

# BIO-CEL® MBR Systems

Efficient Wastewater Treatment with  
BIO-CEL® MBR for a camping site in Croatia



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ADVANCED SEPARATION TECHNOLOGIES

# BIO-CEL® MBR Systems

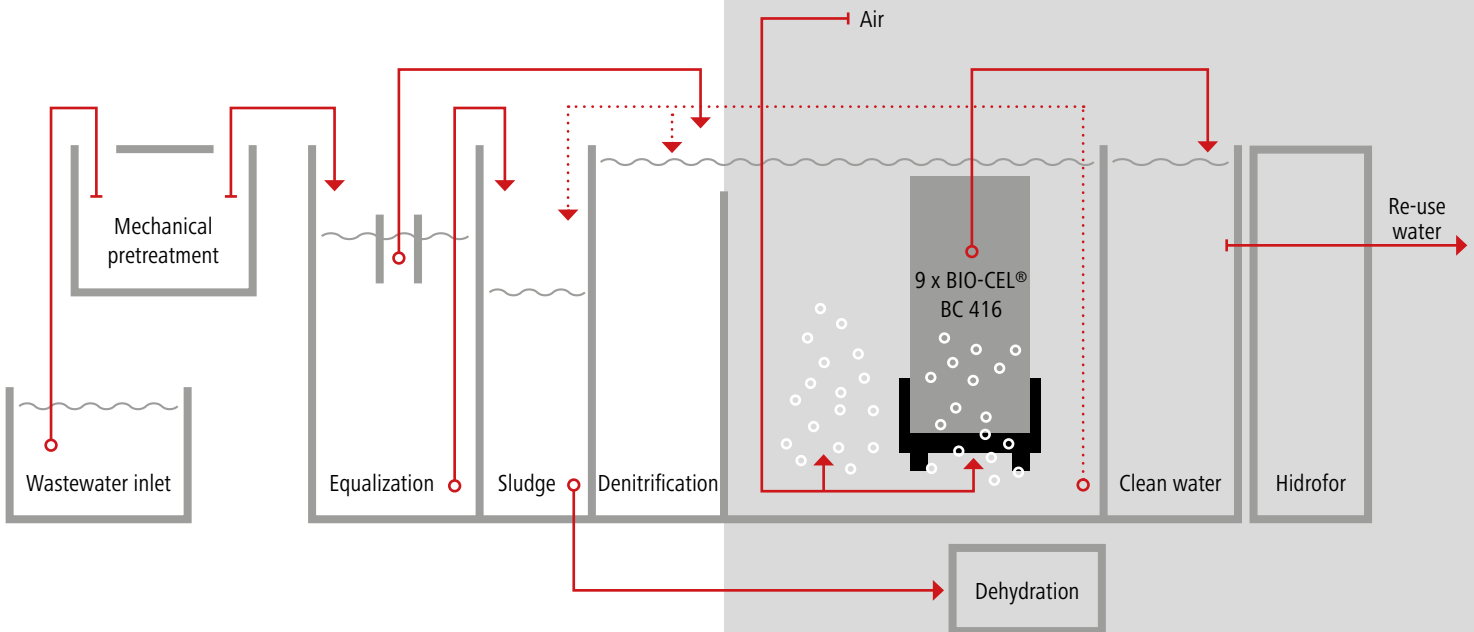
## Efficient Wastewater Treatment with BIO-CEL® MBR for a camping site in Croatia

Back in 1987 the wastewater treatment plant at the camping site "Park Umag" in Croatia was initially put into operation. The initial plant was a flotation plant. Due to insufficient performance the plant was reconstructed and changed to an MBR solution with a capacity of 5000 PE. In 2015 the plant was again upgraded using BIO-CEL® MBR technology by MICRODYN-NADIR. A capacity increase for additional 11000 PE was achieved. Despite the tremendous capacity increase the new MBR line could be built on the same ground plan dimensions as the previous plant – only the walls of the existing basins needed to be raised.

The wastewater treatment plant is equipped with 9 BIO-CEL® modules type BC416 offering a total membrane area of 3,744 m<sup>2</sup>. The modules are arranged in two separate filtration lines in one ba-

sin. The maximum daily flow is 800 m<sup>3</sup>/d with a daily average flow of 36 m<sup>3</sup>/h. Sludge Retention Time (SRT) is over 45 days from the beginning of the season to mid season and 25 days in high season.

The BIO-CEL® plant is in seasonal operation during summer – usually for about 5-6 months per year. At the end of the season the sludge is discharged, intensive membrane cleaning is performed and the membrane modules are stored in chlorinated water (100-500 ppm). As the sludge is stabilized after the dehydration process (without polymer in bags), the same is used as fertilizer for flowers, tree seedlings and grass field of the camp. Moreover, the processed water is reused for irrigation purposes which significantly reduces costs for the irrigation of the camp field.



## ADVANTAGES

- » Space saving installation
- » Constant effluent quality (better than required!)
- » Reliable performance and efficient operation of the modules
- » Cost savings
  - Reuse of treated effluent for irrigation of green areas of the camp
  - Reuse of the stabilized sludge as fertilizer
  - Biomass yield  $Y = 0.1 - 0.3$  kg biomass/kg BOD

## Parameters of the plant

	Influent quality	Effluent quality
Suspended solids	100 - 300 [mg/l]	< 5 [mg/l]
BOD	200 - 800 [mg/l]	< 5 [mg/l]
COD	600 - 1500 [mg/l]	< 35 [mg/l]
Nitrogen (total)	80 - 200 [mg/l]	< 15 [mg/l]
Phosphate (total)	4 - 18 [mg/l]	< 2 [mg/l]

## Plant design

Commissioning	July 2015
Plant Integration	Almes-eko d.o.o.
Number of BIO-CEL® BC 416 installed	9
Total Membrane Area	3,744 m <sup>2</sup>
Maximum Daily Flow	800 m <sup>3</sup> /d
Average Daily Flow	36 m <sup>3</sup> /h
Trans Membrane Pressure	- 0.24 bar