

USERS AND MAINTENANCE MANUAL

WASTEWATER TREATMENT PLANTS Mod.
DF



manzi

Impianti Depurazione Acque



manzi

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Safety Considerations

The correct use and regular maintenance of the plant is essential for:

- Ensuring the safety of all persons involved in the use and maintenance of the product.
- Preventing damage, breakage and/or malfunction of the product, which could cause leakage of the product and contamination of the environment.
- Achieving and maintaining high levels of purification efficiency.

WARNING

Do not work on the product without the necessary personal and collective protective equipment, in compliance with the regulations in force on health and safety in the workplace

WARNING

If the instructions and information given in this manual are NOT followed, there is a risk of causing damage or injury to persons and objects. Manzi Aurelio s.r.l. shall not be responsible for any damage to the environment, to persons or to objects resulting from the improper use of the product.

Important Reminders

- Any changes to or departures from the use and maintenance instructions published in this manual must be approved in writing by Manzi Aurelio s.r.l. prior to actual implementation.
- It may be necessary to comply with local laws and regulations (of the country of destination) during use of the product. It is recommended that they be consulted.
- If you do not have the specific skills and experience for the proper operation and management of the plant, avail yourselves of qualified personnel, who are able to provide technical advice.
- Always contact Manzi Aurelio S.r.l. when necessary, in order to solve any problems of a technical nature that may arise during the life of the product.
- Consider the possibility of establishing an annual scheduled maintenance program for the product, in order to maximize its functional characteristics and purification efficiency.

Product Warranty

Improper use of the product will result in the immediate cancellation of the warranty.

Before Starting

- Read, understand and follow the following instructions.
- For any questions on details regarding the accessories (e.g. specific procedures for extracting or removing parts of the product), please contact the Manzi Aurelio s.r.l. Technical Support Service.
- For any questions regarding logistics (delivery of materials, technical documents, transport, etc.) of replacement parts, contact the Manzi Aurelio s.r.l. Logistics Assistance Service.

IMPORTANT TELEPHONE NUMBERS

After-Sales Assistance Service
+39 0761 827185 4
Logistics Assistance Service
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Manzi Aurelio S.r.l. reserves the right to make changes to this User's and Maintenance Manual without notification. Possible changes to the product might not correspond to the figures shown in this Manual.

List of Enclosures

- Product technical specifications
- Electric board diagrams
- Electric board Declaration of Conformity.

Instructions for the correct use of the product

1.1 General Information

The purpose of this manual is to provide the necessary information regarding the use and maintenance of the Mod. DF total oxidation plants.

The contents of this manual refer to the standard product as presented in the sales literature. Any special versions may be supplied with additional instruction sheets. Refer to the sales contract for the variations and specifications of the special versions.

Always specify the exact type and item number of the plant if you need to ask for technical information or replacement parts from our After-Sales Assistance Service.

Contact our After-Sales Assistance Service for any instructions, situations and events not covered in this manual or in the sales literature.

ATTENTION

If correctly installed, used and maintained the plant is able to purify domestic and similar wastewaters according to the limits of Table 3, Annex 5 of Legislative Decree no. 152/06 and subseq. amend.

1.1.1 Identification plates

Three identification plates are affixed to every Mod. DF plant that contain the plant reference data (including the serial number, which must be provided to the Manzi s.r.l. After-Sales Assistance Service for any needs.)

The three plates are affixed to the body of the plant, to the inner partition (which can be seen opening the inspection hatches) and to the electric control board.

IMPORTANT

Copy down the information on the identification plate, especially the serial number (s/n).

1.2 Description of Operation

The mod. DF

oxidation plants are monoblock plants for the purification of wastewater from industrial activities and car washing; this means that the components necessary for the water treatment are integrated in a single “block.”

1.2.1 Operation of Mod. DF Plants

Mod. DF plants are shown in Figure 1 and Figure 2 (seen in plan view and section view), in which all the internal components and the related process stages can be seen.

They are divided into the following main stages:

- A. Sludge trap
- B. Bioreactor (Oxidizer)
- C. Sedimentation tank

Sludge trap

This is the first stage of the purification process, and it has the following functions:

- Retention of coarse solids
- Retention of oily substances
-

The retention of the substances takes place by means of gravimetric separation, through the differences in the specific weight of the substances in the wastewater.

