



Rev0 08.11.24

# **GREYWATER REUSE AND RECYCLING SYSTEM (SPRAC) ECODEPUR<sup>®</sup> BIOX PRO**

## ECODEPUR® BIOX PRO

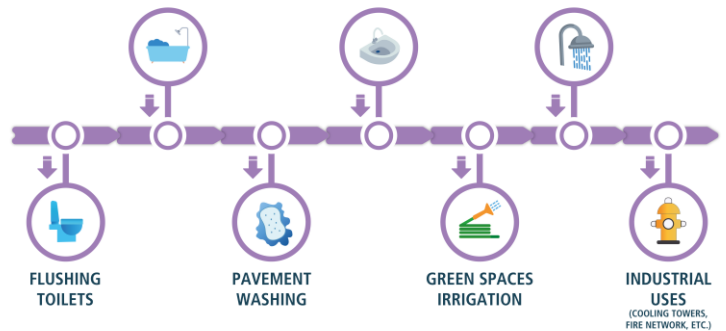
The reuse of treated wastewater, as a strategy to combat the growing scarcity of water, is one of the main challenges facing mankind in the coming years.

Grey Water Reuse and Recycling Systems **ECODEPUR® BIOX PRO** are solutions intended for the reception and treatment of grey water (bathtubs, showers and washbasins), adapting the quality of the treated water for secondary uses (toilet flushes, irrigation, firefighting reserves, among others).

Although water that comes from kitchens and washing machines is considered grey water, it isn't usually recycled due to its high contamination.

The different ECODEPUR® BIOX PRO systems and options are based on the technical specifications of European Standard **EN 16941-2** (Systems for the use of treated greywater) and also of European Standard EN 1717 (Protection against pollution of potable water by backflow).

### GREY WATER COLLECTION AND TREATMENT

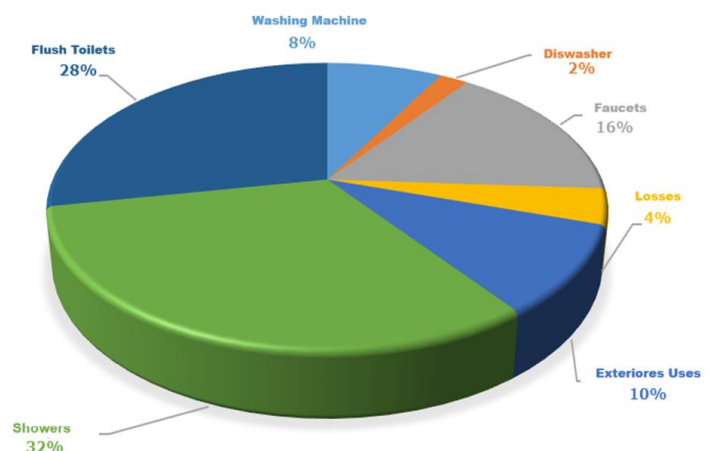


## Legal And Regulatory Framework

European Standard EN 1717	European Standard EN 16941-2
Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow	On-site non-potable water systems – Part 2: Systems for the use of treated greywater

## Treated Grey Water Origin and Uses

In summary, it can be stated that at least 38% of the domestic water consumption doesn't need drinking water quality, namely toilet flushes, washing cars, private gardens watering, among others. There are also other public uses that don't require drinking water such as street washing, as well as commercial and industrial uses



## Grey Water Contamination

Despite presenting lower levels of contamination than domestic wastewater (set of black water and grey water) grey water has important levels of organic matter, as well as the possible presence of potentially pathogenic microorganisms.

In general, the substances in grey water are easily biodegradable and come mostly from personal hygiene products, detergents, hair and skin.

Typical Contaminants Concentrations	Parameters	Grey Water	Urban Wastewater
<b>Physical / Chemical Parameters</b>	Total Suspended Solids (TSS)	45 – 330 mg/l	450 mg/l
	Biochemical Oxygen Demand (BOD5)	90 – 290 mg/l	400 mg/l
	Total Kjeldahl Nitrogen (TKN)	2,1 – 31,5 mg/l	50 – 60 mg/l
	Turbidity	22 – 200 NTU	-
<b>Microbiological Parameters</b>	Total coliforms	$10^1 - 10^6$ UFC/100 ml	$10^6 - 10^7$ UFC/100 ml
	Escherichia Coli	$10^1 - 10^5$ UFC/100 ml	$10^5 - 10^6$ UFC/100 ml

