are to be carried out, with removal of the sludge if necessary. It is sometimes recommended not to remove all the deposited sludge, but to **leave approximately 1/10 of the sludge** that has deposited in the tank; this accelerates re-start of the processes. The use of the Rototec Bio-activator is highly recommended to trigger the biological processes more quickly, thus limiting the number of sludge removal operations and reducing the risk of bad smells.

### MANAGEMENT – PRIMARY SEDIMENTATION

| WHAT TO DO   | WHEN                     | HOW  |
|--|--------------------------|--|
| Inspect the septic tank  | From 1 to 4 times a year | Unscrew the inspection covers and check the level of sediments |
| Remove the settled sludge, clean the interior and the inlet and outlet pipes | Every 6 / 12 months      | Contact a licensed waste disposal company                      |

**N.B.** the frequency of operations will depend on the incoming organic load.

### PROHIBITIONS

- **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents), always use biodegradable products;
- **NEVER** flush paper tissues, kitchen towel, paper napkins or other materials except toilet paper down the toilet;
- **NEVER** allow rainwater to enter the system.

### WARNINGS

- make sure that drains have a siphon;
- check that the pipes slope sufficiently (approximately 1% - 2%);
- connect the biogas vent pipe (**see underground installation**);
- after emptying, fill the tank again with **clean water**;
- in the event of a maintenance operation of any kind, always comply with the **safety regulations** regarding operations within enclosed wastewater treatment areas and with the general technical procedures applicable.
- make sure that drains have a siphon;

# TECHNICAL SECTION – DEPURBLOK

## TECHNICAL CHARACTERISTICS – ACTIVATED SLUDGE SECTION

Activated sludge plants are secondary treatment systems that make use of the action of the bacterial colonies that, remaining in suspension in the effluent, consume the biodegradable organic material, using it as a nutrient to obtain the necessary energy and the material required for the synthesis of new cells. In this manner, increasingly stable compounds are formed leading to the total degradation of the organic load. Very high concentrations of aerobic type bacteria are developed inside activated sludge plants, sufficient, that is, to absorb the dissolved oxygen in the water in order to consume the biodegradable material. To guarantee the concentration of oxygen necessary for the development of the biological reaction, an aeration system is adopted consisting of submerged diffusers which, from the bottom of the tank, disperse a flow of fine air bubbles. This also guarantees sufficient mixing to keep the high concentrations of solids present in the tank in suspension.

In the oxygen rich environment of the aeration tank, a number of different processes are set in motion:

- **Chemical**, i.e. the oxidation of malodorous compounds (hydrogen sulphide, sulphites...)
- **Physical**, i.e. the removal of effluent solids trapped by the dispersion of bacteria
- **Biological**, i.e. direct assimilation of the organic substances dissolved in the sewage.

The sizing of the activated sludge plants is performed on the basis of the **sludge load** (or organic load factor) expressed as the ratio between the organic load  $BOD_5$  and the micro-organisms; the lower this ratio, the more intensely the organic load is consumed, at the same time reducing the production of excess sludge. Rototec activated sludge plants are sized to have sludge loads of less than 0.08 KgBOD / KgSSD with retention times of more than 24 hours at mean flows and volumetric loads of less than 0.25 KgBOD / m<sup>3</sup>d in the prolonged aeration (or total oxidation) configuration and sludge loads of less than 0.15 KgBOD/KgSSD and volumetric loads less than 0.5 KgBOD / m<sup>3</sup>d in the low-load configuration.

## USE AND MAINTENANCE – ACTIVATED SLUDGE SECTION

The small user activated sludge plant is designed with the sedimentation compartment inside the oxidation tank in order to provide sewage settlement as well as sludge recirculation. This however leads to a build-up of solids in the oxidation chamber. It should be remembered that in order to ensure the correct operation of an activated sludge plant, a grease separator should be installed upstream of the reactor itself, and that the aeration should be kept on during the periods of use of the plant. The plant needs 10-15 days in order to reach normal operation. This time can be reduced however by adding biomass activators (Rototec bio activator) directly to the sewage.

## MANAGEMENT – ACTIVATED SLUDGE SECTION

| WHAT TO DO   | WHEN                | HOW   |
|--|---------------------|---|
| Inspect the activated sludge plant   | Every 6 / 12 months | Unscrew the covers on the inspection holes and check the level of sediments             |
| Check operation of the blower  | Every month         | Unfasten the inlet inspection hole cover and check that air is being blown in           |
| Extract the bottom sludge, clean the interior, the inlet and outlet pipes and the diffuser plate | Every 6 / 12 months | Contact a licensed waste disposal company   |
| Change the chlorine tablet   | Every 2 months      | Unfasten the outlet inspection hole cover and insert the tablet in the housing provided |

**N.B.** the frequency of operations will depend on the incoming organic load.

## PROHIBITIONS

- **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents), always use biodegradable products;
- **NEVER** put the chlorine tablet into the plant, but insert it in the proper housing;
- **NEVER** drain rainwater into the system.

