

**Eqe Bay Exploration Program  
Type 'B' Water Licence Application**

**Attachment 8  
Vendor Information  
(Incinerator, WTP, STP)**



**ECO WASTE SOLUTIONS**

# Clean Burning Solutions Product Spotlight

## CA Model

### technical **description**

**Two Stage Process:** 1st stage (Primary Burner) burns waste and produces inert ash and combustible gases. 2nd stage Afterburner (Secondary Chamber) combusts off-gases to eliminate smoke and minimize contaminants.

**Cycle Time:** Burn cycle of 2-6 hours per batch depending on waste type and density. Followed by a 1-2 hour cool down. Average total cycle length is 5 hours.

**Controls:** Integrated control panel with programmable logic control, supervisory control, monitoring, data acquisition and remote diagnostic capability. PC computer workstation optional.

**Operating Environment:** Inside a building or protected from the weather. Weatherproofing options available.

**Other Options:** Air Pollution Control System (APCS) - Scrubber, Continuous Emissions Monitoring System (CEMS).

**Warranty:** 1 year after start-up on defective parts or workmanship.

### technical **specifications**

**External Casing/Finish:** 1/4" (0.6 cm) mild steel, sandblasted and coated with rust inhibiting and heat resistant paint.

**Burners:** Electronic auto spark, packaged industrial burners, secondary burners modulate.

**Fuel Supply Options:** Diesel, Fuel Oil, JP8, Natural Gas, Arctic Diesel, Propane. Auxiliary waste oil burners can be added.

**Operating Temperature:**

Primary Chamber: 1200°F (650°C) - 1560°F (850°C)

Afterburner: 1832°F (1000°C), with a 2 second retention time.

**Power:** Typically 3 phase, 120/208 V, 60 Hz. Other power supply options available.

### **advantages**

- Available in 3 standard sizes
- Compact format
- Easily transportable
- Reduces waste volumes by over 90%
- Smokeless and odourless
- Automatic process control
- Low operating and maintenance costs



### acceptable **waste streams**

Community Waste  
Camp Waste  
Biomedical Waste



### **capacities**

Model		CA-50	CA-100	CA-600
Waste Capacity	Domestic Waste* lbs/batch	200	400	750
	Biomedical Waste** lbs/batch	120	240	450

\*Based on typical solid waste densities.

\*\*Based on typical biomedical waste densities.



# **Eco Waste Solutions (EWS)**

**Technical Overview, Technical Specifications  
& Itemized Firm Quotation  
For Batch Incineration Equipment**

**Prepared for: Baffinland Iron Mines**

**Steensby Exploration Camp  
Baffin Island, Nunavut, Canada**

**Submitted by: Eco Burn Inc. o/a  
Eco Waste Solutions & Eco Waste Solutions Nunavut (collectively “EWS”)**

**Quotation No: BSEC– CA 100C**

**Quotation Date: March 29, 2018**

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**Ext.280**



***Eco Waste Solutions is a manufacturer of innovative point-of-need waste systems. Our mission is to provide robust, reliable, thoughtfully-designed equipment that is environmentally responsible. We foster a climate of energy and engagement within our team and with our clients; and we rely on procedures and practices that evolve with input from our clients and participation of employees in a continuous improvement effort.***

***Eco Waste Solutions' goal is to be a world leader in sustainable waste management solutions for our planet.***

## INCINERATION AND WASTE MANAGEMENT

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**Eco Waste Solutions (EWS)** is a Canadian environmental technology company focused on point-of-need waste management solutions. **EWS** incineration systems offer a sustainable waste management alternative for projects in remote locations and regions that are ecologically sensitive, where proponents want to avoid the environmental legacy of a landfill or other traditional disposal methods used in the past.

### ***Why is incineration often the best solution for point-of-need waste management?***

- Landfilling of waste, without prior treatment, is no longer an acceptable practice for domestic waste management. Many countries and the European Union have banned the practice of landfilling without recovering to the maximum extent possible and treating the residual while recovering valuable energy.
- The construction of a landfill is the creation of a permanent feature that requires on-going monitoring and management.
- With land disposal there is always a risk of material and/or microbes migrating from the landfill via wind, animal or bird movement, or water run-off causing contamination far from the site of disposal.
- Shipping material to other communities or sites for disposal is now viewed as pushing the problem onto someone else to deal with.
- Transportation is also heavily dependent upon fossil fuels, impacts the air and contributes to greenhouse gases – shipping waste long distances has a high environmental cost.
- The potential for contamination and liability is greatly increased once waste leaves the generator's site. Shipping material away from the creation point can be risky, if the material is mishandled or there is an accident the waste can pose an uncontrolled threat to the population and/or the environment

### ***How does incineration offer a better solution?***

- Processing waste at the point-of-need reduces transportation impacts and lowers the risk of contamination to waterways and/or the land.
- The ash residual, even with the presence of metal and glass containers, will represent less than 10% of the original volume of waste. The process includes a long and thorough burn down of the material to an ash residual that has minimal unburned carbon, is non-leaching and essentially inert.
- Waste materials are exposed to the required temperatures for destruction of disease causing pathogens, an important consideration in communities because of the risk of home care medical waste which often ends up in the landfill. Pathogen destruction makes incineration a suitable means for disposing of dewatered sewage sludge.
- Modern incineration with good control and high temperatures ensures that there will be no smoke and/or odour – a huge improvement over the uncontrolled burning that often occurs at landfills. Packages can be supplied with integrated air pollution control scrubbers guaranteed to meet the strictest standards in the world.
- Incineration is a fully commercialized and trusted method of waste disposal. Experimental technologies such as gasification will take many years before they are fully commercialized, dependable methods of waste disposal that a community can be relied upon for their long-term waste management needs.

## ECO WASTE INCINERATION EQUIPMENT: RUGGED AND FIELD-PROVEN

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A modern advanced technology incinerator, like the **Eco Waste Solutions ECO Model** proposed in this document, can be the basis of a pollution prevention approach to waste management for a remote mining operation.

Having an incinerator at the point-of-need allows for immediate and full control of the disposal of waste. This cost-effective waste management solution turns waste into non-toxic, non-leaching ash residual that will represent less than 10% of the original volume of waste prior to incineration.

The **Eco Waste Solutions (EWS)** standard equipment packages are well known to be high quality and extremely robust. In 1995, **EWS** began supplying equipment to the Canadian Department of Defence (DND). The first contract with the DND was at Canada Forces Station Alert, the northern-most inhabited place in the world. The equipment deployed to Alert in 1995 is still serving this remote military post today.

The expectation of military ruggedness was influential in the early **EWS** equipment designs and remains the construction standard used by **EWS** today. **EWS** products are noticeably more robust than traditional incinerators. Materials of construction most notably the steel shell, refractory lining, electrical and controls are more advanced and higher grade than are traditionally available. These factors are strongly correlated with equipment durability and lifespan; factors that have led to the strong following **EWS** has earned among its very demanding clients in the mining and military industries. Considerable R&D investment and continuous product improvement have led to a thoughtful design that is more practical, operator-friendly and reliable in the field.

**EWS** also uses the latest in control technology including PLC (Programmable Logic Controller) computer-based system automation and the latest communication protocols.

Finally, one of **EWS'** most distinguishing features is the higher standard of environmental integrity inherent in its products. **EWS** has proven its environmental performance through more independent third-party testing and verification than any other incinerator manufacturer.

### ***How is Eco Waste Solutions Technology different?***

- Our industry-leading equipment with computerized automation and comprehensive monitoring has become the benchmark for many new regulatory requirements
- The automated operation of the system minimizes the need for a highly technical operator and constant operator input
- Customer feedback has been the basis for many of the advancements that our technology has over traditional equipment. The product has developed with a focus on ease of use, safety and reduced labor.
- **EWS** has a patented incineration process with unique process control that minimizes harmful emissions particularly Dioxins and Furans

## DESIGN SPECIFICATION CRITERIA

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### Reference

**Baffinland Iron Mines** has invited **Eco Waste Solutions (EWS)** to submit a proposal for the supply of a modular incinerator for the **Steensby Exploration Camp Project**.

### Project

The **Steensby Exploration Camp Project** is an advanced exploration project, located in northern Baffin Island, Nunavut.

Baffinland requires an incinerator system on-site commissioned, as soon as possible to manage the solid waste that will be generated at the camp.

### Waste Quantity & Description

#### Quantity

As per Baffinland, the exploration camp will have a population of ~50 people with the possibility to expand up to 100 people in the next 5 years.

Typically, as a conservative number, EWS uses a per capita waste generation rate of 2 kg per person per day, to calculate daily waste generation, at a mine camp. Therefore, the daily waste generation rate expected at the Steensby exploration camp has been calculated at ~100 kg/day and up to ~200 kg/day within the next 5 years.

#### Description

Baffinland did not have any waste description available. Instead, EWS has made waste assumptions based on 20+ years past experience working with mining companies and engineering firms hired to procure equipment for the mining sector.

In short, the solid waste generated is considered to be typical mining camp waste such as, but not limited to, food waste, domestic waste and packaging material.

Regardless of recycling programs that may or may not be available, it is assumed that the solid waste, listed above will include some plastic packaging and containers. The waste is assumed to be bagged, stored in skips/bins around the camp and then brought to the incinerator by truck or some other means.

It is important to note that inappropriate materials including, but not limited to, reactive/explosive chemicals and items containing heavy metals will not be processed in the incinerator proposed herein.

Please see *Appendix A: Acceptable & Unacceptable Waste Streams*

## DESIGN SPECIFICATION CRITERIA (CONTINUED...)

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### EWS Waste Assumptions

In addition to the daily waste generation rate calculated above, one of the most critical assumptions to be made in planning a waste management/incineration disposal system is the estimation of the waste density.

With batch incinerators in particular, waste density is critical to determining the size of the incineration system.

EWS has based the waste characteristics assumptions upon our previous work experience for similar applications and on industry standard. Please see table below:

Description	Total Moisture Content	Average Density	Average Heat Value
Domestic Camp Waste	Up to 40%	10-15 lbs/ft <sup>3</sup> 160-240 kg/m <sup>3</sup>	6,500 BTU/lb 15,150 KJ/kg



## PRODUCT SELECTION

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EWS offers a range of products to accommodate point-of-need waste disposal. These incinerator systems can be combined with other components, as required, such as weigh scales, building enclosures, air pollution control systems (scrubbers), continuous emissions monitoring systems, heat recovery features, etc.

The needs of the **Steensby Exploration Camp** can be addressed by using batch incineration equipment. The Eco Waste Solutions **CA Model** is an excellent option and is often selected because of the minimal labour requirements of the once or twice per day operation cycle. Also, combustion of waste materials as a single batch load without disturbance to the waste bed (by continuous feeding of waste) produces a much cleaner emission particularly lower dust emissions.

EWS has recommended the purchase of the CA 100 Model containerized system sized as follows:

	<b>CA 100</b>
<b>Maximum Incinerator Processing Rate</b>	Up to 180 kg per batch
<b>Hours of operation</b>	Burn Cycle: 5-6 hours, Cool-Down Cycle: 3-5 hours
<b>Maximum Waste processed in 24 hours (operated twice per day only)</b>	360 kg per day (over 2 batches)

The **CA 100** containerized system is a small format modular incinerator. The main components of the incinerator are permanently installed in one modified shipping container. However, the incinerator requires some assembly on site.