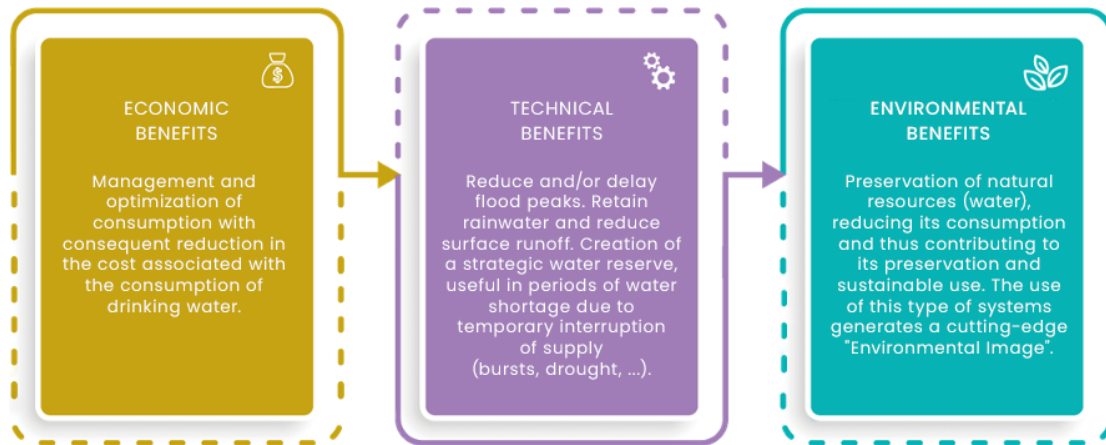
## Treated water quality requirements

In the absence of an International legal framework regulating the recycling of grey water, and taking into account the pioneering spirit of the countries of the Iberian Peninsula in the reuse of treated grey water due to local constraints, both climatic and water-related, the minimum quality of treated grey water meets the requirements presented in the technical guide of AQUA ESPANA (Spanish Association of Water Treatment and Control Companies).

Parameters	Residencial Uses	Services
<b>Turbidity (NTU)</b>	< 5	< 10
<b>E. Coli (UCF/100 ml)</b>	Undetected	< 200
<b>Residual disinfectant (mg/l Cl<sub>2</sub>)</b>	0,5 – 2,0	0,5 – 2,0
<b>pH (in case of chlorine disinfection)</b>	7,8 – 8,0	7,8 – 8,0

## GREY WATER REUSE AND RECYCLING BENEFITS

ECODEPUR® BIOX PRO system allows to significantly reduce domestic water consumption, resulting not only in an effective contribution to water resource preservation, but also in an advantageous investment with economic return.



It's suggested to apply Grey Water Reuse and Recycling Systems ECODEPUR® BIOX PRO in all new constructions and rehabilitations, developed for different applications:

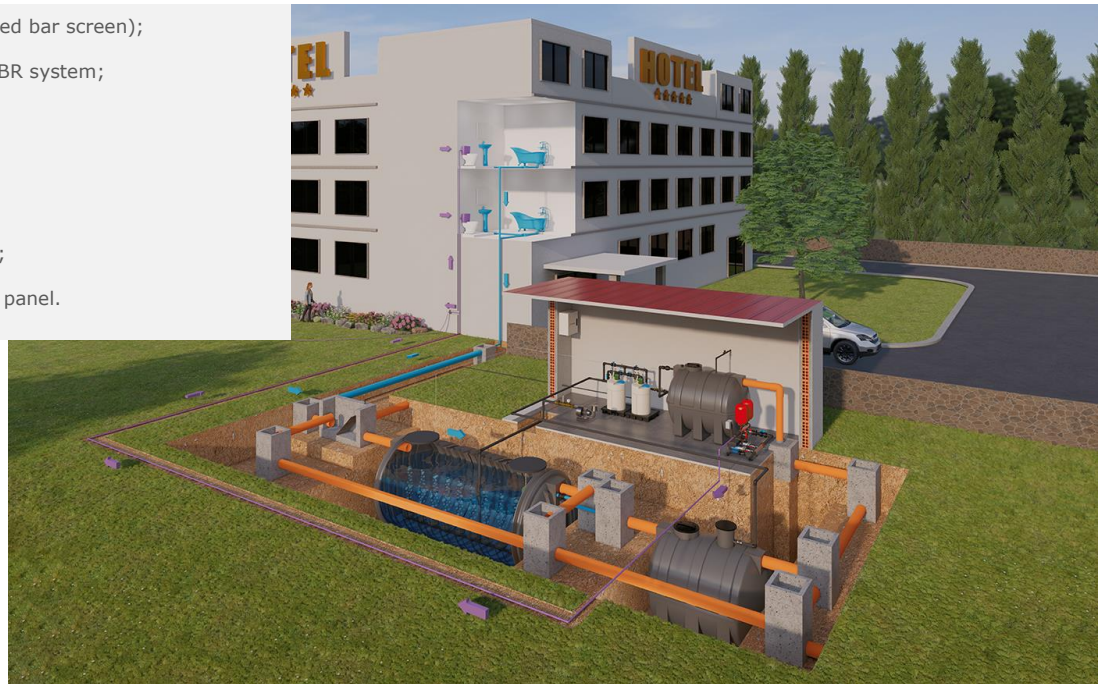
- Condos;
- Gyms;
- Sports facilities;
- Campsites;
- Public and Institutional buildings;
- Schools;
- Hotels;
- Among others.

