

TECHNICAL NOTES

FOREST PRODUCTS LABORATORY

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AUTOMATIC CONTROL OF HUMIDITY IN SHOPS

Devices for controlling humidity in shops are of three types. The first are makeshifts, such as wet sawdust strewn on the floor, troughs of running water at the sides of the room, or simply an ordinary sprinkling can. Such crude devices are not in any sense self-regulating, and even with the most careful personal attention produce only haphazard results. The sprinkling-can type of humidifier has been in use for hundreds of years and is of interest chiefly because it shows that the need for air-conditioning apparatus in many industrial plants has been recognized for a long time. A second class of humidifiers includes those that are capable of increasing the moisture in the air up to the point for which they are set, but cannot decrease it. When the weather forces the humidity above the desired point, such instruments remain inactive. Few instruments of this type attempt any control of the temperature. A third type of conditioning apparatus is that which is able to hold the atmosphere in a room at a constant temperature and humidity irrespective of outside conditions.

One of the few instruments which absolutely control both the temperature and the humidity of the air is that developed at the Forest Products Laboratory, Madison, Wisconsin. For several years this apparatus has maintained in the laboratory wood-parts storage rooms the typical climatic conditions found in various parts of the United States, ranging from the hot, moist climate of the South to the cold, dry climate found in the mountain regions. The same type of instrument also keeps the wood-working rooms at the laboratory at uniform temperature and humidity year in and year out, with the result that the wooden articles manufactured there give the minimum amount of trouble afterwards from warping and checking, and the shop conditions are healthful and comfortable to the highest degree. These instruments have required very little personal attention since they were installed.

The principle upon which the laboratory automatic humidity-control apparatus works is that of cooling the air to the dewpoint temperature for the desired atmospheric

condition, saturating it with moisture at that point, and then heating it without addition of moisture to the required room temperature. For any given room temperature it is possible to get any humidity desired, simply by choosing the temperature at which the air is saturated.

The apparatus consists of a small cabinet, or chamber, through which the air is drawn as often as it needs to be conditioned. The conditioning chamber contains water sprays whose temperature is kept constant by a mixing valve. These sprays suck in the air by their own action, cool it to the temperature at which it should be saturated, and give it all the moisture it can hold. As the air leaves the chamber it is heated to room temperature by coils, whose steam supply is controlled by a thermostat located in the outlet. Thus when the air is drawn into the chamber it may be too hot or too cold, too moist or too dry, but the apparatus automatically humidifies or dehumidifies it and brings it to the correct temperature before allowing it to pass again into the room. Both in the storage rooms, where the air needs conditioning very infrequently, and in the workrooms, where it is completely changed every ten minutes, the recording instruments show that the atmospheric conditions have varied to only a slight extent throughout a three-year period.

This method of air conditioning was developed primarily for woodworking shops and wood gluing, finishing, and drying rooms. It is adaptable, however, to numerous other industrial plants, including textile mills and chemical, foodstuff, and tobacco factories, in which close control of atmospheric conditions would be beneficial to both the material being manufactured and the health of the employees. It is practicable wherever there is a supply of cold water and steam heat.

Drawings of the apparatus and further details concerning its installation and operation may be had on application to the Forest Products Laboratory.