

# Safety, Health, and Environment

George F. Martell

We are grateful to NCEES for granting us permission to copy short sections from the FE Handbook to show students how to use Handbook information in solving problems. This information will normally appear in these videos as white boxes.

# Other Disciplines Specifications

## Safety, Health, and Environment 4–6

- A. Industrial hygiene (e.g., carcinogens, toxicology, SDS, lower exposure limits)
- B. Basic safety equipment (e.g. pressure relief valves, emergency shut-offs, fire prevention and control, personal protective equipment)
- C. Gas detection and monitoring (e.g., O<sub>2</sub>, CO, CO<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>S, Radon)
- D. Electrical safety

Identify this GHS symbol:



- A. Flammable
- B. Pyrophoric
- C. Oxidizer
- D. Explosive

(page 13 in the reference handbook)

**UFL and LFL are based on:**

- A. Volume % in air
- B. ppm
- C. mL
- D. ft<sup>3</sup>

**(page 16 in the reference handbook)**

**If a generator produces a noise pollution of 100 dB at a distance of 10 ft, how far should it be placed from the worksite so that noise abatement is not required during an average 8 hr work day?**

- A. 1 ft
- B. 10 ft
- C. 100 ft
- D. 1000 ft

**Solution (page 26 in the reference handbook):**

90 dB is the maximum level permissible for 8 hours without noise abatement (**note:** hearing conservation program is still required)

The Point Source attenuation formula is:

$$\Delta \text{SPL (dB)} = 10 \log_{10} (r_1/r_2)^2$$

100 dB to 90 dB is a change of 10 dB

$$10 \text{ dB} = 10 \log_{10} (r_1/10)^2$$

$$r_1 = 100 \text{ ft}$$

**If a person were to receive an electrical shock, what current level would be considered the lowest “Perception level”:**

- A. 1 mA
- B. 10 mA
- C. 50 mA
- D. 100 mA

**(page 18 in the reference handbook)**



**When the signal word “Danger-Poison” is used on a pesticide, what toxicity category would this product be placed:**

- A. Non-Toxic
- B. Slightly Toxic
- C. Moderately Toxic
- D. Highly Toxic

**(page 16 in the reference handbook)**

**Which of the following has the lowest acutely lethal dose?**

- A. Alcohol
- B. Morphine
- C. Botulinum toxin (food poison)
- D. Nicotine

**(page 18 in the reference handbook)**

**What is the Threshold Limit Value (TLV) for Ammonia:**

- A. 25 ppm
- B. 50 ppm
- C. 100 ppm
- D. 150 ppm

**(page 19 in the reference handbook)**

**Toluene is a common organic solvent. What is the allowable workplace exposure limit?**

- A. 10 mg/m<sup>3</sup>
- B. 80 mg/m<sup>3</sup>
- C. 100 mg/m<sup>3</sup>
- D. 170 mg/m<sup>3</sup>

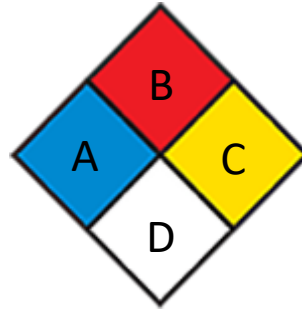
**(page 19 in the reference handbook)**

**A safety data sheet (SDS) must contain all of the following information EXCEPT:**

- A. Handling precautions
- B. First-aid measures
- C. Experiment setup instructions
- D. Hazards

**(page 15 in the reference handbook)**

Identify Position C on the fire/hazard diamond below:



- A. Health
- B. Flammability
- C. Reactivity**
- D. Specific Hazard

(page 12 in the reference handbook)

**According to NFPA and USDOT, at what point is a liquid considered flammable:**

- A. 100 °C
- B. 100 °F
- C. 150 °C
- D. 150 °F

**(page 16 in the reference handbook)**