Flammable & Combustible Liquids

Introduction to Flammable & Combustible Liquids

- There are two primary hazards associated with flammable and combustible liquids—explosion and fire.

- OSHA has standards concerning the handling, storage, and use of flammable and combustible liquids with a flash point below 200°F.
  - The standards address the primary concerns of design and construction, ventilation, ignition sources, and storage

Terminology

- **Boiling Point** - The point at which a liquid boils when at a pressure of 14.7 pounds per square inch absolute (psia). At temperatures above the boiling point, the pressure of the atmosphere can no longer hold the liquid in the liquid state and bubbles begin to form. The lower the boiling point, the greater the vapor pressure at normal ambient temperatures and consequently the greater the fire risk.
- **Closed Container** - A container (any can, barrel, or drum) so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.
- **Combustible Liquid** - Any liquid having a flash point at or above 100°F (37.8°C).

Terminology (cont'd)

- **Fire Area** - An area of a building separated from the remainder of the building by construction having a fire resistance of at least 1 hour. All communicating openings to the area should be properly protected by an assembly having a fire resistance rating of at least 1 hour.
- **Flammable Liquid** - Any liquid having a flash point below 100°F (37.8°C), except any mixture having components with flashpoints of 100°F (37.8°C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.
- **Flash Point** - The minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. The flash point is normally an indication of susceptibility to ignition.

Combustible Liquids

There are three main classes of liquids—Class I, Class II, and Class III.

- Class I Liquids - Flammable liquids that are divided into three subclasses: IA, IB, and IC.
- Class II and III Liquids – Combustible liquids. Class III liquids are divided into two subclasses: IIIA and IIIB.

Combustible Liquids

- **70°F**
  - **Flammable**

	Flash Point	**Boiling Point**
Class IA	Below 73°F (22.8°C)	Below 100°F (37.8°C)
Class IB	Below 73°F (22.8°C)	At or above 100°F (37.8°C)

- **90°F**
  - **Flammable**

	Flash Point
Class IC	At or above 73°F (22.8°C) and less than 100°F (37.8°C)

Combustible Liquids

- **130°F**
  - **Combustible**

	Flash Point
Class II	At or above 100°F (37.8°C) and below 140°F (60°C) *Exceptions:* Any mixture having components with flash points of 200°F (93.3°C) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

- **140°F**
  - **Combustible**

	Flash Point
Class IIIA	At or above140°F (60°C) and below 200°F (93.3°C) *Exceptions:* Any mixture having components with flash points of 200°F (93.3°C) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

Combustible Liquids

- **200°F**
  - **Combustible**

	Flash Point
Class IIIB	At or above 200°F (93.3°C)

Flammable (Explosive) Limits

When vapors of a flammable or combustible liquid are mixed with air in the proper proportions in the presence of a source of ignition, rapid combustion or an explosion can occur.

- The proper proportion is called the flammable range (also often referred to as the explosive range)

Flammable (Explosive) Limits

The boundary-line mixtures of vapor with air are known as the upper and lower flammable limits (UFL or LFL) and they are usually expressed in terms of percentage by volume of vapor in the air.

Safe Use of Flammable & Combustible Liquids

A good plan for safe use of flammable and combustible liquids contains at least these components:

- Control of ignition sources (Always provide adequate ventilation to reduce the potential for ignition of flammable vapors.)
- Proper storage
- Fire control
- Safe handling

Safe Use of Flammable & Combustible Liquids

- When handling flammable and combustible liquids, you must take adequate precautions to prevent ignition of flammable vapors.
- Some sources of ignition include:
  - Open flames
  - Smoking
  - Static electricity
  - Cutting and welding
  - Hot surfaces
  - Electrical and mechanical sparks
  - Lightning