

SAMPLE WWTP 17 July 2023 - 17 August 2023

PROCESS REPORT

Measured Influent Concentrations

COD	BOD	Total Nitrogen	NH ₄	Total Phosphorus	TSS	VSS
272,08 mg/L	144,44 mg/L	36,41 mg/L	23,78 mg/L	4,18 mg/L	231,55 mg/L	137,58 mg/L

Corrected Influent Concentrations

COD	BOD	Total Nitrogen	NH ₄	Total Phosphorus	TSS	VSS
331,32 mg/L	144,44 mg/L	36,41 mg/L	23,78 mg/L	4,18 mg/L	236,11 mg/L	165,45 mg/L

Difference

COD	BOD	Total Nitrogen	NH ₄	Total Phosphorus	TSS	VSS
21,78 %	0,00 %	0,00 %	0,00 %	0,00 %	1,97 %	20,26 %

Physical Conditions

Average Wastewater Temperature	Average Air Temperature	Average Humidity
24,84 °C	25,92 °C	60,08 %

Operating Conditions

Plant Flow Rate	Average Excess Sludge Flow Rate	Average Excess Sludge Mass
85.708 m ³ /day	1.584 m ³ /day	15.607 kg/day
Average SSAT	Average SSRS-G	Average SSRS-Y
4,49 kg/m ³	9,85 kg/m ³	9,85 kgm ³

Measured Effluent Concentrations

COD	BOD	Total Nitrogen	NH ₄	Total Phosphorus	TSS	VSS
33,67 mg/L	4,48 mg/L	5,61 mg/L	0,10 mg/L	1,44 mg/L	10,08 mg/L	0,00 mg/L

Nitrogen Removal Calculations

Nitrogen Balance

CN,IAT	36,41	mg/L
SNorg,EST	1,14	mg/L
SNH ₄ ,EST	0,10	mg/L
SNO ₃ ,SET	8,00	mg/L
XorgN,BM	7,22	mg/L
SNO ₃ ,D	19,95	mg/L
SNO ₃ ,D / CBOD,IAT 12 °C	0,138	mg/mg
SNO ₃ ,D / CBOD,IAT 24,84 °C	0,122	mg/mg
Minimum Required VD/VAT Ratio	0,25	
Selected VD/VAT Ratio	0,50	
Current Denitrification Capacity	0,17	mg/mg
Min. SF	1,45	
tss,nit,min	1,88	day
tss,min	3,76	day
Current Sludge Age	5,10	

Internal Bridge Velocity

Daily Nitrogen Concentration to be Nitrified	27,95	mg/L
Minimum Required Denitrification Efficiency	71,37	%
Minimum Required TR Ratio	249,33	%
Current Return Sludge Ratio (RS)	83,70	%
Current Internal Recirculation Ratio (IR)	209,18	%
Calculated Denitrification Efficiency	74,55	%
Actual Denitrification Efficiency	84,36	%
Actual Effluent NO3N Concentration	4,37	mg/L

Additional Carbon Requirement

Maximum Denitrifiable Nitrate Concentration	24,45	mg/L
Required Denitrifiable Nitrate Concentration	19,95	mg/L
Denitrification Capacity at Corrected Temperature SNO ₃ ,D/CBOD,IAT	0,17	mg/mg
Nitrate Concentration to be Removed with Additional Carbon SNO ₃ ,D,ExT	0,00	mg/L
Additional Carbon COD Concentration SCOD,DExT	0,00	mg/L
Required Additional COD Amount	0,00	kg/day
Required Methanol Amount	0,00	kg/day
Required Methanol Amount	0,00	m³/day

