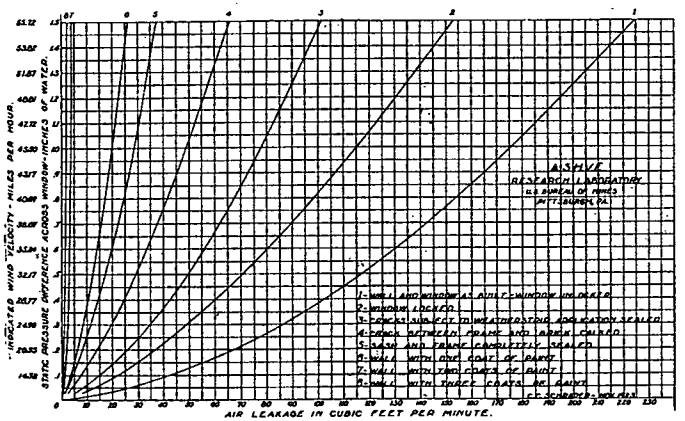


FIG. 1. RESULTS OF TESTS OF LEAKAGE THROUGH VARIOUS PARTS OF WINDOW AND FRAME

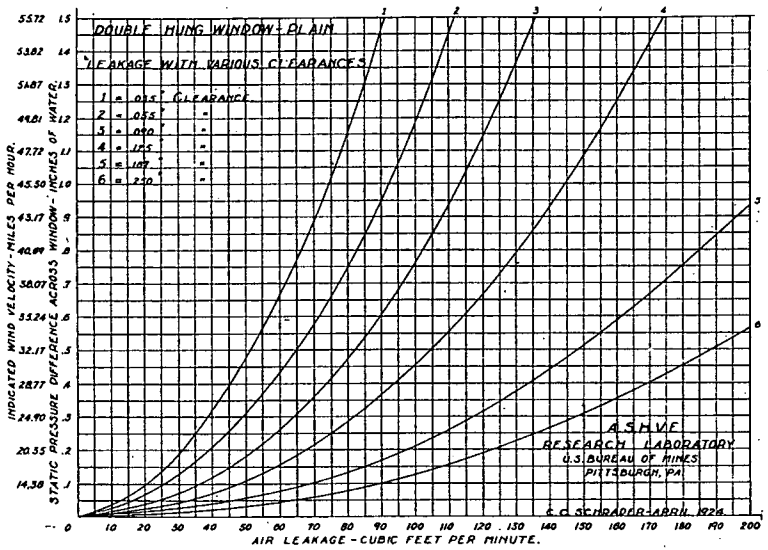


FIG. 2. LEAKAGE THROUGH PLAIN WINDOW WITH VARIOUS CLEARANCES





The measure of heat most commonly accepted in engineering work in the United States of America and Great Britain is the British thermal unit, abbreviated, the B.t.u. and represents the amount of heat required to raise the temperature of one pound of water 1 deg. fahrenheit, abbreviated, fahr. The fahrenheit scale which is commonly used divides temperature between the freezing point of water, 32 deg. and the boiling point 212 deg. into 180 equal parts. In other parts of the world, there is another system used in which the calorie is the common unit of heat, of which one B.t.u. equals 0.252 calories or 1 calorie equals 3.968 B.t.u. Instead of the fahrenheit thermometer, the centigrade system is generally used with the calorie in which the thermometer is divided into 100 equal parts between freezing point and the boiling points of water. To convert centigrade temperature the following method can be used:

9/5 × centigrade temperature plus 32 equals fahr. temperature.

To convert fahr. temperature to the centigrade temperature the following method can be used:

Fahr. temperature minus 32 × 5/9 equals centigrade temperature.

## INFILTRATION

Infiltration losses can be materially reduced by the use of storm doors, and windows, metal weather-stripping on doors and windows, by calking around doors, and casing in frame construction by close fitting tongue and groove strips covered with heavy building paper, and by the use of insulating materials against the sheathing or in combination with the lath and plaster. There are also various manufactured products used as substitutes for lath and plaster that are of value for the foregoing purpose.

Infiltration losses through brick walls are considerable, and still higher through hollow tile walls, due to the many openings and thin mortar bearing points where the ends of tile abutt. Whitten and March (See A. S. H. & V. E. TRANSACTIONS, Vol. 22, 1916, p. 195), show that it is as difficult to heat an exposed room 25 deg. above zero with 25 mile wind velocity as it would be to heat the same room 25 deg. below zero with no wind velocity.

Strong winds seldom prevail at temperatures below 15 deg. above zero. The drop in temperature for each mile wind velocity is given in an accompanying table (see Table 15) and it can be readily seen that this matter of wind velocity must receive careful consideration in planning and designing heating plants that will render efficient service under all conditions of weather.

This cold air entering through the building construction cracks, and crevices, windows, etc., is a load that the heating plant must meet and each installation presents a particular problem in this respect.

The cold air leaking into the room must be heated from the temperature of the outside air to that of the room temperature. One cubic foot of air at zero weighs 0.086 lb., while at 70 deg. 1 cu. ft. of air weighs only 0.075 lb. Therefore, 0.87 cu. ft. of air leakage into a room at 0 deg. becomes 1 cu. ft. of air at the room temperature of 70 deg. The specific heat of air at constant pressure, or the number of heat units