### Addressing Waste Oil On-site

EWS' enclosed offering includes a **Waste Oil Burner, Tank and Piping Package**, to dispose of any used waste oil generated at the mine site.

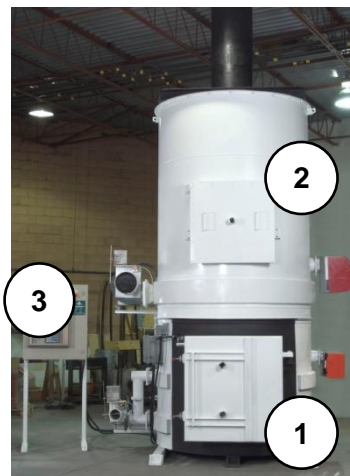
This packaged burner can utilize some of the waste oils generated on site and function as a fuel source to operate the incinerator system. This packaged burner will not only dispose of the waste oils in an environmentally sound manner, but it will also decrease the daily operating costs of the waste incinerator system.

There is no need to mix waste oil/used oils with diesel for combustion purposes. Each fuel source should be used independently at the same time to operate the system.

## CA 100 MODEL INCINERATOR PACKAGE

### CA 100 Model Overview (CA 600 depicted)

1. Primary Chamber
2. Secondary Chamber
3. Main Control Panel



## ECO WASTE SOLUTIONS TECHNOLOGY

COMPONENT	FUNCTIONAL OVERVIEW
<b>Primary Chamber</b>	In the first stage, a burner is used to elevate the temperature of the <b>Primary Chamber</b> to ignite the waste. Once the Chamber reaches a temperature of approximately 650-850°C, the burn process becomes self-fuelling and the burner will shut off. To save fuel and control temperatures, only when the energy contained within the waste is depleted will the burner periodically turn on. At these operating temperatures, waste is allowed to fully combust and is rendered sterile. Waste is reduced in volume by over 90%. Independent tests have shown that the residual ash is non-hazardous, non-leaching and essentially inert. After enduring the combustion process, metals and glass remain intact. Preservation of metals and glass not only protects the refractory lining from damage caused by melted and fused metals and glass, but also allows for post-combustion recycling where possible.
<b>Secondary Chamber</b>	As waste burns in the Primary Chamber, gases containing the products of combustion enter the high temperature zone of the <b>Secondary Chamber</b> for cleansing. The Secondary Chamber is sized to retain the incoming gases for a <b>minimum of 2 seconds</b> at 1000°C. This chamber utilizes a packaged, high output, fully modulating burner to maintain the required temperature (even in the absence of energy input from the first stage which is important when processing wet or low energy waste such as food). This stage employs a large blower, tightly controlled by the control system using a variable frequency drive on the motor. The blower creates the turbulence required to mix the gases and oxygenate them. This fosters the high efficient combustion required to break hydrocarbon chains into carbon dioxide and water vapour
<b>Main Control Panel</b>	There is one <b>Main Control Panel</b> that controls all of the interconnecting modules. The Operator has one simple interface to start the equipment, view system status and change control settings if required. The system utilizes a PLC (programmable logic controller) to automate its functions. Incinerator critical process parameters such as temperature, combustion airflow and burner output are operated using EWS' patented system control program to maintain optimal combustion.

## EWS BATCH SYSTEM OPERATING PHILOSOPHY

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The proposed incinerator is permanently installed in a modified shipping container to house the unit. Generally speaking there is no need for pre-sorting of the waste if source separation is practiced to keep inappropriate materials out of the waste feed.

The system operates in a batch style. As proposed, the system includes a large front door for easy access to load the waste manually. It is expected that each day the **Primary Chamber** will be loaded to design capacity or at a minimum, to half capacity. If waste quantities are not sufficient to operate the machine daily, it can be used to store the waste until requirement is met. The use of a weigh scale to confirm daily throughput and for record keeping is recommended and included as an option.

Once loading is complete, the door is sealed shut and the **Secondary Chamber** is fired. The system is interlocked so that **Primary Chamber** waste is not allowed to combust until the **Secondary Chamber** is at operating temperature. Once this occurs, usually within the first 20 minutes of the cycle, the **Primary Chamber** cycle is initiated. During this phase, gaseous products of combustion produced from the solid waste burning in the **Primary Chamber** are burned off in the highly oxygenated, turbulent environment of the **Secondary Chamber** for up to 2 seconds at a temperature of 1000°C to complete the combustion reaction.

Typically, the Operator only remains present to load waste and supervise the beginning of the process, generally the first hour of the burn, and then is no longer required to be at the incinerator. The system will complete the burn-cycle and cool-down phases automatically. Based on the waste quantity and description, the burn-cycle is expected to occur over 5 to 6 hours, but could be longer depending on waste characteristics, to allow for thorough burn down. The cool-down phase that automatically follows is generally 3 to 5 hours. At completion, the operator will then be able to open the **Primary Chamber** door and clean out the ash. This is generally performed during the second part of the day or the next day prior to loading the **Primary Chamber** with another batch of domestic camp waste material.

Waste oils such as waste crankcase, hydraulic and other lubricating oils can be burned in the **Secondary Chamber** of the modular incinerator system by utilizing the optional item for purchase, **Waste Oil Burner, Tank and Piping Package**. The heat value of the waste oil is significant and can reduce the need for virgin fuels when they are being processed greatly reducing the system's operating costs and solving another waste problem on-site.

Waste oils, when available, should be delivered to the system on a regular basis. Waste oils will be pumped from a tanker truck or from a storage drum using a customer supplied pump, to the **Waste Oil Burner's** integral waste oil metering tank. The waste oil feed rate will be metered automatically based on the system's temperature control loop.

The entire process will be controlled by the PLC in the **Main Control Panel**. All key operating parameters will be controlled to factory pre-set settings using the integrated PLC. For simplicity of operation, the **Main Control Panel** comes with a user interface that utilizes the EWS proprietary HMI monitoring and control application viewable on a full-colour graphic display with touch screen controls. The Operator can see the status of all the critical components and visual alarms for any malfunctions. The software also allows for logging and recording of system data, including historical trends. With this feature, it is not necessary to constantly monitor the process.

## SPECIFICATIONS: CA MODEL BATCH INCINERATION SYSTEM

INCINERATOR COMPONENT	DETAILS
<b>General Overview</b>	<ul style="list-style-type: none"> <li>• Model <b>CA 100</b></li> <li>• Custom sized, high capacity, two-stage (dual chamber), controlled air, batch style incineration system with internal insulation and refractory lined chambers with burners and blowers</li> <li>• Factory assembled, pre-piped, pre-wired and pre-tested prior to shipping</li> <li>• Some disassembly required for shipping purposes</li> <li>• Designed with lifting lugs for installation and maintenance purposes</li> <li>• Designed to meet all local codes and standards</li> </ul>
<b>Primary Chamber</b>	<ul style="list-style-type: none"> <li>• One (1) chamber to hold up to a maximum of 180 kg of waste material per batch</li> <li>• Total throughput is 360 kg per day, if operated twice a day</li> <li>• Batch cycle time: 5-6 hours (burn cycle) and 3-5 hours (cool-down)</li> <li>• Operating temperature of 650°C to 850°C</li> <li>• Includes:               <ul style="list-style-type: none"> <li>• Manifold with air inlets (ports) for combustion air and blower for cooling</li> <li>• Viewing ports to permit safe observation of the combustion process during the burn cycle</li> <li>• Large front access door for on-ground loading of waste and for manual ash removal</li> </ul> </li> </ul>
<b>Secondary Chamber</b>	<ul style="list-style-type: none"> <li>• Separate vessel from the Primary Chamber to expose gaseous products of combustion to high temperature</li> <li>• Operates at 1000°C with a retention time of 2 seconds</li> <li>• Includes:               <ul style="list-style-type: none"> <li>• Manifold air inlet (ports) for combustion and cooling air with excess air blower</li> <li>• Viewing ports to permit safe observation of the process</li> <li>• Access door for maintenance</li> </ul> </li> </ul>
<b>Outer Shell/ Casing</b>	<ul style="list-style-type: none"> <li>• 6 mm (1/4" steel) thick carbon (mild) steel refractory lined, sand blasted, primed, painted with inhibiting and heat resistant paint</li> </ul>
<b>Refractory Lining</b>	<ul style="list-style-type: none"> <li>• Combination of durable, resilient refractories; castable and ceramic fiber modules.</li> </ul>

INCINERATOR COMPONENT	DETAILS
<b>Diesel Burner Package</b>	<ul style="list-style-type: none"> <li>• CSA approved burners</li> <li>• <u>General</u>: Forced draft, pressure-mechanical atomizing, with built-in blower to supply combustion air, complete with silencer and damper, oil pump driven by blower motor, complete with integral relief valve and filter, pressure gauge, high voltage ignition transformer.</li> <li>• <u>Control</u>: electronic combustion control relay with scanner to control combustion and to supervise flame. Fuel control cut-off, ignition and supervision of burner operation. Main burner in the Secondary Chamber is fully modulating.</li> </ul>
<b>Diesel Day Fuel Tank</b>	<ul style="list-style-type: none"> <li>• Double-walled constructed fuel day/storage tank capacity of 2200 L, to be installed by others in accordance with applicable codes and standards</li> <li>• Storage fuel tank allows for interstitial monitoring and includes a spill contaminant box for filling</li> <li>• Integrated low-level switch shuts burner off, when tank level reaches minimum</li> <li>• Valve train from burners to container wall included. Interconnecting piping from tank to burner maximum 10'</li> <li>• The packaged burner has an integrated fuel pump to suction fuel from the supplied tank, no additional pump is required, if located within 15'</li> <li>• Customer to use own transfer pump to fill tank</li> <li>• Tank location to be determined based on site location</li> </ul>
<b>Waste Oil Burner, Heated Waste Oil Tank with Mixer and Heated Piping Package</b>  <b>(winter rated)</b>  <i>Itemized separately in Pricing Section</i>	<p>Packaged supplementary burner for processing waste oils at a rate of 13 litres per hour. Includes:</p> <ul style="list-style-type: none"> <li>• Automatic control package as well as all necessary valves, pressure gauges/switches, fuel supply and return piping. Piping will be heat-traced (with thermostat) for outdoor use.</li> <li>• Doubled-walled tank specially rated to contain waste oil. Capacity: 1100 litres.</li> <li>• Includes a low level shut off (to be installed in the field)</li> <li>• It is recommend that the tank to be located outside. It is anticipated that the waste oil may contain some water (less than 5% bv). Therefore a stir mixer has been included to prevent liquid stratification. An in-tank immersion heater and heat tracing of the lines have been included has been included.</li> <li>• Valve train from burners to container wall included. Interconnecting piping from tank to burner maximum 10'</li> </ul>
<b>Blowers</b>	<ul style="list-style-type: none"> <li>• One (1) in Primary Chamber, used for cool-down only</li> <li>• One (1) in Secondary Chamber for Oxidation, VFD controlled</li> </ul>

