ROTOTEC

SEWAGE TREATMENT

CATALOGUE AND PRICE LIST

www.rototec.it

EN

SEWAGE TREATMENT

CATALOGUE
AND PRICE LIST

ROTOTEC

TECHNICAL CATALOGUE

2018

ISO 9001
BUREAU VERITAS
Certification
Certificate N° IT231900

ROTOTEC

SYSTEM GROUP

Rototec is a member of the **System Group,** founded in 1979 by the historic company **Centraltubi.** After over 35 years of activity, **System Group** has **13 manufacturing plants** and agencies located in **7 different countries**, with a workforce of well over **600 employees** who are still as enthusiastic as they were at the start. System Group has become a **world leader** in the manufacture and supply of complete polyethylene and polypropylene pipeline systems (pipes, fittings, specials...) serving over **50,000 customers** in 30 countries.

CENTRALTUBI
SAMI PLASTIC ROMÂNIA
ITALIANA CORRUGATI
FUTURA SYSTEMS
TUBERÍAS DE POLIETILENO
SaMiplastic
FRIGERIO
SYSTEM GROUP
ROTOTEC s.p.a.
Futura
PEBO
ASAB
STRADAL GROUP Srl
SYSTEM GROUP FRANCE
SYSTEM GROUP RUS
MECSYSTEM
Lucania Resine
SYSTEM GROUP SENEGAL
SYSTEM GROUP MIDDLE EAST
UniLine
HB BOSCARINI
EVOLUTION
HB SERVIZI
SYSTEM GROUP INTERNATIONAL SPC
SYSTEM GROUP PVC

ROTOTEC

ISO 9001
BUREAU VERITAS
Certification
Certificato N° IT231900

Rototec S.p.A. is a dynamic company in continuous expansion present throughout Italy and abroad (France, Spain, Hungary...). Founded in 2000, it was soon specialising in the production of corrugated and smooth tanks in linear polyethylene manufactured using rotational moulding technology.
Over the years, **Rototec S.p.A.** has always felt the need to distinguish itself on the Italian and international markets, investing its resources in research and in updating its own production to meet European standards, in order to provide its customers with increasingly high performance and reliable treatment systems that will contribute even more to the defence of our land. Increasing awareness of aspects regarding **environmental protection** and **regulatory updates** have become 2 of Rototec's strategic aims, which are pursued using real time communication channels (Facebook, web site, newsletters, etc...) and more traditional channels such as organisation of training meetings, seminars and study days with the co-operation of local Authorities, Universities and professional Bodies and Organisations.

SERVICES

TECHNICAL SUPPORT WHEN DESIGNING THE SYSTEMS

ON-SITE TECHNICAL SUPPORT

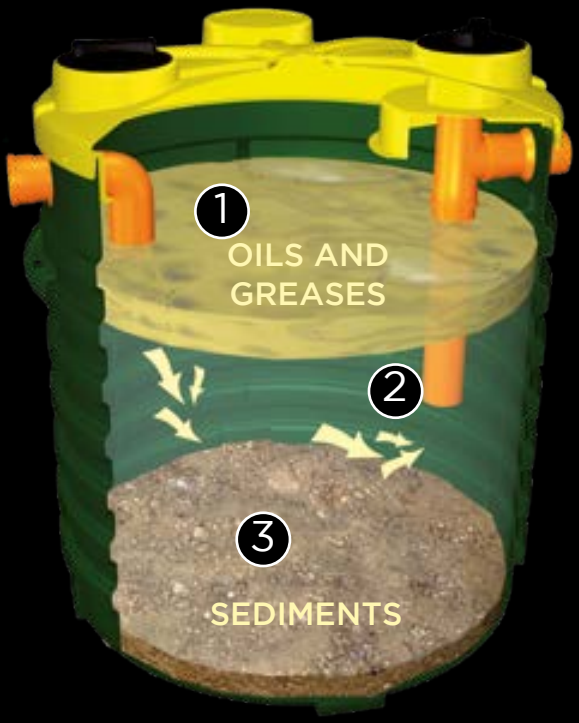
EXTENSIVE NETWORK OF AGENTS AND SALES OUTLETS THROUGHOUT THE COUNTRY

PROMPT DELIVERY

GREASE SEPARATORS

GREASE SEPARATORS

CE

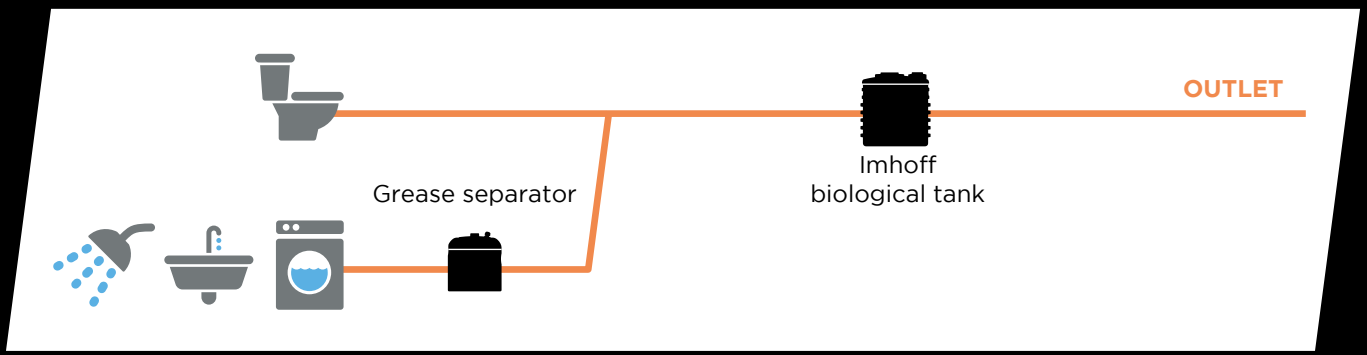


1. OILS AND GREASES: inlet zone in which the turbulence of the inlet flow is dampened and in which the substances with a specific weight lower than water (oils, foams, etc...) accumulate.

2. STILLING AREA: zone into which the separated and treated effluent flows.

3. SEDIMENTS: area in which temporary accumulation of the solids (food waste, etc...) takes place.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: The grease separator is a physical pre-treatment process that removes oils, foams, greases and all substances of specific weight less than that of the effluent.
The grease separator is nothing more than a stilling tank in which the substances of specific weight less than water are separated by floatation (surface). Sedimentation also takes place, with a part of the suspended solids depositing at the bottom of the tank.

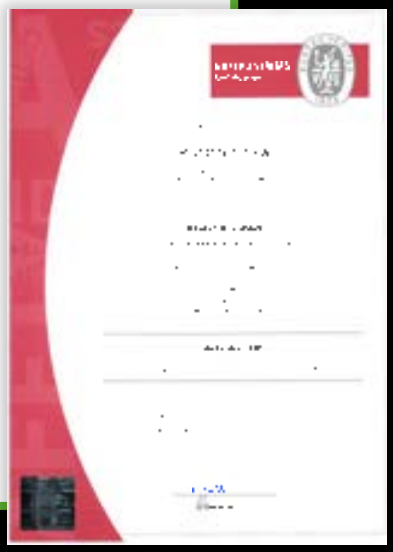
USE: primary treatment of grey water from kitchens, washbasins, bidets, showers, baths, washing machines and dishwashers.

PRODUCT CERTIFICATION

Rototec grease separators (with the exception of the modular range) are CE marked and are designed, tested and certified compliant with UNI EN 1825-1 "Grease separators – Part 1: Principles of design, performance and testing, marking and quality control".
The grease separators have been verified and tested at Rototec and by a third party certifying body, and have been found to comply with the necessary requirements.

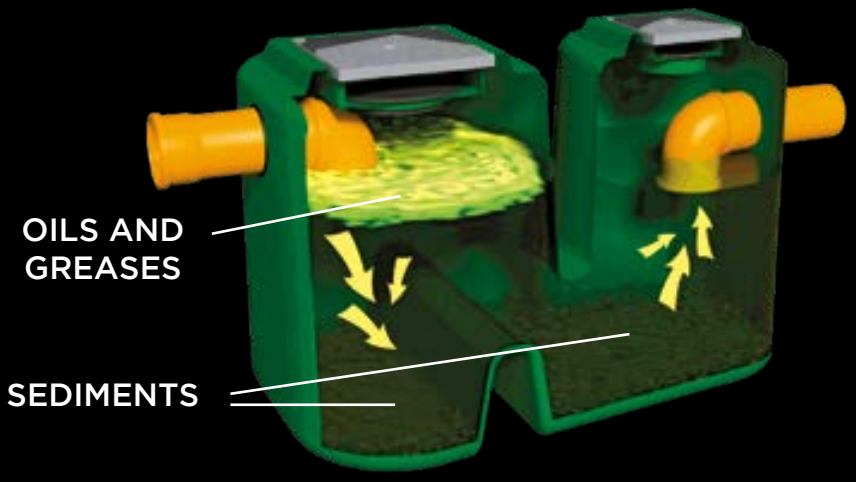
• Watertightness	✓
• Structural stability	✓
• Determination of the nominal size	✓
• Functional requirements	✓
• Reaction to fire	Class E

CERTIFIED UNI EN 1825-1



SEPARATION BAFFLES

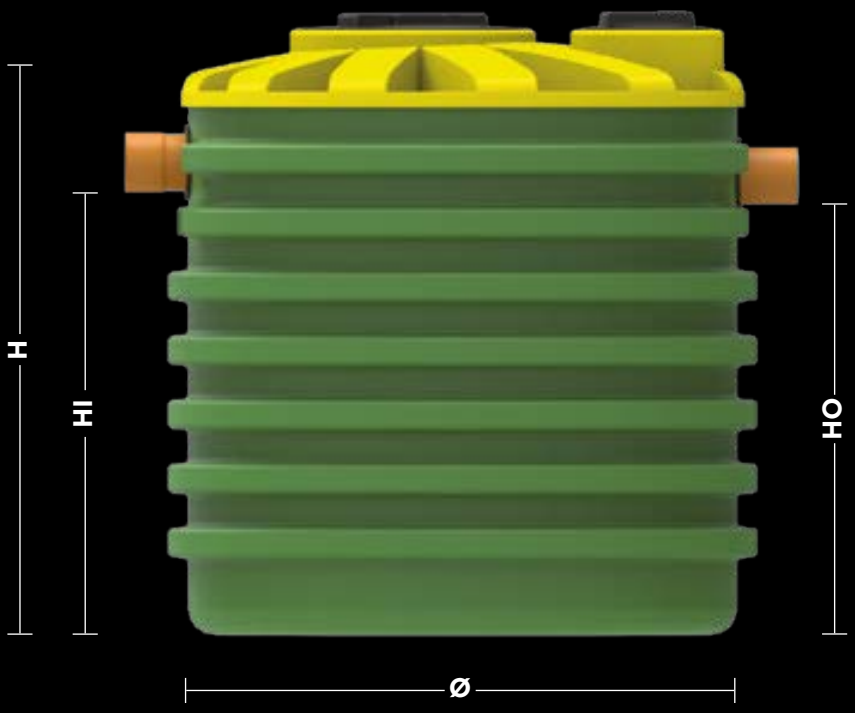
Grease separators with separation baffles



CE

GREASE SEPARATORS

MODEL



SMOOTH

SEPARATION BAFFLES

CORRUGATED

ELIPSE

MODULAR

GREASE SEPARATORS
MODULAR

GREASE SEPARATORS

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Useful Vol. l	Vol. of grease l	Vol. of sediment l	NS	PE.	Цени в лв/без ДДС
DD50		-	-	430	430	270	200	100	CC355	PP35	39	5	10	0.1	**1**	**139.00**
DD150		-	-	580	660	510	440	100	CC255	PP30	121	16	32	0.3	**5**	**172.00**
NDD150		950	650	-	565	375	345	100	CC255-CC130	PM30x30G PM20x20G	180	25	35	0.4	**7**	**240.00**
NDD200		1000	635	-	675	490	440	100	CC255-CC130	PM30x30G PM20x20G	205	30	50	0.5	**10**	**280.00**
DD300		-	-	630	970	770	700	100	CC255	PP30	218	30	59	0.5	**10**	**235.00**
NDD300		1100	700	-	775	585	535	100	CC255-CC130	PM30x30G PM20x20G	303	40	80	0.7	**15**	**310.00**
NDD400		1150	750	-	890	695	645	100	CC255-CC130	PM30x30G PM20x20G	409	55	110	1	**20**	**370.00**
DD500		-	-	790	790	630	560	100	CC455-CC140	PP45	276	32	72	0.7	**15**	**310.00**
NDD500		1400	900	-	750	560	530	100	CC255-CC130	PM30x30G PM20x20G	510	75	140	1.2	**25**	**420.00**
DD800		1480	630	-	1090	870	800	110	CC355-CC255	PP35-PP30	693	80	180	1.8	**20**	**380.00**
NDD1000		-	-	1150	1220	880	810	110	CC455-CC255	PP45-PP30	774	90	200	2	**30**	**510.00**
NDD1200		1900	708	-	1630	1250	1180	110	CC355-CC355	PP35-PP35	1142	120	300	3	**35**	**680.00**
NDD1500		-	-	1150	1720	1360	1290	110	CC455-CC255	PP45-PP30	1193	128	320	3.1	**40**	**750.00**
NDD1700		1900	708	-	2140	1760	1690	110	CC355-CC355	PP35-PP35	1775	200	450	4	**50**	**890.00**
NDD2100		-	-	1350	1975	1540	1490	125	CC455-CC355	PP45-PP35	1850	260	550	4	**60**	**980.00**
NDD2600		-	-	1710	1450	1000	930	125	CC455-CC355	PP45-PP35	1971	220	550	5	**70**	**1220.00**
NDD3200		-	-	1710	1725	1240	1170	125	CC455-CC355	PP45-PP35	2435	256	640	6.4	**80**	**1500.00**
NDD3800		-	-	1710	1955	1480	1410	160	CC455-CC355	PP45-PP35	3026	330	800	7.9	**90**	**1800.00**
NDD4600		-	-	1710	2225	1700	1630	160	CC455-CC355	PP45-PP35	3510	400	910	9	**110**	**2100.00**
NDD5400		-	-	1950	2250	1630	1560	200	CC455-CC455	PP45-PP45	4152	462	1085	10.5	**140**	**2400.00**
NDD6400		-	-	1950	2530	1940	1870	200	CC455-CC455	PP45-PP45	4862	495	1268	11.8	**160**	**2600.00**
NDD7000		-	-	2250	2367	1810	1740	200	CC455-CC455	PP45-PP45	6711	900	1400	13	**200**	**3400.00**
NDD9000		-	-	2250	2625	2030	1960	200	CC455-CC455	PP45-PP45	7534	1200	1800	15.5	**250**	**3580.00**
ITDD15000		5620	-	2100	2200	1820	1750	200	TAP710	2 x PP77	14150	1490	3720	37.2	**400**	**7500.00**
ITDD22000		7880	-	2100	2200	1820	1750	200	TAP710	2 x PP77	20700	2170	5450	54.5	**600**	**10900.00**
ITDD30000		10140	-	2100	2200	1780	1710	250	TAP710	2 x PP77	27250	2870	7170	71.7	**800**	**14300.00**
ITDD36000		12400	-	2100	2200	1780	1710	250	TAP710	2 x PP77	33800	3560	8890	88.9	**1000**	**17700.00**

Sizing: PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØE/U = inlet/outlet pipe diameter; NS = limit flow rate (l/s).

TECHNICAL SECTION - GREASE SEPARATORS

TECHNICAL CHARACTERISTICS

The grease separator is a **physical pre-treatment process** that removes oils, foams, greases and all substances of specific weight less than that of the effluent. Greases and oils produced during normal domestic activities derive from the consumption of butter, margarine, lard and vegetable oils. They also originate from waste meat and vegetables and from some cosmetic products. Greases are insoluble in water and have a low density. In the presence of surface-active agents (detergents), they create stable foams of floating materials that can cause an accumulation of putrescible substances in the sewerage pipes and render oxygenation of the sewage difficult, which also has a detrimental effect on the biological treatment processes located downstream.
The grease separator is nothing more than a **stilling tank** in which the substances of specific weight less than water are separated by floatation (surface). The reduced velocity of the fluid also allows sedimentation of a part of the suspended solids which deposit at the bottom of the tank. As temperature has a considerable influence on the operation of the grease separator, the separation process becomes 100% effective when the temperature does not rise much above the melting point of the greases, estimated as being around 20°C.
Rototec gravity grease separators consist of a polyethylene tank with two semi-submerged inlet and outlet pipes at different levels. The working volume is divided into three compartments: an inlet zone in which the turbulence of the inlet flow is dampened, a second zone in which the separation takes place together with temporary accumulation of the solids and a third outlet zone for the treated effluent. The longer the retention time of the sewage in the grease separator the more efficient is the removal of the floating materials. This retention time must nevertheless be more than 3 minutes at peak flow. **The grease separators are certified in accordance with standard UNI-EN 1825-1** and guarantee a sewage retention time of at least 4 minutes at peak flow (Qmax), taking into account the available volume only, i.e. that not occupied by greases or heavy sediments. This guarantees retention times at mean daily flow rates of more than 15 minutes.

USE AND MAINTENANCE

The substances removed by floatation accumulate at the surface of the grease separator in the form of a surface crust, while the heavier solids settle at the bottom of the tank to form a deposit of putrescible sludge.
It is advisable to provide for the periodic removal of the accumulated materials by **specialist technicians**, as they reduce the effective volume required for the passage of the effluent, thus reducing the retention time and, as a result, compromising the efficiency of the plant. An excessive accumulation of sludge in the grease separator can cause septic conditions to develop, resulting in resulting bad smells, in particular during the summer.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the grease separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the surface crust.
Remove the surface crust, the settled sludge and clean the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company

N.B. *the frequency of cleaning depends on the amount of oil, grease and solids in the wastewater.*

PROHIBITIONS

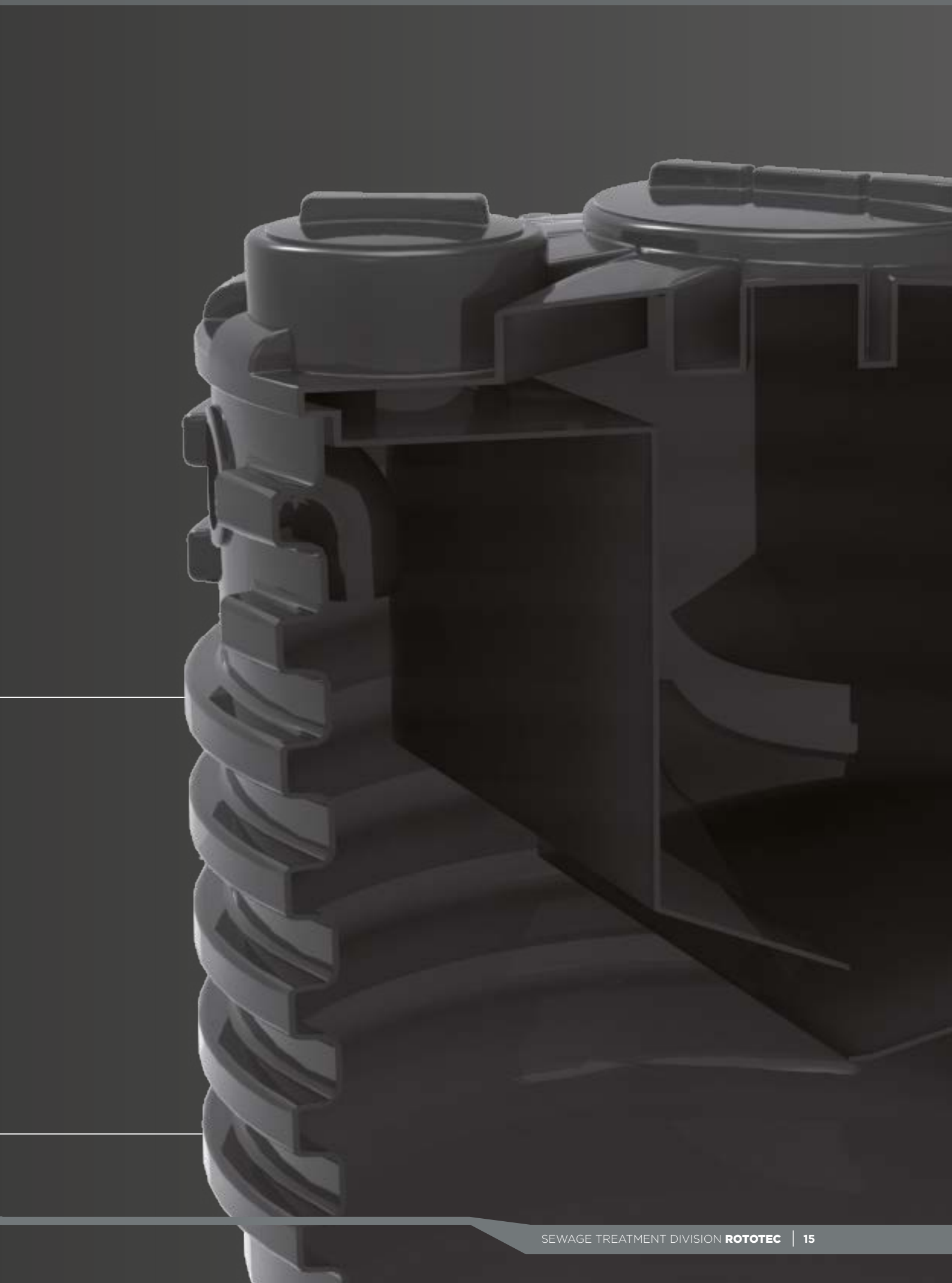
- **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents), always use biodegradable products;
- **NEVER** allow rainwater to enter the system.

WARNINGS

- make sure that drains have a siphon;
- check that the pipes have sufficient gradient (approximately 1% - 2%);
- connect the biogas vent pipe (**see underground installation**);
- in the case where grey water and sewage flow through the same pipe, **DO NOT** install the grease separator, but an Imhoff septic tank one class higher than that for the Population Equivalent (P.E.) number;
- 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.

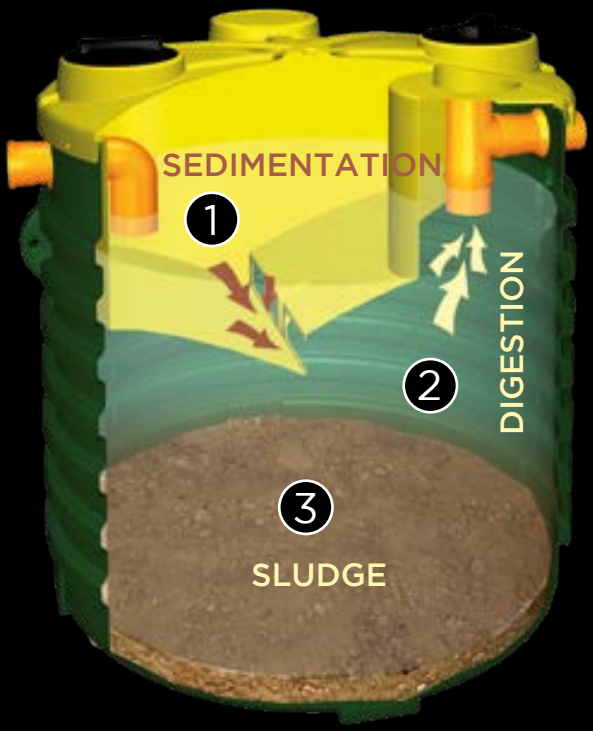
NOTES

IMHOFF BIOLOGICAL TANKS - DEPURO NIM



DEPURO NIM
IMHOFF BIOLOGICAL TANKS

CE

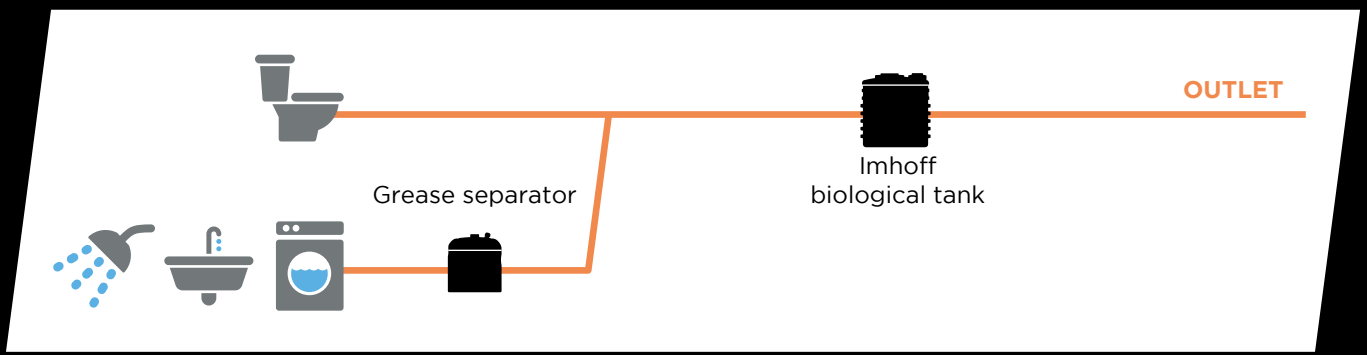


1. SEDIMENTATION: sedimentation area for incoming solids.

2. DIGESTION: area into which the treated effluent flows for digestion.

3. SLUDGE: area in which the biological sludge responsible for purifying the effluent is formed.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: DEPURO NIM consists of a polyethylene (PE) tank manufactured using rotational moulding technology. The tank is divided internally into two sections: the upper sludge sedimentation section, characterised by the classic Imhoff cone, and the lower section in which the settled sludge accumulates and is digested.

USE: Primary treatment of domestic sewage or similar from toilets.

PRODUCT CERTIFICATION

Rototec Imhoff biological tanks are CE marked and have been designed, tested and certified under standard UNI EN 12566-3 "Small wastewater treatment systems for up to 50 PT — Part 3: Packaged and/or site assembled domestic wastewater treatment".
The tests were carried out at the PIA Gmbh accredited test laboratory (Aachen - Germany). The Imhoff tanks were found to comply with the necessary requirements.

- Sewage treatment efficiency ✓
- Watertightness ✓
- Structural behaviour ✓

CERTIFIED UNI EN 12566-3

- Percentage reduction in pollutants:

64%	52%	79%
COD	BOD_5	SS

ADVANTAGES DEPURO NIM

Operating guarantee: the tests carried out according to European standards under the control of a qualified laboratory certify the actual sewage treatment levels of the system

High sewage treatment efficiency

Wide range of models: for homes from 2 to 40 Population Equivalent

Reduced costs of management and installation

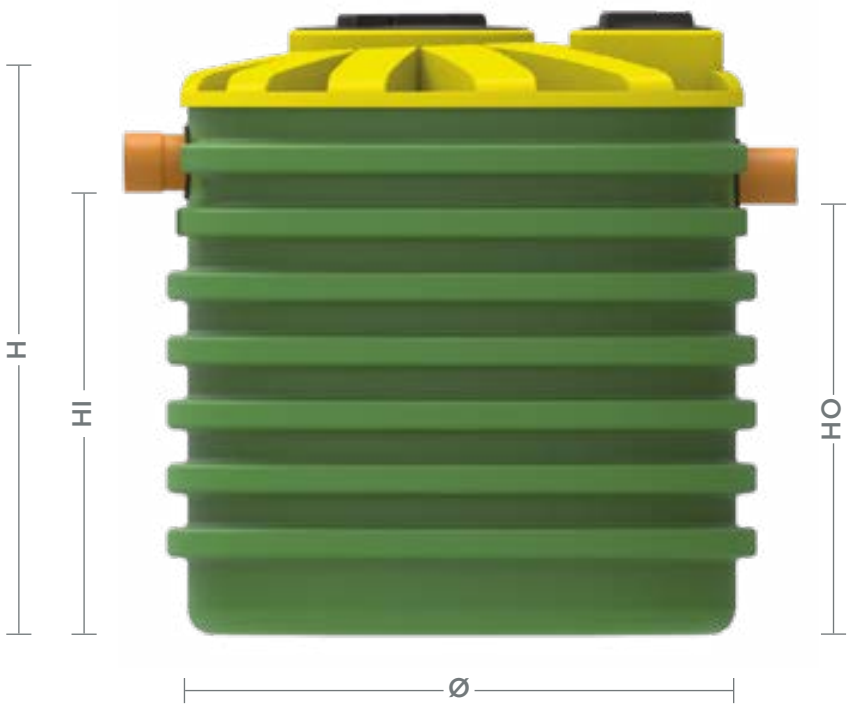
Easy installation and maintenance: thanks to the lightweight components

Strength: robust, high-strength one-piece elements

Respect for the environment: polyethylene is 100% recyclable

DEPURO NIM

MODEL



CORRUGATED

Item	Model	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Sed. Vol. l	Dig. Vol. l	Hydraulic load l/d	Organic load $gBOD_5/d$	PE.	Цени в лв/без ДДС
DEPUR002 NIM		1150	1220	880	860	110	243	607	400	120	2	610.00
DEPUR004 NIM		1150	1720	1360	1340	110	362	906	800	240	4	850.00
DEPUR007 NIM		1710	1450	1000	980	125	629	1432	1400	420	7	1350.00
DEPUR010 NIM		1710	1725	1240	1220	125	760	1765	2000	600	10	1550.00
DEPUR012 NIM		1710	1955	1490	1470	125	965	2139	2400	720	12	1900.00
DEPUR015 NIM		1710	2225	1710	1690	125	1085	2713	3000	900	15	2200.00
DEPUR020 NIM		1950	2250	1660	1640	160	1210	3137	4000	1200	20	2550.00
DEPUR025 NIM		1950	2530	1970	1950	160	1322	3778	5000	1500	25	2800.00
DEPUR032 NIM		2250	2367	1850	1830	160	1460	5474	6400	1920	32	3580.00
DEPUR040 NIM		2250	2625	2070	2050	160	2020	5803	8000	2400	40	4150.00

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

TECHNICAL SECTION - DEPURO NIM

TECHNICAL CHARACTERISTICS

A series of chemical, physical and biological processes take place inside the DEPURO NIM biological septic tank, allowing a reduction in the values of the main reference parameters (BOD5, COD, SS (Suspended Solids).
More specifically, the Imhoff cone means that the turbulence of the inlet flow is dampened in the **upper sedimentation section**, with solids tending to settle and enter the lower digestion section. In the same way, any substances with a specific weight lower than that of water (e.g. oils and greases, foam,...) separate from the effluent and accumulate on the surface. In the **digestion section**, in a **completely anaerobic environment**, the bacterial flora developed and maintained partially digests the accumulated sludge, transforming it into more stable, non-polluting products.
The Imhoff biological tank must be installed directly on the sewage line. It is good practice to install a grease separator tank for the pre-treatment of grey water from bathroom and kitchen sinks, showers, bidets, etc.

USE AND MAINTENANCE

From the moment the Imhoff DEPURO NIM is put into operation, the anaerobic bacterial flora starts to develop inside the tank. Obviously, a certain period of time is necessary in order to reach the correct balance and maximum treatment efficiency. This is known as the **start-up phase**, and can last between 2 and 5 weeks. To reduce this time, the use of a specific bio-activator is recommended.
An excessive accumulation of sedimentable material in the sludge compartment can cause **uncontrolled anaerobic digestion** phenomena, leading to an over-production of biogas and bad smells. 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, causing deterioration in the quality of the treated effluent.
The use of the Rototec BIO-ACTIVATOR is highly recommended for rendering the initiation of the biological processes more rapid, thus limiting the number of **sludge removal operations** and reducing the risk of malodorous emissions.
The DEPURO NIM Imhoff tank is designed to provide primary and secondary recirculation sludge storage for a period of 6-8 months of plant operation. A minimum of 1-2 inspections per year by qualified personnel and eventual emptying operations must be programmed according to the loads fed to the tank. Once the settled sludge has been removed, the internal surfaces of the tank must be cleaned in order to eliminate any material obstructing the effluent inlet and outlet pipes and the outlet of the sedimentation chamber.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the Imhoff biological tank	From 1 to 2 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 have sufficient gradient (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.

BIOLOGICAL SEPTIC TANKS

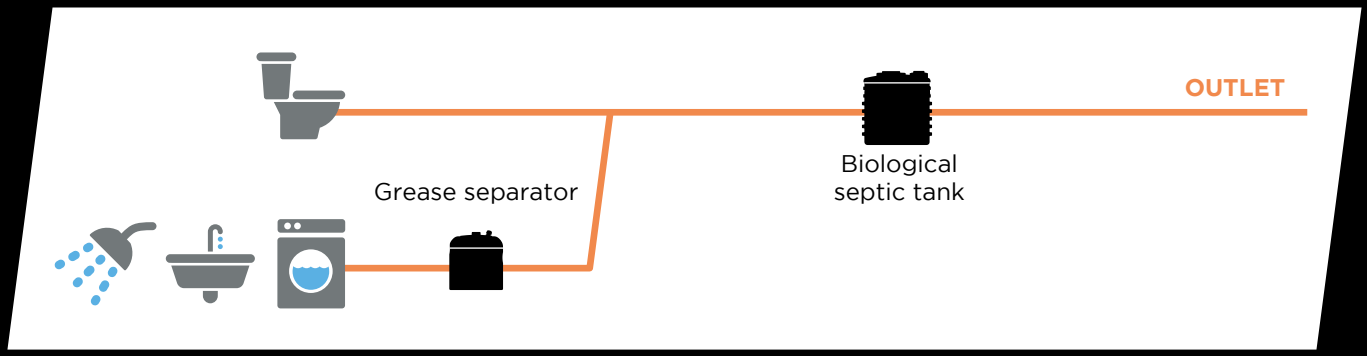
SEPTIC TANKS
BIOLOGICAL TANKS

CE

1. STILLING AREA: area in which the incoming effluent slows down, allowing sludge to settle and any lighter substances to separate.

2. SLUDGE: the separated sludge accumulates on the bottom of the tank, and undergoes anaerobic digestion by the bacterial flora.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: 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.

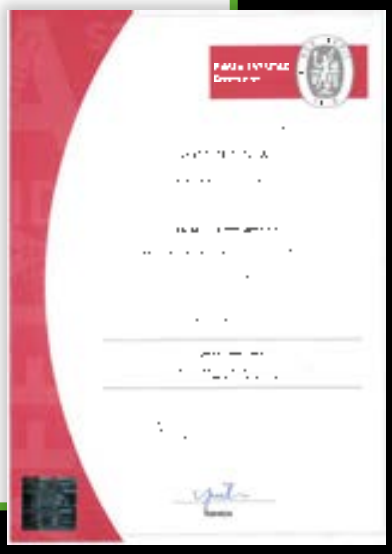
USE: Primary treatment of domestic sewage or similar from toilets.

PRODUCT CERTIFICATION

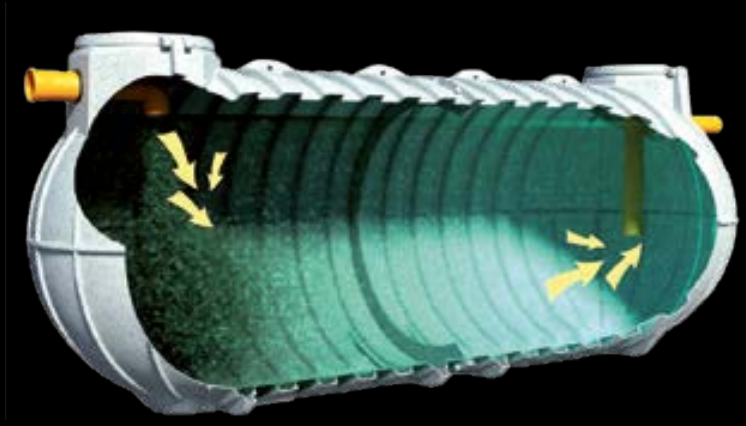
Rototec biological septic tanks are CE marked and have been designed, tested and certified under standard UNI EN 12566-1 “Small wastewater treatment systems for up to 50 PT. Part 1: Prefabricated septic tanks" (excluded modular tanks).
The septic tanks have been verified and tested at Rototec and by a third party certifying body, and have been found to comply with the necessary requirements.

- Hydraulic efficiency ✓
- Watertightness ✓
- Nominal capacity ✓
- Structural behaviour ✓
- Design requirements

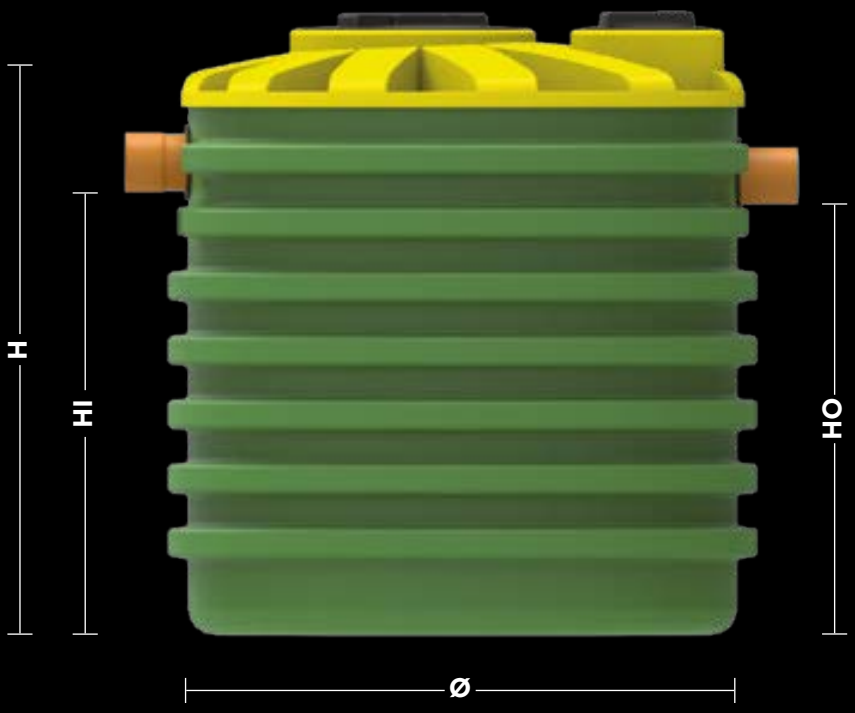
CERTIFIED UNI EN 12566-1



SEPTIC TANKS
BIOLOGICAL TANKS - MODULAR



SEPTIC TANKS
BIOLOGICAL TANKS



MODEL

SMOOTH

CORRUGATED

ELIPSE

MODULAR

SEPTIC TANKS
BIOLOGICAL TANKS - MODULAR

SEPTIC TANKS
SINGLE CHAMBER

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Useful volume l	PE.		Цени в лв/без ДДС
SE500		-	-	790	790	620	600	110	CC455-CC140	PP45	305	2		335.00
NSE1000		-	-	1150	1220	880	860	110	CC455-CC255	PP45- PP30	850	7		510.00
NSE1200		1900	708	-	1630	1250	1230	110	CC355-CC355	PP35-PP35	1200	9		680.00
NSE1500		-	-	1150	1720	1360	1340	110	CC455-CC255	PP45-PP30	1268	11		750.00
NSE1700		1900	708	-	2140	1760	1740	110	CC355-CC355	PP35-PP35	1775	13		890.00
NSE2100		-	-	1350	1975	1540	1520	110	CC455-CC355	PP45-PP35	1950	15		980.00
NSE2600		-	-	1710	1450	1000	980	125	CC455-CC355	PP45-PP35	2061	16		1,220.00
NSE3200		-	-	1710	1725	1240	1220	125	CC455-CC355	PP45-PP35	2525	20		1,500.00
NSE3800		-	-	1710	1955	1525	1505	125	CC455-CC355	PP45-PP35	3175	24		1,800.00
NSE4600		-	-	1710	2225	1745	1725	125	CC455-CC355	PP45-PP35	3835	30		2,100.00
NSE5400		-	-	1950	2250	1700	1680	125	CC455-CC455	PP45-PP45	4578	36		2,400.00
NSE6400		-	-	1950	2530	2000	1980	125	CC455-CC455	PP45-PP45	5293	42		2,600.00
NSE7000		-	-	2250	2367	1850	1830	160	CC455-CC455	PP45-PP45	6934	55		3,400.00
NSE9000		-	-	2250	2625	2070	2050	160	CC455-CC455	PP45-PP45	7823	70		3,580.00
ITSE15000		5620	-	2100	2200	1870	1850	160	TAP710	2 x PP77	14150	140*	70**	7,500.00
ITSE22000		7880	-	2100	2200	1850	1830	200	TAP710	2 x PP77	20700	200*	100**	10,900.00
ITSE30000		10140	-	2100	2200	1820	1800	250	TAP710	2 x PP77	27250	270*	135**	14,300.00
ITSE36000		12400	-	2100	2200	1820	1800	250	TAP710	2 x PP77	33800	330*	165**	17,700.00

* When sizing the septic tank using a pro capita volume of 100 l / PE it is necessary to pump out the tank 3-4 times a year.
** When sizing the septic tank using a pro capita volume of 200 l/PE it is necessary to pump out the tank 1-2 times a year.

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

TECHNICAL SECTION - SEPTIC TANKS

TECHNICAL CHARACTERISTICS

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. **The septic tanks are certified under standard UNI EN 12566-1**.

USE AND MAINTENANCE

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

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.

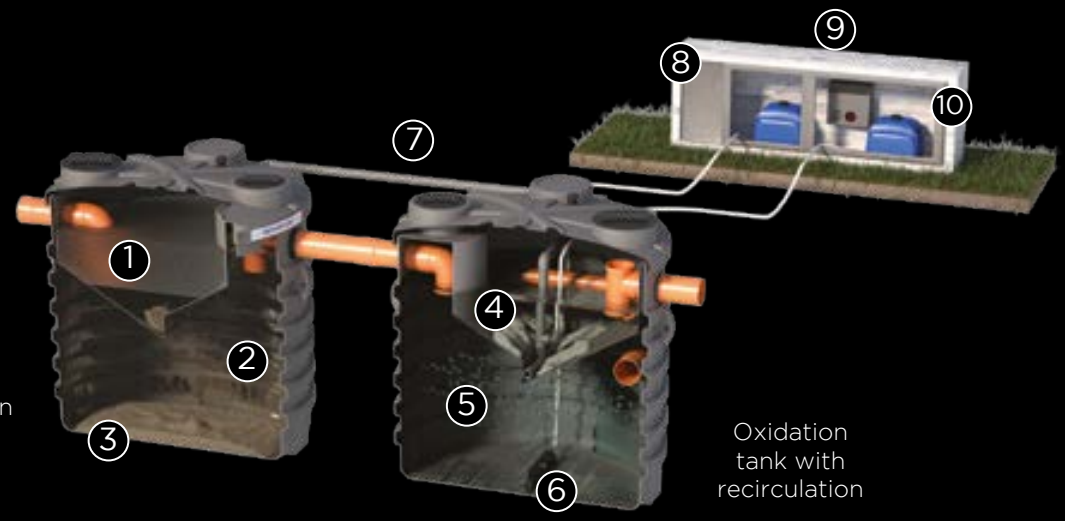
WARNINGS

- 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.

NOTES

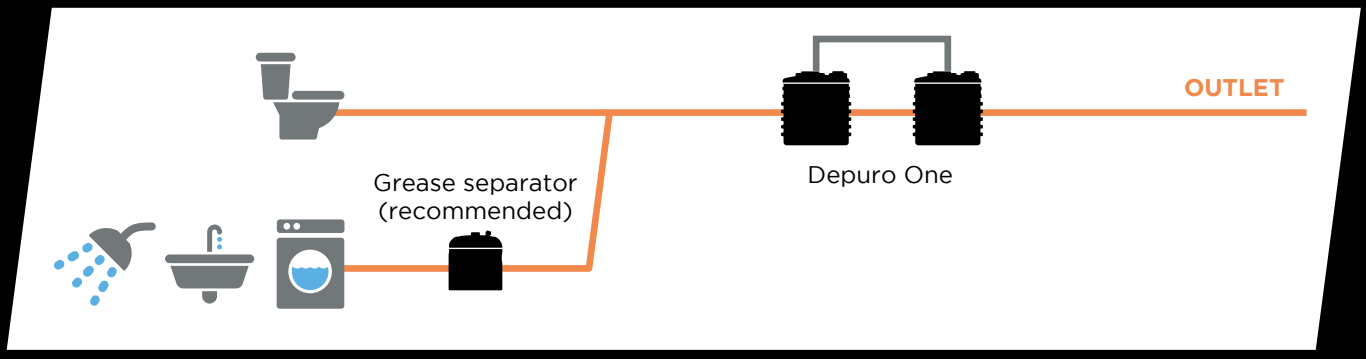
SEWAGE TREATMENT PLANTS - DEPURO

DEPURO ONE



1.SEDIMENTATION: sedimentation area for incoming solids.
2. DIGESTION: area into which the treated effluent flows for digestion.
3. SLUDGE: area in which the biological sludge responsible for purifying the effluent is formed.
4. SEDIMENTATION AREA: stilling area in which the residual sludge sediments and returns once again to the primary sedimentation tank.
5. OXYGENATION AREA: area in which the effluent is mixed and oxygenated, thanks to air diffuser plates. This develops aerobic bacteria that transform the biodegradable compounds into CO2, organic nitrogen into ammonia and ammonia into nitrates.
6. PIPE DIFFUSERS: micro-bubble air diffusers, included
7. SLUDGE RETURN: air-lift system to return the sludge that has settled in the primary sedimentation tank.
8. RECIRCULATION BLOWER: included.
9. ELECTRIC PANEL: serving the blowers. Fitted with timer and an audible/visual alarm (included).
10. OXYGENATION BLOWER: used to blow air into the oxygenation area through the diffusers. Included.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: DEPURO ONE is a fully biological treatment system for domestic effluent and the like. It consists of two tanks: a primary tank for separation, digestion and sludge accumulation (primary sedimentation tank) and an oxydation tank with recirculation to oxidise the pollutants present in the effluent. Both tanks are made of polyethylene (PE) manufactured using rotational moulding technology.

USE: Primary and secondary treatment of domestic and assimilable sewage.

PRODUCT CERTIFICATION

Rototec DEPURO ONE systems are CE marked and have been designed, tested and certified under standard UNI EN 12566-3 "Small wastewater treatment systems for up to 50 PT — Part 3: Packaged and/or site assembled domestic wastewater treatment".
The tests were carried out at the PIA Gmbh accredited test laboratory (Aachen - Germany). DEPURO ONE systems were found to comply with the necessary requirements.

- Sewage treatment efficiency ✓
- Watertightness ✓
- Structural behaviour ✓

CERTIFIED UNI EN 12566-3

- Percentage reduction in pollutants:

84%	87%	92%	27%
COD	BOD_5	SS	N_{tot}

ADVANTAGES DEPURO ONE

Operating guarantee: the tests carried out according to European standards under the control of a qualified laboratory certify the actual sewage treatment levels of the system

High sewage treatment efficiency

Wide range of models: for homes from 2 to 40 Population Equivalent

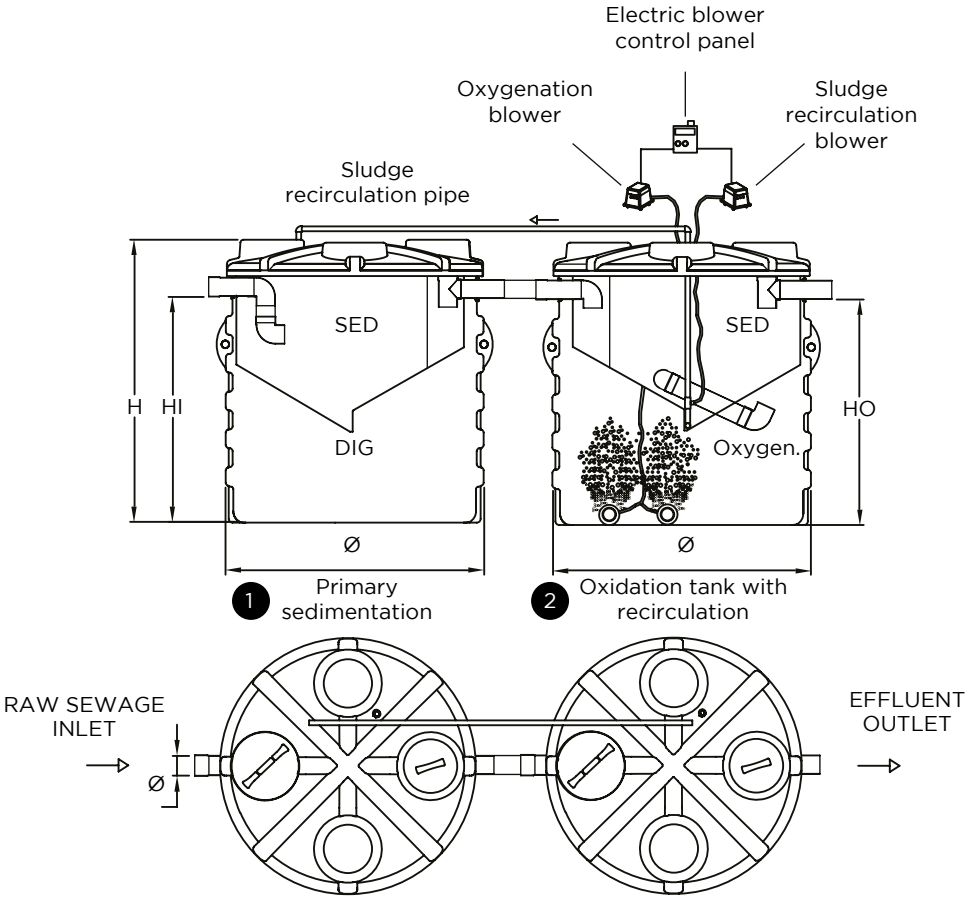
Reduced costs of management and installation

Easy installation and maintenance: thanks to the lightweight components

Strength: robust, high-strength one-piece elements

Respect for the environment: polyethylene is 100% recyclable

DEPURO ONE



MODEL

CORRUGATED

Item	Model	Ø mm	H mm	HI mm	HO mm	Ø Pipes mm	TANK 1		TANK 2		Hydraulic load l/d	Organic load $gBOD_5/d$	Blower power W	PE.	Цени в лв/без ДДС
							Sed. vol. l	Dig. vol. l	Oxyg. vol. l	Final sed. vol. l					
DEPURO 020NE		1150	1220	880	860	110	243	607	607	243	400	120	61+31	2	3550.00
DEPURO 040NE		1150	1720	1360	1340	110	362	906	906	362	800	240	61+31	4	4150.00
DEPURO 070NE		1710	1450	1000	980	125	629	1432	1432	629	1400	420	91+31	7	5900.00
DEPURO 100NE		1710	1725	1240	1220	125	780	1765	1765	780	2000	600	91+31	10	6050.00
DEPURO 120NE		1710	1955	1490	1470	125	965	2139	2139	965	2400	720	91+61	12	6770.00
DEPURO 150NE		1710	2225	1710	1690	125	1085	2713	2713	1085	3000	900	152+61	15	7500.00
DEPURO 200NE		1950	2250	1680	1640	160	1210	3137	3137	1210	4000	1200	152+61	20	8400.00
DEPURO 250NE		1950	2530	1970	1950	160	1322	3778	3778	1322	5000	1500	152+61	25	8800.00
DEPURO 320NE		2250	2367	1850	1830	160	1460	5474	5474	1460	6400	1920	186+91	32	10700.00
DEPURO 400NE		2250	2625	2070	2050	160	2020	5803	5803	2020	8000	2400	186+91	40	11300.00

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height.

TECHNICAL SECTION - DEPURO ONE

TECHNICAL CHARACTERISTICS

A number of both anaerobic and aerobic biological processes take place within the **DEPURO ONE** treatment plant, creating different species of bacterial that do or do not use oxygen to oxidise the organic substrate. For this reason, the nitrogenous compounds present in the effluent are oxidised (in an aerobic environment) or reduced (in an anaerobic environment), transforming into more simple, non-polluting compounds such as molecular nitrogen (N2). The system consists of 2 elements:

TANK 1: this is a true Imhoff type **biological tank**, consisting of two overlapping and hydraulically communicating compartments. In the upper compartment the sedimentable solids drop to the bottom of the sedimentation chamber by gravity. The chamber is suitably inclined to allow the sludge to pass into the lower compartment. Here the sludge accumulates and is partially digested by **anaerobic bacterial micro flora** which develops and remains active.
In the same way, the components with a specific weight lower than that of water (e.g. oils and greases, foam,...) separate from the effluent and accumulate in the upper compartment of the tank.
The surplus sludge recirculated by the oxidation tank installed downstream also accumulate in this first tank.
The physical process of gravity separation, combined with the cold anaerobic digestion processes that take place in this first tank, result in an **over 50% reduction** of the solid and organic component in the effluent itself.

TANK 2: this is also divided into two sections: the lower, and larger, section provides for **oxygenation of the effluent**, whereas the (successive) upper section is a **stilling area** in which the residual surplus sludge separates from the effluent, accumulates on the bottom of the tank, and are returned to the first tank via an air-lift type recirculation system. The oxygen required to develop the aerobic reactions is made available in dissolved form through dissolution in the liquid of the oxygen present in the atmosphere, by means of energetic artificial aeration using suitable **blowers/compressors** and **micro-bubble air diffusers**, located on the bottom of the tank. Complex phenomena are set up in the oxygen-rich environment of the aeration compartment. These are chemical (chemical oxidation of the malodorous substances), physical (the jelly-like flakes of activated sludge trap any solids that may have escaped primary treatment) and above all biological (the micro-organisms use the dissolved organic substances to develop, transforming them into a living substance that can be separated from the water by sedimentation) . The two blowers/compressors (the oxygenation blower and the one feeding the recirculation system) are low-energy diaphragm compressors equipped with a **control panel with digital timer** to optimise the system on/off timing. This control panel also has a **buzzer** and a **visual alarm** to indicate any malfunctions in the compressors.

USE AND MAINTENANCE

TANK 1: an excessive accumulation of sedimentable material in the sludge compartment can cause **uncontrolled anaerobic digestion** phenomena, leading to an over-production of biogas and 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.
The use of the Rototec BIO-ACTIVATOR is highly recommended for rendering the initiation of the biological processes more rapid, thus limiting the number of **sludge removal operations** and reducing the risk of malodorous emissions.
The Imhoff tank is designed to provide primary and secondary recirculation sludge storage for a period of 6-8 months of plant operation. A minimum of 1-2 inspections per year by qualified personnel and eventual emptying operations must be programmed according to the loads fed to the tank. Once the settled sludge has been removed, the internal surfaces of the tank must be cleaned in order to eliminate any material obstructing the effluent inlet and outlet pipes and the outlet of the sedimentation chamber.