Bioreactor (Oxidizer)

This is the stage of the aerobic digestion – in other words that of the real purification – of the pollutants in the sewage or wastewater.

The digestion takes place through the mixing of the wastewater (thus containing a high organic content) with the air aspirated by submerged pumps by means of the Venturi system connected to a suction pipe (visible in Figure 2.)

The mixing of the wastewater with air brings about in a completely natural way the generating of bacterial strains that form “activated sludge.” The activated sludge has the task of biologically breaking down the pollutants, mineralizing them.

The principle of operation of this particular type of oxidation is the Moving Bed Biofilm Reactor, or MBBR. According to this principle, the formation of biofilm on the contact surface of the filling bed inside the oxidation area allows high purification performance even with a small sized oxidation area.

ATTENTION

The number of submerged pumps varies according to the model, and is given in the enclosed product technical sheet.

Sedimentation tank

This has the task of recreating a calm zone, inside which the activated sludge mixed with purified water has the time necessary to precipitate (decantation), separating from the water, which will thus be clarified and ready to be discharged.

Note that inside the sedimentation area there is an oxygenation pump, which has the function of pumping the liquid from the sedimentation stage to the oxidation stage, at the same time mixing it with the air aspirated from the outside by means of the venturi effect. The air/water mixture brought back to the oxidation stage feeds the biofilm bacteria bed, which consequently operates the digestion process and thus the purification of the effluent.

