AIREX INDUSTRIES

BIOMASSE TORREFACTION OVEN

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FEBX500

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BIOMASSE
TORREFACTION OVEN

GENERAL INFORMATION

The torrefaction is a heat treatment which aims to modify the properties of various wood varieties. Unlike a conventional drying, torrefaction is done at high temperature, in the range of 160°C to 250°C [320°F to 490°F]. The torrefied wood develops increased resistance to deterioration, fungal attack as well as insects. In addition, the wood becomes hydrophobic, ie water will pearl on is surface and does not penetrate the fiber. It is not necessary to chemically treat the torrefied wood for use in external applications. Finally, the torrefaction can change the shade of the wood. Thus, woods varieties with paler shades can be torrefied from golden honey to very dark colors.

AIREX INDUSTRIES **FIG.01**
THE TORREFACTION OVEN
FEBX500

Airex Industries has developed a high end technology oven for performing torrefaction treatment on wood. It was designed and created to meet the needs of this particular application. The torrefaction oven is intended to be fully autonomous, requiring a minimum of human intervention. Simply insert the wood into the oven, entering the starting data in the computer and the oven will do the rest!

SPECIFICATIONS	
External dimensions (L x W x H)	276" x 114" x 170"
Internal lining	Stainless steel 304
Load capacity	3 000 FBM
Operating temperature	160 °C à 250 °C [320 °F à 490 °F]
Total capacity of heating coils	200 kW
Total capacity of fans	30 000 cfm
Electric Motors	2 x 25 hp
Input power	600 V
Temperature Sensor	Type K
Number of nozzles for water injecting	8
Capacity of each nozzle	0,25 gpm @ 40 psi

HERE ARE SOME OF THE FEATURES AND BENEFITS THAT COME WITH THE FEBX500 UNIT.

- Basic capacity of 3 000 foot board measure (FBM) per batch.
- Suitable for all woods varieties.
- Modular ventilation system, allowing you to receive an oven to the length that will suit your needs.
- Heating by electric heat coil.
- High-efficiency electric motor.
- Automatically reversible air flow.
- Adjustable air distribution within the oven.
- Smart door lock, making impossible to open the oven when it is on.
- Access door making the inspections and maintenances easily.
- Rail on the floor to easily enter the wood load on a cart designed for that purpose.
- Autonomous water injection system used for humidification.
- Flowmeter for the water injection system
- Thermal probes network to visualize the temperature:
  - At the entrance of the ventilation system.
  - At the exit of the ventilation system.
  - Inside the wood.
- High-temperature internal pressure sensor.
- Control panel with PLC annexed to oven.

THEORY OF OPERATION

First, the load of wood has to be stacked on the cart specially designed for this application. The cart is introduced in the oven with the help of the rail system that allows the insertion and extraction of the wood, effortlessly and securely. Once done, simply lock the door properly. It remains only to enter the technical data relating to the variety wood to be torrefied in the computer and the process begins. All stages are fully managed by the oven computer.

Once the process finished, just extract the load using the rail system and to introduce it in the steaming pit. It is a chamber allowing the wood to cool down in a controlled and safe environment. Once out of this room, the wood is ready to be transformed.

RELATED EQUIPMENTS FOR THE REALIZATION OF THE TORREFACTION PROCESS.

STEAMING PIT

Following its passage in the torrefaction oven, the wood is introduced into the steaming pit. It allows cooling down the wood in a controlled and safe environment.

FEATURE:

- Autonomous water injection system used for humidification.
- Flowmeter for the water injection system
- Central ventilation system.
- reversible air flow.
- Cooling system with heat recovery for heating the building.

SPECIFICATIONS	
External dimensions (L x W x H)	334" x 89" x 102"
Cooling system Capacity	165 000 Btu/h
Fan Capacity	10 000 cfm
Fan motor	7,5 hp
Filter	High-temperature reusable filter

RAIL SYSTEM

This innovative rail system allows a single person to introduce and extract the cart with the load of wood in the oven and the steaming pit. This system allows the cart to move quickly and safely.

FEATURE:

- Robust rail structure.
- Remote Control.
- Easy handling.
- Safe design.

SPECIFICATIONS	
Rail Dimensions (L x W x H)	267" x 47" x 11"
Winch first layer capacity	5 500 lb @ 19,0 pi./minute
Winch second layer capacity	4 400 lb @ 22,3 pi./minute
Winch motor	3 hp
Remote control station to the winch	50 Feets
Cart wheel	Ductile iron with roller bearing

RETENTION TANK

The retention tank allows the hot gases collected from the oven ton condense. The steam escaping from the retention tank is directed to the incinerator.

FEATURE:

- Electronic level probe
- Solenoid ball valve for the water inlet.
- Drain system.

SPECIFICATIONS	
External dimensions (L x W x H)	87" x 51" x 38"
Water level sensor	Mercoid CRF2
Internal lining	Stainless steel 304

INCINERATOR

The incinerator burns the volatile organic compounds (VOC'S) and other contaminants escaping from the retention tank. The gases coming from the retention tank are burned to more than 800°C [1 500°F] eliminating the majority of contaminants.

FEATURE:

- Operating temperature of 800°C [1 500°F].
- Stainless steel construction.
- Temperature sensors.
- Independent control panel.

SPECIFICATIONS	
External Dimensions (Dia x L x H)	36" x 180" x 108"
Internal lining	Stainless steel 304
Burner Capacity	2, 000, 000 Btu/h
Fuel	Natural Gas or Propane

GAS COLLECTING HOOD

The hood can capture the evacuation of steam when opening the oven door at the end of the process. The hood, supply the steam to a filter section to remove impurities. The steam is then exhausted to the outside.

FEATURE:

- Hood with balancing system.
- Pre-filtering section.
- Filter section.
- Wall exhaust.

SPECIFICATIONS	
Hood dimensions (L x W x H)	98" x 48" x 28"
Hood type	With balancing system
Prefilters	High-temperature reusable filter
Main filter	Activated charcoal filter
Fan Capacity	7 000 cfm
Fan motor	3 hp