TANK 2: check the sedimentation section periodically to see whether there are areas of **sludge build-up**. In the same way, also check the characteristics of the effluent in the oxygenation section. The effluent must be rather clear, with suspended flakes (activated sludge) that are clearly defined and **light brown in colour**. If there is an excessive build-up of sludge in the sedimentation chamber and the effluent is excessively turbid with dark, stringy flakes, the sludge must be extracted. Like the primary sedimentation tank, the oxidation tank normally requires cleaning and pumping out every 6-8 months.
Activation of the oxidation tank and formation of the flakes of sludge requires an initial period of 2-3 weeks. The activation processes can be optimised and speeded up by using the Rototec BIO-ACTIVATOR specific for aerobic treatment plants.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the primary sedimentation	From 1 to 2 times a year	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	Every 6 / 12 months	Contact a licensed waste disposal company
Inspect the oxydation tank	Every 6 / 12 months	Unscrew the covers on the inspection holes and check the level of sediments
Extract the bottom sludge, clean the internal walls and the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company
Clean the pipe diffuser in the oxydation tank	Every 6 / 12 months	Contact a licensed waste disposal company (water jet pump-out)
Check that the blower in the oxydation tank is working properly	Every month	Unfasten the cover on the inlet inspection hole and check that air is being blown into the oxydation tank
Check that the recirculation blower is working properly	Every month	Unfasten the cover on the oxydation tank inlet and check sludge recirculation

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

PROHIBITIONS

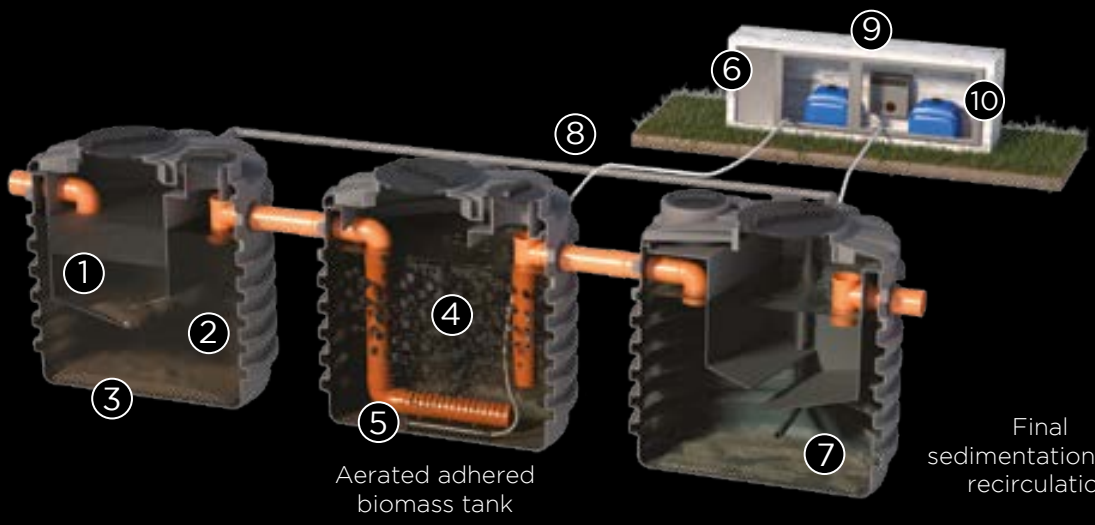
• **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents); always use biodegradable products;
• **NEVER** flush paper tissues, kitchen towel, paper napkins or other materials except toilet paper down the toilet;
• **NEVER** drain 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 in both tanks (**see underground installation**);
• after pump-out, fill the tanks again with **clean water**;
• in the event of a maintenance operation of any kind, always comply with the **safety regulations** regarding operations within closed wastewater treatment areas, and with the general technical procedures applicable.

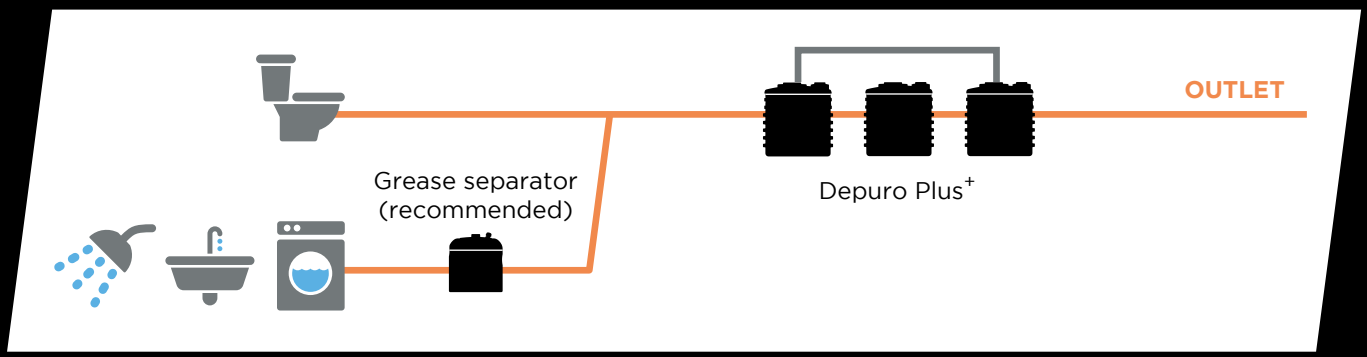
DEPURO PLUS+

CE



1.SEDIMENTATION: sedimentation area for incoming solids.
2. DIGESTION: area into which the treated effluent flows for digestion.
3. SLUDGE: area in which the biological sludge responsible for treatment of the effluent is formed.
4. FILTER MEDIA: plastic filter media with a large surface area (> 450 m2/m3) that act as a support on which the aerobic bacterial that treat the effluent can develop.
5. PIPE DIFFUSERS: micro-bubble air diffusers, included
6. OXYGENATION BLOWER: used to blow air into the treatment plant through the diffusers. Included.
7. FINAL SEDIMENTATION: stilling tank in which the surplus sludge sediments and returns once again to the primary sedimentation section.
8. SLUDGE RETURN: air-lift system to return the sludge that has settled in the primary sedimentation tank.
9. ELECTRIC PANEL: serving the blowers. Fitted with timer and buzzer/visual alarm (included).
10. RECIRCULATION BLOWER: included.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: DEPURO PLUS is a fully biological treatment system for domestic effluent and the like. It consists of three tanks: a primary tank for separation, digestion and sludge accumulation (primary sedimentation tank), an aerated adhered biomass treatment tank to oxidise the pollutants present in the effluent and a final sedimentation tank for the separation of the surplus sludge and the recirculation of it. All the tanks are made of polyethylene (PE) manufactured using rotational moulding technology.

USE: Primary and secondary treatment of domestic and assimilable sewage.

PRODUCT CERTIFICATION

Rototec DEPURO PLUS systems are CE marked and have been designed, tested and certified under standard UNI EN 12566-3 "Small wastewater treatment systems for up to 50 PT — Part 3: Packaged and/or site assembled domestic wastewater treatment".
The tests were carried out at the PIA Gmbh accredited test laboratory (Aachen - Germany). DEPURO PLUS systems were found to comply with the necessary requirements.

- Sewage treatment efficiency ✓
- Watertightness ✓
- Structural behaviour ✓

CERTIFIED UNI EN 12566-3

- Percentage reduction in pollutants:

92%	95%	96%	57%
COD	BOD_5	SS	N_{tot}


PIA
PERFORMANCE RESULTS

ADVANTAGES DEPURO PLUS+

Operating guarantee: the tests carried out according to European standards under the control of a qualified laboratory certify the actual sewage treatment levels of the system

High sewage treatment efficiency

Wide range of models: for homes from 3 to 45 Population Equivalent

Reduced costs of management and installation

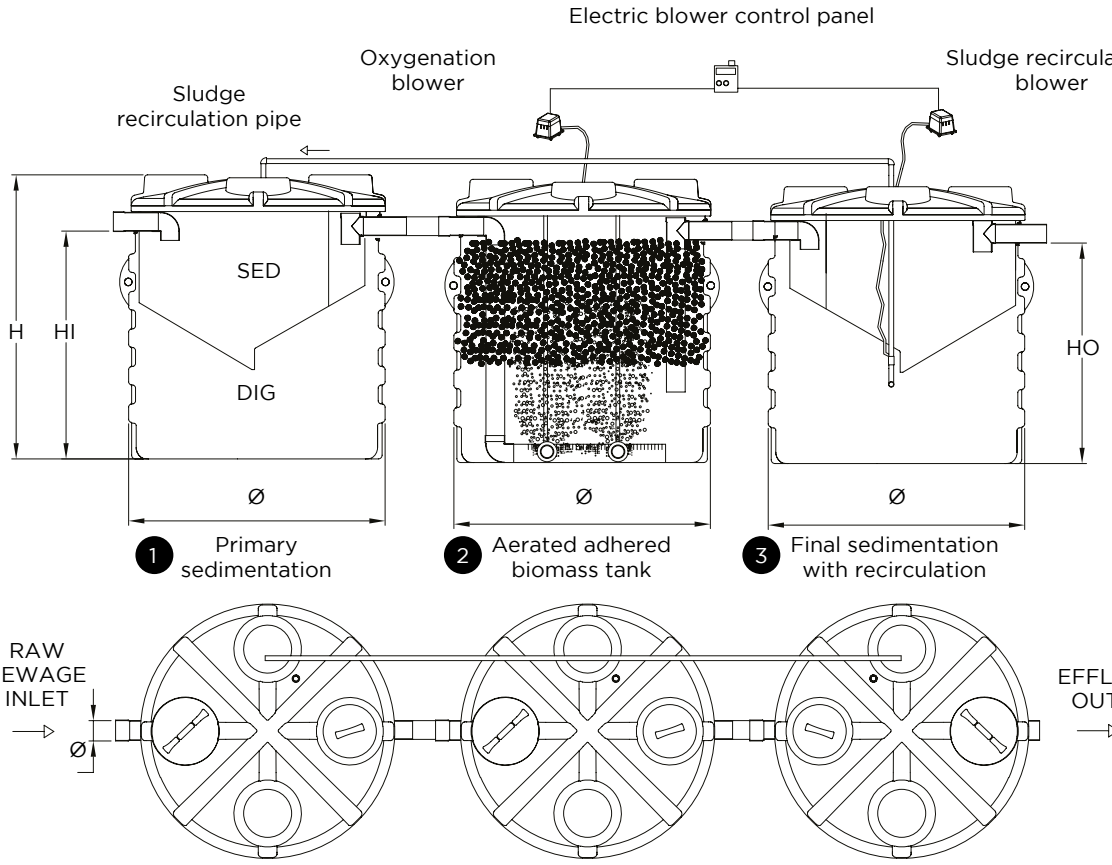
Easy installation and maintenance: thanks to the light-weight components

Strength: strong, high-resistance one-piece elements

Respect for the environment: polyethylene is 100% recyclable

DEPURO PLUS+

MODEL



CORRUGATED

Item	Model	Ø mm	H mm	HI mm	HO mm	Ø Pipes mm	TANK 1		TANK 2	TANK 3	Hydraulic load l/d	Organic load $gBOD_5/d$	Blower power W	PE.	Цени в лв/без ДДС
							Sed. vol. l	Dig. vol. l	Filter vol. l	Tot. vol. l					
DEPURO 03PLUS		1150	1220	880	860	110	243	607	607	850	600	180	61+31	3	4680.00
DEPURO 05PLUS		1150	1720	1360	1340	110	362	906	906	1268	1000	300	61+31	5	5760.00
DEPURO 10PLUS		1710	1450	1000	980	125	629	1432	1432	2061	2000	600	91+31	10	8340.00
DEPURO 14PLUS		1710	1725	1240	1220	125	780	1765	1765	2525	2800	840	91+31	14	8560.00
DEPURO 18PLUS		1710	1955	1490	1470	125	965	2139	2139	3175	3600	1080	91+61	18	9980.00
DEPURO 23PLUS		1710	2225	1710	1690	125	1085	2713	2713	3835	4600	1360	152+61	23	11200.00
DEPURO 28PLUS		1950	2250	1680	1640	160	1210	3137	3137	4578	5600	1680	152+61	28	12800.00
DEPURO 35PLUS		1950	2530	1970	1950	160	1322	3778	3778	5293	7000	2100	152+61	35	13870.00
DEPURO 40PLUS		2250	2367	1850	1830	160	1460	5474	5474	6934	8000	2400	186+91	40	16870.00
DEPURO 45PLUS		2250	2625	2070	2050	160	2020	5803	5803	7823	9000	2700	186+91	45	17650.00

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height.

TECHNICAL SECTION - DEPURO PLUS+

TECHNICAL CHARACTERISTICS

A number of both anaerobic and aerobic biological processes take place within the **DEPURO PLUS** treatment plant, creating different species of bacteria that do or do not use oxygen to oxidise the organic substrate. For this reason, the nitrogenous compounds present in the effluent are oxidised (in an aerobic environment) or reduced (in an anaerobic environment), transforming into more simple, non-polluting compounds such as molecular nitrogen (N2). The system consists of 3 elements:

TANK 1: this is a true Imhoff type **biological tank**, consisting of two overlapping and hydraulically communicating compartments. In the upper compartment the sedimentable solids drop to the bottom of the sedimentation chamber by gravity. The chamber is suitably inclined to allow the sludge to pass into the lower compartment. Here the sludge accumulates and is partially digested by **anaerobic bacterial micro flora** which develops and remains active.
In the same way, the components with a specific weight lower than that of water (e.g. oils and greases, foam,...) separate from the effluent and accumulate in the upper compartment of the tank.
The surplus sludge recirculated by the final sedimentation tank installed downstream of the adhered biomass treatment plant also accumulate in this first tank.
The physical process of gravity separation, combined with the cold anaerobic digestion processes that take place in this first tank, result in an **over 50% reduction** of the solid and organic component in the effluent itself.

TANK 2: this is an **aerated adhered biomass trickle filter** in which there is a large number of plastic filter media bodies characterised by their high surface area **(> 450 m2/m3)**. These act as a support for development of the bacterial populations that are responsible for the treatment processes. As it has a very high volume of empty space, it reduces the risk of blocking the filter bed to a minimum and also guarantees better air circulation. The filter bed, made up of filter media, is oxygenated thanks to the presence of **micro-bubble air diffusers** located on the bottom of the tank and powered by a suitable external low-energy diaphragm **blower/compressor**. Complex phenomena are set up in the **oxygen-rich environment**. These are chemical (chemical oxidation of the malodorous substances), physical (the jelly-like flakes of activated sludge trap any solids that may have escaped primary treatment) and above all biological (the micro-organisms that develop on the surfaces of the plastic supports use the dissolved organic substances to develop, transforming them into a living substance that can be separated from the water by sedimentation) .

TANK 3: this is a second Imhoff tank that allows separation by sedimentation of the surplus sludge coming from the biomass treatment plant. This is then returned to the first tank via an **air-lift type recirculation system** powered by a second diaphragm compressor blower.

USE AND MAINTENANCE

TANK 1: an excessive accumulation of sedimentable material in the sludge compartment can cause **uncontrolled anaerobic digestion** phenomena, leading to an over-production of biogas and 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.
The use of the Rototec BIO-ACTIVATOR is highly recommended for rendering the initiation of the biological processes more rapid, thus limiting the number of **sludge removal operations** and reducing the risk of malodorous emissions.
The primary sedimentazione tank is designed to provide primary and secondary recirculation sludge storage for a period of 6-8 months of plant operation. A minimum of 1-2 inspections per year by qualified personnel and eventual emptying operations must be programmed according to the loads fed to the tank. Once the settled sludge has been removed, the internal surfaces of the tank must be cleaned in order to eliminate any material obstructing the effluent inlet and outlet pipes and the outlet of the sedimentation chamber.
During periodic inspections, also make sure that the sludge recirculation pipe is **working properly** and, if necessary, clean it internally using a jet of pressurised water.
TANK 2: periodically check the interior of the tank. If the trickle filter is working properly, the filter media will be covered by a thin layer of light brown biological sludge. When the filter media is **completely covered** with sludge and no empty spaces inside them are visible, or when the sludge takes on a darker colour it is necessary to pump out the tank. Like the Imhoff tank, the trickle filter normally requires cleaning and pumping out every 6-8 months.
Activation of the adhered biomass trickle filter, by formation of the bacterial film on the filter media, requires an initial period of 2-3 weeks. The activation processes can be optimised and speeded up by using the Rototec BIO-ACTIVATOR specific for aerobic treatment plants.
TANK 3: an excessive accumulation of sedimentable material in the sludge compartment can cause uncontrolled anaerobic digestion phenomena, leading to an **over-production of biogas** and 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. Once the settled sludge has been removed, the internal surfaces of the tank must be cleaned in order to eliminate any material obstructing the effluent inlet and outlet pipes and the outlet of the sedimentation chamber.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the primary sedimentation tank	From 1 to 2 times a year	Unscrew the inspection covers and check the level of sediments
Extract the bottom sludge, clean the interior and the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company
Inspect the aerated adhered biomass tank	Every 6 / 12 months	Unscrew the inspection covers and check the level of sediments
Remove the settled sludge, clean the internal walls, the inlet and outlet pipes and backwash the filter media	Every 6 / 12 months	Contact a licensed waste disposal company
Clean the aerated adhered biomass tank pipe diffuser	Every 6 / 12 months	Contact a licensed waste disposal company (water jet pump-out)
Check that the blower in the aerated adhered biomass tank is working properly	Every month	Unscrew the cover on the inlet inspection hole and check that air is being blown into the aerated adhered biomass tank
Check that the recirculation blower is working properly	Every month	Unscrew the cover on the first Imhoff tank inlet inspection hole and check sludge recirculation

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 have sufficient gradient (approximately 1% - 2%);
• connect the biogas vent pipe in both tanks (**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.

TECHNICAL SECTION - DEPURO ACCESSORIES
(INCLUDED IN THE SUPPLY)

BLOWER/COMPRESSOR

Rototec fits its aerated biomass tanks with diaphragm type air compressors which make use of the **electromagnetic vibration** of an actuator rod supported by rubber diaphragms.
This system reduces **energy consumption to a minimum** by supplying constant air flows without any variations in working pressure. The blower does not have any moving parts in contact, and as such does **not require any lubrication**. Special attention is paid to the sound insulation and to the design of the vibrating section of the compressor in order to make it **as silent as possible**.

COMPRESSOR BLOWER

Item	Voltage V	Frequency Hz	Watt W	Amps A	Capacity l/min	rated pressure bar	Noise level dB	Weight kg	Цени в лв/без ДДС
HP 40	220	50	31	0.32	40	0.13	<39	4.9	**240.00**
HP 60	220	50	61	0.6	70	0.15	<48	6.9	**340.00**
HP 80	220	50	91	1	88	0.15	<57	7	**400.00**
HP 150	220	50	152	1.9	148	0.2	<53	13	**550.00**
HP 200	220	50	186	1.7	200	0.2	<48	11.9	**1050.00**

Description: diaphragm type air compressors used in air-lift sludge return systems and for developing an aeration system necessary for the digestive processes of the aerobic bacteria, making use of the electromagnetic vibration of an actuator rod supported by synthetic rubber diaphragms.

INSTALLATION

- install in a special above ground technical room (with an environment free from corrosive gas), protected from the weather but with adequate ventilation to avoid overheating of the blower;
- **maximum distance of 10 m** from the aerated biomass tank;
- the blower must rest on a stable, flat surface, not exposed to vibration, at a level higher than that of the plant itself so as to avoid any return of the sludge if the air supply is interrupted;
- if necessary, provide ducting for the air pipe, running from the technical room to the edge of the tank (minimum diameter 80mm), and for the electric cable (minimum diameter 63mm);
- connect one end of the air feed pipe supplied to the outlet of the blower using the appropriate clips;
- connect the other end of the pipe to the coupling on the tank;
- when installation has been completed, connect the blower to the **power socket (220V, 50Hz)**.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Check that the blower is working properly	Every month	Unscrew the cover on the inlet inspection hole and check that air is being blown into the tank
Clean the suction filter	Every 3 months	Remove the filter, eliminate excess dust and if necessary wash with mild detergent

PROHIBITIONS

- never connect the compressor to energy sources other than those indicated. In the case of doubt regarding making the connections, **DO NOT** connect up the equipment.

WARNINGS

- the operating temperature must be between –20°C and +40°C with relatively low humidity;
- always carry out all cleaning and/or replacement operations **with the electric power supply disconnected**;
- before carrying out any cleaning and/or replacement operation, make sure that the body of the compressor has **cooled down,** to avoid any risk of burns;
- when carrying out repairs, it is good practice only to use **original materials** in order to guarantee the safety of the equipment;
- maintenance operations that require the presence of electricity, such as detecting faults inside the blower, must only be carried out by **qualified technicians**;

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 m^3/h	Working temperature limit	Weight kg	Diaphragm material	Clip material	Цени в лв/без ДДС
IFADNT600	60	300	1-3	5.1-15.3	From 0° to 120°C	0.9	Silicone	304 stainless steel	**75.00**

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.

ELECTRIC PANEL CONTROLLING BLOWERS

The electric panel allows the system's two blower/compressors to be managed independently.
Each blower has an ON/OFF switch, a **thermal cut-out** and a **digital timer** to adjust when it is turned on and off. The thermal cut-outs are connected to a LED and a **buzzer**, to indicate any malfunctions in one or both the blowers.

ADJUSTING THE TIMER

For proper operation of the plant it is necessary to set the times so as to adjust operation of the two blowers/compressors as indicated below:

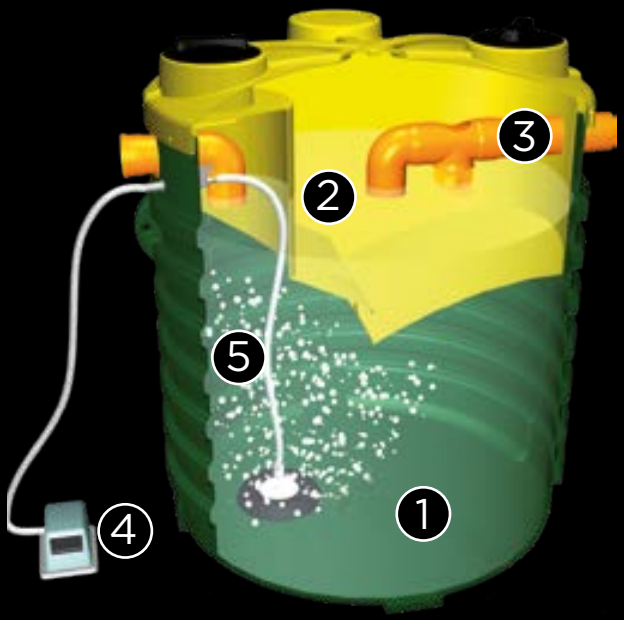
- **oxygenation:** 1/2 an hour on, 1/2 an hour off during the whole 24 hours of one day;
- **sludge recirculation:** four times a day for 2 minutes at the following times: 11:00-11:02, 15:00-15:02, 22:00-22:02, 03:00-03:02.

WARNINGS

- Do not use the product in environments where there is dust, acids, corrosive and/or flammable gasses, etc...
- The panel must be **moved with care**, as falls or impact might cause damage that is not visible externally.
- Connection of the electric panel must be carried out by a **qualified electrician**, in compliance with current electrical regulations.
- The panel must be connected to an efficient earthing system, according to local **electrical regulations in force**.
- Before carrying out any type of control or maintenance operation, disconnect the power supply.
- If the alarm is triggered, disconnect the two blowers/compressors from the power supply and have a specialist technician check them to identify the problem.

ACTIVATED SLUDGE PLANTS

ACTIVATED SLUDGE PLANT
LOW-LOAD



1. OXYGENATION AREA: area in which the effluent is mixed and oxygenated, thanks to micro-bubble air diffuser plates, powered by an external blower/compressor. This develops aerobic bacteria that transform the biodegradable compounds into CO2, organic nitrogen into ammonia and ammonia into nitrates.

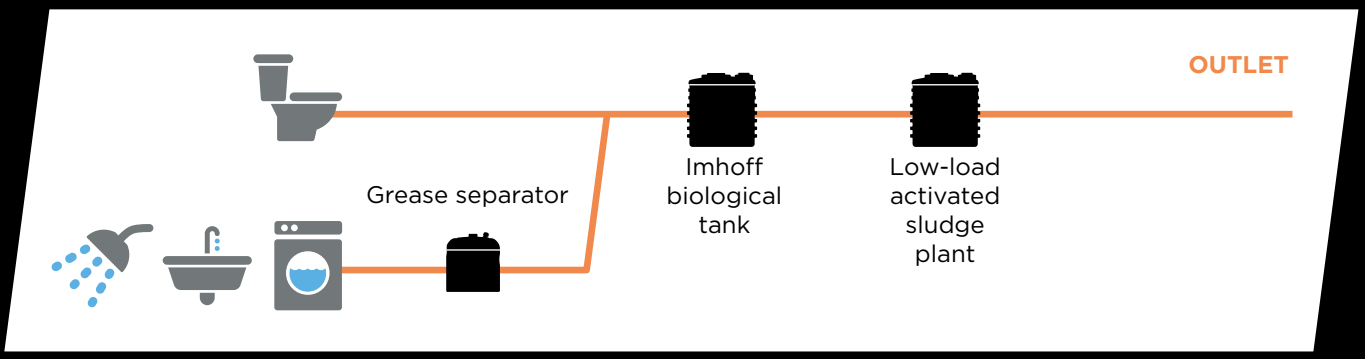
2. SEDIMENTATION AREA: stilling area in which the residual sludge sediments and returns once again to the oxygenation section.

3. FINAL DISINFECTION: housing, on the outlet pipe, into which a slow release chlorine tablet is inserted. In this way the effluent is disinfected before being discharged.

4. BLOWER (included).

5. DIFFUSER PLATE (included).

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: 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 ep the high concentrations of solids present in the tank in suspension.

USE: secondary treatment of domestic sewage.

REFERENCE STANDARDS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator, an Imhoff biological tank and an activated sludge plant (installed as shown in the diagram at page 50) ensures that the concentrations of the final effluent are:

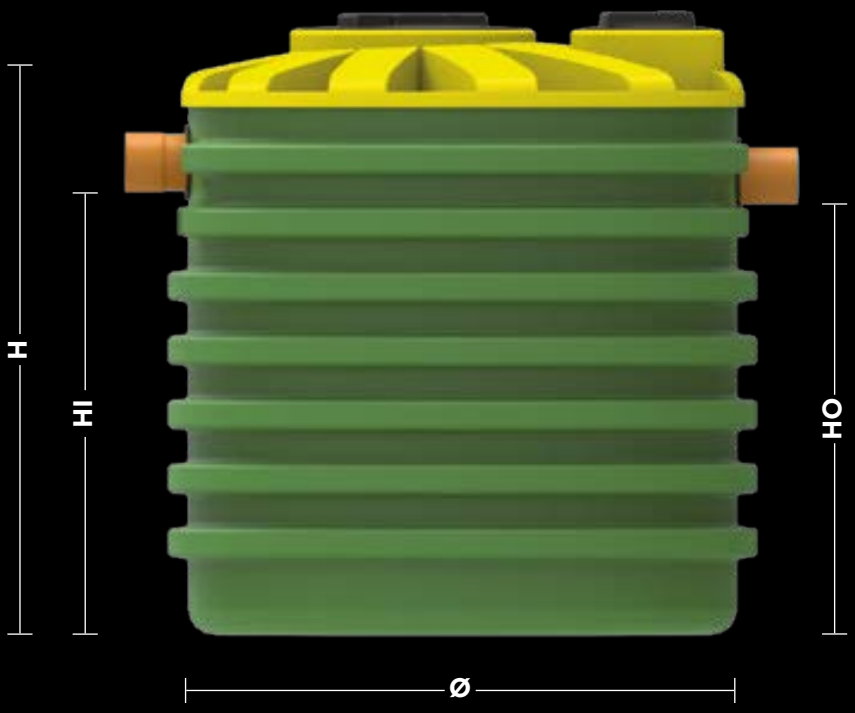
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

ACTIVATED SLUDGE PLANT

MODEL



CORRUGATED

ELIPSE

MODULAR

ACTIVATED SLUDGE PLANT
MODULAR

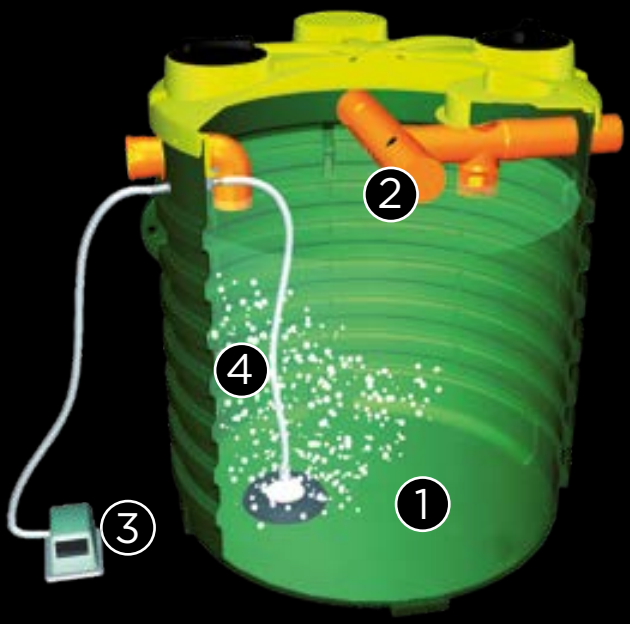
ACTIVATED SLUDGE PLANT

LOW-LOAD

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Aerated volume l	Sedimentation volume l	Blower Mod.	Diffuser Plates No.	PE.	Цени в лв/без ДДС
NIFA1000		-	-	1150	1220	880	860	110	CC455-CC255	PP45- PP30	607	243	HP40	1	5	1400.00
NIFA1200		1900	708	-	1630	1250	1230	110	CC355-CC355	PP35-PP35	910	290	HP40	1	6	1650.00
NIFA1500		-	-	1150	1720	1360	1340	110	CC455-CC255	PP45-PP30	906	362	HP40	1	8	1700.00
NIFA1700		1900	708	-	2140	1760	1740	110	CC355-CC355	PP35-PP35	1363	412	HP40	1	9	1800.00
NIFA2100		-	-	1350	1975	1540	1520	110	CC455-CC355	PP45-PP35	1470	480	HP60	2	11	2260.00
NIFA2600		-	-	1710	1450	1000	980	125	CC455-CC355	PP45-PP35	1432	629	HP80	2	13	2550.00
NIFA3200		-	-	1710	1725	1240	1220	125	CC455-CC355	PP45-PP35	1765	760	HP80	2	16	2700.00
NIFA3800		-	-	1710	1955	1490	1470	125	CC455-CC355	PP45-PP35	2139	965	HP80	2	20	3200.00
NIFA4600		-	-	1710	2225	1710	1690	160	CC455-CC355	PP45-PP35	2713	1085	HP80	2	25	3500.00
NIFA5400		-	-	1950	2250	1660	1640	160	CC455-CC455	PP45-PP45	3137	1210	HP80	2	30	4000.00
NIFA6400		-	-	1950	2530	1970	1950	160	CC455-CC455	PP45-PP45	3778	1322	HP80	2	35	4400.00
NIFA7000		-	-	2250	2367	1850	1830	160	CC455-CC455	PP45-PP45	5474	1460	HP150	2	40	5980.00
NIFA9000		-	-	2250	2625	2070	2050	160	CC455-CC455	PP45-PP45	5803	2020	HP150	2	50	6480.00
ITIFA15000		5620	-	2100	2200	1870	1850	160	TAP710	2 x PP77	14150	402	HP402SF	12	75	10280.00
ITIFA22000		7880	-	2100	2200	1870	1850	160	TAP710	3 x PP77	20700	402	HP402SF	18	120	15100.00
ITIFA30000		10140	-	2100	2200	1870	1850	160	TAP710	4 x PP77	27250	402	HP502SF	24	150	20400.00
ITIFA36000		12400	-	2100	2200	1870	1850	160	TAP710	5 x PP77	33800	402	HP502SF	30	180	24100.00

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

ACTIVATED SLUDGE PLANT
TOTAL OXIDATION



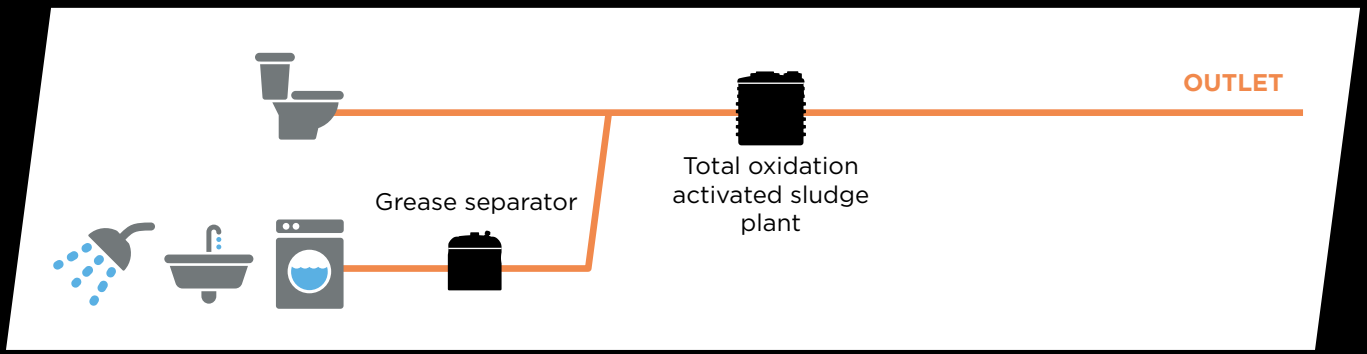
1. OXYGENATION AREA: area in which the effluent is mixed and oxygenated, thanks to micro-bubble air diffuser plates, powered by an external blower/compressor. This develops aerobic bacteria that transform the biodegradable compounds into CO2, organic nitrogen into ammonia and ammonia into nitrates.

2. FINAL DISINFECTION: housing, on the outlet pipe, into which a slow release chlorine tablet is inserted. In this way the effluent is disinfected before being discharged.

3. BLOWER (included)

4. DIFFUSER PLATE (included)

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Total oxidation activated sludge plants are primary (degreased) domestic sewage 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.

USE: primary and secondary treatment of degreased domestic sewage.

REFERENCE STANDARDS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator and a total oxidation activated sludge plant (installed as shown in the diagram at page 48) ensures that the concentrations of the final effluent are:

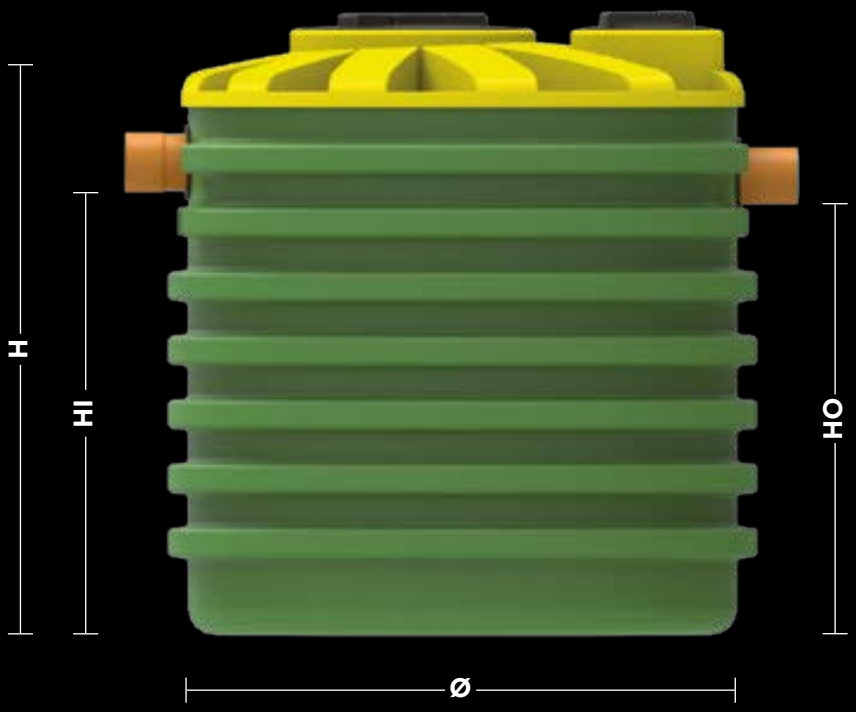
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

ACTIVATED SLUDGE PLANT

MODEL

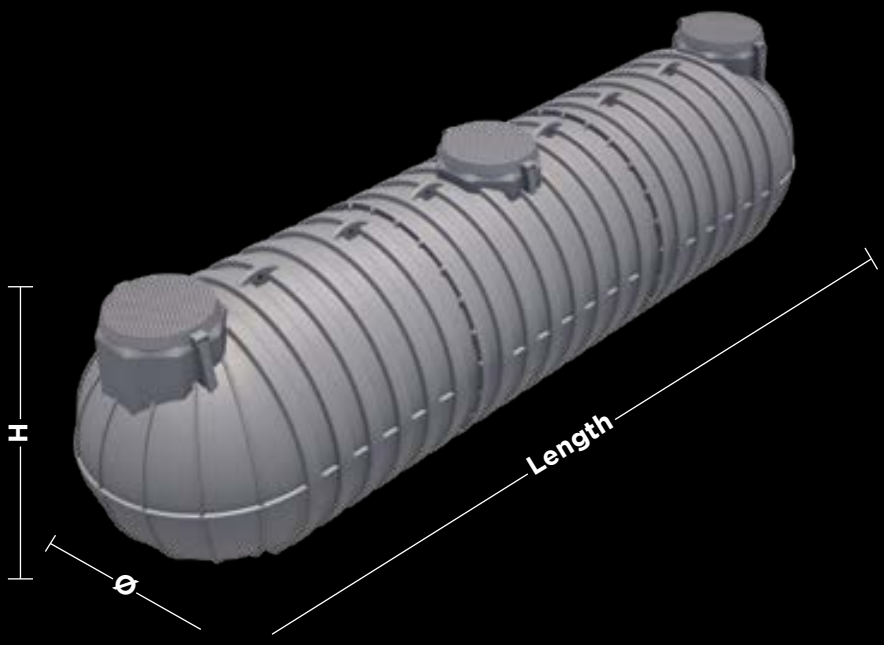


CORRUGATED

ELIPSE

MODULAR

ACTIVATED SLUDGE PLANT
MODULAR



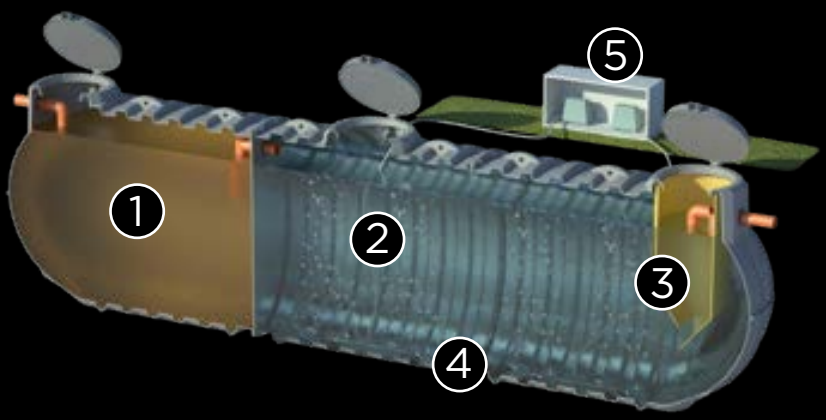
ACTIVATED SLUDGE PLANT

TOTAL OXIDATION

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Aerated volume l	Blower Mod.	Diffuser Plates No.	PE.	Цени в лв/без ДДС
NIFAT1000		-	-	1150	1220	880	860	110	CC455-CC255	PP45- PP30	850	HP40	1	**2**	**1400.00**
NIFAT1500		-	-	1150	1720	1360	1340	110	CC455-CC255	PP45-PP30	1268	HP40	1	**4**	**1700.00**
NIFAT2100		-	-	1350	1975	1540	1520	110	CC455-CC355	PP45-PP35	1950	HP60	2	**5**	**2100.00**
NIFAT2600		-	-	1710	1450	1000	980	125	CC455-CC355	PP45-PP35	2061	HP80	2	**6**	**2300.00**
NIFAT3200		-	-	1710	1725	1240	1220	125	CC455-CC355	PP45-PP35	2525	HP80	2	**8**	**2750.00**
NIFAT3800		-	-	1710	1955	1490	1470	125	CC455-CC355	PP45-PP35	3104	HP80	2	**10**	**2950.00**
NIFAT4600		-	-	1710	2225	1710	1690	125	CC455-CC355	PP45-PP35	3594	HP80	2	**12**	**3200.00**
NIFAT5400		-	-	1950	2250	1660	1640	125	CC455-CC455	PP45-PP45	4578	HP80	2	**15**	**3700.00**
NIFAT6400		-	-	1950	2530	1970	1950	125	CC455-CC455	PP45-PP45	5293	HP80	2	**20**	**3980.00**
NIFAT7000		-	-	2250	2367	1850	1830	125	CC455-CC455	PP45-PP45	6934	HP150	2	**25**	**5300.00**
NIFAT9000		-	-	2250	2625	2070	2050	125	CC455-CC455	PP45-PP45	7823	HP150	2	**30**	**5600.00**
ITIFAT15000		5620	-	2100	2200	1870	1850	160	TAP710	2 x PP77	14150	HP402SF	12	**50**	**10280.00**
ITIFAT22000		7880	-	2100	2200	1870	1850	160	TAP710	3 x PP77	20700	HP402SF	18	**75**	**15100.00**
ITIFAT30000		10140	-	2100	2200	1870	1850	160	TAP710	4 x PP77	27250	HP502SF	24	**100**	**20400.00**
ITIFAT36000		12400	-	2100	2200	1870	1850	160	TAP710	5 x PP77	33800	HP502SF	30	**130**	**24100.00**

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

ONE-PIECE TREATMENT PLANTS
ACTIVATED SLUDGE PLANTS



1. SLUDGE SEDIMENTATION AND DIGESTION SECTION: stilling area in which the solid part of the effluent sediments and accumulates on the bottom; a bacterial flora develops there and transforms the putrescible material in the sludge into inert sludge, carbon dioxide and water.

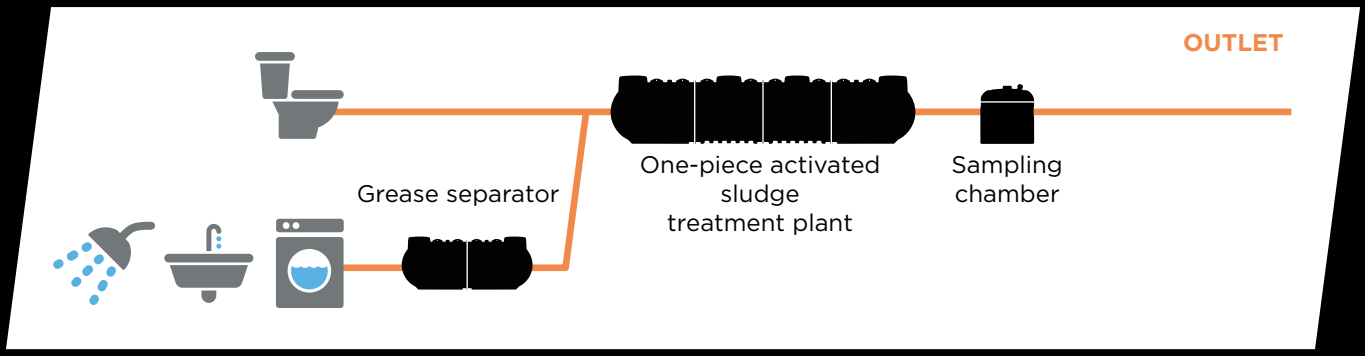
2. OXYGENATION SECTION: area in which forced air is blown in to move and oxygenate the effluent. Aerobic bacteria develop in this environment, oxidising the residual organic component and the nitrogen.

3. FINAL SEDIMENTATION SECTION: stilling area in which any residual sludge decants and is gravity fed once again to the oxidation area.

4. DIFFUSER PLATES in microbored rubber for even distribution of the air within the oxygenation section.

5. BLOWERS-COMPRESSORS with side channel to push the air toward the oxygenation section diffuser plates.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Treatment of domestic raw sewage by primary sedimentation and anaerobic sludge digestion treatment in a septic tank and subsequent secondary activated sludge aerobic digestion treatment. The Rototec one-piece treatment plant is sized for average domestic discharge: a specific discharge flow rate of 200 l/PE x day and a pro capita organic pollution load of 60gBOD/PE x day; it is important that grease and foam be separated upstream of the activated sludge tank, as these might have a negative effect on the treatment performance, which in normal operating conditions reaches up to 90% (percentage removal of the organic load as BOD_5). The treated effluent complies with the emission limits in table 3 of Leg. Decree 152/2006 for discharge to a surface watercourse.

USE: primary and secondary treatment of domestic sewage

REFERENCE STANDARDS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator and an one-piece activated sludge plant (installed as shown in the diagram at page 52) ensures that the concentrations of the final effluent are:

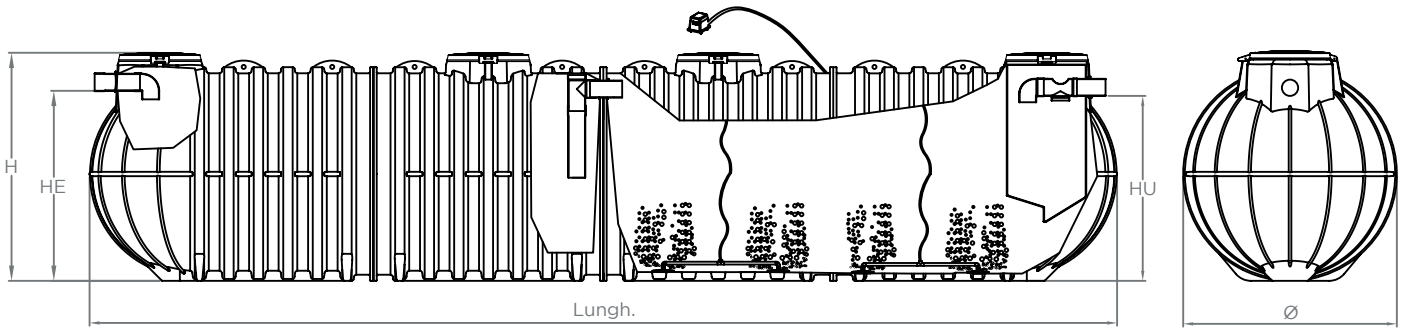
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

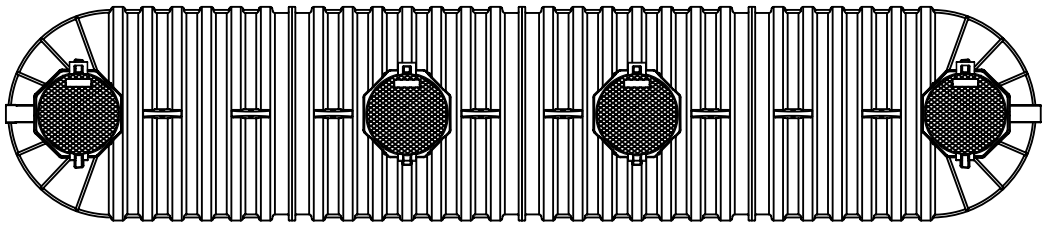
These parameters are respected if the inlet wastewater have the following characteristics (typical concentrations of domestic sewage):

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

ONE-PIECE TREATMENT PLANTS

ACTIVATED SLUDGE PLANTS





Item	Length mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Extensions	Sedim. vol. l	Aerated vol. l	Final sed. volume l	Blowers	Diffuser plates No.	PE.	Цени в лв/без ДДС
ITSEIFA15000	5620	2100	2200	1870	1850	125	2 x PP77	7000	7000	402	HP302SF	6	**40**	**11360.00**
ITSEIFA22000	7880	2100	2200	1870	1850	160	3 x PP77	7000	13000	402	HP402SF	12	**70**	**15200.00**
ITSEIFA30000	10140	2100	2200	1870	1850	160	4 x PP77	13000	13000	402	HP402SF	12	**100**	**18600.00**
ITSEIFA36000	12400	2100	2200	1870	1850	160	5 x PP77	13000	19000	402	HP402SF	18	**130**	**23100.00**

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

TECHNICAL SECTION - ACTIVATED SLUDGE PLANTS

TECHNICAL CHARACTERISTICS

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^3d 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^3d in the low-load configuration.

USE AND MAINTENANCE

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

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.

ACTIVATED SLUDGE PLANTS
ACCESSORIES (INCLUDED IN THE SUPPLY)

BLOWER/COMPRESSOR

Rototec fits its Activated Sludge plants with diaphragm type air compressors which make use of the **electromagnetic vibration** of an actuator rod supported by rubber diaphragms.
This system reduces **energy consumption to a minimum**, by supplying constant air flows without any variations in working pressure. The blower does not have any moving parts in contact, and as such does **not require any lubrication**. Special attention is paid to the acoustic insulation and to the design of the vibrating section of the compressor in order to make it **as silent as possible**.

Model	Voltage V	Frequency Hz	Watt W	Amps A	Flow rate l/min	Rated pressure bar	Noise level db	Weight kg
HP 40	220	50	31	0.32	40	0.13	<39	4.9
HP 60	220	50	61	0.6	70	0.15	<48	6.9
HP 80	220	50	91	1	88	0.15	<57	7
HP 150	220	50	106	1.2	114	0.2	<52	11.8

INSTALLATION

• install in a special above ground technical room (with an environment free from corrosive gas), protected from the weather but with adequate ventilation to avoid overheating of the blower;
• **maximum distance of 10 m** from the activated sludge plant;
• the blower must rest on a stable, flat surface, not exposed to vibration, at a level higher than that of the plant itself so as to avoid any return of the sludge if the air supply is interrupted;
• if necessary, provide ducting for the air pipe, running from the technical room to the edge of the tank (minimum diameter 80mm), and for the electric cable (minimum diameter 63mm);
• connect one end of the air feed pipe supplied to the outlet of the blower using the appropriate clips;
• connect the other end of the pipe to the coupling on the tank;
• when installation has been completed, connect the blower to the **power socket (220V, 50Hz)**.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Check that the blower is working properly	Every month	Unfasten the cover on the inlet inspection hole and check that air is being blown into the tank
Clean the suction filter	Every 3 months	Remove the filter, eliminate excess dust and if necessary wash with mild detergent

PROHIBITIONS

• never connect the compressor to energy sources other than those indicated. If you have any doubts about how to do so, **DO NOT**
connect up the equipment.

WARNINGS

• the operating temperature must be between –20°C and +40°C with relatively low humidity;
• always carry out all cleaning and/or replacement operations **with the electric power supply disconnected**;
• before carrying out any cleaning and/or replacement operation, make sure that the body of the compressor has **cooled down,** to avoid any risk of burns;
• when carrying out repairs, it is good practice only to use **original materials** in order to guarantee the safety of the equipment;
• maintenance operations that require the presence of electricity, such as detecting faults inside the blower, must only be carried out by **qualified technicians**;

SIDE CHANNEL COMPRESSORS/BLOWERS

Description and application: 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.

Item	Voltage V	Frequency Hz	Power kW	Rated current A	Capacity (m^3/h) / pressure (mbar rel.)	Noise level db A	Weight kg
SC302SF	200-240	50	0,7	4,5	see line chart A	55	15
SC402SF	200-240 Δ 345-415 Y	50	1,6	9,7 Δ/5,6Y	see line chart B	66	24
SC502SF	380-415 Δ	50	3,0	10 Δ	see line chart C	72	39

CHART A

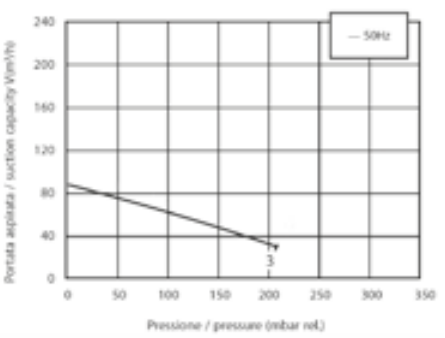


CHART B

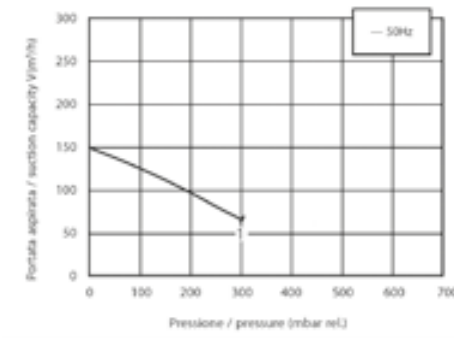


CHART C

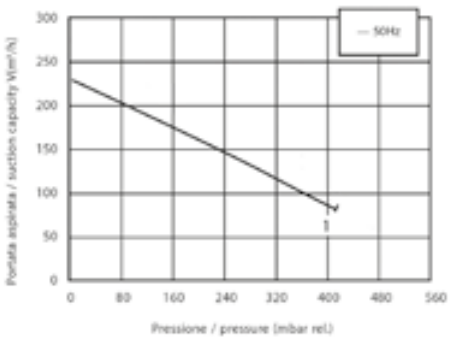


PLATE DIFFUSERS

In its activated sludge plants, Rototec uses diaphragm type diffusers in microbored rubber, constructed to provide a uniform distribution of air with bubbles of microscopic diameter designed to optimise the oxygenation of the effluent. 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. The innovative composition of the plate also ensures absolute impermeability of the connection between the diaphragm, the support plate and the support coupling.

Item	Diameter mm	Weight kg	Maximum air flow rate m^3/h	Diameter of bubbles mm	Oxygenation capacity gO^2 / Nm^3 per metre head
IFADN	211	2.1	5	1-3	18-20

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

Description: 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.

