SPECIAL TESTS

Blood CN levels may be useful during acute intoxication. Urinary thiocyanate levels have been used but are nonspecific and are elevated in smokers.

PERSONAL PROTECTIVE METHODS

If personal protective equipment is necessary, air supplied or self-contained gas masks specific for hydrogen cyanide, and clothing impervious to HCN vapor should be worn. Eye protection can be provided by fullface respirators or goggles. All personnel working with processes involving cyanides should be specially trained so that they fully understand the hazard, and so they will faithfully follow all rules laid down for safe handling.

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ISOCYANATES

DESCRIPTION

Both toluene diisocyanate (TDI) and methylene bisphenyl isocyanate (MDI) are liquids and may exist in different isomers: 2,4-toluene diisocyanate and methylene bisphenyl 4,4'-diisocyanate. Other less commonly used isocyanates are hexamethylene diisocyanate (HDI) and 1,5-naphthalene diisocyanate (NDI).

SYNONYMS

Toluene diisocyanate: TDI, tolylene diisocyanate, diisocyanatotoluene. Methylene bisphenyl isocyanate: MDI, diphenylmethane diisocyanate, methane diisocyanate.

POTENTIAL OCCUPATIONAL EXPOSURES

TDI is more widely used than MDI. Polyurethanes are formed by the reaction of isocyanates with polyhydroxy compounds. Since the reaction proceeds rapidly at room temperature, the reactants must be mixed in pots or spray guns just before use. These resins can be produced with various physical properties, e.g., hard, flexible, semirigid foams, and have found many uses, e.g., upholstery padding, thermal insulation, molds, surface coatings, shoe innersoles, and in rubbers, adhesives, paints, and textile finishes. Because of TDI's high volatility, exposure can occur in all phases of its manufacture and use. MDI has a much lower volatility, and problems generally arise only in spray applications.

A partial list of occupations in which exposure may occur includes:

Adhesive workers
Insulation workers
Isocyanate resin workers
Lacquer workers
Organic chemical synthesizers
Paint sprayers
Polyurethane makers
Rubber workers
Ship burners
Textile processors
Wire coating workers

PERMISSIBLE EXPOSURE LIMITS

The Federal standard for MDI is 0.02 ppm (0.2 mg/m^3) as a ceiling value. The Federal standard for the 2,4 isomer of TDI is also 0.02 ppm (0.14 mg/mg^3) as a ceiling value. However, the standard recommended in the NIOSH Criteria Document for TDI is 0.005 ppm (0.036 mg/m^3) as a TWA and 0.02 for any 20-minute period.

ROUTE OF ENTRY

Inhalation of vapor.

HARMFUL EFFECTS

Local—

TDI and MDI may cause irritation of the eyes, respiratory tract, and skin. The irritation may be severe enough to produce bronchitis and pulmonary edema. Nausea, vomiting, and abdominal pain may occur. If liquid TDI is allowed to remain in contact with the skin, it may produce redness, swelling, and blistering. Contact of liquid TDI with the eyes may cause severe irritation, which may result in permanent damage if untreated. Swallowing TDI may cause burns of the mouth and stomach.

Systemic—

Sensitization to TDI and MDI may occur, which may cause an asthmatic reaction with wheezing, dyspnea, and cough. These symptoms may first occur during the night following exposure to these chemicals. Some decrease in lung function in the absence of symptoms has been observed in some workers exposed to TDI for long periods of time.

MEDICAL SURVEILLANCE

Preplacement and periodic medical examinations should include chest roentgenograph, pulmonary function tests, and an evaluation of any respiratory disease or history of allergy. Periodic pulmonary function tests may be useful in detecting the onset of pulmonary sensitization.

SPECIAL TESTS

None in common use.

PERSONAL PROTECTIVE METH

Protective clothing and goggles should be worn if there is a possibility of contact with the liquids. In areas of vapor concentration, full-

face masks with organic vapor canisters or respirators with supplied air and fullface pieces should be worn.

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AROMATIC HYDROCARBONS

Aromatic hydrocarbons are characterized by the presence of the aromatic nucleus. The basic aromatic nucleus is benzene, C_6H_6. In benzene, the carbon atoms are arranged as a regular hexagon, with a hydrogen atom attached to each of the carbon atoms. The bond between each of the carbon atoms is neither a single bond nor a double bond, but an intermediate form of higher stability. (The electronic character of the benzene nucleus is usually referred to as "resonance.") The fact that the bonds are intermediate between single and double results in all of the carbon atoms being equivalent. The hydrogen atoms on the aromatic nucleus may be replaced by other univalent elements or groups. Aromatic hydrocarbons encompass compounds that include only carbon and hydrogen.

Aromatic hydrocarbons have enjoyed wide usage as solvents and as chemical intermediates. Benzene, the typical aromatic hydrocarbon, has been replaced as a commercial solvent by toluene and other less toxic compounds. These chemicals are also used as feedstock for many organic compounds and are used in the manufacture of fuels, dyes, pharmaceuticals, plastics, resins, and polyesters.

Typically, the vapor of aromatic hydrocarbons causes central nervous system depression or other effects, and, depending on the compound, hepatic, renal, or bone marrow disorders. Vapor is absorped through the lungs, and the liquid may be absorbed through the skin. Repeated and prolonged skin contact may cause defatting of the skin, which leads to dermatitis.

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BENZENE

DESCRIPTION

C_6H_6, benzene, is a clear, volatile, colorless, highly flammable liquid with a charactersitic odor. The most common commercial grade

OCCUPATIONAL DISEASES

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