## WARNINGS

- make sure that drains have a siphon;
- check that the pipes slope sufficiently (approximately 1% - 2%);
- connect the biogas vent pipe (**see installation method**);
- when discharging into the subsoil using a soil absorption system, provide a dosing siphon chamber downstream of the system, for better distribution of the effluent into the dispersion pipes;
- after pump-out, fill the tank again with **clean water**;
- in the event of a maintenance operation of any kind, always comply with the **safety regulations** regarding operations within closed waste water treatment areas, and with the general technical procedures applicable.

## TECHNICAL SECTION – DEPURBLOK

### TECHNICAL CHARACTERISTICS – SECTION WITH ANAEROBIC PERCOLATING FILTER

A trickle filter is a biological reactor, inside which the micro-organisms that purify the effluent develop on the surface of **special bulk fill material (filter media)**. The uniform distribution of the effluent through the filter guarantees maximum contact between the organic material to purify and the biological film covering the spheres making up the fill material.

The spheres making up the filter media are manufactured in polypropylene and are designed to provide a large surface area available for bacterial micro-organisms to take root. In particular, the spheres used provide a **surface area per unit volume of filter media of 140 m<sup>2</sup>/m<sup>3</sup>**, much higher than the traditional stone fill material, with **voids accounting for over 90%**. This solution minimises the risk of clogging the bed and also guarantees an improved circulation of air through the bed of the aerobic filter. Trickle filters allow good purification performance **without any energy overheads**, with management costs limited to the occasional cleaning of the plant.

The sizing of percolating filters for an average domestic effluent refers to the organic load factor kgBOD/m<sup>3</sup>d with which the filter is fed. This parameter is the ratio between the organic load at the inlet kg BOD<sub>5</sub>d and the volume of the filter bed. Rototec trickle filters are designed to operate with medium-low organic load factors kg BOD<sub>5</sub> / m<sup>3</sup>d. This guarantees a good margin of safety, with respect to fluctuations in inlet flow, and a limited production of excess sludge.

### USE AND MAINTENANCE – SECTION WITH ANAEROBIC PERCOLATING FILTER

The filter is designed to ensure **minimum clogging risk**. However, the development of the films on the filter media can over time excessively dirty the filter, with the resulting risk of solids being discharged with the treated effluent.

Cleaning operations are normally carried out as part of the Imhoff tank inspection and emptying operations. It should be remembered that in order for the trickle filter to function correctly, the effluent must first be subjected to sedimentation treatment in an Imhoff tank or similar installed upstream of the filter. The use of Rototec Bio-Activators is recommended for rendering the starting of the biological processes more rapid.

### MANAGEMENT – SECTION WITH ANAEROBIC PERCOLATING FILTER

| WHAT TO DO   | WHEN                 | HOW   |
|--|----------------------|---|
| Inspect the trickle filter   | Every 12 months      | Unscrew the covers on the inspection holes and check the level of sediments |
| Extract the bottom sludge, clean the interior and the inlet and outlet pipes and backwash the filter media | Every 12 / 15 months | Contact a licensed waste disposal company                                   |

**N.B.** the frequency of operations will depend on the incoming organic load.

### PROHIBITIONS

- **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents); always use biodegradable products;
- **NEVER** drain rainwater into the system.

### WARNINGS

- make sure that drains have a siphon;
- check that the pipes slope sufficiently (approximately 1% - 2%);
- connect the biogas vent pipe (**see installation method**).
- **when discharging to a surface watercourse**, install a septic tank (Imhoff or other septic tank) downstream of the trickle filter as the final effluent sedimentation and clarification phase;
- when discharging into the subsoil using a soil absorption system, provide a **dosing siphon chamber** downstream of the system, for better distribution of the effluent into the dispersion pipes;
- after pump-out, fill the tank again with **clean water**;
- in the event of a maintenance operation of any kind, always comply with the **safety regulations** regarding operations within closed waste water treatment areas, and with the general technical procedures applicable.

# DEPURBLOK ACCESSORIES (INCLUDED IN THE SUPPLY-IFABLOK-BIOBLOK)



## SIDE CHANNEL COMPRESSORS/BLOWERS

construction of the ring blowers fan is based on the lateral ducts principle. The blowers can operate as either exhaust or compression fans and are designed for continuous service. The device is assembled directly on the motor shaft: all rotating parts are dynamically balanced to ensure absolute absence of vibration. Full die-cast aluminium construction for maximum sturdiness and ease of handling.

## USE AND MAINTENANCE

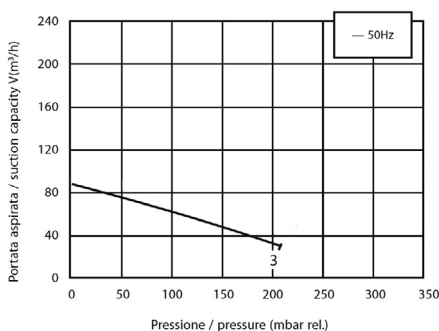
the blower does not have any moving parts in contact, and as such does not require lubrication, its operation is long-term and does not require any other maintenance. It should, however, be installed in a suitable cabinet by qualified personnel.