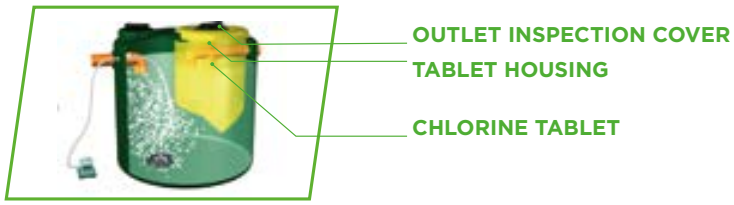
Item	Material	Diameter mm	Size and quantity of the bubbles	Connection	Air flow	Operation temperature	Diffusion area
IFADN250	High grade EPDM hardness 60° ±5	250	1-3 mm 8300 holes	R ¾" NPT	1,5-8,5 m^3/h	0 – 100 °C	1,67 m

CHLORINE TABLET

The Activated Sludge plants are constructed with a disinfection compartment inserted in the effluent discharge pipe. A chlorine tablet can be placed in the housing to produce a disinfected effect which will last for 30-60 days. This device was introduced to prevent the risk of a micro-biological presence in the discharge not complying with legal requirements.

INSTALLATION

• insert a chlorine tablet into the housing provided on the outlet pipe.



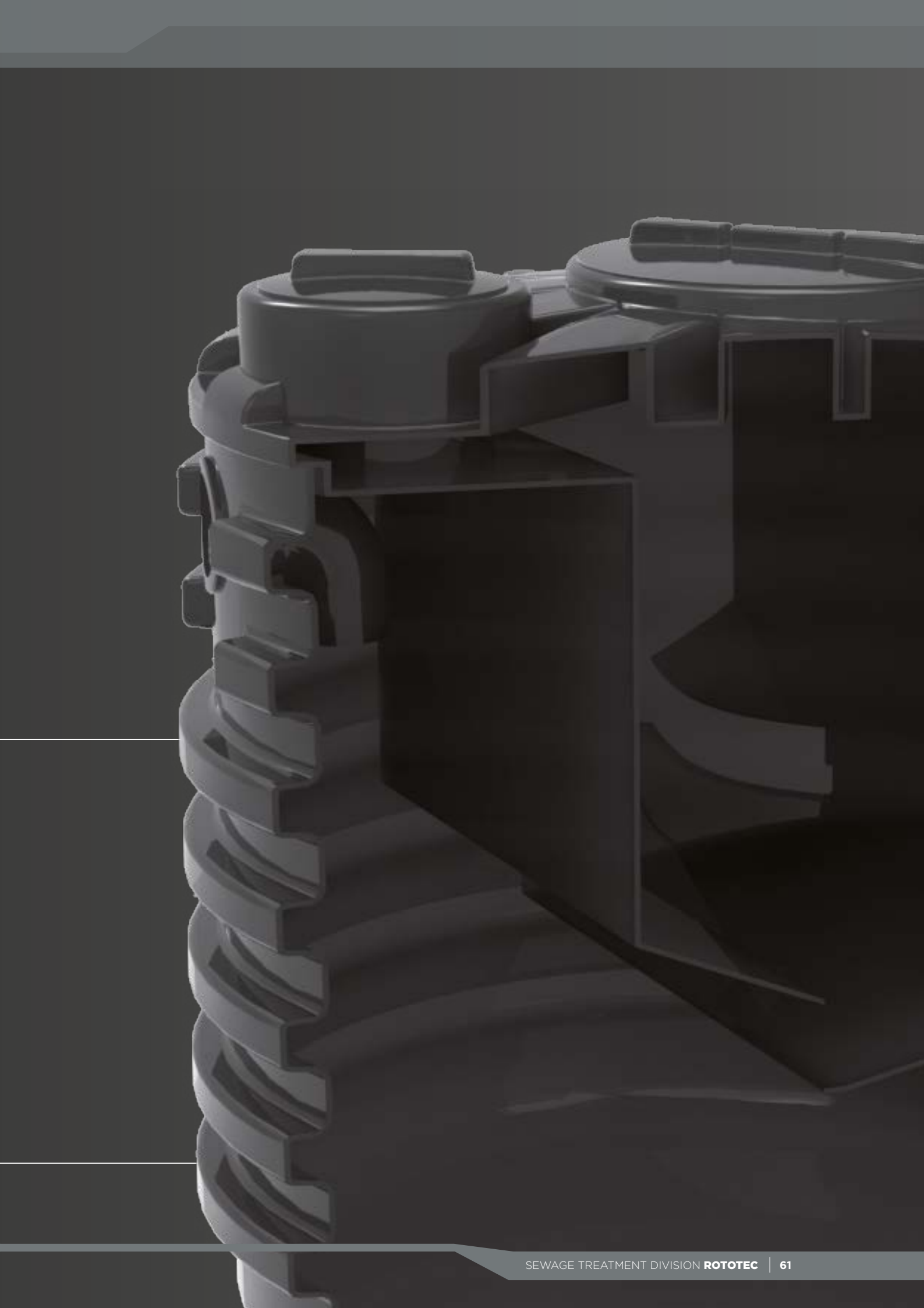
MANAGEMENT

WHAT TO DO	WHEN	HOW
Change the chlorine tablet	Every 2 months	Unfasten the outlet inspection hole cover and insert the tablet into the housing provided

WARNINGS

• Harmful when swallowed;
• Irritant for eyes and respiratory tract (in the case of contact seek medical help);
• Store out of reach of children;
• Keep away from humidity;
• In the case of fire and/or explosion, do not breathe in the fumes;
• Can cause ignition of combustible raw materials;
• Emits toxic gas on contact with acids;
• Highly toxic for aquatic organisms;
• This product must be treated as hazardous waste. Dispose of it responsibly.

TRICKLE FILTERS



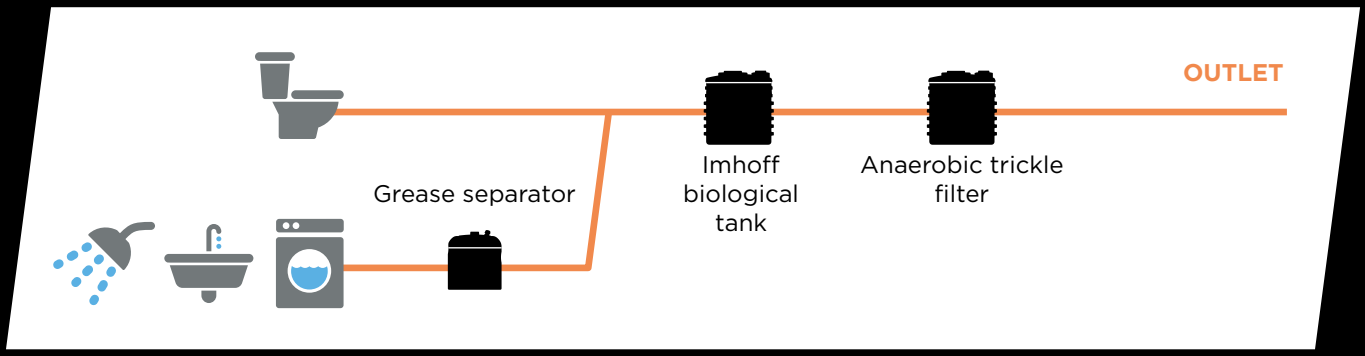
TRICKLE FILTER
ANAEROBIC

1. DISTRIBUTION PIPE: bored pipe for even distribution of the effluent on the surface of the filter.

2. FILTER MEDIA: plastic filler elements with a large surface area that act as a support on which the aerobic bacteria that treat the effluent can develop.

3. COLLECTION PIPE: pipe to draw off the treated effluent from the bottom and send it to the outlet

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: 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. More specifically, the bacteria that grows and develops inside the anaerobic trickle filter consumes the organic load in the effluent in the absence of dissolved oxygen.

USE: secondary treatment of domestic sewage.

REFERENCE STANDARDS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06,

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator, an Imhoff biological tank and an anaerobic trickle filter (installed as shown in the diagram at page 62) ensures that the concentrations of the final effluent are:

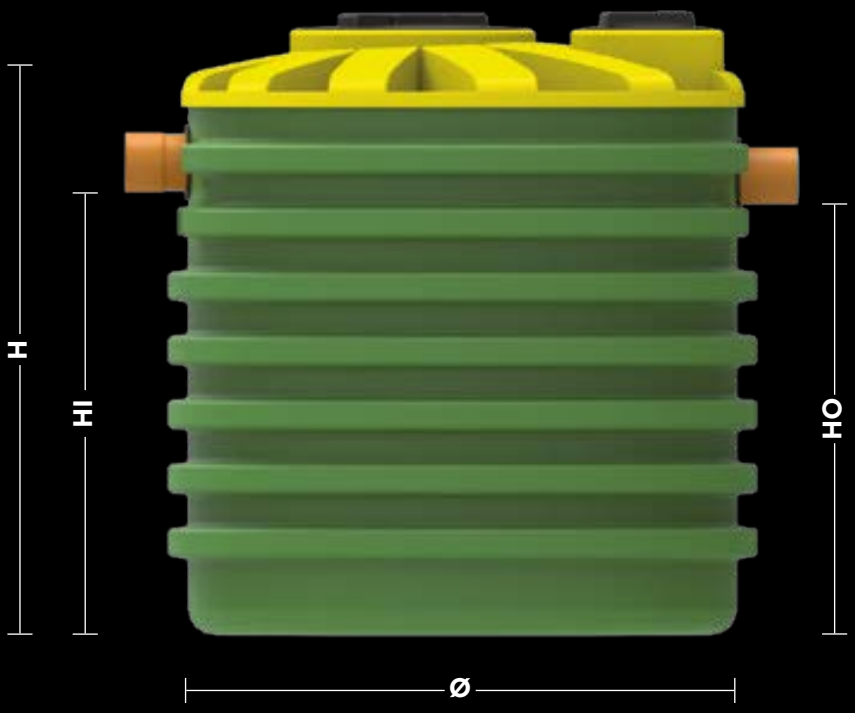
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

ANAEROBIC TRICKLE FILTER

MODEL



CORRUGATED

UNDERGROUND TANK

ELIPSE

MODULAR

ANAEROBIC TRICKLE FILTER
MODULAR

ANAEROBIC TRICKLE FILTER

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Filter surface m^2	Filter volume m^3	PE.	Цени в лв/без ДДС
NAN1000		-	-	1150	1220	880	860	110	CC455-CC255	PP45- PP30	1.04	0.85	**6**	**870.00**
NAN1200		1900	708	-	1630	1250	1230	110	CC355-CC355	PP35-PP35	1.35	1.20	**7**	**1150.00**
NAN1500		-	-	1150	1720	1360	1340	110	CC455-CC255	PP45-PP30	1.04	1.26	**9**	**1210.00**
NAN1700		1900	708	-	2140	1760	1740	110	CC355-CC355	PP35-PP35	1.35	1.77	**10**	**1600.00**
NAN2100		-	-	1350	1975	1540	1520	110	CC455-CC355	PP45-PP35	1.39	1.80	**11**	**1700.00**
NAN2600		-	-	1710	1450	1000	980	125	CC455-CC355	PP45-PP35	2.30	2.06	**14**	**1950.00**
NAN3200		-	-	1710	1725	1240	1220	125	CC455-CC355	PP45-PP35	2.30	2.52	**20**	**2400.00**
NAN3800		-	-	1710	1955	1490	1470	125	CC455-CC355	PP45-PP35	2.30	3.10	**23**	**2800.00**
NAN4600		-	-	1710	2225	1710	1690	160	CC455-CC355	PP45-PP35	2.30	3.80	**27**	**3200.00**
NAN5400		-	-	1950	2250	1660	1640	160	CC455-CC455	PP45-PP45	2.90	4.75	**32**	**3400.00**
NAN6400		-	-	1950	2530	1970	1950	160	CC455-CC455	PP45-PP45	2.90	5.07	**36**	**4100.00**
NAN7000		-	-	2250	2367	1850	1830	160	CC455-CC455	PP45-PP45	3.98	6.93	**45**	**4550.00**
NAN9000		-	-	2250	2625	2070	2050	160	CC455-CC455	PP45-PP45	3.98	7.82	**55**	**6000.00**
NAN10700		2780	2430	-	2660	2170	2130	160	TAP710	PP77	6.75	10.00	**75**	**6300.00**
ITAN15000		5620	-	2100	2200	1830	1800	160	TAP710	2 x PP77	10.20	14.15	**100**	**9650.00**
ITAN22000		7880	-	2100	2200	1830	1800	160	TAP710	3 x PP77	14.90	20.07	**140**	**13800.00**
ITAN30000		10140	-	2100	2200	1810	1780	200	TAP710	4 x PP77	19.16	27.25	**200**	**18300.00**
ITAN36000		12400	-	2100	2200	1810	1780	200	TAP710	5 x PP77	23.67	33.08	**240**	**22700.00**

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

TRICKLE FILTER
AEROBIC

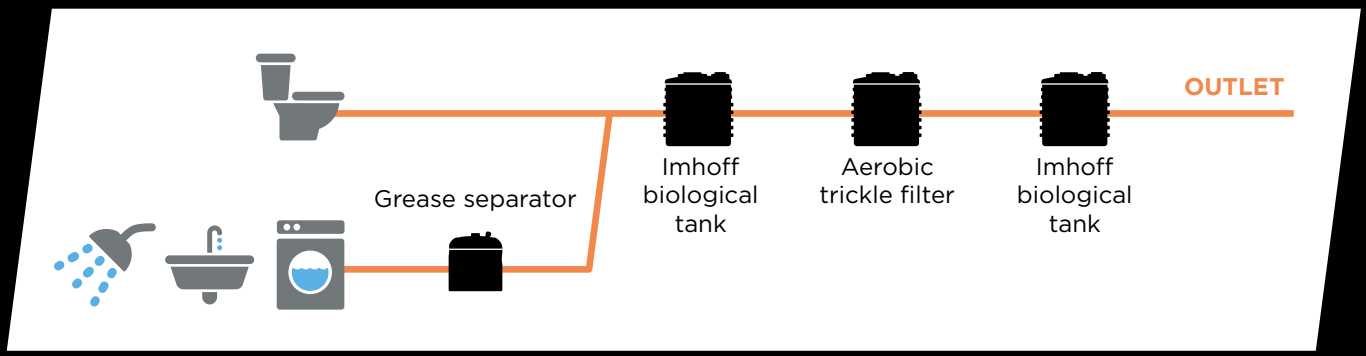
1. DISTRIBUTION PIPE: bored pipe for even distribution of the effluent on the surface of the filter.

2. FILTER MEDIA: plastic filler elements with a large surface area that act as a support on which the aerobic bacteria that treat the effluent can develop.

3. COLLECTION PIPE: pipe to draw off the treated effluent from the bottom and send it to the outlet.

4. VENTILATION CHIMNEY: pipe to the open air for oxygenation of the filter media.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: 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. More specifically, the bacteria that grows and develops inside the aerobic trickle filter consumes the organic load in the effluent in the presence of oxygen, continually entering the tank through the ventilation pipe.

USE: secondary treatment of domestic sewage.

REFERENCE STANDARDS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator, an Imhoff biological tank, an aerobic trickle filter and a final Imhoff tank (installed as shown in the diagram at page 66) ensures that the concentrations of the final effluent are:

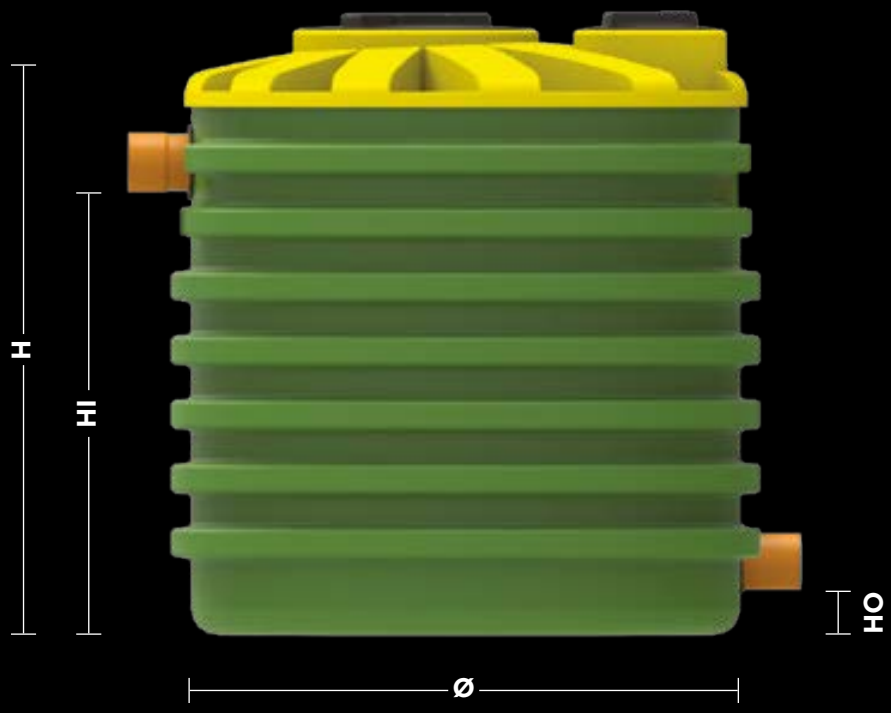
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

AEROBIC TRICKLE FILTER

MODEL

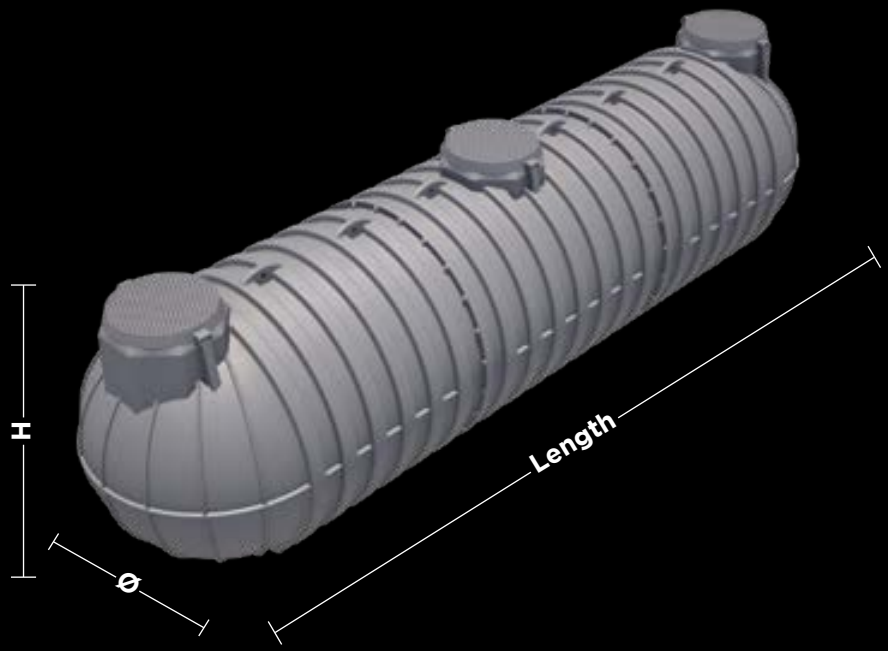


CORRUGATED

UNDERGROUND TANK

MODULAR

AEROBIC TRICKLE FILTER
MODULAR



AEROBIC TRICKLE FILTER

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Filter surface m^2	Filter volume m^3	PE.	Цени в лв/без ДДС
NAR1000		-	-	1150	1220	880	40	110	CC455-CC255	PP45- PP30	1.04	0.85	**6**	**870.00**
NAR1500		-	-	1150	1720	1360	40	110	CC455-CC255	PP45-PP30	1.04	1.26	**9**	**1210.00**
NAR2100		-	-	1350	1975	1540	40	110	CC455-CC355	PP45-PP35	1.39	1.80	**11**	**1700.00**
NAR2600		-	-	1710	1450	1000	40	125	CC455-CC355	PP45-PP35	2.30	2.06	**14**	**1950.00**
NAR3200		-	-	1710	1725	1240	40	125	CC455-CC355	PP45-PP35	2.30	2.52	**20**	**2,400.00**
NAR3800		-	-	1710	1955	1490	40	125	CC455-CC355	PP45-PP35	2.30	3.10	**23**	**2,800.00**
NAR4600		-	-	1710	2225	1710	40	125	CC455-CC355	PP45-PP35	2.30	3.80	**27**	**3200.00**
NAR5400		-	-	1950	2250	1660	40	125	CC455-CC455	PP45-PP45	2.90	4.75	**32**	**3400.00**
NAR6400		-	-	1950	2530	1970	40	125	CC455-CC455	PP45-PP45	2.90	5.07	**36**	**4100.00**
NAR7000		-	-	2250	2367	1850	40	125	CC455-CC455	PP45-PP45	3.98	6.93	**45**	**4550.00**
NAR9000		-	-	2250	2625	2070	40	125	CC455-CC455	PP45-PP45	3.98	7.82	**55**	**6000.00**
NAR10700		2780	2430	-	2660	2170	40	160	TAP710	PP77	6.75	10.00	**75**	**6300.00**
ITAR15000		5620	-	2100	2200	1830	130	160	TAP710	2 x PP77	10.20	14.15	**100**	**9650.00**
ITAR22000		7880	-	2100	2200	1830	130	160	TAP710	3 x PP77	14.90	20.07	**140**	**13800.00**
ITAR30000		10140	-	2100	2200	1810	130	200	TAP710	4 x PP77	19.16	27.25	**200**	**18300.00**
ITAR36000		12400	-	2100	2200	1810	130	200	TAP710	5 x PP77	23.67	33.08	**240**	**22700.00**

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

LIFT STATION TO PUMP WATER LEAVING THE AEROBIC TRICKLE FILTER

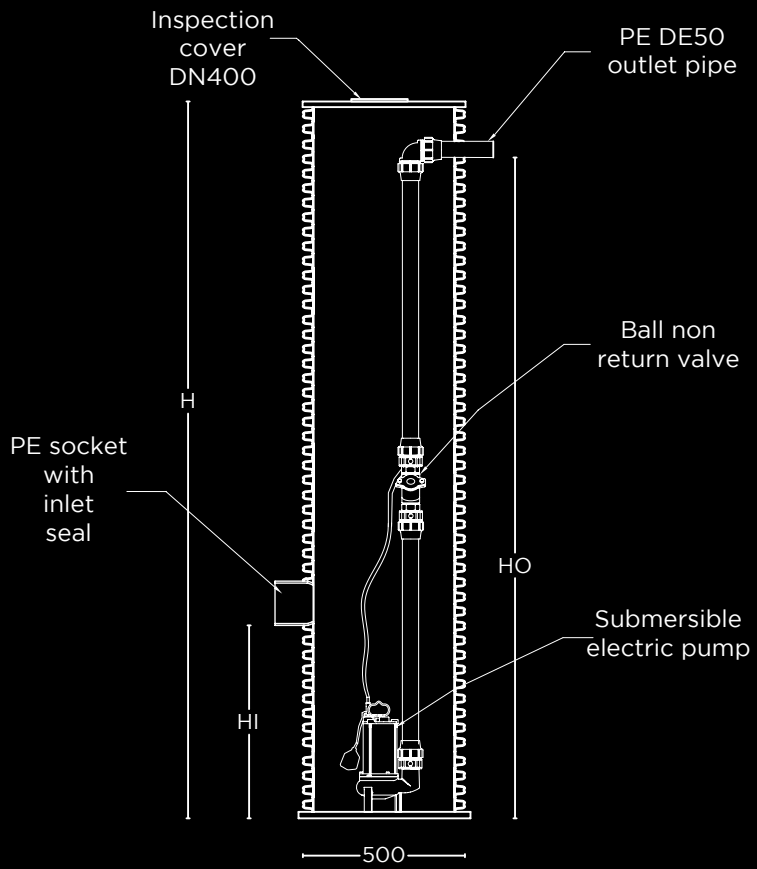
SPECIFICATIONS

TECHNICAL CHARACTERISTICS: narrow vertical cylinder tank for underground installation, in high-density polyethylene (HDPE) fitted with PVC inlet pipe (Ø 125 mm) with N.B.R. rubber seal, submerged electric pump with vortex impeller for sewage connected to a delivery pipe in polyethylene (Ø 50 mm).
The pump is fitted with an automatic start/stop float switch.

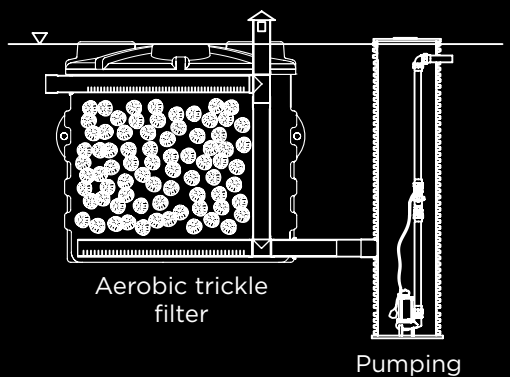
USE: to pump the treated waste water leaving aerobic trickle filters. Essential to bring the discharge line up to ground level, in the absence of an adequate difference in level.

Item	ø mm	H mm	HI* mm	HO mm	ØI / ØO mm	Inspection cover mm	Installed pump	HP	Kw	V	A	µF	Head m	Flow rate l/min.	Цени в лв/без ДДС
NSOLMG2300	500	2300	-	2100	125-50	400	Energy1	0.4	0.3	230	2.2	8	6-1	10-140	**1500.00**
NSOLMG2700	500	2700	-	2500	125 - 50	400	Energy1	0.4	0.3	230	2.2	8	6-1	10-140	**1550.00**
NSOLMG3000	500	3000	-	2800	125 – 50	400	Energy1	0.4	0.3	230	2.2	8	6-1	10-140	**1600.00**

* To be agreed when ordering



INSTALLATION EXAMPLE



TECHNICAL SECTION - TRICKLE FILTERS

TECHNICAL CHARACTERISTICS

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 m²/m³**, 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/m³d with which the filter is fed. This parameter is the ratio between the organic load at the inlet kg BOD_5d and the volume of the filter bed. Rototec trickle filters are designed to operate with medium-low organic load factors kg BOD_5 / m³d. This guarantees a good margin of safety, with respect to fluctuations in inlet flow, and a limited production of excess sludge.

USE AND MAINTENANCE

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

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.*

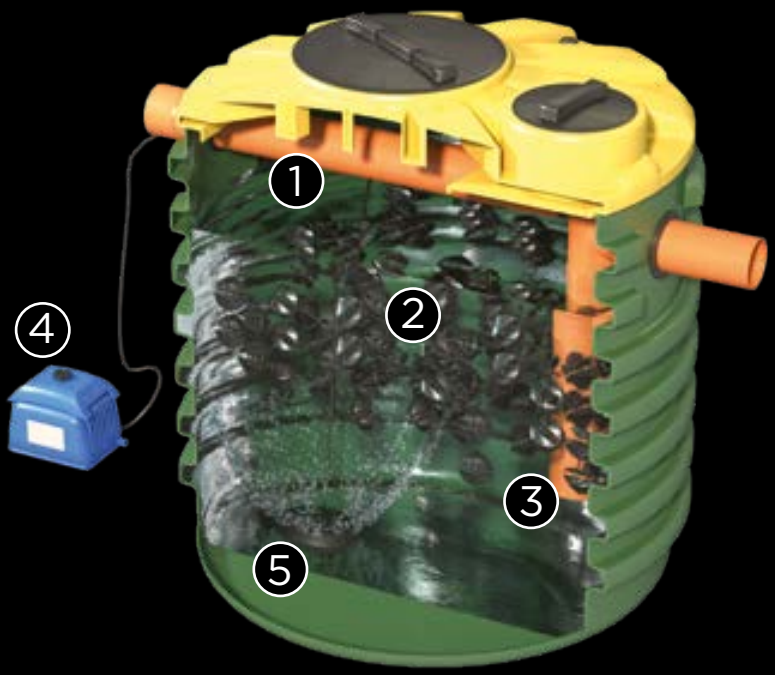
PROHIBITIONS

- **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;
- the outlet from the trickle filter is level with the bottom of the element, and as such in the absence of any difference in level, the installation of a **lifting system** downstream of the filter itself is required;
- 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.

AEROBIC TRICKLE FILTER
TOP OUTLET WITH BLOWER



1. DISTRIBUTION PIPE: bored pipe for even distribution of the effluent on the surface of the filter.

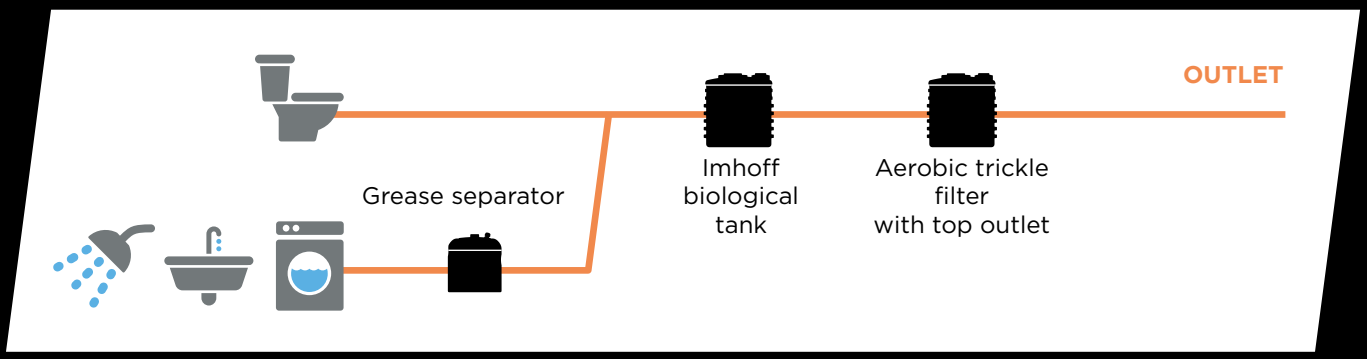
2. FILTER MEDIA: plastic filler elements with a large surface area that act as a support on which the aerobic bacterial responsible for treating the effluent can develop.

3. COLLECTION PIPE: pipe to draw off the treated effluent from the bottom and send it to the outlet.

4. COMPRESSOR BLOWER to pump the air inside the tank (included).

5. DIFFUSER PLATES: for distribution of the air micro-bubbles (included).

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: 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. More specifically, the bacteria that grows and develops inside the aerobic trickle filter with top outlet consumes the organic load in the effluent in the presence of oxygen, continually entering the tank through the external compressor and distributed by the diffuser plates.

USE: secondary treatment of domestic sewage.

REFERENCE REGULATIONS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator, an Imhoff biological tank, an aerobic trickle filter with top outlet and blower (installed as shown in the diagram at page 72) ensures that the concentrations of the final effluent are:

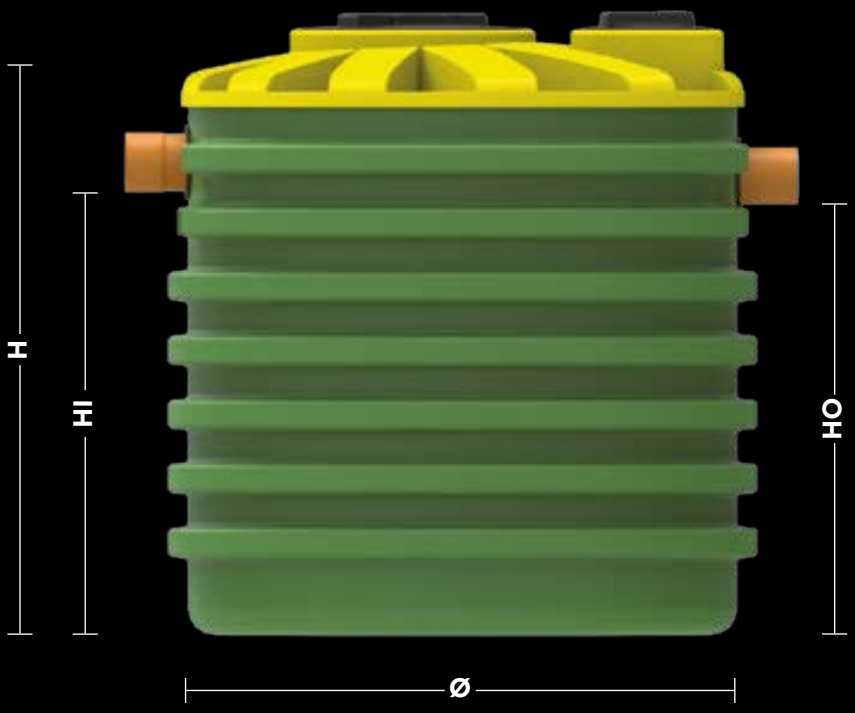
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

AEROBIC TRICKLE FILTER

TOP OUTLET WITH BLOWER



MODEL

CORRUGATED

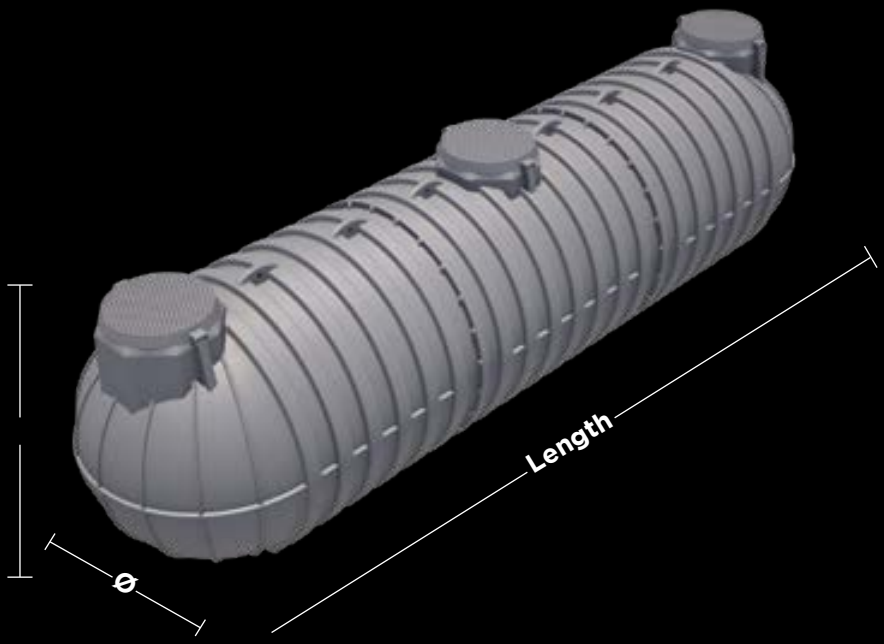
UNDERGROUND TANK

ELIPSE

MODULAR

TRICKLE FILTER

AEROBIC WITH TOP OUTLET - MODULAR



AEROBIC TRICKLE FILTER TOP OUTLET WITH BLOWER

TOP OUTLET WITH BLOWER

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Blowers	Filter surface m^2	Filter volume m^3	PE.	Цени в лв/без ДДС
NARA1000		-	-	1150	1220	880	860	110	CC455-CC255	PP45- PP30	HP40	1.04	0.85	**6**	**1500.00**
NARA1200		1900	708	-	1630	1250	1230	110	CC355-CC355	PP35-PP35	HP40	1.35	1.20	**7**	**1700.00**
NARA1500		-	-	1150	1720	1360	1340	110	CC455-CC255	PP45-PP30	HP40	1.04	1.26	**9**	**1900.00**
NARA1700		1900	708	-	2140	1760	1740	110	CC355-CC355	PP35-PP35	HP40	1.35	1.77	**10**	**2100.00**
NARA2100		-	-	1350	1975	1540	1520	110	CC455-CC355	PP45-PP35	HP40	1.39	1.80	**11**	**2250.00**
NARA2600		-	-	1710	1450	1000	980	125	CC455-CC355	PP45-PP35	HP60	2.30	2.06	**14**	**2900.00**
NARA3200		-	-	1710	1725	1240	1220	125	CC455-CC355	PP45-PP35	HP60	2.30	2.52	**20**	**3200.00**
NARA3800		-	-	1710	1955	1490	1470	125	CC455-CC355	PP45-PP35	HP60	2.30	3.10	**23**	**3800.00**
NARA4600		-	-	1710	2225	1710	1690	125	CC455-CC355	PP45-PP35	HP60	2.30	3.80	**27**	**4100.00**
NARA5400		-	-	1950	2250	1660	1640	125	CC455-CC455	PP45-PP45	HP60	2.90	4.75	**32**	**4400.00**
NARA6400		-	-	1950	2530	1970	1950	125	CC455-CC455	PP45-PP45	HP60	2.90	5.07	**36**	**4950.00**
NARA5700		2420	1920	-	2100	1690	1670	125	TAP710	PP77	HP80	3.78	5.60	**40**	**5400.00**
NARA7000		-	-	2250	2367	1850	1830	125	CC455-CC455	PP45-PP45	HP80	3.98	6.93	**45**	**5800.00**
NARA9000		-	-	2250	2625	2070	2050	125	CC455-CC455	PP45-PP45	HP80	3.98	7.82	**55**	**7600.00**
NARA10700		2780	2430	-	2660	2170	2130	160	TAP710	PP77	HP80	6.75	10.00	**75**	**8100.00**
ITARA15000		5620	-	2100	2200	1830	1800	160	TAP710	2 x PP77	HP402SF	10.20	14.15	**100**	**12400.00**
ITARA22000		7880	-	2100	2200	1830	1800	160	TAP710	3 x PP77	HP402SF	14.90	20.07	**140**	**17600.00**
ITARA30000		10140	-	2100	2200	1810	1780	200	TAP710	4 x PP77	HP502SF	19.16	27.25	**200**	**22900.00**
ITARA36000		12400	-	2100	2200	1810	1780	200	TAP710	5 x PP77	HP502SF	23.67	33.08	**240**	**28200.00**

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

AEROBIC TRICKLE FILTER TOP OUTLET WITH BLOWER

ACCESSORIES (INCLUDED IN THE SUPPLY)

BLOWER/COMPRESSOR

Rototec fits its Activated Sludge plants with diaphragm type air compressors which make use of the **electromagnetic vibration** of an actuator rod supported by rubber diaphragms.
This system reduces **energy consumption to a minimum**, by supplying constant air flows without any variations in working pressure. The blower does not have any moving parts in contact, and as such does **not require any lubrication**. Special attention is paid to the acoustic insulation and to the design of the vibrating section of the compressor in order to make it **as silent as possible**.

Model	Voltage V	Frequency Hz	Watt W	Amps A	Flow rate l/min	Rated pressure bar	Noise level db	Weight kg
HP 40	220	50	31	0.32	40	0.13	<39	4.9
HP 60	220	50	61	0.6	70	0.15	<48	6.9
HP 80	220	50	91	1	88	0.15	<57	7
HP 150	220	50	106	1.2	114	0.2	<52	11.8

INSTALLATION

• install in a special above ground technical room (with an environment free from corrosive gas), protected from the weather but with adequate ventilation to avoid overheating of the blower;
• **maximum distance of 10 m** from the activated sludge plant;
• the blower must rest on a stable, flat surface, not exposed to vibration, at a level higher than that of the plant itself so as to avoid any return of the sludge if the air supply is interrupted;
• if necessary, provide ducting for the air pipe, running from the technical room to the edge of the tank (minimum diameter 80mm), and for the electric cable (minimum diameter 63mm);
• connect one end of the air feed pipe supplied to the outlet of the blower using the appropriate clips;
• connect the other end of the pipe to the coupling on the tank;
• when installation has been completed, connect the blower to the **power socket (220V, 50Hz)**.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Check that the blower is working properly	Every month	Unfasten the cover on the inlet inspection hole and check that air is being blown into the tank
Clean the suction filter	Every 3 months	Remove the filter, eliminate excess dust and if necessary wash with mild detergent

PROHIBITIONS

• never connect the compressor to energy sources other than those indicated. If you have any doubts about how to do so, **DO NOT** connect up the equipment.

WARNINGS

• the operating temperature must be between –20°C and +40°C with relatively low humidity;
• always carry out all cleaning and/or replacement operations **with the electric power supply disconnected**;
• before carrying out any cleaning and/or replacement operation, make sure that the body of the compressor has **cooled down,** to avoid any risk of burns;
• when carrying out repairs, it is good practice only to use **original materials** in order to guarantee the safety of the equipment;
• maintenance operations that require the presence of electricity, such as detecting faults inside the blower, must only be carried out by **qualified technicians**;

SIDE CHANNEL COMPRESSORS/BLOWERS

Description and application: 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.

Item	Voltage V	Frequency Hz	Power kW	Rated current A	Capacity (m^3/h) / pressure (mbar rel.)	Noise level db A	Weight kg
SC302SF	200-240	50	0,7	4,5	see line chart A	55	15
SC402SF	200-240 Δ 345-415 Y	50	1,6	9,7 Δ/5,6Y	see line chart B	66	24
SC502SF	380-415 Δ	50	3,0	10 Δ	see line chart C	72	39

CHART A

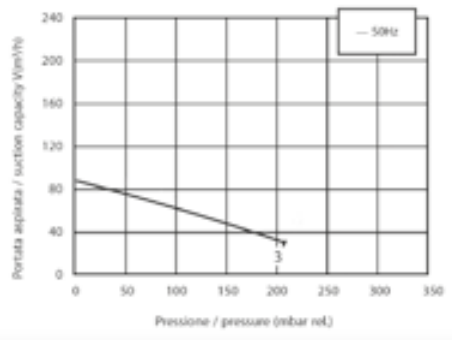


CHART B

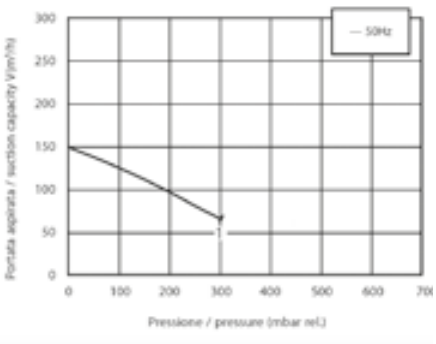


CHART C

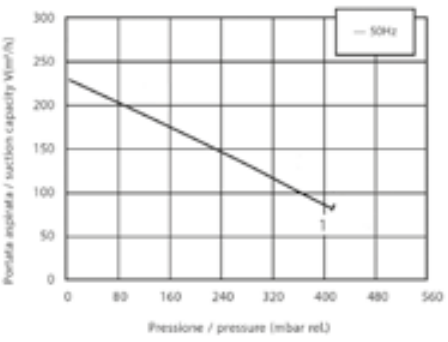


PLATE DIFFUSERS

In its activated sludge plants, Rototec uses diaphragm type diffusers in microbored rubber, constructed to provide a uniform distribution of air with bubbles of microscopic diameter designed to optimise the oxygenation of the effluent. 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. The innovative composition of the plate also ensures absolute impermeability of the connection between the diaphragm, the support plate and the support coupling.

Item	Diameter mm	Weight kg	Maximum air flow rate m^3/h	Diameter of bubbles mm	Oxygenation capacity gO^2 / Nm^3 per metre head
IFADN	211	2.1	5	1-3	18-20

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

Description: 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

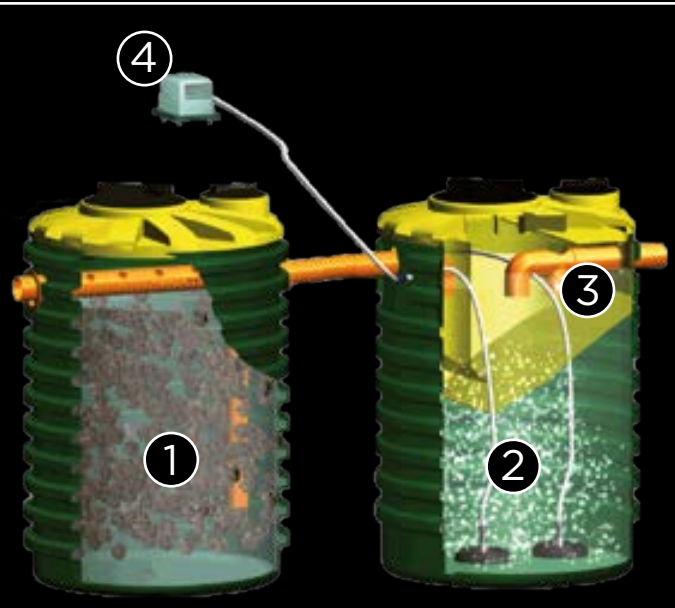
Applications:
- Wastewater treatment
- Intermittent operation capability
- Clean water treatment
- Sludge stabilization
- Aeration of fish pond, streams and lakes

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 8300 holes	R ¾" NPT	1,5-8,5 m^3/h	0 – 100 °C	1,67 m

HIGH EFFICIENCY SECONDARY TREATMENTS

HIGH LEVEL SECONDARY TREATMENT (DEP)



ANAEROBIC TRICKLE FILTER

LOW-LOAD ACTIVATED SLUDGE PLANT

1. FILTER MEDIA: plastic filler elements with a large surface area that act as a support on which the anaerobic bacteria responsible for treating the effluent can develop.

2. OXYGENATION AREA: area in which the effluent is mixed and oxygenated, thanks to micro-bubble air diffuser plates, powered by an external blower/ compressor. This develops aerobic bacteria that transform the biodegradable compounds into CO2, organic nitrogen into ammonia and ammonia into nitrates.

3. FINAL SEDIMENTATION AND DISINFECTION AREA: stilling area in which the residual sludge sediments and returns once again to the oxygenation section. A housing is present on the outlet pipe, in which to insert a slow release chlorine tablet. In this way the effluent is disinfected before being discharged.

4. BLOWER-COMPRESSOR for forced blowing of oxygen into the activated sludge plant (included).

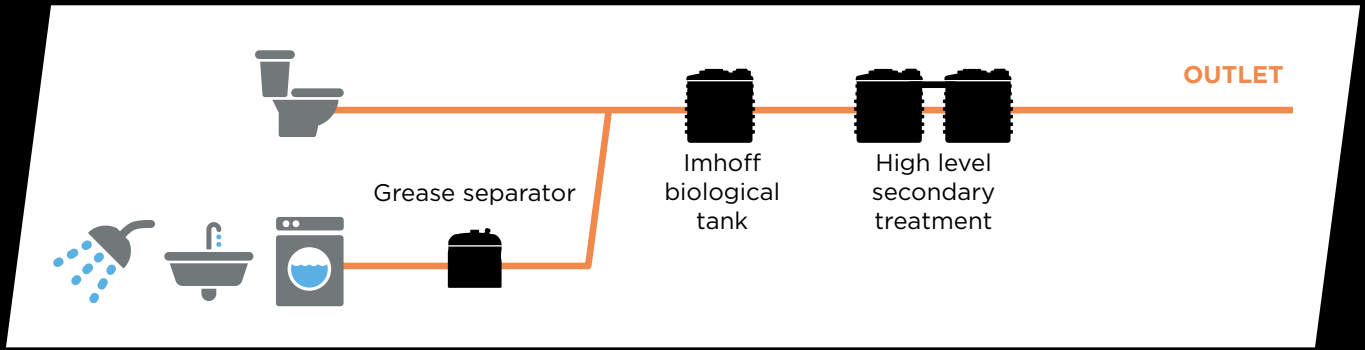
SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Secondary treatments consisting of an anaerobic trickle filter and an activated sludge plant allow almost 100% removal of the organic load and suspended solids with a very high reduction in the nitrogen load and phosphorous load found in domestic sewage. The trickle filter is a biological reactor in which the micro-organisms, under anaerobic conditions, make use of the biodegradable substance contained in the effluent. These micro-organisms develop on the surface of special bulk fill material in polypropylene, specifically designed to maximise the contact surface area between the micro-organisms and the effluent. Activated sludge plants are systems in which the bacterial flora develops in colonies that remain in suspension in the effluent and consume the remaining biodegradable material. The process is fully aerobic and the oxygen necessary for the development of the bacteria is supplied by submersed diffusers that emit a flow of fine bubbles of air from the bottom of the tank. This also guarantees continuous effluent mixing.

USE: high level secondary treatment of domestic sewage.

REFERENCE REGULATIONS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

INSTALLATION DIAGRAM



AEROBIC TRICKLE FILTER
TOP OUTLET WITH BLOWER

1. DISTRIBUTION PIPE: bored pipe for even distribution of the effluent on the surface of the filter.

2. FILTER MEDIA: plastic filler elements with a large surface area that act as a support on which the aerobic bacterial responsible for treating the effluent can develop.

3. COLLECTION PIPE: pipe to draw off the treated effluent from the bottom and send it to the outlet.

4. COMPRESSOR BLOWER to pump the air inside the tank (included).

5. DIFFUSER PLATES: for distribution of the air micro-bubbles (included).

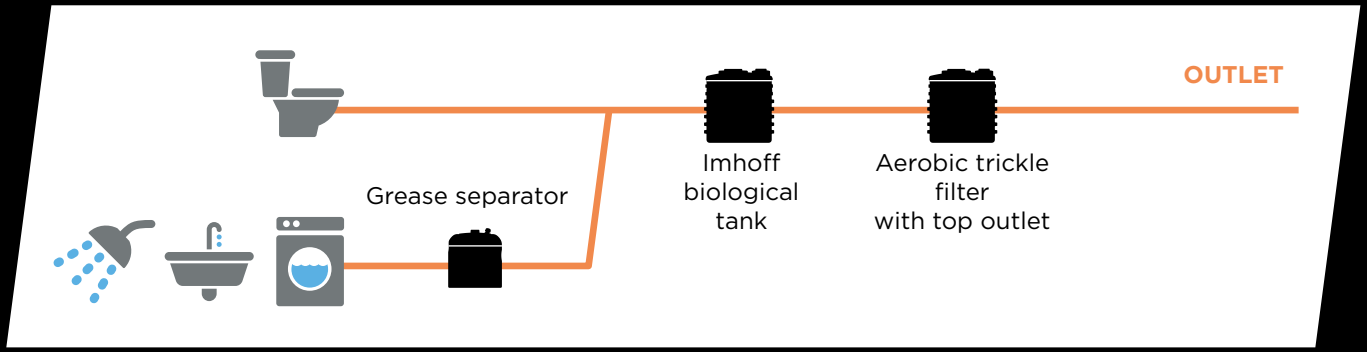
SPECIFICATIONS

TECHNICAL CHARACTERISTICS: 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. More specifically, the bacteria that grows and develops inside the aerobic trickle filter consumes the organic load in the effluent in the presence of oxygen, continually entering the tank through the ventilation pipe.

USE: secondary treatment of domestic sewage.

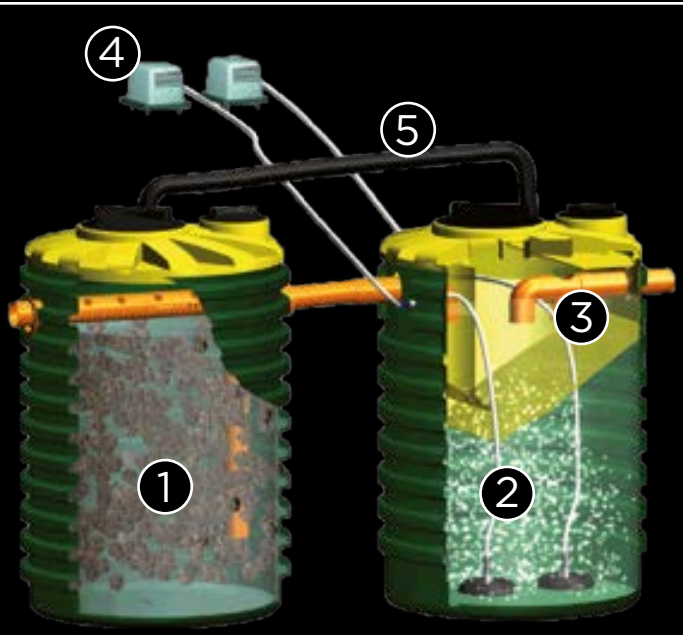
REFERENCE REGULATIONS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06,

INSTALLATION DIAGRAM



HIGH LEVEL SECONDARY TREATMENT (DEP RF)

WITH SLUDGE RETURN



ANAEROBIC TRICKLE FILTER

LOW-LOAD ACTIVATED SLUDGE PLANT

1. FILTER MEDIA: plastic filler elements with a large surface area that act as a support on which the anaerobic bacteria responsible for treating the effluent can develop.

2. OXYGENATION AREA: area in which the effluent is mixed and oxygenated, thanks to micro-bubble air diffuser plates, powered by an external blower/ compressor. This develops aerobic bacteria that transform the biodegradable compounds into CO2, organic nitrogen into ammonia and ammonia into nitrates.

3. FINAL SEDIMENTATION AND DISINFECTION AREA: stilling area in which the residual sludge sediments and returns once again to the oxygenation section. A housing is present on the outlet pipe, in which to insert a slow release chlorine tablet. In this way the effluent is disinfected before being discharged.

4. BLOWERS-COMPRESSORS for forced blowing of oxygen into the activated sludge plant and for air-lift recirculation system (included).

5. SLUDGE RECIRCULATION PIPE

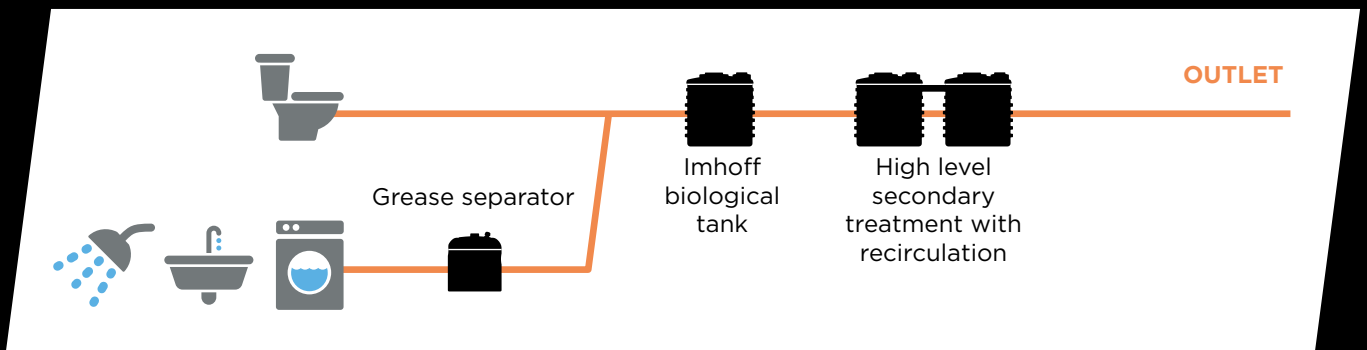
SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Secondary treatments consisting of an anaerobic trickle filter and an activated sludge plant allow almost 100% removal of the organic load and suspended solids with a very high reduction in the nitrogen load and phosphorous load found in domestic sewage. The trickle filter is a biological reactor in which the micro-organisms, under anaerobic conditions, make use of the biodegradable substance contained in the effluent. These micro-organisms develop on the surface of special bulk fill material in polypropylene, specifically designed to maximise the contact surface area between the micro-organisms and the effluent. Activated sludge plants are systems in which the bacterial flora develops in colonies that remain in suspension in the effluent and consume the remaining biodegradable material. The process is fully aerobic and the oxygen necessary for the development of the bacteria is supplied by submersed diffusers that emit a flow of fine bubbles of air from the bottom of the tank. This also guarantees continuous effluent mixing.

