

HEATING VENTILATING AIR CONDITIONING GUIDE 1940

TABLE 10. HEAT GAIN FROM VARIOUS SOURCES

Source	Btu Per Hour		
	Sensible	Latent	Total
Electric Heating Equipment			
Electrical Equipment—Dry Heat—No Evaporated Water	100%	0%	100%
Electric Oven—Baking	80%	20%	100%
Electric Equipment—Heating Water—Stewing, Boiling, etc.	50%	50%	100%
Electric Lights and Appliances per Watt (Dry Heat)	3.4	0	3.4
Electric Lights and Appliances per Kilowatt (Dry Heat)	3413	0	3413
Electric Motors per Horsepower	2546	0	2546
Electric Toasters or Electric Griddles	90%	10%	100%
Coffee Urn—Large, 18 in. Diameter—Single Drum	2000	2000	4000
Coffee Urn—Small, 12 in. Diameter—Single Drum	1200	1200	2400
Coffee Urn—Approx. Connected Load per Gallon of Capacity	600	600	1200
Electric Range—Small Burner	*	*	3400
Electric Range—Large Burner	*	*	7500
Electric Range—Oven	8000	2000	10000
Electric Range—Warming Compartment	1025	0	1025
Steam Table—Per Square Foot of Top Surface	300	800	1100
Plate Warmer—Per Cubic Foot of Volume	850	0	850
Baker's Oven—Per Cubic Foot of Volume	3200	1300	4500
Frying Griddles—Per Square Foot of Top Surface	*	*	4600
Hot Plates—Per Square Foot of Top Surface	*	*	9000
Hair Dryer in Beauty Parlor—600 w.	2050	0	2050
Permanent Wave Machine in Beauty Parlor—24-25 w Units	2050	0	2050
Gas Burning Equipment			
Gas Equipment—Dry Heat—No Water Evaporated	90%	10%	100%
Gas Heated Oven—Baking	67%	33%	100%
Gas Equipment—Heating Water—Stewing, Boiling, etc.	50%	50%	100%
Stove, Domestic Type—No Water Evaporated—Per Medium Size Burner	9000	1000	10000
Gas Heated Oven—Domestic Type	12000	8000	20000
Stove, Domestic Type—Heating Water—Per Medium Size Burner	5000	5000	10000
Residence Gas Range—Giant Burner (About 5 1/4 in. Diameter)	*	*	12000
Residence Gas Range—Medium Burner (About 4 in. Diameter)	*	*	10000
Residence Gas Range—Double Oven (Total Size 18 in. x 18 in. x 22 in. High)	*	*	18000
Residence Gas Range—Pilot	*	*	250
Restaurant Range—4 Burners and Oven	*	*	100000
Cast-Iron Burner—Low Flame—Per Hole	*	*	100
Cast-Iron Burner—High Flame—Per Hole	*	*	250
Simmering Burner	*	*	1000
Coffee Urn—Large, 18 in. Diameter—Single Drum	5000	5000	10000
Coffee Urn—Small, 12 in. Diameter—Single Drum	3000	3000	6000
Coffee Urn—Per Gallon of Rated Capacity	500	500	1000
Egg Boiler—Per Egg Compartment	2500	2500	5000
Steam Table or Serving Table—Per Square Foot of Top Surface	400	900	1300
Dish Warmer—Per Square Foot of Shelf	540	60	600
Cigar Lighter—Continuous Flame Type	2250	250	2500
Curling Iron Heater	2250	250	2500
Bunsen Type Burner—Large—Natural Gas	*	*	5000
Bunsen Type Burner—Large—Artificial Gas	*	*	3000
Bunsen Type Burner—Small—Natural Gas	*	*	3000
Bunsen Type Burner—Small—Artificial Gas	*	*	1800
Welsbach Burner—Natural Gas	*	*	3000
Welsbach Burner—Artificial Gas	*	*	1800
Fish-tail Burner—Natural Gas	*	*	5000
Fish-tail Burner—Artificial Gas	*	*	3000
Lighting Fixture Outlet—Large, 3 Mantle 480 C.P.	4500	500	5000
Lighting Fixture Outlet—Small, 1 Mantle 160 C.P.	2250	250	2500
One Cubic Foot of Natural Gas Generates	900	100	1000
One Cubic Foot of Artificial Gas Generates	540	60	600
One Cubic Foot of Producer Gas Generates	135	15	150
Steam Heated Equipment			
Steam Heated Surface Not Polished—Per Square Foot of Surface	330	0	330
Steam Heated Surface Polished—Per Square Foot of Surface	130	0	130
Insulated Surface, Per Square Foot	80	0	80
Bare Pipes, Not Polished Per Square Foot of Surface	400	0	400
Bare Pipes, Polished Per Square Foot of Surface	220	0	220
Insulated Pipes, Per Square Foot	110	0	110
Coffee Urn—Large, 18 in. Diameter—Single Drum	2000	2000	4000
Coffee Urn—Small, 12 in. Diameter—Single Drum	1200	1200	2400
Egg Boiler—Per Egg Compartment	2500	2500	5000
Steam Table—Per Square Foot of Top Surface	300	800	1100
Miscellaneous			
Heat Liberated By Food per person, as in a Restaurant	30	30	60
Heat Liberated from Hot Water used direct and on towels per hour—Barber Shops	100	200	300

*Per cent sensible and latent heat depends upon use of equipment; dry heat, baking or boiling.

CHAPTER 8. COOLING LOAD

Heat Emission of Appliances

Heat generating appliances which give off either sensible heat or both sensible and latent heat in an air conditioned enclosure may be divided into three general classes of equipment or devices:

1. Electrical appliances.
2. Gas appliances.
3. Steam heating appliances.

In the first group may be found such devices as lights, motors, toasters, waffle irons, etc. The capacities of most electrical devices may be determined from the watt capacity indicated on their name plates. The Btu equivalent of heat generated per hour is determined by multiplying the watt capacity by 3.4 (one watt hour is equivalent to 3.413 Btu).

The capacities of electric motors are usually expressed in terms of horsepower instead of watts. If the motor efficiency is known, the watts input may be calculated from the formula:

$$P = \frac{746 (hp)}{n} \quad (7)$$

where

P = motor input, watts.

hp = motor load, horsepower.

n = motor efficiency (expressed as a decimal).

When the motor efficiency is not known the heat equivalent of electrical input can be approximately determined by applying data given in Table 9.

TABLE 9. HEAT GENERATED BY MOTORS

NAMEPLATE RATING HORSEPOWER	HEAT GAIN IN BTU PER HOUR PER HORSEPOWER	
	Connected Load in Same Room	Connected Load Outside of Room
1/8 to 1/2	4250	1700
1/2 to 3	3700	1150
3 to 20	2950	400

In the second group belong such appliances as coffee urns, gas ranges, steam tables, broilers, hot plates, etc. For heat generating capacities of such appliances refer to Table 10.

Considerable judgment must be exercised in the use of data given in Table 10. Consideration must be given to time of day when appliances are used and the heat they contribute at time of peak load. Only those appliances in use at the time of the peak load need be considered. Consideration must also be given to the way appliances are installed, whether products of combustion are vented to a flue, whether they escape into the space to be conditioned, or whether appliances are hooded allowing part of the heat to escape through a stack. There are no generally accepted data available on the effects of venting and shielding heating appliances but it is believed that when they are properly hooded with a positive fan exhaust system through the hood that 50 per cent of the heat will be