INCINERATOR COMPONENT	DETAILS
<b>Stack</b>	<ul style="list-style-type: none"> <li>• Self-supporting exhaust stack, refractory lined carbon steel</li> <li>• Refractory held in place with Type 310 SS (stainless steel) anchors</li> <li>• Stack sections with flanged/bolted connections for mounting on the outlet from the Secondary Chamber Container</li> <li>• External surface is sand blasted, primed and painted with high temperature paint</li> <li>• Includes Air Emission test/sampling ports with caps</li> <li>• Includes opacity monitor ports</li> </ul>
<b>Main Control Panel Package</b>	<p>Main Control Panel with motor starters, overloads and fuses for all components is housed in a NEMA 12 enclosure. Features include:</p> <ul style="list-style-type: none"> <li>• Variable Frequency Drive (VFD) controls the Secondary Combustion Fan</li> <li>• Single point electrical connection</li> <li>• Emergency stop switch</li> </ul> <p>Integrated Allen Bradley Programmable Logic Controller (PLC) automatically monitors the process, and controls the following functions:</p> <ul style="list-style-type: none"> <li>• Temperature control, air/fuel modulation, system interlocks</li> <li>• Environment Canada's <b>Technical Document for Batch Incineration (March 2009) compliant monitoring and data acquisition system</b>. Equipment includes temperature sensors (primary, secondary and stack), differential pressure sensors with transmitter, monitoring of burner functions, auxiliary burner operation and fan amperage monitoring via current transducer, door position interlock monitoring, high temperature limit and interlock, low fuel level limit and interlock, air proving switch interlocks and integrated weigh scale to record the weight of waste prior to incineration</li> </ul>

INCINERATOR COMPONENT	DETAILS	
<b>4G Control System</b>	<p>Touch-Screen Operator Control Panel Display makes system start up and operation visual and intuitive. The display also allows the Operator to view operating parameters (settings and signal outputs) during operation.</p> <ul style="list-style-type: none"> <li>• Pre-installed with EWS' user friendly easy to understand graphics customized to reflect the package's unique configuration and components.</li> <li>• Screens include graphic representation of the equipment with status of all major components, display of alarms or system faults and data trending using historical charts</li> <li>• All system inputs above are recorded and logged for record-keeping purposes</li> <li>• Data acquisition system allows for historical trending of key operating conditions</li> <li>• The system automatically records operations to a USB Key on the HMI. Data can be transferred to a computer for future use. This feature is also useful in managing data for submission to regulatory bodies</li> </ul>	
<b>Process Monitoring<sup>1</sup></b>	<b>ELEMENT</b>	<b>DETAIL</b>
	<b>Base System Parameters</b>	Continuous Process Monitoring Includes: <ul style="list-style-type: none"> <li>• Primary Chamber, Secondary Chamber and Stack Temperature;</li> <li>• System Pressure and Draft</li> </ul>
	<b>Analyzer Type</b>	Temperature: Thermokinetics thermocouple Pressure Transmitter: Dwyer transmitter
	<b>Measurement Sensitivity</b>	Temperature range: 0 C to 1,250C Pressure range: -2" WC to 2" WC
	<b>Data Acquisition System</b>	Integrated into the HMI (touchscreen) and logged internally and displayed in historical trending graphs.

INCINERATOR COMPONENT	DETAILS	
<b>Continuous Emissions Monitoring System<sup>2</sup> (CEMS)</b>  <i>Itemized separately in Pricing Section</i>	<b>Base System Parameters</b>	Measures Opacity
	<b>Compliance</b>	EPA PS-1
	<b>General</b>	<ul style="list-style-type: none"> <li>• Flanged mounting to stack ports</li> <li>• Transceiver/Reflector</li> <li>• Local control panel (standard specifications available, other specifications may be available)</li> <li>• Air purge Assembly</li> </ul>
	<b>Calibration</b>	Calibration kit with 3 standards and carrying case included (on-site calibration or RATA by others)
	<b>Data Acquisition System</b>	Signal outputs sent to the incinerator PLC for display on the local HMI.
<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. These items are included as part of our standard supply and are at no additional cost and will comply with CCME and Nunavut requirements</li> <li>2. Nunavut Department of Environment “ Environmental Guideline for Burning and Incineration of Solid Waste” section 4.3 “Commercial Camps” lists the monitoring and control systems required as “key operational parameters must be monitored using on-line instruments capable of continuously measuring the combustion process and stack emissions quality.”</li> </ol>		



INCINERATOR COMPONENT	DETAILS
Optional Electronic Weigh Scale	<p>The Environment Canada's <b>Technical Document for Batch Incineration (March 2009)</b> requires that materials are weighed prior to incineration to avoid exceeding the incinerator's rated capacity. To ensure that this step is taken, <b>EWS</b> recommends an integrated weigh scale that will track weights automatically instead of manual methods but pricing and specifications for one of each type is provided.</p> <p>An accessory for measuring the weight of waste materials charged to the incinerator. The package will be integrated with the incinerator so that it automatically logs and totals the weighs and signals a cut-off when the maximum weight of waste has been reached.</p> <ul style="list-style-type: none"> <li>• Low profile above ground 3' x 3' with 5000 lbs capacity</li> <li>• Mild Steel platform and base</li> <li>• Hermetically sealed (protection from dust, dirt and liquids)</li> <li>• Self-aligning ball bearing suspension of scale</li> <li>• Wall-mountable local weight indicator for Operator viewing at point of use c/w LED digital display in IP69 enclosure (rated for temperatures from -10 C to +50 C)</li> <li>• Includes analog output module (4-20mA) to send signal to the incinerator PLC to automatically record measured values</li> </ul>
Optional Spare Parts Packages	<p>The following recommended spare parts packages can be purchased at the same time or at a later date to keep at site as inventory, when required:</p> <ul style="list-style-type: none"> <li>• Commissioning &amp; Start Up Spares</li> <li>• Special Tools required for installation, operation or maintenance</li> <li>• Capital Spares</li> <li>• Operating Spares</li> </ul> <p>For budgetary purposes, EWS has provided estimated figures herein.</p>
Domestic Packaging	<p>This containerized packages includes two (2) 20' ISO shipping containers to transport all incinerator components to site:</p> <ol style="list-style-type: none"> <li>1) Incinerator Housing Container: high-cube container</li> <li>2) Shipping Container: to transport smaller incinerator components such as stack sections, spare parts packages, etc. from EWS facility.</li> </ol> <p>Small components will be packaged appropriately (in crates or skidded).</p>

## MODIFIED SHIPPING CONTAINER SPECIFICATIONS

BUILDING COMPONENT	DETAILS
<b>General</b>	<ul style="list-style-type: none"> <li>One sea-worthy container modified by EWS to act as an enclosure for the proposed incinerator. Finished product supplied with marine survey.</li> <li>Pre-piping, pre-wiring of incinerator proposed, then tested, prior to shipping</li> </ul>
<b>Outside Dimensions</b>	<ul style="list-style-type: none"> <li>8' wide x ~20' long x 9.5' high (High Cube container)</li> </ul>
<b>Wall Construction</b>	<ul style="list-style-type: none"> <li>Continuous-corrugated steel panels and steel plate reinforced floor</li> </ul>
<b>Roof Construction</b>	<ul style="list-style-type: none"> <li>Rigid steel framework supports the corrugated steel roof</li> </ul>
<b>Roof Modification</b>	<ul style="list-style-type: none"> <li>Roof opening and flashing for weather-tight seal</li> </ul>
<b>Floor Construction</b>	<ul style="list-style-type: none"> <li>Removed original container wood floor and reinforced the base with S4@13 beams</li> <li>Installed tubing 1" solid bar on top of the cross members at 13" centre, 20' long</li> <li>Installed steel plates 44W stitch weld the plates to solid bar</li> <li>Welded plates to the bottom rail and the seams, install unistrut</li> <li>Strong, non-combustible, slip resistant, easy to clean</li> </ul>
<b>Door (s)</b>	<ul style="list-style-type: none"> <li>Shipping container barn-doors at each end (non-modified)</li> </ul>
<b>HVAC</b>	<ul style="list-style-type: none"> <li>Includes one electric space heater</li> <li>Includes 3 ventilation louvers</li> <li>Includes wall mounted fan c/w switch for manual operation when required</li> </ul>
<b>Lighting</b>	<ul style="list-style-type: none"> <li>Outdoor lighting above man-door with photocell</li> <li>Indoor lighting: 3 LED fixtures c/w 1 wall switch</li> </ul>
<b>Electrical</b>	Breaker panel for all above named electrical devices c/w 2 spare breakers

### Estimated Shipping Dimensions and Weights

<b>20' High Cube Container for Primary chamber, Secondary chamber (LxWxH)</b>	6090 x 2440 x 2896 mm	20 x 8 x 9.5 ft
<b>20' High Cube Container Weight</b>	7257 kg	16,000 lbs
<b>20' ISO Container for secondary chamber, stacks, tanks etc. (LxWxH)</b>	6090 x 2440 x 2590 mm	20 x 8 x 8.5 ft
<b>20' ISO Container Weight</b>	19,000 kg	41,900 lbs

## EWS DOCUMENTATION PACKAGE

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The following list defines the EWS standard documentation package.

Additional documentation can be provided but must be agreed upon and defined in the contract. Also, additional documentation may result in increased costs.

DOCUMENT NAME	FORMAT	QUANTITY
<b>Production Schedule*</b>	Electronic PDF file	1
<b>ISO Quality Plan*</b>	Electronic PDF file	1
<b>ISO Inspection &amp; Test Plan</b>	Electronic PDF file	1
<b>Installation, Operation, Maintenance &amp; Training Operator Manual</b>	Hardcopy in 3-ring binder and files on a compact disc	2 binders, 2 CDs In English
<b>Equipment Layout Drawing – General Arrangement* with weights and dimensions</b>	Electronic PDF file	1
<b>Itemized Spare Parts Lists</b>	Electronic PDF file	
<b>Piping &amp; Instrument Diagram*</b>	Electronic PDF file	1
<b>Electrical Wiring Diagram</b>	Electronic PDF file	1

**Note\*:** Items highlighted above are typically included in the preliminary documentation package which will be submitted to client at 2ARO (After Receipt of Order).