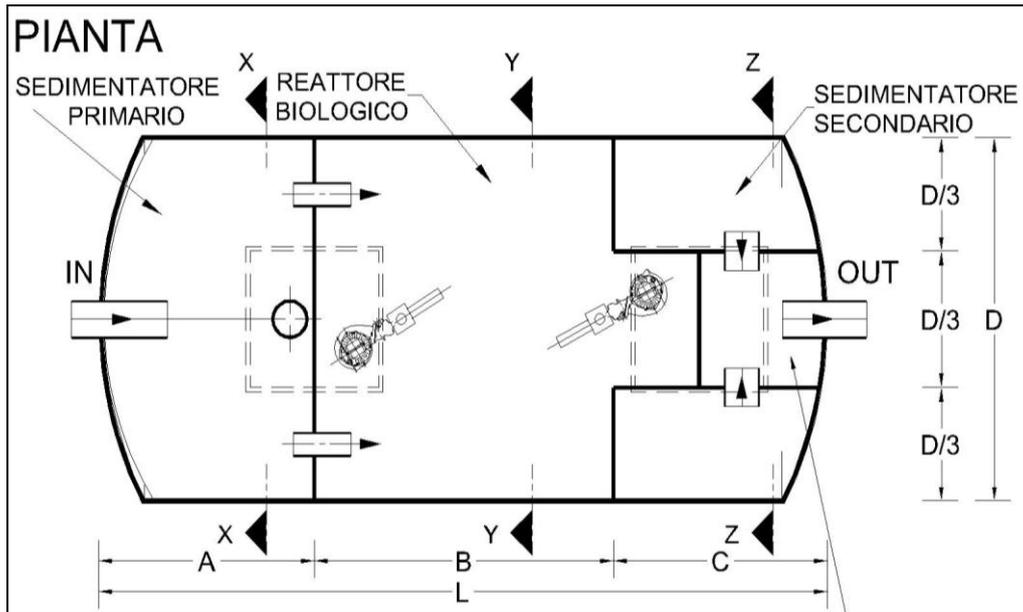


Figure 1 Mod. DF Plan View

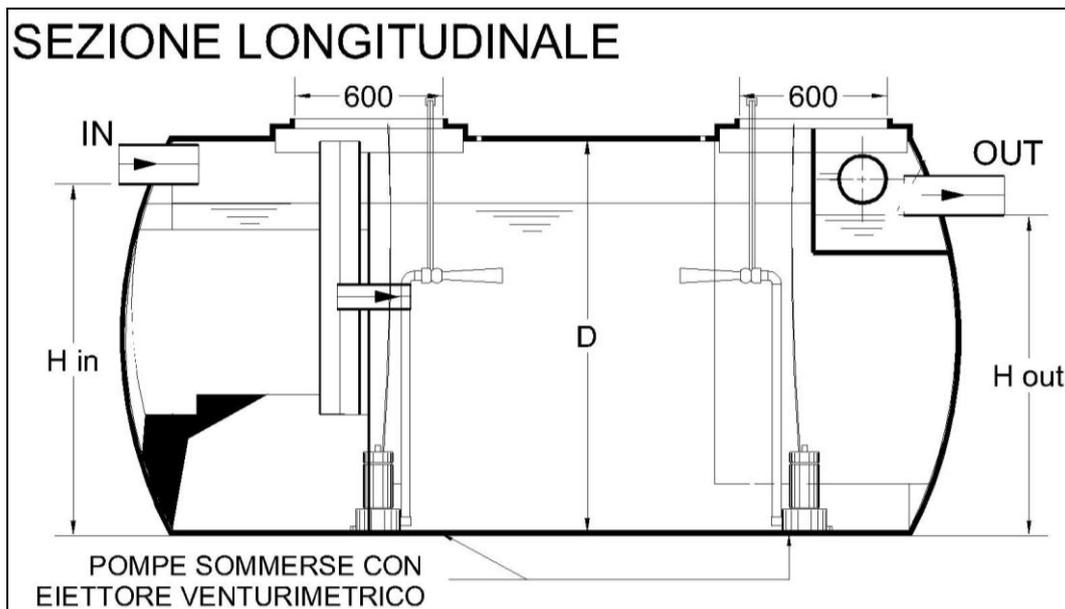


Figure 2 Mod. DF Longitudinal Section View

1.3 Uses

The connection of Mod. DCA, DCAF, DCAR and DCARF wastewater treatment plants to the discharge is permitted only after proper authorization has been obtained.

The application for authorization to discharge must also be sent to the competent authorities along with the documents supplied with the treatment plant.

In order to obtain authorization to discharge it is necessary to provide for the possibility of carrying out periodically the maintenance operations included in this manual and, if necessary, to have them carried out by a company with qualified personnel.

ATTENTION

Italian environmental laws (D.Lgs 152/06 and subseq. amend.) provides for the obligation to have proper authorization for discharging, before being able to connect the treatment plant to the receiving body (body of surface water, public sewer, ground, etc.).

1.3.1 *Limits of Use*

WARNING

Italian environmental laws (D.Lgs 152/06 and subseq. amend.) classifies and prohibits the discharging of hazardous substances into any receiving body. Any discharging of such substances inside the products shall relieve Manzi s.r.l. from any liability and shall constitute grounds for the immediate cancellation of the warranty on the product.

IMPORTANT

Treating wastewater with a high grease and oil content requires the installation of a grease separator upstream from the plant. It can be requested from Manzi s.r.l. as an optional.

Treatable liquids

WARNING

Make sure that the wastewater to be treated in the plant does not contain pollutants in quantities greater than those indicated in the "maximum allowable inlet concentrations."

Substance	Maximum inlet concentrations	
Sulfates	mg/l	50
BOD5	mg/l	300
COD	mg/l	600
Phosphorus	mg/l	2
pH		6 – 8
Total Hydrocarbons	mg/l	10
Total Suspended Solids	mg/l	300
Total Surfactants	mg/l	7.5
Max. Temperature		35 °C

Table 1 Maximum allowable inlet values and concentrations

WARNING

Never exceed the limits indicated in the product sheet enclosed with this manual. Pay attention in particular to the quantities of wastewater (flow) discharged into the plant. An excessive discharge flow can irreparably damage the plant, the environment, and cause damage or injury to persons and objects.

WARNING

Never use the submerged pumps for any purposes other than those for which they are intended.

1.3.2 Improper Uses

DON'T

- Introduce an oils and light hydrocarbons content greater than the limit indicated.
- Introduce coarse solid materials, paper, cardboard, newspaper, fabrics, threads or anything else that could clog the pipes and/or block the pumps or ducts.
- Introduce liquids that are hazardous (harmful, irritant, toxic, explosive, corrosive, flammable).
- Introduce strongly acid or alkaline cleaning liquids.
- Introduce strongly oxidizing substances (such as fluorides or chlorides), bactericides, or liquids or substances that may damage the bacterial flora.
- Introduce non-biodegradable detergents (or biodegradable but in a percentage less than 90%).
- Introduce nutrient products in uncontrolled amounts and/or chemical additives.
- Discharge the treated wastewater onto the ground.

1.4 Putting into Operation

1.4.1 Electric board with programmable relay

IMPORTANT

Follow the instructions given in the user's manual for the control panel supplied with the plant.

