

CITY OF UNALASKA
UNALASKA, ALASKA

ORDINANCE 2021-09

CREATING BUDGET AMENDMENT #7 TO THE FISCAL YEAR 2021 BUDGET, APPROPRIATING AN ADDITIONAL \$300,000 FROM THE WATER PROPRIETARY FUND FOR THE PYRAMID WTP CHLORINE UPGRADES PROJECT

BE IT ENACTED BY THE UNALASKA CITY COUNCIL:

- Section 1. Classification: This is a non-code ordinance.
Section 2. Effective Date: This Ordinance becomes effective upon adoption.
Section 3. Content: The City of Unalaska FY21 Budget is amended as follows:

- A. That the following sums of money are hereby accepted and the following sums of money are hereby authorized for expenditure.
B. The following are the changes by account line item:

Amendment #7 to Ordinance #2020-10

	<u>Current</u>	<u>Requested</u>	<u>Revised</u>
I. OPERATING BUDGETS			
A. Water Proprietary Fund			
Sources:			
Budgeted Use of Unrestricted Net Assets	\$ 1,160,088	\$ 300,000	\$ 1,460,088
Uses:			
Transfer to Enterprise Capital Project	\$ 259,735	\$ 300,000	\$ 559,735
II. CAPITAL PROJECT BUDGETS			
A. Pyramid WTP Chlorine Upgrades Project			
Sources:			
Transfer From Water Operating	\$ 100,000	\$ 300,000	\$ 400,000
Uses:			
Machinery & Equipment	\$ -	\$ 300,000	\$ 300,000

PASSED AND ADOPTED by a duly constituted quorum of the Unalaska City Council on _____, 2021.

Mayor

ATTEST:

City Clerk

City of Unalaska
Summary of Budget Amendment and Schedule of Proposed Accounts
Budget Amendment 7 to the FY21 Budget

- 1) Water Proprietary Fund - Operating Budget
 Add \$300,000 to Transfers to Enterprise Capital Projects for the Pyramid WTP Chlorine Upgrades Project
 Add \$300,000 to Budgeted Use of Unrestricted Net Assets
- 2) Capital Project - Pyramid WTP Chlorine Upgrades Project
 Add \$300,000 to Machinery and Equipment for owner furnished materials
 Add \$300,000 to Transfers from Proprietary Ops - Water Fund

	Org	Object	Project	Current	Requested	Revised
1) <u>Water Proprietary Fund - Operating Budget</u>						
Sources:						
Budgeted Use of Unrestricted Net Assets	51015549	49910		\$ 1,160,088	\$ 300,000	\$ 1,460,088
Uses:						
Transfers To Enterprise Capital Project	51029854	59940		\$ 259,735	\$ 300,000	\$ 559,735
2) <u>Capital Project Budgets - Water</u>						
<i>Pyramid WTP Chlorine Upgrades Project</i>						
Sources:						
Transfers From Proprietary Ops - Water	51119848	49130	WA21A	\$ 100,000	\$ 300,000	\$ 400,000
Uses:						
Machinery and Equipment	51125553	57400	WA21A	\$ -	\$ 300,000	\$ 300,000

MEMORANDUM TO COUNCIL

To: Mayor and City Council Members
From: Tom Cohenour, Director, Department of Public Works
Through: Erin Reinders, City Manager
Date: April 27, 2021
Re: Ordinance 2021-09 - Creating Budget Amendment #7 to the Fiscal Year 2021 Budget, Appropriating an Additional \$300,000 from the Water Proprietary Fund for the Pyramid WTP Chlorine Upgrades Project

SUMMARY: In order to achieve economy of scale between the PWTP Chlorine Upgrades Project and the PWTP Micro Turbines Project, staff is requesting \$300,000 to purchase Owner Furnished Materials for the Chlorine Upgrades Project and install them during the Micro Turbines Project construction. Funding will come from the Unrestricted Net Assets of the Water Proprietary Fund. Staff estimates a savings of up to \$200,000 if the Projects are constructed concurrently. If complications arise during the equipment procurement process or contractor negotiation that do not allow these projects to be constructed concurrently these savings will not be realized. However, without approval of this proposed Budget Amendment there is no chance of capturing these savings. Staff recommends approval.

