The safety professional is required to make judgments on the degree of hazard associated with chemical exposures It is his duty, therefore, to obtain information on the fire and health hazards of these chemicals and use it to evaluate and, where necessary, control the exposures

This chapter tabulates the basic physical constants of many common industrial chemicals and lists relative health and fire hazards New chemicals are being introduced and new data on the properties of existing chemicals are constantly being published and revised For this reason, the safety professional should also consult the most up-to-date revisions of the references referred to for each chemical

Using the Table

Recognition

The material in this chapter can be used to determine the degree of fire and health hazards in using a new chemical For example, the safety professional can compare evaporation rates, vapor volumes, and flash points and choose a solvent that combines the lowest volatility and fire and health hazards consistent with process needs

Then too, this tabulation can serve as a means of gaining familiarity with the properties of chemicals—liquids, dusts, gases, vapors, and solids—encountered in the working environment

Evaluation

Also in this chapter is the fundamental information needed for a preliminary evaluation of a chemical hazard The more complex problems, however, require the services of an industrial hygienist

The following is an example in which the degree of health hazard resulting from a solvent exposure is to be evaluated using data from the table in this chapter and Table 38-E, "Threshold Limit Values for 1973," from Chapter 38, "Industrial Toxicology"

Trichloroethylene is being used in a metal-finishing workroom 20 by 10 by 20 ft In an 8-hr workday, 5 gal of the solvent is lost through evaporation There are two air changes per hour Is there a potential health hazard?

Solution· Assuming there is complete mixing of the trichloroethylene throughout the workroom, then

Volume of room = 20 × 10 × 20 = 4000 cu ft

Total volume of air supplied to workroom in 8 hr = 4000 cu ft × 8 hr × 2 changes/hr
= 64,000 cu ft/8-hr day

Vapor volume = 36 cu ft/gal (from table)

Total vapor volume = 36 cu ft/gal × 5 gal = 180 cu ft

Threshold limit value of trichloroethylene (from Table 38-E) = 100 ppm

Total volume of air required to dilute trichloroethylene to threshold limit $= \frac{180 \times 1{,}000{,}000}{100}$
= 1,800,000 cu ft/8-hr day

Therefore, since natural ventilation is supplying only 64,000 cu ft of air per 8-hr day, there is a potential health hazard and additional ventilation is required to maintain the solvent concentration within safe limits

Note that this type of calculation is valid only if the air contaminant is uniformly distributed at a relatively low concentration Where the air contaminant is localized in high concentrations, such as in a paint-spraying operation, more complex means of evaluating the hazard must be used (See details in NSC's *Fundamentals of Industrial Hygiene*)

Control

Data from the table in this chapter can also be used to estimate the amount of exhaust ventilation needed to control an explosion hazard

Example An average of 1 gal of n-heptane per hour is being evaporated in a drying oven Estimate rate of exhaust ventilation needed to prevent an explosive concentration

Solution. Assuming complete mixing of the n-heptane throughout the oven, the rate of ventilation depends on the volume of evap-