

Burnbox Operational Guidelines By Tok Welding and Fabrication

SOLID WASTE BURN UNIT

Model 2000, 2001, and 2001B

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Location of Units in Alaska:

One Model 2000 in the Village of Manley in operation since early '00. One Model 2000 located in the Village of Beaver delivered in the fall of '00.

Goals:

Updated and New products which meet and exceed environmental standards are what we continually strive for. We have a commitment to our ENVIRONMENT and to YOU the Community Coordinator and the facility USER to provide the very best service applicable for your needs.

Description:

The Unit has two chambers; an upper waste receiving chamber approx. 5 cubic yards and a lower ash chamber approx. 4 cubic yards. There is one large loading door 34" dia. and a lower door accessing the ash chamber to facilitate clean-out. The rear dump door is hinged at the top and spans the diameter of the Unit and is held in the closed position by gravity. There are screened intakes on both sides of the Unit body. The combustion air inlets are located just under the grating which separates the interior chambers. The exhaust stack is bolted on the top of the Unit. There is a skid platform extending under the Unit and out the front which both acts as the Unit support and loading deck. The loading deck is incorporated with skid resistant grating for the facility user loading trash into the upper chamber and a diamond plateing drive over pad where vehicles are positioned for unloading. The Model 2001 is self contained requiring no logistical transfer stations, cement pads or other permanent structures. The Model 2001B has a small built in structure (on front of skid platform) where the generator (if power is not readily available) and blower motor are located.

Weight and Dimensions:

The actual weight of the Unit delivered to Beaver was 5638 pds. The approximate weight of the newer Model 2001 series will be 6350 pds.

The skid platform measures 66" wide 8" high and 25' long.

The burn box structure is 69" in Dia. and 12' long.

Overall assembled Unit;

- 13 foot high (with the 6 1/2 foot tall exhaust stack bolted on)
- 28 foot long (with the burn box mounted on skid platform)
- 75 inch wide (accounting for air intakes mounted on sides)

Transportation and Setup:

Entire Unit will arrive assembled and ready for operation except for the bolt on exhaust stack which is stored inside Unit for shipment. The stack is easily bolted on top to the respective collar using common tools and the supplied bolts. A temporary hitch tongue is bolted onto the skid platform along with a set of dolly axles underneath the entire Unit. A 3/4 ton pickup with a 2 5/8 inch ball can transport entire Unit along the road system without permits (a temporary trip license tag may be required as the Unit itself will become in effect, a trailer). The dollies will be supplied free of charge for a one week period for each Unit shipped. A deposit, and rental agreement (if in use over 7 days) with the manufacturer will be required for use of the tongue and dolly set. Removal of the dolly set is accomplished by unbolting the dolly carriage and by using a bucket loader or equivalent lifting the rear portion of Unit clear of the ground. Manufacturer can deliver the Unit anywhere in Alaska on the contiguous road system for a price of \$1.43 per mile measured from Tok to delivered site.

Site Preparation and Positioning:

Normal landfill sites are compatible with the use and operation of the 2001 Burn Unit. Level and cleared ground at the site extending away from the landfill pit approximately 75 foot is required. The Unit is pushed on it's skids into position at the pit edge using a small track vehicle or bucket loader. Approximately 8" of the rear skid platform will extend over the pit rim. The integrity of the earth under the Unit must be sufficient to bear the weight without caving in (very sandy soils would be an unsuitable site location).

Pit Trench

I I

I U I

I N I

I I I

I T I Drive up to or over skid platform to unload

I I waste into Unit.

Operation:Resident facility user:

Users of the landfill facility position vehicle upon or beside drive over ramp on diamond plated skid platform. Household waste is then manually put into the upper chamber through the large upper diameter loading door. Attempts should be made to deposit waste towards the rear of the chamber to accommodate more material. When the upper chamber is approximately 60% to 80% filled the Unit is ready for 'firing'.