PREVIOUS COUNCIL ACTION: This Project was funded at \$100,000 via the FY2021 Capital Budget appropriation Ordinance No. 2020-10, passed and adopted on June 9, 2020. Council has taken no other action on the Project.

BACKGROUND: This project was funded in order to move the Water Utility away from shipping chlorine gas used for potable water disinfection to Unalaska. Chlorine gas has been difficult to obtain, is becoming more regulated by the Federal Government, most likely will cause the Utility to be required to perform an expensive Corrosion Study and add a corrosion control inhibitor to the potable water supply, is inherently dangerous to bring to the Plant, and the machinery and equipment required to utilize it is both time consuming and expensive to operate and maintain. This Project funds the Utility's switch to on-site generation of liquid sodium hypochlorite (bleach), a much safer and cost-effective means of potable water disinfection. The machinery to be purchased is similar to that already in use at the Wastewater Treatment Plant and Aquatics Center.

DISCUSSION: This Budget Amendment request is driven by analysis that, if this project is constructed concurrently with the PWTP Micro Turbines Project, the City will realize a six figure cost savings over building both as standalone projects:

- materials and labor for components of the PWTP Micro Turbines Project would become unnecessary or require replacement when the Chlorine Upgrade Project is constructed

- the PWTP Micro Turbines Project requires a supplemental I/O panel for SCADA integration with chlorine gas injection, and this panel and the associated programming would not be required once the PWTP Chlorine Upgrade Project is constructed
- savings on mobilization and demobilization of a new construction crew if the machinery and equipment installation is integrated into the PWTP Micro Turbines Project
- reduced construction administration and inspection costs through project integration
- reduced bid support and bid selection costs

The funds requested will be used to purchase the generating equipment this fiscal year instead of in FY22 as the CMMP nomination set out in its timeline, and the request for FY22 funding will be reduced by this amount.

The City Engineer’s memo outlining the benefits of integrating the two Projects, including a detailed breakdown of estimated cost savings, is attached.

ALTERNATIVES: Council may elect to wait to fund the construction of this Project until FY22, per the current CMMP Nomination, or abandon the Project altogether. Staff believes neither of these options are in the best interests of the Water Utility, the City, or the Citizens of our community.

FINANCIAL IMPLICATIONS: Of the initial \$100,000 in funding, \$59,844 has been encumbered on a Purchase Order to the designer, Taku Engineering. There is \$40,156 remaining in the budget. Staff estimates it will cost \$300,000 to purchase the owner furnished equipment portion of this project. The portion of the project budget that would be effected by approving this Budget Amendment request is set forth below.

PWTP CHLORINE UPGRADES PROJECT WA21A				
SOURCE				
WATER PROPRIETARY FUND	G/L CODE	CURRENT	THIS REQUEST	REVISED BUDGET
BUDGETED USE OF UNRESTRICTED NET ASSETS	5101-5549-49910	\$ 1,160,088	\$ 300,000	\$ 1,460,088
USE				
	G/L CODE	CURRENT	THIS REQUEST	REVISED BUDGET
MACHINERY & EQUIPMENT	5112-5553-57400 WA21A	\$ -	\$ 300,000	\$ 300,000
		\$ -	\$ 300,000	\$ 300,000

LEGAL: Not applicable in this instance.

STAFF RECOMMENDATION: Staff recommends approval of this Budget Amendment to fund the purchase of Owner Furnished Materials for the PWPT Chlorine Upgrade Project allowing for the possibility to see substantial cost savings if procurement and contractor negotiations proceed as planned.

PROPOSED MOTION: “I move to approve Ordinance 2021-09”.

CITY MANAGER COMMENTS: I support this request and staff's recommendation. Staff reviewed this concept with Council at the April 12, 2021 Council meeting as part of the CMMP review. We have reduced the CMMP request for FY22 by \$300,000 to match this Budget Amendment for FY21.

