APPENDIX E

Mechanical Equipment Technical Information (Vendor Information)

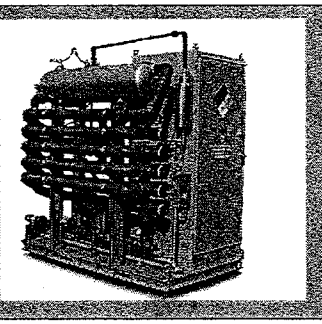
Applied

Applied Process Technology, Inc.

Clean Water. No Waste.

HiPOx HCU

Advanced Oxidation System



HCU

The HiPOx HCU is an advanced oxidation system that combines ozone and hydrogen peroxide to destroy groundwater contaminants in a continuous flow reactor. The system utilizes multiple reagent injection points and mixers to maximize contaminant destruction in a waste-free process.

The HCU is a compact skid-mounted unit with a footprint ideal for very small spaces. Low-to-medium ozone capacities make the HCU appropriate for low-flow sites with low-to-moderate contaminant concentrations.

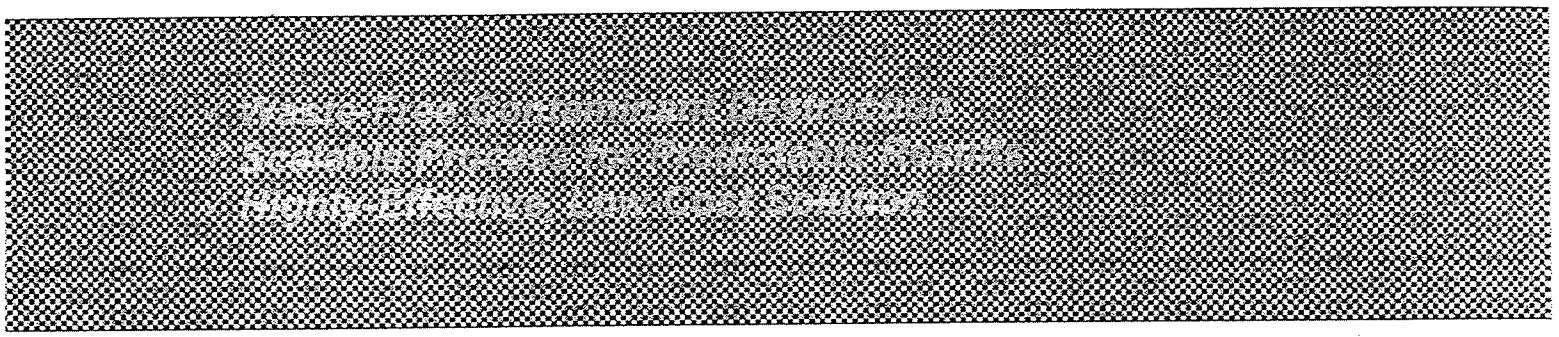
- ✓ PLC control system provides for unattended and automated operation
- ✓ Fail-safe operation
- ✓ Automatic paging in event of shutdown
- ✓ Operating set points adjusted via local Operator Interface Terminal (OIT) or remotely via modem with optional SCADA package

STANDARD SPECIFICATIONS

Flow Rate	3 – 160 GPM
Ozone Capacity	Up to 20 lbs/day
Dimensions	8'L x 4'6"Wx 7'6"H
Weight	Approx. 4,500 lbs
Electrical Requirements	208VAC, 3Ø or 240VAC, 1Ø, 60 Hz, 55A maximum
Power Consumption	7-13 kW

SYSTEM CONFIGURATION AND FEATURES

Enclosure/Skid	Galvanized-skid platform; weather-resistant enclosure; corrosion-resistant piping; NFPA signage; power and process connections conveniently located to facilitate quick installation
Safety	Shop tested; ozone detector and destruct unit; fail-safe shutdown features; all ozone-containing piping is joint-free or (double-)contained within monitored enclosures



OZONE GENERATION / DISTRIBUTION SYSTEM*

Generator Capacity	Up to 20 lbs/day**
Concentration	8% – 10% by weight
Injection Capacity	5 – 150 mg/L ozone dose
Injection Piping	PFA Teflon™

**includes rack-mounted, solid-state ozone generator(s), ozone manifold with metering and check valves, automatic pressure control and shutoff valve*
***uses oxygen from liquid oxygen dewars or produced by oxygen generation system*