Maintenance operator:

The facility maintenance operator will then visually inspect the load to ensure that it is properly prepared for firing, i.e., no concentrated volatile fumes, waste load properly positioned to the rear of the chamber, vehicles and flammable items positioned 50' away from Unit, that the blower motor ducting is in place (Model 2001B only), and that the propane stack 'after burner' assembly is positioned and ready for ignition. (The 'after burner' assembly is not field tested yet. It is envisioned that only certain waste stream demands would need this modification to the Model 2001 series in order to meet strict opacity requirements). When ready (as per applicable ancillary supplemental directions for modified Units) the facility operator will light the household waste using a match or propane wand (such as a weed burner) through the loading chamber door. The burn cycle will need no further supervision (i.e. normal loads not requiring blower motor/after burner operation). The actual burn will be three to four hours with a three to four hour cool down. Thus, if ignited at the end of the hours of operation for that day, the Unit will be ready for loading the following morning.

Clean out:

The maintenance operator would determine when to clean out the Unit. Normally when 30% ash accumulation in lower chamber is evidenced. The time periods between clean-outs will vary depending on usage and maintenance operator discretion. Clean-out may be necessary in as little as two weeks of operation or as long as every two months for infrequent usage. The clean-out procedure is outlined in the four page handout 'Directions and precautions for use'. Briefly, the clean-out procedure is a one man operation. The Burn Box portion of the Unit is manually jacked up and pinned into position. The rear clean-out door is now automatically in the opened position. The front lower door is unpinned and removed by the maintenance operator. Using the 'Ash Removal Rod' supplied with the Unit, the ash load is pushed out the rear door into the pit. The Burn Box is then lowered down into the normal position, the lower ash chamber door replaced, and the Unit is now in the ready condition to start a new operating sequence.

Periodic Maintenance and Item Replacement Schedule:

Visual inspection of the Unit by the maintenance operator before each firing is required. Areas to inspect are welded seams and brackets for cracks or distortion. Latching mechanisms and pins for excessive wear or distortion. Proper lubrication of Unit hinge pin and freedom of movement. Replace the bolt in 'rack' separating the two chambers should burn through or excessive distortion necessitate (common pipe stock is used). Ensure proper lubrication and movement and operation of lifting jack mechanism (A simple 'Handy-Man' jack is supplied by the manufacturer as the lifting mechanism). Repair or replace broken or distorted parts, before firing or lifting for clean-out.

Waste Residue:

Is not attractive to scavengers and the Unit is Bear resistant. Tin cans are friable and glass will often melt into a glob. It is anticipated that most medical waste will be made harmless if added after Unit comes up to temperature (specific study for specific items are warranted, no wholesale claim as to the safe disposal of medical waste herein is made).

Limitations:

Designed to reduce the volume of household trash; Not intended for paints solvents, petroleum waste, liquid septage, old tires, or batteries. These and other materials classified as hazardous should be disposed of in an authorized manner.

Costs:

Model 2001.....\$17,500

Model 2001B....\$20,000 (with generator to supply power to blower).

Stack 'After Burner' modification is anticipated to increase cost by \$500.

Transportation...\$1.43 /mile if delivered by Manufacturer

An operating instruction manual is supplied with each Unit. It is not anticipated that additional operating instructions/training will be required. Telephone instructions and clarifications will be available on an as contacted basis free of charge. Field instruction will be offered for a 4 hour period by the Manufacturer on the day of delivery free of charge if delivered by the manufacturer.

It is anticipated that most repair and replacement will be done locally. There are no special tools or obscure parts necessitating the Manufacturer to supply. Ancillary additions of blowers, stack 'after-burner' assemblies, or generators will all be common shelf items purchased in hardware stores or by catalogue.

Appropriate Technology:

Current production modifications to the basic Model 2000 warrant a new designation. Thus our new Basic Model 2001 comes with design improvements including; increased intake vent size, adding our unique 'Stack Blast' of heated air directionally aimed within the first portion of the exhaust stack to facilitate decreased opacity, a stack 'swirler' insert designed to help burn off carbon particles in the exhaust emissions and finally a more rigid skid platform. (The above improvements are all passive systems requiring no external power/fuel source). The 2001B has the added option of a Blower motor designed to help maintain stack opacity within acceptable limits for 'troublesome loads' such as high garbage (high moisture) content loads, especially where stricter emission standards are required.

The '2001' series is designed for community populations of up to around 100 persons. Communities exceeding this population will require multiple Units. There are several practical advantages to the approach of adding multiple Units; small but growing communities can add Units as the need dictates, adaptability to multiple landfill sites, easy relocation of Units within each facility, and compatibility with the 'use cycle' operation, i.e., as one Unit is fired another Unit will be available for loading use.