ATTACHMENTS: Memo from Bob Cummings, City Engineer, to DPU Director Dan Winters, DPW Director Tom Cohenour, and Water Utility Supervisor Jeremiah Kirchhofer, dated April 6, 2021, with attachment



MEMORANDUM

TO: Dan Winters, Public Utilities Director
Tom Cohenour, Public Works Director

CC: Jeremiah Kirchhofer, Water Division Supervisor

FROM: Bob Cummings, City Engineer

DATE: April 6, 2021

SUBJECT: Pyramid Micro Turbines Project & Chlorine Upgrade Project Integration

Currently the Pyramid Micro Turbines Project is scheduled to be constructed between October 1, 2021 and December 1, 2021 by Industrial Resources, Inc. (IRI). Roughly \$190,000 remains unencumbered in this project budget in the engineering, construction administration and contingency line items. The construction of this project was originally scheduled to be performed in October – December of 2020 but due to COVID and supplier delays the construction window was pushed back. Monies for final design and construction were appropriated in FY20.

The Chlorine Upgrade Project was appropriated \$100,000 for engineering design in FY21. To date approximately \$60,000 has been encumbered through a contract with Taku Engineering to do the engineering design for this project. The current CMMP is requesting \$881,500 for FY 22 to complete this project through equipment purchase and construction. As currently planned, the design and equipment selected by June. The equipment can be purchased and the advertisement of bids done in July with the contractor being selected in August and the project constructed in January of 2022. These two projects were originally planned to be constructed two years apart, but due to COVID and other factors, they are currently on schedule to be constructed three months apart.

However, there are likely significant cost savings if these projects can be integrated. Taku Engineering has estimated that more than \$200,000 can be saved if the projects are integrated versus if they are completed as stand-alone projects. The cost savings are a result of savings from the following sources:

- materials and labor for components of the microturbines project that would become unnecessary or require replacement when the chlorine upgrade project is constructed
- currently a supplemental I/O panel is required for SCADA integration with chlorine gas injection, but this panel and the associated programming would not be required with the chlorine upgrade project
- savings on mobilization and demobilization of a new construction crew
- reduced construction administration and inspection costs through project integration
- reduced bid support and bid selection costs

In addition to these cost savings there would other advantages such as less interruption to Water Division operations and the advantage of more immediate improved water quality through producing water that is less acidic due to the Chlorine Upgrade project.

Going forward there are two main options:

1. Status Quo – projects constructed at two different times as standalone projects
2. Project Integration – Projects constructed concurrently

1. Status Quo – Standalone

Advantages

1. Only relies on CMMP approval as proposed

Disadvantages

1. Increased cost
2. Additional bidding process required
3. Additional staff time required
4. Increased construction administration/ inspection
5. Increased disruption of Water Division operations
6. Delay of improved water quality

2. Project Integration – Concurrent Construction

In this option, a budget amendment would be required to move funds from chlorine upgrade project into the microturbines project budget. At a minimum the amount required for equipment purchase, approximately \$300,000, would be required to be transferred. This process would have to be completed by mid-May in order for this option to be feasible due to the lead time of this equipment. In preliminary talks with IRI they have expressed interest in performing the Chlorine Upgrade Project as a change order to their Microturbines Project contract.

Advantages

1. Decreased cost
2. Decreased staff time
3. Decreased construction administration/ inspection
4. Less disruption of Water Division operations
5. Delivery of improved water quality is expedited
6. No additional bidding process required

Disadvantages

1. Budget Amendment is required
2. Assumes CMMP funds will be approved for construction phase of the project
3. Design and Equipment delivery timelines are more critical

Due to the significant cost savings that can be achieved by integrating the Pyramid Micro Turbines and the Chlorine Upgrade Projects I would recommend that we seriously consider requesting a budget amendment to approve funds for the equipment purchase for the Chlorine Upgrade Project. This would not be a request for “additional” funds per se but rather a request to expedite the approval of funds as currently proposed on the CMMP. By expediting these funds, it is estimated that the City can save over \$200,000.

