

Removal of micropollutants in the Friedrichshafen wastewater treatment plant

Specification of the plant:

Treatment capacity	[PE]	87,500
Load	[PE]	75,987
Inflow volumes:		
▪ Dry weather	[l/s]	276
▪ Max. wet weather flow	[l/s]	910
▪ Annual wastewater volume	[m³/a]	11,161,648



Process technology:

Mechanical treatment	Fine screen, sand and grease trap, primary clarifier
Biological treatment	Pre-denitrification, nitrification, secondary clarifier
Chemical treatment	Phosphate precipitation: simultaneous and post
Elimination of micropollutants	Ozonation
Filtration	Multi-layer sand filter



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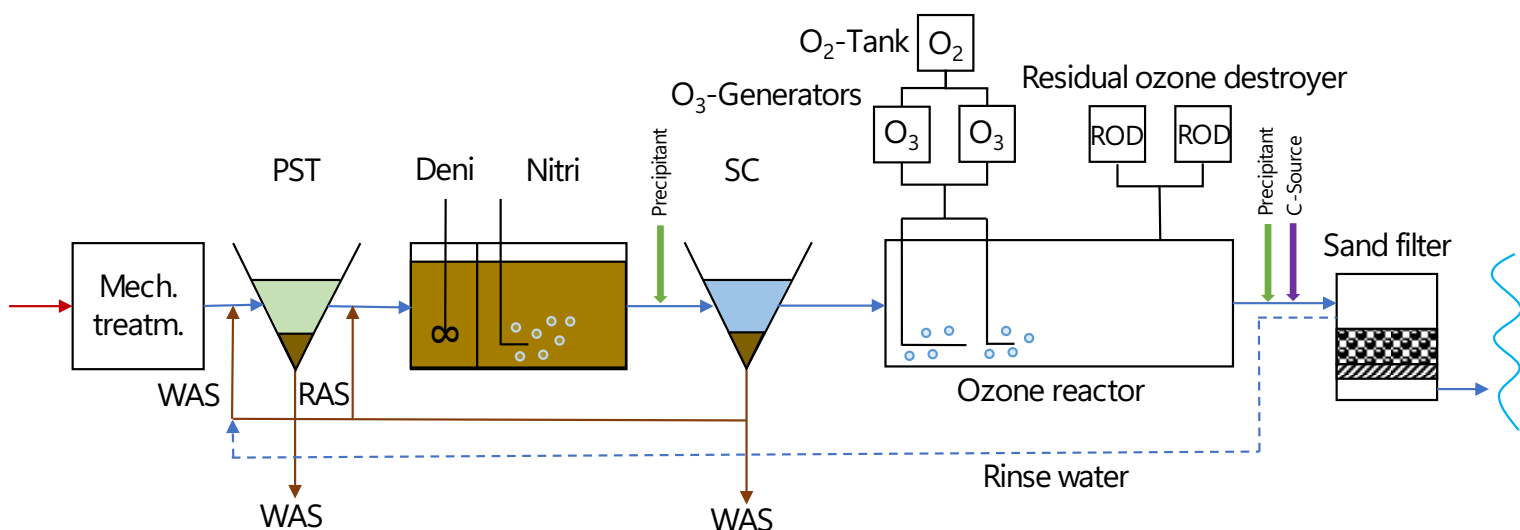


Fig 1: Process diagram of the Friedrichshafen wastewater treatment plant

Design of the ozone stage:

Year of commissioning of the advanced stage				2021
Max. treatable volumetric flow rate	[L/s]	910	Max. ozone production	[kg O ₃ /h] 16.1
<u>Contact reactor</u>		<u>Filter</u>		
▪ Volume	[m³]	1,130	▪ Configuration	Multi-layer sand filter
▪ Retention time at Q _{DW}	[min]	80	▪ Filter media	anthracite (140 cm) quartz sand (60 cm)
▪ Retention time at Q _{max}	[min]	20	▪ Number of filter cells	10
▪ Water depth	[m]	5.9	▪ Total filter area	[m²] 357
▪ Typical ozone dose	[mg/l]	3	▪ Max. filter velocity	[m/h] 10
▪ Injection system	Diffusors		▪ Max. filter influent	[l/s] 910