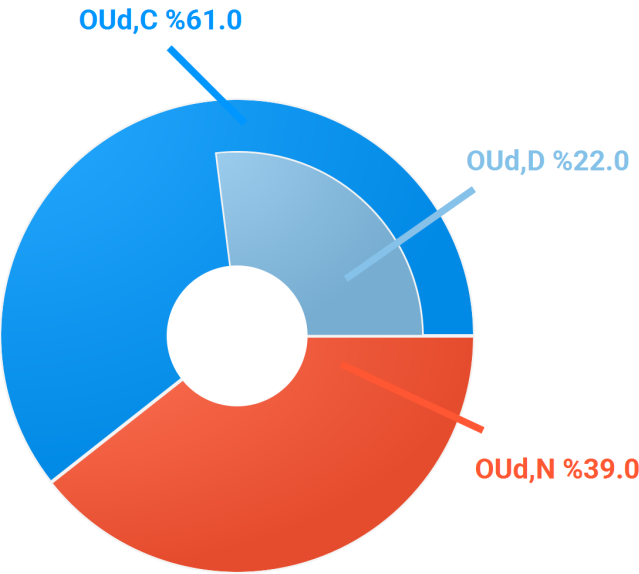
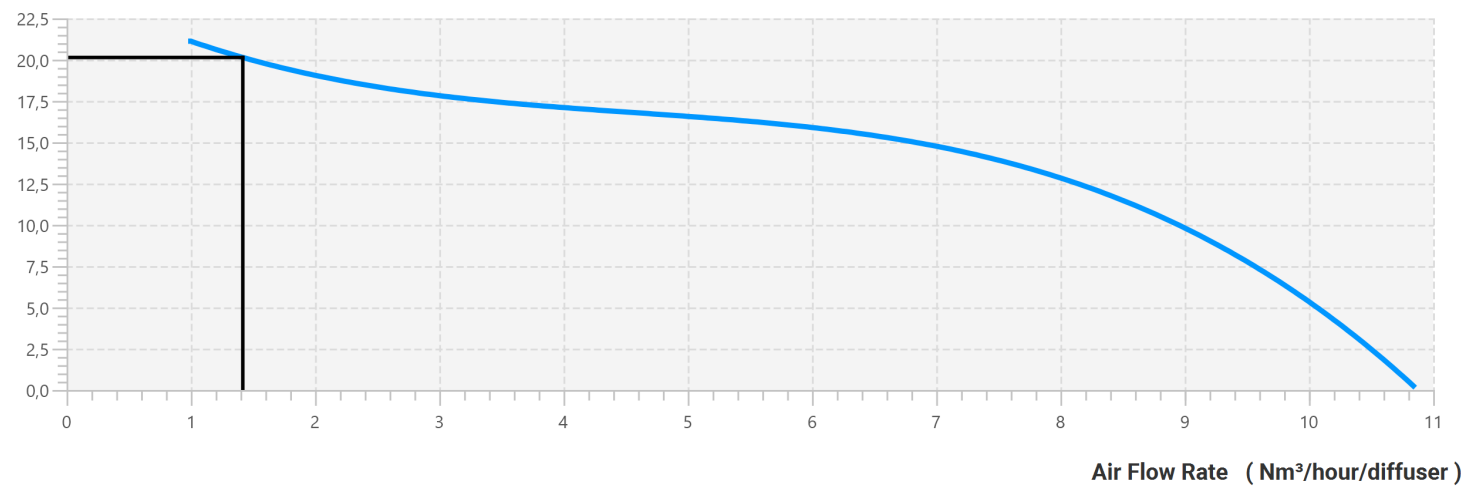
Phosphorus Removal Calculations

TP	4,18	mg/L
CP SET	1,00	mg/L
Normal Phosphorus Uptake	1,44	mg/L
Chemical Phosphorus Removal	0,06	mg/L
Actual Effluent P Concentration	1,44	mg/L
Calculated Advanced P Removal	1,24	mg/L
Dosaged FeCl ₃	108,48	kg/day
Additional FeCl ₃	748,01	kg/day
Maximum Biological P Removal Potential	2,17	mg/L