Enclosure: Sodium Hypochlorite Project Cost Analysis Standalone vs. Combined performed by Taku Engineering

Combined Project (PWTP Chlorine Upgrade & Microturbines)

TURBINE CONSTRUCTION DEDUCTIONS

ITEM	QTY	UNIT PRICE	LABOR HRS	LABOR RATE	LODGING/PER DEIM	FREIGHT	TOTAL
PLC	1 (Not in bid)		24	140		500	5360
Exist Chlorine System							
Commissioning (Boreal)	1	0	60	200		1500	13500
Commissioning Standby (Other Crafts)	1	0	80	140		1000	12200
Piping Demolition	1	500	20	140		1000	4800
Piping Reconfiguration	1	8000	60	140		2000	19900
Field Wiring Devices	1	3000	40	140		1000	10350
						TOTAL	66110
						CONTINGENCY (20%)	13222
						TOTAL DEDUCTIONS	\$79,332

CHLORINE ADDITIONS

ITEM	QTY	UNIT PRICE	LABOR HRS	LABOR RATE	LODGING/PER DEIM	FREIGHT	TOTAL
Field Wiring Devices	1	1000	40	140		1000	8350
Piping Demolition	1	500	40	140		1000	7600
Piping Reconfiguration	1	8000	30	140		2000	15700
Demolition of Gaseous Chlorine System	1	500	40	140		750	7350
Install of Sodium Hypochlorite Generators	2	1000	40	140		1000	9100
Commissioning of New Sodium Hypochlorite System (Boreal)	1		40	200		1000	9000
Commissioning Standby (Other Crafts)	1		40	140		1000	6600
						TOTAL	63700
						CONTINGENCY (20%)	12740
						TOTAL ADDITIONS	\$76,440

TOTAL PROJECT INSTALLATION COST performed as a COMBINED project - \$2,892
(Excluding Sodium Hypochlorite Generation Equipment)

Separate Projects (PWTP Chlorine Upgrade & Microtubines)

TEMPORARY TURBINE WORK REQUIRED

ITEM	QTY	UNIT PRICE	LABOR	LABOR RATE	LODGING/PER DEIM	FREIGHT	TOTAL
PLC	1	25,000	24	140	500	1500	30360
Exist Chlorine System Commissioning (Boreal)	1	0	60	200	1500	0	13500
Commissioning Standby (Other Crafts)	1	0	80	140	1000	0	12200
Piping Demolition	1	500	20	140	1000	500	4800
Piping Reconfiguration	1	8000	60	140	2000	1000	19400
Field Wiring Devices	1	3000	40	140	1000	1000	10600
						TOTAL	90860
						CONTINGECY (20%)	18172
						REQUIRED TURBINE WORK	\$109,032

CHLORINE ADDITIONS

ITEM	QTY	UNIT PRICE	LABOR	LABOR RATE	LODGING/PER DEIM	FREIGHT	TOTAL
Demolish Gaseous Chlorine and PLC Wiring	1	1000	20	140	750	500	5050
Field Wiring Devices	1	1000	40	140	1000	1000	8600
Piping Demolition	1	500	40	140	1000	500	7600
Piping Reconfiguration	1	8000	30	140	2000	1000	15200
Demolition of Gaseous Chlorine System	1	500	40	140	750	500	7350
Install of Sodium Hypochlorite Generators	2	1000	40	140	1000	500	9100
Commissioning of New Sodium Hypochlorite System (Boreal)	1	0	40	200	1000	0	9000
Commissioning Standby (Other Crafts)	1	0	40	140	1000		6600
Electrician Mob/Demob	1	2500	20	140	300	800	6400
Pipefitter Mob/Demob	1	2500	20	140	300	800	6400
Project Kickoff	1	0	8	140	0	0	1120
						TOTAL	77370
						CONTINGENCY (20%)	15474
						TOTAL ADDITIONS	\$92,844

TOTAL PROJECT INSTALLATION COST performed as STANDALONE projects **\$201,876**
(Excluding Sodium Hypochlorite Generation Equipment)

TOTAL PROJECT INSTALLATION COST performed as a COMBINED project **-\$2,892**
(Excluding Sodium Hypochlorite Generation Equipment)

ADDITIONAL Cost of performing projects as STANDALONE versus COMBINED **\$204,768**

MICROCLOR

The Next Generation

It is well known that chlorine is a powerful disinfectant used in water treatment and plays a vital role in controlling bacteria and viruses that can cause human illness.

