

# THE Bio-Burner™

Nature's Best Heat Source

## BB-500

LEI Products introduces The Bio-Burner™ 500k BTU Unit. The BB-500 is a 500k BTU biomass boiler/burner with the same unique design as the BB-100. It is a multi-day, multi-fuel boiler/burner that uses hydronics to produce enough BTU's for the commercial or light industrial application.



Like the BB-100, the BB-500 can also be used in series with other Bio-Burners for a greater heat demand or one unit can be linked to multiple smaller structures to provide central heating from one source. The list of possible heating applications for The BB-500 Bio-Burner™ is rapidly growing.

The BB-500 is compatible with all Bio-Burner Fuel Feed Systems: standard 400 gallon fuel surge bin (BB-500M) or any bulk fuel feed system (BB-500B). The BB-500B bulk feed systems include all motors, augers, computer controls and plans for either the 11 or 22 yd wooden bin (wooden parts not included.)

## Product Applications

The BB-500 has many applications.

(**Examples:** central heating, green houses, tobacco drying, heating chicken houses, ice skating rinks, large department stores, fire houses, schools, churches, government buildings, wood kilns, heat treating firewood and drying pallets)

Combined with The Bio-Burner™ Fuel Processing System (BB-FPS), one can process and dry biomass fuel for other Bio-Burners™ or use the system for applications such as pre-processing and drying biomass for the pellet industry.

# Biomass Fuel Possibilities

The Bio-Burner™ technology is centered around “GREEN” thinking. The fuels that can be burned are not just traditional biomass such as wood, pellets, and corn. This technology goes a step further by burning the non-traditional or waste bio-mass that can be found all around us. The saying, “Why burn the corn when you can burn the cob?” gives insight into the capabilities of The Bio-Burner™. Yes, it can easily burn traditional biomass, but it can also burn biomass such as corn stover, sawdust, dirty “waste” chips, grass pellets, waxed cardboard, hay, and straw. The list of potential fuels continues to grow as more testing is done. The goal is to allow the owner to find locally available fuels that are inexpensive because they would be considered “waste” (tree trimmings, crop stover, contaminated animal feed, dirty corn, etc.)

The Bio-Burner™ can burn almost any biomass as long as the size and moisture content fall in the acceptable range for that particular model. The BB-100 is rated for a maximum B10 chip size with moisture content (MC) maximum of 40%. The BB-500 can burn a larger B50 chip with up to 50% MC. For maximum efficiency use fuel that is at the ideal moisture content (25%), low in ash and high density.

## Fuel Feed Systems

The Bio-Burner™ uses a unique fuel feed system that has multi-day, multi-fuel capabilities. Each system comes with computer controls that regulate the amount of fuel fed into the combustion chamber according to the heat demand. The unique design of these systems eliminates the fuel bridging issue of many other feed systems. These systems are capable of feeding all approved types of fuel with little to no mechanical adjustments.

The two types of fuel feed systems are the standard plastic metering bin and the bulk feed bin. The standard metering bin is a 400 gallon plastic tank, including a weather proof lid, that holds up to 2 yards of fuel.

The bulk fuel feed systems come in 2 sizes (11yd , 22yd) and can feed 1 – 3 machines at a time. These systems come in kits that include all the hardware, control boxes, augers and plans for the wood frame and sidewalls (4’ or 8’ high). Wood supplies not included. There are standard kits and industrial kits, both have the option of 1, 2 or 3 auger feeds. Tent top covers for the bulk bin can be purchased for weather proofing. Another bulk bin kit option is to mount one of our bulk feed systems to the floor of your own fuel storage container (10’D x 8’H limit) using our floor mount kit (single auger only.)

A proprietary Bio-Burner™ Fuel Feed System is required for each Bio-Burner™ unit, neither will be sold separately. All Bio-Burner™ fuel feed systems are compatible with any Bio-Burner™ unit.

