conventional-kiln-drying

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Information on Conventional Kiln Drying Lumber by Global Energy

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Information by Global Energy Container Kiln for conventional drying.

PDF Version of the webpage (first pages)

Conventional Kiln Drying Lumber

Conventional Kiln Drying Hardwoods

Shown in this section are schedules for steam-heated kilns operated at temperatures between 100 and 180 deg. F. (A few schedules have maximum dry-bulb temperatures of 200 deg. F. or 93.5 deg. C.) Suggested schedules are essentially the same as those listed in U.S. Department of Agriculture Handbook 188, Dry Kiln Operator's Manual.

In general, these schedules call for changes in kiln conditions to be made on the bases of the average MC of the wood. The use of sample boards is required. (See appendix B, for a brief summary of a method for obtaining sample boards.)

For some western hardwood species time schedules are also listed. Suggested schedules for products other than lumber, e.g. squares, handle blanks, etc., are listed under "other products." For squares of species with no specific listing, use a wet-bulb depression number one unit higher than the one suggested for lumber of the same thickness. Thus, for 3- by 3-inch yellow birch squares, use T3-B3, rather than T3-B2 listed for 12/4 lumber.

Assembled schedules can be found in Section VII [the kiln schedules]. Schedules are intended for kiln drying from the green condition or when stock has been partly or well air-dried. These schedules are recommended starting points, and the prudent kiln operator will modify these schedules to accommodate regional species characteristics. For example, in the northeastern United States, kiln operators have modified schedules for hard maple, oak, and eastern white pine to accommodate the drying requirements and smaller diameters of trees being harvested.

These schedules are listed in the index to Schedules under the comments section for the selected species. Specific procedures for starting up the kiln ad the first day or two of the run when drying air-dried or partly air-dried stock are given below.

Specific Procedure for Air-Dried Stock

(Average MC should be 25 pct or lower, with no material over 30 pct.)

4/4, 5/4, Most 6/4

1. Bring dry-bulb temperature up to the value prescribed by schedule for the average MC of the controlling kiln samples. Maintain conditions during warming so that EMC does not exceed initial wet- and dry-bulb settings.

2. After prescribed dry-bulb temperature has been reached: a. If the air-dried stock had not undergone surface wetting or been exposed for a considerable period to high RH just before it was placed in the kiln, set the wet-bulb controller at the prescribed wet-bulb temperature.

Turn on the steam spray only if necessary to start equalizing. b. If there has been surface moisture regain or if dried in a predryer above 75 percent RH, set the wet-bulb controller for a 10 deg. F. wet-bulb depression and turn on the steam spray.

Let the kiln run 12 to 18 hours at this wet-bulb setting, then change to the dry- and wet-bulb settings prescribed by the schedule.

8/4 (Plus 6/4 Oak)

1. Bring dry-bulb temperature up to value prescribed by the schedule for the average MC of the controlling kiln samples, keeping the vents closed. Use steam spray only as needed to keep wet- bulb depression from exceeding 12 deg. F.

2. After prescribed dry-bulb temperature has been reached: a. If there has been no surface moisture regain, set the wet-bulb controller at the prescribed wet-bulb temperature. Turn on the steam spray only if necessary. b. If there has been surface moisture regain or if dried in a predryer above 75 percent RH, set the wet-bulb controller for an 8 deg. F. wet-bulb depression and turn on the steam spray. Let the kiln run 18 to 24 hours at this setting. Then set for a 12 deg. F. depression and run for 18 to 24 hours more before changing to the conditions prescribed by the schedule.

Specific Procedure for Partly Air-Dried Stock

(No material should be over 50 pct. MC.) 4/4, 5/4, Most 6/4

1. Bring dry-bulb temperature up to the value prescribed by the schedule for the average MC of the controlling kiln samples. Keep the vents closed. Use steam spray only as needed to keep the wet-bulb depression from exceeding 10 deg. F. However, do not allow the depression to become less than 5 deg. F. or moisture will condense on the lumber.

2. After the prescribed dry-bulb temperature has been reached, run a minimum of 12 hours on each of the first three wet-bulb depression steps of the whole schedule, but still observe the 5 deg. F minimum wet-bulb depression. Then change to the conditions prescribed for the MC of the controlling samples.

8/4/ (Plus 6/4 Oak)

1. Bring the dry-bulb temperature up the value prescribed by the schedule for the average MC of the controlling kiln samples. Keep the vents closed. Use steam spray only as needed to keep wet-bulb depression from exceeding 8 deg. F. However, do not allow depression to become less than 5 deg. F.

2. After the prescribed dry-bulb temperature has been reached, run a minimum of 18 hours on each of the first three wet-bulb depression steps of the schedule, but still observe the 5 deg. F minimum wet-bulb depression.

When the kiln conditions coincide with those prescribed by the schedule for the average MC of the controlling samples, change to the MC basis of operation.

Suggested Procedure for Frozen or Snow-Covered Hardwood Lumber

During winter in the colder regions, a kiln operator may find it necessary to load a kiln with frozen lumber or lumber with an appreciable cover of snow and/or ice. While many operators go directly to the indicated step in the schedule, others use the following practice: Warm the lumber for 12 to 24 hours with dry-bulb temperatures of 80 to 90 deg. F and a wet-bulb depression of about 5 deg. F; operate vents as needed but turn off steam spray. After this warming period, refer to the preceding section on procedures for air-dried or partly air- dried stock with surface moisture regain.