More stringent regulations for transportation and storage of bulk chlorine or pressurized chlorine gas have required many to search for alternative methods of disinfection.

Onsite generation of sodium hypochlorite alleviates the safety concerns associated with storing and using bulk sodium hypochlorite or chlorine gas.



300 PPD

Systems Capable of 20 to 3600 Pounds
per Day Chlorine Equivalent

The MicroClor vertical cell array (V-Ray) allows for the instantaneous passive removal of all hydrogen produced.

Making Bleach Made Easy

- Low Cost Hypochlorite
- Enhanced Performance
- Small Footprint
- 24 Hour Service
- Safe
- Vertical V-Ray Cell Design
- Immediate Hydrogen Removal
- Reduce Scaling
- Low Maintenance

V-Ray
Technology

MICROCLOR



40 PPD

The state of the art patent pending Microclor onsite hypochlorite generation system is a brand new design built upon twenty years of dedicated research and development in the field of onsite hypochlorite generation.

The design incorporates all of the advantages of current industry standards while radically improving all safety aspects of the process. Specifically, the manner in which hydrogen is removed from the electrolytic cell is a huge improvement over more conventional horizontal tubular designs.

The MICROCLOR onsite hypochlorite generation system incorporates a multitude of unique features that are now patent pending. The most significant features are as follows:

1. Passive hydrogen removal.
2. Brine conductivity control.
3. Full wave D.C. rectification.
4. No cell electrode penetrations.
5. High velocity electrolyte flow.
6. Higher performance level.
7. Recirculating cell loop.
8. No internal cell baffles or gasketing.

There is no other onsite hypochlorite system in the marketplace today that possesses even one of the above advantages, no less all eight.

A brief discussion of each feature follows:

Passive Hydrogen Removal

The V-Ray cells are configured in a vertical format with a recirculation loop on each cell that allows for optimized brine utilization and passive release of the hydrogen gas from each cell. Hydrogen gas is not allowed to pass from cell to cell. This design radically increases operator safety and substantially reduces the possibility of hydrogen gas build-up in the cell and the potential of catastrophic failure. Immediate hydrogen removal at the top of each cell loop greatly reduces electrode blinding and associated heat buildup.

Brine Conductivity Control

Constant current is achieved via a current feedback loop where the brine pump speed is controlled by the system programmable logic controller. This feedback loop accounts for variations in temperature, conductivity and water flow. The titanium, Teflon impregnated gear pump is attached to a variable speed drive that continually provides a consistent blended electrolyte flow to the cells maximizing salt efficiency.

Full Wave D.C. Rectification

The DC Rectifier design consists of a fully isolated step-down transformer and bridge rectifier. DC voltage is fixed with primary taps for + 5, 10% voltage correction. DC ripple is less than 4.0% with a power factor of 99% or better. Switching rectifier or phase angle fired SCR voltage correction technology is not utilized as this twenty year old technology has an excessively high failure rate.

No Cell Electrode Penetrations

The V-Ray cells consist of thirteen internal bipolar electrodes while the cell outer plates serve as both terminating anode and cathode. All anodic surfaces are coated with DSA catalytic coating. The design of the cell precludes the need for wet D.C. cable connections or problematic O-ring seals.

High Velocity Electrolyte Flow

The passive hydrogen gas removal provides a hydraulic lift within the V-Ray cell loop which causes a high velocity flow through the recirculation loop and across the V-Ray cell plates. This high velocity flow results in a scouring action between the vertically mounted V-Ray cell plates. This novel self cleaning feature virtually eliminates the need for acid cleaning of the electrolytic cells and reduces heat build up.

Higher Performance Level

PSI's proprietary patent pending vertical V-Ray cell design provides for a far more efficient generation platform than the industry standard of 3.5 pounds salt and 2.5 KWH per pound chlorine equivalent.