## ITEMIZED PRICING: INCINERATOR w/ MODIFIED SHIPPING CONTAINER

CA 100 INCINERATOR PACKAGE WITH MODIFIED SHIPPING CONTAINER		
Item	Description	Unit Price \$CAD
1	<b>CA 100 Modular Containerized Incineration System</b> <ul style="list-style-type: none"> <li>As per technical specifications given herein</li> <li>Includes EWS Documentation Package given herein</li> <li>The bracing of smaller incinerator components within the shipping container</li> <li>Loading the containers onto Purchaser's nominated transportation supplier</li> </ul>	\$321,100
2	<b>Start Up &amp; Training Package (Commissioning)</b> <ul style="list-style-type: none"> <li>1 Technician, 7 days on-site for system installation check, system start-up</li> <li>This is performed once assembly has been completed and photos have been provided to EWS</li> <li>\$3000 per additional day on-site</li> </ul>	\$35,860
3	<b>Expediting Charges (4 weeks) to meet sealift schedule</b>	\$44,000
4	<u>Requested:</u> <b>Waste Oil Burner, Heated Waste Oil Tank with Mixer and Heated Piping Package (winter rated)</b>	\$26,480
5	<u>Requested:</u> <b>Opacity Monitoring System to meet Nunavut Regulation</b>	\$55,000
<b>FCA BURLINGTON, ONTARIO TOTAL EQUIPMENT PACKAGE</b>		<b>\$482,540</b>

## ITEMIZED PRICING: OPTIONAL ITEMS FOR PURCHASE

OPTIONAL ITEMS FOR PURCHASE		
1	<b>Recommended Commissioning Spares Package<sup>1</sup></b>	\$4,840
2	<b>Recommended Special Tools Package<sup>1</sup></b>	\$9,350
3	<b>Recommended Operations Spares Package<sup>1</sup></b>	\$26,400
4	<b>Recommended Capital Spares Package<sup>1</sup></b>	\$14,300
5	<b>EWS Installation and Assembly Supervision Package<sup>2</sup></b> <ul style="list-style-type: none"> <li>• 1 Technician on-site 5 days to supervise equipment installation and assembly by buyer's local trades people</li> <li>• \$3000 per additional day on-site</li> <li>• Based on 1 day travel to site</li> </ul>	\$23,760
6	<b>Electronic Weigh Scale</b>	\$7,865
7	<b>Shipping cost of incinerator package to Valleyfield, Quebec utilizing one (1) stepdeck truck<sup>3</sup></b>	\$2,500

### Notes:

- 1) Spare parts packages are estimated at this time. Upon receipt of signed Purchase Order and after completion of in-house detailed engineering, EWS will provide itemized spare parts list with firm pricing. Spare parts packages are considered critical as mine site is located in remote location.
- 2) EWS Installation/Assembly Supervision Package is not mandatory but recommended
- 3) Shipping cost is estimated at this time and is based on truck availability. Upon receipt of signed Purchase Order (PO) and after completion of in-house detailed engineering, including confirmation of actual ship date, EWS will obtain a firm shipping cost to Valleyfield

## EWS TECHNICAL ASSISTANCE RATES

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In-field Service & Training Rate	Price	Description
Standard Rate	\$3,000.00	per day for standard ten (10) hour day (Monday to Friday)
Overtime Rate	\$375.00	per hour for weekdays (Monday to Friday) in excess of ten (10) hour per day
Weekends/ Holidays	\$375.00	per hour for Saturday, Sunday or Holidays in excess of ten (10) hours per day
Weekends/ Holidays Overtime Rate	\$560.00	per hour for Saturday, Sunday or Holidays in excess of ten (10) hours per day
Travel Time	\$850.00	per day
Travel Costs	TBD	Travel expenses charged out at cost + 10%
Standby Time	\$850.00	per day

## EWS MAINTENANCE PACKAGES

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EWS is committed to working with our customers to ensure that they have reliable, well maintained equipment.

Therefore, we offer Maintenance Packages to help manage the total cost of ownership. Planned and budgeted service and maintenance costs are considerably less expensive and less difficult to manage than emergency repairs or impromptu service calls. The cost of a Maintenance service contract is generally outweighed by the costs of any downtime with unplanned emergency service calls.

With the purchase of a Maintenance Package we can also offer discounted technical assistance rates and training rates. For more details please request a quotation for an EWS Maintenance Package

## EWS QUOTATION TERMS

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1. Equipment quotation valid for 30 days
2. Excludes all applicable taxes, duties and tariffs
3. Subject to correction in the event of errors and/or omissions
4. Incinerator to be operated using diesel oil
5. Pricing is FCA EWS Shop in Burlington, ON. However, upon request, EWS can arrange shipping of incinerator package to Valleyfield, Quebec. An estimated freight rate has been provided, herein, as an optional item for purchase.
6. Incinerator air emissions testing that may be required by Environmental Regulators must be carried out by an independent, third-party, accredited laboratory. Definition of the test plan, arrangements for testing and the contract with the lab is normally arranged by the Owner. EWS can assist the Owner in finding a suitable lab and planning for the test. EWS can also arrange to have a Technician on-site during the tests. Additional fees apply.
7. **EWS** Technical Services
  - All pricing is subject to change based on actual days on-site and unforeseen circumstances while on-site.
  - All travel expenses (air travel, taxi, etc.), accommodations and other expenses incidental to the work will be charged and invoiced directly to the customer at cost plus 10%. Charges will be substantiated by copies of receipts and billed separately.
  - **EWS** Technician will be working 12 hour days
  - Weekends are included in package price
  - Travel days included in package price but not listed for total days on site.
  - Standby days are not included and will be charged at \$850 per day, invoiced to customer separately
8. Optional items for purchase such as, but not limited to the following, are not included:
  - a. Maintenance Packages
  - b. Signed and sealed drawings by a P.Eng., if required
  - c. Any upgrades external to proposed design. EWS requires all applicable specifications, such as but not limited to climatic conditions and mechanical, especially Control & Electrical specifications to give revised price, if those apply.

## ITEMS BY OTHERS: (not included in equipment price)

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1. Site preparation, including concrete pad or other suitable level surface
2. Installation and assembly of incinerator
3. Final electrical terminations and power to main control panel and junction boxes
4. Environmental permits, testing, bonding, local permits
5. Shipping arrangements and cost to final site in the Nunavut
6. Crane and forklift for off-loading equipment at site
7. Mobilization to and from Jobsite by EWS technicians (air travel, taxi etc.) and Room and Board on-site. To be billed separately at \$ per Diem.
8. Time for site specific safety orientation or other safety requirements such as Medical Exam (if required)
9. Air Emissions Testing and Test Plan by Independent Certified Laboratory

## EWS PAYMENT TERMS

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**Eco Burn Inc. o/a Eco Waste Solutions** manufactures equipment on a custom order basis. Therefore, the Schedule of Payments is as follows:

Progress payment schedule:

- 20% Down Payment with Purchase Order
- 30% of Purchase Order after all major sub-orders placed (steel, refractory and electrical) as evidenced by un-priced work orders
- 40% of Purchase Order upon readiness to ship
- 10% of Purchase Order upon system commissioning or 90 days after readiness to ship, whichever occurs first

## EWS DELIVERY

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The incinerator will be ready-to-ship from EWS facility in Burlington, ON, Canada, by client's preferred shipping carrier at **15 weeks** upon receipt of down payment and signed PO. For example, if EWS receives PO by **Monday April 2<sup>nd</sup>**, the system will be ready to ship on **July 15, 2018**. Note that to meet the July 15 ship date an expediting fee is required as presented in the itemized pricing to meet the 15 week ready to ship, otherwise ready to ship is 20 weeks.



## EWS ENVIRONMENTAL PERFORMANCE

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**Eco Waste Solutions (EWS)** is a leader in providing environmentally responsible waste management equipment. EWS has certified air emissions test data proving that the equipment can reproducibly achieve the emission regulations referenced in the RFQ.

The Government of Nunavut is a signatory to the CCME (Canadian Council of the Ministers of the Environment) CWS (Canada Wide Standards). It is therefore assumed that these limits will be imposed on this project as with other projects in the region. These limits can be met using the ECO Model incinerator packages proposed herein when processing the described waste in accordance with factory recommended operating procedures.

The waste types to be processed are considered non-hazardous and it is assumed that any/all hazardous materials including batteries will be eliminated from the incinerator waste stream. The waste types to be processed are typical of camp waste and should not include any heavy metals or other problematic compounds.

However, it should be noted that heavy metals cannot be controlled by incinerator design. To avoid the need to add an additional air pollution control system (scrubber) to the package it is important that waste segregation and tracking procedures are in place whenever waste is to be incinerated and meet the regulations specified. In particular, materials that may contain Mercury should be diverted away from the incinerator waste in-feed.

EWS will guarantee compliance of the Incinerator Package with the Canada Wide Standards for Dioxins and Furans

Pollutant	Limit
Dioxins & Furans	80 pg/ Rm3 TEQ

NO guarantee is included for the any METALS (Mercury, Arsenic, Cobalt, Chromium, Copper, Manganese, Nickel, Cadmium, Lead and Thallium). All metals have been left out of the scope of the guarantee as they are not controlled by the equipment but rather a function of the waste input. If waste is properly segregated emissions will be well below those given as limits.

Please note, control equipment for metals can be added to the scope if metals in the waste cannot be controlled, pricing for this additional equipment can be provided upon request. EWS is a leader in providing environmentally responsible waste management equipment.

**EWS Performance Guarantee Criteria**

1. The owner and/or operators are responsible for installing and operating the unit according to the manufacturer's instructions and in compliance with local codes.
2. Only the prescribed, non-hazardous waste will be processed during normal operation.
3. The waste mix during testing must be proven to be representative of the waste details provided herein in "EWS Waste Assumptions" defined in this document.
4. The owner / operator is responsible for preventative measures to ensure that no unapproved waste is processed.
5. The unit must be operated within the rated operating ranges according to instructions and ensuring that the incinerator is not overloaded. The owner / operator will ensure that each chamber is not charged with any load weighing greater than stated capacity or 75-80% of the chamber's internal capacity by volume per burn cycle (as indicated by the lowest aspect of the opening of the breech, or the burner port of the Primary Chamber). The chamber volumes are calculated to provide enough space for the total weight at the assumed density in the area below the burner port.
6. All waste processed must be weighed and recorded, and weights must not exceed the design capacity of the system.
7. Equipment must only be operated by persons who have been trained by EWS Technicians.
8. The equipment must be operated in accordance with EWS Operating and Maintenance Instructions.
9. The Operator must not create excess air and particulate emissions by stoking of the waste bed during burning or continuous feeding. Both actions are not acceptable.
10. Dusty, granular and friable materials that are expected to generate particulate matter should be avoided.
11. Operator is responsible for ensuring the safe operation of the unit, including good housekeeping practices such as ash cleanout prior to re-loading the unit.
12. The unit must be maintained according to the Eco Waste Maintenance Schedule including all EWS recommended daily, weekly and monthly, preventative maintenance procedures outlined in the EWS Operator Manual. Compliance with the EWS Maintenance Program must be well-documented including evidence of parts replacement and labour.
13. Corrective maintenance procedures must also be carried out to maintain the system in good working order at all time.

14. Spare parts must be kept in inventory to accommodate the prompt replacement of any worn or damaged parts and materials.
15. Modification, abuse or other impairment of the unit voids all warranties and equipment performance obligations by Eco Waste Solutions.
16. If these conditions are not met Eco Waste Solutions (EWS) cannot assure the performance of the unit as designed.
17. Performance test plans for the emissions will only consider emissions produced after the “start-up phase” of the burn cycle has concluded but before the burn cycle ends and the cool down is initiated.
18. In the event that the equipment does not meet the limits identified above, EWS has the option at its own expense to make adjustments or additions to the equipment, to ensure that compliance can be met.
19. Items that may affect the EWS Performance Guarantee Criteria that are not included with the price of EWS equipment or services:
  - Services of independent experts, testing labs or any costs associated with testing such as purchase or rental of equipment
  - CEMS utilized for the Performance Test must have been RATA tested and calibrated within 14 days of the Performance Test.
  - An Eco Waste Technician must be present at the Performance Test

## EWS EQUIPMENT WARRANTY

### Equipment Warranty

The warranty period provided by **Eco Waste Solutions** ("EWS" or the "Corporation") is 18 months from notice of ready-to-ship or 12 months from start-up at Purchaser's site, whichever occurs first (the "Warranty Period"). To the original Purchaser, **EWS** warrants that the products and parts manufactured by the Corporation and supplied hereunder shall be free from defective workmanship and material during the Warranty Period. In the case where **EWS** has purchased components from other vendors or suppliers ("3rd Party Components"), the warranty is limited to to **EWS** supplying the part to the Purchaser (F.O.B. Purchaser site). For all warranty issues, including **EWS** manufactured components and 3rd Party Components, the Purchaser must provide written notice to **EWS** within three (3) days after defect is discovered.

