

High Temperature Kiln Drying Lumber

High Temperature Kiln Drying Wood and Lumber

High-temperature kiln drying is accomplished at dry-bulb temperatures of 212 deg. F (100 deg. C) or higher, usually in the range of 230 to 250 deg. F (110 and 121 deg. C). This is a relatively new approach to commercial lumber drying, and proven schedules are not available for every species. The best success has been with softwood species. High-temperature kiln schedules have been suggested in some manuals for selected western softwoods since the late 1960's. High-temperature kiln drying can possibly cause noticeable strength losses.

This should be considered when selecting a kiln schedule for a product where loss of bending or tension strength is important. High-temperature schedules for the southern pines have been used since the early 1970's. Since the mid-1970's, the majority of new kiln-drying installations for southern pine have been using high-temperature drying. Most of these kilns are direct fired, i.e., the hot combustion gases from natural gas, wood or oil are fed directly into the kiln.

There are a few steam-heated kilns drying southern pine. High-temperature drying of hardwoods is just emerging from the research stage and has not as yet enjoyed much commercial application. Acceptable response to high temperature drying of hardwoods from the green condition is very species dependent, varying from quite acceptable to quite unsatisfactory.

The most common high-temperature drying defects are honeycomb, collapse, checking, and darkening of the wood. For many species, a combination schedule— starting from the green at conventional temperatures and switching to high temperatures when the lumber has dried to 20 to 25 percent MC — gives acceptable results, where high- temperature drying from green does not. Current research suggest that with some species and thicknesses the change from conventional temperature to high temperature can be made when the moisture content is as high as 30 to 40 percent, thereby cutting drying time by up to 60 percent while increasing drying defects by about 15 percent.

The acceptability of these kinds of processing tradeoffs depends a great deal on the product being produced. For high- temperature drying of hardwoods, steam-heated kilns are preferred over direct- fired kilns. High-temperature drying is best done in kilns where air speeds through the lumber of 800 to 1,500 feet per minute (4.1 to 7.6 m/sec) can be achieved.

While common industrial practice is to use pile widths of 7 to 9 feet and fan reversal every 4 to 6 hours, more uniform drying can be achieved with piles not more than 6 feet wide and fan reversals every 2 to 3 hours.

Schedules for drying flitches for the Saw-Dry-Rip (SDR) process, developed at the FPL, are listed for selected species. This process consists of live-sawing small logs, drying the flitches, then ripping to produce material for construction type uses. This use is more tolerant of drying defects than uses such as furniture manufacturing where appearance is very important.

For information on Saw-Dry-Rip, search: Maeglin & Boone Titles: Saw-Dry-Rip or SDR