USE: high level secondary treatment of domestic sewage.

REFERENCE REGULATIONS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Secondary treatments consisting of an anaerobic trickle filter and an activated sludge plant with sludge recirculation allow almost 100% removal of the organic load and suspended solids with a very high reduction in the nitrogen load and phosphorous load found in domestic sewage. In this way, the waste water discharged respects the limits indicated in table 4 of attachment 5 to Legislative Decree 152/2006 for discharge to land. The trickle filter is a biological reactor in which the micro-organisms, under anaerobic conditions, make use of the biodegradable substance contained in the effluent. These micro-organisms develop on the surface of special bulk fill material in polypropylene, specifically designed to maximise the contact surface area between the micro-organisms and the effluent. Activated sludge plants are systems in which the bacterial flora develops in colonies that remain in suspension in the effluent and consume the remaining biodegradable material. The process is fully aerobic and the oxygen necessary for the development of the bacteria is supplied by submersed diffusers that emit a flow of fine bubbles of air from the bottom of the tank. This also guarantees continuous effluent mixing. The sludge recirculation system is used to create optimum conditions to develop and maintain the bacteria responsible for removal of the various pollutants present in the effluent.

USE: High level secondary treatment of domestic sewage.

REFERENCE REGULATIONS: Italian Inter-Ministerial Committee for the Protection of Waters Resolution n°48/77, Italian Legislative Decree n°152/06.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment systems made up of a grease separator, an Imhoff biological tank and a high efficiency secondary treatment (installed as shown in the diagram at pages 82-83-84) ensures that the concentrations of the final effluent are:

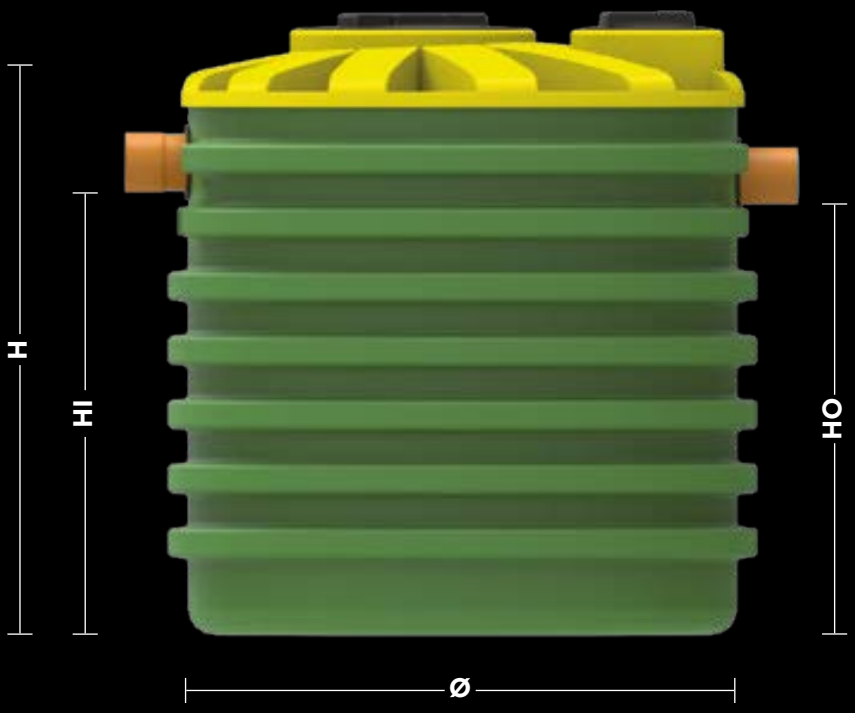
≤100 mg/l	≤20 mg/l	≤25 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS

SECONDARY TREATMENTS

MODEL



CORRUGATED

UNDERGROUND TANK

ELIPSE

MODULAR

SECONDARY TREATMENTS
MODULAR

SECONDARY TREATMENTS (DEP)

Item	Model	Anaerobic trickle filter						Activated sludge plant								PE.	Цени в лв/без ДДС
		Item	Ø mm	H mm	Cover	Extensions	Filter Vol. m^3	Item	Ø mm	H mm	Cover	Exten-sions	Aerated vol. l	Sed. vol. l	Blowers		
DEP 07		NAN 1000	1150	1220	CC455-CC255	PP45-PP30	0.85	NIFA 1000	1150	1220	CC455-CC255	PP45-PP30	607	243	HP40	7	2270.00
DEP 09		NAN 1000	1150	1220	CC455-CC255	PP45-PP30	0.85	NIFA 1500	1150	1720	CC455-CC255	PP45-PP30	906	362	HP40	9	2570.00
DEP 11		NAN 1500	1150	1720	CC455-CC255	PP45-PP30	1.2	NIFA 1500	1150	1720	CC455-CC255	PP45-PP30	906	362	HP40	11	2910.00
DEP 13		NAN 1500	1150	1720	CC455-CC255	PP45-PP30	1.2	NIFA 2600	1710	1450	CC455-CC355	PP45-PP35	1432	629	HP80	13	3760.00
DEP 15		NAN 2600	1710	1450	CC455-CC355	PP45-PP35	2.06	NIFA 2600	1710	1450	CC455-CC355	PP45-PP35	1432	629	HP80	15	4500.00
DEP 17		NAN 2600	1710	1450	CC455-CC355	PP45-PP35	2.06	NIFA 3200	1710	1725	CC455-CC355	PP45-PP35	1765	760	HP80	17	4650.00
DEP 20		NAN 3200	1710	1725	CC455-CC355	PP45-PP35	2.52	NIFA 3200	1710	1725	CC455-CC355	PP45-PP35	1765	760	HP80	20	5100.00
DEP 23		NAN 3200	1710	1725	CC455-CC355	PP45-PP35	2.52	NIFA 3800	1710	1955	CC455-CC355	PP45-PP35	2139	965	HP80	23	5600.00
DEP 26		NAN 3800	1710	1955	CC455-CC355	PP45-PP35	3.17	NIFA 3800	1710	1955	CC455-CC355	PP45-PP35	2139	965	HP80	26	6000.00
DEP 30		NAN 3800	1710	1955	CC455-CC355	PP45-PP35	3.17	NIFA 4600	1710	2225	CC455-CC355	PP45-PP35	2713	1085	HP80	30	6300.00
DEP 35		NAN 4600	1710	2225	CC455-CC355	PP45-PP35	3.83	NIFA 4600	1710	2225	CC455-CC355	PP45-PP35	2713	1085	HP80	35	6700.00
DEP 40		NAN 4600	1710	2225	CC455-CC355	PP45-PP35	3.83	NIFA 7000	2250	2367	CC455-CC455	PP45-PP45	5474	1460	HP150	40	9180.00
DEP 47		NAN 7000	2250	2367	CC455-CC455	PP45-PP45	6.93	NIFA 7000	2250	2367	CC455-CC455	PP45-PP45	5474	1460	HP150	47	10530.00
DEP 52		NAN 7000	2250	2367	CC455-CC455	PP45-PP45	6.93	NIFA 9000	2250	2625	CC455-CC455	PP45-PP45	5803	2020	HP150	52	11030.00
DEP 60		NAN 9000	2250	2625	CC455-CC455	PP45-PP45	7.82	NIFA 9000	2250	2625	CC455-CC455	PP45-PP45	5803	2020	HP150	60	12480.00

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

AEROBIC TRICKLE FILTER WITH TOP OUTLET

Item	Model	Length mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Covers	Extensions	Blowers	Filter surface m^2	Filter volume m^3	PE.	Цени в лв/без ДДС
NARA1000		-	-	1150	1220	880	860	110	CC455-CC255	PP45- PP30	HP40	1.04	0.85	**2**	**1500.00**
NARA1200		1900	708	-	1630	1250	1230	110	CC355-CC355	PP35-PP35	HP40	1.35	1.20	**3**	**1700.00**
NARA1500		-	-	1150	1720	1360	1340	110	CC455-CC255	PP45-PP30	HP40	1.04	1.26	**4**	**1900.00**
NARA1700		1900	708	-	2140	1760	1740	110	CC355-CC355	PP35-PP35	HP40	1.35	1.77	**5**	**2100.00**
NARA2100		-	-	1350	1975	1540	1520	110	CC455-CC355	PP45-PP35	HP40	1.39	1.80	**6**	**2250.00**
NARA2600		-	-	1710	1450	1000	980	125	CC455-CC355	PP45-PP35	HP60	2.30	2.06	**8**	**2900.00**
NARA3200		-	-	1710	1725	1240	1220	125	CC455-CC355	PP45-PP35	HP60	2.30	2.52	**10**	**3200.00**
NARA3800		-	-	1710	1955	1490	1470	125	CC455-CC355	PP45-PP35	HP60	2.30	3.10	**12**	**3800.00**
NARA4600		-	-	1710	2225	1710	1690	125	CC455-CC355	PP45-PP35	HP60	2.30	3.80	**14**	**4100.00**
NARA5400		-	-	1950	2250	1660	1640	125	CC455-CC455	PP45-PP45	HP60	2.90	4.75	**16**	**4400.00**
NARA6400		-	-	1950	2530	1970	1950	125	CC455-CC455	PP45-PP45	HP60	2.90	5.07	**18**	**4950.00**
NARA5700		2420	1920	-	2100	1690	1670	125	TAP710	PP77	HP80	3.78	5.60	**20**	**5400.00**
NARA7000		-	-	2250	2367	1850	1830	125	CC455-CC455	PP45-PP45	HP80	3.98	6.93	**21**	**5800.00**
NARA9000		-	-	2250	2625	2070	2050	125	CC455-CC455	PP45-PP45	HP80	3.98	7.82	**25**	**7600.00**
NARA10700		2780	2430	-	2660	2270	2230	160	TAP710	PP77	HP80	6.75	10.00	**30**	**8100.00**
ITARA15000		5620	-	2100	2200	1830	1800	160	TAP710	2 x PP77	HP402SF	10.20	14.15	**40**	**12400.00**
ITARA22000		7880	-	2100	2200	1830	1800	160	TAP710	3 x PP77	HP402SF	14.90	20.07	**60**	**17600.00**
ITARA30000		10140	-	2100	2200	1810	1780	200	TAP710	4 x PP77	HP502SF	19.16	27.25	**80**	**22900.00**
ITARA36000		12400	-	2100	2200	1810	1780	200	TAP710	5 x PP77	HP502SF	23.67	33.08	**100**	**28200.00**

PE. = population equivalent: Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

SECONDARY TREATMENT (DEP RF) WITH SLUDGE RECIRCULATION

Item	Model	Anaerobic trickle filter						Activated sludge plant with recirculation								PE.	Цени в лв/без ДДС
		Item	Ø mm	H mm	Cover	Exten-sions	Filter vol. m^3	Item	Ø mm	H mm	Cover	Exten-sions	Aerated vol. l	Sed. vol. l	Blowers		
DEP 07RF		**NAN 1000R**	1150	1220	CC455-CC255	PP45-PP30	0.85	**NIFA 1000R**	1150	1220	CC455-CC255	PP45-PP30	607	243	HP40-HP40	**7**	**2,700.00**
DEP 09RF		**NAN 1000R**	1150	1220	CC455-CC255	PP45-PP30	0.85	**NIFA 1500R**	1150	1720	CC455-CC255	PP45-PP30	906	362	HP40-HP40	**9**	**3,000.00**
DEP 11RF		**NAN 1500R**	1150	1720	CC455-CC255	PP45-PP30	1.2	**NIFA 1500R**	1150	1720	CC455-CC255	PP45-PP30	906	362	HP40-HP40	**11**	**3,350.00**
DEP 13RF		**NAN 1500R**	1150	1720	CC455-CC255	PP45-PP30	1.2	**NIFA 2600R**	1710	1450	CC455-CC355	PP45-PP35	1432	629	HP80-HP60	**13**	**4,300.00**
DEP 15RF		**NAN 2600R**	1710	1450	CC455-CC355	PP45-PP35	2.06	**NIFA 2600R**	1710	1450	CC455-CC355	PP45-PP35	1432	629	HP80-HP60	**15**	**5,000.00**
DEP 17RF		**NAN 2600R**	1710	1450	CC455-CC355	PP45-PP35	2.06	**NIFA 3200R**	1710	1725	CC455-CC355	PP45-PP35	1765	760	HP80-HP60	**17**	**5,200.00**
DEP 20RF		**NAN 3200R**	1710	1725	CC455-CC355	PP45-PP35	2.52	**NIFA 3200R**	1710	1725	CC455-CC355	PP45-PP35	1765	760	HP80-HP60	**20**	**5,600.00**
DEP 23RF		**NAN 3200R**	1710	1725	CC455-CC355	PP45-PP35	2.52	**NIFA 3800R**	1710	1955	CC455-CC355	PP45-PP35	2139	965	HP80-HP60	**23**	**6,100.00**
DEP 26RF		**NAN 3800R**	1710	1955	CC455-CC355	PP45-PP35	3.17	**NIFA 3800R**	1710	1955	CC455-CC355	PP45-PP35	2139	965	HP80-HP60	**26**	**6,500.00**
DEP 30RF		**NAN 3800R**	1710	1955	CC455-CC355	PP45-PP35	3.17	**NIFA 4600R**	1710	2225	CC455-CC355	PP45-PP35	2713	1085	HP80-HP80	**30**	**6,900.00**
DEP 35RF		**NAN 4600R**	1710	2225	CC455-CC355	PP45-PP35	3.83	**NIFA 4600R**	1710	2225	CC455-CC355	PP45-PP35	2713	1085	HP80-HP80	**35**	**7,200.00**
DEP 40RF		**NAN 4600R**	1710	2225	CC455-CC355	PP45-PP35	3.83	**NIFA 7000R**	2250	2367	CC455-CC455	PP45-PP45	5474	1460	HP150-HP150	**40**	**10,200.00**
DEP 47RF		**NAN 7000R**	2250	2367	CC455-CC455	PP45-PP45	6.93	**NIFA 7000R**	2250	2367	CC455-CC455	PP45-PP45	5474	1460	HP150-HP150	**47**	**11,600.00**
DEP 52RF		**NAN 7000R**	2250	2367	CC455-CC455	PP45-PP45	6.93	**NIFA 9000R**	2250	2625	CC455-CC455	PP45-PP45	5803	2020	HP150-HP150	**52**	**12,000.00**
DEP 60RF		**NAN 9000R**	2250	2625	CC455-CC455	PP45-PP45	7.82	**NIFA 9000R**	2250	2625	CC455-CC455	PP45-PP45	5803	2020	HP150-HP150	**60**	**13,500.00**

PE. = population equivalent: Ø = diameter; H = height.

TECHNICAL SECTION – SECONDARY TREATMENT SYSTEMS

TECHNICAL CHARACTERISTICS

Secondary treatments consisting of an anaerobic trickle filter and an activated sludge plant allow almost 100% removal of the organic load and suspended solids with a very high reduction in the nitrogen load and phosphorous load found in domestic sewage. In this way, the waste water discharged respects the limits indicated in table 4 of attachment 5 to Legislative Decree 152/2006 for discharge to land.
The trickle filter is a biological reactor in which the micro-organisms, under anaerobic conditions, make use of the biodegradable substance contained in the effluent. These micro-organisms develop on the surface of special bulk fill material in polypropylene, specifically designed to maximise the contact surface area between the micro-organisms and the effluent.
Activated sludge plants are systems in which the bacterial flora develops in colonies that remain in suspension in the effluent and consume the remaining biodegradable material. The process is fully aerobic and the oxygen necessary for the development of the bacteria is supplied by submersed diffusers that emit a flow of fine bubbles of air from the bottom of the tank. This also guarantees continuous effluent mixing.
The outlet from the activated sludge plant is equipped with a housing in which it is possible to insert a chlorine tablet. This allows the effluent leaving the treatment plant to be disinfected.

USE AND MAINTENANCE

Bacterial organisms develop inside the two tanks forming the treatment system and transform the pollutants into inert sludge which tends to accumulate at the bottom and on the filter media of the trickle filter. Over time, an excessive accumulation of sludge leads to the release of these bacterial organisms with the resulting deterioration in the quality of the final effluent. For this reason, the tanks need to be inspected and subjected to periodic maintenance. These operations are normally carried out as part of the Imhoff tank inspection and emptying operations.
During the tank inspection operations, make sure that there is a continuous supply of air being blown into the activated sludge plant. It should be remembered that in order for the system to function correctly, the effluent must first be subjected to grease separation and sedimentation treatment in an Imhoff tank or similar installed upstream of the system.
The plant needs 10-15 days in order to reach normal operation. This time can be reduced however by adding biomass activators (Rototec Bioactivator) directly to the sewage.

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 activated sludge 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 in both tanks (**see installation method**);
• after pump-out, fill the tanks 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.

WARNINGS (blower)

• the operating temperature must be between –20°C and +40°C with relatively low humidity;
• always carry out all cleaning and/or replacement operations **with the electric power supply disconnected**;
• before carrying out any cleaning and/or replacement operation, make sure that the body of the compressor has **cooled down,** to avoid any risk of burns;
• when carrying out repairs, it is good practice only to use **original materials** in order to guarantee the safety of the equipment;
• maintenance operations that require the presence of electricity, such as detecting faults inside the blower, must only be carried out by **qualified technicians**.
• never connect the compressor to energy sources other than those indicated. If you have any doubts about how to do so, **DO NOT** connect up the equipment.

MANAGEMENT

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
Inspect the trickle filter	Every 6 / 12 months	Unscrew the covers on the inspection holes and check the level of sediments
Check that the blower is working properly	Every month	Unfasten the cover on the inlet inspection hole and check that air is being blown into the activated sludge plant
Clean the blower suction filter	Every 3 months	Remove the filter, eliminate excess dust and if necessary wash with mild detergent
Extract the bottom sludge, clean the interior and the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company
Clean the plate diffuser in the activated sludge plant	Every 6 / 12 months	Contact a licensed waste disposal company (water jet pump-out)
Backwash the filter media in the trickle filter	Every 6 / 12 months	Contact a licensed waste disposal company (water jet pump-out)

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

SECONDARY TREATMENT PLANTS WITH SLUDGE RECIRCULATION

TECHNICAL CHARACTERISTICS

Secondary treatments consisting of an anaerobic trickle filter and an activated sludge plant with recirculation allow almost 100% removal of the organic load and suspended solids with a very high reduction in the nitrogen load and phosphorous load found in domestic sewage. In this way, the discharged effluent complies with the limits laid down by table 4 of appendix 5 of Law Decree 152/2006 for discharge to land and, with the installation of an appropriate disinfection system, can be stored for eventual re-use for less noble purposes (irrigation, vehicle and hardstanding washing,...).
The trickle filter is a biological reactor in which the micro-organisms, under anaerobic conditions, make use of the biodegradable substance contained in the effluent. These micro-organisms develop on the surface of special bulk fill material in polypropylene, specifically designed to maximise the contact surface area between the micro-organisms and the effluent.
Activated sludge plants are systems in which the bacterial flora develops in colonies that remain in suspension in the effluent and consume the remaining biodegradable material. The process is fully aerobic and the oxygen necessary for the development of the bacteria is supplied by submersed diffusers that emit a flow of fine bubbles of air from the bottom of the tank. This also guarantees continuous effluent mixing. Thanks to the recirculation system, a part of the sludge present in the tank is recirculated to the percolator by means of an air lift system. In this way, the removal of the organic load, the nitrogen and the phosphorous is the maximum possible, allowing the effluent to be re-used for irrigation or for discharge to highly protected areas (e.g. Venice Lagoon).
The outlet from the activated sludge plant is equipped with a housing in which it is possible to insert a chlorine tablet. This allows the effluent leaving the treatment plant to be disinfected before being stored.

USE AND MAINTENANCE

Bacterial organisms develop inside the two tanks forming the treatment system and transform the pollutants into inert sludge which tends to accumulate at the bottom and on the filter media of the trickle filter. Over time, an excessive accumulation of sludge leads to the release of these bacterial organisms with the resulting deterioration in the quality of the final effluent. For this reason, the tanks need to be **inspected and subjected to periodic maintenance**. These operations are normally carried out as part of the Imhoff tank inspection and emptying operations.
During the tank inspection operations, make sure that there is a continuous supply of air being blown into the activated sludge plant and a **recirculation of sludge to the anaerobic trickle filter**. It should also be remembered that in order to ensure the correct operation of the plant, a grease separator and Imhoff tank or similar should be installed upstream of the plant itself. Furthermore, particular attention should be paid to the discharge of disinfectants, bleaches, strong acids or bases which could deactivate the biomass. The plant needs 10-15 days in order to reach normal operation. This time can be reduced however by adding biomass activators (Rototec Bioactivator) directly to the sewage.

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 activated sludge 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 in both tanks (**see installation method**);
- after pump-out, fill the tanks 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.

WARNINGS (blower)

- the operating temperature must be between –20°C and +40°C with relatively low humidity;
- always carry out all cleaning and/or replacement operations **with the electric power supply disconnected**;
- before carrying out any cleaning and/or replacement operation, make sure that the body of the compressor has **cooled down,** to avoid any risk of burns;
- when carrying out repairs, it is good practice only to use **original materials** in order to guarantee the safety of the equipment;
- maintenance operations that require the presence of electricity, such as detecting faults inside the blower, must only be carried out by **qualified technicians**.
- never connect the compressor to energy sources other than those indicated. If you have any doubts about making the connections, **DO NOT**connect the equipment.

MANAGEMENT

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
Inspect the trickle filter	Every 6 / 12 months	Unscrew the covers on the inspection holes and check the level of sediments
Check that the blower in the activated sludge plant is working	Every month	Unfasten the cover on the inlet inspection hole and check that air is being blown into the activated sludge plant
Check that the blower in the Air-lift sludge recirculation is working	Every month	Unscrew the cover on the trickle filter inlet manhole and check the sludge recirculation
Clean the blowers suction filter	Every 3 months	Remove the filter, eliminate excess dust and if necessary wash with mild detergent
Extract the bottom sludge, clean the interior and the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company
Clean the plate diffuser in the activated sludge plant	Every 6 / 12 months	Contact a licensed waste disposal company (water jet pump-out)
Backwash the filter media in the trickle filter	Every 6 / 12 months	Contact a licensed waste disposal company (water jet pump-out)

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

CONSTRUCTED WETLAND

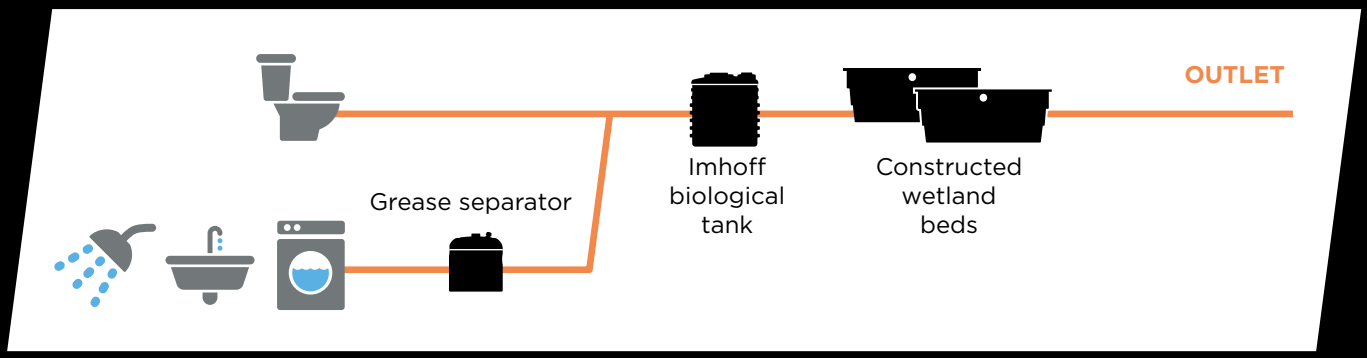
CONSTRUCTED WETLAND

1. EFFLUENT INLET PIPE: DE125 PVC inlet pipe conveying the effluent to the bottom of the bed.

2. EFFLUENT OUTLET PIPE: DE125 PVC outlet pipe taking the waste water from the bottom of the bed.

3. BED: made of one-piece PE without welds, it is perfectly watertight and has a working surface area of 5 sq.m. It is filled with a layer of coarse gravel at the bottom (15 cm) which is then covered with a layer of gravel (15 cm) covered by geotextile membrane. It is then filled in with a mixture of soil and peat, into which the wetland vegetation is planted.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Horizontal subsurface-flow constructed wetland treatment systems for domestic discharges are constructed using linear polyethylene beds (LLDPE) with a one-piece structure to guarantee maximum water tightness. Once filled with inert material, the beds allow the effluent to flow horizontally under continuous saturation conditions (plug-flow reactors), so that the water to be treated is maintained in constant contact with the emergent rooted macrophytes that perform the purification. The effluent flow is maintained a few centimetres below ground level by a special hydraulic device. In this way, a prevalently anoxic environment is created, rich in aerobic microsites on the plant roots. This variety of potential redox conditions (reduction-oxidation) renders the system extremely elastic, versatile and efficient when faced with different types of effluent and variations in pollutant load. As the effluent passes through the filter media and the roots of the plants (which constitute the biofilm reactor) the organic material is decomposed by bacterial action and the nitrogen is denitrified, while the phosphorous and heavy metals are anchored to the filter media by adsorption. The horizontal subsurface-flow systems also provide greater thermal protection of the effluent during the winter, especially in the case where frequent snow cover is expected.

USE: secondary or tertiary treatment of domestic sewage or the like (restaurants, bars, hotels,...).

REFERENCE REGULATIONS: Italian Leg.Dec. 152/2006.

SEWAGE TREATMENT EFFICIENCY

The wastewater treatment system made up of a grease separator, an Imhoff biological tank and constructed wetlands (installed as shown in the diagram at page 96) ensures that the concentrations of the final effluent are:

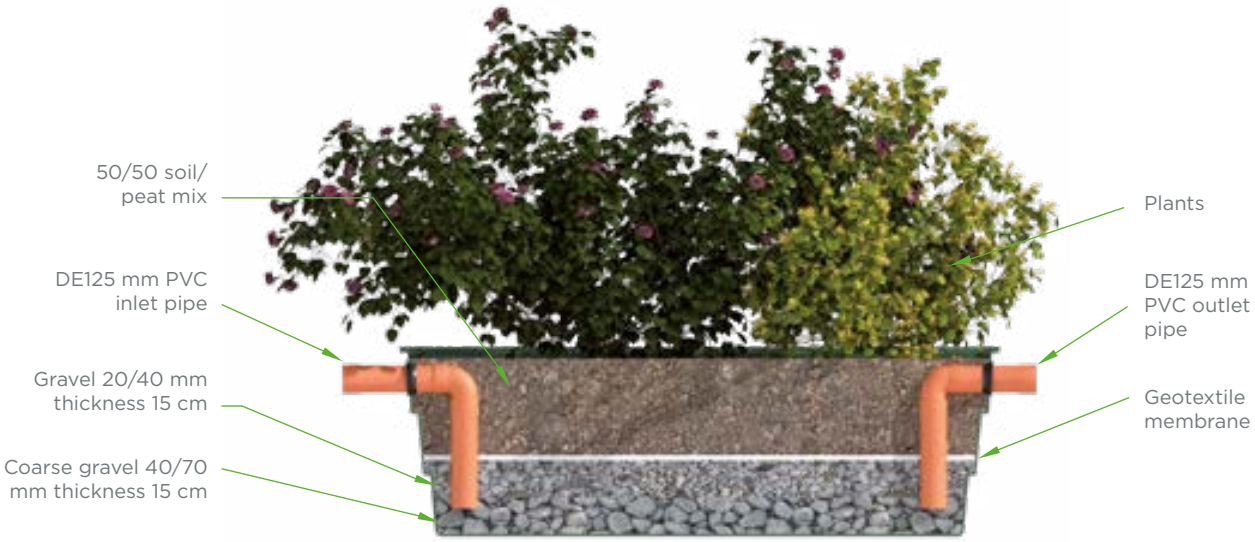
≤160 mg/l	≤40 mg/l	≤80 mg/l
COD	BOD_5	SS

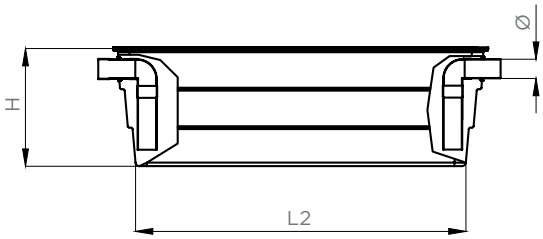
Or, increasing the number of beds

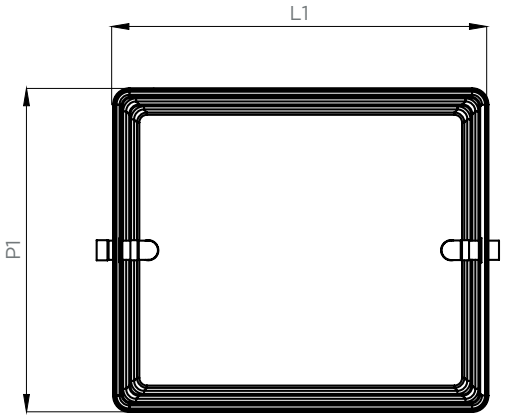
≤100 mg/l	≤20 mg/l	≤25 mg/l
COD	BOD_5	SS

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

≤600 mg/l	≤300 mg/l	≤400 mg/l
COD	BOD_5	SS







Item	L1 mm	L2 mm	P1 mm	P2 mm	H mm	Ø pipes mm	Цени в лв/без ДДС
VS5	2450	2160	2100	1810	765	125	**580.00**

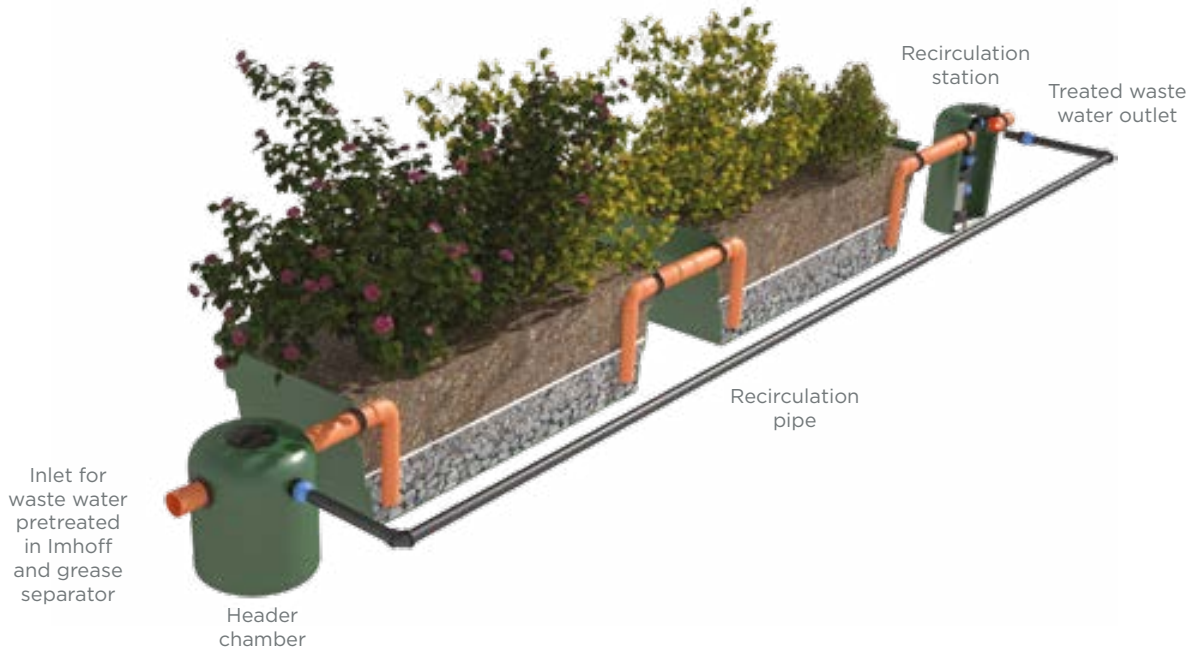
CONSTRUCTED WETLAND
CLASSIC

Treated waste water outlet

Inlet for waste water pretreated in Imhoff and grease separator

PE. (2.5 m²/PE)	PE. (5 m²/PE)	PE. (1 m²/PE)	Beds n°	Surfaces m2	Цени в лв/без ДДС
2	**1**	**5**	1	5	**580.00**
4	**2**	**10**	2	10	**1160.00**
6	**3**	**15**	3	15	**1740.00**
8	**4**	**20**	4	20	**2320.00**
10	**5**	**25**	5	25	**2900.00**
12	**6**	**30**	6	30	**3480.00**
14	**7**	**35**	7	35	**4060.00**
16	**8**	**40**	8	40	**4640.00**
18	**9**	**45**	9	45	**5220.00**
20	**10**	**50**	10	50	**5800.00**
22	**11**	**55**	11	55	**6380.00**
24	**12**	**60**	12	60	**6960.00**
26	**13**	**65**	13	65	**7540.00**
28	**14**	**70**	14	70	**8120.00**
30	**15**	**75**	15	75	**8700.00**
32	**16**	**80**	16	80	**9280.00**
34	**17**	**85**	17	85	**9860.00**
36	**18**	**90**	18	90	**10440.00**
38	**19**	**95**	19	95	**11020.00**
40	**20**	**100**	20	100	**11600.00**

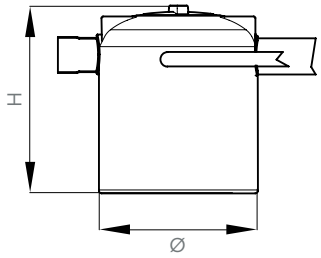
CONSTRUCTED WETLAND
WITH EVAPOTRANSPIRATION



The pre-treated waste water is sent to the constructed wetland basin, which comprises a header chamber and beds connected in series and/or parallel. The water flows horizontally and remains below the top surface of the filler materials at all times. The treated waste water comes out from the last bed and is sent to a lifting station where a pump delivers the waste water to the header chamber, creating a closed circuit. In this way the majority of the waste water treated in the basin is absorbed and subjected to evapotranspiration by the plants, thus reducing final drainage into the environment to a minimum.

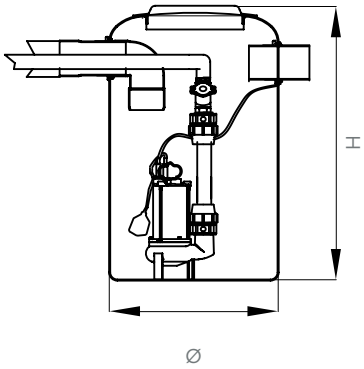
PE. 2.5 sq.m/PE.	PE. 5 sq.m/PE.	PE. 7.5 sq.m/PE.	PE. 10 sq.m/PE.	Beds n°	Surface area m2	Цени в лв/без ДДС
2	1	-	-	1	5	580.00
4	2	1	1	2	10	1160.00
6	3	2	-	3	15	1740.00
8	4	-	2	4	20	2320.00
10	5	3	-	5	25	2900.00
12	6	4	3	6	30	3480.00
14	7	-	-	7	35	4060.00
16	8	5	4	8	40	4640.00
18	9	6	-	9	45	5220.00
20	10	-	5	10	50	5800.00
22	11	7	-	11	55	6380.00
24	12	8	6	12	60	6960.00
26	13	-	-	13	65	7540.00
28	14	9	7	14	70	8120.00
30	15	10	-	15	75	8700.00
32	16	-	8	16	80	9280.00
34	17	11	-	17	85	9860.00
36	18	12	9	18	90	10440.00
38	19	-	-	19	95	11020.00
40	20	13	10	20	100	11600.00

HEADER CHAMBER FOR EVAPOTRANSPIRATION BASIN



Item	Ø mm	H mm	Ø I-O mm	Ø recircu-lation mm	Ø insp. mm	Цени в лв/без ДДС
DD150FT EVT	580	660	125	50	300	172.00

RECIRCULATION STATION FOR EVAPOTRANSPIRATION BASIN



Item	PE.	Ø mm	H mm	Ø Pipes mm	Ø O mm	Ø insp. mm	Цени в лв/без ДДС
SOL326 EVT	1-4	630	970	125	50	400	1100.00
SOL526 EVT	5-10	790	790	125	50	400	1150.00
NSOL1026 EVT	11-25	1150	1220	125	50	400-220	1550.00
NSOL1526 EVT	25-40	1150	1720	125	50	400-220	1850.00
NSOL3026 EVT	>40	1710	1650	125	50	630	2100.00

TECHNICAL SECTION – CONSTRUCTED WETLAND SYSTEMS

TECHNICAL CHARACTERISTICS

Horizontal subsurface-flow constructed wetland systems for domestic discharges are constructed using linear polyethylene beds (LLDPE) with a one-piece structure to guarantee maximum water tightness.
Once filled with inert material, the beds allow the effluent to flow horizontally under continuous saturation conditions (plug-flow reactors). In this way, the effluent to treat is maintained in constant contact with the emergent rooted macrophytes that perform the purification. The effluent flow is maintained a few centimetres below ground level by a special hydraulic device. In this way, a **prevalently anoxic environment** is created, rich in aerobic microsites on the plant roots. This variety of potential redox conditions (reduction-oxidation) renders the system extremely elastic, versatile and efficient when faced with different types of effluent and variations in pollutant load.
As the effluent passes through the filter media and the roots of the plants (which constitute the **biofilm reactor**) the organic material is decomposed by bacterial action and the nitrogen is denitrified, while the phosphorous and heavy metals are anchored to the filter media by adsorption.
The horizontal subsurface-flow systems also provide **greater thermal protection** of the effluent during the winter, especially in the case where frequent snow cover is expected.

For subsurface-flow systems, a plant density of 4 units/m^2 is recommended. In general, the best period for planting is spring, while planting in summer (July, August) or winter is not advised.
The most suitable plant species for constructed wetland systems are:


Spotted laurel (Acuba Japonica)


Butomus Umbrellaus


Caltha Palustris


Carex Elata


Sparganium Erectum


Epatorium Cannabinum


Fern


Iris Pseudocorus


Juncus


Typha


Lythrum Salicaria


Phragmites Australis


Sambucus nigra

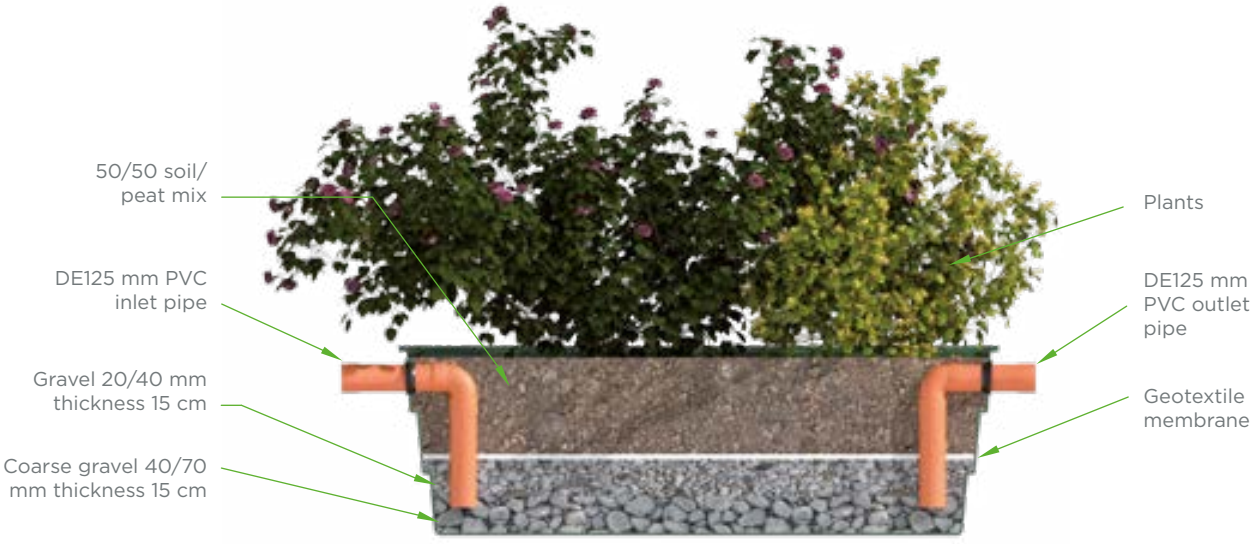

Schoenoplectus nero

CONSTRUCTED WETLAND SYSTEMS

INSTALLATION

The beds for the constructed wetlands must be installed on a **flat stable surface** so that the level of effluent remains constant and the same in all the beds of the plant.
The beds for the constructed wetland can be connected in series to form a single line. If there are a large number of beds, a system can be created in which the beds themselves are positioned along two or three parallel lines. In all cases, however, the above instructions must be followed.
Once installed and connected, the beds are then filled:

- it is advisable to place a **15/20cm thick layer of 40/70 mm coarse gravel** near to the diffuser pipes.
- this is followed by a **15cm layer of finer gravel** (20/40mm). These layers ensure better dispersion of the effluent and reduce the risk of clogging the bed.
- the remaining volume of the beds is then filled with soil consisting of a **50-50 mix of topsoil and peat**.
- to ensure optimum performance of the system, it is advisable to position a **geotextile membrane** under the layer of soil.
- finally, the **vegetation** is planted either in the form of seeds, rootstock or species of vegetation at various levels of growth



CONSTRUCTED WETLAND SYSTEMS

USE AND MAINTENANCE

The choice of pre-treatment systems suitable for the type of effluent to be treated is an important factor for guaranteeing the operation and life of a constructed wetland system. Most of the solids contained in the effluent, in fact, must be removed. For this purpose, both the three-chamber septic tanks and the Imhoff biological tanks are recommended.
In order to ensure the good operation of constructed wetland systems, the primary treatments must be correctly maintained, and the deposit of solid material that could obstruct the distribution systems and/or accumulations in the soil in which the vegetation grows must be monitored.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Check the growth of the plants	Every 3/4 months	-
Inspect the beds	Every 3/4 months	Eliminate weeds from the beds
Clean the dispersion pipes	Every 12 months	Contact a licensed waste disposal company (wash with a pressurised jet)
Cut the tops of the plants	Every 2/3 years	Follow pruning methods according to the type of plant

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

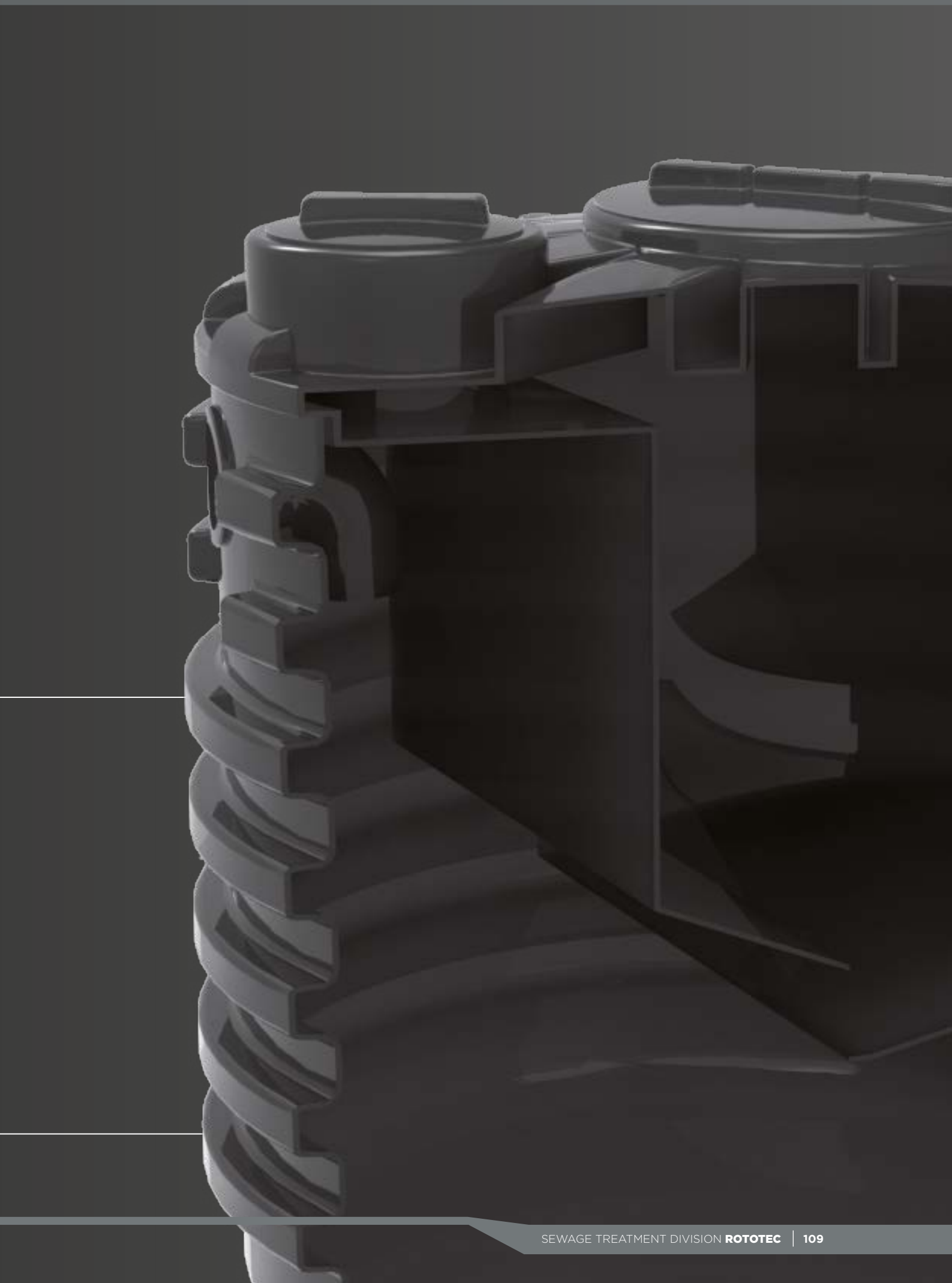
• make sure that drains have a siphon;
• check that the pipes slope sufficiently (approximately 1% - 2%);
• during installation of the beds, create **protective sidewalls** to reduce the formation of rivulets, encouraging the development of a grassy cover near to the beds;
• when discharging into the 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.

NOTES

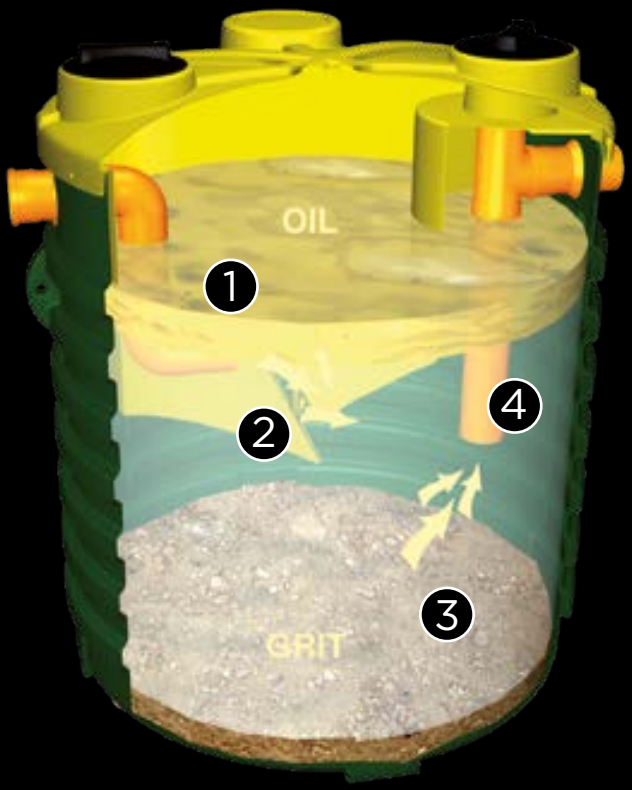

Treatment plant
for car washes
Continuous
rainwater runoff
treatment system

SURFACE RUNOFF TREATMENT

GRAVITY OIL SEPARATORS



OIL SEPARATORS
GRAVITY OIL SEPARATORS



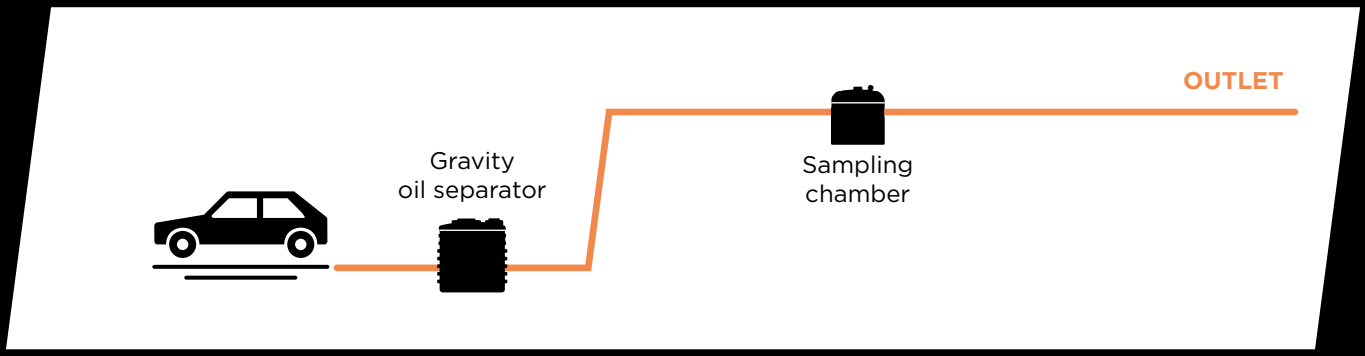
1. OIL SEPARATION AND ACCUMULATION AREA: stilling area in which floating substances such as oil, grease and any foam are separated from the effluent and accumulate on the surface.

2. SEDIMENTATION CHAMBER: conical sedimentation chamber that allows the flow to slow down, so that the heavy substances (sand, gravel, pieces of rubber and metal,...) can settle more easily and be carried into the sludge accumulation section beneath.

3. HEAVY SEDIMENT ACCUMULATION AREA: stilling area in which the heavy substances settle and accumulate.

4. OUTLET PIPE: it features a pipe that picks up the effluent at approximately the middle of the tank, that is to say in the clearest area, so as to avoid the floating and sedimented material from exiting.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Static oil separator tanks are stilling tanks sized for a retention time of at least 15 minutes at maximum discharge flow. These oil separators are defined as class II according to UNI-EN 858-1 and consist of a sedimentation zone in which the lighter liquid (volumetric mass not exceeding 0.85 g/cm^3) is separated from the inert materials: sludge, sand and lime. Each model is designed with a light liquid storage capacity. The oil separators are sized according to a defined nominal flow, i.e. the maximum treatable flow according to the project specifications. This value is defined to allow a sufficient retention time of the treated effluent and on the basis of performance trials carried out on water and diesel oil mixes. The sizing of light liquid separators must take into account the nature and flow of the substances to treat, as well as any stormwater flows that could reach the plant, the volumetric mass of the light liquid and the presence of substances that could obstruct the separation, such as, for example, detergents. The design flow is calculated for light liquids of density less than 0.85 g/cm^3 (diesel, petrol), in the absence of detergents and for surface runoff only

USE: treatment of surface drainage water from covered and open-air hardstandings, car parks, car showrooms, garages,...

REFERENCE STANDARDS: Italian Leg. Dec. 152/2006.

