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container-lumber-and-firewood-dry-kilns

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Shipping Container Lumber Dry Kilns by Global Energy for Dimensional Lumber Slab Wood Timbers Firewood and more

This webpage QR code

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Global Energy invented the shipping container lumber dry kiln back in 1990 to provide access to remote operations and portable sawmill processes for value added KD kiln dried profits. Firewood, poles, blocks, pallets, heat treating wood, lumber, dimension lumber, quarter sawn, beams, sawdust, chips, wood chips.

PDF Version of the webpage (first pages)

Global Energy Container Kiln Plans

Global Energy designed and developed the container kiln back in 1991. The purpose is to give access to portable sawmill owners, furniture makers, and small business the value added profit of dry kiln lumber and quality hardwoods.

With the advent of huge price spikes in 2020 in lumber and kiln-dried lumber, we are now offering plans for our epic container dry kiln system, which we developed in 1991. The system has been copied by lots of groups over the past 30 years (validating its profitability and access to the small commercial sawmill proprietors).
This kiln concept is now all over the world. We offer the plans at a low price to cover the website costs.
Periodically, we'll up date the News, with new innovations and improvements to the industry.
The most recent addition is the Vacuum kiln, which can reduce drying time down to 3 days.

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Vacuum Lumber Dry Kilns

We're working on a small DIY vacuum kiln chamber for artisan and portable sawmill owners.

The technology is migrated from fiberglass and epoxy builders where they do a vacuum bagging process. The same could be used for wood by simply laying over a heavy duty plastic sheet over lumber or logs, then applying a vacuum. This would need to be done over a stable substrate like a concrete floor.

This process could revolutionize the kiln drying industry by bringing down the cost and time of conventional kiln drying and also reducing costs by 90 percent.

Vacuum bagging is already used for a very effective clamp during a glue process, but what about drying ?

We already know you can vacuum dry lumber using an expensive kiln (mainly due to the costly pressure resistant structure). For really small applications the artisan vacuum drying technique can be done in a large diameter pipe which is pressure sealed.

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All Container Kiln Plans now offered

These plans are provided as a license to build for personal use.

Plans may be purchased via PayPal, and then we will email you the .pdf plans. We charge a small fee for the plans to cover the website costs. Plans purchases are non-refundable. For all other inquiries, or for consulting, please contact Global Energy.

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Container Lumber Dry Kiln Plans 5,000 BF

The 5,000 BF container kiln consists of one 40 foot high-cube aluminum shipping container. The first kiln built in 1992 was a 15,000 BF size and worked great.

This first container kiln had several innovations, including the use of a direct fired heat pipe (Furnace Type Dry Kiln) and a Conifer sawdust burner.

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Container Lumber Dry Kiln Plans 15,000 BF

The 15,000 BF container kiln consists of two 40 foot high-cube aluminum shipping containers side by side, or two refrigerated vans (already insulated). The first kiln built in 1992 was a 15,000 BF size and worked great.

This first container kiln had several innovations, including the use of a direct fired heat pipe (Furnace Type Dry Kiln) and a Conifer sawdust burner.

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Firewood Container Dry Kiln Plans

The firewood container kiln consists of one or two 40 foot high-cube aluminum shipping containers side by side, or two refrigerated vans (already insulated).

These can be HT (or high temperature) kiln type design since you want to dry the wood (cracking is fine) as fast as possible.

We recommend a direct fired heat pipe (Furnace Type Dry Kiln), Conifer sawdust burner, or Central Boiler which can use your wood waste as the heat source.

The benefits of KD (kiln dried) firewood is reduced drying time, increased customer satisfaction, less creosote when burning, and higher revenue from sales. This allows you to dry into heating season, when other firewood suppliers have run out of inventory.

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Using Supercritical CO2 to Kiln Dry Wood

Conventional kiln drying of wood operates by the evaporation of water at elevated temperature. In the initial stage of drying, mobile water in the wood cell lumen evaporates. More slowly, water bound in the wood cell walls evaporates, requiring the breaking of hydrogen bonds between water molecules and cellulose and hemicellulose polymers in the cell wall. An alternative for wood kiln drying is a patented process for green wood dewatering through the molecular interaction of supercritical carbon dioxide with water of wood cell sap. When the system pressure is reduced to below the critical point, phase change from supercritical fluid to gas occurs with a consequent large change in CO2 volume. This results in the efficient, rapid, mechanical expulsion of liquid sap from wood.

A potential advantage of applying the green wood dewatering process described above to produce wood material with moisture content at the fibre saturation point and with no resulting distortion, shrinkage, or discolouration is to use the dry wood output from this process as either a finished product in itself (as in the example of eucalypt wood), or as an intermediate towards wood modification or biocide treatment where, as for the triazoles, the modifying agent or biocide is soluble in supercritical carbon dioxide.

The ability to carry out two key steps in the manufacture of dry, durable wood materials and products at a single site, in one factory where the equipment and machinery could be used for both drying and molecular-modifying steps, would potentially eliminate the multiple handling of wood at intermediate conventional processing steps.

