

standardization of design and method of tests for rating. Already this need has been partially met by a Radiator Test Code recently adopted by the Society.

In the past the unit of measure recognized in figuring radiation was the square foot of heating surface. The use of this unit is rapidly being discarded however, for the reason that the heat-emission depends upon the design of the radiator as well as its surface area. The engineer is interested primarily in the amount of heat emitted by, rather than the amount of surface in, a radiator. As a result, radiators are being rated on the amount of heat given off either in B.t.u. per hour or in equivalent square feet based on 240 B.t.u. per hour.

Heating effect or heating efficiency has recently become recognized as an important factor in heating by radiation. It has been shown by Brabbée, Frost, and others, that two radiators of different design may warm a given space to a comfortable temperature by condensing different amounts of steam or by emitting different amounts of heat. This variation in heating efficiency depends upon whether the radiator warms the lower part of the room where the occupants are while sending more or less heat to the ceiling. Heating efficiency may depend upon a number of factors including the size, height, and shape of the radiator, the relative amount of heat it emits by radiation and convection, whether or not it is in an inclosure, and its location in, and the size and shape of, the room being heated.

HEAT EMISSION OF RADIATORS

Tables 1 to 7 give the heat emitted by cast iron radiators of the column, wall, and window type, of various standard heights and numbers of columns when using steam at 215 deg. fahr. in a 70 deg. fahr. room. In the last three lines of each table the heat emitted in B.t.u. per intermediate section, and the B.t.u. emitted per rated square foot of intermediate and end sections are given.

Table 8 gives conversion factors for determining the heat emission of 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.

Tables 9 to 11 give the heat emitted by cast iron, column, wall, and window radiators of various standard heights and numbers of sections for hot water heating with mean water temperature of 170 deg. fahr. and room temperature of 70 deg. fahr.

The tables were computed from data given in a report¹ of the Research Laboratory of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, resulting from experiments by John R. Allen and F. B. Rowley.

For reasons mentioned it is not possible at this time to give data on heat-emission for tubular or art radiation or for other types of direct and semi-indirect radiation on the market.

Tables 12 and 13 give the heat emission of various standard types of coil radiation for steam and hot water heating respectively.

¹Direct Radiation Tables by F. Paul Anderson, F. C. Houghten, Louis Ebin, JOURNAL, of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, December, 1921.

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.
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TABLE 1. HEAT EMITTED BY DIRECT RADIATION—SINGLE-COLUMN RADIATORS
Room Temperature at 70 deg. fahr.

LENGTH INCHES	No. OF SECTIONS	38 IN.			32 IN.			26 IN.			23 IN.			20 IN.		
		Rated Surface sq. ft.	Total B.t.u. per hr.	Total B.t.u. per hr.	Rated Surface sq. ft.	Total B.t.u. per hr.	Total B.t.u. per hr.	Rated Surface sq. ft.	Total B.t.u. per hr.	Total B.t.u. per hr.	Rated Surface sq. ft.	Total B.t.u. per hr.	Total B.t.u. per hr.	Rated Surface sq. ft.	Total B.t.u. per hr.	Total B.t.u. per hr.
5	1	3	1125	952	2.5	4098	770	2	1589	1.66	654	1.5	593	1.5	593	
	2	6	2378	1589	5.0	4725	1293	4	2217	3.33	1112	3.0	982	3.0	982	
	3	9	3578	2217	7.5	5354	1807	6	3307	5.00	1555	4.5	1377	4.5	1377	
	4	12	4780	2845	10.0	5982	2321	8	3971	6.66	1997	6.0	1772	6.0	1772	
	5	15	5985	3471	12.5	6610	2835	10	4604	8.33	2440	7.5	2168	7.5	2168	
15	6	18	4765	4098	15.0	7236	3348	12	4725	10.00	2882	9.0	2562	9.0	2562	
	7	21	5494	4725	17.5	7863	3863	14	5354	11.66	3294	10.5	2957	10.5	2957	
	8	24	6223	5354	20.0	8489	4377	16	5982	13.33	3767	12.0	3353	12.0	3353	
	9	27	6950	5982	22.5	9117	4891	18	6610	15.00	4209	13.5	3748	13.5	3748	
	10	30	7680	6610	25.0	9744	5404	20	7236	16.66	4652	15.0	4143	15.0	4143	
30	11	33	8408	7236	27.5	10372	5918	22	7863	18.33	5095	16.5	4538	16.5	4538	
	12	36	9137	7863	30.0	10999	6432	24	8489	20.00	5538	18.0	4932	18.0	4932	
	13	39	9867	8489	32.5	11624	6947	26	9117	21.66	5980	19.5	5327	19.5	5327	
	14	42	10594	9117	35.0	12250	7459	28	9744	23.33	6422	21.0	5723	21.0	5723	
	15	45	11322	9744	37.5	12875	7974	30	10372	25.00	6865	22.5	6118	22.5	6118	
40	16	48	12053	10372	40.0	13511	8489	32	10999	26.66	7309	24.0	6514	24.0	6514	
	17	51	12781	10999	42.5	14136	9000	34	11624	28.33	7752	25.5	6908	25.5	6908	
	18	54	13511	11624	45.0	14761	9515	36	12250	30.00	8193	27.0	7304	27.0	7304	
	19	57	14239	12250	47.5	15386	10028	38	12875	31.66	8635	28.5	7698	28.5	7698	
	20	60	14964	12875	50.0	16011	10544	40	13511	33.33	9080	30.0	8094	30.0	8094	
B.t.u. per Intermed. Section			728	626	....	514	....	....	....	....	....	....	....	....	....	395
" " Sq. Ft. " "			243	250	....	257	....	....	....	....	....	....	....	....	....	263
" " End Surface			375	380	....	385	....	....	....	....	....	....	....	....	....	395