

are considered consistent with good practice, although there are boilers which have high efficiencies and also operate at higher transmission rates.

RATING AND TESTING CODES

Heating boilers are usually rated according to codes developed by the *Steel Boiler Institute*, the *Institute of Boiler and Radiator Manufacturers*, the *American Gas Association*, and the *Heating, Piping and Air Conditioning Contractors National Association*, whose test codes have been prepared specifically for the purpose of obtaining information required for establishing acceptable ratings. In view of the preference of industry for the above codes, consideration is being given to the withdrawal of the following five Society codes for determining efficiency and performance characteristics:

ASHVE Standard and Short Form Heat Balance Codes for Testing Low-Pressure Steam Heating Solid Fuel Boilers—Codes 1 and 2—(Revision of June, 1929).¹

ASHVE Performance Test Code for Steam Heating Solid Fuel Boilers—Code No. 3—(Edition of 1929).²

The ASHVE Standard Code for Testing Steam Heating Boilers Burning Oil Fuel, (Adopted June, 1938).³

The ASHVE Standard Code for Testing Stoker-Fired Steam Heating Boilers, (Adopted June 1938;⁴ also adopted by the Stoker Manufacturers Association, 1938).

The various current rating and testing codes will be discussed in following paragraphs in which limitations, methods of application, and resulting ratings will be described.

The *Steel Boiler Institute* has adopted a rating code for boilers designated *Table 1 Steel Boilers* and *Table 2 Steel Boilers* and a testing code for *Oil-fired Table 2 Steel Boilers* (SBI Rating Code, Sixth Edition, July 1954). Tables 1 and 2 of this chapter show the SBI ratings of these two classes of boilers. The *Table 1* boilers (defined as those having 129 to 3571 sq ft of heating surface and formerly designated as *Commercial* boilers) are rated in square feet E.D.R. (steam) on the basis of heating surface with limitations set for grate area, furnace volume, and furnace height. The *Table 2* boilers (defined as those having not more than 294 sq ft of heating surface and formerly designated as *Residential* boilers) are rated from tests of oil-fired boilers, with limitations in relation to heating surface and testing conditions. Stoker-fired and gas-fired *Table 2* boilers are rated (SBI Net Rating) not in excess of the oil-fired rating. Hand-fired *Table 2* boilers are rated (SBI Net Rating) not greater than fourteen times the heating surface.

The *Institute of Boiler and Radiator Manufacturers* has adopted a code⁵ for rating cast-iron heating boilers, based upon performance obtained under controlled test conditions. This code applies to all sectional cast-iron heating boiler except those of magazine-feed type.

The *Gross I=B=R Output* is obtained by test, and is subject to certain limiting factors. For hand-fired boilers, the number of boilers of a series to be tested, the minimum overall efficiency, the minimum time limit (the time an *Available Fuel Charge* will last when burned at a rate which will produce the *Gross I=B=R Output*), the chimney area and height, and the draft in the stack are all subject to the limits established in the code. Tests are run using anthracite coal of standard specification. Bituminous coal and coke ratings are the same as for anthracite.