## ADVANTAGES

- Ease and flexibility of installation (reduced human intervention);
- Absence of odours;
- Ease and comfort of operation and maintenance (automatic operation / minimisation of human intervention);
- Low initial investment and operating costs;
- Industrial Design (cutting-edge equipment);
- Absence of annoying noise;
- Functional safety (hydraulic – sanitary).

# SPRAC ECODEPUR® BIOX PRO Underground Installation

1. Screening (hand cleaned bar screen);
2. Biological treatment SBR system;
3. Equalisation tank;
4. Assisted filtration;
5. Disinfection;
6. Treated water storage;
7. Command and control panel.



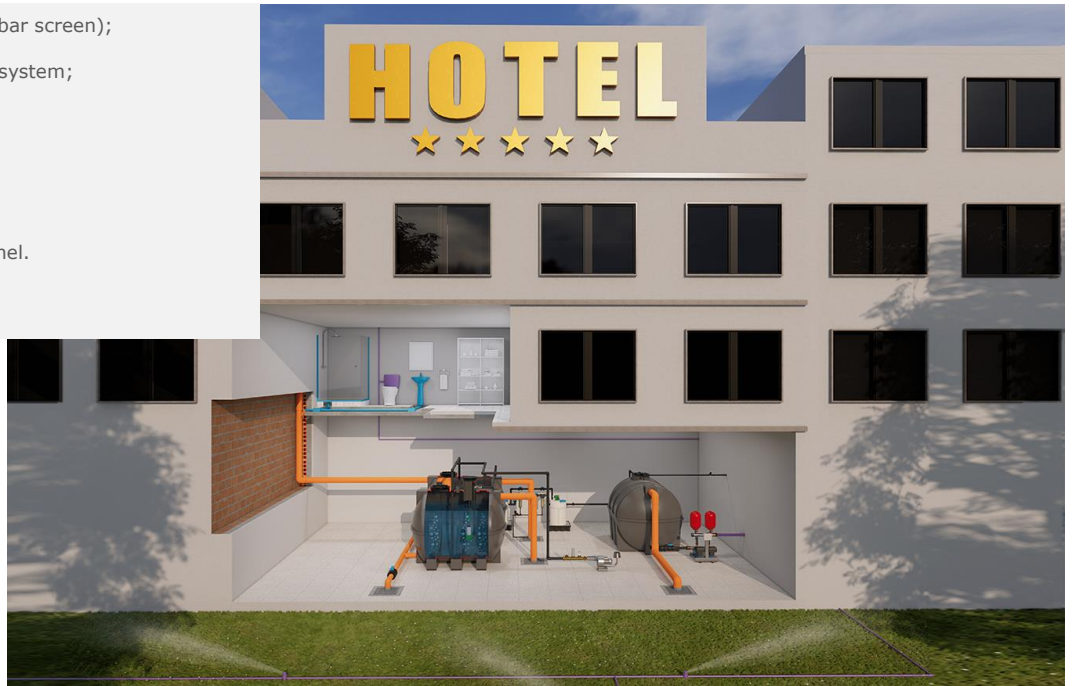
Model	Flow Rate (m <sup>3</sup> /day)	Biological Treatment Volume (m <sup>3</sup> ) [LxØxH] (mm)	Tertiary Treatment			Treated water accumulation Volume (m <sup>3</sup> ) [LxØxH] (mm)
			Equalisation (m <sup>3</sup> ) [LxØxH] (mm)	Filtration Pump	Filters	
SPRAC BIOX PRO 1,4	1,4	1.5 [1.350x1.210x1.250]	-	Open Turbine 1"1/2	Centrifuges 1"1/4	1.5 [1.350x1.210x1.250]
SPRAC BIOX PRO 2,8	2,8	3 [1.910x1.500x1.540]	-	Open Turbine 1"1/2	Centrifuges 1"1/4	1.5 [1.350x1.210x1.250]
SPRAC BIOX PRO 5,6	5,6	5 [2.360 x 1.800 x 1.870]	-	Open Turbine 1"1/2	Centrifuges 1"1/4	3 [1.910x1.500x1.540]
SPRAC BIOX PRO 11,2	11,2	10 [3.440 x 2.190 x 2.265]	-	Open Turbine 1"1/2	Centrifuges 1"1/4	5 [2.360x1.800x1.870]
SPRAC BIOX PRO 16,8	16,8	15 [4.980 x 2.190 x 2.265]	-	Open Turbine 1"1/2	Centrifuges 2"	8 2x[--- x1.890x1.910]
SPRAC BIOX PRO 22,4	22,4	20 [6.520x2.190x2.265]	-	Open Turbine 1"1/2	Centrifuges 2"	10 2x[2.360x1.800x1.870]
SPRAC BIOX PRO 26,6	26,6	25 [8.060x2.190x2.265]	-	Open Turbine 1"1/2	Centrifuges 2"	15 3x[2.360x1.800x1.870]
SPRAC BIOX PRO 33,3	33,3	30 [9.600x2.190x2.265]	-	Open Turbine 1"1/2	Centrifuges 2"	15 3x[2.360x1.800x1.870]
SPRAC BIOX PRO 39,2	39,2	35 [11.140x2.190x2.265]	10 [3.440x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 1"1/4	20 [6.520x2.190x2.265]
SPRAC BIOX PRO 46,6	46,6	40 [12.680x2.190x2.265]	10 [3.440x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 2"	25 [8.060x2.190x2.265]
SPRAC BIOX PRO 53,9	53,9	50 [8.520x2.980x3.050]	15 [4.980x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 2"	25 [8.060x2.190x2.265]
SPRAC BIOX PRO 63,7	63,7	60 [10.060x2.980x3.050]	15 [4.980x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 2"	30 [9.600x2.190x2.265]
SPRAC BIOX PRO 74,2	74,2	70 [11.600x2.980x3.050]	20 [6.520x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 2"	35 [11.140x2.190x2.265]
SPRAC BIOX PRO 84,7	84,7	80 [13.140x2.980x3.050]	25 [8.060x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 2"	40 [12.680x2.190x2.265]
SPRAC BIOX PRO 97,3	97,3	90 [14.680x2.980x3.050]	30 [9.600x2.190x2.265]	Open Turbine 1"1/2	Centrifuges 2"	50 [8.520x2.980x3.050]