HYDROGEN PEROXIDE SYSTEM*

Storage	25-gallon, non-metallic tank
Concentration	5% – 35% technical grade
Injection Piping	Polyethylene

**injection system included*

OXYGEN SYSTEM*

Standard Supply	Liquid-oxygen Dewar cylinders
Size	160 – 265 liters
Concentration	99.9+%vol (Grade 6)

Optional Supply	PSA**-enriched gas
Concentration	90+%vol (-70°F dew point)

**oxygen flow controller included; optional gas manifold available*
***Pressure-Swing Adsorption*

REACTOR SYSTEM*

Flow Rate	3 – 160 GPM
Reactor Construction	PVC piping with internal static mixers
Reagent Control	Reagent addition precisely controlled and adjusted as needed at each injector

**includes gas/liquid separator and inlet flow meter; optional feed tank, pump and recycle valve also available*

COOLING SYSTEM

Method	Refrigerated package chiller with outdoor condenser

- ✓ Multiple ozone injection points maximize process efficiency and contaminant destruction
- ✓ Precision instrumentation for accurate reagent control
- ✓ One-button startup and shutdown; touchscreen control display for ease of operation

™Teflon is a registered trademark of the DuPont Co.

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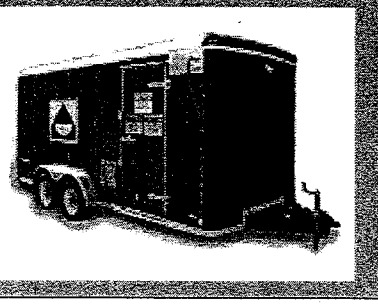
Applied

Applied Process Technology, Inc.

Clean Water. No Waste.

PulseOx 1000

In-Situ Chemical Oxidation



P-1000

The PulseOx 1000 (P-1000) system is an advanced in-situ chemical oxidation system that uses four reagents—ozone, hydrogen peroxide, oxygen, and air—to aggressively oxidize adsorbed-phase and aqueous contaminants in the subsurface environment.

The P-1000 is ideal for larger or heavily-impacted sites where a significant dose of oxidants is required to achieve contaminant reduction. The system is designed to maximize distribution of reagents at multiple injection points across a site's treatment zone.

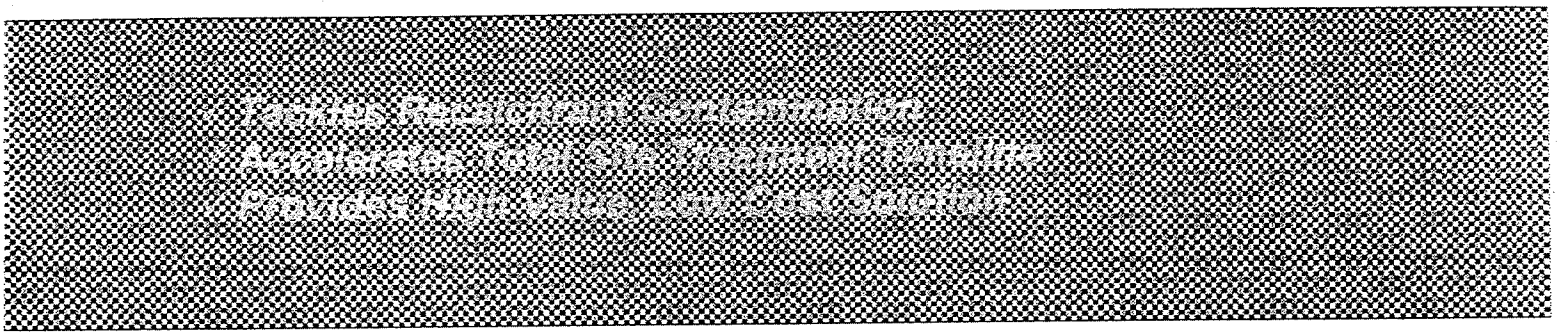
- ✓ PLC integrated control system provides fully automated operation
- ✓ Continuous monitoring
- ✓ Fail-safe operation mode
- ✓ Automatic paging in event of shutdown
- ✓ Adjust operating set points and injection profile via Operator Interface Terminal (OIT) or remotely via modem
- ✓ Reagent injection ratios and frequencies individually controlled and adjusted as needed at each injection point