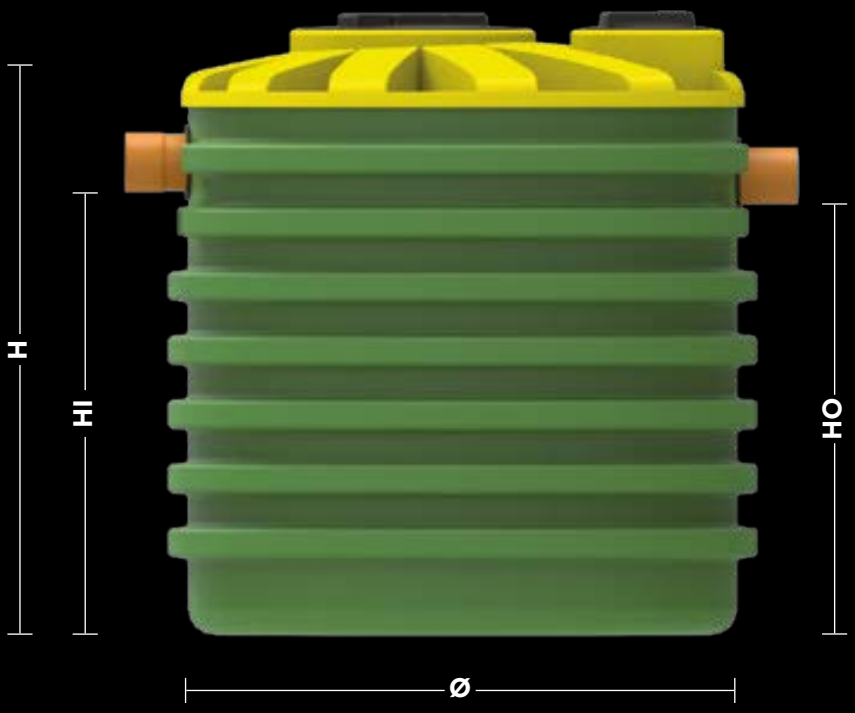
TREATMENT EFFICIENCY,

The gravity oil separators (installed as shown in the diagram at page 110) are defined as class II in accordance to UNI EN 858-1 and ensure that the concentrations of the final effluent are:

≤200 mg/l
SS

≤10 mg/l
Total Hydrocarbons

OIL SEPARATORS
GRAVITY OIL SEPARATORS



MODEL

CORRUGATED

SEPARATION BAFFLES

MODULAR

OIL SEPARATORS
GRAVITY OIL SEPARATORS - MODULAR

OIL SEPARATORS
GRAVITY OIL SEPARATORS

Item	Model	Len-gth mm	Width mm	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Useful vol. l	Oil vol. l	Sedim. vol. l	NS l/s	Covered hardstanding		Uncovered hardstanding		Цени в лв/без ДДС
													m2	Car spaces	m2	Car spaces	
NDO150		950	650	-	565	375	345	100	180	35	25	0.3	**80**	6	**30**	2	**240.00**
NDO200		1000	635	-	675	490	440	100	205	30	50	0.4	**140**	8	**50**	3	**280.00**
NDO300		1100	700	-	775	585	535	100	303	40	80	0.6	**220**	12	**75**	4	**310.00**
NDO400		1150	750	-	890	695	645	100	409	55	110	0.8	**290**	16	**100**	5	**370.00**
NDO500		1400	900	-	750	560	530	100	510	75	140	1	**360**	20	**125**	6	**420.00**
NDO1000		-	-	1150	1220	880	860	110	850	22	62	2	**700**	40	**210**	12	**610.00**
NDO1500		-	-	1150	1720	1360	1340	110	1268	34	100	3	**1000**	55	**320**	18	**850.00**
NDO2100		-	-	1350	1975	1540	1520	110	1950	45	130	4.5	**1300**	70	**450**	25	**1100.00**
NDO2600		-	-	1710	1450	1000	980	125	2061	50	143	5	**1500**	80	**520**	30	**1350.00**
NDO3200		-	-	1710	1725	1240	1220	125	2525	63	180	6.5	**2000**	110	**630**	35	**1550.00**
NDO3800		-	-	1710	1955	1525	1505	160	3175	80	220	8	**2400**	135	**800**	45	**1900.00**
NDO4600		-	-	1710	2225	1745	1725	160	3835	100	285	10	**3000**	165	**950**	52	**2200.00**
NDO5400		-	-	1950	2250	1700	1680	160	4578	120	340	12	**3400**	190	**1200**	67	**2550.00**
NDO6400		-	-	1950	2530	2000	1980	160	5293	140	395	15	**4000**	225	**1300**	72	**2800.00**
NDO7000		-	-	2250	2367	1885	1865	200	6934	225	657	17	**5200**	285	**1700**	94	**3780.00**
NDO9000		-	-	2250	2625	2105	2085	200	7823	258	753	19	**6000**	330	**2000**	110	**4150.00**
ITDO15000		5620	-	2100	2200	1860	1840	200	14150	460	1280	35	**10000**	550	**3500**	194	**9060.00**
ITDO22000		7880	-	2100	2200	1840	1820	250	20700	700	1850	47	**15000**	830	**5000**	280	**13350.00**
ITDO30000		10140	-	2100	2200	1840	1820	250	27250	910	2480	60	**20000**	1100	**7000**	385	**18600.00**
ITDO36000		12400	-	2100	2200	1840	1820	315	33800	1200	3050	75	**25000**	1380	**8500**	470	**20300.00**

Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height;
ØI/O = inlet/outlet pipe diameter.

TECHNICAL SECTION – GRAVITY OIL SEPARATORS

TECHNICAL CHARACTERISTICS

Oils and greases are present in most industrial effluents. Their removal is necessary prior to discharge due to the negative effects on the environment and the damage caused to flora and fauna. Furthermore, their removal is also necessary as a pre-treatment prior to any other treatment phase, in that they create problems for the development of the biological treatment processes.
In the case of service stations, mechanical workshops and parking areas, **the oils and greases are essentially mineral type** and non-biodegradable, including in the long-term. Consequently, the discharge of these substances into the sewerage system has an even greater negative effect, not only due to the risk causing blockages in the system itself but also because they cannot be degraded at all during the subsequent treatment process. To remove this type of pollutants, oil separators with gravity filters are used when the final outlet is to the public sewer.
Static oil separator tanks are stilling tanks sized for a retention time of at least 15 minutes at maximum discharge flow. These oil separators are defined as **class II** according to UNI-EN 858-1 and consist of a sedimentation zone in which the lighter liquid (volumetric mass not exceeding 0.85 g/cm^3) is separated from the inert materials: sludge, sand and lime. Each model is designed with a light liquid storage capacity.
The oil separators are sized according to a defined **nominal flow**, i.e. the maximum treatable flow according to the project specifications. This value is defined to allow a sufficient retention time of the treated effluent and on the basis of performance trials carried out on water and diesel oil mixes. The sizing of light liquid separators must take into account the nature and flow of the substances to treat, as well as any stormwater flows that could reach the plant, the volumetric mass of the light liquid and the presence of substances that could obstruct the separation, such as, for example, detergents. The design flow is calculated for light liquids of **density less than 0.85 g/cm^3** (diesel, petrol), in the absence of detergents and for surface runoff only.

USE AND MAINTENANCE

An excessive accumulation of floating material causes a reduction in the volume available for separation. This risk worsens in the presence of considerable quantities of sedimentable substances that settle at the bottom of the plant.
To **prevent the escape of solids and mineral oils** that could compromise the quality of the discharged effluent, it advisable to carry out inspections and removal of the accumulated pollutants. These operations should be more frequent if the plant receives effluent from vehicle workshops, oil storage areas or service stations. The deposits must be removed by **specialised personnel** and subjected to the appropriate treatment.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the gravity oil separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the floating material
Remove the floating material, the bottom sediment and clean 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 pollutant load.*

PROHIBITIONS

• **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents).

WARNINGS

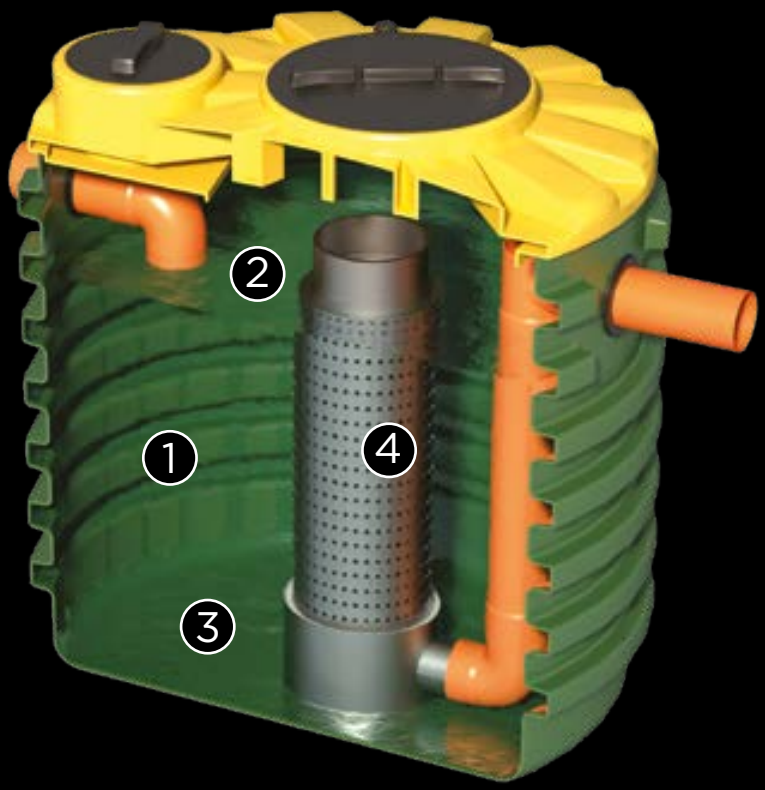
• make sure that drains have a siphon;
• check that the pipes slope sufficiently (approximately 1% - 2%);
• connect the biogas vent pipe (**see installation method**);
• after pump-out, fill the tank again with **clean water**;
• in the event of a maintenance operation of any kind, always comply with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

NOTES

OIL SEPARATORS WITH COALESCING FILTER

OIL SEPARATORS
COALESCING FILTER TYPE

CE



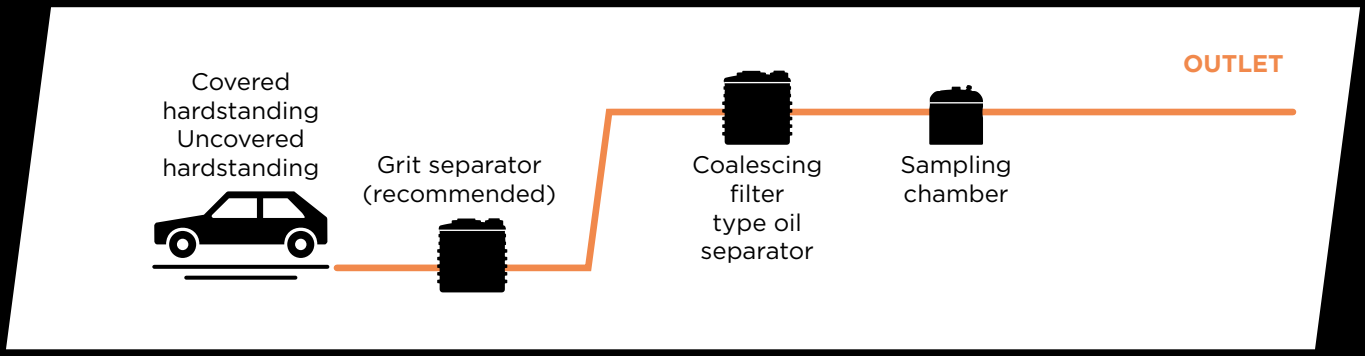
1. SEPARATION AREA: stilling area in which floating substances such as oil, grease and any foam are separated from the effluent and accumulate on the surface, while the heavy substances (stones, grit, pieces of rubber and metal,...) settle on the bottom of the tank.

2. OIL ACCUMULATION AREA: the oils separated from the effluent accumulate on the surface.

3. HEAVY SEDIMENT ACCUMULATION AREA: the heavy materials separated from the effluent accumulate on the bottom of the tank.

4. COALESCING FILTER: fine micro-bubble polyurethane filter inserted into a stainless steel grid, which can be extracted thanks to the presence of a base and guides, also made of stainless steel. The coalescing filter is able to join the fine particles of oil present in the effluent into larger drops that are large enough to migrate towards the surface, separating from the effluent.

INSTALLATION DIAGRAM



SPECIFICATIONS

TECHNICAL CHARACTERISTICS: Oil separators with coalescing filters allow improved performance to be obtained in removing light substances. The system makes use of a polyurethane sponge support on which the oil and hydrocarbon particles collect until their dimensions are such that enable them to settle away from the effluent by gravity. This treatment is recommended in the presence of particularly severe limitations on the discharged concentrations of mineral oils and hydrocarbons. It is advisable to install a grit separator upstream of the oil separator in order to prevent solid particles from clogging the filter meshes.

USE: treatment of surface drainage water from covered and open-air hardstandings, car parks, car showrooms, garages,...

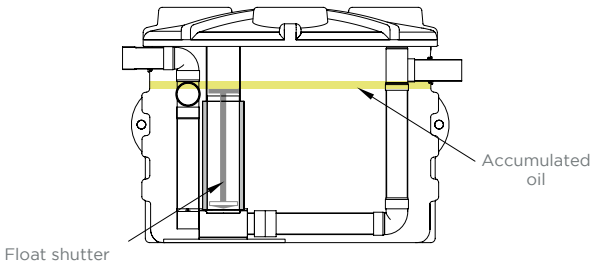
PRODUCT CERTIFICATION

The Rototec oil separators with coalescing filter (excluding the modular range) are CE marked and have been designed, tested and certified under UNI EN 858-1 "Separator systems for light liquids (e.g. oil and petrol). Part 1: Principles of design, performance and product testing, marking and quality control".
The oil separators with coalescing filter have been verified and tested at Rototec and by a third party certifying body, and have been found to comply with the necessary requirements.

- Watertightness ✓
- Structural stability ✓
- Nominal capacity ✓
- Functional requirements ✓
- Raw material requirements ✓
- Structural behaviour ✓
- Reaction to fire Class E

CERTIFIED UNI EN 858-1

AUTOMATIC SHUTTER
ON REQUEST

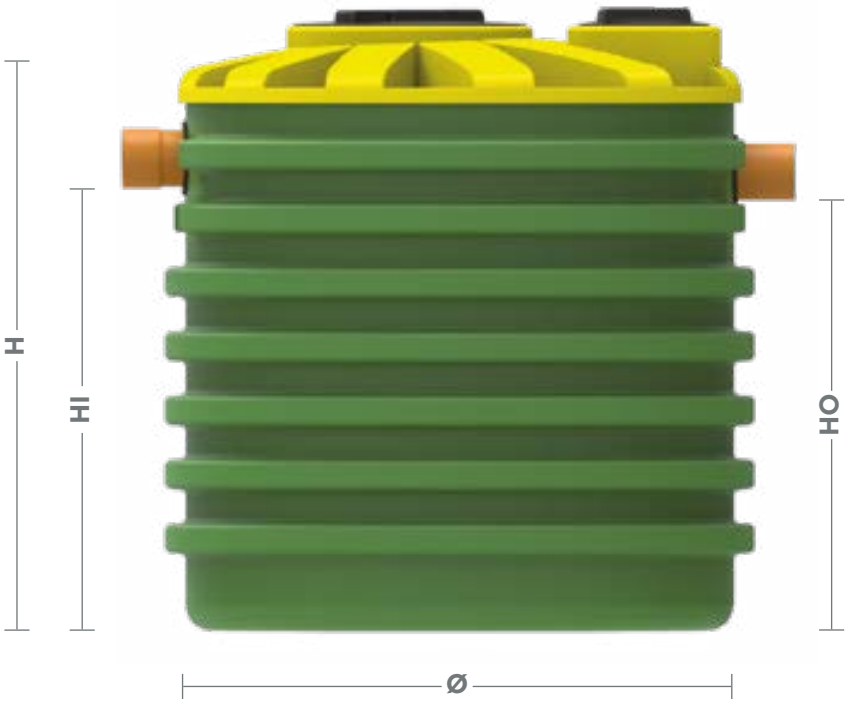


TECHNICAL CHARACTERISTICS: floating plastic shutter calibrated for light liquids of density > 0.85 g/cm^3.

USE: when installed inside coalescence type oil separators it allows the outlet pipe to be closed automatically when the maximum oil storage level is reached.

OIL SEPARATORS
COALESCING FILTER TYPE

MODEL



CORRUGATED

Item	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Useful vol. l	Oil vol. l	NS l/s	Covered hardstanding		Uncovered hardstanding		Цени в лв/без ДДС
									m2	Car spaces	m2	Car spaces	
NDOFC1000 1.5 l/s	1150	1220	880	860	125	850	27	1.5	**675**	54	**270**	22	**1200.00**
NDOFC1500 2 l/s	1150	1720	1360	1340	125	1268	35	2	**900**	72	**360**	30	**1400.00**
NDOFC1000 3 l/s	1150	1220	880	860	125	850	53	3	**1350**	108	**540**	43	**1400.00**
NDOFC1500 4 l/s	1150	1720	1360	1340	125	1268	70	4	**1800**	144	**720**	58	**1800.00**
NDOFC2100 6 l/s	1350	1975	1540	1520	125	1950	130	6	**2700**	200	**1000**	80	**2100.00**
NDOFC2600 7.5 l/s	1710	1450	970	950	160	2061	152	7.5	**3375**	270	**1350**	110	**2900.00**
NDOFC3200 10 l/s	1710	1725	1200	1180	160	2525	176	10	**4500**	360	**1800**	147	**3400.00**
NDOFC3800 15 l/s	1710	1955	1430	1410	200	3175	225	15	**6750**	540	**2700**	220	**4200.00**
NDOFC4600 20 l/s	1710	2225	1650	1630	200	3835	300	20	**9000**	720	**3600**	294	**4400.00**
NDOFC5400 25 l/s	1950	2250	1600	1580	250	4347	375	25	**11250**	900	**4500**	367	**4700.00**
NDOFC6400 30 l/s	1950	2530	1890	1870	250	5100	450	30	**13500**	1080	**5400**	440	**5200.00**
NDOFC7000 35 l/s	2250	2367	1720	1700	315	6934	525	35	**15750**	1260	**6300**	515	**5500.00**
NDOFC7000 40 l/s	2250	2367	1720	1700	315	6934	600	40	**18000**	1440	**7200**	588	**6300.00**
NDOFC9000 50 l/s	2250	2625	1950	1930	315	7823	750	50	**22500**	1800	**9000**	734	**6800.00**

Ø = diameter; H = height; HI = inlet pipe height; HO = outlet pipe height; ØI/O = inlet/outlet pipe diameter.

TECHNICAL SECTION – OIL SEPARATORS WITH COALESCING FILTER

TECHNICAL CHARACTERISTICS

Oils and greases are present in most industrial effluents. Their removal is necessary prior to discharge due to the negative aesthetic effects that they produce when discharged to a body of surface water and due to the damage caused to flora and fauna. Furthermore, their removal is also necessary as a pre-treatment prior to any other treatment phase, in that they create problems for the development of the biological treatment processes.
In the case of service stations, car washes, workshops and hardstandings, **oils and greases are essentially of a mineral type**. These are non-biodegradable even in the long term, so that the consequences of allowing these substances into the sewerage system or worse still into watercourses or the soil are even more negative, not only because of the risk of blockage, but because they cannot be degraded at all by the environment. To remove this type of pollutants, coalescing filter type oil separators are used when the final outlet is to a watercourse or soak-away system. These oil separators are defined as **class I** under UNI-EN 858-1.
Coalescing filter type oil separators allow **improved performance in removing light substances**. The system makes use of a polyurethane sponge support on which the oil and hydrocarbon particles collect until their dimensions are such that enable them to settle away from the effluent by gravity. This treatment is recommended in the presence of particularly severe limitations on the discharged concentrations of mineral oils and hydrocarbons. It is advisable to install a grit separator upstream of the oil separator in order to prevent solid particles from clogging the filter meshes.

USE AND MAINTENANCE

An excessive accumulation of floating material causes a reduction in the volume available for separation. This risk worsens in the presence of considerable quantities of sedimentable substances that settle at the bottom of the plant. To **prevent the escape of solids and mineral oils** that could compromise the quality of the discharged effluent, it advisable to carry out
frequent inspections and removal of the accumulated pollutants. These operations should be more frequent if the plant receives effluent from vehicle workshops, oil storage areas or service stations.
As far as maintenance of the coalescing filter oil separators is concerned, in addition to the normal emptying by specialist technicians, it is also advisable to remove the sponge support and wash it thoroughly upstream of the plant.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the coalescing filter type oil separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the floating material
Clean the coalescing filter	Every 1 / 2 months	Extract the steel cage containing the filter and wash it with a jet of water at the head of the plant
Remove the floating material, the bottom sediment and clean the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company

N.B. *the frequency of cleaning operations depends on the amount of oil, grease and the frequency of rainfall.*

PROHIBITIONS

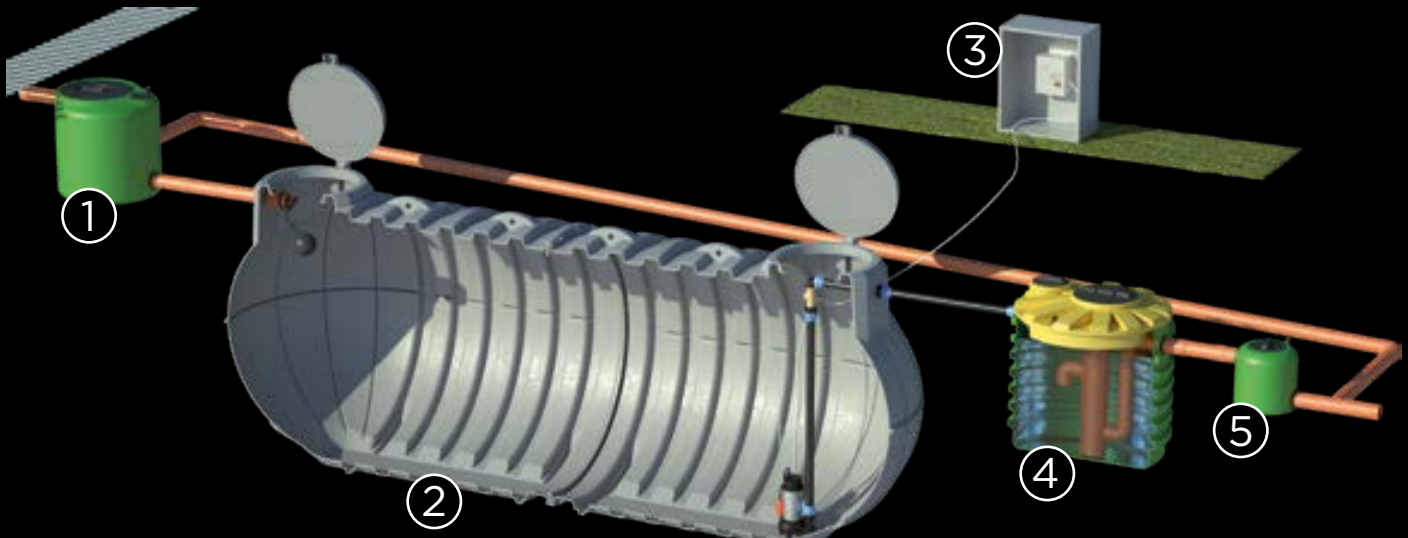
• **do not use toxic and/or poisonous substances** (bleach, solvents, insecticides, disinfectant substances, aggressive detergents).

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**);
• 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.

STORMWATER RUNOFF TREATMENT WITH STORAGE

STORMWATER RUNOFF TREATMENT PLANTS
WITH STORAGE



1. FLOW SPLITTING CHAMBER: carries the collected rainwater from the hardstanding to the storage tank and, when this is full, carries the secondary rainwater directly to the end drain through the by-pass pipe

2. STORAGE TANK: this is sized to contain stormwater runoff amounting to approximately 5 mm of rainfall distributed evenly across the collection surface. A float valve is fitted on the inlet pipe. The presence of a timed pump allows the tank to be emptied at a steady flow rate, with the effluent being carried to the treatment system 48-96 hours after the end of the rainstorm. This period of time allows the suspended solid material to be separated from the waste water.

3. ELECTRIC PANEL: to command the recovery pump, it activates start-up of the stormwater recovery pump after an adjustable delay. By law this delay must be between 48 and 96 hours from the end of the rainstorm.

4. TREATMENT SYSTEM: according to the model, this consists of a grit separator and a coalescing filter type oil separator for treatment of the stormwater runoff stored in the tank and recovered by the constant flow rate pump.

5. SAMPLING CHAMBER: to take samples of the waste water at the treatment plant outlet.

SPECIFICATIONS

TECHNICAL CHARACTERISTICS: The plant includes a flow splitter, a storage system with automatic shut-off valve and timed submersible pump, a grit separation and oil separation system sized in accordance with standard UNI-EN858-1 and in compliance with Law Decree 152/06. The plant is sized to treat the first 5 mm of rainfall, in that this is the only part in which pollutants are present, according to that indicated by Lombardy Regional Law No. 62 of 27 May 1985. Once the storage tank has been filled, the subsequent rainfall, defined as secondary and in theory non-polluting, flows directly to the receiving body of water thanks to the flow splitter located upstream of the storage tank. The stored and polluted rainwater is evacuated by a submersible pump controlled by an electric panel that regulates the emptying of the storage tank in such a manner that 48/96 hours after the rainfall, the system is ready for a new operating cycle. The plant is effective for the following parameters:

- Sedimentable solids.
- Total hydrocarbons and other light liquids that have not been emulsified of specific weight up to 0.85 g/cm^3.
- Unless otherwise specified, the peak flows in m^3/h for each single model must be less than that indicated on the technical data sheet.
- Unless otherwise specified, the surface area (m^2) of the hardstanding to treat for each single model must be less than or equal to the limits indicated on the technical data sheet.
- For that not specifically indicated, refer to the design data specified on the technical data sheet.

USE: treatment of surface drainage water from open-air hardstandings, car parks, roads, service stations, warehouses,...

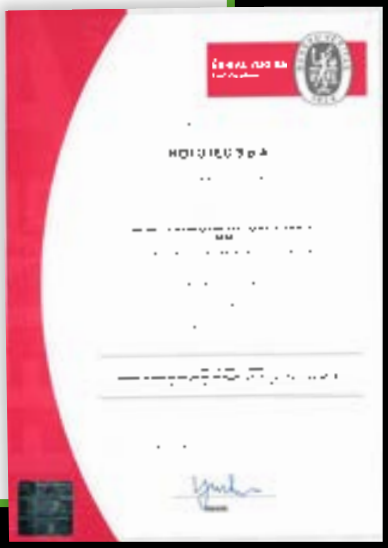
REFERENCE STANDARDS: Italian Legislative Decree 152/2006, standard UNI EN 858-1 (oil separator), regional standards for treatment of rainwater.

PRODUCT CERTIFICATION

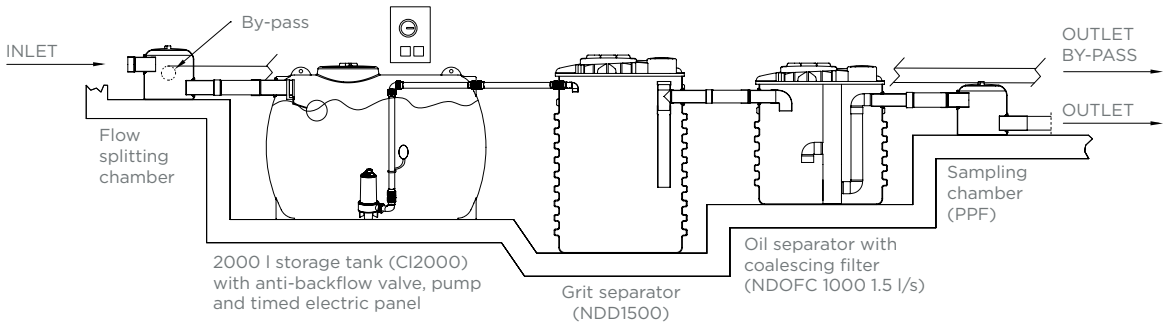
The Rototec oil separators with coalescing filter (excluding the modular range) are CE marked and have been designed, tested and certified under UNI EN 858-1 "Separator systems for light liquids (e.g. oil and petrol). Part 1: Principles of design, performance and product testing, marking and quality control".
The oil separators with coalescing filter have been verified and tested at Rototec and by a third party certifying body, and have been found to comply with the necessary requirements.

• Watertightness	✓
• Structural stability	✓
• Nominal capacity	✓
• Functional requirements	✓
• Raw material requirements	✓
• Structural behaviour	✓
• Reaction to fire	Class E

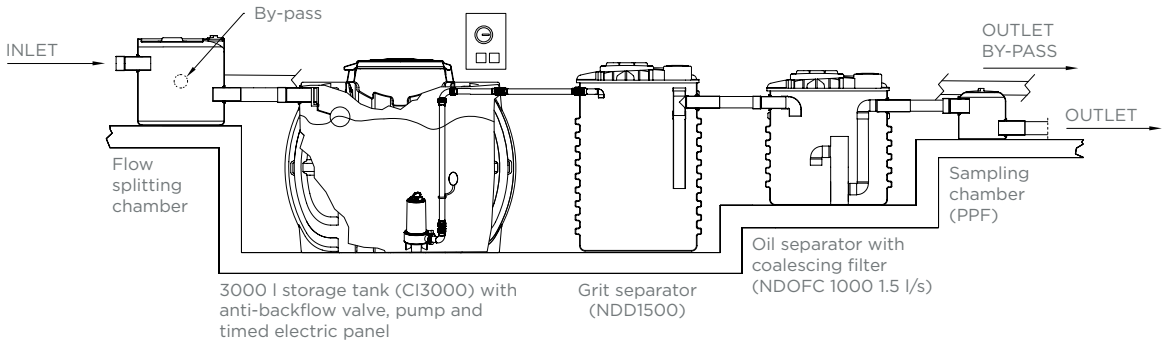
CERTIFIED UNI EN 858-1



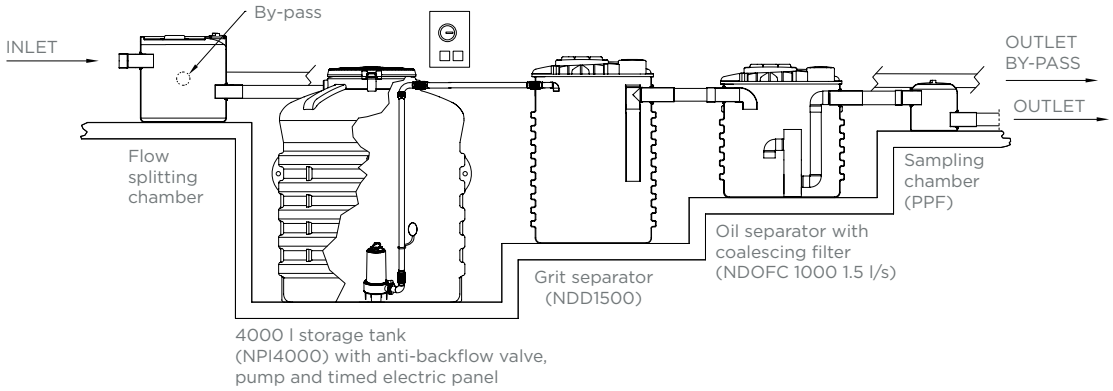
STORMWATER RUNOFF TREATMENT PLANTS
WITH STORAGE



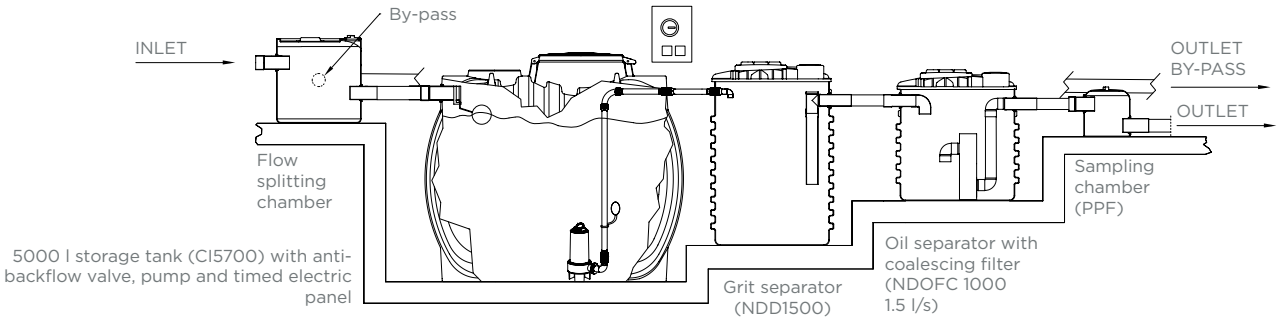
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Grit separator Ø x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	Øl-Ø0-ØBp mm					
IPP350DOFC	2000	350	500	790x790	125-125-125	1900x1250x1320	1150x1720	1150x1220	430x465	**5030.00**



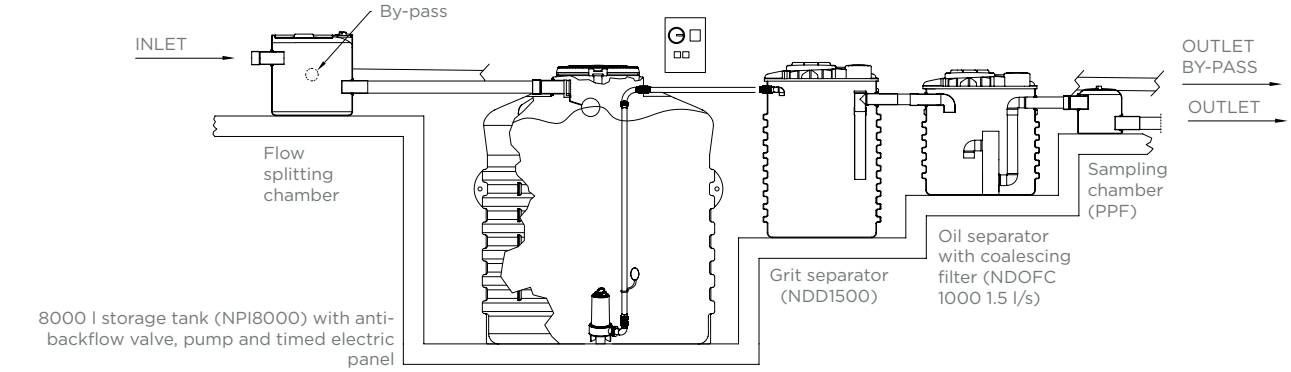
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Grit separator Ø x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	Øl-Ø0-ØBp mm					
IPP500DOFC	3000	500	750	790x790	125-125-125	2090x1500x1720	1150x1720	1150x1220	430x465	**5700.00**



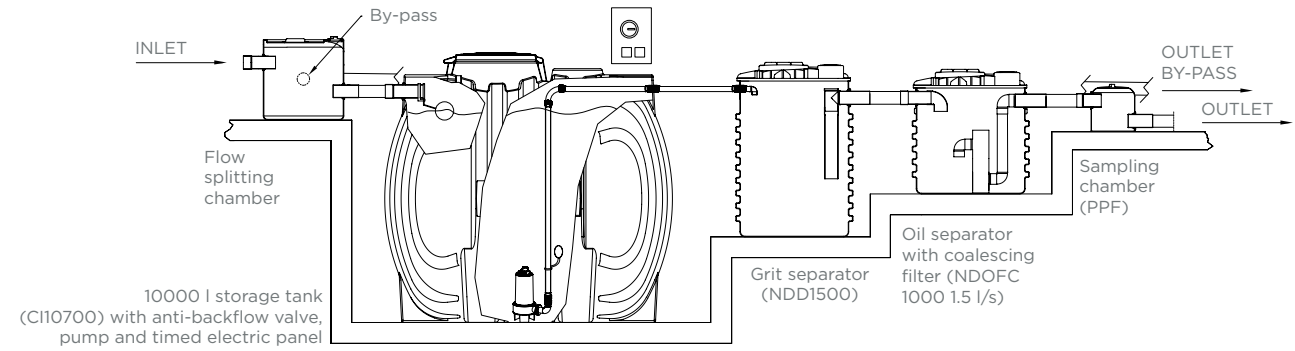
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank Ø x H mm	Grit separator Ø x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	Øl-Ø0-ØBp mm					
IPP750DOFC	4000	750	1000	790x790	125-125-125	1710x2150	1150x1720	1150x1220	430x465	**6000.00**



Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Grit separator Ø x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-Ø0-ØBp mm					
IPP1000DOFC	5000	1000	1250	790x790	125-125-125	2420x1920x2100	1150x1720	1150x1220	430x465	**6600.00**

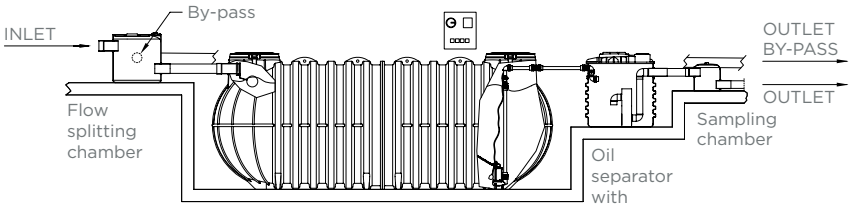


Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank Ø x H mm	Grit separator Ø x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-Ø0-ØBp mm					
IPP1500DOFC	8000	1500	2000	790x790	125-125-125	2270x2750	1150x1720	1150x1220	430x465	**6900.00**



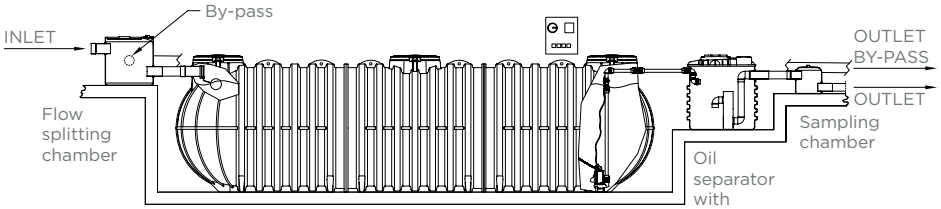
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Grit separator Ø x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-Ø0-ØBp mm					
IPP2000DOFC	10000	2000	2500	790x790	125-125-125	2780x2430x2580	1150x1720	1150x1220	430x465	**8200.00**

STORMWATER RUNOFF TREATMENT PLANTS
WITH STORAGE



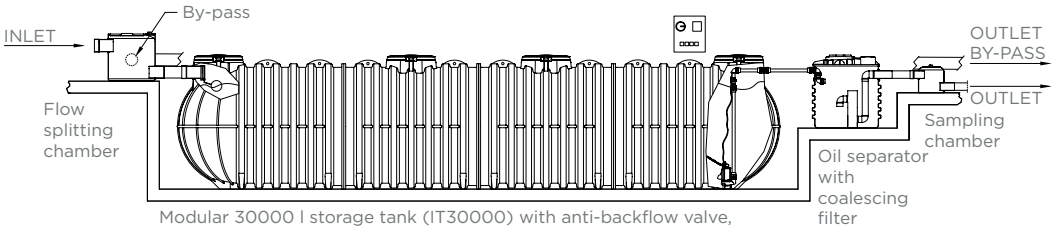
Modular 15000 l storage tank (IT15000) with anti-backflow valve, pump and timed electric panel

Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mmz				
ITIPP3000DOFC	15000	3000	3750	790x790	160-160-160	5620x2100x2200	1150x1220	430x465	**9850.00**



Modular 22500 l storage tank (IT22000) with anti-backflow valve, pump and timed electric panel

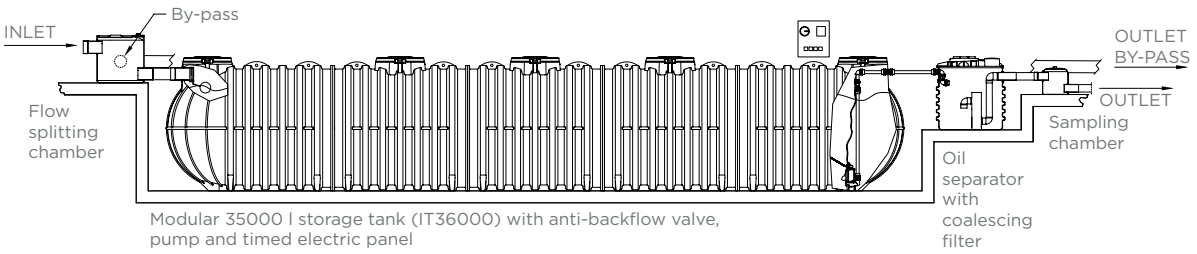
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP4500DOFC	22500	4500	5620	790x790	160-160-160	7880x2100x2200	1150x1220	430x465	**13250.00**



Modular 30000 l storage tank (IT30000) with anti-backflow valve, pump and timed electric panel

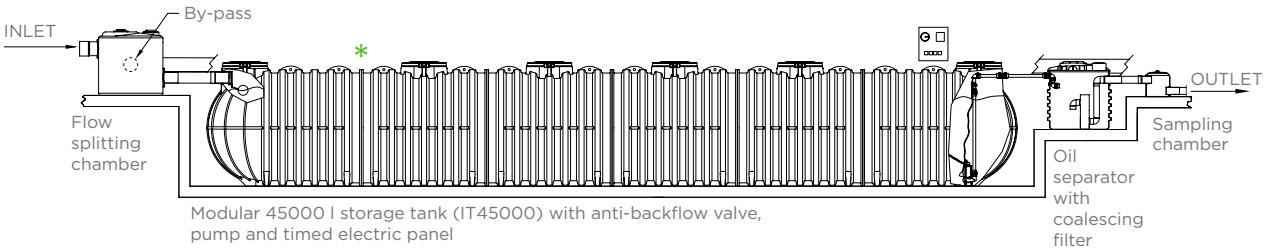
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP6000DOFC	30000	6000	7500	790x790	200-200-200	10140x2100x2200	1150x1220	430x465	**16700.00**

*** On-site welding**
carried out by specialist Rototec technicians, to be quantified in the offer when foreseen
N.B.: for larger sizes please contact our technical office.
N.B.: The position of the asterisk is purely indicative



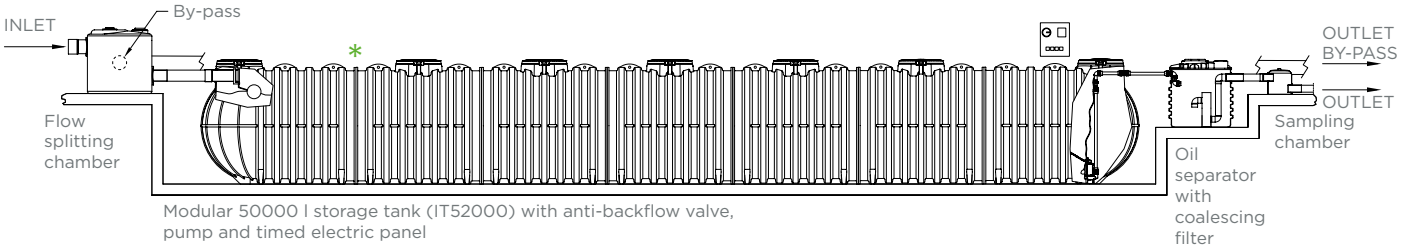
Modular 35000 l storage tank (IT36000) with anti-backflow valve, pump and timed electric panel

Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP7000DOFC	35000	7000	8750	790x790	200-200-200	12400x2100x2200	1150x1220	430x465	**20100.00**



Modular 45000 l storage tank (IT45000) with anti-backflow valve, pump and timed electric panel

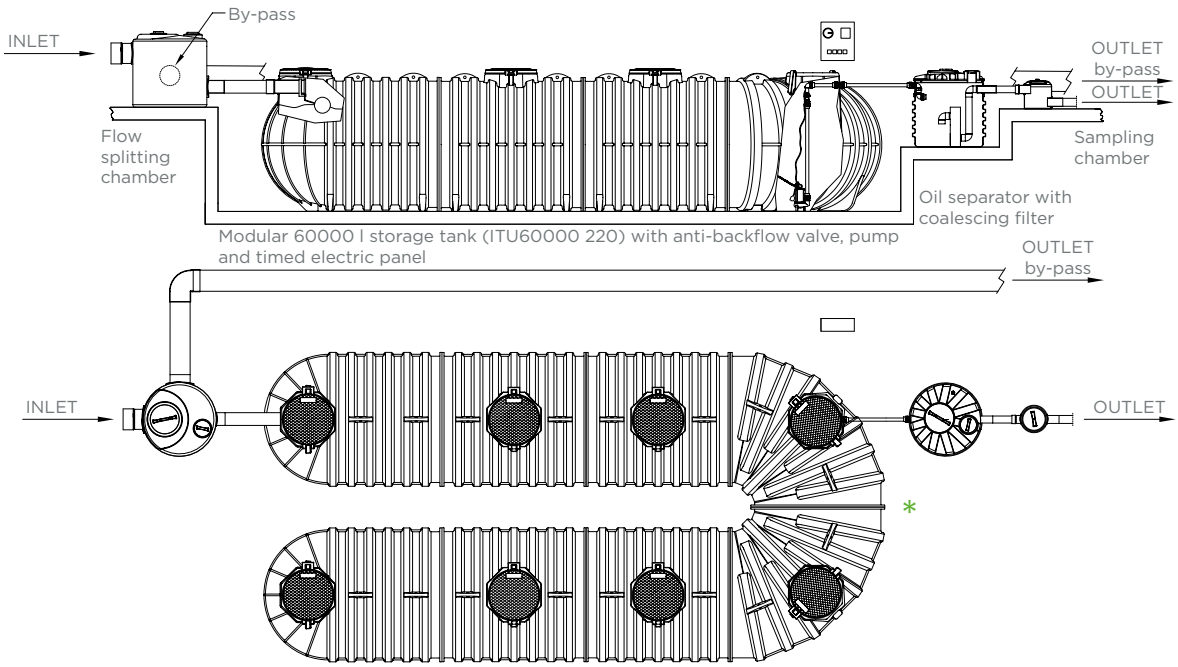
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP9000DOFC	45000	9000	11250	1160X1140	250-200-250	14660x2100x2200	1150x1220	430x465	**23000.00** *



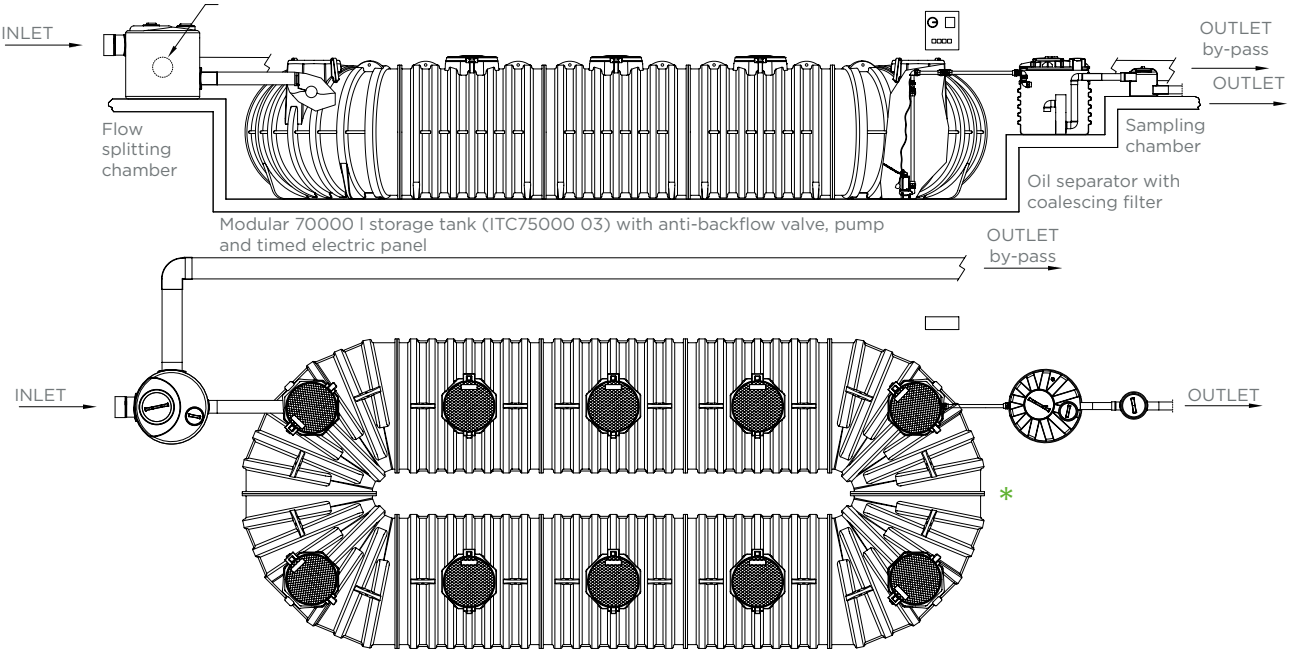
Modular 50000 l storage tank (IT52000) with anti-backflow valve, pump and timed electric panel

Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP10000DOFC	50000	10000	12500	1160X1140	250-200-250	16920x2100x2200	1150x1220	430x465	**26950.00** *

STORMWATER RUNOFF TREATMENT PLANTS
WITH STORAGE



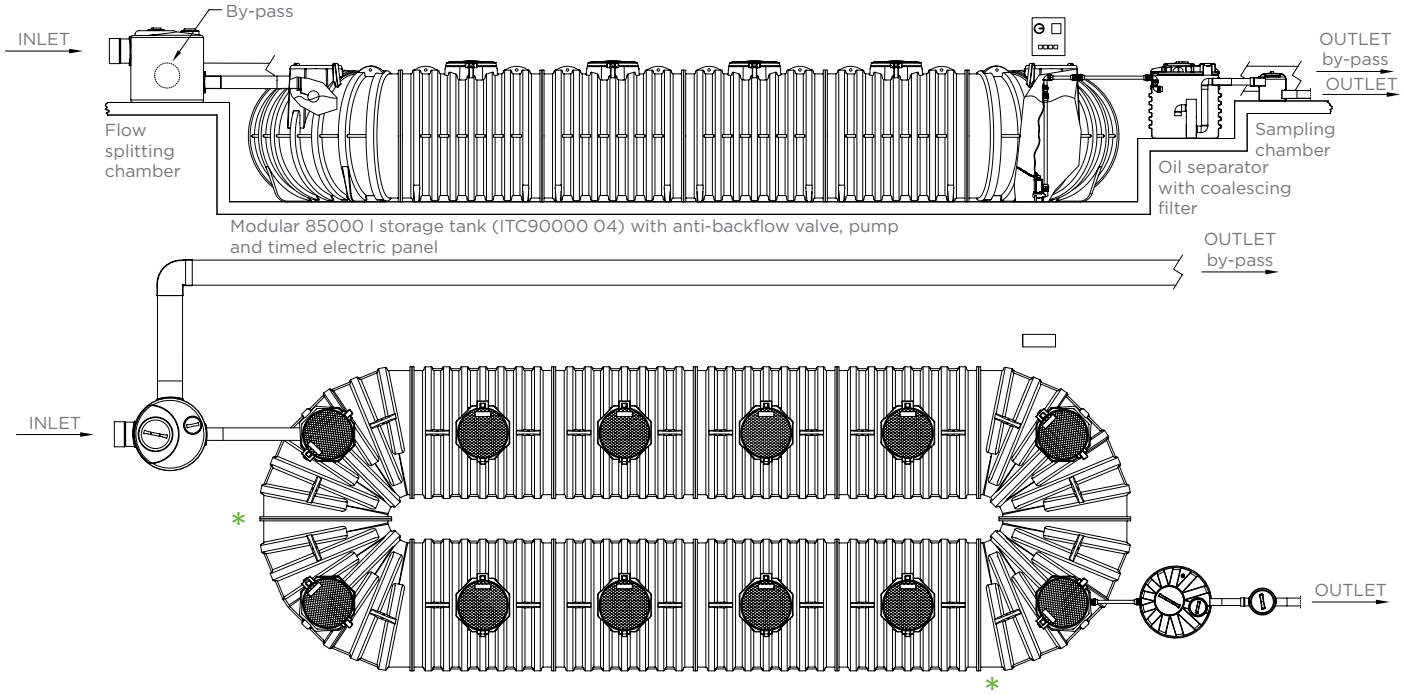
Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP12000DOFC	60000	12000	15000	1160X1140	315-200-315	9750x4850x2200	1150x1220	430x465	**31000.00** *



Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP14000DOFC	70000	14000	17500	1160X1140	315-200-315	11880x4850x2200	1150x1220	430x465	**38000.00** *

*** On-site welding**

carried out by specialist Rototec technicians, to be quantified in the offer when foreseen
N.B.: for larger sizes please contact our technical office.
N.B.: The position of the asterisk is purely indicative



Item	Stormwater runoff vol. l	Surface area (5 mm) m2	Surface area (4 mm) m2	Flow splitting chamber		Storage tank L x w x H mm	Oil separator Ø x H mm	Sampling chamber Ø x H mm	Цени в лв/без ДДС
				Ø x H mm	ØI-ØO-ØBp mm				
ITIPP17000DOFC	85000	17000	21250	1160X1140	315-200-315	14150x4850x2200	1150x1220	430x465	**44700.00** *

ACCESSORIES
STORMWATER RUNOFF TREATMENT PLANTS

TIMED ELECTRIC PANEL (INCLUDED)

Item	Pump power		Current		Size			Weight	Цени в
	kW	HP	from (A)	to (A)	Height mm	Length mm	Depth mm	kg	лв/без ДДС
QCIPP	0.37-2.2	0.5-3	2	16	340	240	170	2.5	320.00

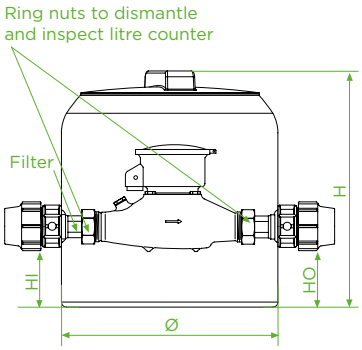
Application: pump start-up panel for stormwater runoff treatment plant. The start-up command can be either manual or automatic by means of a timer. To adjust the timer and set a delay time of 24 hours, follow the instructions on the attached technical data sheet. The panel is also fitted with visual alarms (indicator lights). The power supply is single-phase (domestic type: 230 V).

RAIN SENSOR (ON REQUEST)

Item	Height mm	Width mm	Цени в лв/без ДДС
SPIPP	137	165	195.00

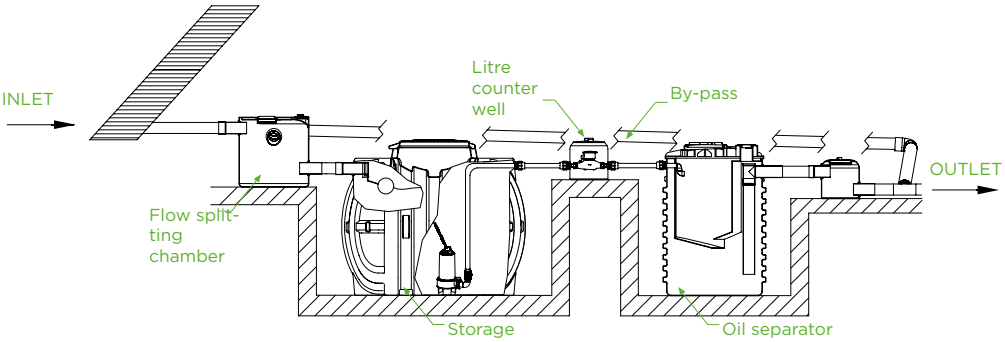
Application: sensor commanding the pump/s of a stormwater runoff plant. Combined with the electric panel, it allows automatic activation of the timer once the rainstorm has ended. In this way only the stormwater from each rainstorm is treated, regardless of the duration and intensity of the rainstorm itself.

