

DAGUÀ

DRINKING WATER...WITHOUT CHEMICALS

Rate (m ³ /jour)		1,000	25,000	36,000	100,000	250,000	500,000	
Pre-ozonation	Oxygen consumption (m ³ /h)	0.6	11.9	17.1	47.4	118.5	237.1	
	Annual consumption (m ³)	5,197.34	103,946.86	149,683.48	415,291.28	1,038,228.19	2,076,704.47	
	Annual Cost	\$1,039.47	\$20,789.37	\$29,936.70	\$83,058.26	\$207,645.64	\$415,340.89	
	% of Annual cost	22.3%	117.8%	117.8%	126.4%	148.0%	156.5%	
	Cooler Electric Power (kW)	0.56	11.2	16.1	18.9	56.6	113.2	
	Annual Electric Power (kW)	4,905.60	98,112.00	141,281.28	165,272.00	495,816.00	991,632.00	
	Annual Cost	\$372.83	\$7,456.51	\$10,737.38	\$12,560.67	\$37,682.02	\$75,364.03	
	% of Annual cost	105.4%	111.1%	111.1%	50.3%	70.7%	74.7%	
	Ozone Production Electric Power (kW)	1.3	25.5	36.7	100.0	200.4	470.0	
	Annual Electric Power (kW)	11,154.40	223,088.00	321,246.72	876,000.00	1,755,504.00	4,117,200.00	
	Annual Cost	\$847.73	\$16,954.69	\$24,414.75	\$66,576.00	\$133,418.30	\$312,907.20	
	% of Annual cost	239.7%	252.7%	252.7%	266.6%	250.3%	310.2%	
	Pump Inlet Electric Power (kW)	7.0	140.2	201.9	632.4	1276.6	2553.3	
	Annual Electric Power (kW)	61,404.00	1,228,080.06	1,768,435.29	5,539,424.96	11,183,367.38	22,366,734.76	
	Annual Cost	\$4,666.70	\$93,334.08	\$134,401.08	\$420,996.30	\$849,935.92	\$1,699,871.84	
	% of Annual cost							
	Pump Pressure Electric Power (kW)	2.6	52.2	75.2	193.9	387.8	596.6	
	Annual Electric Power (kW)	22,863.19	457,263.85	658,459.95	1,698,408.60	3,396,817.20	5,225,872.61	
	Annual Cost	\$1,737.60	\$34,752.05	\$50,042.96	\$129,079.05	\$258,158.11	\$397,166.32	
	% of Annual cost	491.2%	518.0%	518.0%	516.8%	484.3%	393.8%	
Compressor Electric Power (kW)	1	5	7.2	10	17	17		
Annual Electric Power (kW)	4,380.00	43,800.00	63,072.00	87,600.00	151,840.00	151,840.00		
Annual Cost	\$332.88	\$3,328.80	\$4,793.47	\$6,657.60	\$11,539.84	\$11,539.84		
% of Annual cost	9.2%	4.9%	4.9%	2.7%	2.3%	1.3%		
Low Pressure Compressor Electric Power (kW)	0.8	16.7	24.0	55	125	250		
Annual Electric Power (kW)	365.00	7,300.00	10,512.00	24,090.00	54,750.00	109,500.00		
Annual Cost	\$27.74	\$554.80	\$798.91	\$1,830.84	\$4,161.00	\$8,322.00		
% of Annual cost	0.8%	0.8%	0.8%	0.7%	0.8%	0.9%		
Aeration Basin Fan Electric Power (kW)	0.4	6.7	9.6	43.3	73.3	160		
Annual Electric Power (kW)	3,893.33	58,400.00	84,096.00	379,600.00	642,400.00	1,401,600.00		
Annual Cost	\$295.89	\$4,438.40	\$6,391.30	\$28,849.60	\$48,822.40	\$106,521.60		
% of Annual cost	8.2%	6.6%	6.6%	11.7%	9.9%	11.7%		
Post-ozonation	Oxygen Annual consumption (m ³ /h)	0.6	11.9	17.1	47.4	118.5	237.1	
	Annual consumption (m ³ /h)	5,197.34	103,946.86	149,683.48	415,291.28	1,038,228.19	2,076,704.47	
