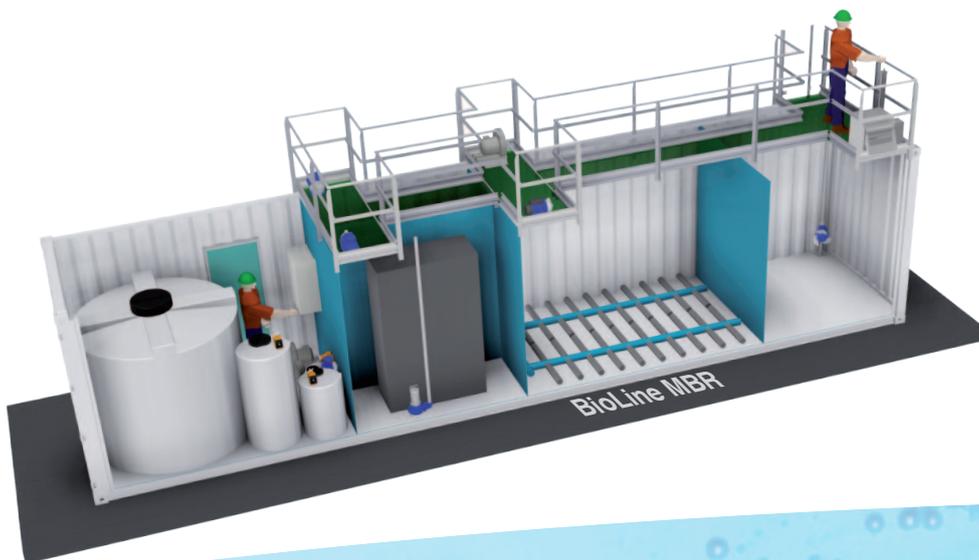
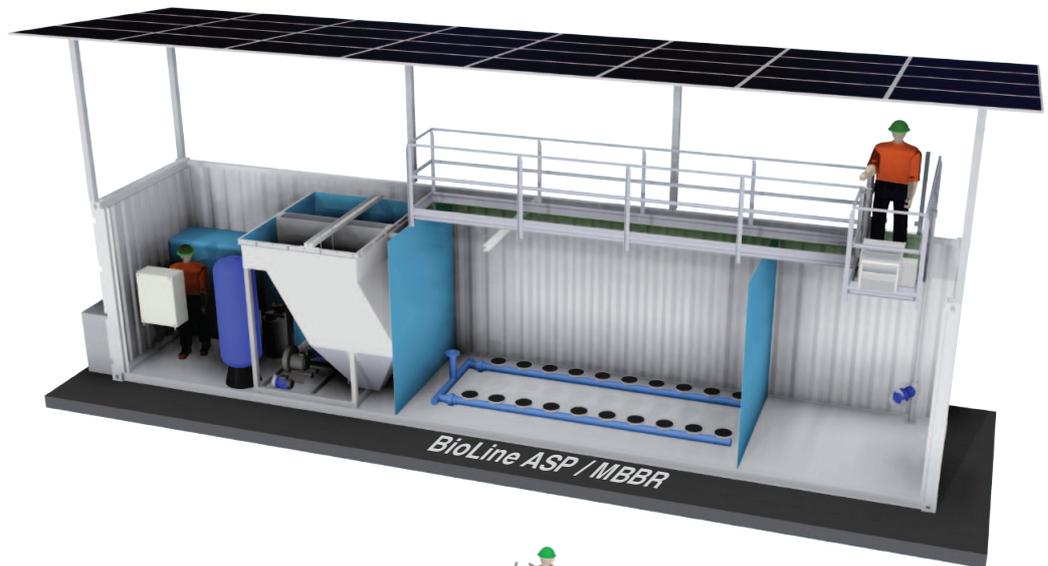


