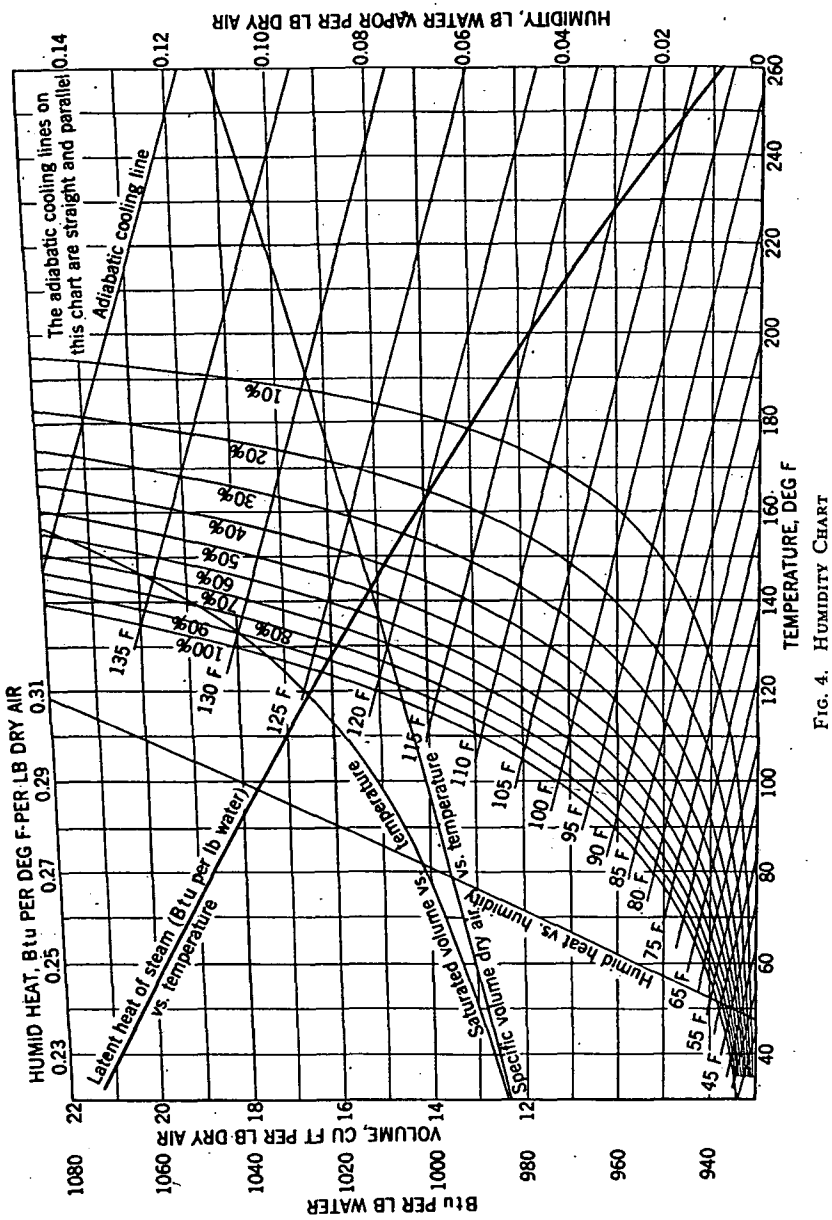

FIG. 4. HUMIDITY CHART

withstand the heat must be used. Metal lined ovens are easy to keep clean, and many high temperature driers up to 1000 F are made of metal panels with insulation between. Care should be taken to avoid *through metal* (metal extending through the oven from inside to out). Batch type ovens are entirely closed while in use and control of air leakage is easily taken care of. In the continuous drier where the ends are open, heat and air leakage becomes important. Warm air leaking out of the ends of ovens means a heat loss, and often the temperature and humidity outside the oven becomes unbearable. For this reason, inclined or bottom entry ovens are used, as the warm air leakage can be more easily controlled. See Figs. 5 and 6.

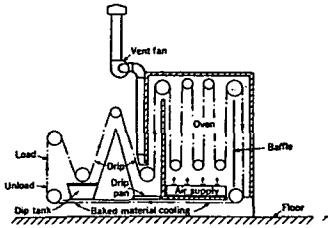

FIG. 5. SMALL PART MULTIPLE PASS OVEN

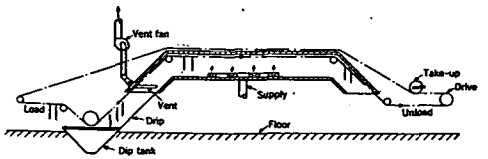

FIG. 6. INCLINED END ENAMELING OVEN

HUMIDITY CHART FOR DRYING WORK

In drying problems the chemical engineer uses different psychrometric values than those used by the heating, ventilating and air conditioning engineer. The humidity chart illustrated in Fig. 4 is based upon values determined from the following explanations:

Humidity (H) is the number of pounds of water vapor carried by one pound of dry air.

Percentage Humidity ($\% H$) is the number of pounds of water vapor carried by one pound of dry air at a definite temperature, divided by the number of pounds of vapor that one pound of dry air would carry if it were completely saturated at the same temperature.

Per Cent Relative Humidity (Φ) is the ratio of weight of water vapor contained in any given volume of air, to the weight of water vapor present in the same volume of saturated air, all values referring to the same temperature.

To convert from one relation to the other,

$$\% H = \frac{29.92 - p_s}{29.92 - p} \times \Phi \qquad (1)$$

where

p_s = vapor pressure of water, inches mercury; at dry-bulb temperature, degrees Fahrenheit.

$p = \Phi\, p_s$.

COMBUSTION

Where products of combustion are used directly in the oven, a knowledge of their formation and heat values is important. The properties of