The images and dimensions shown may be changed without prior notice

# SPRAC ECODEPUR® BIOX PRO

## Surface installation

1. Screening (hand cleaned bar screen);
2. Biological treatment SBR system;
3. Assisted filtration;
4. Disinfection;
5. Treated water storage;
6. Command and control panel.



Model	Flow rate (m <sup>3</sup> /day)	Biological Treatment Volume (m <sup>3</sup> ) [LxØxH] (mm)	Tertiary Treatment		Treated water accumulation Volume (m <sup>3</sup> ) [LxØxH] (mm)
			Filtration Pump	Filters	
SPRAC BIOX PRO 1,4 AE	1,4	1.5 [1.350x1.210x1.250]	Open Turbine 1"1/2	Centrifuges 1"1/4	1.5 [1.350x1.210x1.250]
SPRAC BIOX PRO 2,8 AE	2,8	3 [1.910x1.500x1.540]	Open Turbine 1"1/2	Centrifuges 1"1/4	1.5 [1.350x1.210x1.250]
SPRAC BIOX PRO 5,6 AE	5,6	5 [2.360 x 1.800 x 1.870]	Open Turbine 1"1/2	Centrifuges 1"1/4	3 [1.910x1.500x1.540]
SPRAC BIOX PRO 11,2 AE	11,2	10 2x [2.360 x 1.800 x 1.870]	Open Turbine 1"1/2	Centrifuges 1"1/4	5 [2.360x1.800x1.870]
SPRAC BIOX PRO 16,8 AE	16,8	15 3x [2.360 x 1.800 x 1.870]	Open Turbine 1"1/2	Centrifuges 2"	8 2x[--- x1.890x1.910]
SPRAC BIOX PRO 22,4 AE	22,4	20 4X [2.360 x 1.800 x 1.870]	Open Turbine 1"1/2	Centrifuges 2"	10 2x[2.360x1.800x1.870]

