

# Thermodyne™ Evaporator – A Molded Pulp Products Dryer



## Thermodyne Evaporator—A Substantially Improved Molded Pulp Products Dryer

With assistance from DOE's Inventions and Innovation Program, Merrill Air Engineers demonstrated that its Thermodyne dryer outperforms conventional molded pulp dryers. Unlike other dryers, the Thermodyne dryer reheats water vapor released from the product being dried to create superheated steam that is directed onto the material being dried. Conventional paper dryers exhaust this liberated water outdoors, causing a large visible plume and dumping valuable heat. The Thermodyne dryer is sealed so internal vapor (moisture) cannot escape into the insulated dryer walls. The retained water vapor passes through indirect integral heaters to raise its temperature to a level that allows for substantially faster drying rates than if drying in relatively dry air. An absence of oxygen in the dryer also means the drying temperature can be higher and the retained water vapor can help protect and evenly dry the material. The released water vapor also helps control internal temperatures by mixing with the superheated steam, dropping its temperature to a more desirable level. Finally, the system recovers heat and harmful volatile organic compounds (VOCs) from the dryer's condensate, substantially reducing the amount released into the atmosphere.

## Benefits

### Energy Savings and Emissions Reductions

Substantially reduces energy requirements by eliminating the thermal energy needed to make up air exhausted from conventional dryers. Uses up to 50% less energy than a conventional dryer with the potential of saving up to 5 million Btu/ton of pulp. Captures volatile organic carbon (VOC) emissions by containing condensable gases.

### Productivity

Process promotes easier stacking and wrapping.

### Product Quality

The superheated steam-drying environment suppresses oxygen, reducing the chance of scorching or burning the product under higher and faster drying temperatures. Other quality enhancements include less warping, reduced case hardening, and no discoloration.

### Profitability

Process promotes lower shipping costs and lowers product losses.

## Overview

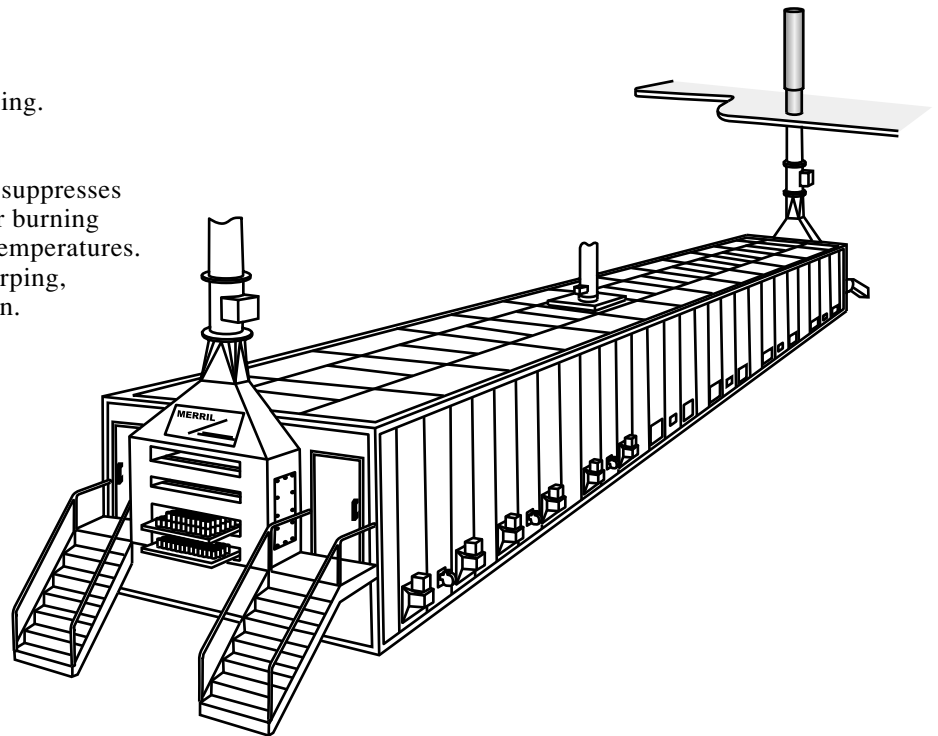
- ◆ Developed by Merrill Air Engineers
- ◆ Commercialized in 1997
- ◆ 1 unit operating in Yakima, WA and 1 in Ireland

## Applications

Forest products industry for manufacturing molded fiber articles and for drying pulp, wood, cotton, cellulose, or torrefied wood and wood veneers

## Capabilities

- ◆ Fully capable of replacing conventional drying systems in the forest products industry.
- ◆ Handles a wide variety of forest products and can be applied to agricultural applications.



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