## Emissions Management

The Bio-Burner™ BB-100 has meet all requirements for the EPA Phase 2 rating (tag pending) and all the UL/CSA ratings as an Indoor/Outdoor – Biomass/Gas burner. (Tested with wood pellets) All other Bio-Burner™ models follow the same revolutionary design which enables them to attain these high standards. This unique design includes a **non-catalytic** combustion process. The Bio-Burner™ accomplishes a complete clean combustion in 1 chamber with no need for a complex, high maintenance, secondary chamber. This non-catalytic design means less expense, fewer parts, less maintenance and NO creosote.

The use of a **cyclone ash collection system** keeps most fly ash and all sparks from ever reaching the flue emissions, thus making The Bio-Burner™ flue emissions spark free.

The sophisticated computer controls include a ‘**Smoke Guard**’ feature wich acts as added protection against unwanted smoke.

Most wood burners have a “turn down” process that causes a smoldering of the excess fuel which in turn creates a large amount of smoke. The Bio-Burner™ uses a computer controlled ‘**Turn Off**’ feature that stops the fuel feed (conserving the amount of biomass used) when there is no heat demand so there is no excess fuel to smolder; therefore, The Bio-Burner™ is nearly smoke free.

# Computer Controls

The heart of the clean burning Bio-Burner™ is its computer control system.

Love them or hate them, computers are an everyday part of our society. In The Bio-Burner™, they do the monitoring work necessary to control fuel feed rates and air ratios. The unique control process used in The Bio-Burner™ allows it to burn a very wide range of fuels while burning cleanly, efficiently and safely. The Bio-Burner™ provides advanced technology with its color touch screen controls that also allow remote access to the burner. Below are some of the benefits of The Bio-Burner™ computer controls.

## Clean Burn

- Precise control of fuel to air ratio
- Small amounts of fuel in combustion chamber
- Complete gasification before shut down
- Gas igniter reduces smoke = NO CREOSOTE
- 'Smoke Guard' feature

## Efficient

- Precise control of fuel to air ratio maximizes combustion efficiency
- Ample heat exchanger surface = nominal stack temps (250-350°)
- Computer senses high stack temps (max 450°) and adjusts automatically
- Low stack temps & cyclone = no sparks

## Safety

- Intelligent troubleshooting assistance
- 10 built-in safety/control limits with warnings or auto shut-down

# Other Products



The Bio-Burner™ product line includes the BB-100 (100k BTU/29kWh), BB-250 (250k BTU/73kWh), BB-500 (500k BTU/146kWh) burners. These burners range from residential use to light industrial use.

The Bio-Burner™ fuel feed systems include both Standard and Industrial systems ranging from a 2 yd plastic metering bin to the industrial 22 yd bulk bin kit.

The product line also includes a Bio-Burner™ Fuel Processing System (hammer mill, drying tubes with augers, and cyclone dust collection system). Future projects will include CHPC (Combined Heat, Power, Cooling). This will make The Bio-Burner™ useful in all climates and seasons.

LEI Products also manufactures a product line called the Bio-Liquidator. The Bio-Liquidator is a portable or stationary tissue digestion system used for carcass disposal and disease control. It uses the process of alkaline hydrolysis which kills DNA and prions leaving only a few large bones and a liquid which can be used as fertilizer or a composting accelerant. For more information on this product visit [www.bioliqidator.com](http://www.bioliqidator.com)

# The Future in Biomass Heating Technology

Welcome to the world of The Bio-Burner™ -

a “green” world where multiple biomass fuels can create heat energy and save or make you

The Bio-Burner™ is a multi-fuel, multi-day burner/boiler with a universal fuel feed system. Heat energy is created by burning “untraditional” bio-fuels (dirty fuels, fine dust products, crop stover, etc.) as well as the traditional biomass (corn, wood chips, pellets, etc.) in the same unit. The Bio-Burner, designed and manufactured by LEI Products in Madisonville, KY, is designed to use locally produced fuel for the lowest cost and greatest savings to the end user. The core design of the Bio-Burner is a foundation for future technology in creating micro CHPC (Combined Heat, Power and Cooling.)