Trimethyl borate and some boratranes (tricyclic borate esters) are also soluble in supercritical carbon dioxide, making these potential compounds for the modification of dewatered wood using supercritical carbon dioxide as the biocide delivery solvent for the manufacture of biologically durable, quality wood products.

Dewatering green sapwood derived from plantation-grown radiata pine and several other softwood and hardwood timber species, using carbon dioxide cycled between the supercritical fluid and gas phase, has proven to be an efficient process for rapidly reducing wood moisture content from as much as 200 percent (based on dry weight) to 40 percent (or below, depending on the anatomical structure of the wood). Dewatering has the added benefit of zero volatile emission compared to kiln drying, with all of the sap chemicals being captured in the exudate, which in turn provides a source of numerous chemicals with potential high value to be obtained from them. While the dewatering process has merit for producing dry timber as an industrial product per se, a significant benefit for wood product manufacture may be the ability to sequentially dewater green wood and then undertake wood material modification. For example, biocide molecules dissolved in supercritical carbon dioxide could be introduced in situ, to impart wood product bio-durability without the need to physically handle the wood material.

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Conifer Sawdust Burners

For those interested in a Conifer burner today, BET – BioMass Energy Techniques continues to support Conifer parts, service, and installation through an approved distributor network. While the new BET Burner Systems represent new advancements in renewable energy techniques, all of the installers are trained and able to support the original Conifer sawdust burners.

Applications vary with units starting at 225,000 BTU, and the BET team is always excited to work with you to ensure you are getting the most out of your burner unit – regardless of the history and how long you have been using it.

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The Conifer Sawdust Burner

The Conifer has been around for a long time. We build one from a kit in 1992 for our original 15,000 BF kiln, here in Madison, Wisconsin (sold to a customer in Michigan).

The kit was basically cast iron plates which were assembled with poured ceramic material and ceramic fire bricks. The Conifer is great for direct-fired kilns and sawdust burners which exit into biomass boilers or long stainless steel pipes (see Forest Products Lab Furnace Type Kiln).

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Dry Kiln Schedules for Commercial Woods Temperate and Tropical

The original and the best General Technical Report FPL GTR 57 from the Forest Products Lab here in Madison, Wisconsin. USDA Forest Service.

This report contains suggested dry kiln schedules for over 500 commercial woods, both temperate and tropical. Kiln schedules are completely assembled and written out for easy use.

Schedules for several thicknesses and specialty products (e.g. squares, handle stock, gunstock blanks) are given for many species.

The majority of the schedules are from the world literature, with emphasis on U.S., Canadian, and British publications. Revised schedules have been suggested for western U.S. and Canadian softwoods and for the U.S. southern pines. Current thinking on high temperature drying (temperatures exceeding
212 F) schedules for both softwoods and hardwoods is reflected in suggested high-temperature schedules for selected species.

Keywords: Lumber drying, hardwoods, softwoods, kiln drying, conventional temperature (< 180 F) schedules, elevated-temperature (180 to 212 F) schedules, high temperature (>212 F) schedules, tropical woods, temperate woods.

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Central Boiler

The Central Boiler is an outstanding wood fired boiler for homes and container dry kilns.

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Using Wood to Heat a Lumber, Pole, or Firewood Dry Kiln

Overall the fastest type of wood burner for drying is a direct fired into a 12-16 inch diameter steel pipe (see the USDA furnace type kiln). Any direct fired kiln has heat that is more difficult to control, and unless it is sealed properly, may lead to kiln fire. For this reason, we suggest you ensure a air-tight seal between pipe connections, and proper clearances with hot surfaces. This type of heat-in-pipe kiln provides the fastest way to heat a kiln, especially if you have the properly distanced kiln fans and associated airflow going over the pipe to circulate the hot air.

Another option for this large diameter pipe type kiln heat is using a gas gun (burner) instead or in addition to wood heat. That gives you the flexibility of using multiple heat sources in case one runs out.

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Using Wood to Heat a Lumber, Pole, or Firewood Dry Kiln

While the hot water option may be the slower type heat, it is the most controllable and preferred method of kiln heat, since it can be fired by a wood-fired waterstove, gas, or solar thermal sources. We built and sold lots of kiln kits using a wall-mounted commercial gas water heater (on-demand) which worked quite well.

Wood versus Gas: Unless the price of propane or gas is very high, it is the preferred method since using dried firewood is basically burning up profits instead of selling the wood.
Considerations to use wood for heat:- inexpensive source of dry waste wood, such as slabs, cut ends, sawdust, or other wood waste- high cost of gas or propane- inaccessible gas source- wood waste which is considered waste and a disposal cost (i.e. can't be sold)

Some areas have burning (smoke) restrictions, which limit the use of wood burning unless the wood appliance is registered as in compliance with smoke emissions.

Using Wood to Heat a Lumber, Pole, or Firewood Dry Kiln

We have used the Conifer burner (direct fired using sawdust) and a Central Waterstove (water heat using chuck wood).

While you can use any wood burning device, we have used these (we were using the Taylor Waterstove in the past and found them prone to failure).

Overall, the most used wood heat option have been direct fired into pipe gas burners, and wall mounted on-demand gas hot water heaters.

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