# ESPRESSO

BIO line

BIOLOGICAL LINE - WASTE WATER  
package solution - plug'n'play system



**protecno**  
WATER TREATMENT PLANTS & SYSTEMS

## ESPRESSO *BIO line*

### The innovative modular system of Protecno Srl.

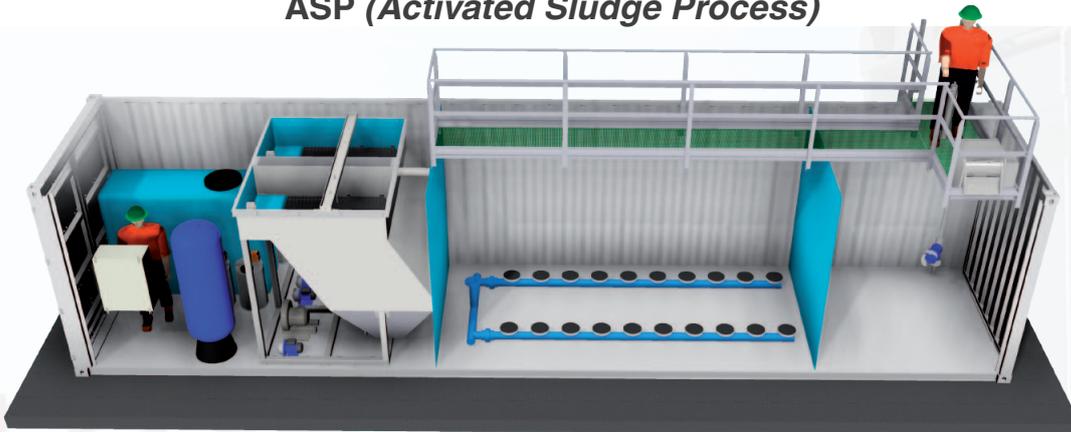
ESPRESSO bio-line is a compact system for the treatment of domestic effluent (or comparable), designed to provide a quick solution and in the same time simple and efficient within the biological purification field.

ESPRESSO bio-line consists of a single transportable module, containing all the necessary equipment and know-how for maximum performance output.

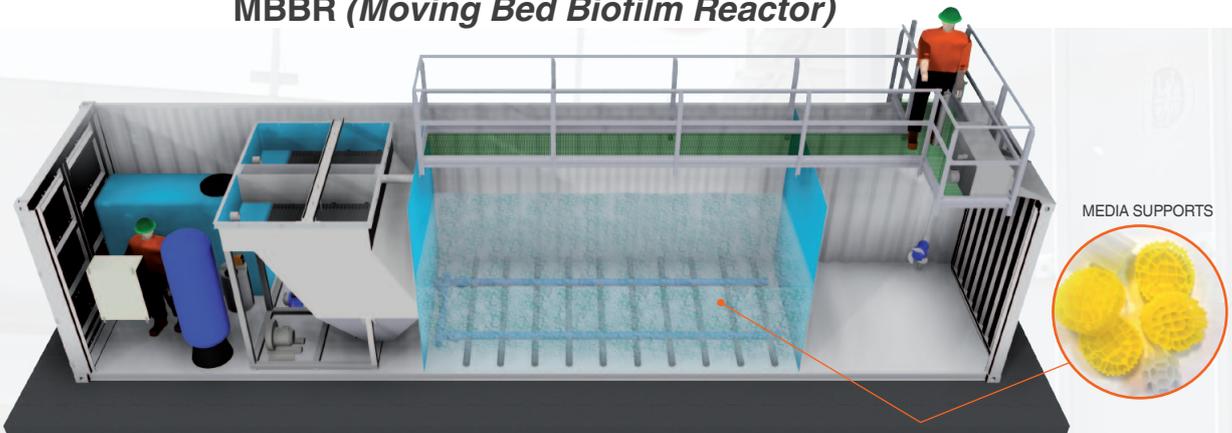
## TREATMENT PROCESS

- PRETREATMENT FOR SAND SEPARATION AND FINE SCREEN
- DENITRIFICATION
- OXIDATION / NITRIFICATION
- SETTLING
- DISINFECTION
- SAFETY TERTIARY FILTRATION