Oxygen Demand Calculations

Q1	8.602	m³/hr
QL	7.304	Nm³/hr
Fow Rate of Each Diffuser	1,42	Nm³/hr
SSOTR	20,13	gO ₂ /Nm³/m
OC	956	kgO ₂ /hour
α	0,69	
αOC	659	kgO ₂ /hour
fsα	1,53	
βα	0,93	
OUh	846	kgO ₂ /hour
OUd,C	15.853	kgO ₂ /day
OUd,N	10.299	kgO ₂ /day
OUd,D	5.860	kgO ₂ /day
SAE	4,05	kgO ₂ /kWh
Cx	1,03	

SSOTR (gO₂/Nm³/m)



COD Fraction Diagram

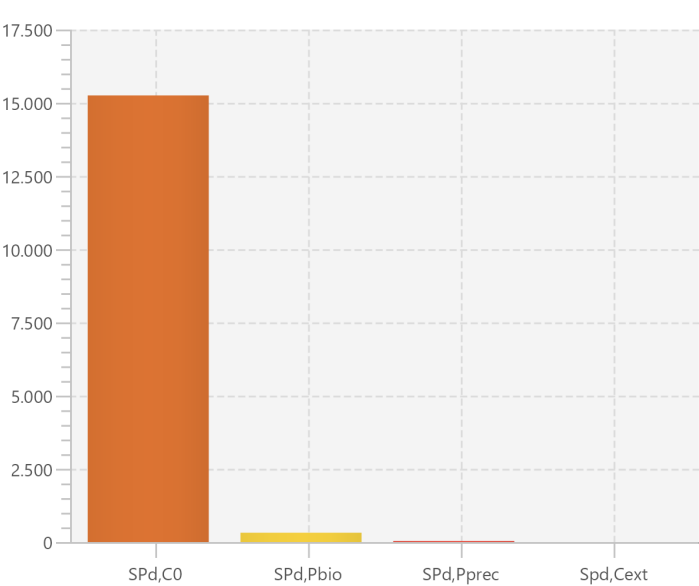
Percent(%)	Influent	Treatment Process	Percent(%)
% 6.61	Scod,inert,IAT	Scod,inert,EST	% 6.61
% 20.98	Scod,deg,IAT	OU	% 55.83
% 50.9	Xcod,deg,IAT		
		Xcod,BM,inert	% 7.22
% 21.51	Xcod,inertIAT	Xcod,inert,IAT	% 21.51

Carbon-Nitrogen-Phosphorus (C-N-P) Ratio			
	C	N	P
BOD	100	25	2,90
	C	N	P
COD	100	11	1,26

COD	BOD	COD / BOD
331,32 mg/L	144,44 mg/L	2,29
A	B	Influent Measured B
0,30	0,30	0,41

Sludge Production Calculations

SPd,C	15.251	kgDS/day
SPd,Pbio	319	kgDS/day
SPd,Pprec	37	kgDS/day
SPd,Cext	0	kgDS/day
Total Solids Production	15.607	kgDS/day
Sludge Age	13,22	day
F/M	0,06	kg/kg*day
Volumetric Loading Rate	0,27	kg/m³*day
Average Polymer Consumption	71,38	kg Poly/day
Polymer Used	4,57	kg Poly/Ton DS
Average DS Ratio	22,56	%



Alkalinity Calculations

TN	36,41	mg/L
NH ₄	23,78	mg/L
NH ₄ / TN	0,65	
Influent Alkalinity as CaCO ₃	284,11	mg/L
SALK.IAT	6,93	mmol/L
Influent NH ₄ Concentration	23,78	mg/L
Alkalinity Gained from Ammonification	0,88	mmol/L
Alkalinity Loss from Organic Nitrogen Formation	-0,59	mmol/L
Alkalinity Loss from Nitrification	-3,91	mmol/L
Alkalinity Gained from Denitrification	1,65	mmol/L
Alkalinity Loss from Chemical Phosphorus Removal	-0,01	mmol/L
Alkalinity at Aeration Tank Outlet (SALK, EAT)	4,96	mmol/L
pH - Aeration Tank Outlet Actual	6,29	
pH - Aeration Tank Outlet Calculated	6,51	