UNIVERSITY OF HOUSTON – DOWNTOWN

ENGR 4310 - INDUSTRIAL HYGIENE INSTRUMENTATION

LECTURE NOTE OUTLINE – GASES, VAPORS, AND SOLVENTS
CHAPTER 7

WEEK 5

I. Properties of Gases, Vapors, and Solvents
   - A. Gases
   - B. Vapors
   - C. Solvents
     1. Volatility
     2. Polarity
     3. Solubility
     4. Routes of Exposure
     5. Organic Chemistry

II. Critical Exposure Factors
   - A. Mode of Use
   - B. Potential for Exposure
   - C. Temperature and Volatility
   - D. Concentration
   - E. Reactivity
   - F. Exposure Guidelines

III. Hazards of Gases, Liquids, Solvents, and Vapors
   - A. Gases
   - B. Cryogenic Liquids
   - C. Flammability, Explosions, and Reactivity
     1. Flash Points
     2. Flammable Liquids
     3. Combustible Liquids
     4. Fire Point
     5. Flammable Range
     6. Requirements and Guidelines

IV. Toxicological Effects
   - A. Site of Action
   - B. Asphyxiation
   - C. Organic and Inorganic Gases
   - D. Inorganic Acids and Bases
   - E. Other Aqueous Solutions and Systems
   - F. Solvents and Vapors

V. Physiological Effects
   A. Hydrocarbons
      1. Aliphatic
      2. Cyclic
      3. Aromatic
      4. Halogenated
      5. Nitrohydrocarbons
   B. Oxygen-Containing Functional Groups
      1. Alcohols
      2. Aldehydes
      3. Ketones
      4. Esters
      5. Ethers
      6. Glycols, Glycol Ethers, and Esters
   C. Other Factors

VI. Air Pollution
   A. Criteria Pollutants
   B. Hydrocarbons
   C. Upper Atmosphere Effects
   D. Global Warming

VII. Hazard Evaluation
   A. Chemical and Properties
   B. Evaluation Procedure
      1. Toxicity
      2. Concentration in Breathing Zone
      3. Manner of Use
      4. Duration of Exposure
      5. Controls/Effectiveness
      6. Susceptibilities

VIII. Controls
   A. Responsibility
   B. Process Controls
   C. Engineering Controls
   D. PPE

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LECTURE NOTE OUTLINE – PARTICULATES – CHAPTER 8

WEEK 5

I. Background
   - A. Aerosol
   - B. Nuisance Dusts
   - C. Pneumoconiosis

II. Particle Deposition Mechanisms
   - A. Inertial Impaction
   - B. Interception
   - C. Sedimentation
   - D. Electrostatic Attraction
   - E. Diffusion
   - F. Particle Size Distributions

III. Critical Factors in Exposure
   - A. Chemical and Biological Composition
   - B. Crystalline, Structural, and Isotopic Nature
   - D. Particle Shape
   - E. Particle Size
   - F. Dose
   - G. Pre-existing Health or Genetic Status of Worker
   - H. Concurrent Exposure to Other Toxic Agents

IV. Biological Reactions

V. Sampling and Analysis
   - A. Particulate Matter
   - B. Microbial Sampling
   - C. Radon
   - D. Diesel Exhaust
   - E. Size Selective Particles
   - F. Dual-Phase Monitoring
   - G. Isokinetic Sampling
   - H. Surface Sampling
   - I. Dermal Monitoring