Flammable and Combustible Liquids – Explained



What's at Stake?

Flammable and combustible liquids are present in most workplaces. Common liquids you're likely familiar with at both work and at home include gasoline and diesel fuel, solvents, thinners, cleaners, paints, polishes, and adhesives.

What's the Danger?

When used and stored properly these liquids rarely present a problem. But, when that's not the case, the results can be catastrophic.

How to Protect Yourself

Being knowledgeable when it comes to common terms and key concepts related to flammable and combustible liquids is one of the best ways to protect yourself.

1. What are flammable and combustible liquids?
   a. Flammable and combustible liquids are liquids that can burn.
   b. They are classified by their flashpoints.
   c. Flammable liquids have a flashpoint below 100°F (37.8°C).
   d. Combustible liquids have a flashpoint at or above 100°F (37.8°C) and below 200°F (93.3°C).
2. What is a flashpoint and why is it important?
   a. The flashpoint of a liquid is the lowest temperature at which the liquid gives off enough vapor at the
   surface of the liquid to start burning (be ignited).
   b. In addition to distinguishing flammable liquids from combustible liquids, knowing the flashpoint
   will alert you to when conditions are more favorable for a liquid to ignite.
3. What is an auto-ignition temperature?
   a. The auto-ignition temperature of a substance is the temperature at or above which a material
   will spontaneously ignite (catch fire) without an external spark or flame.
   b. At the auto-ignition temperature, the temperature alone provides sufficient energy to induce combustion.
   c. Most common flammable and combustible liquids have auto-ignition temperatures in the range

of 572°F (300°C) to 1022°F (550°C).

4. Does the flammable or combustible liquid itself burn?
   a. Flammable and combustible liquids themselves do not burn. It is the mixture of their vapors and
   air that burns.
   b. Example 1: Gasoline is a flammable liquid with a flashpoint of -40°F (-40°C), which means that even
   at temperatures as low as -40°F (-40°C), it gives off enough vapor to form a burnable mixture in air.
   c. Example 2: Phenol is a combustible liquid with a flashpoint of 175°F (79°C), so it must
   be heated above that temperature before it can be ignited in air.
5. What are flammable or explosive limits?
   a. There is a minimum concentration of gas below which a flammable or combustible gas will
   not ignite and an upper concentration above which the air will be “too rich” to ignite.
   b. These boundary lines are known as the upper and lower explosive (or flammable) limits. They
   are usually expressed as a percentage.
   * The minimum concentration of a gas or vapor necessary for it to combust in air is defined
   as the lower explosive limit or lower flammable limit (LEL or LFL).
   * The maximum concentration of a gas or vapor that will allow it to burn in air is the upper
   explosive limit or upper flammable limit (UEL or UFL).
   c. Every combustible gas or vapor has a specific range of fuel to oxygen mixture during which it will
   ignite. The flammable range for every gas or vapor is the range between the LEL and UEL.
   d. Example: Hydrogen has an LEL of 4%. This means if the atmosphere has less than 4.0% hydrogen,
   an explosion cannot occur even if a source of ignition is present.

Final Word

Stay safe by understanding and respecting the conditions and limits of flammable and combustible liquids.