SOLID WASTE BURN UNIT
Model 2000, 2001, and 2001B
Directions and precautions for use

General Overview:

The primary purpose of this Unit is to contain and reduce the volume of trash loaded. There are possible secondary benefits such as reduced spreading of disease by scavengers, converting some components of trash into safer materials, reduced fire danger and keeping items out of physical danger to people or wildlife. However, no claim is made beyond the primary purpose of this Unit, i.e., to reduce the volume of trash loaded in a safer and more environmentally friendly manner.

Goals:

Updated and New products which meet and exceed environmental standards are what we continually strive for. We have a commitment to our ENVIRONMENT and to YOU the Community Coordinator and the facility User to provide the very best service and the very best product applicable for your needs.

Model Description:

Current production modifications to the basic model 2000 warrant a new designation. Thus our Basic Model 2001 comes with design improvements including; Increasing intake vent size, adding our unique 'Stack Blast' of heated air directionally aimed within the first portion of the exhaust stack to facilitate decreased opacity, a stack 'swirler' insert designed to burn off carbon particles and help scrub stack emissions. And finally a more rigid skid platform is incorporated into the 2001 line. (The above improvements are passive systems requiring no external power/fuel source). The 2001B has the added option of a blower motor designed to help maintain stack opacity within acceptable limits for 'troublesome loads' such as high garbage (high moisture content) loads, especially during initial firing and where stricter emission standards are required.

The '2001' series is designed for community populations of up to around 100 persons. The expectation and design intention is that communities exceeding this population will need multiple Units. There are several practical advantages to the approach of adding Units as the need dictates; affordability for smaller but growing communities, adaptability to multiple landfill sites, and compatibility with the 'use cycle' operation, i.e., as one Unit is being operated another Unit can be available for loading.

Limitations:

Not intended for paints, solvents, old tires, batteries or petroleum waste. These and other materials classified as hazardous should be disposed of in an authorized manner.

Use by Facility User:

Waste, 'household trash' is loaded, (Never load or open door of a 'Hot' or 'Burning' Unit), by the user of the Sanitary Landfill facility into the upper portion of the Unit through the top hinged door. Attempts should be made to deposit the waste towards the rear of the Unit upon the interior grating to accommodate more material.

CAUTION; To prevent personal injury the Unit should not be used or 'loaded' while burning. The Unit will be HOT and could cause a burn injury, plus there is a danger of EXPLOSION from an aerosol can bursting and/or gas-air mixture igniting causing a FLASH FIRE FRONT of super heated gas or flame to be released into the face of the user attempting to load Unit.

CAUTION; The Unit load should be ignited by the maintenance operator only.

-It is the responsibility of the Landfill Operator to ensure that the Unit is 'Safe' for use (loading) by the facility user. Loading instructions should be posted handed out or otherwise made available to potential users.

Maintenance:

The maintenance operator's duties include insuring proper loading, inspecting and igniting the waste load, cleaning out the ashes, ensuring structural integrity of the Unit assembly and performing preventative maintenance procedures. The above duties are necessary to provide safe operation and to lengthen the useful life of the Unit. Protective face shield and clothing should be worn when appropriate.

1. Igniting the load-(Wear protective gear) The maintenance operator should inspect the waste/trash load first before ignition to ensure that volatile fumes are not concentrated. The trash fuel load should not exceed 60% of the upper portion of Unit when ignited, this will help ensure a more complete burn. On models 2001B The blower assembly is attached for the initial firing of Unit and for waste loads requiring a hotter burn cycle to help maintain required emission tolerances. Close latch and secure both front doors after ignition and move combustible items, vehicles, and personnel a distance of at least 50 foot away from the Unit. On models 2001B start blower motor as per applicable supplement.

2. Clean out the ashes and debris when 20% accumulation is built up in the bottom of the lower compartment.

Procedure for Cleanout:

-Unlock the Unit, remove lower clean out door, install lift jack in receptacles and safety latch the jack with pins and safety chain. Carefully jack Unit up keeping left hand on top of jack stand while keeping the operators body in front of but clear of Unit and at a 45 degree angle away from the front of the jack. When the Unit is jacked up half way install safety bracket supplied just below jack mechanism through the jack stand holes, (This will act as a safety catch should the jack mechanism release for an inadvertent reason). Continue jacking Unit up to nearly the top of the jack stand.