The MICROCLOR vertical V-Ray cell produces hypochlorite at 0.8% while consuming less than 3 pounds of salt and 2.0 AC KWH per pound of equivalent chlorine.

There is no competitive open cell process available which is more efficient than the MICROCLOR System.

PSI welcomes a side by side comparison with any manufacturer claiming higher performance levels than MICROCLOR.

No Internal Cell Baffles or Gasketing

There are no internal cell baffles, gaskets or fasteners found inside the cell. The cells are built with clear acrylic guides that support the internal bi-polar plates that allows for direct visual inspection of the plates. Anode and Cathode mono-polar plates are surface mounted to the outside of the acrylic guides.

V-Ray Cell maintenance and replacement

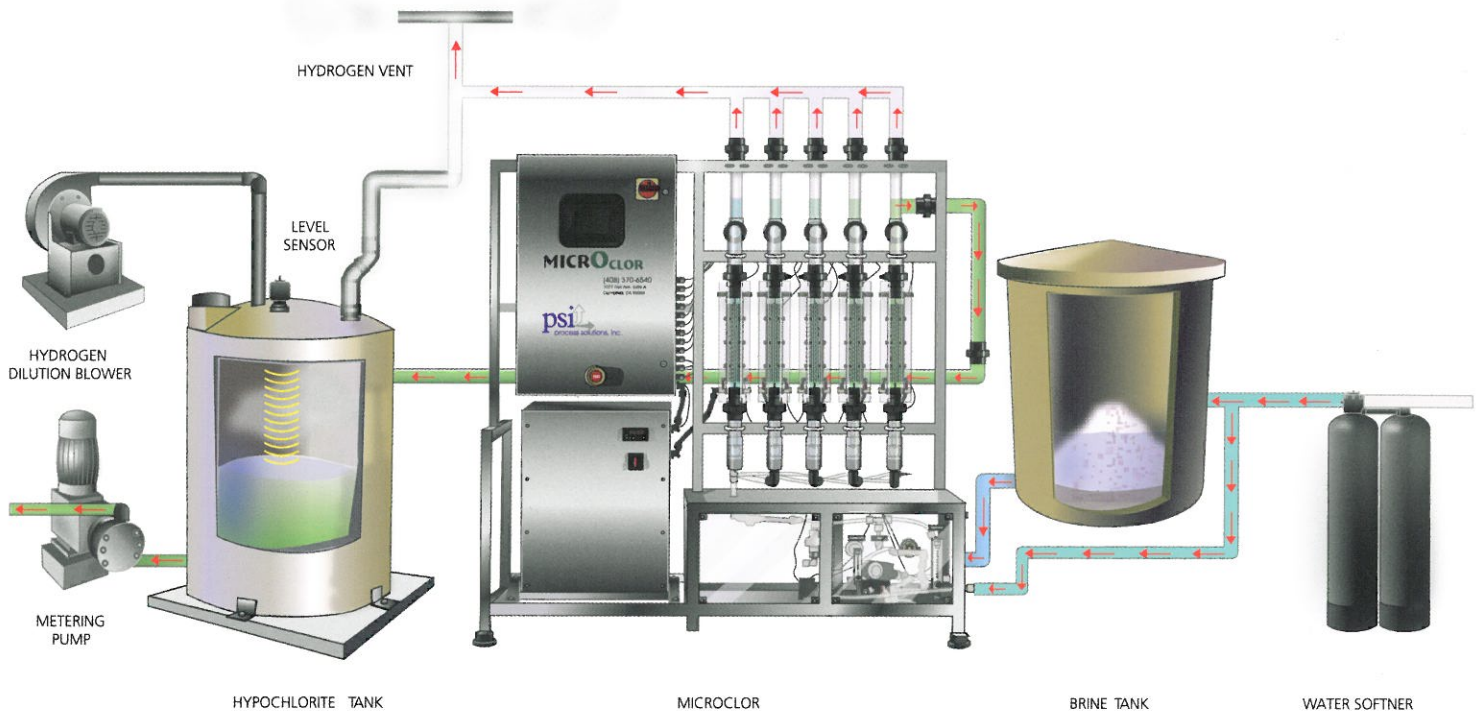
The Microclor vertical V-Ray cell design allows for the cell to easily be removed from the cell carrier piping by simply breaking two unions. This makes for simple cell maintenance and or replacement.