The Bio-Burner™ product line introduces cutting edge non-catalytic technology in the bio-fuel industry. The product line includes biomass burners rated at 100K (BB-100), 250K (BB-250), and 500K (BB-500) BTU's, multiple fuel feed systems, fuel processors and flash dryers. All burners have the same design as the BB-100 which has received approval ratings for UL/CSA safety standards as an indoor/outdoor and gas burner as well as meeting the standards for the EPA Phase 2 emissions rating - tag pending (tested with wood pellets.) The unique multi-fuel design of The Bio-Burner™ allows the use of a broad range of fuels to be fed all from the same computer controlled fuel feed system. The multi-day fuel bins range from 2-22 yard (1.5-17 cum) capacities which is enough fuel to run for extended periods of time, all with the added reassurance of a back-up gas system.

The Bio-Burner™ has a wide range of applications as an environmentally friendly, economic producer of heat. Just as the list of burnable bio-fuels is growing, so is the list of consumers that would benefit from this technology. The wide range of applications include heat for homes and business facilities, swimming pools/hot tubs, greenhouses, wood drying kilns, workshops, firewood treatment, ice rinks, poultry houses, tobacco drying, biomass drying and central heating (housing sub-divisions, apartment complexes, Native American Reservations, etc.) These applications are made possible due to both the variety of burner sizes as well as the option of using multiple units for one application or one unit for multiple structures.

LEI Products was founded in 2007 by Scott Laskowski and his father, Don. The Laskowski family has over 80 years of combined experience in building and managing successful companies like Wood-Mizer Products® while bringing quality products to market. “Being involved in the wood industry for over 25 years, I saw the need for utilizing the mountains of sawdust created by band mills and began working on a sawdust burner. The Bio-Burner™, with the help of their expert design team, evolved from that idea,” said Scott Laskowski. LEI Products is dedicated to creating innovative environmental solutions for today's “green” conscious world and The Bio-Burner™ is just the beginning.

# Technical Specifications

- **BTU output:** 500,000BTU (150+kW)
- **Weight:** 3500 LBS
- **Burner footprint:** 112 W x 58 D x 95 H
- **Power requirement:** 220 VAC 20 amps
- **Flue pipe:** 8"
- **Water storage:** 134 Gallons
- **Water hookup:** 2" NPT
- **Gas:** Propane or NG (1" NPT) 399,000 BTU input
- **Standard fuel bin:** 2 cu yards
- **Bulk fuel bin:** Up to 22 yards
- **ID fan:** Computer controlled VFD
- **Fuel stir motor:** 115 VAC constant speed
- **HX turbulators:** Accessible from outside of the machine for cleaning
- **Water pump:** Included
- **Boiler protection valve:** 135 degree included
- **Flow rate required:** 50 GPM minimum
- **Ash removal:** Manual / Auto (optional)
- **User interface:** Color touch screen / remote access
- **Maximum fuel size:** B50
- **MC of fuel:** Up to 50% (wet basis) - 25% for peak efficiency
- **Normal Operating Temperature Ranges:**

**Water** - 135-185F **Flue** - 250-450F **Combustion** - 1100-1800F

**B10**

**Nominal Chip Sizes**

Length (in)	1.00	1.50	2.00	2.50	3.00
Width (in)	1.00	0.67	0.50	0.40	0.33
Thickness (in)	0.25	0.25	0.25	0.25	0.25

**Maximum Chip Size**

Length (in)	3.00
Width (in)	1.00
Thickness (in)	0.50

**B25**

**Nominal Chip Sizes**

Length (in)	1.50	2.00	2.50	3.00	3.50	4.00
Width (in)	1.50	1.13	0.90	0.75	0.64	0.56
Thickness (in)	0.25	0.25	0.25	0.25	0.25	0.25