1.4.2 Electric board

The Mod. DCA, DCAF, DCAR and DCARF treatment plants are equipped with an industrial electric board, for controlling all the internal electrical components.

Each electric board supplied with the purification plants is duly certified by Manzi S.r.l. and has IP56 minimum protection, thus it can be installed outdoors.

IMPORTANT

All the documents regarding the electric board and plant electrical components are contained inside the electric board cabinet. They must be carefully read and stored.

The electric board consists of three basic parts:

- Cabinet
- Synoptic front panel
- Internal electrical wiring

Cabinet

This is the container of the synoptic panel, the electrical components and the wiring. It gives the electric board IP56 minimum protection.

Synoptic front panel

WARNING

Before handling or operating the components of the synoptic panel, check to ensure that the electric board has a properly installed ground connection.

The synoptic panel makes it possible to control the submerged pumps and to visually monitor their status.

The synoptic panel has the following components:

- Red indicator lights
 - They indicate the presence of voltage, i.e. when the electric board is powered.
- Orange indicator lights
 - They indicate the thermal block status for each electrical component (oxygenation pumps, recirculation pumps, external side channel blowers, etc.).
- Green indicator lights
 - They indicate the run status for each electrical component (oxygenation pumps, recirculation pumps, external side channel blowers, etc.).

- Control switches
 - There are control switches for each submerged pump, with three possible statuses: manual mode, timed mode and stop.

IMPORTANT

Check the synoptic panel daily, in order to identify any possible malfunctioning (thermal blocks) and to reduce plant downtime.

ATTENTION

Manzi S.r.l. is not responsible for any reductions in purification efficiency due to plant downtime situations not detected and not communicated by the user.

IMPORTANT

Check periodically to ensure that the indicator lights are working, unscrewing the colored caps, so as to reduce the risk that plant shutdown will not be indicated.

Internal electrical wiring

All of the electric boards for Mod. DCA, DCAF, DCAR and DCARF plants are wired according to the European regulations currently in force.

All of the electrical components used to build the electric boards are in compliance with the applicable regulations currently in force.

WARNING

ALWAYS shut off power to the auxiliary circuits before doing any work on them, lowering the circuit breaker inside the electric board cabinet. Failure to do so can result in injury or death.

WARNING

Do not do any work directly on the internal components of the electric board if you are not perfectly aware of the risks you may be taking. If you have any doubts about the functioning of the internal components, contact expert personnel or the Manzi S.r.l. After-Sales Assistance Service.

Access to the electric board wiring and components requires the opening of the synoptic front panel. To open the front panel, you must release the fasteners and pull the panel out with your fingers, gripping it at the notches.

1.4.3 Electrical check

The preliminary electrical check of all the connections made by the installation company is necessary in order to guarantee the correct starting up of the plant.

WARNING

Have qualified personnel check that the voltages and frequencies correspond to the specifications of the electrical components. The ratings for the submerged electrical components can be found in the manuals supplied with the plants.

It is necessary to check that all connections between the electric board and the submerged pumps have been made correctly; in particular, the seal of the junction boxes for the electrical connections along the power supply line. Check also that connections between the treatment plant electric board and the main electric board (if present) are decoupled, i.e. that the treatment plant electric board does not cause the main electric board's (if present) protection devices to be tripped.

IMPORTANT

If there are doubts regarding how good the electrical connections are between the treatment plant board and the main board, it is recommended that all the absorptions be checked by qualified technical personnel, in order to make the main board independent.

1.4.4 *Starting up the plant*

The starting up of the Mod. DCA, DCAF, DCAR and DCARF is a fundamental step that allows the plant to be able to reach maximum purification efficiency.

The start-up consists of the following fundamental steps:

- Electrical connections check
- Piping connections check
- Piping seals check
- Oxygenation check
- Timing adjustments

Electrical connections check

See point 1.4.3.

Piping connections check

Check that:

- Wastewater intake and discharge pipes are not blocked.
- Air suction pipes are not blocked.
- Any lifting stations for the delivery of unpurified water to the treatment plant are functioning correctly.
- Any lifting stations for the delivery of purified discharge water to the sewer are functioning correctly.

WARNING

Do not provide power to the pumps inside the plant unless they are completely covered by water. Doing so could damage them irreparably.

Timing adjustments

Once the plant has been filled and the correct functioning of the electrical, mechanical and piping components has been checked, the plant can be started up in the full sense of the term.