-Locate and raise the safety bar and insert pin through the bracket attached to the center lower portion of the Unit when the hole in the safety bar lines up with the respective hole on the bracket. Maintain the jack in the 'raise up' position in place, now raise the jack safety bracket and pin it directly below the jack mechanism, (The Unit is only considered 'Safe' to clean out when both the jack and safety bar are both in place in the raised position with safety pins and bracket installed).

-Clean ashes out of lower compartment by pushing ash out of the rear with the ASH PUSH ROD supplied with Unit. (Gravity door is automatically opened as Unit raises).

-Reverse procedure to lower Unit. (Adhere to safety precautions above).

CAUTION: High lift jacks such as what is provided with the Unit must be maintained and inspected by the operator to ensure safe operation. Keep it clean, oiled, and parts replaced from the jack manufacturer as needed.

DANGER: To prevent the jack mechanism from sliding down it's stand when the 'down' lever is placed in the 'down' position (located on left hand side of jack mechanism) weight must be maintained on the jack. Thus if ash load or other waste item is hung up at the rear of the Unit there is a possibility of a neutral weight or an aft overcenter weight condition existing. Never place the jack 'down' lever in the down position unless YOU as the maintenance operator are ensured of three things; (1). The safety bracket is positioned and secured approximately 6 inches below the jack mechanism on the jack stand. (2). No item or ash load is aft (to the rear) of the pivot point axle of the Unit. (3). That there is not an overcenter aft moment (rear of unit heavier then the front) which could lead to reduced weight on jack mechanism causing jack to release and slam down with the consequence of having the Unit unsupported at the front end resulting in a dangerous unstable situation. If a questionable condition exists, an item of sufficient girth and strength (safety beam) can be placed forward of the axle spanning the skid rails to act as a safety stop between the Unit proper and the skid assembly, this safety beam will protect the Unit and operator from harm should something in the jacking down procedure fail. Unless the maintenance operator is sure of the proper operation of all components no attempt should be made to jack the Unit down without a safety beam in place. Lock the Unit in the down position after lowering it completely. Remove the jack and store in a dry clean secure environment.

3. Structural integrity inspection of the Burn Unit components will ensure proper and safe operation. As a consequence of the extreme operating parameters (high temperatures, exposure to the elements, and nature of the diverse materials burned) daily attention and inspection (and repair if warranted) must be focused on the following items:

- All welded seams for separation and welded brackets for distortion or stress failure.
- All safety pins for wear or distortion. Replace at 5% of surface wear of diameter of safety pins or at the first indications of distortion. (Replace with grade 8 hardness or better).

- Hinges on pivot assembly, rear door, and loading door for proper attachment, freedom of movement and proper lubrication.
- Counter Balance in place (if applicable). Replace if missing with equivalent counterbalance before tipping Unit (contact manufacturer).
- Skid platform for distortion or for loose grating which may present a tripping hazard.
- Proper and free operation of jack at each use.

4. Preventative Maintenance procedures; Grease pivot assembly zerk fittings monthly. Grease loading door hinges monthly, (Model 2000 only). Keep jack assembly clean, dry, oil jack mechanism with WD-40 spray lubricant or equivalent before each use. Paint entire Burn Unit box with barbecue stove black paint once each year (3 quarts paint and one quart paint thinner). Take extra caution before attempting to reposition unit. Rough handling, applying side load, or dragging skids over rocks may damage or distort undercarriage. Replace interior rack grating when excessive distortion or burn through occurs. Clean ashes and debris often to prevent compaction and or an inordinate amount of work to do at one time. In other words it is much easier to clean it out often then to let it fill completely up. To prevent a catastrophic spill of entire Unit and Skid platform into the pit, ensure that the rear tips of the skid platform do not extend more the 8 inches past the pit rim and that the integrity of the supporting earth under the Unit is sufficient to bear the weight, (Model 2001 weighs approx. 6000pds).

Allocating Use Times:

The Unit should be ignited at least 12 hours before it is ready for loading by the users of the Landfill facility. Thus the maintenance operator should ignite the trash load at the end of the hours of operation of the landfill for that day to ensure that users coming in the following day are not loading a Unit while it is still burning or hot.

Guarantee:

Materials and workmanship guaranteed for 6 months after delivery date. If repairs or replacement of parts are needed for safe and proper operation, Manufacturer at his option will repair or replace item with no charge within the 6 month period.

Manufacturer:

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