TABLE 29. HEAT EMISSION OF DIRECT PIPE COIL RADIATION FOR STEAM

Steam Temperature at 240 deg. fahr.—Pressure 10 lb. per sq. in.—Room Temperature at 60 deg. fahr.

WALL COILS—Coils Placed Vertical—Pipes Horizontal

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

Size of Coil	1"	1¼"	1½"
Single Row	175	215	245
Two	335	413	462
Four	584	724	816
Six	752	930	1050
Eight	864	1064	1200
Ten	970	1200	1350
Twelve	1075	1330	1500

WALL COILS—Coils Placed Vertical—Pipes Vertical

Emission varies in inverse ratio of the height of the coil. Use 133 B.t.u. per lineal ft. of pipe as an average for 1¼ in. coil, 10 ft. high.

CEILING COILS—Coils Placed Horizontal—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 167 B.t.u. per lineal ft. of pipe for 1 in. coils.
206 " " " " " " 1¼ in. coils.
231 " " " " " " 1½ in. coils.

Note.—This Table 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 Tables 17 to 30. The values are therefore approximate only but can be used with assurance that they are more accurate than those obtained by the usual method for calculating pipe coil surface.

TABLE 30. HEAT EMISSION OF DIRECT PIPE COIL RADIATION FOR HOT-WATER

Water Temperature at 180 deg. fahr. Room Temperature at 60 deg. fahr.

WALL COILS—Coils Placed Vertical—Pipes Horizontal

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

Size of Coil	1"	1¼"	1½"
Single Row	105	131	147
Two	198	248	276
Four	352	432	488
Six	456	558	630
Eight	520	640	720
Ten	583	720	810
Twelve	645	800	900

WALL COILS—Coils Placed Vertical—Pipes Vertical

Emission varies in inverse ratio to the height of coil. Use 80 B.t.u. per lineal ft. of pipe as an average for 1¼ in. Coil 10 ft. high.

CEILING COILS—Coils Placed Horizontal—Pipes Horizontal

Emission is equal to that of a single row coil.

Allowance must be made however, if the coil is at the ceiling where the temperature is higher.

In this case use 100 B.t.u. per lineal ft. of pipe for 1 in. coils.
125 " " " " " " 1¼ in. coils.
138 " " " " " " 1½ in. coils.

Note.—See note under Ceiling Coils for Steam.

RADIATION FOR ROOM TEMPERATURES

The following table from the Establishment of Standard Methods of Proportioning Direct Radiation, by James A. Donnelly (TRANSACTIONS, Vol. 21, p. 535) gives the proportionate heat losses from buildings, the proportionate transmission from direct radiators, and the proportionate radiation required (with steam at 210 deg.) for various room temperatures, when the outside temperature is zero:

TABLE 31. EFFECT OF ROOM TEMPERATURE ON HEAT LOSS AND SIZE OF RADIATOR

Room Temperature	Proportionate Loss in B.t.u.	Difference in Temperature Between Radiator and Room	Proportionate Transmission in B.t.u.	Room Temperature	Proportionate Surface Required Sq. Ft.
35	0.50	175	1.34	35	0.37
40	0.57	170	1.29	40	0.44
45	0.64	165	1.24	45	0.52
50	0.71	160	1.19	50	0.60
55	0.79	155	1.14	55	0.69
60	0.86	150	1.09	60	0.78
65	0.93	145	1.05	65	0.89
70†	1.00†	140†	1.00†	70†	1.00†
75	1.07	135	0.95	75	1.12
80	1.14	130	0.91	80	1.26
85	1.21	125	0.87	85	1.40
90	1.29	120	0.82	90	1.56
95	1.36	115	0.78	95	1.74
100	1.43	110	0.74	100	1.93
105	1.50	105	0.70	105	2.15
110	1.57	100	0.66	110	2.39
115	1.64	95	0.62	115	2.66
120	1.71	90	0.58	120	2.95

† Standard Conditions.

Assuming that the rate of heat loss from a building varies directly with the difference between the outside temperature and the building temperature, and considering the heat loss for zero outside, 70 deg. inside as the standard, or 100 per cent; the second column shows the proportionate loss of heat from a building when the outside temperature is zero, and the inside tempefature is as given in the first column.

Assuming that the rate of transmission from a direct radiator to the air of a building is in proportion to their difference in temperature, with a variation in the rate of transmission of 2 per cent, greater or less, for each 10 deg. increase or decrease in their temperature difference, and considering 140 deg. difference in temperature (steam 210 deg., building 70 deg.) as standard, or 100 per cent transmission, the second column shows the proportionate transmission when the difference in temperature is as given in the first column.

Assuming that under standard conditions of outside temperature zero, building temperature 70 deg., and radiator temperature 210 deg. (or 140 deg. difference between the radiator and room) the amount of radiation necessary is 100 per cent, the proportionate amounts of radiation given in the second column are those necessary to heat a building to the temperatures given in the first column, when the outside temperature is zero.

Note.—The amount of surface required for heating is always obtained by dividing the heat loss from the building by the amount of heat transmitted per square foot of radiation. Therefore, as may be seen from the above tables, the proportionate amount of surface required for heating is obtained by dividing the proportionate heat loss from the building by the proportionate transmission of the radiator, in each case.

The preceding table may be used to find the proportionate amount of radiation necessary to heat a room to any desired inside temperature, other than 70 deg., when the outside minimum temperature is other than zero, and with a radiator temperature other than standard. Find the difference between the outside temperature and the room temperature in the first column; divide the proportionate heat loss opposite this amount,