

Table 1.... Column-Type Cast-Iron Radiator

Height In.	Generally Accepted Rating per Section*					
	One Column		Two Column		Three Column	
	Sq Ft	Btuh	Sq Ft	Btuh	Sq Ft	Btuh
15			1½	360	2¼	540
18			2	480	3	720
20	1½	360	2½	540	3½	900
22			3	720	4	1080
23	1½	400	3½	800	4½	1200
26	2	480	4	960	5	1200
32	2½	600	5	1200	6	1440
38	3	720				
45						
	Four Column		Five Column		Six Column	
	Sq Ft	Btuh	Sq Ft	Btuh	Sq Ft	Btuh
13					3	720
16					3½	900
18	3	720	4½	1120	5	1080
20					5	1200
22	4	960				
26	5	1200	7	1680		
32	6½	1560				
38	8	1920	10	2400		
45	10	2400				

* These ratings are based on steam at 215 F and air at 70 F. They apply only to installed radiators exposed in a normal manner; not to radiators installed behind enclosures, grilles, or under shelves. For Btu per hour ratings at other temperatures, divide table values by factors found in Table 7.

be so designed that they will not impair the performance of the assembled convector. It is desirable that the cabinet or enclosure for the convector fit as snugly as possible, so that the air passing through cannot bypass the heating element.

BASEBOARD UNITS

Baseboard heat-distributing units are divided into three types: (1) radiant, (2) radiant-convector, and (3) finned-tube.

Radiant-type baseboard is made of cast iron or steel. This type of unit emits a large portion of its heat output by radiation. Units are sometimes suspended from the ceiling in rooms having little or no available wall space for floor mounted units. As the convected heat obtained from these units when mounted at the ceiling is less than when they are mounted at floor level, additional length must be added as recommended by the manufacturer, to allow for the reduction.

Radiant-convector type baseboard is also made of cast iron or steel. The units are provided with air openings at the top and bottom to permit circulation of room air over the wall side of the unit. The wall side of the unit has extended surface to provide increased heat output. A large portion of the heat emitted is transferred by convection. This type of baseboard, having a greater output per linear foot than the radiant type, is particularly adaptable where wall space is at a premium or the heat loss of the room is high.

Finned-tube type baseboard has a finned-tube heating element that is concealed by a long, low sheet-metal enclosure.

Table 2.... Large-Tube Cast-Iron Radiators

Sectional, cast-iron, tubular-type radiators of the large-tube pattern, that is, having tubes approximately 1½ in. in diameter, 2½ in. in centers.

Number of Tubes per Section	Catalog Rating per Section ^a		Height	Width	Section Center Spacing ^b	Leg Height to Tapping
	Sq Ft	Btuh	In.	In.	In.	In.
3	1½	420	20	4½	2½	4½
	2	480	23		2½	4½
	2½	560	26		2½	4½
	3	720	32		2½	4½
	3½	840	38		2½	4½
4	2½	540	20	6½-6¾	2½	4½
	3	600	23		2½	4½
	3½	660	26		2½	4½
	4	840	32		2½	4½
	4½	1020	38		2½	4½
5	3½	640	20	8-8½	2½ ^d	4½
	4	720	23		2½ ^d	4½
	4½	840	26		2½ ^d	4½
	5	1040	32		2½ ^d	4½
	5	1200	38		2½ ^d	4½
6	3	720	20	9-10½	2½	4½
	3½	840	23		2½	4½
	4	960	26		2½	4½
	5	1200	32		2½	4½
	6	1440	38		2½	4½
7	2½	600	14	11½-12½	2½	3
	3	720	17		2½	3
	3½	880	20		2½	3 or 4½

* These ratings are based on steam at 215 F and air at 70 F. They apply only to installed radiators exposed in a normal manner; not to radiators installed behind enclosures, grilles, or under shelves. For Btu per hour ratings at other temperatures, divide table values by factors found in Table 7.

^b Maximum assembly of sections. Length equals number of sections times 2½ in.

^c Where greater than standard leg heights are required, this dimension shall be 6 in., except for 1-tube sections, in heights from 13 to 20 in., inclusive, for which this dimension shall be 4½ in. Radiators may be furnished without legs.

^d For 8-tube hospital-type radiation, this dimension is 3 in.

sure or cover. A major portion of the heat is transferred to the room by convection. The output varies over a wide range, depending on the physical dimensions and the materials used. When selecting this type of baseboard, the designer should avoid using a unit with too high an output per linear foot. Baseboard performs best when units are so selected that they are installed along as much of the exposed wall as possible.