Powering the electric board with the switch, the correct voltage should be verified by means of the optical signal system (red lights, see point 1.4.2). Next, test the functioning of the oxygenation pump control system using the switches on the front of the electric board (see point 1.4.2).

Putting the switch into the on position "forces" the starting of the submerged pumps, which is signaled by the lighting up of the lights that indicate correct functioning (generally green, see point 1.4.2), which should stay lit for at least 60" without causing any intervention of the thermal protection devices (which would cause the orange indicator lights to turn on, see point 1.4.2), i.e. the block status of the pumps.

IMPORTANT

If the submerged pump is thermally blocked, it is necessary to check that the thermal intervention values of the protection devices in the electric board have been set correctly. Contact expert personnel for the setting of the thermal protection devices.

IMPORTANT

To reset the thermal protection of the submerged pumps, it is necessary to open the synoptic panel, remove power from the auxiliary circuits by lowering the circuit breaker and pressing the thermal protection reset button (usually red).

ATTENTION

If the submerged pumps are blocked and the thermal protection is set correctly, contact the Manzi After-Sales Assistance Service.

Once the functioning of the pumping components has been checked, the control switches should be put in the automatic position, putting the plant into the timed mode.

The timing of the plant should be done according to the following general rule:

Stage 1 Starting the plant

The term "starting" means the stage in which the purification plant has never operated and thus is lacking the internal bacterial flora.

In this stage it is necessary to transfer a greater quantity of oxygen to the wastewater in order to favor the development of the internal bacterial flora.

The oxygenation pump control timers must be set to ON/OFF cycles of 60-120 minutes ON and 15-30 minutes OFF. This configuration must be maintained for at least 20-30 days.

ATTENTION

During the starting stage foaming may occur, i.e. the development of a white colored foam. This is entirely natural and may last from a few hours to several days.

ATTENTION

During the starting stage the plant may generate obnoxious odors. This should not be cause for concern, as the bacterial flora has not yet been activated and therefore the purification efficiency has not reached its maximum level.

Stage 2 Plant in full operation**Stage 2 Plant in full operation**

Once the plant has reached operating conditions, which can be verified by the absence of bad odors and foam, as well as by analysis of the discharge water, the setting of the oxygenation pump timer can be changed.

The new setting can be 30-60 minutes ON and 15-30 minutes OFF (see Table 2).

The table of the oxygenation cycles is given below.

	ON (minutes)	OFF (minutes)
Stage 1 for 20 – 30 days	60 – 120	15 – 30
Stage 2 at full operation	30 – 60	30 – 60

Table 1 Oxygenation cycles

1.5 Maintenance and Replacement Parts

1.5.1 *Scheduled Maintenance*

Operations

For the reasons discussed so far, it becomes necessary to have a maintenance procedure that can constantly monitor plant operation so as to make purification performance always effective and efficient.

Scheduled maintenance is understood as all those operations that are generally carried out by specialized technicians and that generally provide for the following checks.

- Water replenishment
- Checking/cleaning of grates and traps
- Check wastewater cycle
- Check in/out flow
- Check sediment level in sludge trap/oil separator area
- Check sediment level in secondary sedimentation tank
- Check oils/grease level in sludge trap/oil separator area
- Check condition of filling bed in oxidation area
- Check oxygenation pipes
- Electrical check
 - Power continuity
 - Timing
 - Optical signaling components
 - Fuses
 - Check automatic and manual running of pumps
- Check and cleaning of any coalescing filters (if present)
- Check recirculation system (pump and piping, if present)
- Check recirculation regulation timer (if present)
- Check sampling point
- Removal of floating material
- Writing reports of work done
- Entering reports in the use and maintenance log by the plant operator.

If it becomes necessary to replace materials or components inside the treatment plant, this naturally requires qualified personnel that can safely and effectively restore the damaged or broken down parts. It may also be necessary to provide for the removal of the wastewater contained inside the plant by an authorized company, which will provide for its disposal in accordance with the laws in force on waste disposal.

Frequency

One aspect regarding plant maintenance that must not be overlooked is the frequency with which scheduled maintenance checks and inspections must take place.