**EWS** will provide all labour related to **EWS** manufactured components for the Warranty Period. **EWS** has the option to use outside labour to fulfil its Warranty obligation. The Purchaser cannot use local labour for Warranty items unless agreed to by **EWS** in writing. If the Purchaser proceeds with labour without **EWS** agreement, the Warranty will be null and void, and will be at the full cost of the Purchaser.

### Equipment Covered by Warranty

Equipment supplied under a purchase order to **EWS** including:

- Primary and Secondary Chamber
- Connecting ductwork between Primary and Secondary Chambers (Breach Sections) and the Stack Sections
- Controls – Manual, Electronic and Electric

### Extent of Warranty Coverage

All costs related to the repair or replacement of system components where failure is due to defect in material, workmanship or design is covered by **EWS** for one year from the date of repair or replacement.

Replacement due to abuse, misuse, and/or lack of maintenance or carelessness is not covered. Wear from normal use, or alternative disposal costs are not covered.

There is no warranty on the following parts and/or any consumables:

- All burner flame-front parts
- Thermocouple elements + protection tubes
- Electrodes, photocells
- Gaskets, Seals and tubing
- Fuses, light bulbs and glass assemblies
- Nozzles, filters
- Refractory Surface Cracks\*
- Tubing

\*Note: Normal in high temperature applications

### Warranty Provisions and Exceptions

**EWS** does not guarantee or warrant, either expressly or implied, the materials and workmanship of supplies, materials, equipment or machinery manufactured by third parties and furnished and installed by **EWS** (outside of the scope of this proposal) in the performance of the Work, to the extent such supplies, materials, and equipment or machinery is itself an end product with its own customary warranty.

**EWS** shall endeavor to obtain from all such vendors and suppliers and assign to Purchaser the customary warranties and guarantees of such vendors and suppliers with respect thereto. **EWS** shall, at the sole expense to Purchaser, render reasonable assistance to Purchaser when requested in order to enable Purchaser to enforce such warranties and guarantees by third party manufacturer's suppliers.

**EWS** will not be liable for any consequential damages, loss or expense arising from any change in or alteration to equipment of its manufacturer such changes or alterations having been made by any persons other than personnel of **EWS** or its agents, in which event such agents must have written permission of **EWS** prior to making such changes or alterations.

**EWS** shall in no event, be liable for consequential damages as a result of any breach of this agreement by or for any other reason. This warranty shall not apply to products or parts not manufactured by **EWS** or to equipment parts which shall be subject negligence, accident or improper control, improper operation, maintenance, storage, or damage or circumstances beyond the control of **EWS** or to other than normal use or service. Regarding parts of the equipment purchased by **EWS**, no warranty is made other than that offered by the original equipment manufacturer.

THE ABOVE ARE **EWS**' SOLE WARRANTIES, AND THE REMEDIES SET FORTH ABOVE CONSTITUTE PURCHASER'S EXCLUSIVE REMEDIES IN THE EVENT SUCH WARRANTIES ARE BREACHED. WITH RESPECT TO THE CONSTRUCTION AND MECHANICAL FUNCTION OF THE PRODUCTS, **EWS** MAKES NO OTHER WARRANTIES OF ANY KIND WHATEVER, AND THESE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES OR GUARANTEES, WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

## Acceptable Waste-Streams

The **Eco Waste Solutions Waste Oxidizer** can process a range of waste materials. The following list has some of the potential waste streams that can be effectively processed in our system. This list is only a guide and should not be assumed to be an exhaustive list of materials. Please contact EWS for more details.

### Acceptable Waste Materials Suitable for Processing in Eco Waste Solutions Technology

Solid Waste	Description	Origin
Food Waste	Food, food packaging and containers, plastic and paper waste from food preparation	Kitchen and dining areas
Domestic waste	General refuse such as paper, plastics, cans, bottles, cardboard, newsprint	Dormitory areas, recreation facilities, office areas, warehouse, plant and production facilities
Packaging	Cardboard boxes, paper, plastic containers, plastic film, styrofoam, poly-weave bags	Inbound supplies to all work areas.
Wood waste	Skids, pallets, crates, including wood materials contaminated with chemical residues from Cyanide or explosives	Construction activity, inbound supplies, reagent and chemical packaging.
Absorbents	Rags, wipes, spill cleanup materials	From all work areas
Filters – Air and Fluid	Filters coated with fine particles and trapped solids, saturated with water or fluids (glycol, lube oils, fuel)	From water treatment facility, or generated at point of maintenance of vehicles, machinery and equipment
Medical Waste	Bandages, dressings, gloves, swabs, syringes, sharps	Medical clinic or first aid centre
Tires & Rubbers	Tires, belts, hoses	From vehicles and equipment maintenance shop
Low-level radioactive waste <sup>1</sup>	Personal protective equipment (gloves, overalls, etc.), pallets, packaging, rags, construction debris that have come in contact with radioactive elements.	From maintenance activities, operations and construction activities
Liquid Waste <sup>2</sup>	Description	Origin
Glycol	Used antifreeze	From vehicles and equipment maintenance shop
Used Oils	Used lubricating and hydraulic oils, including synthetics	From vehicles and equipment maintenance shop
Semi-solid Waste <sup>3</sup>	Description	Origin
Sewage sludge	Dry filter cakes	From sewage treatment plant dewatering equipment
Kitchen grease, oils	Solid kitchen fats, grease, used cooking oil	Kitchen grease traps, fryers

**Note: the following items require special features and handling please consult with EWS for details**

1. Processing of radioactive materials requires the inclusion of specifically designed air pollution control system.
2. Glycol can be blended with waste oil (up to 5%) – only with optional upgraded waste oil burner package.
3. Dewatered sewage sludge and kitchen grease can be comingled with waste – restrictions apply.

## Unacceptable Waste-Streams

The following is a list of some of the waste-streams that should not be processed in the Eco Waste Oxidizer. This list is only a guide and should not be assumed to be an exhaustive list of materials. Please contact EWS for more details and to discuss your specific waste processing requirements.

A waste and procurement audit is highly recommended and encouraged to ensure that all sources of heavy metals are identified and diverted to other disposal methods. Small amounts of materials containing heavy metals may be acceptable if air pollution control equipment specially designed for metals removal is included with the package.

### Unacceptable Waste Materials - NOT Suitable for Processing in Eco Waste Solutions Technology

Solid Waste	Description	Origin
Bulky Materials	Automotive or heavy equipment parts such as engine blocks and transmissions	From vehicles and equipment maintenance shop
Non-Combustible Materials	Drywall, asbestos, bricks, concrete, soils	Construction activity
Radioactive Materials	Smoke detectors, laboratory wastes	From Buildings, laboratories
Potentially Explosive Materials	Aerosol spray cans, large propane tanks, other pressurized vessels. Actual explosives	From warehouse, plant and production facilities
Heavy Metals	Items containing lead, mercury, cadmium, for example: batteries, electronic devices, fittings, old pipe work, fluorescent light bulbs, electrical switches, thermometers, PVC plastics, aluminum solder, photovoltaic cells	From maintenance activities, operations and construction activities
Liquid Waste	Description	Origin
High Alkaline or High Acid Materials	By-products of industrial processes, unrefined fuels	From warehouse, plant and production facilities
Solvents	Solvents such as acetone, xylene, methanol	From vehicles and equipment maintenance shop



# **SAMPLE**

## **ASSEMBLY & INSTALLATION PROCEDURES**

**CA 600WC**

Sample

### **Corporate Office:**

Eco Waste Solutions

5195 Harvester Road, Unit 14

Burlington, ON, Canada L7L 6E9

Tel: 905-634-7022 Fax: 905-634-0831

Email: [info@ecosolutions.com](mailto:info@ecosolutions.com)

Web: [www.ecosolutions.com](http://www.ecosolutions.com)



## Introduction

The units will require assembly in the field. Consult Eco Waste Solutions (EWS) for component weights so that properly sized cranes are available at the site for unloading and erecting.

The majority of this unit has been pre-assembled at the factory inside the high cube 20' container, but the upper section of the secondary chamber, the flashing from the container to the secondary chamber and the stack sections will have to be assembled on-site.

Lifting lugs are provided on stacks, and major accessories. These lugs should be used in setting the pieces into position. Do not attach lifting chains or cables to piping or mounting flanges as they may be damaged. Avoid dragging lifting gear across painted surfaces as this will cause damage to the high temperature paint. When placing the incinerator into position be extremely careful not to subject the refractory to mechanical shock as this may result in refractory damage.

Additional utility connections are as follows and some instructions follow at the end of this section:

- Electrical
- Propane



## Incinerator Assembly and Installation Procedures

### Assembly of CA 600WO Incinerator System

**Reference:** Drawing: CA 600-01-02 General Arrangement (GA)

#### Step 1: Foundation for containers

The incinerator's container, the storage container and related components must be installed on a level concrete pad or compacted gravel pad. It is recommended that appropriate consultation with civil engineers and/or architects is taken before designing an appropriate foundation.

Please refer to EWS supplied drawings CA-600-01-04 Foundation Support Details.

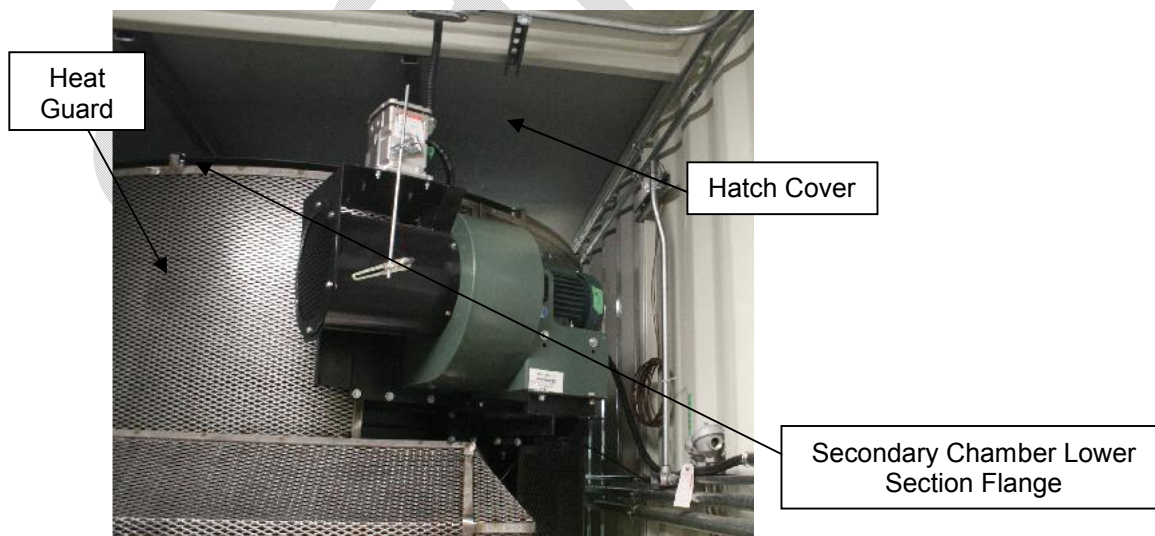
Once the containers are installed on the appropriate foundation, the primary chamber and its components, as well as the lower section of the secondary chamber and its components will be fully installed, assembled and wired.

