

Lesson Plan
General Industry Training Program (10-hour)

Topic: Flammable and Combustible Liquids

Overview of the OSHA Standard

This standard applies to the handling, storage and use of flammable and combustible liquids with a flash point below 200⁰ F. There are two primary hazards associated with flammable and combustible liquids: explosion and fire. In order to prevent these hazards, this standard addresses the primary concern of design and construction, ventilation, ignition sources and storage.

Step 1: Planning the Lesson

• **Instructional Materials.**

1. PowerPoint presentation
2. Instructor notes.
3. Other materials.

• **Instructional Objectives.**

1. Complete the required topics for the OSHA 10-hour course.
2. Complete the following optional topics:
 - a.
 - b.
 - c.
3. Present *Flammable and Combustible Liquids* to [number] participants.
4. Incorporate active participation in each lesson.
5. Provide a quiz or short evaluation at the end of the course.
6. Ensure feedback from participants at various points in the training.

• **Guest Speakers/Presenters and Topics/Responsibilities.**

Step 2: Presenting the Lesson

• **Lesson Introduction**

Introductory remarks or transition from previous lesson.

• **Learning Objectives/Outcomes.**

Upon completion of the lesson, participants will be able to:

1. Define **flash point**, **flammable liquid**, and **combustible liquid**.

Possible responses.

- The **flash point** is the minimum temperature at which a liquid gives off enough vapor to form an ignitable mixture.
- **Flammable liquids** have flash points below 100⁰ F.
- **Combustible liquids** have flash points at or above 100⁰ F.

• **Learning Objectives/Outcomes (Continued)**

2. Explain at least 2 ways to avoid explosion or fire from flammable or combustible liquids.

Possible responses.

- Practice safe handling, storage, fire control and ventilation.
- Ensure flammables and combustibles are properly stored.
- Always handle and transfer flammable or combustible liquids using proper containers; or through proper transfer systems that employ a safety faucet, a safety pump, or a closed piping system.

3. List 4 potential sources of ignition for flammable and combustible liquids.

Possible responses.

- open flames
- smoking
- static electricity
- cutting and welding
- hot surfaces
- electrical and mechanical sparks
- lightning

4. Identify at least 2 actions that apply to each of the 4 components of a good plan for safe use of flammable and combustible liquids.

Possible responses.

- Control of Ignition Sources
 - a. Identify sources of ignition.
 - b. Always use bonding and grounding when transferring flammable liquids into/from containers.
 - c. Always provide adequate ventilation to reduce the potential for ignition.
- Proper Storage
 - a. Identify compatible chemicals.
 - b. Isolate and separate incompatible materials.
 - c. Ensure storage doesn't limit safe egress.
 - d. Store in proper area, cabinet, or container.
 - e. Label storage areas/cabinets.
 - f. Store waste and residue in covered containers and dispose of daily.

• **Learning Objectives/Outcomes (Continued)**

- Fire Control
 - a. Ensure proper hoses, fire extinguishers or other fire control devices are available where flammable or combustible liquids are stored.
 - b. Do not permit flames or smoking in areas where flammable or combustible liquids are stored.
 - c. Store materials that react with water in a room separate from flammable and combustible liquids.

- Safe Handling
 - a. Transfer by means of a safety pump.
 - b. Transfer by gravity through an approved self-closing safety faucet.
 - c. Transfer through a closed piping system.
 - d. Transfer from safety cans.

• **Planned Activities, Discussion or Participant Interaction.**

Step 3: Evaluating Student Learning and Instruction

• **Lesson Evaluation and Comments.**

References

OSHA Standard

- 29 CFR 1910.106 Subpart H – Flammable and Combustible Liquids (1910.106)
 - http://www.osha-slc.gov/OshStd_data/1910_0106.html

OSHA Publications

- <http://www.osha-slc.gov/OshDoc/Additional.html>
- 3088 How to Prepare for Workplace Emergencies

OSHA References/Resources

- OSHA’s Small Business Outreach Training Program, Flammable and Combustible Liquids
 - <http://www.osha-slc.gov/SLTC/smallbusiness/sec8.html>
- OSHA Technical Links – Ventilation
 - <http://www.osha-slc.gov/SLTC/ventilation/index.html>
- Self-Inspection Checklists
 - <http://www.osha-slc.gov/SLTC/smallbusiness/chklist.html#Flammable>