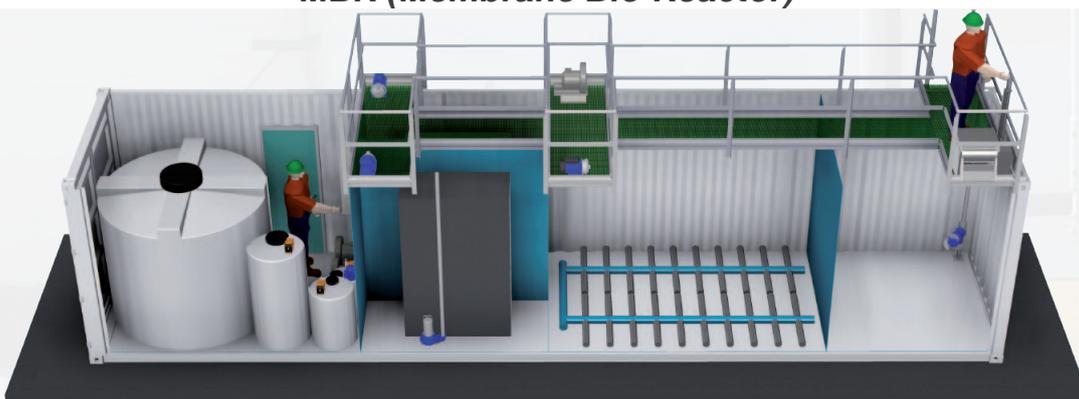
### ASP (*Activated Sludge Process*)



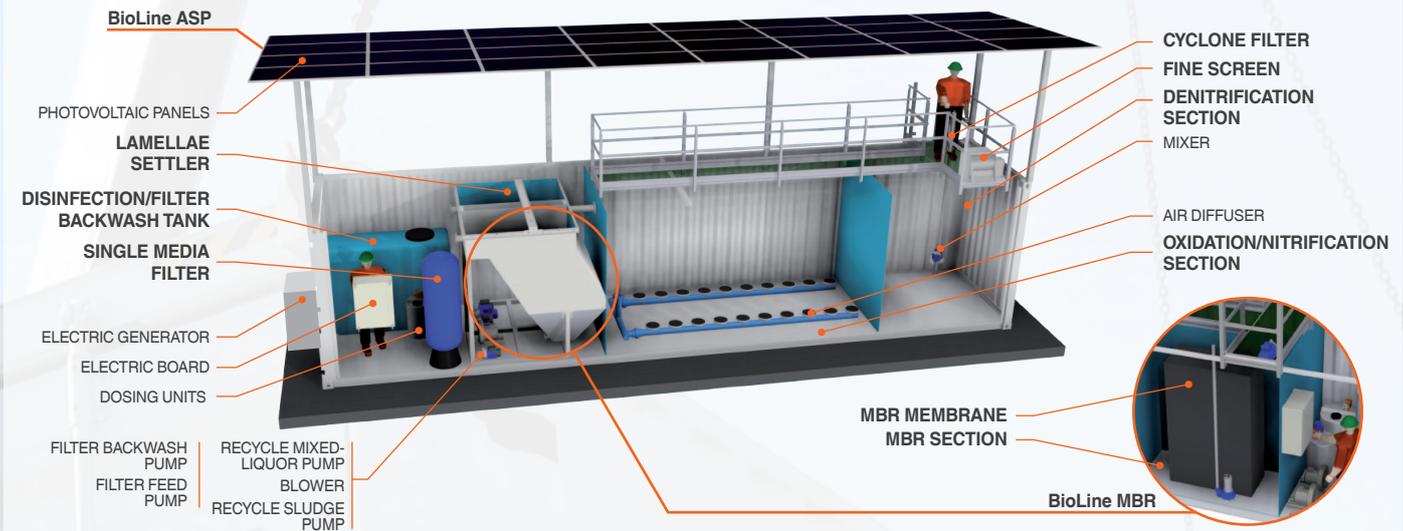
### MBBR (*Moving Bed Biofilm Reactor*)



### MBR (*Membrane Bio-Reactor*)



## DESIGN



### **ASP - Maximum potentiality: 350 population equivalent** (view data sheet)

The purifying activity of the biological sludge system is performed thanks to the presence of a suspension of active biomass (bacteria colonies, protozoa, metazoa, fungous, etc.) that develops and lives within the liquid phase. Through the degradation process of organic matter existing in the wastewater to be treated, under aerobic conditions, it produces less complex compounds that the micro-organic flora uses for their survival and reproduction. In the next phase of secondary sedimentation, the developed biomass flakes are separated by the liquid phase, once disinfected, it is suitable for the discharge.