#### Step 2: Secondary Chamber Upper Section

Remove the hatch cover installed on the container roof for protection during shipping and the heat guard that was installed on top of the secondary chamber flange for shipping.

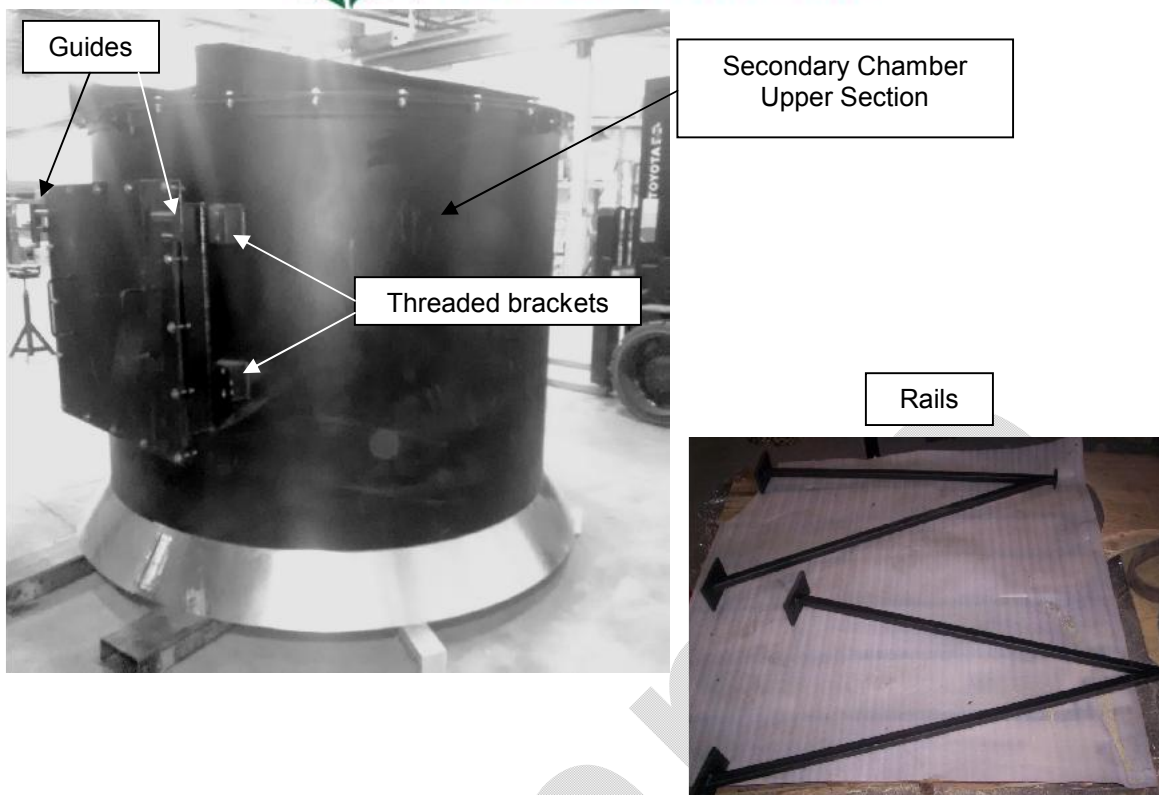
Install the *Secondary Chamber Upper Section* aligned with the *Secondary Chamber Lower Section*. Lower *Secondary Chamber Upper Section* slowly onto *Secondary Chamber Lower Section* through the opening on the top of the container, compressing the insulating blanket between the *lower* and *upper sections* of the *Secondary Chamber*.

Align bolt holes and install the ½" x 2" UNC bolts with flat washer from the top of the aligned flanges, leaving the ends without nuts, re-install the heat guard but this time under the flange, bolt together the upper section the lower section and the heat guard using the flat washers, the lock washers and the nuts provided.



#### Step 3: Secondary Chamber Door

With the door attached to the secondary chamber, disassemble the guides attached to the door. These guides will ride on the rails shipped loose



Install the rails to the secondary chamber using the pre-installed threaded Brackets

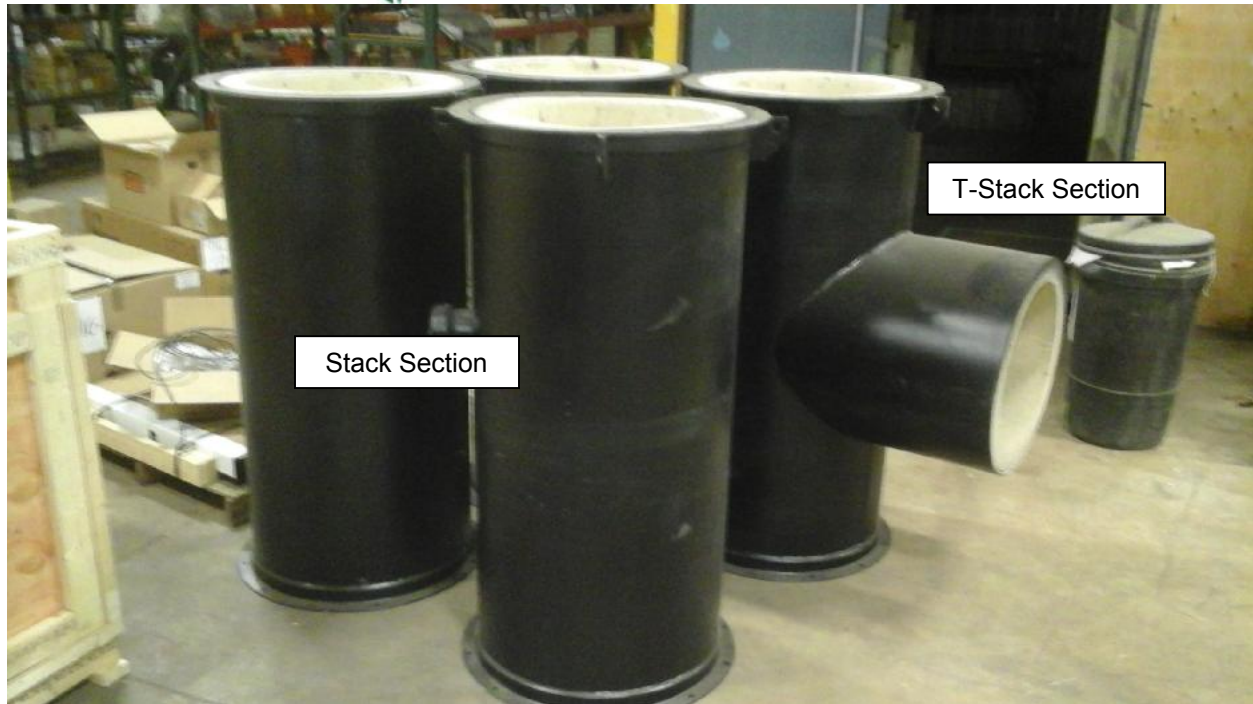
This secondary chamber door can only be opened when the incinerator is cold and for maintenance purposes.

#### **Step 4: T-Stack and Stack Sections**

Install stack gaskets between stack sections.



Install refractory-lined *T-Stack Section* on top of the *Secondary Chamber* using the hardware provided. Then install the next three *Stack Sections* as per the drawing using hardware provided.

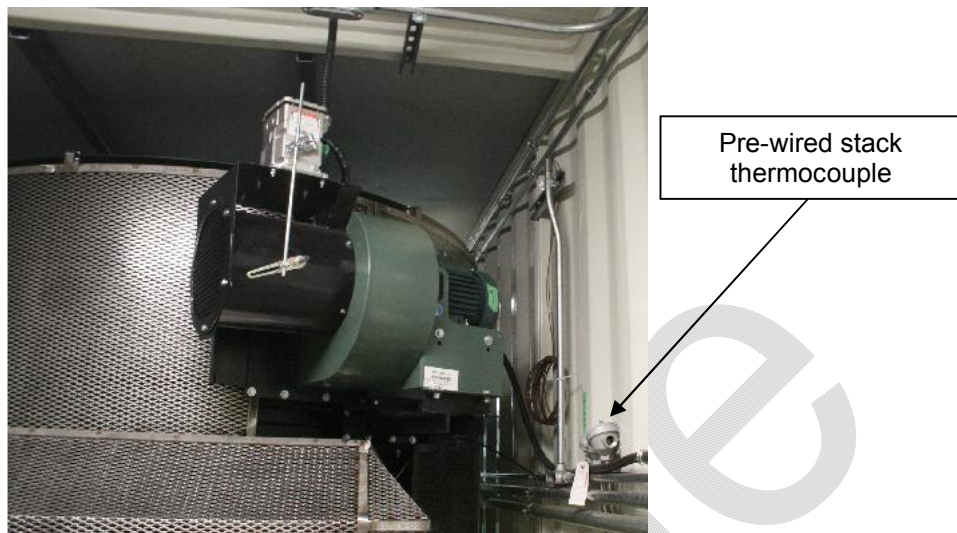


This is a Sample Photo only of Erection of the Stack Sections



**Step 5: Stack Thermocouple**

Install the pre-wired stack Thermocouple at port in the T-Stack (not shown in picture).



**NOTE** When wiring the thermocouples there must be no splices between the Main Control Panel and the thermocouple.

On the Thermocouples the red wire is NEGATIVE and the Yellow is POSITIVE.

**Step 6: Roof Flashing**

Once steps 1 through 5 are completed, install the container's roof flashing to prevent rain, snow or dust to get inside the container. Use plenty of high temperature silicone in all the transition surfaces (chamber body to collar, flashing to collar and flashing to container frame) before installing the screws to fix the flashing to the chamber and to the container.

**Collar installed to Upper Secondary Chamber Body**

Flashing sections to be installed over the collar and attached to the container opening frame



#### **Step 7: Propane Gas Connections**

**Reference:** Drawing CA 600-01-02 General Arrangement (GA)

The Propane gas tank and evaporator are pre-assembled on a skid; the gas trains for the burners are pre-installed in the container. The connection from the tank/evaporator skid to the burners' gas train has to be carried on-site (by client's qualified contractors). There must be a clearance of at least 25' (7,620mm) from the tank/evaporator skid to the container, or a distance according to the local code.

#### **Propane Skid**



#### **Propane Burners gas Train**





**NOTE** All Propane Gas connections to be done by a certified technician and should satisfy all local codes (all lines to be pressured tested), including the distance between the incinerator system and the tank.

#### **Step 8: Electrical Connections**

**Reference:** Electrical Drawings provided



**NOTE** All electrical connections, terminations and conduit installation to be done by a certified electrician and should satisfy all local codes.

Most of the internal incinerator wiring of the incinerator was completed at the factory; the pre-wired stack thermocouple needs to be installed in the T-Stack.

The external wiring necessary on-site (by client's contactors) is from the *power source* to the *Main Control Panel*, from the incinerator's container to the storage container and from the container to the propane vaporizer

#### **Step 9: Start-Up**

**NOTE CAUTION:** Do not attempt to place the equipment into operation until an EWS Service Technician has checked out all equipment and interlocks.

Upon completion of mechanical erection, interconnection of equipment and provisions of utilities as described above, arrangements should be made with the EWS field service department for scheduling of a service technician for initial start-up.

An EWS representative must perform start-up of all incinerator systems unless specifically arranged otherwise in writing by EWS.

