TABLE 5. EQUIVALENT FULL LOAD OPERATING HOURS OF REFRIGERATION EQUIPMENT USED FOR SUMMER COOLING
MAY 15 TO OCT. 15[a]

APPLICATION	HR OPEN FOR BUSINESS	ATLANTA	BOSTON	CHICAGO	DETROIT	LOS ANGELES	NEW ORLEANS	NEW YORK	PHILADELPHIA	OKLAHOMA CITY	ST. LOUIS	WASHINGTON D.C.
Barber Shops	1280	1010	650	720	720	680	1080	830	860	1020	890	940
Department Stores	940	840	560	610	610	580	890	700	720	840	750	780
Drug Stores	2100	1630	950	1060	1060	980	1790	1280	1330	1650	1420	1530
Funeral Parlors	600	440	300	330	330	310	470	370	380	440	400	410
Offices	940	870	560	620	620	580	900	710	740	880	770	810
Restaurant (Short Hour)	1290	970	535	620	620	570	1060	760	800	980	830	880
Restaurant (Long Hour)	2100	1510	820	930	930	850	1690	1170	1210	1530	1300	1400
Specialty Shops (5 & 10)	1090	800	530	590	590	560	860	670	690	810	720	750
Theaters—Continuous	1500	1010	700	750	750	720	1080	850	870	1020	910	950
Theaters—Neighborhood	900	640	420	450	450	430	650	500	520	650	550	580

[a] Modern Air Conditioning, Heating and Ventilating, by W. H. Carrier, R. E. Cherne and W. A. Grant (*Pitman Publishing Corp.* 1940, p. 73).

entering and leaving temperatures are considered constant, the average gallons per minute per ton obviously are equal to the design gallons per minute per ton. However, when the source is river or lake water, its maximum seasonal temperature will generally be reached at the same time that the refrigeration load factor is highest. The average gallons per minute per ton should be calculated from known or estimated water temperatures, because they vary through the season. Maximum water main temperatures are given in Chapter 35, but should always be verified locally. In lieu of this tedious work, the average gallon per minute per ton may be taken as 80 percent of design gallons per minute per ton with reasonable accuracy,

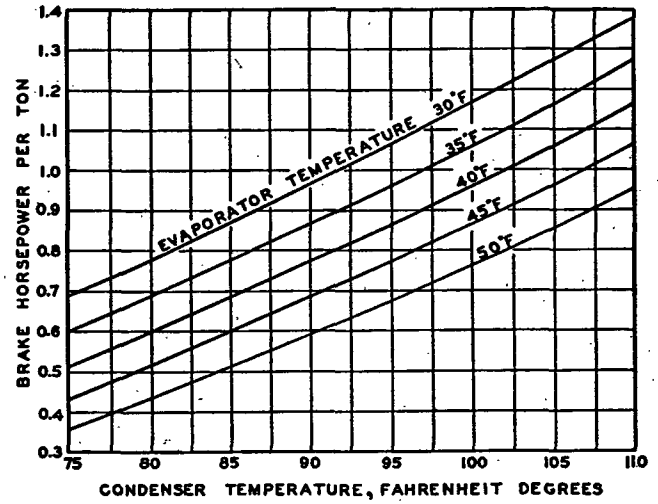


FIG. 1. TYPICAL BRAKE HORSE POWER REQUIREMENTS FOR REFRIGERATION[a]

[a] Values given are representative of "F-12" reciprocating machines of about 25 tons capacity in air conditioning applications. Requirements of smaller machines are usually higher, and for larger machines may be lower. Values shown are for liquid refrigerant at condenser temperature (no subcooling). Subcooling of the liquid may decrease these values approximately 0.3 percent to 0.5 percent for each Fahrenheit degree the liquid temperature is lowered.

for the condition of variable temperature of entering water obtained from rivers and lakes.

When cooling towers or evaporative condensers are used, the windage and evaporation losses are usually between 2 percent and 3 percent of the water circulated.

Heating

The method of estimating fuel consumption to balance the building heat loss is given in Chapter 18. It is important to include the fuel required to heat ventilation air as used in ventilating and air conditioning systems. In estimating fuel consumption for ventilation air, the tendency of the conventional control systems to use less than the estimated quantity of outside air in cold weather should be considered in its effect in lowering fuel consumption. In addition, the heat required to accomplish winter humid-