**Maximum Chip Size**

Length (in)	4.00
Width (in)	1.25
Thickness (in)	0.50

**B50**

**Nominal Chip Sizes**

Length (in)	2.00	2.50	3.00	3.50	4.00	4.50	5.00
Width (in)	2.00	1.60	1.33	1.14	1.00	0.89	0.80
Thickness (in)	0.25	0.25	0.25	0.25	0.25	0.25	0.25

**Maximum Chip Size**

Length (in)	5.00
Width (in)	1.50
Thickness (in)	0.50

**Acceptable Chip Size Mixture Range**

Dust - Nominal Chip Size: 100%

Maximum Chip Size: 5%

Example: 95% Nominal / 5% Maximum

**Acceptable Moisture Content Range**

**B10:** up to 40% @ 32°f or more / up to 25% @ 32°f or less

**B25:** up to 45% @ 32°f or more / up to 25% @ 32°f or less

**B50:** up to 50% @ 32°f or more / up to 25% @ 32°f or less

# LEI-PRODUCTS

CREATING INNOVATIVE ENVIRONMENTAL SOLUTIONS

## Product

## Description

<b>BIO-BURNER MODELS</b>	
BB-100	100K BTU Burner
BB-500	500K BTU Burner
<b>FUEL PROCESSING SYSTEM</b>	Includes: BB-500, Hammermill, Drying Tube, Fuel Bins, Cyclone Dust Collection System

<b>FUEL BIN CONFIGURATIONS</b>	<i>Every Bio-Burner requires a selection of one of the standard fuel bin options below</i>
100M	BB-100 Standard 2yd Metering Bin
500M	BB-500 Standard 2yd Metering Bin
100B-1 *	BB-100 Bulk Bin Kit
100B-2	BB-100 Bulk Multi-Bin (Double Auger) Kit
100B-3	BB-100 Bulk Multi-Bin (Triple Auger) Kit
500B -1 *	BB-500 Bulk Bin Kit
500B-2	BB-500 Bulk Multi-Bin (Double Auger) Kit
500B-3	BB-500 Bulk Multi-Bin (Triple Auger) Kit

<b>UPGRADE KITS</b>	<i>Add the cost listed below to upgrade from one of the standard bin options **</i>
100B -1 Industrial upgrade *	BB-100 Industrial Bulk Bin Kit
100B-2 Industrial upgrade	BB-100 Industrial Bulk Multi-Bin (Double Auger) Kit
100B-3 Industrial upgrade	BB-100 Industrial (Triple Auger) bulk bin kit
500B -1 Industrial upgrade *	BB-500 Industrial Multi-Bin (Triple Auger) Kit
500B-2 Industrial upgrade	BB-500 Industrial Bulk Multi-Bin (Double Auger) Kit
500B-3 Industrial upgrade	BB-500 Industrial Multi-Bin (Triple Auger) Kit

<b>BULK BIN KIT OPTIONS</b>	
Bulk Bin Plans	PDF file of parts dimensions and assembly instructions
Floor Mount Kit *(used only with single auger kits)	Hardware for mounting auger and drive system to the floor or your own fuel storage container. 10'D x 8'H size limitation
Bulk Bin Size Option	Sidewalls either 4' high (11 yd) or 8' high (22 yd) to be designated with order
11yd Pre-cut Bulk Bin Kit	Pre-cut parts kit for the 11yd Bulk Bin.
22yd Pre-cut Bulk Bin Kit	Pre-cut parts kit for the 22yd Bulk Bin.
Partially Assembled Bulk Bin Kit	Floor frame assembled in three pieces before shipping. Rest of assembly to be done on job site.

<b>BULK BIN COVER KIT</b>	Tent style top to cover the 11 or 22 yard bulk bin
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<b>** INDUSTRIAL UPGRADE KIT</b>	<b>FEATURES:</b>
	Industrial grade 90 VDC motors
	Extra motor drives for independent motor control
	Oil bath gear boxes
	Large high pressure casting gear boxes
	Larger shaft and bearings
	Longer life