Attempts to start-up incinerator systems by the buyer without prior written approval may result in revocation of all expressed or implied warranties.

2230 S. Huron Dr., Santa Ana, CA 92704 USA

Tel: (714) 432-9996 | Fax: (714) 432-9898

sales@pureaqua.com | www.pureaqua.com

<b>Company:</b>	Baffinland	<b>Country:</b>	Canada
<b>Name:</b>	JT Gibbens	<b>Phone:</b>	+416-364-8820 x 5061
<b>Email:</b>	john.gibbens@baffinland.com	<b>Fax:</b>	

Qty	Part No.	Description	Unit Price (\$)	Ext Price (\$)
<b>5,000 GPD UF System</b>				
1	FP	UF Feed Pump, 110V/1ph/60Hz	\$1,950.00	\$1,950.00
1	CDS-G-15	Prechlorination Dosing System, Adjustable Metering Pump, Polyethylene Solution Tank, Manual, 110V/1ph/60Hz	\$420.00	\$420.00
1	UF-5K-1-SG	Ultra Filtration (UF) System designed to produce 5000 GPD, 1 UF module (Hydranautics 40 or equal), automatic filter screen, PVC sched. 80 piping, automatic valves, all on one skid	\$21,500.00	\$21,500.00
1	CEB #1	Chemical Enhanced Backwash - Acid (Fe)	\$1,650.00	\$1,650.00
1	CEB#2	Chemical Enhanced Backwash - Alkali (TOC)	\$1,561.00	\$1,561.00
1	CEB#3	Chemical Enhanced Backwash, Oxidant (TOC)	\$1,463.00	\$1,463.00
1	UF-CS4-1	Cleaning Skid for UF modules	\$5,202.00	\$5,202.00
1	Cont	Containerization all the above equipment, (1) 20' ISO shipping containers including: interconnecting piping and wiring (within container), lights, paint & AC.	\$27,500.00	\$27,500.00
1	TT	Wire Transfer Fee	\$35.00	\$35.00

<b>Terms and Conditions</b>	
<b>Payment:</b>	50% down/50% at shipping
<b>Lead Time:</b>	6-8 weeks
<b>Validity:</b>	30 days
<b>FRT Terms:</b>	<b>Exworks Santa Ana, CA – USA</b>

Sub Total:	\$61,281.00
Discount 0%:	\$0.00
Tax 0%:	\$0.00
Freight:	\$0.00
<b>Total (USD):</b>	<b>\$61,281.00</b>

No Credit Card Payments, Only Check or Wire Transfer.



## TERMS AND CONDITIONS OF SALE

**ORDER ACCEPTANCE:** Pure Aqua reserves the right to accept or reject an order request. Possession of a price sheet or a product catalog shall not be construed as an offer to sell the product listed. Pure Aqua sells wholesale only and does not sell to end users. These terms and conditions shall be considered a part of all accepted orders and accepted purchase orders. Some orders will require a down payment.

**CANCELLATION OR CHANGE OF ORDER:** Orders are processed as they are received. Once an order is in process (or production), add-ons (or change of orders) may hold up shipment of the original order (or build), or may be shipped as a separate order. Buyer's add-ons or changes to orders are subject to Pure Aqua acceptance. Cancellations are subject to Pure Aqua acceptance and may incur a 35% restocking fee.

**CUSTOM EQUIPMENT:** Custom equipment is subject to the terms and conditions detailed on the separate Pure Aqua quote form and will require a down payment.

**PRICES:** Products are sold at prices currently in effect at time of order, and are exworks Santa Ana, CA-USA unless otherwise specified. Prices generally coincide with dated Pure Aqua printed price sheets and website information. However, Pure Aqua reserves the right to change prices at anytime, without notice and without updating published material on our website or in print. Freight costs are for the customer's account.

**DELIVERY:** Stock items distributed by Pure Aqua are generally shipped within 1 to 4 working days after receipt of order. Additional time is required on special orders, large orders, or items not stocked. Pure Aqua is not responsible for delays due to conditions beyond our control. Orders will be delayed, or not processed, where accounts are found delinquent and no arrangements have been made with the Credit Department to settle the account.

**SHIPPING CHARGES:** All shipments are exworks Santa Ana, CA-USA, unless otherwise specified and shipping costs are the customer's responsibility.

**TERMS OF PAYMENT:**

1. Via Wire Transfers
2. Via Letter of Credit (L/C)
  - Letter of credit must be irrevocable, advised and confirmed by any MAJOR bank in the United States with draft payable at sight.
  - Letter of Credit must state that all bank charges inside and outside the United states are to be borne by the opener.

A minimum purchase requirement of \$250 is necessary to help defer handling.

**OPEN ACCOUNT:** To establish an open account, a complete credit analysis is required. This involves correspondence with you, your suppliers, and your bank. The time involved depends on the response time from the references you give us. You will be notified when your credit is approved. In the interim, all orders must be prepaid. No open account terms for customers outside of the United States.

**DAMAGED MERCHANDISE:** Pure Aqua is not responsible for damage or loss to a shipment by a freight carrier. Check shipments for damage before acceptance or note on freight bill "Subject to inspection for concealed damage." Consignee is responsible for filing a claim with the freight carrier for any and all damages or losses. Return of Damaged Goods will not be authorized.

**ERRORS AND RETURN GOODS AUTHORIZATION:** No returns will be accepted without prior authorization. Call Pure Aqua for an RGA number. Freight/shipping must be prepaid. An RGA not used in 30 days will expire. A return after that will be refused and invoice will be payable within terms. Special order goods are not returnable. All authorized returns are subject to a 35% restocking fee.

**DEFECTIVE GOODS & WARRANTY PROCESSING:** An item returned for warranty consideration without prior authorization will be refused. Call Pure Aqua for an RGA number. Pure Aqua and its manufacturers reserve the right to repair or replace defective merchandise. If pre-warranty replacement merchandise has been sent and the warranted goods are repairable, the repaired product will be returned to you at our expense and the pre-warranty invoice will be for your account. If the warranted product is not repairable, an offsetting credit invoice will be issued to your account. If the warranty consideration is denied, all expenses are for your account.

**LIMITED WARRANTY:** Products manufactured by Pure Aqua are warranted to be free of defects in material and workmanship for a period of one year from the system start up and commissioning, or fourteen months from the ship date, whichever comes first. Pure Aqua's responsibility and liability shall be limited solely and exclusively to the replacement or the repair of parts manufactured by Pure Aqua and will not be liable for any cost arising from removal, installation, transportation or any other charges that may arise in connection with the warranty claim. Products and/or system components sold by Pure Aqua and manufactured by others are subject to the warranty provided by the manufacturer of said products and/or components and not by Pure Aqua's warranty. Pure Aqua will not be liable for damage to products caused by incorrect operation, misuse, abuse, unauthorized alteration, repair, accident or if products were not installed and operated in accordance to the Pure Aqua operation and installation manual. Pure Aqua will not be liable for any incidental or consequential damages, losses, or expenses arising from installation, use or any other causes.

# Chemical Dosing Systems

Capacity: 3 to 120 GPD

**CDS**  
**SERIES**

The Pure Aqua CDS series chemical dosing systems offer a wide range of capacities to meet various chemical treatment applications. Each system includes the chemical metering pump and polyethylene chemical tank, along with the necessary hoses and fitting for the pump.

## Standard Features

- Fully adjustable output capacity from 3-120 GPD
- Manual function control for stroke rate & length
- Highly reliable timing circuit
- EMI resistant
- Thermally protected solenoid with auto-reset
- Bleed valve assembly
- Plastic pvc head/fittings and polyethylene tank for a
- wide range of corrosion resistance to such chemicals as mild acid, chlorine, and caustic solution

## Available Options

- 230V/1ph/50Hz or 60Hz
- Epoxy coated stainless steel mixer
- pH controller
- ORP controller
- Stand-by pump
- Skid mounted unit
- Custom built unit
- Pump maintenance spare kit
- Level switch
- Local control panel



## Applications

- Water purification and pollution control
- Iron, hydrogen sulfide & manganese removal
- Scale prevention
- Acid water neutralization
- Coagulation and turbidity removal
- Waste water treatment
- Food Processing
- Detergent and wetting agent metering
- Swimming pool treatment
- Liquid fertilizer treatment
- Hydroponics nutrient treatment
- Municipal water treatment
- Algae control
- Livestock water treatment



# Chemical Dosing Systems

Capacity: 3 to 120 GPD

**CDS**  
SERIES



## Materials of Construction

- Pump Head: PVC
- Diaphragm: Teflon-faced
- O-Rings: Teflon
- Balls: Ceramic
- Fittings: PVC
- Tubing: Clear PVC / White PE
- Tank / Cover: Polyethylene



Model #	Output Capacity		Max Pressure (PSI)	Tubing/ Connection	Kopkit	Input Power (Watts)		Stroke Frequency		
	GPD	LPD				Peak	Avg.	Control (Manual)	Max. SPM	Turn-Down Ratio
CDS-3	3	12	100	3/8" PVC/PE	KX100	130	50	Online Adjustable	125	100:1
CDS-6	6	23	150	3/8" PVC/PE	K2VTC1					
CDS-12	12	46	150	3/8" PVC/PE	K3VTC1					
CDS-24	24	83	100	3/8" PVC/PE	K4VTC1					
CDS-30	30	114	100	3/8" PVC/PE	K4VTC1					
CDS-44	44	167	100	3/8" PVC/PE	K4VTC1	300	130	Online Adjustable	125	100:1
CDS-76	76	288	100	1/2" PVC/PE	K5VTC3					
CDS-120	120	454	100	1/2" PVC/PE	K6VTC3					

Pure Aqua also supplies: Custom Engineered Solutions, Multimedia Pretreatment, Activated Carbon Pretreatment, Water Conditioning, Chemical Dosing Systems, Ultraviolet (UV) Sterilizers and Ozonation Systems.

 **Pure Aqua, Inc.®**

Water Treatment and Reverse Osmosis Systems

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Authorized Dealer:

# Industrial Ultrafiltration Systems

Capacity: 10,000 to 1,000,000 GPD

**UF**  
**SERIES**

Ultrafiltration is a pressure driven membrane separation process that removes suspended or particulate matter (including colloids & silt) from water. Ultrafiltration is more reliable than conventional multimedia filtration that removes approx. 10 micron or larger matter. Ultrafiltration also efficiently removes bacteria and most viruses.



## Standard Features

- UF modules (PVC)
- Stainless steel backwash pump
- 150 um flushable screen
- Schedule 80 PVC piping
- Microprocessor control panel
- Motor starters
- NEMA 12 enclosure
- Differential pressure switch
- Liquid filled pressure gauges (panel mount)
- Electrically actuated valves
- Flow meter

Pure Aqua supplies a full line of standard and fully customizable Ultrafiltration systems, all of which are engineered using advanced 3D computer modeling and process design software.

## Available Options

- Chemically Enhanced Backwash (CEB)
- Feed/backwash oxidizer (dosing system)
- Membrane cleaning skid (CIP)
- 380-415V/3Ph/50Hz power supply
- Online turbidity monitor
- Stainless steel multi-stage feed pump
- Feed pump VFD
- PLC + HMI
- Filtrate (backwash) tank (HDPE)
- Pressure Transducers
- Blower (for backwash)
- Duplex 2205 screen (versus SS 316)





# Industrial Ultrafiltration Systems

Capacity: 10,000 to 1,000,000 GPD

**UF**  
**SERIES**

Ultrafiltration systems eliminate the need for clarifiers and multimedia filters. Standard design is based on a UF module with outside-in flow configuration which allows for less plugging, higher solids loading, higher flow area and easy cleaning.

