TABLE 7. VARIATION IN DIMENSIONS AND CATALOG RATING OF 10-SECTION TUBULAR CONDUCTORS MADE BY SIX MANUFACTURERS

No. of Tubes	3	4	5	6	7
Width of Conductor, Inches	4.6–5.1	6.0–7.0	8.0–8.9	9.1–10.4	11.4–12.8
Length per Section, Inches	2.5	2.5	2.5	2.5	2.5–3.0
HEIGHT WITH LEGS—INCHES	HEAT EMISSION—SQUARE FEET				
13–14	.....	.....	.....	20	25.0–32.5
16–18	.....	.....	28.5	.....	30.0–38.3
20–21	15.0–17.5	20.0–22.5	25.0–31.2	30	36.7–45.0
22–23	20.0–21.3	25	30.0–33.9	35	40.0–45.2
25–26	20.0–26.7	25.0–27.5	32.5–39.8	37.5–40.0	50.0–53.5
30–32	25.0–30.9	33.3–35.0	40.0–48.6	50	63.3–62.5
36–38	30.0–36.7	40.0–42.5	50.0–56.5	60	70.0–75.4

Direct Radiation

2-*A*. Decide upon the type and the number of heaters to be used. Then find from manufacturers guaranteed performance tables for the particular type of heater as given in the catalog section of THE GUIDE or elsewhere, the number of sections or the size of each heater required to supply the heat loss from the room.

Cabinet or Concealed Convectors

2-*B*. If convectors for which heat emission data are given only for use as conductors are to be used, estimate the percentage decrease in heat emission from a conductor thus installed and add this percentage to the heat loss from the room as estimated in (1).

3-*B*. From the manufacturers guaranteed performance data as given in the catalog section of THE GUIDE or elsewhere, find the number of sections or size of each convector to supply the corrected heat loss found in 2-*B*.

Indirect Gravity Convectors

2-*C*. Add to the estimated heat loss from the room from (1) any additional heat loss, not entering the room to be heated, from the duct or enclosure of the convector. If the enclosure or ducts are so designed as to decrease the heat emission of the convector as given by the manufacturer, estimate this percentage decrease and add it also to the estimated heat loss from the room as given in (1).

3-*C*. From the manufacturers' guaranteed data as given in the catalog section of THE GUIDE or elsewhere, find the number of sections or size of convector to supply the estimated heat loss given by 2-*C*.

Blast Convectors

2-*D*. Decide upon the desired temperature of warm air entering the room and from this temperature and the estimated heat loss from the room from (1), calculate the quantity of air to be supplied.

3-*D*. Increase the temperature of the air entering the room by an amount sufficient to take care of the heat loss from the duct system to give the temperature of air leaving the blast convectors.

4-*D*. Estimate the temperature at which the air will enter the cold side of the blast convectors, and calculate the temperature rise through the convectors.

5-*D*. From the manufacturers' guaranteed performance data as given in the catalog section of THE GUIDE or elsewhere, find the required number of sections or size and arrangement of the blast convectors to give the temperature rise indicated by 4-*D*, to the air volume given in 2-*D*.

6-*D*. The resistance offered by the convector chosen, must be added to the resistance of the duct system in choosing the fan. In order not to make this resulting resistance too high, consideration should be given to the resistance of the convector in selecting it.

CHAPTER 17

AUTOMATIC HEAT CONTROL

Types of Thermostats; Temperature Control Requirements; Residence Heating; School and Church Heating; Office Heating; Factory Heating; Greenhouse Heating; Swimming Pool Heating; Domestic Hot Water Heating; Manufacturing Processes; Household Devices.

THE control of heat as applied to the multitudinous industries and processes where heat is employed involves much more than the mere regulation of temperatures. Heat control usually means some arrangement that will not permit overheating, and this arrangement or device may be manual, semi-automatic or full automatic.

Whether the heat supply be for human comfort, for process work, or for any of the other myriad requirements, it should be equal to the maximum demand, and any quantity wanted short of this maximum demand must be subject to control. It is obvious that the control of heat is necessary not only to comfort, perfection of product, etc., but also that it is necessary if economy shall be achieved.

Heat control may be divided into the following classes:

1. Control of heat employed to give bodily comfort.
2. Control of heat in process work in manufacturing industries.
3. Control of heat in laboratory research. This is of the greatest importance in all matters pertaining to the exactness of the heat components.
4. Control of heat in service-rendering devices such as refrigerators, laundries, household appliances, etc.

The subject matter of this division will deal largely with the control of heat as employed in the daily activities of life and to a great extent it will confine itself to automatic heat control, since the refinements in the art of heating find its highest expression in automatic control.

The term *heating* will include everything pertaining to air temperatures in the spaces controlled. Where water temperatures or metal temperatures are involved appropriate words will be added.

For convenience in classification *heating* is divided as follows:

1. Residence Heating.
2. School and Church Heating.
3. Office Heating.
4. Factory Heating.
5. Theater Heating.
6. Greenhouse Heating.
7. Swimming Pool Heating.
8. Domestic Hot Water Heating.
9. Bath and Shower Heating.