

Fires, Explosions & Mayhem

1 Hr Presentation

I. Introduction

Combustion/Very Rapid Oxidation. This presentation will focus on the hazards of combustible dusts, combustible/flammable liquids and flammable gases in the workplace. There will be several live chemical demonstrations to illustrate the hazardous nature of these materials.

1. *The States of Matter*

- a. Solids, Liquids, and Gases

II. Dust Explosions: The First Physical State of Matter – Solids

This state of matter represents a large number of common materials most which do not meet the definition of a Flammable Solid yet can readily burn. We will also point out the primary products of combustion.

1. *Applicable OSHA Regulations*

- a. 29 CFR 1910.1000 Table Z-1 Nuisance dusts
- b. 29 CFR 1910.1000 Table Z-3 Mineral dusts (e.g. silica)
- c. 29 CFR 1910.134 Respiratory Protection
- d. 29 CFR 1910.146 Permit-Required Confined Space Entry
- e. 29 CFR 1926.55 Gases, vapors, fumes, dusts and mists
- f. Combustible dusts – National Emphasis Program 3/11/2008

III. Combustible/Flammable Liquids: The Second Physical State of Matter – Liquids

Combustible/Flammable Liquids represent the most common materials we think of as flammable substances. Combustion of liquids is still an oxidation process but it requires that the fuel first vaporize prior to ignition. We will explain the difference between combustible and flammable liquids and demonstrate the hazards of a few selected flammable liquids.

1. *Applicable OSHA Regulations*

- a. 29 CFR 1910.106 Flammable and combustible liquids
- b. 29 CFR 1910.107 Spray finishing using flammable and combustible materials
- c. 29 CFR 1910.119 Process safety management of highly hazardous chemicals
- d. 29 CFR 1910.120 Hazardous waste operations and emergency response
- e. 29 CFR 1910.1200 Hazard communication
- f. 29 CFR 1910.125 Additional requirements for dipping and coating operations that use flammable or combustible liquids
- g. 29 CFR 1926.152 Flammable and combustible liquids

IV. The Third Physical State of Matter – Gases

Gases are all around us and may be Flammable, Non-flammable, Toxic, Non-Toxic, Corrosive, inert or a combination of these properties. We will demonstrate several of the physical/chemical properties of gases in this segment.

1. *Applicable OSHA Regulations*

- a. 29 CFR 1910.101 Compressed gases (general requirements)
- b. 29 CFR 1910.102 Acetylene
- c. 29 CFR 1910.103 Hydrogen
- d. 29 CFR 29 CFR 1910.104 Oxygen
- e. 29 CFR 1910.110 Storage and handling of liquefied petroleum gases
- f. 29 CFR 1910.111 Storage and handling of anhydrous ammonia
- g. 29 CFR 1926.153 Liquefied petroleum gas (LP-Gas)
- h. 29 CFR 1926.350 Gas welding and cutting