Generally speaking (to be evaluated for each case on the basis of how the treatment plant is used), there are three time intervals within which given checks and inspections must take place:

- Weekly check-up
- Semiannual check-up
- Annual check-up

Weekly check-up

The weekly check-up is always desirable and generally involves the following operations:

- Synoptic panel check
- Check for bad odors in the vicinity of the plant
- Check for the presence of foam after the initial start up of the plant (and any restarting after plant downtime)
- Check for any electric pump thermal block
- Check the efficiency of air blowing/suction for the oxygenation components
- Cleaning of manholes
- Cleaning of the sampling point

IMPORTANT

In order for the plant to function well, the user must constantly check the consumption of soaps, disinfectants and degreasing agents, making sure they never exceed the plant maximum values (see point 1.3.1).

Semiannual check-up

Every six months the following operations must be carried out:

- Measure the hydrostatic level in the tanks
- Remove any encrustations and/or deposits inside the purifier
- Measure the level of solids settled in primary and secondary sedimentation tank
- Careful cleaning of inspection wells
- Check state of preservation of valves, pipes and other components
- Monthly check-up operations
- Measure the level of solids settled in primary and secondary sedimentation tank (Imhoff cone not more than 200-300 ml/l)
- Check condition of filling bed, in particular the quantity of sludge adhering to the surface of the individual carriers
- Necessary sampling and analysis of discharge water, looking at the following parameters: pH - TSS - COD – BiAS – MBAS – tot.HC

Annual check-up

Besides the aforementioned semiannual operations:

- Removal (if necessary) of sediments in the sludge trap/oil separator
- Washing of the sludge trap/oil separator area
- If necessary, extraction and washing of all filling beds with complete cleaning out of any sludges remaining inside the oxidation area.

ATTENTION

The removal of excess sediments and sludges must be done by qualified and accredited personnel, using specialized equipment. Every time substances are removed (not sampling) from the treatment plant, it must be recorded in the disposal log.

ATTENTION

The disposal of substances inside treatment plants must be done in compliance with the environmental regulations in force. Always refer to the local regulations where the treatment plant is operating.

1.5.2 *Extraordinary Maintenance*

If problems should appear suddenly, see chapter 1.6 in order to identify the possible causes. If it becomes necessary, contact the Manzi After-Sales Assistance Service.

WARNING

In response to sudden problems, never attempt to solve them alone. Do not attempt makeshift solutions to restore normal plant operation. Doing so may result in serious damage or injury to persons, animals or objects.

1.5.3 *Replacement Parts*

IMPORTANT

In order to reduce the response time of the Manzi After-Sales Assistance Service, always give the serial number (s/n) of the plant or at least the model for which you wish to receive information on original replacement parts.

WARNING

Use only original replacement parts to replace damaged components. The use of other parts may cause irreparable damage to the plant and serious harm to the environment.

1.6 Troubleshooting

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTIONS
The electric pump does not start.	No electric power	Restore electric power supply
The main switch is in the off position.	Pump thermal protection is engaged	Wait until the pump motor has cooled
	Incorrect setting of the daily cycle timer	Check the timer setting
The electric pump starts, but the thermal protection intervenes right away	Motor overload	Check the working conditions of the electric pump
	Damaged power cable	Check the cable
The electric pump starts, but after a short time the thermal protection intervenes	Power supply voltage is not within the limits of the motor	Check the working conditions of the electric pump
The electric pump starts, but after some time the thermal protection intervenes	Temperature of the liquid suctioned is too hot	Check the working conditions of the electric pump
	Presence of too large solid particles that block the impeller	Remove and clean the electric pump. If the problem persists, check the working conditions of the electric pump
The electric pump starts too frequently	Incorrect setting of the daily cycle timer	Check the timer setting
The electric pump starts but effluent and air do not come out of the ejector.	Delivery pipe clogged or there is an air bubble	Check the installation
	The electric pump is damaged or its inner parts are obstructed	See instructions in the pump manual
The general protection of the plant intervenes	Short circuit	Check the connection cables
The differential circuit breaker (ground fault interrupter) is tripped	Ground leakage	Check the insulation of the electric pump and the cables

Table 3 Problems, causes and possible solutions

1.7 Decommissioning and disposal

The decommissioning of treatment plants may require the remediation of the site where they are installed. Pay attention to the regulations in force and especially to any local regulations.

The disposal of the plants requires that they be treated as special waste pursuant to the laws in force.

ATTENTION

In regard to decommissioning and disposal, pay attention to the regulations in force and especially to any local regulations. Consult qualified technical consultants in order to prevent any risks connected with improper disposal.