STANDARD FEATURES AND SPECIFICATIONS

Dimensions	7 ft x 7 ft x 16 ft enclosure; total external length is 21 ft
Weight	Approx. 6,500 lbs
Electrical Requirements	230 V, 3 Phase, 60 Hz (90 A service)
Power Consumption	22 kW

SYSTEM ENCLOSURE AND SAFETY

Enclosure	Ventilated, tandem axle trailer; power and process connections conveniently located to facilitate quick installation
Safety	Ozone monitor; ozone destruct unit on system exhaust fan; automatic shutdown features



OZONE GENERATION SYSTEM*

Generator Capacity	Up to 15 lbs/day**
Concentration	Up to 12% by weight
Injection Capacity	Low flows (<1.3 scfm) at 10% - 12% concentrations; or high flows (up to 17 scfm) at 1% to 9% concentrations

**on-board, solid-state ozone generators*
***uses oxygen produced by oxygen generation system*

OXYGEN GENERATION SYSTEM

Method	Pressure swing adsorption (PSA)**
Concentration	Up to 95%
Capacity	Up to 130 lbs/day*

**high grade oxygen from compressed air*
***no gas cylinders or oxygen dewars required*

REAGENT DISTRIBUTION SYSTEM

Capacity	Up to 10 ozone and 10 hydrogen peroxide injection points; upgradeable to handle additional injection points
Reagent Control	Reagent ratios individually controlled and adjusted as needed at each injection point

HYDROGEN PEROXIDE SYSTEM

Storage	150-gallon, double-walled tank
Concentration	Up to 35% solution
Injection Capacity	75 gal/day at 25 psig or higher*

**injection rates subject to site conditions*

COMPRESSED AIR SYSTEM

Operating Pressure	Up to 120 psig
Injection Capacity	Up to 18 scfm

- ✓ High ozone flow rates for maximum availability in the subsurface
- ✓ High ozone concentrations for maximum contaminant destruction
- ✓ Controlled hydrogen peroxide injection rates eliminate significant temperature increases in the subsurface

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PRODUCT DATA SHEET
January, 2007

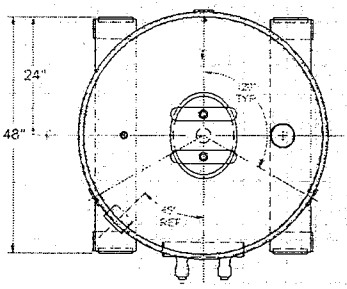
KLEEN.WATER 1000HPV & 2000HPV

GENERAL INFORMATION

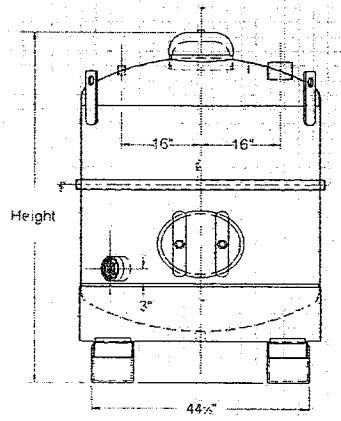
These units are designed for the efficient purification of contaminated water or liquid streams. These filters have the ability to remove contaminants to non-detectable levels. The vessels are constructed of heavy-duty mild steel and are lined with a double-layer epoxy coating.

WEIGHTS AND MEASURES

Max. Flowrate:	*1000HPV:* 80 gpm *2000HPV:* 100 gpm
Max. Pressure:	75 psi
Max. Temp:	150°F
Height:	*1000HPV:* 70" *2000HPV:* 96"
Diameter:	48"
Shipping Wt*: (drum + media) (*Media dependent)	1000HPV: 2050 lbs. – 3050 lbs. 2000HPV: 3100 lbs. – 5100 lbs.