The basic advantage of the baseboard heat-distributing unit is that its normal placement is along the cold walls and under areas where the greatest heat loss occurs. Other advantages claimed for the baseboard heat-distributing unit are: it is inconspicuous; it offers a minimum of interference with furniture placement, and it distributes the heat near the floor. This last characteristic reduces the floor-to-ceiling temperature gradient to about 2 to 4 F deg, and tends to produce uniform temperatures throughout the room. It also makes baseboard heat-distributing units adaptable to basement homes, where cold floors are prevalent.¹

Heat loss calculations for baseboard heating systems are the same as those used for other types of heat-distributing

Radiators, Convectors, Baseboard and Finned-Tube Units

Table 3.... Small-Tube Cast-Iron Radiators

Number of Tubes per Section	Catalog Rating per Section ^a	Section Dimensions						
		Height ^a	A		B		C	D
			Sq Ft	Btuh	Min	Max		
3 ^d	1.6	384	25	3½	3½	1½	2½	
	1.6	384	19	4½	4½	1½	2½	
	1.8	432	22	4½	4½	1½	2½	
4 ^d	2.0	480	25	4½	4½	1½	2½	
	2.1	504	22	5½	5½	1½	2½	
	2.4	576	25	5½	5½	1½	2½	
5 ^d	2.1	504	22	5½	5½	1½	2½	
	2.4	576	25	5½	5½	1½	2½	
	2.3	552	19	6½	6½	1½	2½	
6 ^d	3.0	720	25	6½	6½	1½	2½	
	3.7	888	32	6½	6½	1½	2½	



* These ratings are based on steam at 215 F and air at 70 F. They apply only to installed radiators exposed in a normal manner; not to radiators installed behind enclosures, grilles, or under shelves. For Btu per hour ratings at other temperatures, divide table values by factors found in Table 7.

^b Length equals number of sections times 194 in.

^c Overall height and leg height, as produced by some manufacturers; are one inch greater than shown in Columns A and D. Radiators may be furnished without legs. Where greater than standard leg heights are required this dimension shall be 4½ in.

^d Or equal.

units. The procedure for designing baseboard heating systems is given in *I = B = R Installation Guide No. 800*.² Ratings for baseboard heat-distributing units are expressed in Btu per linear foot.

FINNED-TUBE UNITS

A finned-tube heat-distributing unit is a room-air heater composed of a finned-tube element fabricated from metallic tube to which metallic fins have been bonded. It does not include a fin-tube type baseboard element provided with an enclosure for replacement of the conventional baseboard.

Finned-tube units are available in several tube sizes, either steel or copper (1 to 2 in. IPS or ½ to 1½ nominal copper) with various fin sizes, spacings, and materials. The resistance to the flow of steam or water in finned-tube elements is the same as that through standard distribution piping of equal size.

The finned-tube unit can be used with either steam or hot water systems. It has advantages for installation where

Table 4.... Cast-Iron Wall Radiators

Approximate Dimensions—Inches			Heat Output*	
Height	Length or Width	Thickness	Sq Ft	Btuh
13½	16½	3	6½	1560
13½	22	3	8	1920
22	13½	3	8	1920
13½	29	3	11	2640
29	13½	3	11	2640

* These ratings are based on steam at 215 F and air at 70 F. They apply only to installed radiators exposed in a normal manner; not to radiators installed behind enclosures, grilles, or under shelves. For Btu per hour ratings at other temperatures divide table values by factors found in Table 7.

Table 5.... Heat Emission of Pipe Coils Placed Vertically on a Wall (Pipes Horizontal) Containing Steam at 215 F and Surrounded with Air at 70 F

Size of Pipe	Btu per linear foot of coil per hour (not linear feet of pipe)		
	1 in.	1½ in.	2 in.
Single row	132	162	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

it is desired to distribute the heat along the entire outside wall, and thereby prevent down drafts along the walls in buildings such as schools, churches, hospitals, and factories.

Normal placement of finned tube is along the walls where the heat loss is greatest. If necessary, the units can be installed in two or three tiers along available wall space to meet the heating requirements. For hot water system installations where two or three tiers are required, a sinusoidal water flow through the heaters is recommended, because a header connection with parallel flow may permit the water to short circuit along the path of least resistance.

Finned-tube elements may be installed bare in locations where human contact is unlikely; they may be protected by open-type grilles, fabricated of expanded or perforated metal, covering the top and front of the element, or they may be installed in a variety of designs of covers or enclosures.

A cover is a fabricated shield having at least a portion of the front skirt made of solid material. It can be mounted on the finned-tube element so that there is clearance between the wall and the cover, and the rear of the finned-tube element is not completely enclosed. A cover may have a top, front, or inclined outlet.

An enclosure is a shield of solid material installed so that the finned-tube element is completely enclosed at both front and rear. An enclosure may have an integral back or may be installed tightly against the wall so that the wall itself forms the back. An enclosure may have a top, front, or inclined outlet.

A multiplicity of enclosures have been developed, in cooperation with architects and designers, to meet the requirements of modern building design. The wide variety of finned-tube elements (tube size and material, fin size, spacing, and material, and multiple tier installation), together with the

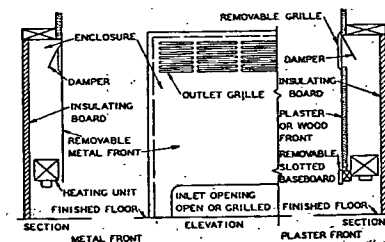


Fig. 1.... Typical Recessed Convector