

for moving air than it is for still air. This difference between the effective temperature for still air and for moving air, of any velocity, is the cooling resulting from that velocity. The difference between the dry or wet bulb

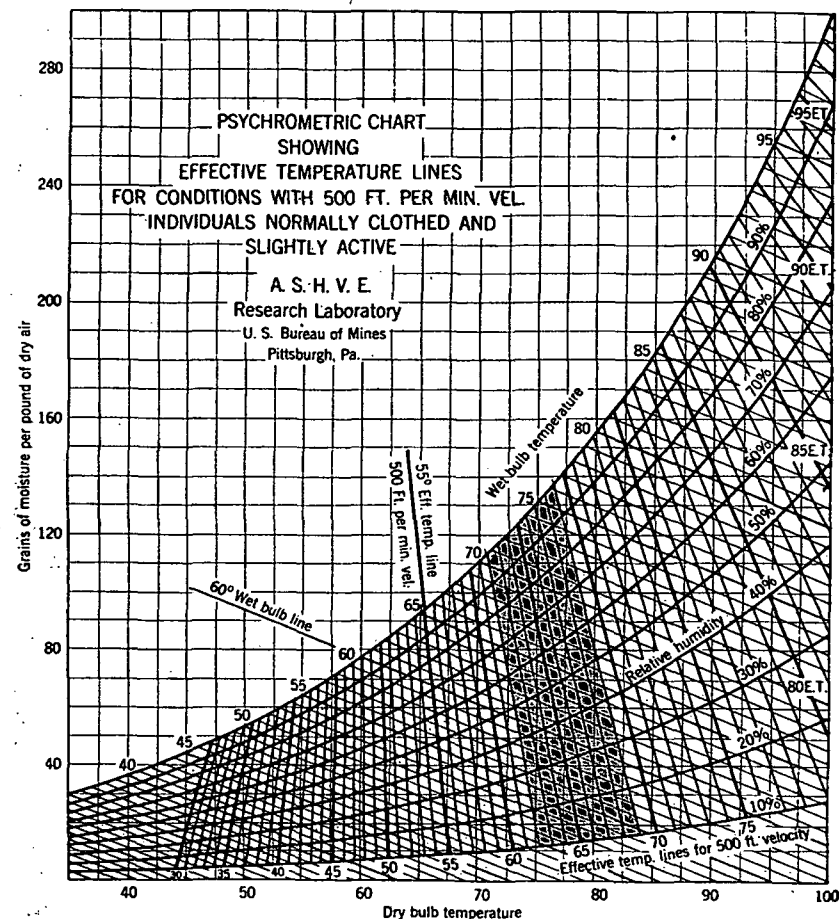


FIG. 4. PSYCHROMETRIC CHART WITH EFFECTIVE TEMPERATURE LINES FOR 500 FT. AIR VELOCITY. (SHADED AREA INDICATES THE COMFORT ZONE)

temperature and the effective temperature at saturation also gives the cooling produced by the velocity for that condition.

The psychrometric chart (Fig. 5) gives the effective temperature lines for still air and for three velocities ranging from 150 to 500 ft. per minute on the same chart. It is of value in giving at a glance the relative cooling effect of different velocities.

THE COMFORT LINE AND THE COMFORT ZONE

That range of effective temperatures over which 50 per cent of people feel comfortable, namely 62 to 69 deg. fahr. is called the *comfort zone*.

That particular effective temperature at which a maximum number of people feel comfortable is called the *comfort line*. While at rest, 97 per cent of people have been found to be comfortable at 64 deg. fahr. effective temperature. Persons working at various rates are most comfortable at effective temperatures below 64 deg. The exact effective temperatures giving maximum comfort for persons working at various rates have not yet been determined by the Research Laboratory, but from the best data available; they are as follows: at rest, 64 deg.; light work, 62 deg.; hard work, 60 deg.

The data given in the charts, Figs. 1 to 5, are for persons normally clothed and differ somewhat from the data contained in earlier editions of THE GUIDE, which data were for persons stripped to the waist.

HEAT DISSIPATED TO THE ATMOSPHERE FROM THE HUMAN BODY

The heat dissipated from the human body is a factor which must be taken into consideration in conditioning air in audience halls. Research at the Laboratory of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS¹ has resulted in the data given in Figs. 6, 7, 8 and 9, which are in convenient form for practical application.

Although total heat loss and sensible and latent heat losses are not exact functions of effective and dry-bulb temperature, respectively, for all conditions of humidity and air motion, they are plotted as such in the curves. This is accomplished by approximations not always rigidly accurate, but sufficiently so for application in most practical problems.

These data are offered for the use of the engineer in solving most of his practical problems. In some instances, however, in particular cases where extreme accuracy is desired, the variation in the data for different atmospheric conditions as given in the complete laboratory report may be taken into consideration.

An atmospheric condition resulting in sensible perspiration is to be avoided for good air conditions. Table 2 gives the approximate effective temperature at which perspiration is noticeable in different degrees by most individuals for 95 per cent and 20 per cent relative humidity.

Problems Involving Heat Dissipated from Human Body

Problem 1-A: How much sensible heat, how much latent heat and how much water vapor will be added per hour to the atmosphere of an auditorium by an audience of 1,000 adults, when the dry and wet bulb temperatures are 75 deg. fahr. and 63.5 deg. fahr., respectively?

Problem 1-B: If the dry and wet bulb temperatures of the auditorium were 85 deg. and 63 deg., respectively, how much heat and moisture would be dissipated to the atmosphere?

Solution—Problem 1-A: From Fig. 7 find the sensible heat loss per person for 75 deg. dry bulb and still air to be 265 B.t.u. per hour. From Fig. 8 find the latent heat loss per person for 75 deg. dry bulb to be 134 B.t.u. per hour and the moisture added to be

¹Heat and Moisture Losses from the Human Body and Their Relation to Air Conditioning Problems, by F. C. Houghten, W. W. Teague, W. E. Miller and W. P. Yant (TRANSACTIONS, A. S. H. V. E., 1929, when published).