LITRE COUNTER CHAMBER (ON REQUEST)



Item	Ø mm	H mm	HI mm	HO mm	Ø cover mm	Exten-sion	Calibre mm	Max flow rate m^3/h	Nominal flow rate m^3/h	Min flow rate l/h	Sensiti-vity l/h	Readings min. l	Цени в лв/без ДДС
PCLT 50	430	430	120	120	300	PP 35	32	12	6	120	15	0.05	450.00

Material: One-piece linear polyethylene (LLDPE) chamber with PP inspection cover, housing a flow-through volumetric litre counter.
Application: When required, the litre counter chamber is fitted downstream of a stormwater runoff storage tank and is used to measure the amount of water that is sent for treatment and then discharged.



TECHNICAL SECTION – STORED STORMWATER RUNOFF TREATMENT

TECHNICAL CHARACTERISTICS

The plant includes a flow splitter, a storage system with automatic shut-off valve and timed submersible pump, a grit separation and oil separation system sized in accordance with standard UNI-EN858-1 and in compliance with Law Decree 152/06.
The plant is sized to treat the first 5 mm of rainfall, in that this is the only part in which pollutants are present, according to that indicated by Lombardy Regional Law No. 62 of 27 May 1985.
Once the storage tank has been filled, the subsequent rainfall, defined as secondary and in theory non-polluting, flows directly to the receiving body of water thanks to the flow splitter located upstream of the storage tank.
The stored and polluted rainwater is evacuated by a submersible pump controlled by an electric panel that regulates the emptying of the storage tank in such a manner that 48/96 hours after the rainfall, the system is ready for a new operating cycle.
When the storage system consists of a single one-piece tank (up to **IPP2000 DOFC**) the grit separator is installed upstream of the oil separator. If, instead, the storage system consists of modular tanks, the task of the grit separator is performed in the first modules, in which the suspended solids are settled.
In both cases, as provided for by law, prior to discharging the treated effluent to the final receptor, a sampling chamber is installed from where it is possible to analyse the effluent. The plant is effective for the following parameters:
• Sedimentable solids.
• Total hydrocarbons and other light liquids that have not been emulsified of specific weight up to 0.85 g/cm^3.

USE AND MAINTENANCE

The pollutants separated from the stormwater runoff inside the plant are mainly non-biodegradable (grit, lime, stone, hydrocarbons, oils, etc.). These tend to build up inside the various tanks. Over time, this build-up becomes excessive and tends to **have a negative effect on the efficiency** of the treatment plant (blocked pipes, release of the pollutants themselves, etc.). This means it is necessary to carry out **periodic inspections** on the
tanks and, if necessary, to empty and clean them, contacting **licensed waste disposal companies**.
The inspections must be more frequent during the first months the system is in operation, in order to identify approximately how often pump-out will be necessary.

WARNINGS

• make sure that drains have a siphon;
• check that the pipes slope sufficiently (approximately 1% - 2%);
• connect the biogas vent pipe in both tanks (**see installation method**);
• after pump-out, fill the tanks 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.

WARNINGS (electric pump)

• Do not transport or handle the pump using the electric power supply cable.
• Before installing the pump, make sure that the power supply network is properly earthed.
• **Before carrying out any type of control or maintenance operation, disconnect the power supply**.
• Never start the pump if you are in contact with the liquid to be pumped.
• Always ensure that the pump is checked and repaired by authorised personnel only. Unauthorised repairs might make the product unsafe and/or dangerous.
• If the electric pump is not properly fixed, it may become unsteady or topple over on start-up due to the starting torque.
• Never move the electric pump when it is operating or with the power cable connected
to the power supply.
• **Never put your hands** or other objects into the pumped liquid inlets or outlets in the vicinity of the impellers, if present, as these are moving parts.
• Do not remove the suction filter for any reason whatsoever.
• Avoid operating the pump in the horizontal position. The pump can only function in the vertical position (with the motor at the top and the pump part at the bottom).

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the stormwater runoff storage tank	Every 1 / 2 months	Open the covers on the inspection holes and check the level of sediment and the floating material
Inspect the grit separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the floating material
Inspect the coalescing filter type oil separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the floating material
Clean the coalescing filter	Every 1 / 2 months	Extract the steel cage containing the filter and wash it with a jet of water at the head of the plant
Remove the floating material, the bottom sediment and clean the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company who will empty all the elements in the plant
Check the pumping system	Every 12 months	Extract the pump, clean the inlet to remove any debris, assess the state of the impeller, the electric cable and the floats
Check the timed electric panel	Every 12 months	Use specific testers to check for the presence of power

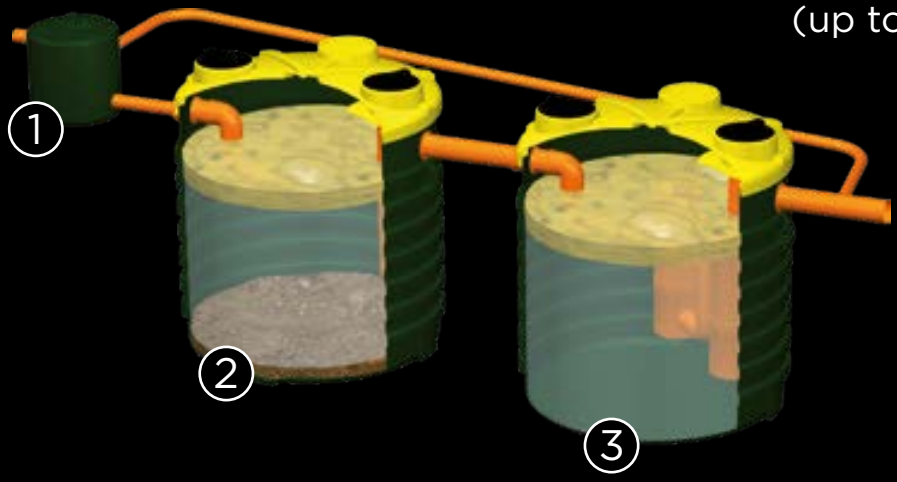
N.B. *the frequency of operations will depend on the incoming pollutant load.*

NOTES

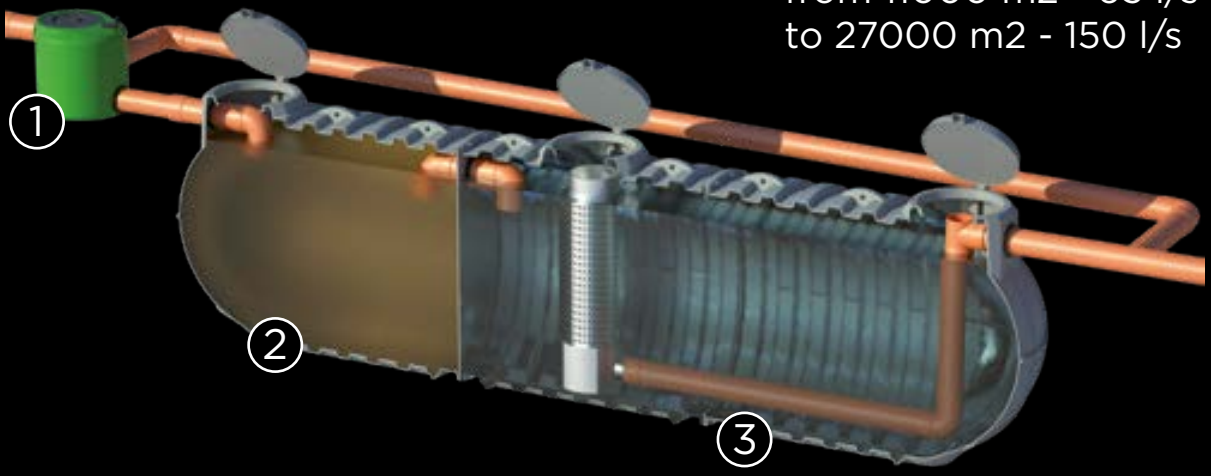
CONTINUOUS STORMWATER RUNOFF TREATMENT PLANTS

STORMWATER RUNOFF
CONTINUOUS TREATMENT PLANTS

With separate tanks
(up to 9000 m2 – 50 l/s)



One-piece
from 11000 m2 - 65 l/s
to 27000 m2 - 150 l/s



1. FLOW SPLITTING CHAMBER: carries the collected rainwater from the hardstanding to the grit separator and oil separator system. When the incoming flow exceeds the design specifications, part of the incoming water is carried directly to the end tank via the by-pass pipe

2. GRIT SEPARATOR SECTION: stilling tank in which the heavy substances (stones, grit, pieces of rubber and metal,...) settle and accumulate on the bottom of the tank. At the same time the larger light components (drops of oil, hydrocarbons and any foam) accumulate on the surface.

3. COALESCING FILTER TYPE OIL SEPARATION SECTION: thanks to the fine micro-bubble polyurethane coalescing filter inserted into a stainless steel grid, which can be extracted thanks to the presence of a base and guides, also made of stainless steel, the fine particles of oil and hydrocarbons join together to form drops that are large enough to migrate towards the surface, separating from the effluent.

SPECIFICATIONS

TECHNICAL CHARACTERISTICS: The plant allows the continuous treatment of stormwater runoff from impermeable surfaces up to 27000 m^2 used for transit or parking in industrial areas, residential zones and service stations subject to possible pollution from mineral oils, hydrocarbons, sand/grit and inert materials. The stormwater runoff treatment system makes use of the action of a grit and oil separator in continuous operation capable of treating flows of up to 150 l/s. Runoff from impermeable transit areas must be carried to the treatment system. The treatment tanks receive the flow appertaining to first 5 mm of rain falling over a 15 minute period. For higher flows, the by-pass is activated which sends the excess to the stormwater storage tanks. The treatment plant consists of a grit separator and a coalescing filter type oil separator.
The plant is effective for the following parameters:
• Sedimentable solids.
• Total hydrocarbons and other light liquids that have not been emulsified of specific weight up to 0.85 g/cm^3.
• Unless otherwise specified, the peak flows in m^3/h for each single model must be less than that indicated on the technical data sheet.
• Unless otherwise specified, the surface area (m^2) of the hardstanding to treat for each single model must be less than or equal to the limits indicated on the technical data sheet.
• For that not specifically indicated, refer to the design data specified on the technical data sheet.

USE: treatment of surface drainage water from open-air hardstandings, car parks, roads, service stations, warehouses,...

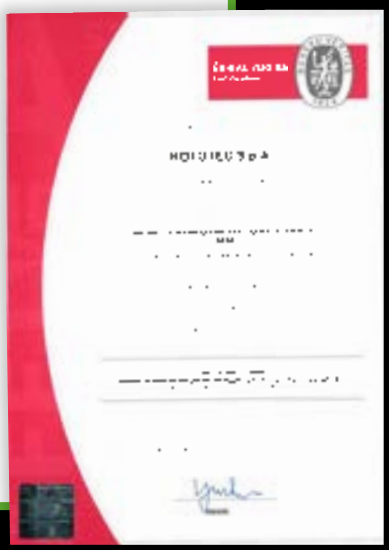
REFERENCE STANDARDS: Italian Legislative Decree 152/2006, standard UNI EN 858-1 (oil separator), regional standards for treatment of rainwater.

PRODUCT CERTIFICATION

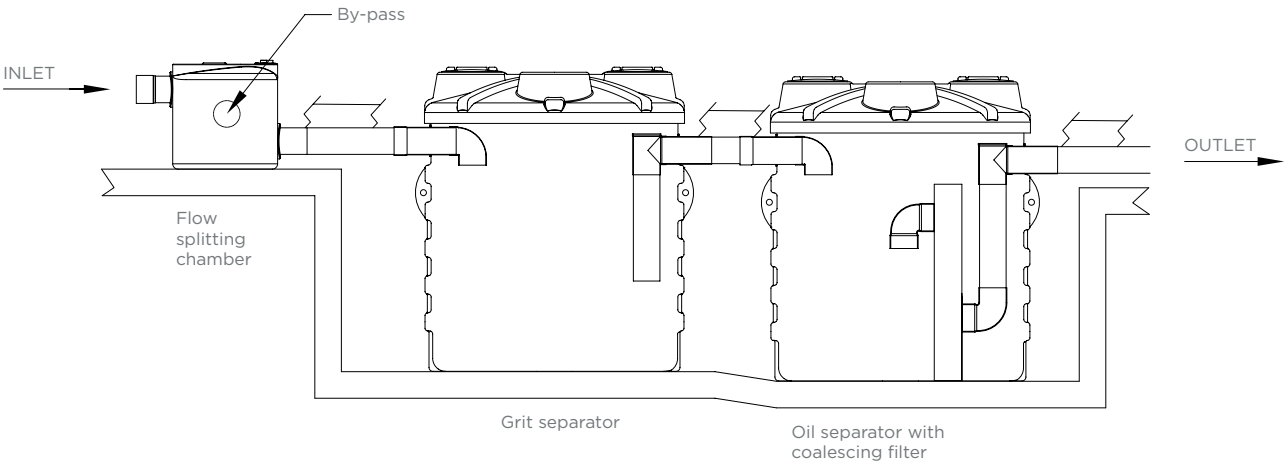
The Rototec oil separators with coalescing filter (excluding the modular range) are CE marked and have been designed, tested and certified under UNI EN 858-1 "Separator systems for light liquids (e.g. oil and petrol). Part 1: Principles of design, performance and product testing, marking and quality control".
The oil separators with coalescing filter have been verified and tested at Rototec and by a third party certifying body, and have been found to comply with the necessary requirements.

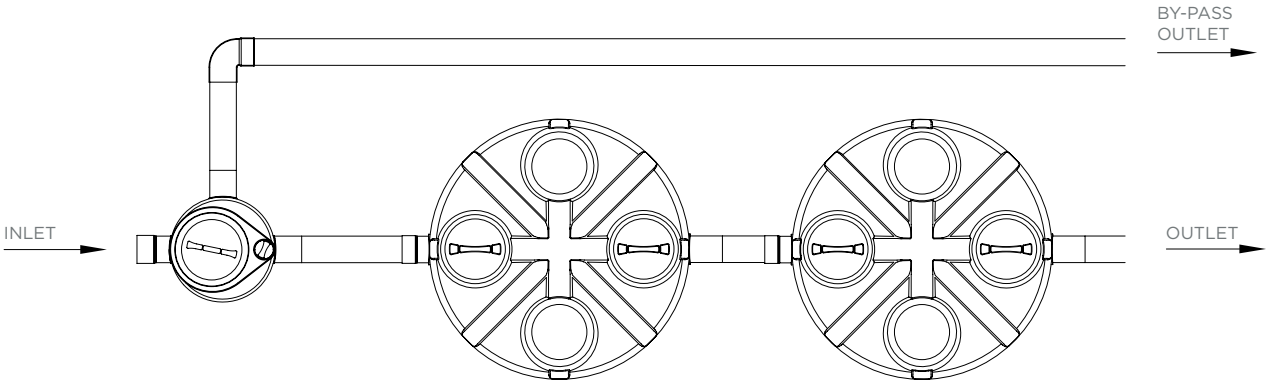
• Watertightness	✓
• Structural stability	✓
• Nominal capacity	✓
• Functional requirements	✓
• Raw material requirements	✓
• Structural behaviour	✓
• Reaction to fire	Class E

CERTIFIED UNI EN 858-1

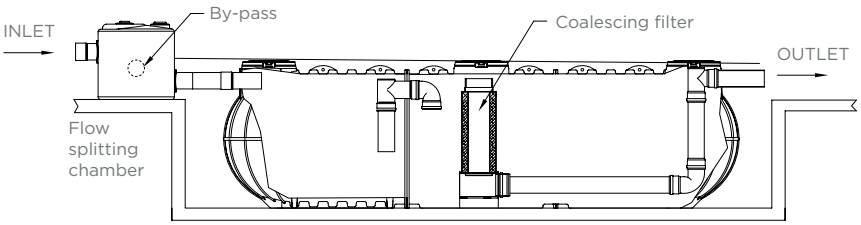


STORMWATER RUNOFF
CONTINUOUS TREATMENT PLANTS



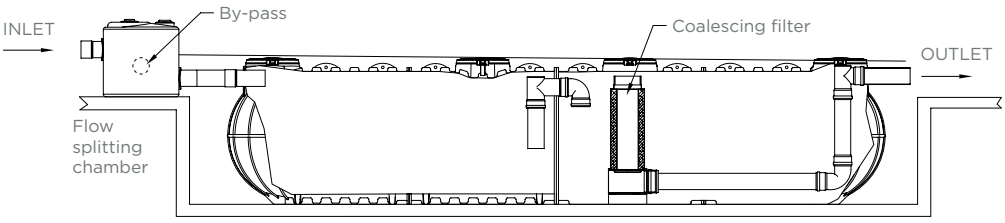


Item	Flow rate l/s	Uncovered surface m2	Total useful volume l	Oil collection volume l	Grit collection volume l	Flow splitting chamber		Grit separator		Oil separator		Цени в лв/без ДДС
						Ø x H mm	ØI-ØO-ØBp mm	Ø x H mm	ØI-ØO mm	Ø x H mm	ØI-ØO mm	
IPC270	1.5	270	1700	27	150	790x790	125-125-125	1150x1220	125-125	1150x1220	125-125	**2130.00**
IPC360	2	360	2118	35	200	790x790	125-125-125	1150x1220	125-125	1150x1720	125-125	**2330.00**
IPC540	3	540	2118	53	300	790x790	125-125-125	1150x1720	125-125	1150x1220	125-125	**2570.00**
IPC720	4	720	2536	70	400	790x790	125-125-125	1150x1720	125-125	1150x1720	125-125	**2970.00**
IPC1000	6	1000	3900	130	700	790x790	125-125-125	1350x1975	125-125	1350x1975	125-125	**3450.00**
IPC1350	7.5	1350	4122	152	860	790x790	160-160-160	1710x1450	160-160	1710x1450	160-160	**4800.00**
IPC1800	10	1800	5050	176	1000	790x790	160-160-160	1710x1725	160-160	1710x1725	160-160	**5180.00**
IPC2700	15	2700	6208	225	1500	790x790	200-200-200	1710x1955	200-200	1710x1955	200-200	**6140.00**
IPC3600	20	3600	7596	300	2000	790x790	200-200-200	1710x2225	200-200	1710x2225	200-200	**6680.00**
IPC4500	25	4500	8694	375	2500	790x790	250-250-250	1950x2250	250-250	1950x2250	250-250	**7320.00**
IPC5400	30	5400	10200	450	3000	790x790	250-250-250	1950x2530	250-250	1950x2530	250-250	**7960.00**
IPC6300	35	6300	13868	525	3500	1160x1140	315-315-315	2250x2367	315-315	2250x2367	315-315	**8450.00**
IPC7200	40	7200	14757	600	4000	1160x1140	315-315-315	2250x2625	315-315	2250x2367	315-315	**10200.00**
IPC9000	50	9000	15357	750	5000	1160x1140	315-315-315	2250x2625	315-315	2250x2625	315-315	**12200.00**



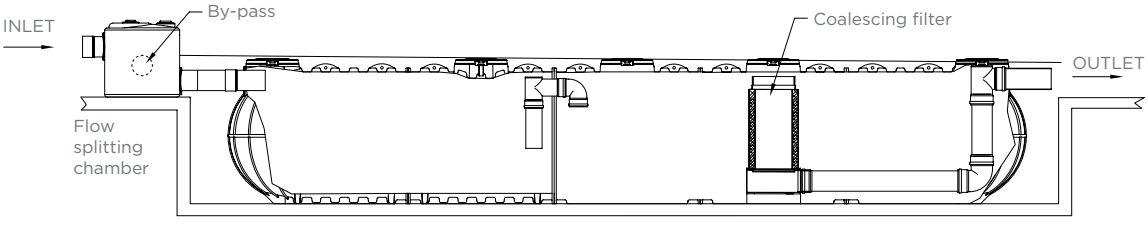
One-piece grit and oil separation tank with coalescing filter

Item	Flow rate l/s	Uncovered surface m2	Overall useful volume l	Oil collection volume l	Grit collection volume l	Flow splitting chamber		One-piece grit/oil separator				Цени в лв/без ДДС
						Ø x H mm	ØI-ØO-ØBp mm	L x w x H mm	Grit separator volume l	Oil separator volume l	ØI-ØO mm	
ITIPC10000	65	11500	20500	1000	6700	1160x1140	315-315-315	7880x2100x2200	7000	13500	315-315	**16300.00**



One-piece grit and oil separation tank with coalescing filter

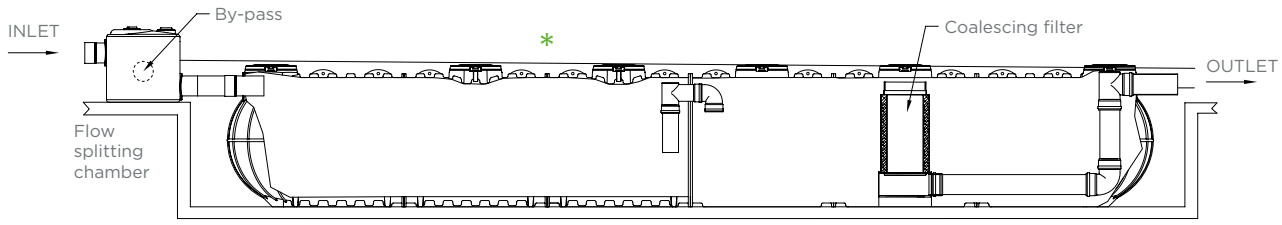
Item	Flow rate l/s	Uncovered surface m2	Overall useful volume l	Oil collection volume l	Grit separator volume l	Flow splitting chamber		One-piece grit/oil separator				Цени в лв/без ДДС
						Ø x H mm	ØI-ØO-ØBp mm	L x w x H mm	Grit separator volume l	Oil separator volume l	ØI-ØO mm	
ITIPC12500	85	15300	27000	1300	8600	1160x1140	315-315-315	10140x2100x2200	13500	13500	315-315	**19700.00**



One-piece grit and oil separation tank with coalescing filter

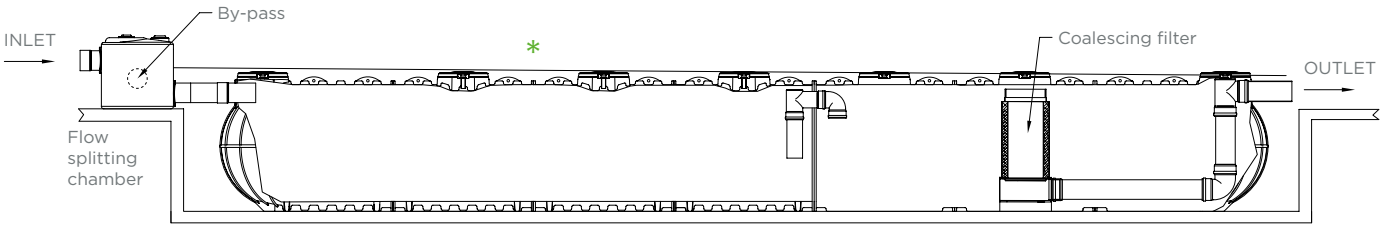
Item	Flow rate l/s	Uncovered surface m2	Overall useful volume l	Oil collection volume l	Grit separator volume l	Flow splitting chamber		One-piece grit/oil separator				Цени в лв/без ДДС
						Ø x H mm	ØI-ØO-ØBp mm	L x w x H mm	Grit separator volume l	Oil separator volume l	ØI-ØO mm	
ITIPC15000	100	18000	33500	1550	10000	1160x1140	315-315-315	12400x2100x2200	13500	20000	315-315	**24800.00**

STORMWATER RUNOFF
CONTINUOUS TREATMENT PLANTS



One-piece grit and oil separation tank with coalescing filter

Item	Flow rate l/s	Uncovered surface m2	Overall useful volume l	Oil collection volume l	Grit separator volume l	Flow splitting chamber		One-piece grit/oil separator				Цени в лв/без ДДС
						Ø x H mm	ØI-ØO-ØBp mm	L x w x H mm	Grit separator volume l	Oil separator volume l	ØI-ØO mm	
ITIPC18000	120	22000	40000	1850	13000	1160x1140	315-315-315	14660x2100x2200	20000	20000	315-315	**28300.00** *



One-piece grit and oil separation tank with coalescing filter

Item	Flow rate l/s	Uncovered surface m2	Overall useful volume l	Oil collection volume l	Grit separator volume l	Flow splitting chamber		One-piece grit/oil separator				Цени в лв/без ДДС
						Ø x H mm	ØI-ØO-ØBp mm	L x w x H mm	Grit separator volume l	Oil separator volume l	ØI-ØO mm	
ITIPC22000	150	27000	46500	2300	15500	1160x1140	400-315-400	16920x2100x2200	26500	20000	315-315	**32700.00** *

*** On-site welding**
carried out by specialist Rototec technicians, to be quantified in the offer when foreseen
N.B.: for larger sizes please contact our technical office.
N.B.: The position of the asterisk is purely indicative

TECHNICAL SECTION – CONTINUOUS STORMWATER RUNOFF TREATMENT

TECHNICAL CHARACTERISTICS

The plant allows the continuous treatment of stormwater runoff from **impermeable surfaces up to 27000 m²** used for transit or parking in industrial areas, residential zones and service stations subject to possible pollution from mineral oils, hydrocarbons, sand/grit and inert materials. The stormwater runoff treatment system makes use of the action of a grit and oil separator in continuous operation capable of treating **flows of up to 150 l/s**.
Runoff from impermeable transit areas must be carried to the treatment system. For flow rates higher than the design data, the by-pass is activated, sending the excess flow to the rainwater system.
The coalescing filter type oil separators are certified under standard UNI EN 858-1 and are CE-marked.
The plant is effective for the following parameters:

- Sedimentable solids.
- Total hydrocarbons and other light liquids that have not been emulsified of specific weight up to 0.85 g/cm3.

USE AND MAINTENANCE

The pollutants separated from the stormwater runoff inside the plant are mainly non-biodegradable (grit, lime, stone, hydrocarbons, oils, etc.). These tend to build up inside the various tanks. Over time, this build-up becomes excessive and tends to **have a negative effect on the efficiency** of the treatment plant (blocked pipes, release of the pollutants themselves, etc.).
It is therefore necessary to carry out **periodic inspection** of the tanks and, if necessary, to pump them out and clean them, contacting **licensed waste disposal companies**.
The inspections must be more frequent during the first months the system is in operation, in order to identify approximately how often pump-out will be necessary.

MANAGEMENT

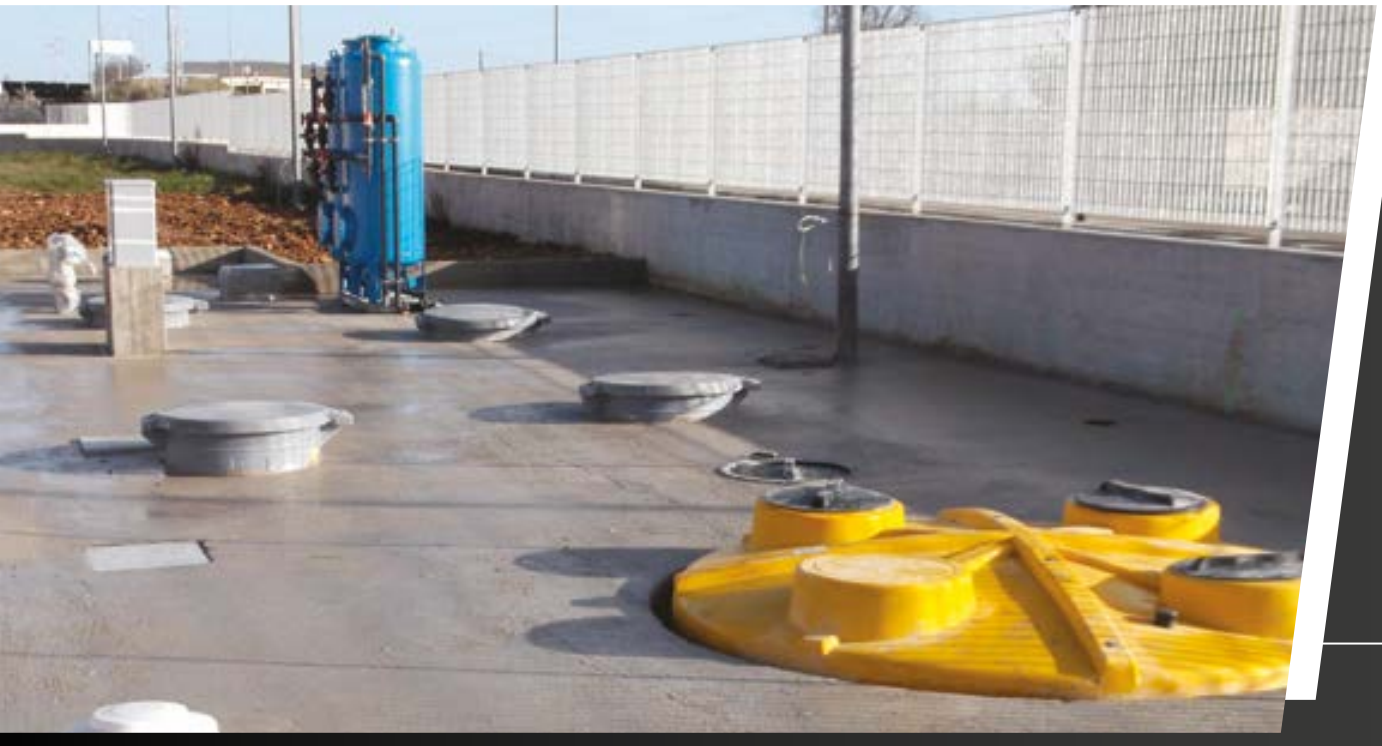
WHAT TO DO	WHEN	HOW
Inspect the grit separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the floating material
Inspect the coalescing filter type oil separator	Every 1 / 2 months	Unscrew the covers on the inspection holes and check the level of sediment and the floating material
Clean the coalescing filter	Every 1 / 2 months	Extract the steel cage containing the filter and wash it with a jet of water at the head of the plant
Remove the floating material, the bottom sediment and clean the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company who will empty all the elements in the plant

N.B. *the frequency of cleaning operations depends on the amount of oil, grease and the frequency of rainfall.*

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**);
- after pump-out, fill the tank again with **clean water**;
- inspect the tanks periodically both during and after rain, so as to check that the various devices and elements are working properly;
- 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.

TREATMENT PLANTS FOR CAR WASHES



PLANTS FOR CAR WASHES

SPECIFICATIONS

The growing interest for **environmental protection and safety** is focussing more and more not only on treatment for domestic sewage or the like but also, particularly in recent years, on treatment systems for runoff from potentially polluted impermeable surfaces.
This includes water from car washes, which is characterised by the presence of **various types of pollutants** such as: suspended solids (sand and mud, gravel, grit, vegetable residues,...), detergents, oils and hydrocarbons. For this reason, the purification treatment of these effluents requires a series of phases that treat the pollutants in succession. Choice of the different types of treatment varies according to the final discharge. The inlet concentrations are : SS ≤400 mg/l ; Total Hydrocarbons ≤50 mg/l ; Total Surfactants ≤5 mg/l.

The first phase consists of a **grit separator** in which all the compounds of specific weight different to that of water are separated by gravity: the heavier materials (sand, mud, gravel,...) settle to the bottom of the tank while the lighter materials (oil, grease, foam,...) accumulate at the surface. The outlet pipe draws from halfway down the tank to prevent the separated material from being drawn-off.

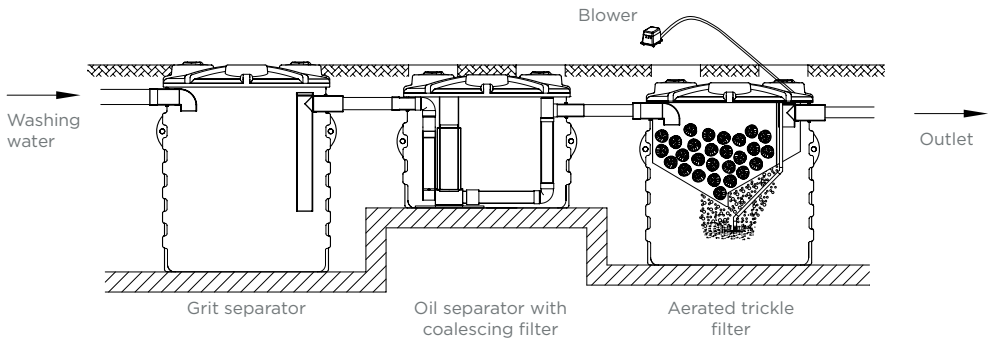
The second phase is the **oil separation**. The residual oils and hydrocarbons are trapped by the coalescing filters, thus separating them from the effluent.

In the third phase, the effluent is subjected to **intensive biological treatment,** in which the particular strains of bacteria digest the dissolved organic substances (BOD5 and COD) and the detergents (Phosphorous). When discharging to a public sewer, the biological treatment consists of an aerated trickle filter. When discharging to a surface watercourse, another anaerobic trickle filter is added upstream. The blowers of the aerated trickle filters must remain in operation 24 hours a day.
Finally, to improve the quality of the treated water to discharge it into the open air/to the land or to re-use it in the initial phases of the washing cycle (pre-wash,...), the treatment plant is combined with a tertiary treatment consisting of a **quartzite and activated charcoal filter system**.

USE: treatment of water from manual and automatic car wash areas

REFERENCE STANDARDS: Italian Legislative Decree 152/2006, standard UNI EN 858-1 (oil separator), regional standards for treatment of rainwater and surface runoff.

PLANTS FOR CAR WASHES



Item	Sizing			Plant composition											Цени в лв/без ДДС
				Grit separator				Oil separator			Aerated trickle filter				
	Cars/ day n°	Hydraulic load l/day	Max Q l/h	Model	Ø mm	H mm	V tot l	Model	Ø mm	H mm	Model	Ø mm	H mm	V tot l	
DEPAUT010PF	0-10	2000	400	NDD1500	1150	1720	1193	NDOFC1000 1.5 l/s	1150	1220	NANA1000	1150	1220	850	3500.00
DEPAUT020PF	11-20	4000	400	NDD2600	1710	1450	1971	NDOFC1000 1.5 l/s	1150	1220	NANA1500	1150	1720	1268	4600.00
DEPAUT030PF	21-30	6000	600	NDD2600	1710	1450	1971	NDOFC1500 2 l/s	1150	1720	NANA2100	1350	1975	1950	5400.00
DEPAUT040PF	31-40	8000	800	NDD3200	1710	1725	2435	NDOFC1000 3 l/s	1150	1220	NANA2100	1350	1975	1850	6400.00
DEPAUT050PF	41-50	10000	1200	NDD3800	1710	1955	3026	NDOFC1500 4 l/s	1150	1720	NANA3200	1710	1725	2525	6900.00
DEPAUT060PF	51-60	12000	1800	NDD4600	1710	2225	3510	NDOFC2600 7.5 l/s	1710	1450	NANA3200	1710	1725	2525	7500.00
DEPAUT080PF	61-80	16000	2200	NDD6400	1950	2530	5100	NDOFC2600 7.5 l/s	1710	1450	NANA3800	1710	1955	3104	9500.00
DEPAUT0100PF	81-100	20000	3000	NDD7000	2250	2367	6711	NDOFC2600 7.5 l/s	1710	1450	NANA4600	1710	2225	3835	11200.00

TREATMENT EFFICIENCY

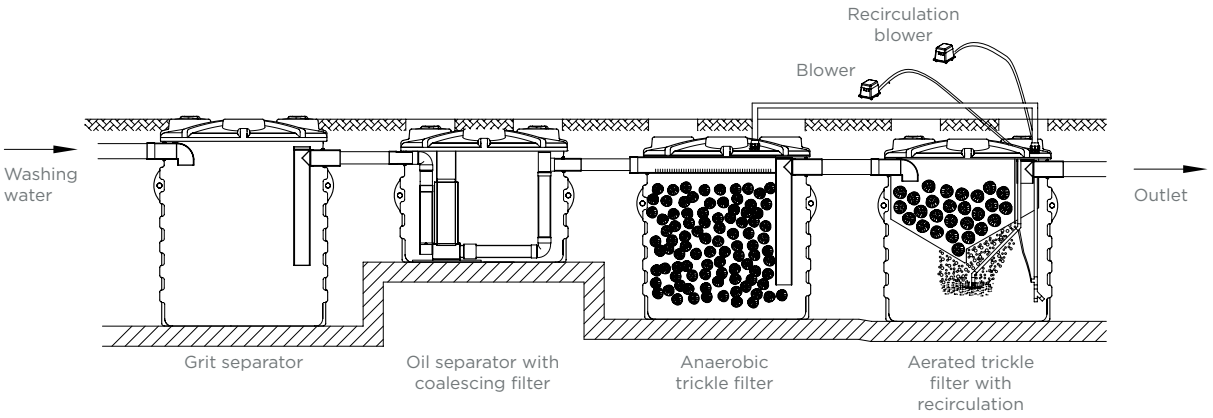
The treatment plant for car washes made up of a grit separator, an oil separator with coalescing filter and an aerated trickle filter (installed as shown above) ensures that the concentrations of the final effluent are:

≤200 mg/l
SS

≤10 mg/l
Total Hydrocarbons

≤4 mg/l
Total surfactants

PLANTS FOR CAR WASHES



Item	Sizing			Plant composition														Цени в лв/без ДДС
	Cars/ day n°	Hydraulic load l/day	Max Q l/h	Grit separator				Oil separator			Anaerobic trickle filter				Aerated trickle filter with sludge recirculation			
				Model	Ø mm	H mm	V tot l	Model	Ø mm	H mm	Model	Ø mm	H mm	V tot l	Model	Ø mm	H mm	V tot l	
DEPAUT010	0-10	2000	400	NDD1500	1150	1720	1193	NDOFC1000 1.5 l/s	1150	1220	NAN1000R	1150	1220	850	NANAR1000	1150	1220	850	**5800.00**
DEPAUT020	11-20	4000	400	NDD2600	1710	1450	1971	NDOFC1000 1.5 l/s	1150	1220	NAN1500R	1150	1720	1268	NANAR1500	1150	1720	1268	**8000.00**
DEPAUT030	21-30	6000	600	NDD2600	1710	1450	1971	NDOFC1500 2 l/s	1150	1720	NAN1500R	1150	1720	1268	NANAR2600	1710	1450	1971	**8800.00**
DEPAUT040	31-40	8000	800	NDD3200	1710	1725	2435	NDOFC1000 3 l/s	1150	1220	NAN2600R	1710	1450	1971	NANAR2600	1710	1450	1971	**9900.00**
DEPAUT050	41-50	10000	1200	NDD3800	1710	1955	3026	NDOFC1500 4 l/s	1150	1720	NAN3200R	1710	1725	2435	NANAR3200	1710	1725	2435	**11400.00**
DEPAUT060	51-60	12000	1800	NDD4600	1710	2225	3510	NDOFC2600 7.5 l/s	1710	1450	NAN3200R	1710	1725	2435	NANAR3200	1710	1725	2435	**13000.00**
DEPAUT080	61-80	16000	2200	NDD6400	1950	2530	5100	NDOFC2600 7.5 l/s	1710	1450	NAN3800R	1710	1955	3104	NANAR3800	1710	2225	3510	**13900.00**
DEPAUT0100	81-100	20000	3000	NDD7000	2250	2367	6711	NDOFC2600 7.5 l/s	1710	1450	NAN4600R	1710	2225	3510	NANAR4600	1710	2225	3510	**16800.00**

TREATMENT EFFICIENCY

The treatment plant for car washes made up of a grit separator, an oil separator with coalescing filter, an anaerobic trickle filter and an aerated trickle filter with recirculation (installed as shown above) ensures that the concentrations of the final effluent are:

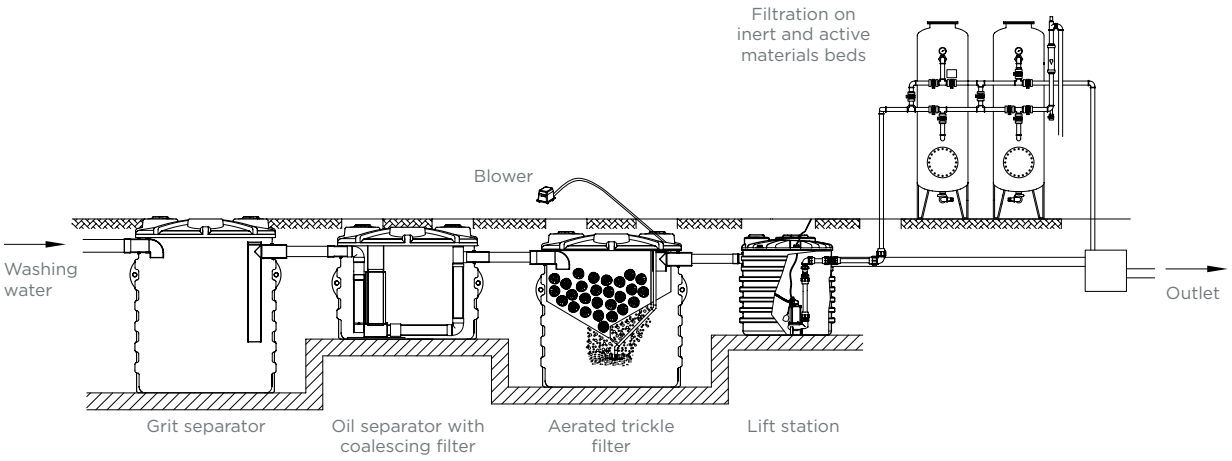
≤80 mg/l
SS

≤5 mg/l
Total Hydrocarbons

≤2 mg/l
Total surfactants

PLANTS FOR CAR WASHES

RE-USE OF THE TREATED WATER



Item	Sizing			Plant composition																		Цени в лв/без ДДС
				Grit separator				Oil separator			Aerated trickle filter			Pumping station				External filtration				
	Cars/ day n°	Hydraulic load l/d	Max Q l/h	Model	Ø mm	H mm	V tot l	Model	Ø mm	H mm	Model	Ø mm	H mm	Model	Ø mm	H mm	V tot l	Model	L. x w mm	H mm		
DEPAUTO10T4	0-10	2000	400	NDD 1500	1150	1720	1193	NDOFC1000 1.5 l/s	1150	1220	NANA 1000	1150	1220	NSOL 1000EC	1150	1220	900	FQCA05	1000x390	1640		**12200.00**
DEPAUTO20T4	11-20	4000	400	NDD 2600	1710	1450	1971	NDOFC1000 1.5 l/s	1150	1220	NANA 1500	1150	1720	NSOL 1000EC	1150	1220	900	FQCA05	1000x390	1640		**13980.00**
DEPAUTO30T4	21-30	6000	600	NDD 2600	1710	1450	1971	NDOFC1500 2 l/s	1150	1720	NANA 2100	1350	1975	NSOL 1000EC	1150	1220	900	FQCA08	1320x560	2120		**17800.00**
DEPAUTO40T4	31-40	8000	800	NDD 3200	1710	1725	2435	NDOFC1000 3 l/s	1150	1220	NANA 2100	1350	1975	NSOL 1000EC	1150	1220	900	FQCA08	1320x560	2120		**18800.00**
DEPAUTO50T4	41-50	10000	1200	NDD 3800	1710	1955	3026	NDOFC1500 4 l/s	1150	1720	NANA 3200	1710	1725	NSOL 1500EC	1150	1720	1400	FQCA1	1600x650	2300		**22,780.00**
DEPAUTO60T4	51-60	12000	1800	NDD 4600	1710	2225	3510	NDOFC2600 7.5 l/s	1710	1450	NANA 3200	1710	1725	NSOL 1500EC	1150	1720	1400	FQCA2	1800x750	2400		**27650.00**
DEPAUTO80T4	61-80	16000	2200	NDD 6400	1950	2530	5100	NDOFC2600 7.5 l/s	1710	1450	NANA 3800	1710	1955	NSOL 3000EC	1710	1650	3000	FQCA2	1800x750	2400		**29700.00**
DEPAUTO100T4	81-100	20000	3000	NDD 7000	2250	2367	6711	NDOFC2600 7.5 l/s	1710	1450	NANA 4600	1710	2225	NSOL 3000EC	1710	1650	3000	FQCA2	1800x750	2400		**31500.00**

TREATMENT EFFICIENCY

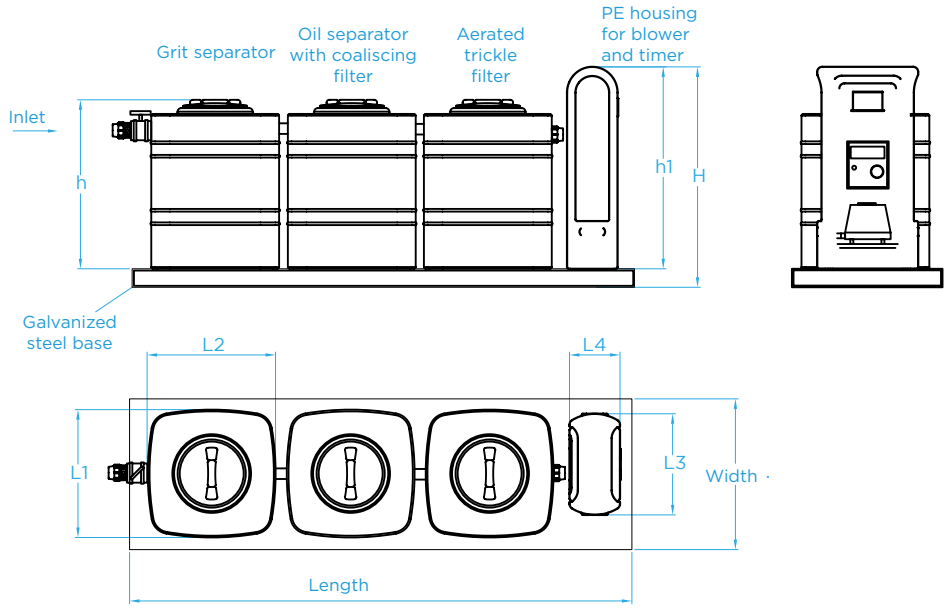
The treatment plant for car washes made up of a grit separator, an oil separator with coalescing filter, an anaerobic trickle filter and an aerated trickle filter with recirculation (installed as shown above) ensures that the concentrations of the final effluent are:

≤25 mg/l
SS

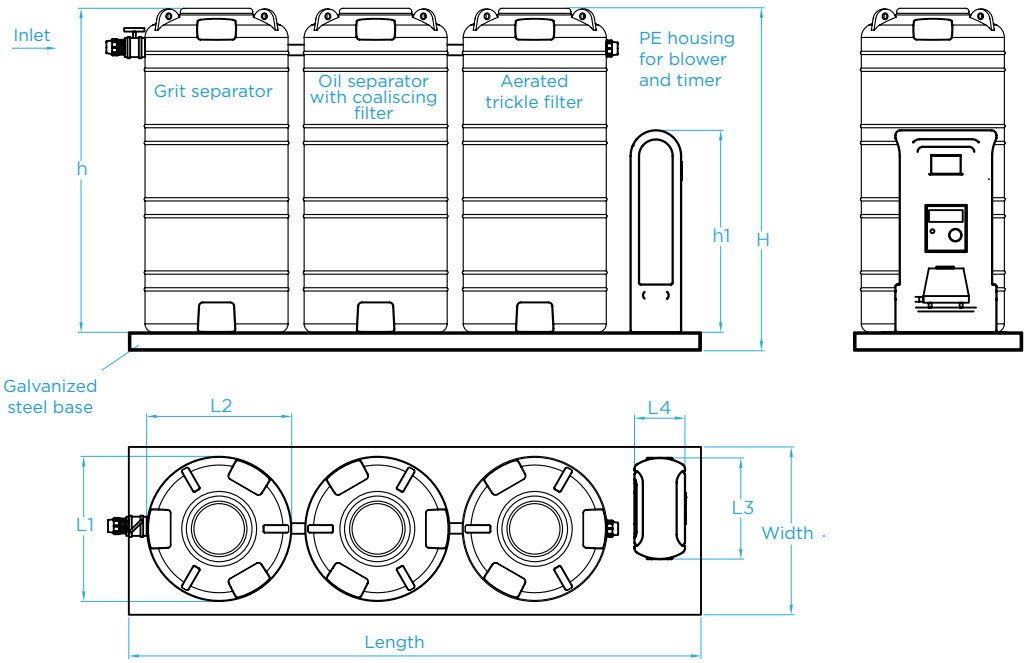
≤0 mg/l
Total Hydrocarbons

≤0,5 mg/l
Total surfactants

EXTERNAL TREATMENT SYSTEMS FOR CAR WASHES



Item	Cars/day n°	Over all dimensions (length x width x H) mm	Grit separator/Oil separator/ filter (L1 x L2 x h) mm	PE housing (L3 x L4 x h1) mm	ØI – ØO mm	Total volume l	Blower (W)	Цени в лв/без ДДС
DEPAUTOEST10	**0-10**	3400 x 1000 x 1300	760 x 760 x 980	300 x 600 x 1200	50-75	1350	31	**3670.00**



Item	Cars/day n°	Over all dimensions (length x width x H) mm	Grit separator/Oil separator/ filter (L1 x L2 x h) mm	PE housing (L3 x L4 x h1) mm	ØI – ØO mm	Total volume l	Blower (W)	Цени в лв/без ДДС
DEPAUTOEST20	**11-20**	3400 x 1000 x 2003	850 x 850 x 1930	300 x 600 x 1200	50-75	2700	31	**4200.00**

QUARTZITE AND ACTIVATED CHARCOAL FILTRATION

DESCRIPTION OF THE PLANT

Filtration plants constructed in a single block are **the most rational and economic solution**, for treatment of effluent characterised by pollution due to the presence of substances such as Suspended Solids, Hydrocarbons and Surfactants from: car washes, mechanical workshops, etc..

Their economy of operation relates to their ability to work without the need for operator intervention, which is only required for a few minutes/week, during the periodic wash-out operations.

The systems do not require chemical products for operation, so the salt content of the waste water is not altered. This is particularly advantageous in all cases when partial re-use of the treated water is required.

The filtration lines consist of **two tanks or columns**, equipped with n° 2 inspection covers, to allow periodic operations to load and replace the Quartzite and/or Activated Charcoal filter beds. These are extremely reliable and long-lasting finished products, that are able to withstand both the action of chemical agents and the weather. All the electromechanical equipment installed to support the plant feature **maximum reliability**, extreme simplicity of use and a **minimum need for maintenance**.

THE TREATMENT CYCLE FOR DISCHARGE TO LAND OR RE-USE

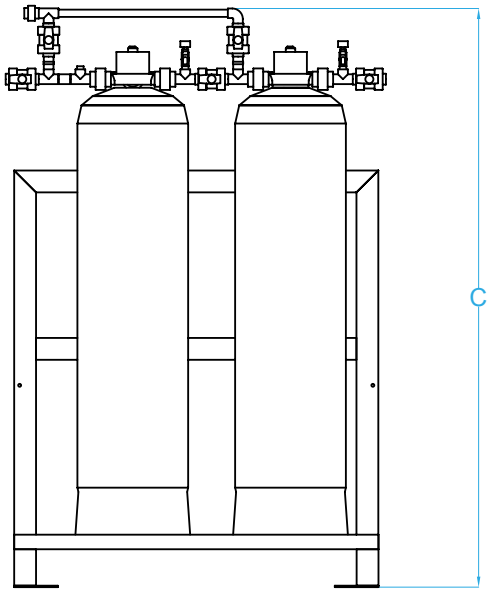
1. The water to be treated following external car washing activities are carried to the pre-treatment section, which consists of: grit separator, coalescing filter type oil separator and aerated trickle filter;

2. The waste water leaving the pre-treatment section enters a so-called homogenisation and storage tank, which contains the submerged electric pump used to power the plant.

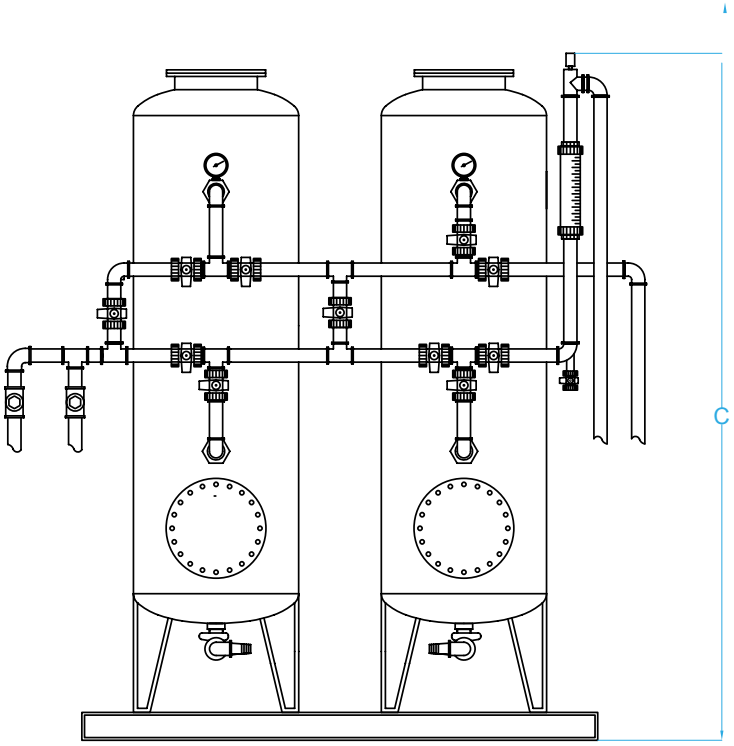
3.The pre-treated water is then sent to the first stage of filtration, where they pass through a bed of ultra-fine Quartzite, with a suspended substance selection level of around 50µm.

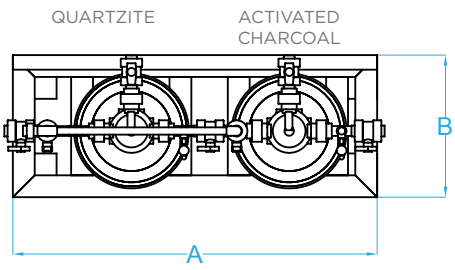
4. After this, the clarified waste water moves on to the second stage of filtration, consisting of an Activated Charcoal bed. The feature of activated charcoal is its ability to retain, within its microporous structure, pollutants such as, for example, Surfactants, Hydrocarbons, Solvents etc.

