

TECHNICAL NOTE NUMBER 148

FOREST PRODUCTS LABORATORY · U. S. FOREST SERVICE · MADISON, WISCONSIN

CARE AND USE OF THE HYGROMETER IN KILN DRYING

The correct use of the hygrometer is of vital importance in the interpretation and consequent regulation of kiln conditions. Drying conditions altered because of a false conception of the conditions present often result in honeycomb and other highly detrimental degrade. Several basic practices are suggested by the Forest Products Laboratory for the proper handling of hygrometers.

Calibration

Hygrometers should never be assumed as registering the correct reading until their accuracy has been established. It is not at all unusual for a thermometer to register a few degrees higher or lower than the true temperature. Each thermometer of a hygrometer should be checked against a standard thermometer of known accuracy over the range of temperatures anticipated in its use. Corrections for the several temperatures may thus be determined if inaccuracy exists. Checking should be done with bulbs of the standard and the tested thermometers close together and in the same medium and temperature of medium. The correction factor for a thermometer at a certain reading being known, it is simple enough to determine the true temperature.

Filling and Care

Hygrometer reservoirs should be filled with pure water only. The open-top type of reservoir is easily filled, but the inverted-tube type often presents difficulties. The latter type may be filled if submerged horizontally in a pail of water with the water level slightly above the well opening. Other methods of filling such a tube are by means of a wash bottle or small bent-stem funnel. In any case the body should be dropped below the mouth level.

It is important that the silk or muslin covering of the wet bulb be kept in good condition at all times. At least a

small amount of solid material is always left in the meshes after evaporation, and sooner or later such a deposit impedes the transfusion of moisture. It is because of this that pure or distilled water should always be used in the reservoir and that the wick should frequently be changed.

Placing the Hygrometer

The hygrometer should be placed at the exact points where information as to conditions is desired. Do not place it near a door or a wall or where it will be subjected to direct radiation from the heating coils, as conditions at these points are probably not representative. To obtain representative conditions take an average of several readings in different parts of the kiln.

Taking the Readings

In reading the wet-bulb thermometer care should be taken that there is sufficient air circulation to give the maximum evaporation rate from the bulb covering. At low temperatures, i.e., up to 120° F., there should be an air velocity of at least 15 feet per second. At the higher temperatures this rate is not quite so essential. A thorough fanning of the air about the wet bulb is usually required. The lowest wet-bulb reading for any air condition is the one desired.