



Test Number 3.

Register temperature=197.5 deg. fahr. (Draft=0.16 in. and combustion rate=6.5 lb. per sq. ft. of grate.)

$$\begin{array}{l} 452 \times 134 = 60,500 \\ 228 \times 168 = 38,400 \\ 128 \times 243 = 31,000 \end{array}$$

130,000 B.t.u. per hr.

By merely increasing the draft and combustion rate, the register temperature has been raised from 141.2 deg. fahr. to 197.5 deg. fahr., and the heat-capacity has been increased from 58,500 to 130,000 B.t.u. per hr., or an increase of 122 per cent, but the free area through the furnace, and the leader pipe area have remained the same.

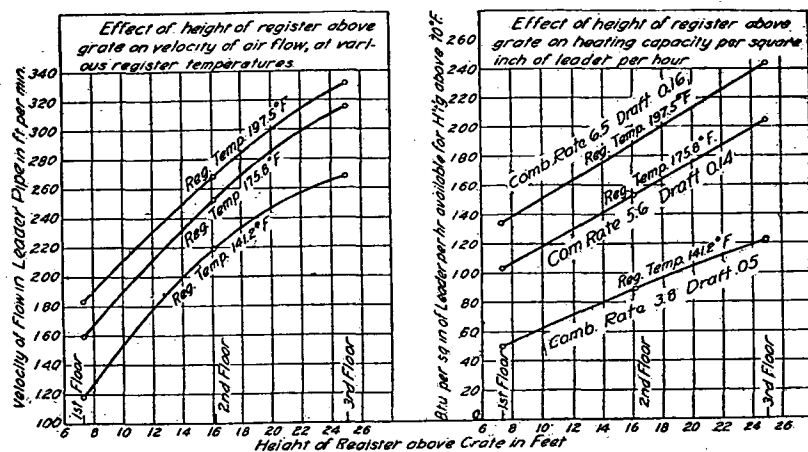


FIG. 47. CHARTS SHOWING EFFECT OF HEIGHT OF REGISTER ABOVE GRATE UPON VELOCITY OF AIR FLOW AND HEATING CAPACITY

It should, therefore, be apparent that the rating of any furnace in square inches of leader pipe area means nothing unless the air temperature at the registers is also definitely stated at the same time. The preceding discussion is in no sense an argument against rating on the free area basis, but rather an argument to show the manufacturer and the installer the vital importance of fixing upon some standard register temperature, so that ratings in square inches of leader pipe area will be definite and can be made comparable and understandable by both the manufacturer and the engineer. The Advisory Committee on Furnace Research of the *National Warm Air Heating and Ventilating Association* has recently approved a maximum register temperature of 180 deg. fahr. for warm air furnace heating systems.

Every manufacturer of warm air furnaces should give this matter his careful consideration for the fixing of the register temperature places a definite maximum rating on each of his furnaces.

GAS HEATING

GAS heating appliances may be divided into two general classes, namely those which discharge their products of combustion indoors and those which discharge their products of combustion outdoors, as follows:

1. Products of Combustion Discharged Indoors

- a. Space Heaters $\begin{cases} (1) \text{ Luminous Flame} \\ (2) \text{ Bunsen Flame} \end{cases} \begin{cases} (a) \text{ Radiant Type} \\ (b) \text{ Convection Type} \end{cases}$
- b. Gas Fired Steam Radiators.

2. Products of Combustion Discharged Outdoors

- a. Localized.....
- (1) Fireplace Heaters
 - (a) Gas Logs
 - (b) Radiant Heaters
 - (2) Vented
 - (a) Gas Fired Steam Radiators
 - (b) Gas Fired Hot-Air Radiators
 - (c) Garage Heaters
 - (d) Stoves
- b. Central Plants
- (1) Hot Air
 - (a) Radiators
 - (b) Furnaces
 - (2) Radiation
 - (a) Hot Water
 - (b) Vapor
 - (c) Steam

Unvented appliances are appropriate only in a limited way. The same is true of vented appliances for localized heating.

Of central heating plants, the choice between the various systems is governed by the same considerations that affect the selection of coal burning apparatus.

EFFICIENCY

The *gross* heating value of a gas is usually referred to in codes of regulatory bodies; most gas men also refer to the *gross* value when designating the heating power of their fuel. It is the basis upon which gas fuel is sold. Yet, some manufacturers of appliances, in rating their product, have taken as a basis the lower *net* heating value. The distinction should be thoroughly understood when comparisons are made.

For example for an Hypothetical gas, having a *gross* heating value of 550 B.t.u. per cu. ft., and a *net* heating value of 500 B.t.u. per cu. ft., and

Material for this section was prepared especially for THE GUIDE 1923 by E. P. Bailey, Jr., Cleveland, and H. C. Eckenroth, San Francisco, Cal. Photos for this section were furnished through the courtesy of C. M. H. Kernchen, Cleveland, and the authors.