For automatically-fired boilers, the number of boilers of a series to be

TABLE 1. SBI RATINGS FOR TABLE 1 STEEL BOILERS

MECHANICALLY-FIRED										HAND-FIRED				(e) TAPPINGS		
SBI Rating			SBI Net Rating			(c) Min- imum Furnace Volume Cu Ft (7)	(b) Minimum Furnace Height In. (8)	MINIMUM HEATING SURFACE Sq Ft (9)	SBI Rating		SBI Net Rating		(d) Minimum Grate Area Sq Ft (16)	Steam Outlet I.P.S. In. (17)	(a) Steam Return I.P.S. (18)	
Sq Ft Steam (1)	Sq Ft Water (2)	Btu Per Hr (3)	Sq Ft Steam (4)	Sq Ft Water (5)	Btu Per Hr (6)				Sq Ft Water (10)	Sq Ft Steam (11)	Btu Per Hr (12)	Sq Ft Water (13)	Sq Ft Steam (14)	Btu Per Hr (15)		
2,180	3,500	528,000	1,800	2,880	432,000	15.7	28	129	1,800	2,880	432,000	1,500	2,400	360,000	6	3*
2,360	4,280	643,000	2,200	3,520	528,000	19.2	28	157	2,200	3,520	528,000	1,830	2,930	433,000	6	3*
3,160	5,050	788,000	2,600	4,160	624,000	22.6	29 1/4	185	2,600	4,160	624,000	2,170	3,470	521,000	6	3*
3,650	5,840	876,000	3,000	4,800	720,000	26.1	29 1/4	215	3,000	4,800	720,000	2,500	4,000	600,000	8	4*
4,250	6,800	1,020,000	3,500	5,600	840,000	30.4	30	250	3,500	5,600	840,000	2,920	4,970	700,000	8	4*
4,850	7,770	1,166,000	4,000	6,400	960,000	34.8	30 1/4	280	4,000	6,400	960,000	3,330	5,330	800,000	8	4*
5,470	8,750	1,313,000	4,500	7,200	1,080,000	39.1	31 1/4	322	4,500	7,200	1,080,000	3,750	6,000	900,000	8	4*
6,090	9,720	1,460,000	5,000	8,000	1,200,000	43.5	31 1/4	358	5,000	8,000	1,200,000	4,170	6,870	1,000,000	8	4*
6,710	10,690	1,606,000	5,500	8,800	1,320,000	47.9	32 1/4	400	5,500	8,800	1,320,000	4,590	7,590	1,100,000	8	4*
8,500	13,500	2,040,000	7,000	11,200	1,680,000	60.8	32 1/4	450	7,000	11,200	1,680,000	5,830	9,330	1,300,000	8	4*
10,330	16,520	2,475,000	8,500	13,600	2,040,000	73.8	35 1/4	608	8,500	13,600	2,040,000	7,680	11,330	1,500,000	8	4*
12,150	19,440	2,910,000	10,000	16,000	2,400,000	86.8	37 1/4	715	10,000	16,000	2,400,000	8,830	13,330	1,700,000	8	4*
15,180	24,280	3,643,000	12,500	20,000	3,000,000	108.5	40 1/4	893	12,500	20,000	3,000,000	10,420	16,700	2,000,000	8	4
18,220	29,130	4,376,000	15,000	24,000	3,600,000	130.2	43	1,072	15,000	24,000	3,600,000	12,560	20,000	2,300,000	8	4
21,260	34,000	5,109,000	17,500	28,000	4,200,000	151.8	46	1,250	17,500	28,000	4,200,000	14,580	23,330	2,500,000	8	4
24,300	38,860	5,832,000	20,000	32,000	4,800,000	173.5	49 1/4	1,428	20,000	32,000	4,800,000	16,670	26,870	2,800,000	8	4
30,360	48,570	7,285,000	25,000	40,000	6,000,000	216.3	52 1/4	1,725	25,000	40,000	6,000,000	20,650	32,330	3,300,000	8	4
36,430	58,280	8,738,000	30,000	48,000	7,200,000	260.3	55 1/4	2,148	30,000	48,000	7,200,000	24,630	38,000	3,900,000	10	6
42,500	68,000	10,191,000	35,000	56,000	8,400,000	303.6	58 1/4	2,560	35,000	56,000	8,400,000	28,610	46,070	4,500,000	10	6
48,570	77,710	11,644,000	40,000	64,000	9,600,000	346.9	61 1/4	2,857	40,000	64,000	9,600,000	32,590	53,900	5,000,000	12	6
54,640	87,420	13,097,000	45,000	72,000	10,800,000	393.3	64 1/4	3,214	45,000	72,000	10,800,000	36,570	60,700	5,600,000	12	6
60,710	97,140	14,550,000	50,000	80,000	12,000,000	430.6	67 1/4	3,671	50,000	80,000	12,000,000	41,670	66,700	6,200,000	12	6

(a) The return tapping sizes shown for boilers having 129 to 500 sq ft heating surface, inclusive, are adequate for forced hot water.

(b) Bituminous Stoker-Fired. Does not apply to Scotch Type Boilers.

(c) Oil, gas or bituminous stoker-fired coal. Minimum furnace volumes for anthracite, stoker-fired, are not specified in this code.

(d) Does not apply to Scotch Type Boilers.

(e) Does not apply to high pressure boilers.

Note: Scotch Type Boilers are cataloged in sizes having 60 sq ft minimum heating surface with 7.2 cu ft minimum furnace volume, and 99 sq ft minimum heating surface with 11.9 cu ft minimum furnace volume.