## Operation Specifications

- Power supply: 460V/3Ph/60Hz
- Turbidity < 50 max. 300 NTU
- TSS < 50 max. < 100 mg/L
- TOC < 10 max. < 40 mg/L
- COD max. < 60 mg/L
- pH 6-9 (2-11 cleaning)
- Temperature 25°C (max. 40°C)
- Cl<sub>2</sub> 0.5 ppm (2,000 cleaning)
- Backwash frequency 20-60 minutes

## Applications

- RO pretreatment
- Process separation or recovery
- Drinking water treatment
- Tertiary wastewater or grey water treatment



Model #	Filtrate Surface or Grey Water Flux: 25 GFD		Filtrate Sea Water Flux: 35 GFD		Filtrate Ground Water Flux: 53 GFD		Number of UF Modules
	GPD	M <sup>3</sup> /D	GPD	M <sup>3</sup> /D	GPD	M <sup>3</sup> /D	
UF-10K-1	10,000	38	15,000	60	25,000	98	1
UF-20K-2	20,000	76	30,000	117	50,000	192	2
UF-40K-4	40,000	153	63,000	241	103,000	394	4
UF-60K-6	60,000	229	94,000	358	154,000	586	6
UF-80K-8	80,000	305	127,000	481	207,000	788	8
UF-100K-10	100,000	382	158,000	599	258,000	980	10
UF-120K-12	120,000	458	190,000	722	311,000	1,182	12
UF-161K-16	161,000	611	254,000	963	415,000	1,575	16
UF-201K-20	201,000	764	316,000	1,197	517,000	1,959	20
UF-262K-26	262,000	993	412,000	1,561	674,000	2,555	26
UF-302K-30	302,000	1,145	475,000	1,802	778,000	2,949	30
UF-403K-40	403,000	1,527	633,00	2,401	1,037,000	3,928	40

 **Pure Aqua, Inc.®**

Water Treatment and Reverse Osmosis Systems

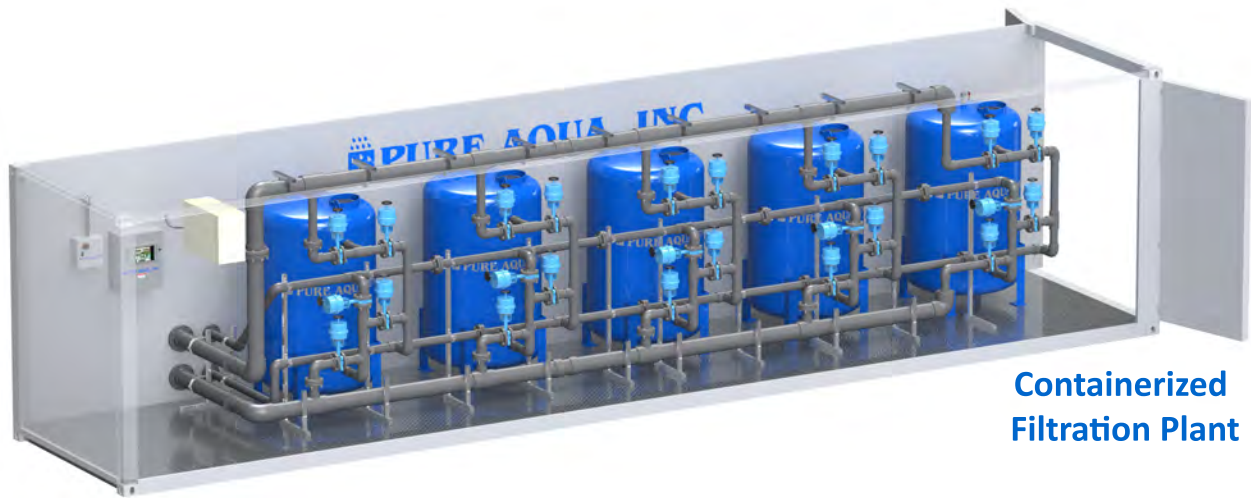
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Authorized Dealer:





Containerized  
Filtration Plant



Containerized  
Ultrafiltration Plant



Containerized  
NanoFiltration Plant



Containerized  
Brackish RO Plant



Containerized  
Seawater RO Plant



GENERAL ARRANGEMENT DRAWING						
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<div></div> <div><b>PURE AQUA, INC.</b> 2230 South Huron Drive Santa Ana, CA 92704 USA Phone: (714) 432-9996 Fax: (714) 432-9898 <a href="http://www.pureaqua.com">www.pureaqua.com</a></div>				<div>TITLE: <b>Containerized Solutions</b></div> <div>PROJECT:</div> <div>CUSTOMER:</div>		
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES, TOL. FRAC. ± 1", ANG. MACH. ± 1/4°, BEND ± 1/2"						
DRAWN: S.B.	REVIEWED:	VERIFIED:	VALIDATED:	DWG NO:		REVISION
DATE: 2/9/2017	DATE:	DATE:	DATE:	JOB NO:	SHEET: 1 OF 1	0
2					1	



# **Canwest Tanks & Ecological Systems Ltd.**

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## **DESIGN SPECIFICATIONS For MODEL CWT50 50 MAN MOBILE CAMP SEWAGE TREATMENT PLANT**

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**Office & Plant: 11975 Old Yale Road, Surrey, B.C. V3V 3X4, Canada**  
**Tel: 604-580-3030, Toll Free (Canada) 1.888.704.3030 Fax: 604-580-1171**  
**Email: [canwest@direct.ca](mailto:canwest@direct.ca) Web: [www.canwest-tanks.com](http://www.canwest-tanks.com)**

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### **PREAMBLE**

The Canwest Tanks' Mobile Sewage Treatment Plant is designed for efficiency and mobility when deployed in remote areas. The design takes into consideration that the camp site may be located in areas with severe weather conditions and thus is furnished to accommodate such conditions.

## **SYSTEM OVERVIEW**

The system is divided into four (4) parts, and the waste water flows through four stages, they are:

- 1<sup>st</sup> Stage - two settling tanks (trash tanks) @ 1,760 I.gals in serie
- 2nd Stage - Reactor Unit - extended aeration with clarifier
- 3rd Stage - Reactor Unit - Fixed Film Media and Clarification
- 4<sup>th</sup> Stage - Pump Chamber to discharge

The wastewater treatment plant (WWTP) utilizes the activated sludge extended aeration and Fixed Film Media process.

Raw wastewater is being pumped from a collector tank into the first & second Settling Tank.

Wastewater is then hydraulically displaced into the first Reactor Unit for further settling and Aeration then gravity flows into the second Reactor Tank, housing the Fixed Film Growth Media

The fixed media is designed to promote colonization of microorganisms on the surface of the media thereby increasing process stability and sludge settle-ability.

A Sludge Return air lift is installed in the Reactor, circulating activated sludge from the bottom of the chamber to the Fixed Media. This increases effectiveness of the media by delivering more nutrients to the microorganisms, accelerating growth thus enabling increased digestion.

Wastewater lastly flows through a quiescent zone at the outlet of the Reactor into the Pump Chamber.

In the pump Chamber the effluent passes through two sets of UV lights before final discharge.

Clear supernatant leaves the WWTP

## **DESIGN CRITERIA**

The treatment plant is designed to treat 2,500 imp. gals Average Daily Flow (ADF) of raw sewage with domestic influent strength.

The treatment plant is designed for influent with a max. Strength of  $BOD_5 = 250 \text{ mg/l}$   
 $TSS = 250 \text{ mg/L}$

However the treatment plant capable of delivering effluent quality of 20/20 BOD & TSS.

It should be noted that—, the influent strength and characteristics as well as proper maintenance are determining factors on the quality of the discharged effluent.

Expected Nitrate reduction is approx. 70%

A Commercial Grease Trap is strongly recommended in all cases where there is a kitchen attached.

## **ENGINEERS REPORT**

## ENGINEERS LETTERS FOR STRUCTURAL DESIGN OF TANKS & PERFORMANCE OF THE SYSTEM



July 31, 2013

TO WHOM IT MAY CONCERN:

**Re: Design Review of Tanks for Canwest Mobile Sewage Treatment Plants - Model CWT25, CWT50, CWT100 & CWT200**

Dear Sir/Madam,

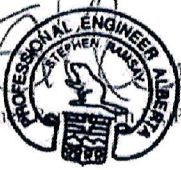
Grey Owl Engineering Ltd. has been retained by Canwest Tanks & Ecological Systems Ltd. to conduct a design review of certain aspects of the Canwest Mobile Sewage Treatment Plants, Model CWT25, CWT50, CWT100 and CWT200.

I have reviewed the design of the tanks for the above applications, and have found them to be suitable for the intended purpose, and in conformance with all relevant Canadian federal and provincial design codes and regulations, industry standards and accepted practice. The tanks are suitably designed for their intended usage.

I confirm by this letter that the tanks will meet the necessary structural and seismic requirements.

Yours sincerely,

GREY OWL ENGINEERING

Steph  P.Eng.



TO WHOM IT MAY CONCERN:

**Re: Design Review of Sewage Treatment Process for Canwest Mobile Sewage Treatment Plants - Model CWT25, CWT50, CWT100 & CWT200**

Dear Sir/Madam,

Grey Owl Engineering Ltd. has been retained by Canwest Tanks & Ecological Systems Ltd. to conduct a design review of certain aspects of the Canwest Mobile Sewage Treatment Plants, Model CWT25, CWT50, CWT100 and CWT200.

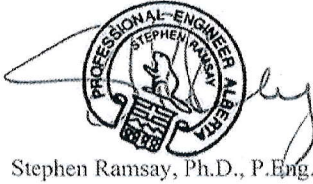
Further to your request, we have reviewed the general arrangement drawings, process flow diagrams (PFDs) and relevant design documents for the above captioned sewage treatment systems. Based on our experience with similar sized systems at industrial or work camps, it is our opinion that the systems proposed are capable of treating the influent wastewater such that carbonaceous biological oxygen demand (BOD5) and Total Suspended Solids (TSS) are less than 25 mg/L and 25 mg/L, respectively, based on the following design and operating assumptions:

- When the systems were tested by NSF they produced effluent, consistently, of BOD5 and TSS less than 20 mg/L and 20mg/L, respectively.
- The source of the wastewater will be domestic in nature, i.e. toilet, sink, shower, kitchen and laundry with no significant industrial sources or deleterious substances discharged into the sewer
- The sewage flow rate for the various camps shall not exceed the design Average Daily Flow (ADF) specified for the individual models.
- The system will be maintained in good working order by personnel skilled and experienced in the operation of wastewater treatment plants. Specifically, the air compressor will operate continuously and sludge and mixed liquor suspended solids concentration will be managed.
- Grease from the kitchen shall be discharged to a suitably sized commercial grease trap prior to discharging to the building sewer.

We trust that this provides the information you currently require. If you have any questions or require comments, please feel free to contact the undersigned.

Yours truly,

**GREY OWL ENGINEERING**



Stephen Ramsay, Ph.D., P.Eng.



## **SYSTEM DRAWING**