Downflow operation is recommended



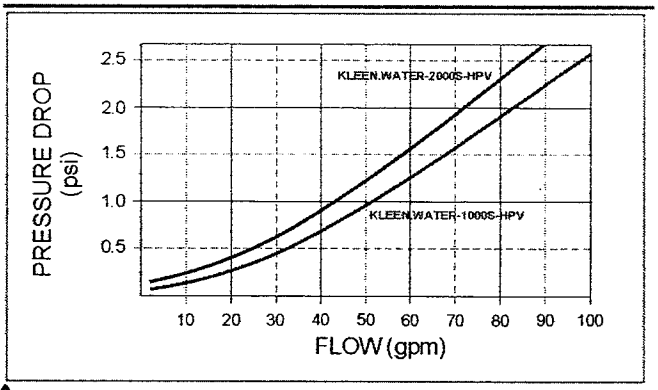
FILTER MEDIA

Types:	•Activated Carbon •Organoclay •Ion Exchange Resin •Specialty Media
Volume:	*1000HPV:* 34 cu. ft. *2000HPV:* 68 cu. ft.
Weight*: (*Media dependent)	*1000HPV:* 1000 lbs. – 2000 lbs. *2000HPV:* 2000 lbs. – 4000 lbs.

MISCELLANEOUS

Inlet:	4" FNPT
Outlet:	4" FNPT
Interior Coating:	Double-layered epoxy coating
Internals:	PVC underdrain
Media Access:	Top & side 12"x16" manways (neoprene gaskets)

PRESSURE DROP DATA



NOTE:

1. *Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate procedures for potentially low oxygen spaces must be followed, including all federal and state requirements.*

BAKERCORP

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BAKER FILTRATION

A Division of BAKER TANKS

VCC 8x30 Virgin Coconut Shell Carbon

Baker Filtration's VCC 8x30 mesh virgin carbon made from select grades of coconut shell. These activated carbon granules are a uniform adsorbent with well developed pore structure, allowing for a wide range of adsorbate retention. This carbon is ideal for purification of potable water, industrial wastewater treatment and groundwater treatment. This product is also suitable for refinement of organic liquids requiring purification and color reduction, such as amine and glycol solutions and will remove MTBE from groundwater.

PHYSICAL PROPERTIES:

Carbon Tetrachloride Activity:	60% minimum
Apparent Density (lbs./cu.ft.):	29 average
Total Ash Content:	3% maximum
Hardness (Ball Abrasion):	98% minimum
Iodine Number:	1,000 minimum
Moisture (as packed):	5% maximum
Mesh Size:	8x30

Standard Packaging: 1000 lb. super sacks. Other packaging available upon request.

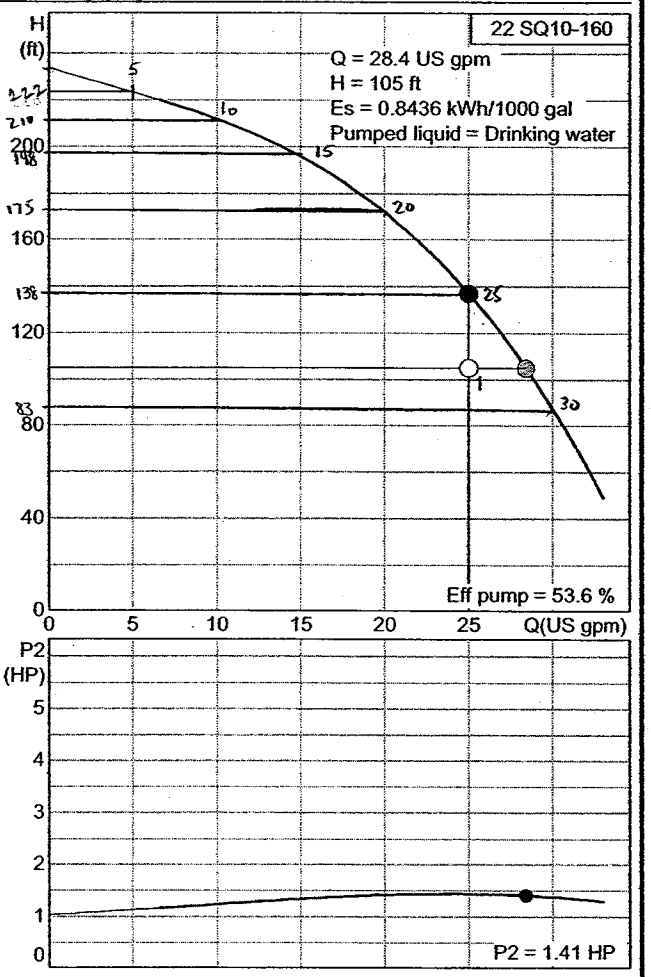
These specifications represent general parameters and are subject to change. Please consult with Baker Filtration before processing with your applications.