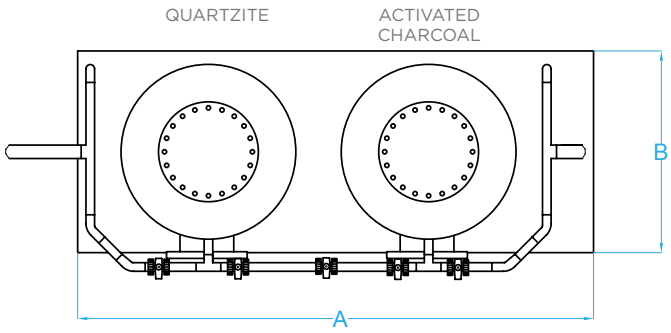
Layout FQCA05 - FQCA08



Layout FQCA1 - FQCA2



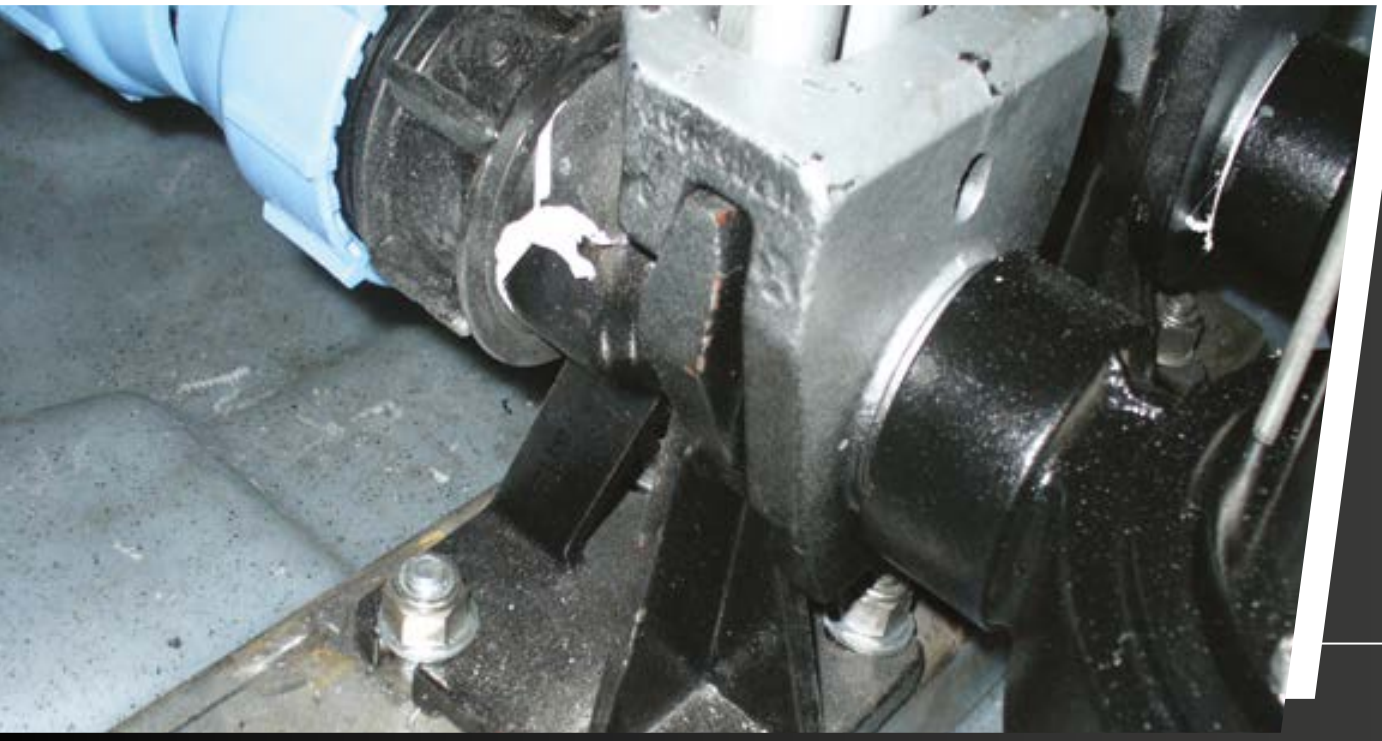




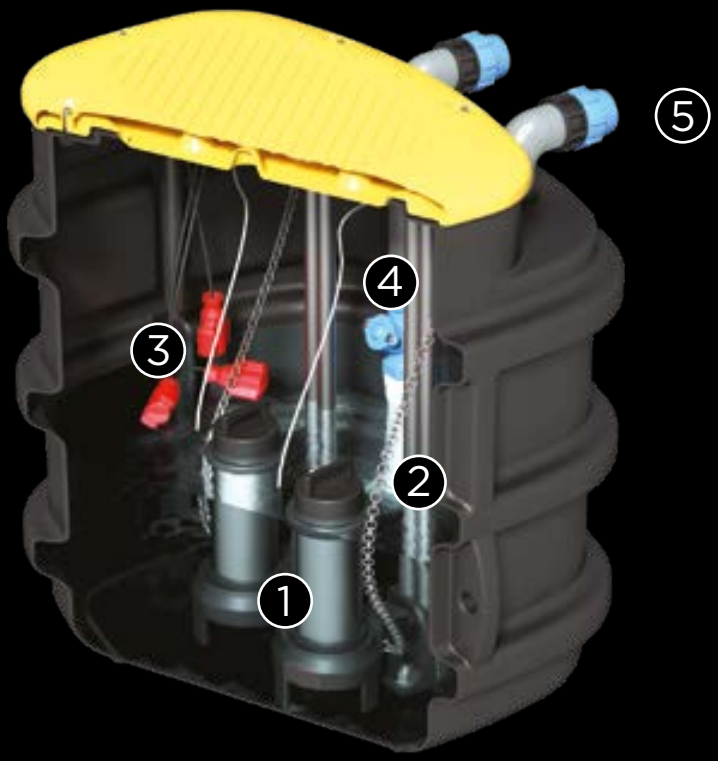
Item	Flow rate (l/h)	Overall SKID dimensions			Installed power (Kw)	Supply voltage (V)	Weight during service (kg)	Column material	Цени в лв/без ДДС
		A (cm)	B (cm)	C (cm)					
FQCA05*	500	100	39	164	0.44	220	300	Fibreglass	**7880.00**
FQCA08*	800	132	56	212	0.44	220	750	Fibreglass	**11920.00**
FQCA1**	1500	160	65	220	1.1	380	850	Carbon steel	**15880.00**
FQCA2**	3000	180	75	240	1.5	380	1550	Carbon steel	**21200.00**

*supplied with submerged electric pump
**supplied with submerged electric panel

LIFT STATIONS



LIFT STATIONS



1. Submersible electric pumps
2. Stainless steel downpipe and quick-connection system
3. Command floats
4. Cast iron ball check-valve
5. Outlet pipes

* Example of TEKNOSOL equipment with dual pump

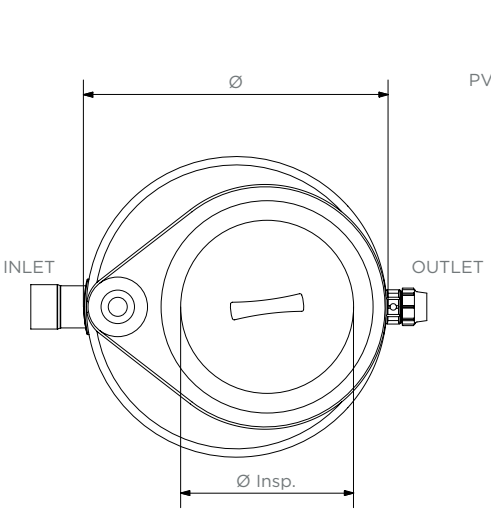
SPECIFICATIONS

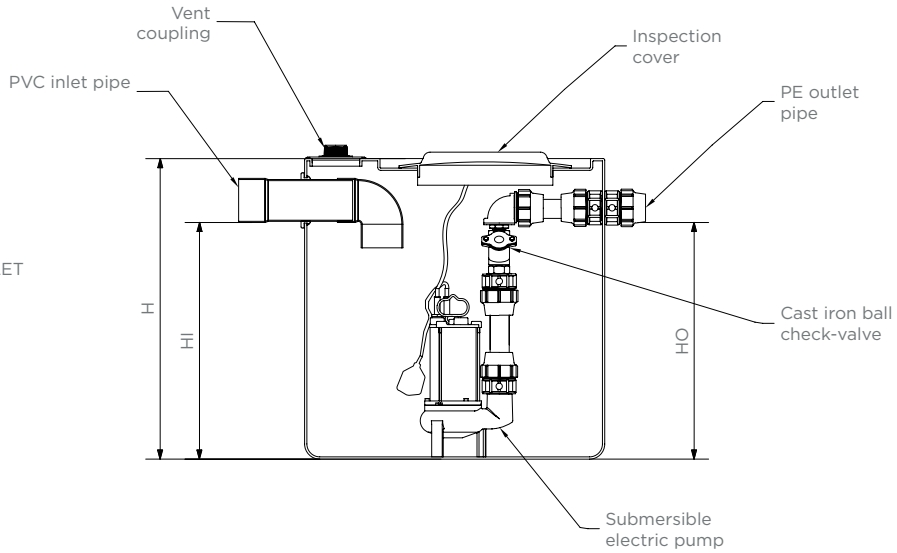
TECHNICAL CHARACTERISTICS: Sewage lift stations are systems that allow effluent to be lifted and transferred to stations located at higher levels (sewerage systems, treatment systems). They become necessary, for example, when the discharge level of a WC is lower than that of the treatment plant or sewerage pipes (cellars, underground premises, etc.) and when the hydraulic profile of the treatment system cannot work by gravity. The station consists of a linear polyethylene (LLDPE) storage tank of various sizes, with a submerged electric pump installed inside it. If the flow rates of waste water to be lifted are very high and/or variable and if the presence of a spare pump is necessary, dual pump models are provided. The pumps are connected to suitable electric panels so that, according to requirements, the start-up command can be either manual or automatic by means of start/stop float switches located inside the tank. Depending on need, the lift stations can be equipped with various types of pumps with different heads, flow rates and working pressures. For pumps possessing particular characteristics, contact the ROTOTEC technical office.

USE: to pump pre-treated and untreated waste water, rainwater, etc. to higher levels

PICO SOL LIFT STATIONS

SMALL VOLUMES

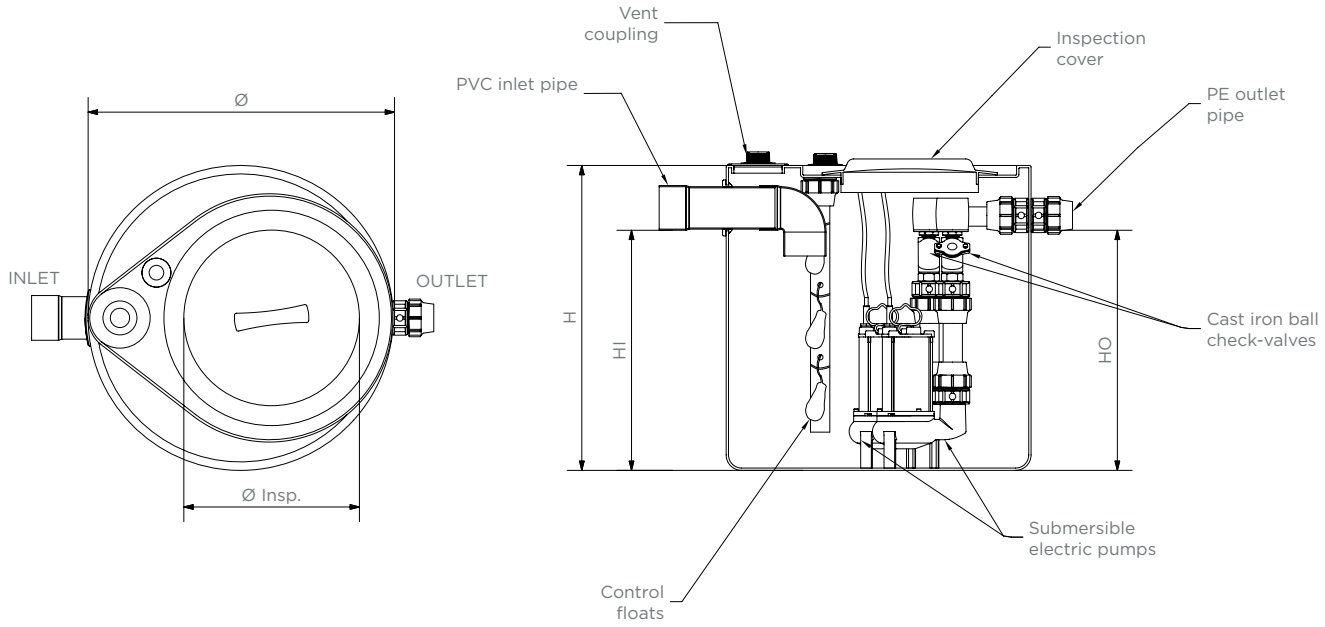




Single pump

Item	Volume l	Ø mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
SOL150	120	580	660	510	510	100-50	300	PNRG01	Vortex	0.3	10-140	6-1	**800.00**
SOL326	230	630	970	750	750	110-50	400	SM265	Vortex	0.55	0-300	8.5-1	**1100.00**
SOL345	230	630	970	750	750	110-63	400	SM390	Vortex	0.75	0-500	10.5-1	**1200.00**
SOL312	230	630	970	750	750	110-63	400	SM125	Grinder	1.18	0-110	30-3	**1870.00**
SOL302	230	630	970	750	750	110-63	400	PMST2	Grinder	0.9	35-215	16-4	**1810.00**
SOL526	305	790	790	625	625	110-50	400	SM265	Vortex	0.55	0-300	8.5-1	**1150.00**
SOL545	305	790	790	625	625	110-63	400	SM390	Vortex	0.75	0-500	10.5-1	**1200.00**
SOL563	305	790	790	625	625	110-63	400	SM635	2-channel	1.1	0-650	15-0	**1450.00**
SOL512	305	790	790	625	625	110-63	400	SM125	Grinder	1.18	0-110	30-0	**1890.00**
SOL502	305	790	790	625	625	110-63	400	PMST2	Grinder	0.9	35-215	16-4	**1840.00**

(Single and dual-pump lift stations, size 120 - 300 l)

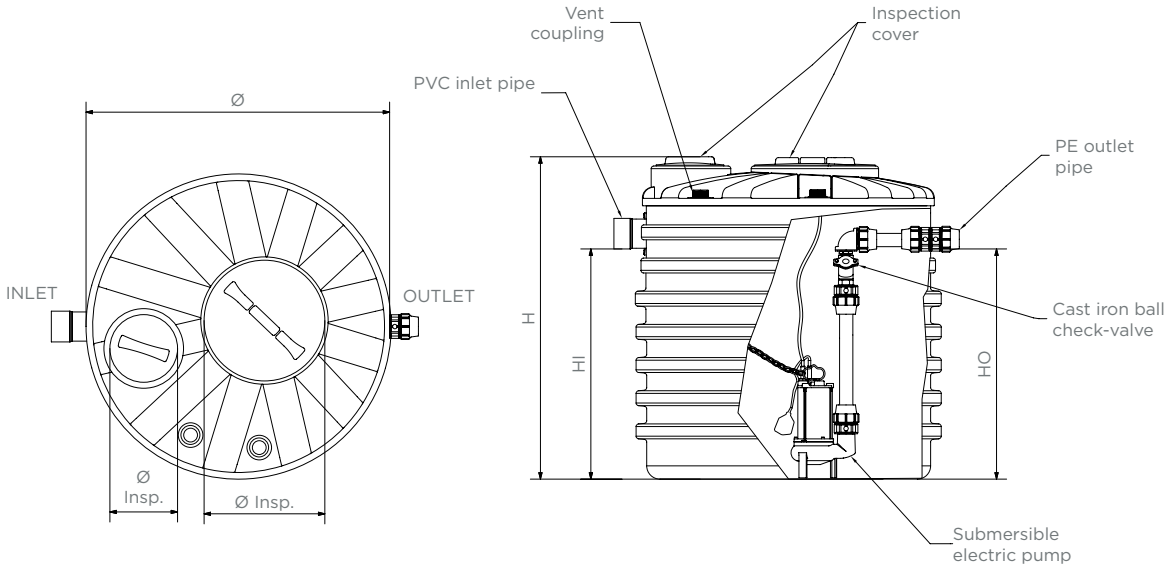


Dual pump

Item	Volume l	Ø mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
SOL526P2	305	790	790	625	625	110-50	400	SM265	Vortex	0.55	0-300	8.5-1	**2000.00**
SOL545P2	305	790	790	625	625	110-63	400	SM390	Vortex	0.75	0-500	10.5-1	**2250.00**
SOL563P2	305	790	790	625	625	110-63	400	SM635	2-channel	1.1	0-650	15-0	**2700.00**
SOL512P2	305	790	790	625	625	110-63	400	SM125	Grinder	1.18	0-110	30-0	**3440.00**
SOL502P2	305	790	790	625	625	110-63	400	PMST2	Grinder	0.9	35-215	16-4	**3320.00**

ENNE SOL LIFT STATIONS

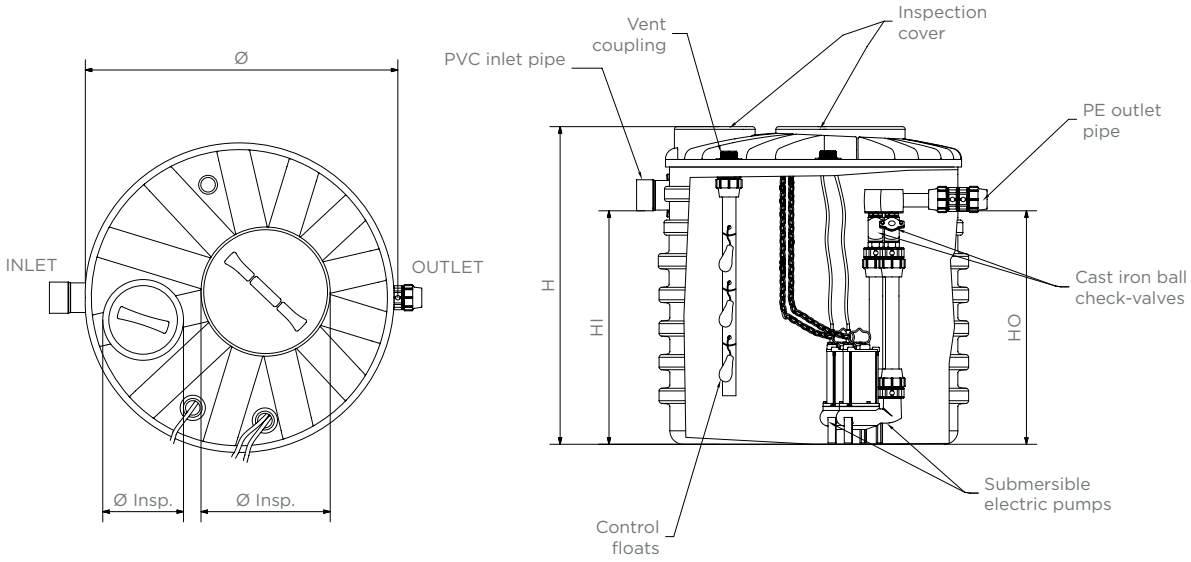
LARGE VOLUMES



Single pump

Item	Volume l	Ø mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
NSOL1026	903	1150	1220	870	870	110-50	400-210	SM265	Vortex	0.55	0-300	8.5-1	**1550.00**
NSOL1045	903	1150	1220	870	870	110-63	400-210	SM390	Vortex	0.75	0-500	10.5-1	**1670.00**
NSOL1063	903	1150	1220	870	870	110-60	400-210	SM635	2-channel	1.1	0-650	15-0	**1900.00**
NSOL1012	903	1150	1220	870	870	110-63	400-210	SM125	Grinder	1.18	0-110	30-3	**2190.00**
NSOL1002	903	1150	1220	870	870	110-63	400-210	PMST2	Grinder	0.9	35-215	16-4	**2140.00**
NSOL1526	1400	1150	1720	1360	1360	125-50	400-210	SM265	Vortex	0.55	0-300	8.5-1	**1850.00**
NSOL1545	1400	1150	1720	1360	1360	125-63	400-210	SM390	Vortex	0.75	0-500	10.5-1	**1950.00**
NSOL1563	1400	1150	1720	1360	1360	125-63	400-210	SM635	2-channel	1.1	0-650	15-0	**2200.00**
NSOL1512	1400	1150	1720	1360	1360	125-63	400-210	SM125	Grinder	1.18	0-110	30-3	**2470.00**
NSOL1502	1400	1150	1720	1360	1360	125-63	400-210	PMST2	Grinder	0.9	35-215	16-4	**2400.00**
NSOL3026	3000	1710	1650	1355	1355	125-50	630	SM265	Vortex	0.55	0-300	8.5-1	**2100.00**
NSOL3045	3000	1710	1650	1355	1355	125-63	630	SM390	Vortex	0.75	0-500	10.5-1	**2200.00**
NSOL3063	3000	1710	1650	1355	1355	125-63	630	SM635	2-channel	1.1	0-650	15-0	**2450.00**
NSOL3012	3000	1710	1650	1355	1355	125-63	630	SM125	Grinder	1.18	0-110	30-3	**2680.00**
NSOL3002	3000	1710	1650	1355	1355	125-63	630	PMST2	Grinder	0.9	35-215	16-4	**2600.00**
NSOL3004	3000	1710	1650	1355	1355	125-63	630	PMST4	Grinder	1.5	20-245	22-6	**3180.00**

(Single and dual-pump lift stations, size 900 - 3000 l)

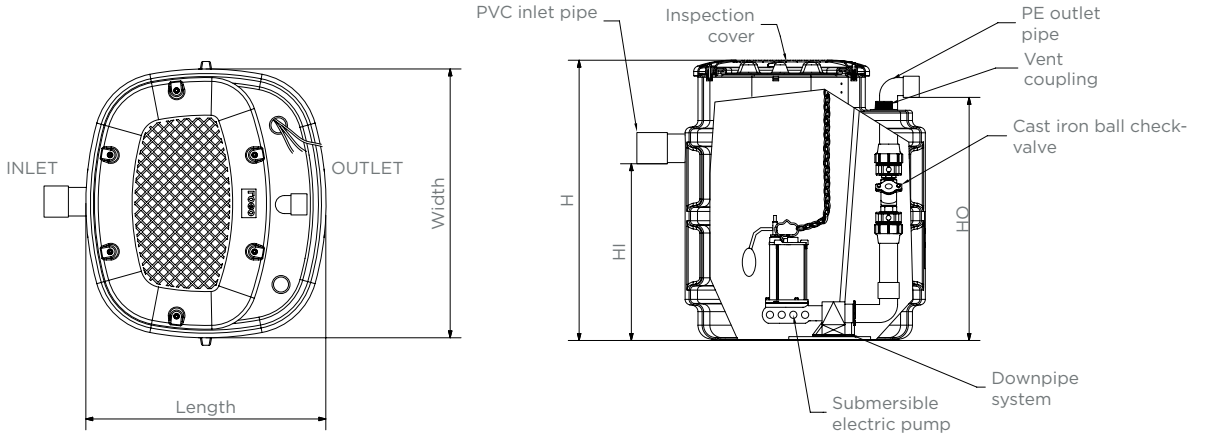


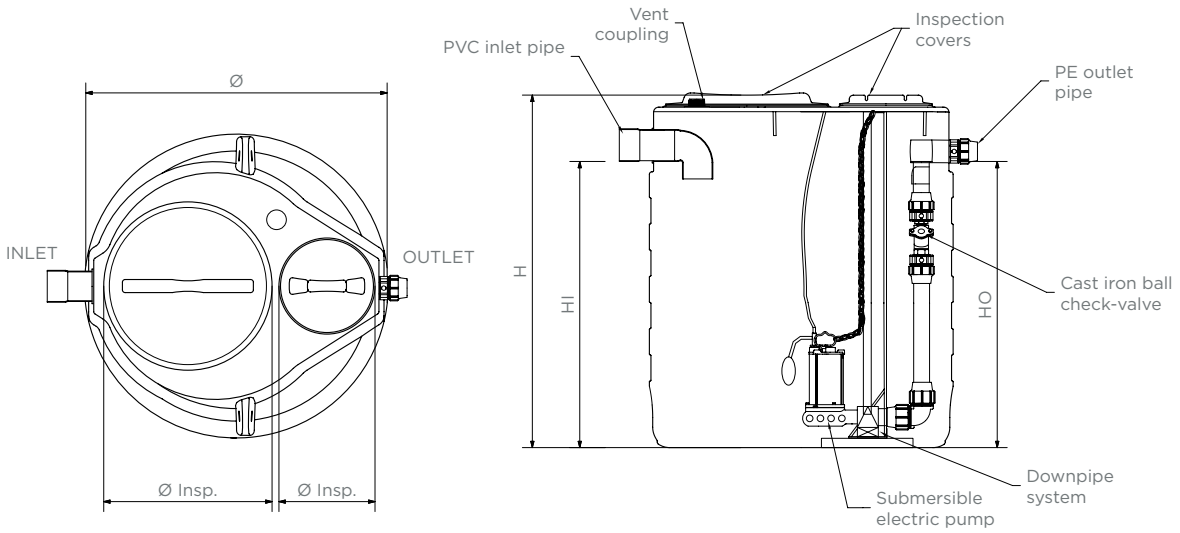
Dual pump

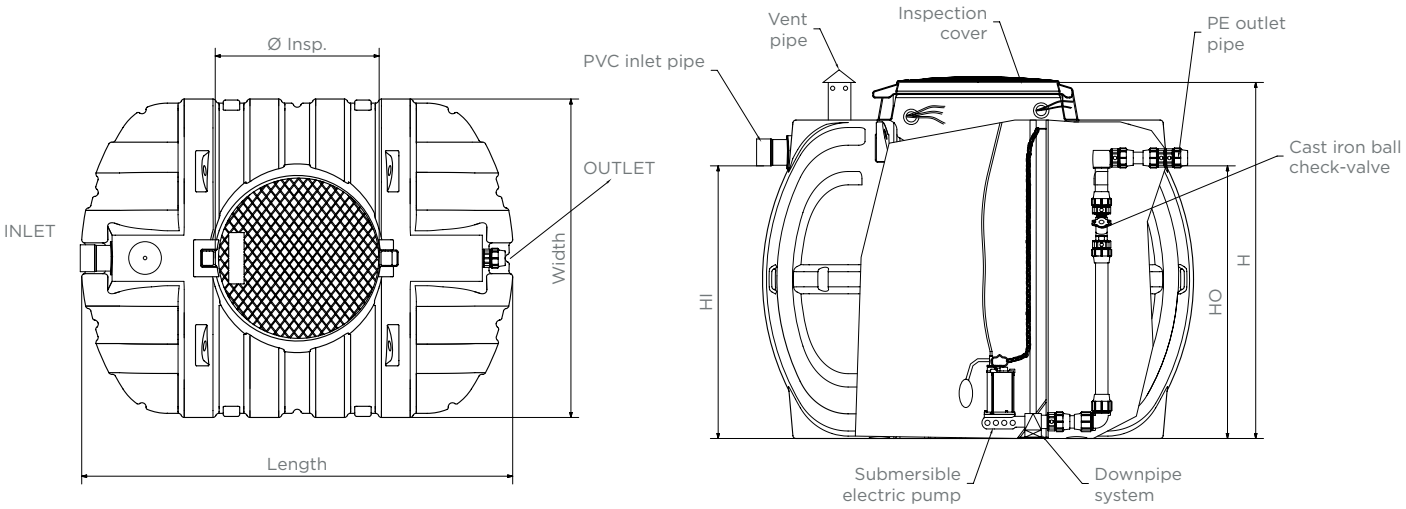
Item	Volume l	Ø mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
NSOL1026P2	903	1150	1220	870	870	110-50	400-210	SM265	Vortex	0.55	0-300	8.5-1	**2400.00**
NSOL1045P2	903	1150	1220	870	870	110-63	400-210	SM390	Vortex	0.75	0-500	10.5-1	**2600.00**
NSOL1063P2	903	1150	1220	870	870	110-60	400-210	SM635	2-channel	1.1	0-650	15-0	**3200.00**
NSOL1012P2	903	1150	1220	870	870	110-63	400-210	SM125	Grinder	1.18	0-110	30-3	**3800.00**
NSOL1002P2	903	1150	1220	870	870	110-63	400-210	PMST2	Grinder	0.9	35-215	16-4	**3770.00**
NSOL1526P2	1400	1150	1720	1360	1360	125-50	400-210	SM265	Vortex	0.55	0-300	8.5-1	**2700.00**
NSOL1545P2	1400	1150	1720	1360	1360	125-63	400-210	SM390	Vortex	0.75	0-500	10.5-1	**2900.00**
NSOL1563P2	1400	1150	1720	1360	1360	125-63	400-210	SM635	2-channel	1.1	0-650	15-0	**3500.00**
NSOL1512P2	1400	1150	1720	1360	1360	125-63	400-210	SM125	Grinder	1.18	0-110	30-3	**4170.00**
NSOL1502P2	1400	1150	1720	1360	1360	125-63	400-210	PMST2	Grinder	0.9	35-215	16-4	**4140.00**
NSOL3026P2	3000	1710	1650	1355	1355	125-50	630	SM265	Vortex	0.55	0-300	8.5-1	**3000.00**
NSOL3045P2	3000	1710	1650	1355	1355	125-63	630	SM390	Vortex	0.75	0-500	10.5-1	**3200.00**
NSOL3063P2	3000	1710	1650	1355	1355	125-63	630	SM635	2-channel	1.1	0-650	15-0	**3700.00**
NSOL3012P2	3000	1710	1650	1355	1355	125-63	630	SM125	Grinder	1.18	0-110	30-3	**4390.00**
NSOL3002P2	3000	1710	1650	1355	1355	125-63	630	PMST2	Grinder	0.9	35-215	16-4	**4360.00**
NSOL3004P2	3000	1710	1650	1355	1355	125-63	630	PMST4	Grinder	1.5	20-245	22-6	**5230.00**

TEKNOSOL LIFT STATIONS

SINGLE PUMP







(Single and dual-pump lift stations, size 400 - 3000 l with rapid connection-release-extraction system)

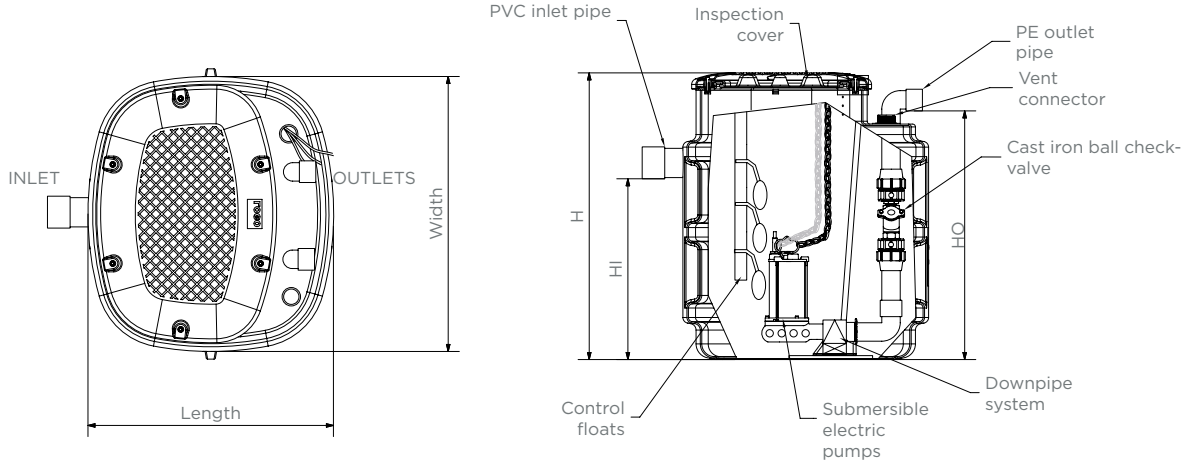
Item	Volume l	Length x Width mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
TSOL526	400	992x840	980	620	850	110-63	800x570	SM265	Vortex	0.55	0-300	8.5-1	**2050.00**
TSOL545	400	992x840	980	620	850	110-63	800x570	SM390	Vortex	0.75	0-500	10.5-1	**2120.00**
TSOL563	400	992x840	980	620	850	110-63	800x570	SM635	2-chan.	1.1	0-650	15-0	**2290.00**
TSOL512	400	992x840	980	620	850	110-63	800x570	SM125	Grinder	1.18	0-110	30-3	**2770.00**
TSOL502	400	992x840	980	620	850	110-63	800x570	PMST2	Grinder	0.9	35-215	16-4	**2750.00**
TSOL726	650	992x840	1250	825	1125	110-63	800x570	SM265	Vortex	0.55	0-300	8.5-1	**2150.00**
TSOL745	650	992x840	1250	825	1125	110-63	800x570	SM390	Vortex	0.75	0-500	10.5-1	**2220.00**
TSOL763	650	992x840	1250	825	1125	110-63	800x570	SM635	2-chan.	1.1	0-650	15-0	**2390.00**
TSOL712	650	992x840	1250	825	1125	110-63	800x570	SM125	Grinder	1.18	0-110	30-3	**2880.00**
TSOL702	650	992x840	1250	825	1125	110-63	800x570	PMST2	Grinder	0.9	35-215	16-4	**2850.00**
TSOL926	800	992x840	1525	1100	1390	110-63	800x570	SM265	Vortex	0.55	0-300	8.5-1	**2250.00**
TSOL945	800	992x840	1525	1100	1390	110-63	800x570	SM390	Vortex	0.75	0-500	10.5-1	**2320.00**
TSOL950	800	992x840	1525	1100	1390	110-63	800x570	SM590	Vortex	1.5	0-600	15-2	**2570.00**
TSOL963	800	992x840	1525	1100	1390	110-63	800x570	SM635	2-chan.	1.1	0-650	15-0	**2490.00**
TSOL912	800	992x840	1525	1100	1390	110-63	800x570	SM125	Grinder	1.18	0-110	30-3	**2980.00**
TSOL902	800	992x840	1525	1100	1390	110-63	800x570	PMST2	Grinder	0.9	35-215	16-4	**2950.00**

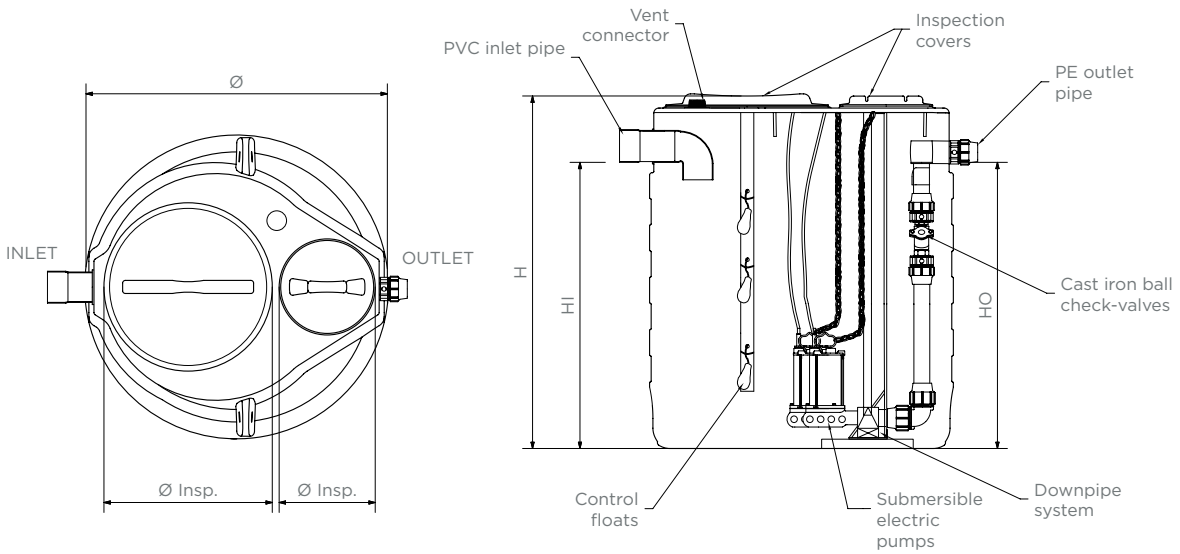
Item	Volume l	Ø mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
TSOL1026	1000	1160	1300	1140	1140	125-63	600-200	SM265	Vortex	0.55	0-300	8.5-1	**2350.00**
TSOL1045	1000	1160	1300	1140	1140	125-63	600-200	SM390	Vortex	0.75	0-500	10.5-1	**2480.00**
TSOL1063	1000	1160	1300	1140	1140	125-63	600-200	SM635	2-chan.	1.1	0-650	15-0	**2660.00**
TSOL1012	1000	1160	1300	1140	1140	125-63	600-200	SM125	Grinder	1.18	0-110	30-3	**3140.00**
TSOL1002	1000	1160	1300	1140	1140	125-63	600-200	PMST2	Grinder	0.9	35-215	16-4	**3130.00**
TSOL1004	1000	1160	1300	1140	1140	160-90	600-200	PMST4	Grinder	1.5	20-245	22-6	**3550.00**
TSOL1005	1000	1160	1300	1140	1140	160-90	600-200	PMST5	Grinder	2.2	30-255	28-6	**3800.00**
TSOL1526	1300	1160	1500	1300	1300	125-63	600-200	SM265	Vortex	0.55	0-300	8.5-1	**2420.00**
TSOL1545	1300	1160	1500	1300	1300	125-63	600-200	SM390	Vortex	0.75	0-500	10.5-1	**2570.00**
TSOL1563	1300	1160	1500	1300	1300	125-63	600-200	SM635	2-chan.	1.1	0-650	15-0	**2750.00**
TSOL1512	1300	1160	1500	1300	1300	125-63	600-200	SM125	Grinder	1.18	0-110	30-3	**3250.00**
TSOL1502	1300	1160	1500	1300	1300	125-63	600-200	PMST2	Grinder	0.9	35-215	16-4	**3210.00**
TSOL1504	1300	1160	1500	1300	1300	160-90	600-200	PMST4	Grinder	1.5	20-245	22-6	**3640.00**
TSOL1505	1300	1160	1500	1300	1300	160-90	600-200	PMST5	Grinder	2.2	30-255	28-6	**3890.00**

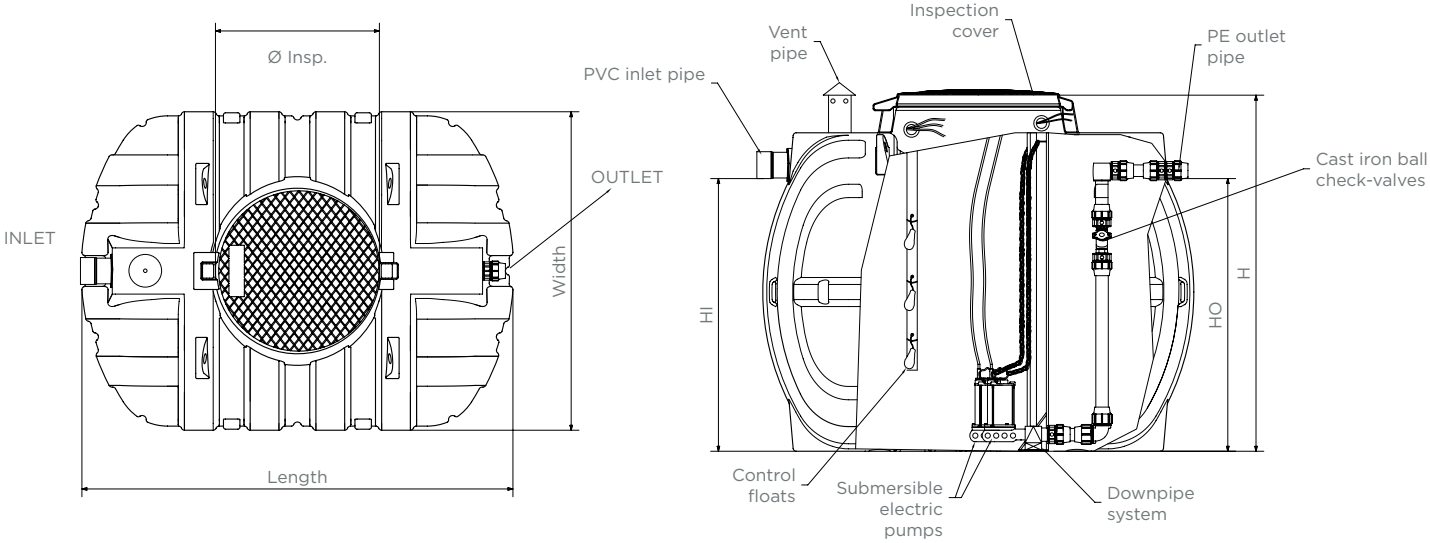
Item	Volume l	Length x Width mm	H mm	HI mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
TSOL3026	3000	2090x1500	1720	1320	1320	125-50	630	SM265	Vortex	0.55	0-300	8.5-1	**3270.00**
TSOL3045	3000	2090x1500	1720	1320	1320	125-63	630	SM390	Vortex	0.75	0-500	10.5-1	**3430.00**
TSOL3063	3000	2090x1500	1720	1320	1320	125-63	630	SM635	2-chan.	1.1	0-650	15-0	**3600.00**
TSOL3065	3000	2090x1500	1720	1320	1320	125-63	630	SM650	Vortex	1.5	0-600	9-3	**3720.00**
TSOL3050	3000	2090x1500	1720	1320	1320	160-90	630	SM590	Vortex	1.5	0-600	15-2	**3270.00**
TSOL3080	3000	2090x1500	1720	1320	1320	160-90	630	NRG09	Vortex	2.2	0-700	18-2	**3980.00**
TSOL3011	3000	2090x1500	1720	1320	1320	160-90	630	SM1100	Vortex	2.2	0-900	13-1	**4590.00**
TSOL3012	3000	2090x1500	1720	1320	1320	125-63	630	SM125	Grinder	1.18	0-110	30-3	**4090.00**
TSOL3002	3000	2090x1500	1720	1320	1320	125-63	630	PMST2	Grinder	0.9	35-215	16-4	**4070.00**
TSOL3004	3000	2090x1500	1720	1320	1320	160-90	630	PMST4	Grinder	1.5	20-245	22-6	**4500.00**
TSOL3005	3000	2090x1500	1720	1320	1320	160-90	630	PMST5	Grinder	2.2	30-255	28-6	**4750.00**

TEKNOSOL LIFT STATIONS

DUAL PUMP







(Single and dual-pump lift stations, size 400 - 3000 l with rapid connection-release-extraction system)

Item	Volume l	Length x Width mm	H mm	Hl mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
TSOL526P2	400	992x840	980	620	850	110-63	800x570	SM265	Vortex	0.55	0-300	8.5-1	**2850.00**
TSOL545P2	400	992x840	980	620	850	110-63	800x570	SM390	Vortex	0.75	0-500	10.5-1	**3170.00**
TSOL563P2	400	992x840	980	620	850	110-63	800x570	SM635	2-chan.	1.1	0-650	15-0	**3520.00**
TSOL512P2	400	992x840	980	620	850	110-63	800x570	SM125	Grinder	1.18	0-110	30-3	**4490.00**
TSOL502P2	400	992x840	980	620	850	110-63	800x570	PMST2	Grinder	0.9	35-215	16-4	**4460.00**
TSOL726P2	650	992x840	1250	825	1125	110-63	800x570	SM265	Vortex	0.55	0-300	8.5-1	**3050.00**
TSOL745P2	650	992x840	1250	825	1125	110-63	800x570	SM390	Vortex	0.75	0-500	10.5-1	**3370.00**
TSOL763P2	650	992x840	1250	825	1125	110-63	800x570	SM635	2-chan.	1.1	0-650	15-0	**3720.00**
TSOL712P2	650	992x840	1250	825	1125	110-63	800x570	SM125	Grinder	1.18	0-110	30-3	**4690.00**
TSOL702P2	650	992x840	1250	825	1125	110-63	800x570	PMST2	Grinder	0.9	35-215	16-4	**4660.00**
TSOL926P2	800	992x840	1525	1100	1390	110-63	800x570	SM265	Vortex	0.55	0-300	8.5-1	**3250.00**
TSOL945P2	800	992x840	1525	1100	1390	110-63	800x570	SM390	Vortex	0.75	0-500	10.5-1	**3570.00**
TSOL950P2	800	992x840	1525	1100	1390	110-63	800x570	SM590	Vortex	1.5	0-600	15-2	**4070.00**
TSOL963P2	800	992x840	1525	1100	1390	110-63	800x570	SM635	2-chan.	1.1	0-650	15-0	**3920.00**
TSOL912P2	800	992x840	1525	1100	1390	110-63	800x570	SM125	Grinder	1.18	0-110	30-3	**4890.00**
TSOL902P2	800	992x840	1525	1100	1390	110-63	800x570	PMST2	Grinder	0.9	35-215	16-4	**4860.00**

Item	Volume l	Ø mm	H mm	Hl mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
TSOL1026P2	1000	1160	1300	1140	1140	125-63	600-200	SM265	Vortex	0.55	0-300	8.5-1	**3240.00**
TSOL1045P2	1000	1160	1300	1140	1140	125-63	600-200	SM390	Vortex	0.75	0-500	10.5-1	**3540.00**
TSOL1063P2	1000	1160	1300	1140	1140	125-63	600-200	SM635	2-chan.	1.1	0-650	15-0	**3900.00**
TSOL1012P2	1000	1160	1300	1140	1140	125-63	600-200	SM125	Grinder	1.18	0-110	30-3	**4860.00**
TSOL1002P2	1000	1160	1300	1140	1140	125-63	600-200	PMST2	Grinder	0.9	35-215	16-4	**4830.00**
TSOL1004P2	1000	1160	1300	1140	1140	160-90	600-200	PMST4	Grinder	1.5	20-245	22-6	**6595.00**
TSOL1005P2	1000	1160	1300	1140	1140	160-90	600-200	PMST5	Grinder	2.2	30-255	28-6	**6440.00**
TSOL1526P2	1300	1160	1500	1300	1300	125-63	600-200	SM265	Vortex	0.55	0-300	8.5-1	**3400.00**
TSOL1545P2	1300	1160	1500	1300	1300	125-63	600-200	SM390	Vortex	0.75	0-500	10.5-1	**3720.00**
TSOL1563P2	1300	1160	1500	1300	1300	125-63	600-200	SM635	2-chan.	1.1	0-650	15-0	**4070.00**
TSOL1512P2	1300	1160	1500	1300	1300	125-63	600-200	SM125	Grinder	1.18	0-110	30-3	**5030.00**
TSOL1502P2	1300	1160	1500	1300	1300	125-63	600-200	PMST2	Grinder	0.9	35-215	16-4	**5000.00**
TSOL1504P2	1300	1160	1500	1300	1300	160-90	600-200	PMST4	Grinder	1.5	20-245	22-6	**6100.00**
TSOL1505P2	1300	1160	1500	1300	1300	160-90	600-200	PMST5	Grinder	2.2	30-255	28-6	**6600.00**

Item	Volume l	Length x Width mm	H mm	Hl mm	HO mm	Ø I-O mm	Ø insp. mm	Pump	Impeller type	Kw	Flow rate l/min	Head m	Цени в лв/без ДДС
TSOL3026P2	3000	2090x1500	1720	1320	1320	125-50	630	SM265	Vortex	0.55	0-300	8.5-1	**4300.00**
TSOL3045P2	3000	2090x1500	1720	1320	1320	125-63	630	SM390	Vortex	0.75	0-500	10.5-1	**4570.00**
TSOL3063P2	3000	2090x1500	1720	1320	1320	125-63	630	SM635	2-chan.	1.1	0-650	15-0	**4930.00**
TSOL3065P2	3000	2090x1500	1720	1320	1320	125-63	630	SM650	Vortex	1.5	0-600	9-3	**5160.00**
TSOL3050P2	3000	2090x1500	1720	1320	1320	160-90	630	SM590	Vortex	1.5	0-600	15-2	**5400.00**
TSOL3080P2	3000	2090x1500	1720	1320	1320	160-90	630	NRG09	Vortex	2.2	0-700	18-2	**5830.00**
TSOL3011P2	3000	2090x1500	1720	1320	1320	160-90	630	SM1100	Vortex	2.2	0-900	13-1	**6980.00**
TSOL3012P2	3000	2090x1500	1720	1320	1320	125-63	630	SM125	Grinder	1.18	0-110	30-3	**5900.00**
TSOL3002P2	3000	2090x1500	1720	1320	1320	125-63	630	PMST2	Grinder	0.9	35-215	16-4	**5870.00**
TSOL3004P2	3000	2090x1500	1720	1320	1320	160-90	630	PMST4	Grinder	1.5	20-245	22-6	**7034.00**
TSOL3005P2	3000	2090x1500	1720	1320	1320	160-90	630	PMST5	Grinder	2.2	30-255	28-6	**7550.00**

PUMPS FOR LIFT STATIONS

MULTI-CHANNEL IMPELLER PUMPS

Submersible electric pumps with multichannel open shim impeller. These are ideal to pump clear and turbid water without solid and stringy matter, for example rainwater and treated waste water.

Pump	Power		A	µF	DNM	A mm	B mm	C mm	Weight kg	Flow rate l/min	Head m	Цена с поплавък	Цена без поплавък
	HP	Kw											
TCN4	1	0.75	4.8	20	1" ½	317	57	188	14.5	35-380	12-1	**440.00**	**420.00**
SM635SL	1.5	1.1	7.3	25	2"	466	60	250	19.3	0-650	15-0	**720.00**	**690.00**

PUMPS WITH VORTEX IMPELLER

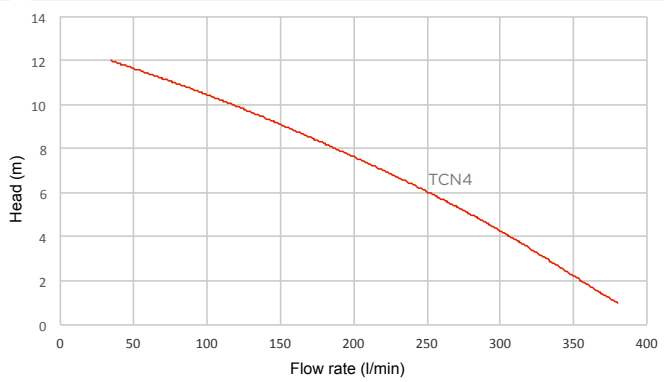
Submersible electric pumps with vortex impeller. These are ideal for low head (<8 m) pumping of sewage, including sewage with solid or stringy matter in suspension, such as water from marshy land and untreated domestic sewage

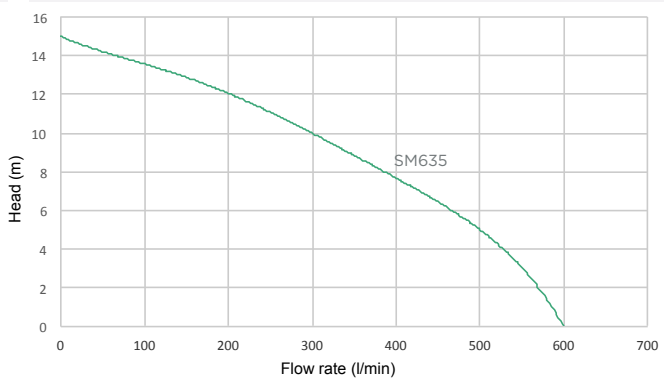
Pump	Power		A	µF	DNM	A mm	B mm	C mm	Weight kg	Flow rate l/min	Head m	Цена с поплавък	Цена без поплавък
	HP	Kw											
PNRG01	0.4	0.3	2.2	8	1 ¼	263	42	151	9	20-155	6-1	**270.00**	**255.00**
SM265	0.75	0.55	4.2	16	1" ½	400	50	230	16.5	0-300	8.5-1	**410.00**	**390.00**
SM390	1	0.75	5.5	20	2"	450	65	235	18.8	0-500	10.5-1	**480.00**	**450.00**
SM650L	2	1.5	12	31.5	2" ½	445	91	334	22	0-600	9-3	**750.00**	**710.00**
SM590	2	1.5	10.5	31.5	2"	496	162	198	18.2	0-600	15-2	**724.00**	**650.00**
NRG09 (three-phase)	3	2.2	5.3	-	2"	445	184	232	26	0-700	18-2	**-**	**895.00**
SM1100/65 (three-phase)	3	2.2	6	-	3"	584	65	417	40	0-900	13-1	**-**	**1560.00**

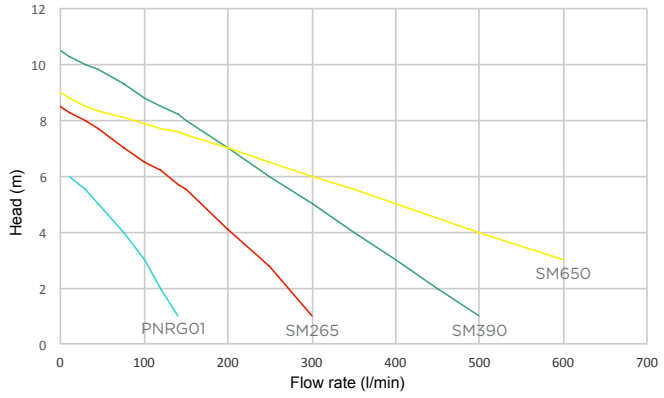
PUMPS WITH GRINDER IMPELLER

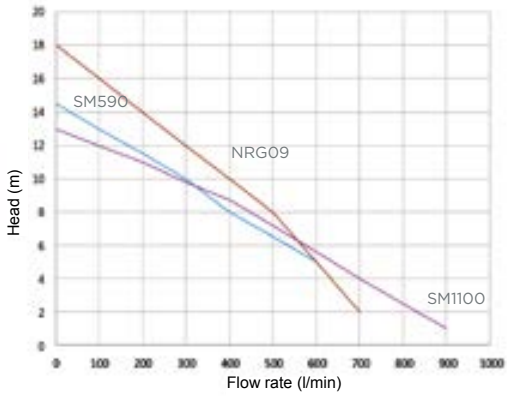
Submersible electric pumps with grinder impeller. These are ideal for pumping of sewage, including sewage with solid or stringy matter in suspension, such as water from marshy land and untreated domestic sewage. Reduction of the solids into small fragments and the high pressure generated by the pump allow considerable differences in level to be overcome.