### **MBBR - Maximum potentiality: 550 population equivalent** (view data sheet)

The biomass processes adherent to mobile bed uses the same degradation mechanism of the organic substance of the ASP systems, with the difference that the biomass grows on special plastic supports free to move throughout the biological reactor.

The advantage of the MBBR technology derives from the fact that the high surface area of the support elements is utilized to facilitate the adherence and growth of the active biomass which, reaching high concentrations, presents an increased metabolic action in respect of the organic substance to digest.

Furthermore, with the MBBR system, the cell's permanence time is released by the hydraulic retention time; this fact allows a high stability and reliability of the process, as well as the eventual ability to vary the filling rate afterwards, obtaining a noticeable advantage in terms of efficiency and flexibility in the management phase.

### **MBR - Maximum potentiality: 550 population equivalent** (view data sheet)

The immersed flat bioreactor membrane allows to combine the traditional active sludge biological system (ASP) the filtering capacity of a selective barrier ("Molecular Weight Cut-Off" 150 kDa), the membrane, capable of separating the sludge biomass from the liquid phase.

The sludge sedimentation characteristics are released using the MBR technology giving the following advantages:

- A major quality of the treated water (absence of colloids, bacteria, viruses)
- An increased removal of COD, BOD 5, and N in the wastewater to be treated
- Less awareness of the quality variations relative to the wastewater to be treated during the biological process;
- High concentration of biomass (up to 15 kg/m<sup>3</sup>) and the number of bacterial species
- Wastewater reuse
- An age increase of the sludge giving a lower production of excess sludge and major stabilization

The engineering of the system allows to perform the washing of the membranes without the extraction of the modules, without interruption of the system.

DESCRIPITON*	UNIT	ASP**	MBBR**	MBR**
POPULATION EQUIVALENT	(PE)	350	550	550
WATER SUPPLY	L/PE day	200÷250	200÷250	200÷250
DAILY CAPACITY	m <sup>3</sup>	70.0÷87.5	110.0÷137.5	110.0÷137.5
AVERAGE HOURLY FLOW	m <sup>3</sup> /h	2.92÷3.65	4.58÷5.73	4.58÷5.73
pH		5.5÷9.5		
TEMPERATURE	°C	5÷35		
COD (total)	mg/L	600÷480		
COD	g/PE day	120		
BOD <sub>5</sub> (total)	mg/L	300÷240		
BOD <sub>5</sub>	g/PE day	60		
TKN (N) (total)	mg/L	60÷48		
TKN (N)	g/PE day	12		
TSS (total)	mg/L	350÷280		
TSS	g/PE day	70		
P (total)	mg/L	10÷8		
P	g/PE day	2		
COLIFORMS (total)	n°/100mL	10 <sup>6</sup> ÷10 <sup>8</sup>		
<b>NOTE:</b> * Upon standard conditions 350/550 PE @ 20°C ** Upon European standard conditions				

DISCHARGE LIMITS		
pH		5,5÷9,5
COD	mg/L	125
BOD <sub>5</sub>	mg/L	25
TKN (N)	mg/L	15
TSS	mg/L	35
P (total)	mg/L	2

TECH SPECS	
MATERIAL	Fe 360
PAINTING <small>INTERNAL/EXTERNAL</small>	Epoxy cycle / Polyurethanic cycle
DIMENSIONS <small>L x W x H</small>	12,192 x 2,806 x 4,000
POWER CONSUPTION	6.0 kW (ASP, MBBR) - 14 kW (MBR)

OPTIONAL
<ul style="list-style-type: none"> <li>- Manual coarse screening</li> <li>- Feed Pump</li> <li>- U.V. Disinfection</li> <li>- Phosphorus removal chemical system</li> <li>- Sludge bag dewatering system</li> <li>- Photovoltaic system, electric generator</li> </ul>

SPARE PARTS <small>(recommended)</small>
<ul style="list-style-type: none"> <li>- Blower maintenance kit</li> <li>- U.V. lamps</li> <li>- Mixed-liquor pump maintenance kit</li> <li>- Sludge recycle pump maintenance kit (ASP, MBR)</li> <li>- O<sub>2</sub> measurement system maintenance kit</li> </ul>

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