## BLOWER TIMING

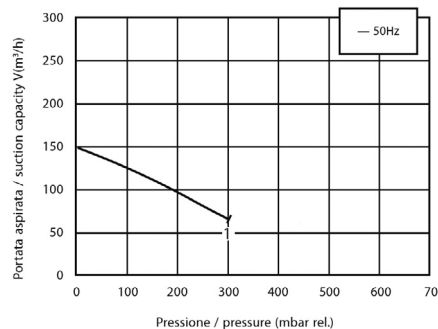
- the blower must remain switched on **24h a day for the first 2-3 months** in order to activate the purification processes;
- after the activation period, blower operation can be timed as follows: **2 hours ON-30 minutes OFF** (repeated for all 24 hour periods)

| Item    | Voltage V | Frequency Hz | Power W | Absorption (A) | Noise level (dBa) | Weight (kg) | Length (mm) | Width (mm) | Height (mm) |
|---------|-----------|--------------|---------|----------------|-------------------|-------------|-------------|------------|-------------|
| HP302SF | 220       | 50           | 0.7     | 4.5            | < 55              | 15          | 458         | 316        | 270         |
| HP302SF | 380       | 50           | 1.6     | 5.6            | < 66              | 24          | 485         | 401        | 315         |
| HP302SF | 380       | 50           | 3       | 10             | < 72              | 38          | 597         | 465        | 371         |

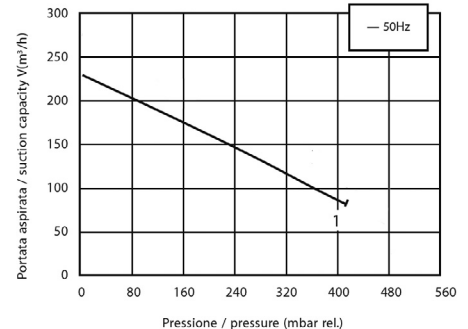
HP302SF



HP402SF



HP502SF

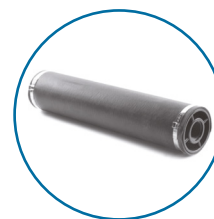


## DEPURBLOK ACCESSORIES (INCLUDED IN THE SUPPLY-IFABLOK-BIOBLOK)

### PIPE DIFFUSERS

The pipe diffusers allow the air various passages, avoiding loss of load and guaranteeing an even distribution of oxygen at balanced concentrations throughout the tank, to optimise treatment in the oxidation system.

The micro-pores present all over the surface act like a valve. When they dilate the air comes out, otherwise, when the flow stops, they close and prevent the water from returning.



### PIPE DIFFUSERS

| Item      | Ø mm | Length mm | Ø Bubbles mm | Capacity m³/h | Working temperature limit | Weight kg | Diaphragm material | Clip material       |
|-----------|------|-----------|--------------|---------------|---------------------------|-----------|--------------------|---------------------|
| IFADNT600 | 60   | 300       | 1-3          | 5.1-15.3      | From 0° to 120°C          | 0.9       | Silicone           | 304 stainless steel |

**Application:** micro-pore pipe diffusers used in oxidation plants, created to give even air distribution that optimises the system's treatment performance. The micro-pores act like a valve. When they dilate the air comes out, otherwise, when the flow stops, they close and prevent the water from returning.

### INSTALLATION

- already fitted inside the tank and connected to the set-up provided;
- stays on the bottom of the tank thanks to its special micro-pore rubber structure.

### MANAGEMENT

| WHAT TO DO               | WHEN   | HOW  |
|--------------------------|--|--|
| Clean the diffuser plate | During pump-out of the plant (every 6/12 months) | Contact a licensed waste disposal company (water jet pump-out) |

### WARNINGS

- during cleaning operations, lift the plate using the transparent pipe provided, paying attention to the set-up in the tank.

### MEMBRANE AIR DIFFUSERS

rubber surface with microholes that act like one valve, dilating themselves in order to let out the air but closing up once the flow is interrupted preventing to the water to enter



### APPLICATIONS

- Wastewater treatment
- Intermittent operation capability
- Clean water treatment
- Sludge stabilization
- Aeration of fish pond, streams and lakes

### USE AND MAINTENANCE

the particular structure of the plates reduces the risk of blockages even during intermittent operation to a minimum and eliminates the possibility of its separation during the inspection phase, thus guaranteeing a high air flow with minimum head loss. The rubber lining of the rigid air distributor provides protection against accidental damage to the system, which will maintain its original characteristics over time. During the cleaning operations of the oxidation plant, clean the membrane air diffusers with water to avoid any clogging of the bored surface.

| Item     | Material                        | Diameter mm | Size and quantity of the bubbles | Connection | Air flow     | Operation temperature | Diffusion area |
|----------|---------------------------------|-------------|----------------------------------|------------|--------------|-----------------------|----------------|
| IFADN250 | High grade EPDM hardness 60° ±5 | 250         | 1-3 mm<br>8300 holes             | R ¾" NPT   | 1,5-8,5 m³/h | 0 – 100 °C            | 1,67 m         |