The Microclor design has taken into account every imaginable failure scenario including direct operator error in the handling of the process equipment.

Sequential operations logic is provided for all process variables where the change from standby to process is confirmed for all sensor locations at each start sequence. This auto diagnostic routine locks out generation in the event of sensor failure or electrical bypass.

Microclor hypochlorite systems meet requirements for 20 to 3600 pounds per day chlorine equivalent.

The Next Generation Onsite Hypochlorite Generator



The MicroOclor is modular in design and based on standard components. These components may be customized to meet a wide range of requirements.

Standard components for the MicroOclor system include:

- Stainless Steel Skid Assembly
- Water Softener
- Brine Tank
- Brine Pump
- Electrolytic Cells
- Skid mounted PLC Control Panel
- D.C. Rectifier
- Hypochlorite Storage Tank
- Hypochlorite Metering Pump
- Hydrogen Dilution Blower

Model/Capacity	Cell Size W X H	# of Cells	H2O GPM	Brine GPM	DC Amps	KVA	FLA 208/240 1PH	FLA 480 3 PH
20	2 x 12	1	0.2	0.02	40	2.4	11.5/11	-
40	2 x 12	2	0.4	0.03	80	4.8	23/22	-
60	2 x 12	3	0.6	0.05	120	7.2	35/33.5	-
80	2 x 12	4	0.8	0.07	160	9.6	46/44	13
100	2 x 12	5	1	0.08	40	12	-	16
200	4 x 12	5	2	0.17	80	24	-	32
300	6 x 12	5	3	0.25	120	36	-	48
600	12 x 12	5	6	0.50	240	72	-	96
900	18 x 12	5	9	0.75	320	96	-	128
1200	24 x 12	5	12	1.00	480	144	-	192
1800	24 x 18	5	18	1.50	720	216	-	288

Note: Typical Nominal Operating Amperage is 75% of Full Load Amperage

Capacities: 20-3600 pounds per day free available chlorine.
 Control: Automatic, regulated by storage tank level.
 Percentage Sodium Hypochlorite: 0.8 + 0.05
 Consumables per pound of chlorine produced:
 3lbs salt, 2KWH (AC), 15 gallons water.
 Water Input: Potable water, 30-80 PSI, 40°F-80°F (5°C-27°C)
 Salt: 99.7% pure dry weight Morton White Crystal or equivalent.

Power: 20-80ppd systems - 208V or 240V AC, 1PH, 60HZ
 80-1800ppd systems- 480V, 3PH, 60HZ
 Control Cabinet: 304 stainless steel NEMA 4X
 Operator Interface: 6" Color Touchscreen
 Programmable Logic Controller: Allen Bradley 1200
 Brine Tank & Hypochlorite Storage Tank shall be appropriately sized for each application.



MICROCLOR

The Next Generation

Comprehensive Warranty

It is our policy to provide every customer with a state of the art, fully tested system. Each MicroClor Hypochlorite Generation System carries a full three-year support agreement covering all parts and labor. In addition, the electrolytic cells and cell housings are warranted on a prorated basis for years 4-7.

Service & Support

PSI prides itself on our service and technical support. We offer complete support for your MicroClor Hypochlorite Generation System including all peripheral components. 24-7 phone support and next day parts are available for your MICROCLOR System. PSI guarantees next day field service, 7 days a week, with technicians located in all major markets plus an extensive factory trained representative network. If you need assistance, we're here to help.



1200 PPD

Represented by:



WATER AND WASTEWATER TREATMENT TECHNOLOGIES

1077 Dell Avenue, Suite A, Campbell, CA 95008
Toll Free: (888) 774 4536 (PSI Help)
Telephone: (408) 370-6540 Fax: (408) 866-4660
Email: mail@4psi.net www.4psi.net
with offices in Clearwater, FL, Mesa, AZ, and Temecula, CA.