

INDUSTRIAL APPLICATIONS

Automatic control of heat in manufacturing processes is believed to be still in its infancy. The promotion and development of automatic heat control was hard pioneering for many years. The reward for this pioneering seems to be in process of realization in the fabulous uses of thermostats in industry.

Without automatic heat control in innumerable manufacturing processes, what now are sure and perfect reactions would be only occasional successes, and the cost of production would be much higher.

In beet sugar making there are at least eleven processes where exact thermostatic control is imperative. In tanning leather there are at least fourteen such stages.

Without exact temperature and humidity control, no fine printing is possible, and no good weaving or dyeing is assured.

In the preparation of most food products automatic heat control is vital.

Thermostats prevent scorching in clothes dryers. They reduce evaporation and are a safety device for oil storage tanks.

They are essential to control gelatine temperature in making photographic films. They are used to control paraffin vats in making waxed paper, milk containers, etc.

They control baking ovens, no matter how the ovens are heated.

They are in use to an enormous extent in the drying and hardening of paints and enamels.

Automatic Control of Unit Heaters

The steady advance of the use of unit heaters for industrial heating has made automatic temperature control available with comparatively small expenditure in practically all buildings thus heated. Several general methods are in vogue; *first*, for small installations with single or, at the most, two or three unit heaters, a very satisfactory method is to use an electric thermostat operating through a relay or direct control switch; *second*, where a large number of unit heaters are furnishing ventilation as well as heat it is advisable to provide them with pneumatic control. The unit heaters may be controlled by means of the standard gradual acting type thermostats controlling steam supply which may be further supplemented with a pneumatic governor switch arranged to automatically shut off the heater when the temperature reaches a limiting degree.

An arrangement of this type where several unit heaters are furnishing heat for a single room will tend to keep the air in circulation and allow a few heaters to furnish the necessary heat with a minimum expense for electric current as well as for steam. With the last named arrangement, double automatic temperature control may be used which will automatically shut down all unit heaters during the non-operating period until the temperature falls below the safe operating point. Most of the floor type of unit heaters have a normal gravity circulating capacity about one-third of their heating capacity. This is enough to heat many buildings for average outside temperatures and also enough to overheat buildings for outside temperatures above the average. It is desirable,

therefore, to control the steam as well as the electric supply to floor type unit heaters.

Unit Control

Automatic control of temperature in any given space as for instance the warming of a room or a group of rooms may be accomplished in several ways. If several rooms are heated from one source and controlled with one thermostat the control may and probably should be called Group Control, or Zone Control, or Master Control, or possibly Service Control, but where each radiator or unit heater is controlled by individual thermostat the control may be called Unit Control and this type of control may be of the pilot type with thermo element relaying to control valve or of

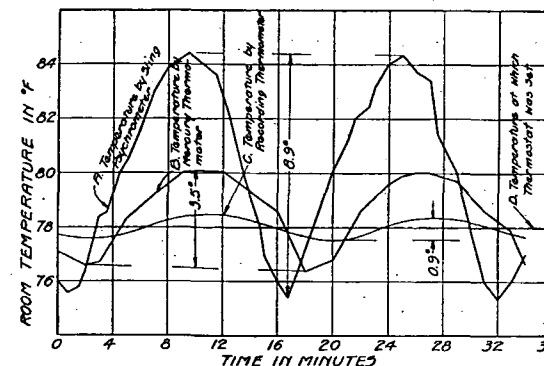


FIG. 13. VARIATIONS IN ROOM TEMPERATURES WITH UNIT CONTROL AND POOR CIRCULATION OF AIR

the self-contained type with thermo element an integral part of control valve.

Thermostatically Controlled Water Mixers

Hot and cold water may be thermostatically mixed to a predetermined temperature and delivered for various purposes ranging from the control of hydrotherapeutic hospital equipment to gang shower baths and various industrial uses where warm water of a specified temperature is needed.

This automatic water mixing is accomplished by an apparatus consisting of a shell enclosing a three-way valve operated by a thermostatic motor, the shell having hot and cold water inlets, an outlet for delivery, and a controller handle, or wheel, by which the apparatus may be adjusted for any desired delivery temperature.

A typical application of this thermostatic water controller is to have one connected in on the hot-water supply to a group of showers, the instrument being so arranged as to limit the hot-water temperature to a safe degree (usually 110 deg. fahr.) leaving it to the bather to mix as much cold water with it as he chooses through the ordinary hand valve.

Another application is to use four of these controllers on the hot-water