for any radiator with steam or water at temperatures other than 215 deg. fahr. and with room temperatures other than 70 deg. fahr., when the emission for 215 deg. fahr. and 70 deg. fahr. are known. These factors have been based on the method outlined in the Report of the Advisory Committee on Radiation, JOURNAL of the AMERICAN SOCIETY OF HEATING

TABLE 1.* HEAT EMITTED BY DIRECT RADIATION

*Steam Temperature 215 deg. fahr. Room Temperature 70 deg. fahr.*

| TYPE | NO. OF COLUMNS | HEIGHT INCHES | RATED SURFACE PER SECTION SQ. FT. | B.T.U. PER SQ. FT. PER HOUR | |
|---|---|---|---|---|---|
| | | | | Intermediate Section | End Section |
| Standard | 1 | 38 | 3.00 | 243 | 375 |
| " | 1 | 32 | 2.50 | 250 | 380 |
| " | 1 | 26 | 2.00 | 257 | 385 |
| " | 1 | 23 | 1.66 | 266 | 394 |
| " | 1 | 20 | 1.50 | 263 | 395 |
| " | 2 | 45 | 5.00 | 217 | 378 |
| " | 2 | 38 | 4.00 | 225 | 396 |
| " | 2 | 32 | 3.33 | 233 | 400 |
| " | 2 | 26 | 2.66 | 240 | 413 |
| " | 2 | 23 | 2.33 | 242 | 415 |
| " | 2 | 20 | 2.00 | 246 | 411 |
| " | 3 | 45 | 6.00 | 206 | 374 |
| " | 3 | 38 | 5.00 | 211 | 380 |
| " | 3 | 32 | 4.50 | 215 | 370 |
| " | 3 | 26 | 3.75 | 219 | 366 |
| " | 3 | 22 | 3.00 | 226 | 380 |
| " | 3 | 18 | 2.25 | 236 | 390 |
| " | 4 | 45 | 10.00 | 191 | 309 |
| " | 4 | 38 | 8.00 | 198 | 321 |
| " | 4 | 32 | 6.50 | 207 | 333 |
| " | 4 | 26 | 5.00 | 216 | 346 |
| " | 4 | 22 | 4.00 | 222 | 358 |
| " | 4 | 18 | 3.00 | 233 | 375 |
| Hospital | 2 | 45 | 5.00 | 230 | 393 |
| " | 2 | 38 | 4.00 | 240 | 407 |
| " | 2 | 32 | 3.33 | 250 | 418 |
| " | 2 | 26 | 2.66 | 256 | 423 |
| " | 2 | 23 | 2.33 | 261 | 428 |
| " | 2 | 20 | 2.00 | 265 | 430 |
| Wall | .... | 29 | 9.00 | 289 | 316 |
| " | .... | 22 | 7.00 | 293 | 319 |
| " | .... | 17 | 5.00 | 310 | 331 |
| Window | .... | 20 | 5.00 | 211 | 342 |
| " | .... | 16 | 3.75 | ..... | ..... |
| " | .... | 13 | 3.00 | 226 | 361 |

*Condensed from Research Laboratory Standard Data—AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS—Result of Cooperative Work with U. S. Bureau of Mines Experiment Station, Pittsburgh, Pa. Copyright 1921.

AND VENTILATING ENGINEERS, March 1927, making use of the relation that the heat outputs vary as the 1.3 power of the temperature ranges.

In order to convert the heat emission from steam radiation with steam at 215 deg. fahr. and room temperature at 70 deg. fahr. to heat emission from hot-water radiation with mean water temperature at 170 deg. fahr. and room temperature at 70 deg. fahr., the heat emission from the steam radiation should be multiplied by the factor, 0.617.





TABLE 2. HEAT EMISSION OF DIRECT PIPE COIL RADIATION FOR STEAM

*Steam Temperature 215 deg. fahr. Room Temperature 70 deg. fahr.*

WALL COILS—COILS PLACED VERTICAL—PIPES HORIZONTAL

B.t.u. per Lineal Feet of Coil per Hour (Not Lineal Feet of Pipe)

| SIZE OF COIL | 1" | 1¼" | 1½" |
|---|---|---|---|
| Single Row | 132 | 155 | 185 |
| Two | 252 | 312 | 348 |
| Four | 440 | 545 | 616 |
| Six | 567 | 702 | 793 |
| Eight | 651 | 796 | 907 |
| Ten | 732 | 907 | 1020 |
| Twelve | 812 | 1005 | 1135 |

WALL COILS—COILS PLACED VERTICAL—PIPES VERTICAL

Emission varies in inverse ratio of the height of the coil

Use 100 B.t.u. per lineal feet of pipe as an average for 1¼ in. coil, 10 ft. high.

CEILING COILS—COILS PLACED HORIZONTALLY—PIPES HORIZONTAL

Emission is equal to that of a single row coil

Allowance must be made, however, if the coil is at the ceiling in a higher temperature. In this case use:

126 B.t.u. per lineal feet of pipe for 1 in. coils.
146 B.t.u. per lineal feet of pipe for 1¼ in. coils.
175 B.t.u. per lineal feet of pipe for 1½ in. coils.

Table 2 has been developed by a method of deduction from the available data on such experimental work on pipe coils as has been recorded, and does not represent definite results of tests as in Table 1. The values are, therefore, approximately only, but can be used with assurance that they are more accurate than those obtained by the usual method for calculating pipe coil surface.

## EXTENDED SURFACE HEATERS

Extended surface heaters in general, consist of one or more steam-carrying tubes or spaces to which the fins or sheets of extended surface are attached. The heating elements in themselves are not generally complete and require a duct, stack or chimney in order to give satisfactory results.

There are heating elements, however, of this type which are complete within themselves, and most other such units are now assembled in accompanying casings to form a complete unit, known either as a heat cabinet, a concealed heater or some appropriate name.

When installed between the walls of a building a sheet metal stack is used between the inlet and the outlet. When the heater is installed in the room it is equipped with a closely fitting box or cabinet which takes place of the stack and gives the necessary chimney effect.

The heating elements are made of brass, copper, aluminum or other highly conductive non-ferrous metal, generally with extended surfaces ranging from about 3½ x 6 in. to 4 x 8 in. in size and from 0.002 to