HOW TO USE THE COMFORT CHARTS

In the Psychrometric Chart, Fig. 1, dry bulb temperature is plotted as abscissae and grains of moisture per pound of dry air as ordinates. The maximum moisture which the air can hold at various temperatures

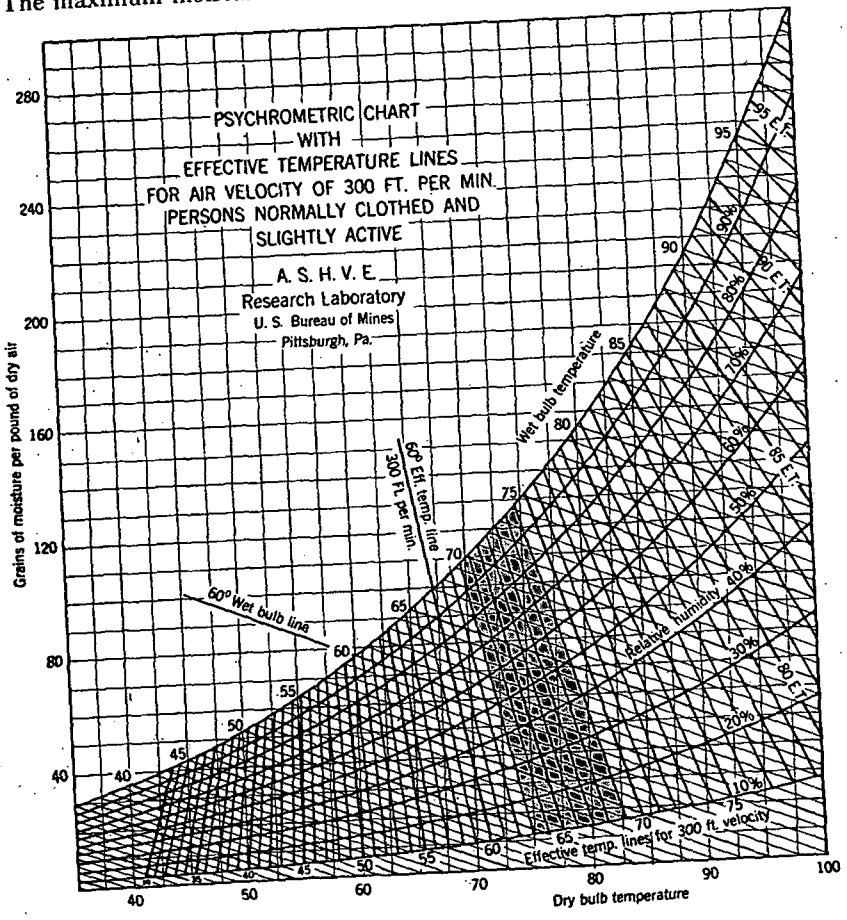

Fig. 3. Psychrometric Chart with Effective Temperature Lines for 300 ft. Air Velocity. Shaded Area Indicates the Comfort Zone

gives the saturation, or 100 per cent relative humidity curve. Relative humidities between 0 and 100 per cent are given by a series of curved lines similar to the saturation curve. The wet bulb temperatures for all atmospheric conditions are given by a series of nearly parallel oblique

lines. Effective temperature is given by a series of oblique but not parallel lines which approach being parallel to the wet bulb lines at high temperatures and humidities, and to the dry bulb lines at low temperatures. The numerical values of the wet bulb and effective temperature lines are given by the dry bulb temperatures at their intersection with the saturation curve.

Dry bulb temperature is the temperature of the air as determined by an ordinary dry bulb mercury thermometer.

Wet bulb temperature is the temperature as determined by a similar thermometer, except with its bulb encased in a fine mesh fabric bag moistened with clean water and whirled through the air until the temperature depression due to the cooling effect of evaporation from the moistened bag reaches equilibrium.

The conditions of comfort as shown by these charts are primarily for winter time conditions in relatively cold climates, and what is hereinafter said relative to these charts pertains to such conditions. The conditions of indoor comfort corresponding to summer time conditions or to conditions in the warmer climates are somewhat different. For data pertaining to this subject see Inside Temperatures, Chapter I, pp. 4.

Wet bulb temperature corresponds to that which a thoroughly wet body will attain if the air passes over it for a sufficient length of time and with a high enough velocity. A person's body is not thoroughly wet and hence does not react entirely in accordance with either the dry or the wet bulb temperature. At high temperatures when the body is moist with perspiration, it reacts more nearly in accordance with wet bulb temperature while at low temperatures when the body is comparatively dry it reacts more nearly in accordance with the dry bulb temperature.

Effective temperature is an experimentally determined scale which unlike the dry bulb and wet bulb scales is a true measure or index of a person's feeling of warmth in all combinations of temperature, humidity, and air motion. In other words, for any one given effective temperature a person will feel the same degree of warmth or coldness regardless of the dry bulb temperature, wet bulb temperature and velocity of the air, required to produce that particular effective temperature.

The psychrometric charts for moving air, Figs. 2, 3 and 4 differ from the chart for still air (Fig. 1) only in that the effective temperature lines for any particular degree do not intersect the dry bulb, wet bulb or dew-point temperature lines at the same degree on the saturation or 100 per cent relative humidity curve but are removed to the right so that the effective temperature for any dry and wet bulb temperature is lower 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 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.