1.8 Tables and Drawings

See the technical sheet for the plants (enclosed) for technical information regarding the dimensions and internal components of the treatment plants.

For the specific data on submerged pumps and on the electric board, refer to the electrical diagrams and the technical documents supplied together with the plant (contained inside the electric board cabinet).

1.9 Glossary

Term	Definition
pH	Hydrogen-ion concentration
COD	Chemical Oxygen Demand
TSS	Total Suspended Solids
tot.HC	Total Hydrocarbons
BiAS	Bismuth Active Substances – non-ionic surfactants
MBAS	Methylene Blue Active Substances – anionic surfactants
Population equivalent (grams BOD ₅ /capita/day)	The quantity organic biodegradable substances entering the treatment plant in one day, due to the normal activities of one person, such as using the bathroom and kitchen. It is measured indirectly by means of the oxygen necessary so that the bacteria can modify the
Daily organic load (kg BOD ₅ /day)	organic biodegradable substances present, making them innocuous over a five-day period (Biological Oxygen Demand 5 = BOD ₅). On average the reference value is 60 grams of oxygen per day. Represents the kilograms of BOD ₅ that enter the plant in one day. It is obtained multiplying the 60 grams of oxygen per day by the population equivalent number.
Volumetric organic load (kg BOD ₅ /m ³ day)	Represents the ratio between the daily organic load and the oxidation volume.
Inlet BOD ₅ concentration (mg/liter O ₂)	Represents the ratio between the daily organic load and the daily discharge volume. To obtain the mg/liter, multiply by the result of the division by 1000
Outlet BOD ₅ concentration (mg/liter O ₂)	Represents the remaining quantity in the wastewater that goes into the discharge.
Inlet COD concentration (mg/liter O ₂)	The quantity of inorganic substances brought to the discharge, in one day, due to the normal activities of one person, such as using the bathroom and kitchen. It is measured indirectly by means of the amount of oxygen necessary to oxidize the organic and inorganic substances present, making them innocuous (Chemical Oxygen Demand = COD).
Unit water supply to discharge (liters/capita/day)	Daily estimated water consumption per capita. This value is commonly 200 liters per day per person.
Oxygen supply factor (kgO ₂ /kgBOD ₅)	Quantity of oxygen aspirated necessary to eliminate one kg of BOD ₅
Population equivalent number	In residential use, it coincides with the number of residents
Maximum hourly flow (l/h)	Represents double the average hourly flow
Average hourly flow (l/h)	Represents the ratio between the daily discharge volume divided by 16 hours, assuming that water use takes place only for two thirds of the day.
Term	Definition
Purification efficiency (%)	Indicates how much the BOD ₅ value is reduced during treatment
SS (mg/l)	Indicates the quantity of total suspended solids. It is the sum of the settleable solids and non-settleable solids

Primary sedimentation time (hours)	Minimum time interval for the sedimentation process to take place. It can be calculated dividing the primary sedimentation volume by the average hourly flow
Secondary sedimentation time (hours)	Minimum time interval for the sedimentation process to take place. It can be calculated dividing the secondary sedimentation volume by the average hourly flow
Sedimentation ascensional velocity (m/h)	Maximum speed for the passing of effluent through the compartments or sedimentation tanks, so that there is no carrying of sludge to the next compartments or tanks. Normally it is calculated dividing the average hourly flow by the area of the compartment or sedimentation tank.
Sludge digestion volume (liters)	Volume of the part of the plant where the mineralization of the coarse solid particles takes place in the absence of air (anaerobic process)
Volume of oxidation – nitrification – denitrification (liters)	Volume of the part of the plant where the oxidation and nitrification of effluent takes place with an excess of air (pump operating) and denitrification where air is lacking (pump stopped)
Daily discharge volume (m ³)	The population equivalent multiplied by the unit water supply to discharge
Primary sedimentation volume (liters)	Volume of the part of the plant where the coarse solid particles separate from the effluent and precipitate to the bottom
Secondary sedimentation volume (liters)	Volume of the part of the plant where the activated sludge separates from the effluent and precipitates to the bottom
Total net volume (liters)	Sum of the primary sedimentation, sludge digestion, oxidation – nitrification – denitrification, and secondary sedimentation volumes

Table 2 Glossary

Company Information

Manzi Aurelio S.r.l.	
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