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## INSTALLATION

In order to be able to adequately install the Grey Water Reuse and Recycling System **ECODEPUR® BIOX PRO**, dual water and sewage networks must be designed and implemented according to the following indications:

- Discharges from toilets, washing machines and dishwashers must be routed directly to the sewage system and public sanitation;
- Grey water discharges (showers, bathtubs and washbasins) must be sent to the Grey Water Reuse and Recycling System ECODEPUR® BIOX PRO;
- There must be a water supply network for noble uses (such as showers, washbasins, bidets, sinks, dishwashers and washing machines) served by the public drinking water network;
- A water supply network must be provided for secondary uses (toilet flushes, irrigation, pavement washing, among others) served by the Grey Water Reuse and Recycling System ECODEPUR® BIOX PRO.

All components of the Grey Water Reuse and Recycling System ECODEPUR® BIOX PRO must be in an independent circuit of the drinking water system, avoiding the risk of cross connections, in accordance with good construction practices.

Furthermore, the system must guarantee water supply even in the event of a possible power outage. In that regard, the protocol for action in the event of switching to the drinking water network should be clearly established in the execution project, complying with the safety provisions established in the EN 1717 standard "Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow".

Aboveground tanks must be installed above a solid and levelled base.

The installation of Grey Water Reuse and Recycling systems ECODEPUR® BIOX PRO must follow the recommendations of the Installation Instructions for Polyethylene Reactors/Tanks (< 10.000 L or Ø 2.190 / Ø 2.980) that are provided along the product catalogue.

## Recommendations

In addition to the instructions mentioned above, the following recommendations should be considered:

1. ECODEPUR® BIOX PRO unit is designed for underground installation. If aboveground installation is planned, ECODEPUR® Technical Services must be contacted so that the equipment can be sized structurally for this purpose;
2. The ventilation pipes should be connected to the respective holes in the tanks to allow ventilation conditions. The discharge location of gaseous by-products, coming from the treatment process, must take into account the specific conditions and layout of the installation (the correct placement of the vent will prevent the formation of any unpleasant odour);
3. The room designated for the electromechanical equipment should have adequate ventilation, and the door should open outwards in order to improve the internal space;
4. The interconnections between the various electromechanical equipment and the Polyethylene tanks must be carried out by specialized professionals (plumber/electrician) and following the installation schemes provided by ECODEPUR;
5. The connection pipes between the discharge pump and the filtration line must have their own supports and must not be supported by the equipment, which could cause deformation or damage to the material;

6. The electrical connections of the equipment should be carried out according to the electrical diagram that will be provided upon confirmation of the system's purchase;
7. ALL POINTS WHERE SECONDARY WATER COULD BE USED MUST BE PROPERLY IDENTIFIED TO AVOID THE RISK OF IT'S CONSUMPTION FOR NOBLE USES. Not only the faucets and irrigation points must be identified, but it is also advisable to use pipes of a different colour whenever the installations are visible;
8. Freely accessible recycled grey water delivery points, if any, must have safety systems complementary to signage, such as detachable or lockable handle taps;
9. In case of any doubt ECODEPUR® Technical Services should always be contacted



ALWAYS follow the instructions for installation according to the characteristics of the soil, dry, floodable or clayey land.

## MAINTENANCE

Grey Water Reuse and Recycling Systems **ECODEPUR® BIOX PRO** are very easy to maintain given the simplicity and robustness of the equipment.

The excess of biological sludge accumulated in the biological reactor must be cleaned whenever its quantity justifies such operation. Cleaning is advised at least every two years.

The cleaning frequency for the accumulation tank should be dictated by the practice of exploitation, although it is recommended at least one general cleaning every two years.

Since the accumulation of foam can have harmful effects on the functioning of the Recycling System, it is advisable to use biodegradable detergents with a low level of surfactant, as well as the use of good practices to reduce the consumption of detergents.

## Equipment

All repair and maintenance operations may only be executed after all electrical current sources have been disconnected.

Under normal operating conditions, the pumps do not require preventive maintenance. However, it may be necessary to clean the hydraulic components if there is a decrease in the pumps' performance. The pumps may only be dismantled by specialized and qualified personnel.

The blower air filter only needs to be cleaned every three months and replaced annually.

The filtration set has a washable sleeve and other replaceable, automatically flushing the waste accumulated. However, a minimum quarterly inspection is recommended to check/replace the filter sleeves.

Regarding the dosing systems, maintenance is limited to cleaning the foot valve, suction pipe and injector (rinsing with clean water) every three months, as well as replacing reagents whenever the respective reservoir becomes empty.