Corporate Offices
4306 W. 190th Street, Torrance, California 90504
Phone: 310.303.3700 ♦ Fax: 310.406.3001

GRUNDFOS

Company name: -
Created by: -
Phone: -
Fax: -
Date: -

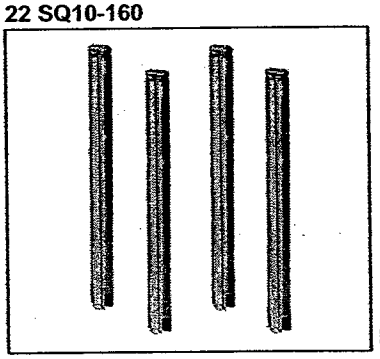
Description	Value
Product name::	22 SQ10-160
Product Number::	96160156
EAN number::	5700398694533
Technical:	
Speed for pump data:	10700 rpm
Actual calculated flow:	28.4 US gpm
Resulting head of the pump:	105 ft
Approvals on nameplate:	UL, cUL
Approvals on motor nameplate:	CE,UL,CUL
Curve tolerance:	ISO 9906 Annex A
Pump Number:	96397385
Stages:	4
Model:	B
Valve:	pump with built-in non-return valve
Materials:	
Pump:	Polyethylene / Stainless steel
	1.4301 DIN W.-Nr.
Motor:	Stainless steel
	1.4301 DIN W.-Nr.
	304 AISI
Installation:	
Min inlet pressure:	-5.2 psi
Pump outlet:	NPT 1 1/2
Minimum borehole diameter:	2.99 in
Liquid:	
Pumped liquid:	Drinking water
Maximum liquid temperature:	95 °F
Max liquid temperature at 0.15 m/sec:	95 °F
Electrical data:	
Motor type:	MS3
Power input - P1:	2.32 kW
Rated power - P2:	2.253 HP
Main frequency:	60 Hz
Rated voltage:	1 x 200-240 V
Start. method:	direct-on-line
Service factor:	2,25
Rated current:	11.2 A
Power factor:	1,00
Rated speed:	10700 rpm
Enclosure class (IEC 34-5):	IP58
Insulation class (IEC 85):	F
Motor protection:	Y
Thermal protec:	internal
Length of cable:	4.922 ft
Motor Number:	96160537
Controls:	
CU 300/CU 301:	no communication possible
Others:	
Sales region:	Namreg



GRUNDFOS

Company name: -
Created by: -
Phone: -
Fax: -
Date: -

Position	Count	Description	Unit price
	1	**22 SQ10-160**	On request



Product photo could vary from the actual product

Product No.: 96160156
3" multi-stage, submersible pump designed for domestic water supply, liquid transfer in tanks, irrigation and environmental applications. The pump has "floating" impellers, each with its own tungsten carbide/ceramic bearing.

The pump features soft starting and protection against dry-running, upthrust, overvoltage, undervoltage, overload and overtemperature.

The motor is a one-phase motor of the permanent magnet rotor type ensuring optimum efficiency within a wide load range.
The motor is fitted with a replaceable cable plug.

Liquid:

Pumped liquid:	Drinking water
Maximum liquid temperature:	95 °F
Max liquid temperature at 0.15 m/sec:	95 °F

Technical:

Speed for pump data:	10700 rpm
Actual calculated flow:	28.4 US gpm
Resulting head of the pump:	105 ft
Approvals on nameplate:	UL, cUL
Approvals on motor nameplate:	CE,UL,CUL
Curve tolerance:	ISO 9906 Annex A

Materials:

Pump:	Polyethylene / Stainless steel 1.4301 DIN W.-Nr.
Motor:	Stainless steel 1.4301 DIN W.-Nr. 304 AISI

Installation:

Min inlet pressure:	-5.2 psi
Pump outlet:	NPT 1 1/2
Minimum borehole diameter:	2.99 in

GRUNDFOS

Company name: -
Created by: -
Phone: -
Fax: -
Date: -

Position	Count	Description	Unit price

Electrical data:

Motor type:	MS3
Power input - P1:	2.32 kW
Rated power - P2:	2.253 HP
Main frequency:	60 Hz
Rated voltage:	1 x 200-240 V
Start. method:	direct-on-line
Service factor:	2,25
Rated current:	11.2 A
Power factor:	1,00
Rated speed:	10700 rpm
Enclosure class (IEC 34-5):	IP58
Insulation class (IEC 85):	F
Length of cable:	4.922 ft