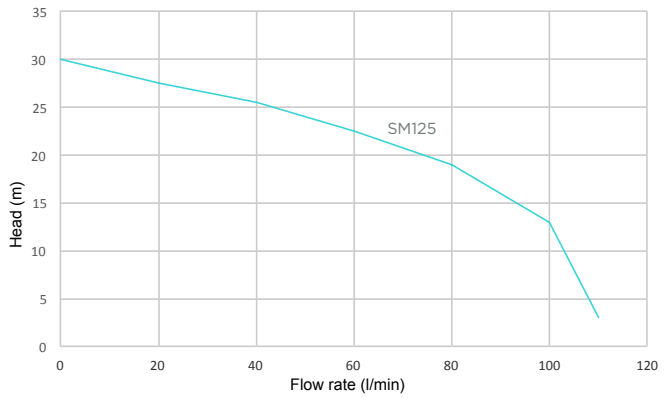
Pump	Power		A	µF	DNM	A mm	B mm	C mm	Weight kg	Flow rate l/min	Head m	Цена с поплавък	Цена без поплавък
	HP	Kw											
SM125GR	1.6	1.18	9.2	35	1" ½	416	29	240	20.5	0-110	30-3	**1080.00**	**1030.00**
PMST2	1.2	0.9	7.3	30+70	1" ¼	385	78	205	23	30-235	18-5	**1025.00**	**990.00**
PMST4	2	1.5	11	40+70	40 mm	442	92	268	38	20-245	22-6	**1680.00**	**1530.00**
PMST5 (three-phase)	3	2.2	5.3	-	40 mm	442	92	268	40	30-255	28-6	**-**	**1605.00**

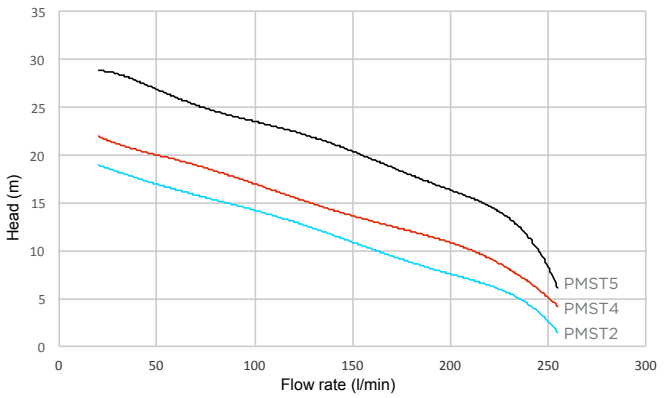

Head (m)
Flow rate (l/min)
TCN4


Head (m)
Flow rate (l/min)
SM635


Head (m)
Flow rate (l/min)
PNRG01
SM265
SM390
SM650


Head (m)
Flow rate (l/min)
SM590
NRG09
SM1100


Head (m)
Flow rate (l/min)
SM125


Head (m)
Flow rate (l/min)
PMST5
PMST4
PMST2

PANELS FOR LIFT STATIONS

DIRECT ELECTRIC PANEL FOR SINGLE PUMP LIFT STATION

Item	Pump power		Current		Size			Weight kg	Цени в лв/без ДДС
	kW	HP	from (A)	to (A)	Height mm	Length mm	Depth mm		
QCSOLP1	0.37-2.2	0.5-3	2	16	340	240	170	1.5	280.00
QCSOLP1T	0.55-3.7	0.75-5.5	2	8	340	240	170	2	370.00

Function: pump start-up panel for sewage lift station. The start-up command can be either manual or automatic by means of start/stop float switches in the tank. The electric panel is fitted with visual alarms (warning lights) and is set-up for connecting a self-powered audible alarm (mod. QALARM) to signal faults, including in the presence of a power cut. The power supply can be single-phase (domestic type: 230 V) or three-phase (industrial type: 400 V).

DIRECT ELECTRIC PANEL FOR DUAL PUMP LIFT STATION

Item	Pump power		Current		Size			Weight kg	Цени в лв/без ДДС
	kW	HP	from (A)	to (A)	Height mm	Length mm	Depth mm		
QCSOLP2	0.37-2.2	0.5-3	2	16	340	240	170	4	380.00
QCSOLP2T	0.55-3.7	0.75-5.5	2	8	340	240	170	5.5	500.00

Function: pump start-up panel enabling activation of alternate or simultaneous operation mode of n. 2 pumps for sewage lift station. The start-up command can be either manual or automatic by means of a series of start/stop float switches positioned at different levels in the tank. The electric panel is fitted with visual alarms (warning lights) and is set-up for connecting an audible alarm (mod. QALARM) to signal faults. The power supply can be single-phase (domestic type: 230 V) or three-phase (industrial type: 400 V).

ALARM UNIT ELECTRIC PANEL

Item	Power supply V	Float			Weight kg	Цени в лв/без ДДС
		Height mm	Length mm	Depth mm		
QALARM	220	160	160	140	0.5	190.00

Function: audible/visual alarm for fault signalling. The unit is set-up for connecting to the electric start-up panels of sewage pumps and level floats (overflow). For installation in lift stations.

TECHNICAL SECTION – LIFT STATIONS

TECHNICAL CHARACTERISTICS

Sewage lift stations are systems that allow effluent to be lifted and transferred to stations located at higher levels (sewerage systems, treatment systems). They become necessary, for example, when the discharge level of a WC is lower than that of the treatment plant or sewerage pipes (cellars, underground premises, etc.) and when the hydraulic profile of the treatment system cannot work by gravity.
The station consists of a linear polyethylene (LLDPE) storage tank of various sizes, with a **submerged electric pump** installed inside it. The pump is connected to the tank by a chain to facilitate its removal, and the inlet pipe is fitted with a **cast iron ball check-valve**. If the flow rates of waste water to be lifted are very high and/or variable and if the presence of a spare pump is necessary, **dual pump models** are provided. The pumps are connected to suitable electric panels so that, according to requirements, the start-up command can be either manual or automatic by means of start/stop float switches located inside the tank.
The dual pump models are provided with an **electric panel** allowing alternating or simultaneous operation of the 2 pumps to be activated. The electric panel can also be fitted with visual alarms (warning lights) and is set-up for connecting an audible alarm device. The power supply can be single-phase (domestic type: 230 V) or three-phase (industrial type: 400 V).
Depending on need, the lift stations can be equipped with various types of pumps with different heads, flow rates and working pressures. For pumps possessing particular characteristics, contact the ROTOTEC technical office. A **three-phase version** of the electric pumps and electric panels can be supplied on request.

USE AND MAINTENANCE

All maintenance operations must be carried out with the pump disconnected from the power supply. The pump must be disconnected by trained technicians, so that there is no risk of it starting accidentally.
The maintenance recommendations indicated are not to be understood as "do-it-yourself" operations, as they require specific technical knowledge. A service contract with a specialist technician will ensure you receive the best technical assistance at all times.
In order for a lift station to function efficiently, it is important that the **most suitable pump for satisfying the specific requirements** is selected during the design phase. To this end, a few important parameters such as the origin and characteristics of the effluent to treat, the function of the lift station, **the head and linear distance to the receiver** must be evaluated.
Even when the pump is capable of handling solid and stringy matter (**vortex impeller**) it is nevertheless advisable to install a primary sedimentation system (e.g. septic tank) upstream or a sewage screening system that can separate non-shreddable materials such as rags, plastics, etc. The installation of such a system is essential when pumps with **2-channel impeller** are installed.
Under normal operating conditions, the electric pumps do not require any maintenance operations.

MANAGEMENT

WHAT TO DO	WHEN	HOW
Inspect the lifting station	Every 6 months	Unscrew the covers on the inspection holes and check the level of sediments on the bottom
Check the seal on pipes, connectors and gaskets	Every 6 months	Check inlet and outlet pipes
Check vent pipe	Every 6 months	If anything is obstructing the free flow of air, remove it
Check the pumping system	Every 12 months	Extract the pump*, clean the inlet to remove any debris, assess the state of the impeller, the electric cable and the floats
Remove bottom sediment and clean the inlet and outlet pipes	Every 6 / 12 months	Contact a licensed waste disposal company

** To dismantle a pump it is necessary to* **unfasten the compression fitting** *on the pump delivery pipe, then extract the pump, with the aid of the* **lifting chain.**

WARNINGS

• provide for a **vent of a size suited** to the power of the pump, to prevent the formation of a vacuum in the tank;
• Only start the electric pump once it has been installed, **do not attempt a dry start**;
• Do not remove the suction filter, if there is one, for any reason whatsoever;
• Avoid operating the pump in the horizontal position. The pump can only function in the **vertical position** (with the motor at the top and the pump part at the bottom);
• On the **three-phase version,** the correct direction of rotation is indicated by the arrow stamped on the pump body and on the identification plate.
• If the electric pump is not properly fixed, it may become unsteady or topple over on start-up due to the starting torque;
• Never use the electric pump to **pump dangerous liquids** (toxic, flammable, etc...);
• 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.
• provide for a **vent of a size suited** to the power of the pump, to prevent the formation of a vacuum in the tank;
• Only start the electric pump once it has been installed, **do not attempt a dry start**;
• Do not remove the suction filter, if there is one, for any reason whatsoever;
• Avoid operating the pump in the horizontal position. The pump can only function in the **vertical position** (with the motor at the top and the pump part at the bottom)

RISK OF ELECTRIC SHOCK:

• Do not transport or handle the pump using the electric power supply cable.
• Never move the electric pump when it is operating or with the power cable connected to the power supply;
• Before connecting up the pump, make sure that the power supply network is properly earthed;
• Before carrying out any type of control or maintenance operation, disconnect the power supply;
• Never start the pump if you are in contact with the liquid to be pumped;
• Always ensure that the pump is checked and repaired by authorised personnel only. Unauthorised repairs might make the product unsafe and/or dangerous;
• Never put your hands or other objects into the pumped liquid inlets or outlets in the vicinity of the impellers, if present, as these are moving parts;

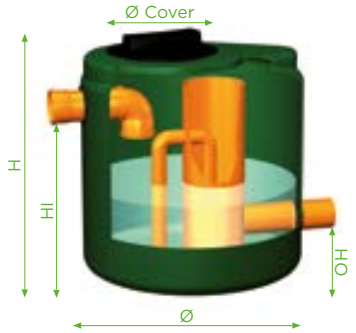
CHAMBERS

CHAMBERS

SAMPLING CHAMBER

Item	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Ø Cover mm	Cover	Extensions	Цени в лв/без ДДС
PPF 50	430	465	260	37	125*	300	CC355	PP35	**140.00**
PPF 500	790	790	618	50	125**	400	CC455	PP45	**335.00**

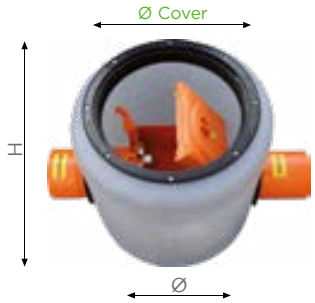
Function: Installation downstream of a sewage treatment plant allows effluent samples to be taken for analysis purposes.
* on request I/O 110 mm
** on request I/O 160 mm



DOSING SIPHON CHAMBER

Item	Ø mm	H mm	HI mm	HO mm	Ø I/O mm mm	Ø Cover mm	Cover	Extensions	Dosing siphon volume l	Цени в лв/без ДДС
PDC 500	790	790	640	100	110	400	CC455	PP45	~ 250	**620.00**
PDC 1200	1240	1250	1080	130	125 / 110	400	CC455	PP45	~ 1000	**1200.00**

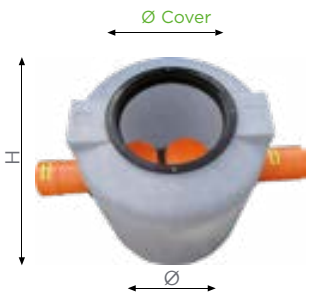
Function: essential upstream of a sub-irrigation system with dispersion pipe, for even distribution of the treated effluent along the whole length of the dispersion pipe



NON-RETURN VALVE/ANTI-RAT CHAMBER

Item	Ø mm	H mm	Ø I/O mm	Ø Cover mm	Cover	Extensions	Цени в лв/без ДДС
PAR 50	430	430	125	300	CC 355	PP 35	**330.00**

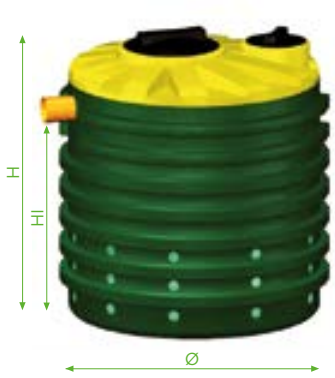
Function: When installed on a waste water drain pipe, this device stops any backflow from the main sewer and prevents the basement from being flooded. At the same time, the valve prevents animals (e.g. rats) from running up the pipe.



SIPHON CHAMBER

Item	Ø mm	H mm	Ø I/O mm mm	Ø Cover mm	Cover	Extensions	Цени в лв/без ДДС
PSIF 150	582	660	125	300	CC355	PP35	**260.00**

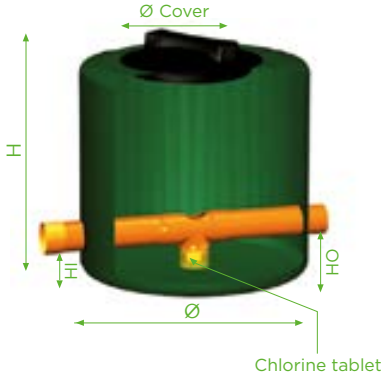
Function: Sewage siphon.



SOAKAWAY CHAMBER

Item	Ø mm	H mm	HI mm	ØI mm	Ø Cover mm	Cover	Extensions	Цени в лв/без ДДС
NPD 1000	1150	1220	890	110	400 - 210	CC455-CC255	PP45 / PP30	**560.00**
NPD 1500	1150	1720	1370	110	400 - 210	CC455-CC255	PP45 / PP30	**790.00**
NPD 2100	1350	1975	1540	110	400 - 300	CC455-CC355	PP45 / PP35	**1030.00**
NPD 4000	1710	2150	1850	125	630	TAP710	PP77	**1480.00**
NPD 8000	2270	2750	2410	125	630	TAP710	PP77	**2890.00**

Function: The holes present at the base of the tank allow previously treated effluent to soak away through the surface layers of soil.



CHLORINATOR CHAMBER

Item	Ø mm	H mm	HI mm	HO mm	Ø I/O mm mm	Ø Cover mm	Cover	Extensions	Цени в лв/без ДДС
PCL 50	430	430	100	90	110	300	CC355	PP35	**170.00**
PCL 150	580	660	100	90	110	300	CC355	PP35	**200.00**

Function: The chamber has a housing for a chlorine tablet. Consequently, when installed downstream of a treatment plant, it disinfects the final effluent prior to discharging to the receptor.

DOSING CHAMBER

Item	Tank volume l	Ø mm	H mm	Ø Cover mm	Cover	Flow rate capacity l/h	Working pressure bar	Absorbed power W	Цени в лв/без ДДС
PDOS 300	300	630	1100	210	CC255	1	5	32	**610.00**

Function: Dosing sodium hypochlorite (or disinfecting agent) at a constant flow in the disinfection tanks or pipes.

Dosing pump

- Plastic container in reinforced PP with protection grade IP55;
- Pump body with manual air vent;
- Compact size;
- Fixing bracket for base or wall mounting;
- Operating status signalling led;
- Silent version available on request;
- The flow rate is adjusted by changing the frequency, using a dial, with a scale of 0-100%.

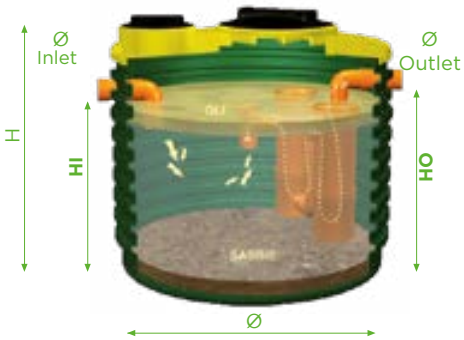
CHAMBERS

DISTRIBUTION CHAMBER

Item	Ø mm	H mm	Ø I/O* mm	HI mm	HO mm	Ø Cover mm	Cover	Extensions	Цени в лв/без ДДС
PRE 500	790	790	125	to be defined according to use		400	CC455	PP45	**350.00**
PRU 500	790	790	125			400	CC455	PP45	**350.00**

* on request I/O 160 mm and 200 mm

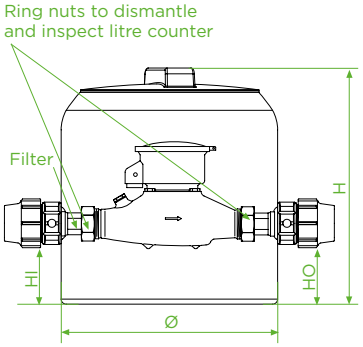
Function: The distribution chambers are installed upstream and downstream of a treatment system laid out in two parallel lines. The upstream chamber divides the effluent into two equal flows, while the downstream chamber combines the two treatment flow lines into one outlet. This latter chamber can also function as a sampling point.



OIL ABSORPTION CHAMBER

Item	Ø mm	H mm	HI mm	HO mm	Ø I/O mm	Useful Vol. l	Цени в лв/без ДДС
POLSS1000	1150	1220	880	860	125	850	**1200.00**

Function: A special fabric is present in a removable stainless steel grid. It is able to absorb and block the particles of oil in the effluent. It is used downstream of stormwater systems of oil separators, to block any residual oil that may escape normal treatment.



LITRE COUNTER CHAMBER

Item	Ø mm	H mm	HI mm	HO mm	Cover	Extensions	Calibre mm	Max. flow rate m³/h	Nominal flow rate m³/h	Min. flow rate l/h	Sensitivity l/h	Readings min. l	Цени в лв/без ДДС
PCLT 50	430	430	120	120	CC355	PP 35	32	12	6	120	15	0.05	**450.00**

Function: When installed on a pressurised pipe this allows measurement of the amount of water passing through the pipe itself. It is often required in stormwater runoff systems, downstream of the storage and delivery tank.

NOTES

General conditions of sale

Premise All buyers are considered as being aware of these conditions of sale. Unless otherwise specified, all sales are effected in line with the general conditions that follow. Any orders transmitted imply the buyer's adhesion to the conditions without reservation.

Orders Purchase orders arriving by fax, e-mail or from our own sales network are always understood as being effected in accordance with the general conditions that follow and, "unless otherwise approved by the vendor", definitively accepted only on presentation of the order confirmation, which must be returned signed for acceptance.

Prices / Invoicing / Payment Each product is sold at the list price in force at the time of ordering exclusive of VAT. Our offers are provided without obligation and, unless expressly indicated, are governed by these general conditions of sale. A validity period is specified for the offers which are available for the time period fixed. The products will be invoiced within the reference month of the delivery at the prices in force at the time of ordering and with the application of the VAT in force on the date of invoicing. The invoice will be made out in the same name as the order and will be issued in accordance with current tax legislation. It will, therefore, be the buyer's responsibility, at the time of ordering and prior to the issue of the invoice, to check and inform the vendor of any variations or additions that may modify the information in the possession of Rototec. Payment for the supply will be made adopting the methods and times provided for in the order confirmation. Delays in the payment, including partial, of the invoices and any extra-contractual renewal of the effects will give rise to interest on arrears at the official discount rate increased by 3 points. Furthermore, any stamp charges will be totally at the cost of the customer. Delayed or non-payment of the invoices will give Rototec the right to request advance payment for any remaining orders or contracts in course, and to consider them rescinded, or suspend or annul them, without the buyer having any right to demand compensation, damages or reservations on the matter.

Ownership of goods The ownership of the goods is transferred to the buyer on receipt of the final balance of the agreed price.
Claims Any claims must be forwarded in writing at the time of unloading of the goods and with an entry on the delivery note. When reporting concealed defects, all necessary documentation required by Rototec technicians (photographs, reports, etc.) for the determination of that disputed must also be sent. Following an assessment by Rototec technicians, if the complaint is deemed as valid, excluding that for which Rototec is not answerable under the terms of the guarantee described below, the company's obligation is limited to replacing the goods at the same place of delivery of the initial supply and subject to the return of the faulty items. The buyer has no rights whatsoever to request the termination of the contract or a reduction in price, or compensation for damages or reimbursement of any costs sustained whatsoever. Claims do not give the buyer any right to suspend payment of the invoice for the contested goods.
Shipping / Transport / Packing / Terms of delivery Rototec products do not require packing unless otherwise specified at the time of order confirmation. The goods are intended as delivered "free ex works". Unless otherwise agreed on the order confirmation, the goods are delivered free to destination in the case of orders of not less than 1,000.00, net of any discounts. For orders below this amount, Rototec, when in agreement with the buyer, is willing to organise transport free to destination, debiting the transport costs according to the volume of the goods and according to the list price of the transporter as indicated on the order confirmation. The goods are transported at the risk of the customer, including when sold free port and transported using Rototec vehicles. Destinations of goods other than the registered/ administrative offices of the company must be indicated at the time of ordering. The contact person and the respective telephone numbers to call at the time of delivery must also be indicated. The buyer is also responsible for ensuring that all the requirements for receiving and unloading the goods have been met. Rototec will not be held liable for damage occurring during the transport of the goods, as a result of which their condition must be verified on receipt. Any claims or disputes arising from product defects must be made immediately on unloading and must be reported on the delivery note, and then sent to Rototec via fax or e-mail in order that the company can take the necessary action. The delivery times indicated in the offer and on the order confirmation are purely indicative. Under no circumstances can any delays in delivery lead to the payment of damages or cancellation, even partial, of the contract, that is unless these conditions have been expressly accepted by the company at the time of contract signing or order confirmation. In all cases, delivery time and organisation of the shipment will be undertaken with the due care and in line with experience, with communication to the customer when the goods are ready for shipment.

Guarantee Rototec guarantees that all materials fully comply with the characteristics and conditions specified in the order confirmation and in the certificates/technical data sheet issued by the technical office. Rototec will not be held liable for applications, installation, inspections or any operations undertaken at the buyer's premises or installation site. Any products with defects resulting from carelessness, incompetence or negligence during use or due to incorrect installation or maintenance by unauthorised or unqualified personnel, or damage caused as a result of circumstances that cannot be traced back to fabrication defects, are not covered by the guarantee. Rototec will not be held liable for injury or damage either directly or indirectly deriving from incorrect installation, use or maintenance of the products sold. Rototec products are supplied with technical data sheets, certification in accordance with current legislation and installation and maintenance instructions developed with the due care and know-how. The customer is informed when the goods are ready for shipment.

Force majeure In cases of force majeure and any other provided for by law, including red alerts, mobilisation, war, fire, occupation of works, etc. or any other impediment that is not the fault of Rototec, the buyer does not have any right to receive damages, compensation or reimbursement and must, where requested, pay for any finished or partly finished products.

Court of Competent Jurisdiction The buyer agrees that any disputes relating to the application, interpretation and execution of this contract fall within the jurisdiction of the Urbino Law Courts.

WARNING! WHEN INSTALLING UNDERGROUND TANKS, THE INSTRUCTIONS SUPPLIED BY THE COMPANY MUST BE SCRUPULOUSLY FOLLOWED

The data reported in this price list is purely indicative. ROTOTEC reserves the right to modify or improve the products illustrated without prior notification. ROTOTEC can make its technical office available for the design and realisation of customised products and/or for satisfying the particular needs of its clientele. Dimensional tolerance ± 3%, capacity tolerance ± 5%.

UNDERGROUND INSTALLATION HANDLING


CASE
CASE

HANDLING


Corrugated tanks model Cisterna


Corrugated tanks model Canotto


Corrugated tanks model Panettone


Smooth tanks model Cisterna


Smooth tanks model Panettone


Modular tanks model Infinitank and Minitank


Corrugated septic tanks


Corrugated septic tanks model Elipse


Reinforced septic tanks


Smooth septic tanks


Septic tanks with separation baffles

WARNINGS

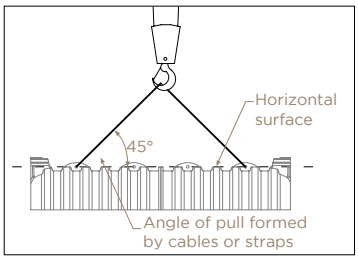
a) When carrying out any of the operations, comply with Legislative Decree 81/2008 and subsequent amendments governing safety at permanent or temporary construction sites.
b) On arrival of the goods, carefully check the material to make sure it corresponds to the order and the project data. Any defects and/or damage due to transport must be reported immediately. Contact the company directly by telephone, fax or e-mail.
c) Check that the product is provided with all the standard documentation (technical data sheets, installation instructions, etc....). Inform the company of any missing items. A copy will be sent immediately.
d) Make sure that the gaskets, pipes and all the various parts other than in polyethylene are suitable for the liquid to be contained.
e) Avoid impacts and contact with sharp-edged objects that could compromise the integrity of the product.
f) Only handle the tanks when they are **completely empty** and then using the lifting eyes (where provided); NEVER lift the tanks by the inlet and/or outlet pipes.
g) For the choice of backfill material and compaction methods, refer to European Standards ENV 1046 and UNI EN 1610.
h) During the installation works, mark the boundary of the working area with suitable warning signs.

PROHIBITIONS

a) **It is absolutely forbidden to install underground tanks above ground.**
b) It is severely prohibited to use the tanks for storing industrial waste or liquids containing chemical substances or mixtures that are not compatible with polyethylene (see compatibility table supplied by Rototec).
c) Underground tanks are N**OT suitable and must NOT be used for storing diesel fuel**.

HANDLING

a) Use transport and lifting equipment **adequate for the load** and compliant with current safety regulations when handling the material.
b) During transport, avoid harsh movements that could compromise the integrity of the tank.
c) Only lift the tank **if it is completely empty**. Never stand under a raised load.
d) When lifting, use cables or straps suitable for the load to be supported and in perfect condition. Hook the cables or straps onto the lifting eyes present on the tanks.
To prevent the load from becoming unbalanced, place the lifting cables symmetrically, respecting the lifting angle which must NEVER be less than 45° (see figure below).



UNDERGROUND INSTALLATION

N.B. The best location for the tank is specified by the qualified technician according to his own technical evaluation. These installation instructions provide the guidelines to follow during installation.

1. EXCAVATION

Excavate a hole of suitable dimensions with a flat bottom, leaving a space of at least **20/30 cm around the tank.In the presence of heavy soil (e.g. clayey subsoil and/or groundwater) the distance must be at least 50 cm. Spread a 15/20 cm deep layer of 2/6 washed gravel on the bottom of the excavation to allow the tank to rest on a uniform and level base. Excavated material must not be used as backfill**.
The excavation must be a minimum of 1 m from any structures.

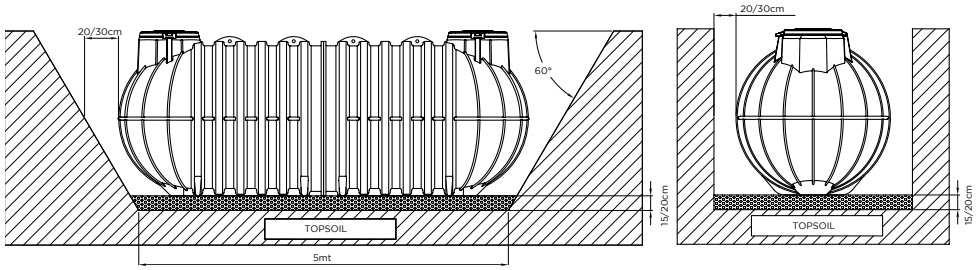


Fig. 1

2. BACKFILL AND FILLING

2.1 Place **the totally empty tank** on a bed of 2/6 washed gravel spread at the bottom of the excavation, gradually fill the tank with water and at the same time backfill with 2/6 washed gravel. Continue with successive layers of **15/20 cm,** filling the tank and then backfilling with gravel. Fill the tank to 3/4 of its capacity and backfill the **last 40 cm with topsoil (NOT clayey/limy material, NOT excavated material)**. To prevent excessive pressure on the tank, **NEVER** use backfill material with sharp edges.
N.B. For installation in more severe conditions (groundwater, clays soils or in sloping ground), refer to chapter 3 "Exceptional Installation".

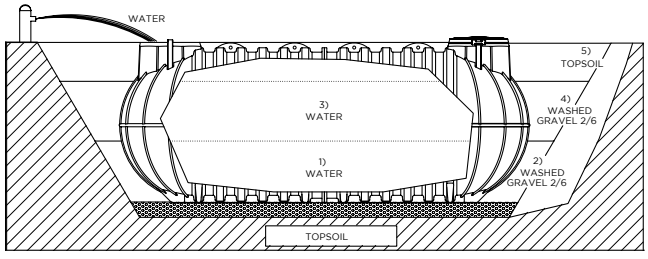


Fig. 2.1

2.2 After the tank has been filled and the excavation suitably backfilled, gradually cover with topsoil **(NOT clayey/limy material, NOT excavated material)** to a depth of 30/40 cm, leaving the inspection covers exposed. In this way, the area concerned is suitable for **pedestrian traffic,** while the transit of motor vehicles **within 2 m of the excavation is prohibited.**
N.B. To render the site trafficable by motor vehicles, refer to chapter 4 "Trafficability".

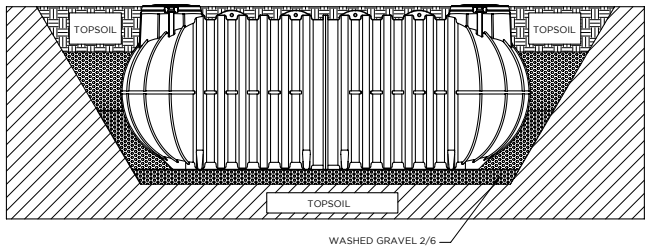


Fig. 2.2

UNDERGROUND INSTALLATION

2.3 EXTENSION INSTALLATION

If the tank is installed at a depth of **30/40 cm** and the site is to remain open to pedestrian traffic, it is advisable to install the **Rototec PE extension** directly on the inspection holes. In the case where the tank is installed deeper than that previously indicated, which constitutes an unfavourable condition and not recommended, adhere scrupulously to the instructions reported in **chapter 4 "Trafficability".** The technician responsible for the installation will follow the instructions reported in the two paragraphs according to the installation depth.

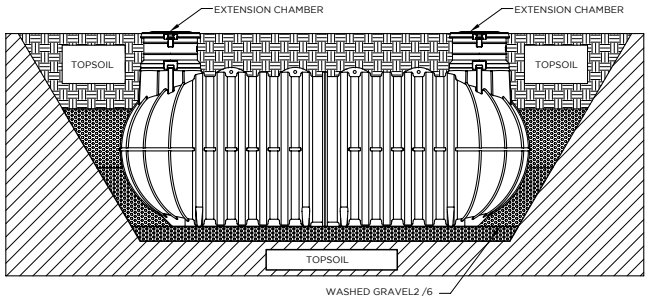


Fig. 2.3

2.4 PUMP/BIOGAS VENT CONNECTION

a) When installing a pump, whether internally or externally, **always** install an open-air vent, **free** and **correctly sized** to prevent the formation of a vacuum and deformation of the tank when the pump is running. After connecting the vent, make the connections and check them.
b) In order to prevent the formation of bad smells and, consequently, enable the treatment plant to function efficiently, **always** connect a pipe (PVC or PE) to the connection point provided for the biogas vent on the tank cover. Run the pipe to the **highest point of the building** or along the downpipes, but in any case higher than the level of the cover. The pipe indicated on the drawing for venting **is not included** in the supply.

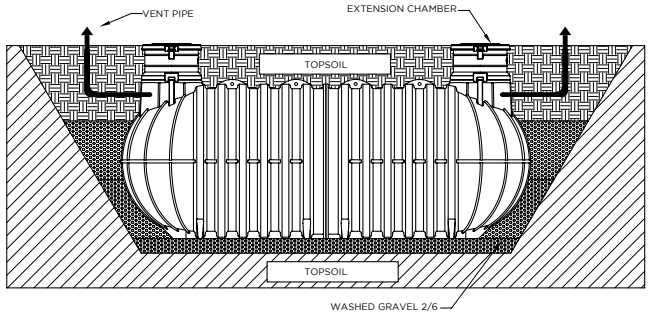


Fig. 2.4

2.5 MANHOLES INSTALLATION

The installation of manholes or covers of **weight exceeding 50 kg** must always be solid with the self-bearing **concrete slab,** suitably designed for the load to support and exerting a uniformly distributed load over the tank. The slab, therefore, must not be constructed directly on the tank but must rest on undisturbed, load-bearing ground. Avoid constructions in brickwork which would compromise maintenance and/or eventual replacement of the tank.

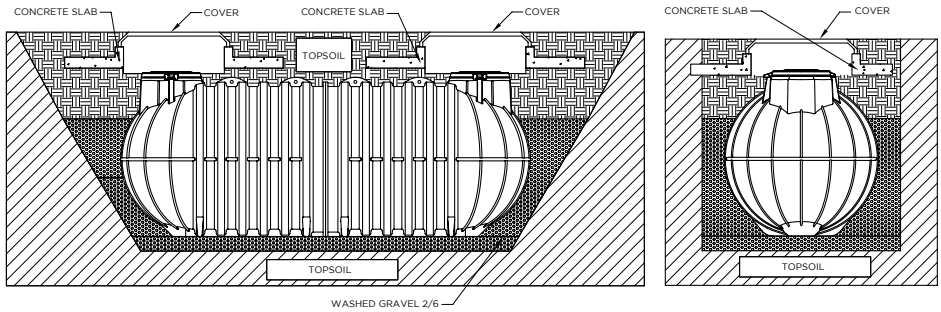


Fig. 2.5

EXCEPTIONAL INSTALLATIONS

3.1 INSTALLATION IN ZONES WITH GROUNDWATER

Installation in the presence of **groundwater** is not recommended as it represents one of the riskiest conditions for a storage tank. In this case, it is advisable to obtain a **geotechnical report** from a specialist. From the report, the installation technician will be able to define the expected pressure from the groundwater and design the backfill material and slab accordingly. In particular, he will design the backfill to have the necessary capacity for resisting the high lateral forces. The resistance capacity can be further increased by inserting an electro-welded wire mesh. Construct the **concrete slab** at the bottom of the excavation, then spread a 10 cm thick layer of 2/6 washed gravel over the top to fill in the voids between the corrugations present at the base of the tank. The tank filling and backfilling operations must always be carried out **progressively**. It is advisable, therefore, to half fill the tank and at the same time backfill with **concrete** and allow it to stand for **24/36 hours** [points 1 and 2]. Then complete the tank filling and the backfill [points 3 and 4].

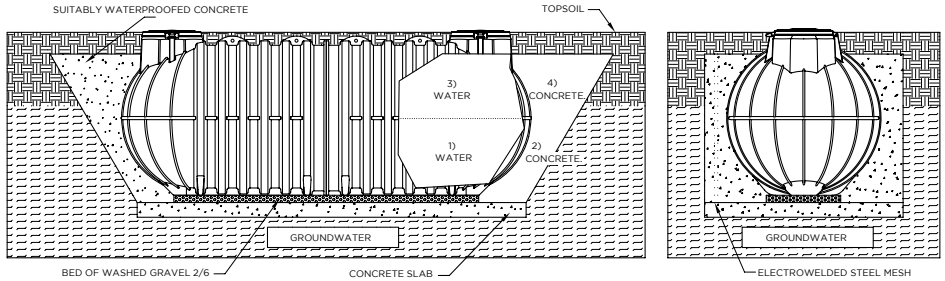


Fig. 3.1

3.2 INSTALLATION IN ZONES WITH CLAYEY/LIMEY SOIL

Installation in areas with a **mainly clay/lime substrate with limited drainage capacity** is another unfavourable condition. A **geotechnical report** prepared by a specialist is advisable in this case also. From the report, the installation technician will be able to define the expected **ground pressure** (high in the case of clayey soil) and design the backfill accordingly. In particular, the bottom of the excavation must be covered by a bed of 2/6 washed gravel and the sides of the tank backfilled with gravel (diameter 20/30 mm) to aid drainage. For tank filling and backfilling, see para. 2.1. A **drainage system must also be provided at the bottom of the excavation.**

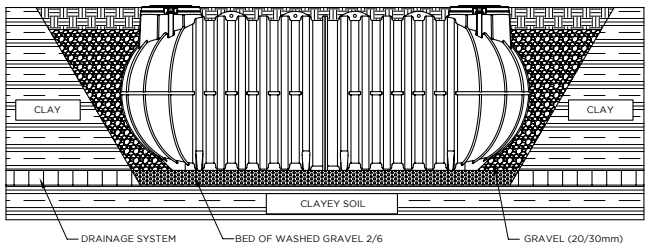


Fig. 3.2

3.3 INSTALLATION NEAR TO SLOPING GROUND

When the tank is to be installed near to a **slope** or on sloping ground, the tank must be protected by a **reinforced concrete retaining wall**, appropriately designed by a specialist, in order to balance the lateral thrust of the ground and to protect the area from possible infiltration. For tank filling and backfilling, see para. 2.1.

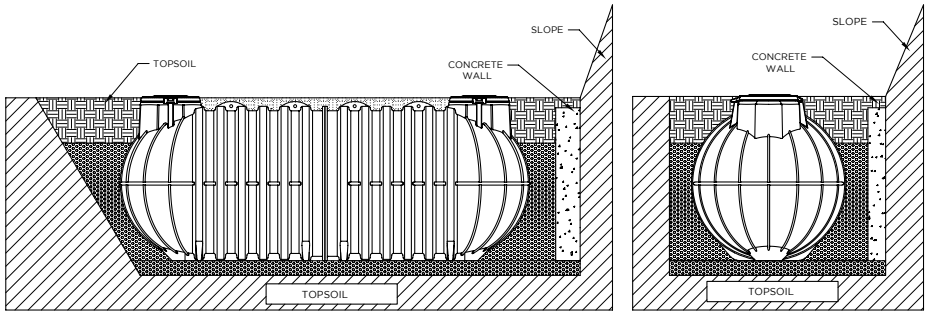


Fig. 3.3

TRAFFIC

4.1 LIGHT TRAFFIC - CLASS B125-EN124/95 - MAX 12.5 TONS

To render the site suitable for the **transit of light vehicles,** a **self-supporting reinforced concrete slab,** designed in relation to the load, must be constructed. The perimeter of the slab must be larger than the excavation to prevent the weight of the slab from bearing on the tank itself. It is also recommended that you construct a **concrete slab** (for example 15/20 cm in height) at the bottom of the excavation, over which a 10 cm thick layer of 2/6 washed gravel must be spread to fill in the voids between the corrugations in the base of the tank. The self-supporting slab in reinforced concrete and the bottom concrete slab must always be designed by a qualified professional. The tank filling and backfilling operations must always be carried out progressively as specified in para. 2.1.

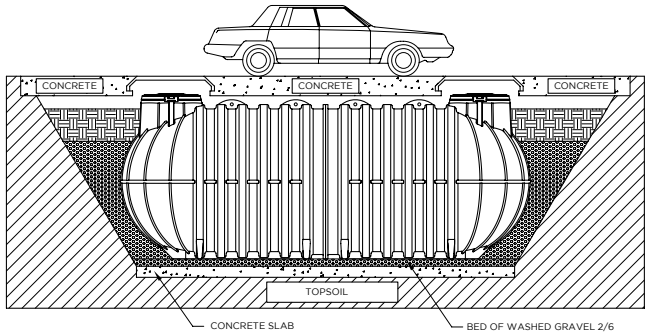


Fig. 4.1

4.2 HEAVY TRAFFIC - CLASS D400-EN124/95 - MAX 40 TONS

To render the site suitable for the **transit of heavy vehicles,** a reinforced concrete containment structure cast on-site with a suitable **concrete cover slab** must be provided. The perimeter of the slab must be larger than the excavation in order to distribute the load on the containment walls and not on the tank itself. Then spread a 10 cm thick layer of 2/6 washed gravel at the bottom of the containment structure to fill in the voids between the corrugations in the base of the tank. The containment structure and cover slab must be designed by a qualified professional in relation to the expected loads. The tank filling and backfilling operations must always be carried out progressively as specified in para. 2.1.

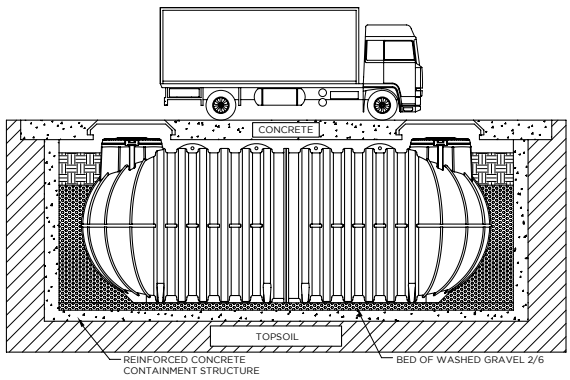


Fig. 4.2

GUARANTEE ON ROTOTEC PRODUCTS

ROTOTEC S.p.A. hereby guarantees its Sewage Treatment Division tanks for underground installation, made of linear high density polyethylene (LLD-PE) using the rotational moulding technique, for a period of 25 years against full-depth corrosion and manufacturing defects.

This guarantee shall apply on condition that the articles are kept in a state of regular use, are subjected to periodic maintenance and are installed according to the methods indicated. The manufacturer will be in no way liable in the event of incorrect installation.

THE GUARANTEE WILL CEASE TO BE VALID IN THE FOLLOWING CASES:

1. If the underground installation methods are not strictly adhered to.
2. If the product is modified without the prior authorisation of the manufacturer.
3. In the case of non conform use.

THE GUARANTEE DOES NOT INCLUDE:

1. Installation costs.
2. Damage due to lack of use.
3. Damage to third parties.
4. Damage resulting from loss of the contents.
5. Cost of transport.
6. Re-establishment of the site.

Rototec guarantees that all materials fully comply with the characteristics and conditions specified in the order confirmation and in the certificates/technical data sheet issued by the technical office.

Rototec will not be held liable for applications, installation, inspections or any operations undertaken at the buyer's premises or installation site.

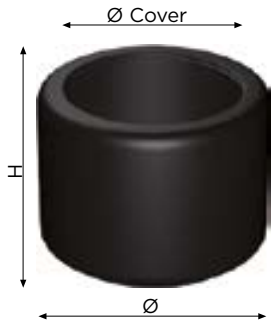
Any products with defects resulting from carelessness, incompetence or negligence during use or due to incorrect installation or maintenance by unauthorised or unqualified personnel, or damage caused as a result of circumstances that cannot be traced back to fabrication defects, are not covered by the guarantee.

Rototec will not be held liable for injury or damage either directly or indirectly deriving from incorrect installation, use or maintenance of the products sold.

Rototec products are supplied with technical information, certification according to current regulations and underground installation and maintenance instructions.

ACCESSORIES

ACCESSORIES



THREADED EXTENSION

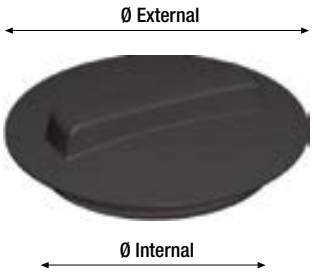
Item	Ø mm	H mm	Ø Cover mm	Цени в лв/без ДДС
PP30	300	300	210	55.00
PP35	435	300	300	70.00
PP35RIM	300	300	210	80.00
PP45	535	300	400	90.00
PP60RIM	535	300	400	145.00

Application: Installing the extensions enables the tops of the tanks to be installed below ground level. More than one extension can be used at the same time (See chapter on Underground installation).

HINGED TOP EXTENSION

Item	Ø mm	H mm	Ø Cover mm	Цени в лв/без ДДС
PP 75	750	430	630	180.00
PP 77	750	430	630	180.00

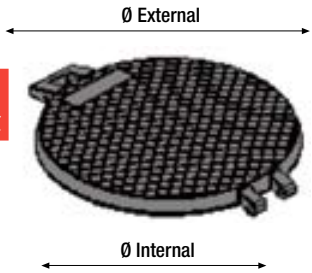
Application: Installing the extensions enables the tops of the tanks to be installed below ground level. More than one extension can be used at the same time (See chapter on Underground installation).



THREADED COVER IN PP*

Item	Ø Internal mm	Ø External mm	Цени в лв/без ДДС
CC 140	120	140	2.00
CC 255	210	250	5.00
CC 355	300	355	7.00
CC 455	400	454	9.00
CC 600	600	611	30.00

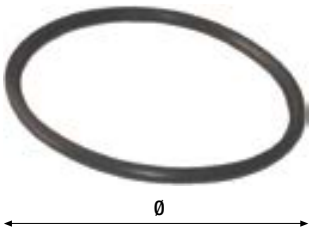
* supplied with treatment tanks



HINGED COVER IN PE

Item	Ø Internal mm	Ø External mm	Цени в лв/без ДДС
TAP 700*	630	800	120.00
TAP 710*	630	800	120.00

*Green colour available on request



Material: NBR rubber

COVER GASKET

Item	Ø Internal mm	Cover model	Цени в лв/без ДДС
GC 255	255	CC 255 - CS 255	4.00
GC 355	350	CC 355 - CS 355	5.00
GC 455	460	CC 455 - CS 455	6.00
GC600	620	CC 600	6.50

RING

Item	Ø External mm	Ø Internal mm	H ring mm	Цени в лв/без ДДС
AF154	155	120	10	3.00
AF255	255	210	30	4.00
AF355	355	300	30	5.00
AF455	455	400	30	6.00
AF600	617	600	30	20.00

Application: Installed when creating customised inspection holes.

GASKET

Item	Ø External mm	Ø Internal mm	L mm	cutter Ø for gasket hole mm	Цени в лв/без ДДС
GG 50	95	50	8	60	11.00
GG 63	110	63	8	75	11.00
GG 80	125	80	8	89	11.00
GG 100	145	100	8	110	14.00
GG 110	150	110	8	127	14.00
GG 125	160	125	10	140	14.00
GG 125 S 15	160	125	13	140	20.00
GG 160	200	160	10	170	20.00
GG 200	230	200	10	210	20.00
GG 250	280	250	10	260	25.00

Application: for installation of a passing pipe on a tank; guarantees hydraulic seal.

ACCESSORIES

COMPRESSOR BLOWER

Model	Voltage V	Frequency Hz	Watt W	Amps A	Flow rate l/min	rated pressure bar	Noise level db	Weight kg	Цени в лв/без ДДС
HP 40	220	50	31	0.32	40	0.13	<39	4.9	**240.00**
HP 60	220	50	61	0.6	70	0.15	<48	6.9	**340.00**
HP 80	220	50	91	1	88	0.15	<57	7	**400.00**
HP 150	220	50	152	1.9	148	0.2	<53	13	**550.00**

Description: diaphragm type air compressors used in activated sludge systems to develop an aeration system necessary for the digestive processes of the aerobic bacteria, making use of the electromagnetic vibration of an actuator rod supported by synthetic rubber diaphragms.

TIMED ELECTRIC PANEL

Item	Size mm	Amps A	Цени в лв/без ДДС
QST	210x210x100	6	**360.00**

Description: Electric panel controlling and protecting the diaphragm blowers serving activated sludge purification systems. Thanks to the 24 hour switching timer it is possible to set the blower to turn on and off automatically as required by the treatment plant.
Dimensions: 210 x 210 x 100 mm

SOCKET TIMER FOR BLOWERS

Item	Size mm	Цени в лв/без ДДС
TMP	70x70x40	**50.00**

Description: socket timer used to set the activation times of blowers-compressors. Fitted with timer switches with 15 minute intervals.

DIFFUSER PLATE

Item	Diameter	Weight kg	Maximum air flow m^3/h	Diameter of bubbles mm	Flow rate l/min	Oxygenation capacity gO^2/Nm^3 per metre head	Цени в лв/без ДДС
IFADN	211	2.1	5	1-3	40	18-20	**128.00**

Description: diaphragm type diffusers in microbored rubber used in activated sludge systems and constructed to provide a uniform distribution of air with bubbles of microscopic diameter designed to optimise performance.

DIFFUSER KIT

Item	Tube length mm	Цени в лв/без ДДС
IFA 1D	according to the depth of the tank	12.00
IFA 2D	according to the depth of the tank	22.00

Application: When connected to a diaphragm type blower and to one or more diffuser plates and installed inside a tank, aerates and agitates the content, either continuously or intermittently.

CHLORINE TABLET

Item	Weight mg	Diameter mm	Height mm	Цени в лв/без ДДС
IFACC	200	75	25	6.00

Description: chlorine tablet consisting of trichloroisocyanuric acid with 90% active chlorine for long-lasting action. The disinfectant is released over a longer period of time (approximately 30-60 days) thanks to its particular molecular structure.

FILTER MEDIA FOR TRICKLING FILTERS

Item	Form	Dimensions mm	Specific surface area m^2 / m^3	Void index %	Dry weight Kg / m^3	Weight during service kg / m^3	Material	Цени в лв/без ДДС/м3
BIOWE120	circular	170	120	approx. 95	38	approx. 350	Black isotactic polypropylene	180.00

Description: Bulk filter media developed especially for the construction of medium-load trickling filter beds treating biodegradable domestic or industrial sewage.
The advantages of using this type of filter media are connected to the high specific surface area and the high void index.

SINGLE DOSE BIO-ACTIVATOR SACHETS

Item	Description	Weight g	Цени в лв/без ДДС
IFABIO	Single dose activator sachet for biological septic tanks	200	26.00

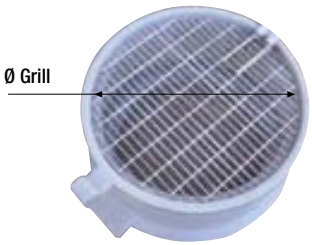
Function: biological activator in powder form, supplied in a single-dose sachet, to speed up the activation time of biological processes that normally develop within waste water treatment plants. Dissolve in a bottle of warm water and pour directly into the WC or into the tanks.

SPECIFIC CONCENTRATED BIO-ACTIVATOR

Item	Description	Weight g	Цени в лв/без ДДС
IFABIODEG	Bio-activator specific for activation of degreasers	750	90.00
IFABIOAN	Bio-activator specific for activation of anaerobic treatment plants (septic or Imhoff tanks, anaerobic trickling filters,...)	750	90.00
IFABIOIFA	Bio-activator specific for activation of aerobic treatment plants (activated sludge system, aerobic trickling filters,...)	750	90.00

Function: concentrated biological activator in powder form, supplied in a 750g container, to speed up the activation time of biological processes that normally develop within waste water treatment plants. Dissolve in a bottle of warm water and pour directly into the WC or into the tanks. Available in three specific types for activation of the various tanks making up a treatment system.

ACCESSORIES



SAFETY GRILL

Item	Ø grill mm	Mesh length mm	Mesh width mm	Цени в лв/без ДДС
GRANT	730	75	30	180.00

Application: The pedestrian grill is a safety device that prevents unintentional entry into the tank.

Installation: The grill is fitted directly on the underground corrugated tank inspection hatch (Cisterna, Panettone and Canotto tanks) and is fastened using the pins provided. It can be mounted directly on the tank manhole or on a hinged cover extension.

ELECTRIC FLOAT

Item	Float dimensions mm	Cable length m	Amps A	Voltage V	Protection grade	Max. tempe-rature °C	Цени в лв/без ДДС
GAL 5	80x100x40	5	10 (4)	250	IP 67	60	30.00

Application: Float level switch for fresh water pump start/stop.

CHECK VALVE

Item	Цени в лв/без ДДС
SCIPP 125	205.00
SCIPP 160	240.00
SCIPP 200	250.00

ONE-PIECE POLYPROPYLENE CHAMBER

Item	Цени в лв/без ДДС
PM20X20G	9.00
PM20X20V	10.00
PM30X30G	10.00
PM30X30V	12.00

ELECTROWELDABLE PE SLEEVE PN10

Item	Цени в лв/без ДДС
MAN 90	30.00
MAN 125	45.00
MAN 160	57.00

PE PIPE PN10

Item	Цени в лв/без ДДС
PIPE 90	10.00
PIPE 125	20.00
PIPE 160	35.00

NOTES

OTHER PRODUCTS

WATER STORAGE DIVISION

- **ABOVE GROUND TANKS**
  Volumes from 50 to 14000 litres
- **UNDERGROUND TANKS**
  Volumes from 1000 to 10000 litres
- **UNDERGROUND MODULAR TANK**
  Volumes from 6m3 to 200 m3
- **RAINWATER HARVESTING SYSTEMS**

For more information, see the water storage division catalogue, available at **www.rototec.it**

OIL DISPOSAL UNIT

DOUBLE WALL CONTAINERS FOR USED FLUIDS

- **WATER STORAGE**
  Container for used mineral oils
- **ROTOVEG**
  Container for used vegetable oils
- **ROTOGEL**
  Container for liquid antifreeze
- **ROTOKIM**
  Container for acids

For more information, see the rotoil catalogue, available at **www.rototec.it**

PORTABLE TOILETS

CHEMICAL TOILETS WITH SEAT OR SQUAT PAN

- Portable ONE-PIECE toilets
- Portable COLLAPSIBLE toilets
- Portable toilets for the DISABLED
- Accessories (chemical decomposing agent, deodorants...)

For more information, see the Portable Toilets catalogue, available at **www.rototec.it**

SITE EQUIPMENT

- **RUBBISH CHUTE**
  Complete system with frame, hopper and chute
- **ROAD BARRIER**
  Available colours: red and white
- **DIESEL TRANSPORTATION TANK**
  Available with digital counter litre also

SERVICE POINT COLUMNS

DELIVERING SERVICES (ELECTRICITY, WATER AND NOTICES)

- **MARINA POINT**
  Service bollard for tourist ports
- **GREEN POINT**
  Column for camp sites and equipped parking areas
- **FIRE POINT**
  Box housing fire extinguishers and fire-fighting hoses

For more information, see the Service Columns catalogue, available at **www.rototec.it**

NOTES

ROTOTEC

Rototec S.p.A
Via dell'Artigianato, 6
61026 Lunano (PU) Italy
tel. (+39) 0722 7228
fax. (+39) 0722 70599

www.rototec.it
info@rototec.it

SYSTEM GROUP

www.tubi.net

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