	Annual Cost	\$1,039.47	\$20,789.37	\$29,936.70	\$83,058.26	\$207,645.64	\$415,340.89	
	Cooler Electric Power (kW)	0.56	11.2	16.1	18.9	56.6	113.2	
	Annual Electric Power (kW)	4,905.60	98,112.00	141,281.28	165,272.00	495,816.00	991,632.00	
	Annual Cost	\$372.83	\$7,456.51	\$10,737.38	\$12,560.67	\$37,682.02	\$75,364.03	
	Ozone Production Electric Power (kW)	1.3	25.5	36.7	100.0	200.4	470.0	
	Annual Electric Power (kW)	11,154.40	223,088.00	321,246.72	876,000.00	1,755,504.00	4,117,200.00	
	Annual Cost	\$847.73	\$16,954.69	\$24,414.75	\$66,576.00	\$133,418.30	\$312,907.20	
	TOTAL COSTS	Pre-ozonation oxygen m ³ / yr	5,197.34	103,946.86	149,683.48	415,291.28	1,038,228.19	2,076,704.47
Pre-ozonation oxygen \$/ yr		\$1,039.47	\$20,789.37	\$29,936.70	\$83,058.26	\$207,645.64	\$415,340.89	
Pre-ozonation electricity kW/ yr		47,561.53	887,963.85	1,278,667.95	3,230,970.60	6,497,127.20	11,997,644.61	
Pre-ozonation electricity \$/ yr		\$3,614.68	\$67,485.25	\$97,178.76	\$245,553.77	\$493,781.67	\$911,820.99	
Pre-ozonation operation \$/ yr		\$4,654.14	\$88,274.63	\$127,115.46	\$328,612.02	\$701,427.31	\$1,327,161.88	
Post-ozonation oxygen m ³ / yr		5,197.34	103,946.86	149,683.48	415,291.28	1,038,228.19	2,076,704.47	
Post-ozonation oxygen \$/ yr		\$1,039.47	\$20,789.37	\$29,936.70	\$83,058.26	\$207,645.64	\$415,340.89	
Post-ozonation electricity kW/ yr		16,060.00	321,200.00	462,528.00	1,041,272.00	2,251,320.00	5,108,832.00	
Post-ozonation electricity \$/ yr		\$1,220.56	\$24,411.20	\$35,152.13	\$79,136.67	\$171,100.32	\$388,271.23	
Post-ozonation operation / yr		\$2,260.03	\$45,200.57	\$65,088.82	\$162,194.93	\$378,745.96	\$803,612.13	
Costs are calculated Qaverage (ie Qmax * 50%). Pumps were removed from the total input power \$ for comparison with the EPA study.		TOTAL Oxygen m ³ / yr	10,394.69	207,893.72	299,366.96	830,582.55	2,076,456.38	4,153,408.93
TOTAL Oxygen \$/yr		\$2,078.94	\$41,578.74	\$59,873.39	\$166,116.51	\$415,291.28	\$830,681.79	
TOTAL Electricity kW/yr		63,621.53	1,209,163.85	1,741,195.95	4,272,242.60	8,748,447.20	17,106,476.61	
TOTAL Electricity \$/yr		\$4,835.24	\$91,896.45	\$132,330.89	\$324,690.44	\$664,881.99	\$1,300,092.22	
Electricity \$/m3		\$0.0132	\$0.0101	\$0.0101	\$0.0089	\$0.0073	\$0.0071	
TOTAL operation / yr	\$6,914.17	\$133,475.20	\$192,204.28	\$490,806.95	\$1,080,173.26	\$2,130,774.01		
Unit Cost (\$/m3)	\$0.0189	\$0.0146	\$0.0146	\$0.0134	\$0.0118	\$0.0117		

Assumptions:
Injection of 3 ppm of ozone pre-ozonation of 3 ppm and post-ozonation.
Price of Oxygen / m3 \$ 0.20
Price per kW Electricity \$ 0.076