# Workplan: Flammable and Combustible Liquids

Flammable and combustible liquids can create a fire and explosion risk. Fortunately, most of the risk can be eliminated through careful use, storage, and disposal. This Workplan sets out a strategy you can implement over a 30-day period (and beyond) to prevent flammable and combustible liquid fires, fatalities, injuries and costly citations.

**Step One: Perform Hazard Assessment (Day 1-5)**

The first step is to identify and evaluate the use of flammable and combustible liquids in your workplace. Methods to use include:

1. Identifying and inventorying all flammable, combustible or explosive substances in the workplace.
    - Flammable and combustible liquids are chemicals and under WHMIS and HAZCOM standards, an employer is responsible for developing, maintaining, and always knowing, what hazardous products are in the workplace and in what amount.
2. Identifying all ignition sources.
    - Anything that can cause flammable, combustible or explosive substances to ignite.
3. Identifying all work operations involving the use of flammable and combustible liquids.
4. Evaluating how these materials are used, handled and stored and observing workers performing these operations.
    - Are safe work procedures being used?
    - Do safe work practices need to be updated or created?
    - PPE – is the correct PPE being worn and is it being worn correctly?
5. Interviewing workers and supervisors to find out more about how liquids are being used and stored.
6. Identifying other hazards, such as:
    - Fire safety aspects of storage, e.g., flammable and combustible liquids not stored near exits or in offices.
    - Improper use of storage containers, missing or damaged labels, failure to use approved safety cans; failure to properly use flammable storage cabinets, etc.
7. Evaluating current alarm and notification equipment in the event of a spill, leak, ventilation system issues.
8. Evaluating the effectiveness of current fire safety and spill response procedures.
9. Evaluating whether adequate fire extinguishers and spill cleanup materials are

on hand.
    - Have workers been trained on how to use fire extinguishers?
    - Have workers been trained how to report spills, safely clean up spills and dispose of spill clean up waste?
10. Reviewing written records of worker complaints or safety committee recommendations involving the use or storage of flammable and combustible liquids.

**Implementation Strategy**: In carrying out your hazard assessment, be on the lookout for the risk factors that can cause hazards, including:

1. Unsafe use, storage, and handling of flammable, combustible or explosive substances.
2. Hot work and other potentially spark or flame-inducing processes.
3. Proximity of hazardous liquids to heat or ignition sources.
4. Areas where accumulation of fumes or vapors are or are probable. i.e. confined spaces, storage areas.
5. Unlabeled containers, open containers or containers missing lids.
6. Amount of liquids on site that are over allowable amounts. Check storage rooms, flammable cabinets, and other designated storage areas.
7. Failure to use flammable cabinets for storage. i.e. paints, solvents, etc. that are being stored on work benches, regular shelving, etc.
8. Accumulations of dangerous debris such as oily rags.
9. Failure of workers to follow good housekeeping practices.
10. Lack of flammable and combustible liquids awareness on the part of workers.

**Step 2: Implement corrective actions to reduce or eliminate the hazards. (Day 6-15)**

Incorporate and implement a plan for the safe use, handling, and storage of flammable and combustible liquids. It can be part of your fire prevention plan or a separate policy/plan. The plan must be available for workers to review.

Additionally, the plan must describe the measures used for the safe use, handling, and storage of flammable and combustible liquids.

Eliminating a hazard (i.e. substitution of safer liquids or process change) is always the safest action to take, but this is often simply not possible.

When this is the case you do your best to manage and control the risk. In order of regulatory preference here are three ways to accomplish this:

***Level 1: Engineering Controls***: Start with engineering controls or mechanical equipment and systems that do something to physically minimize the hazards posed by these liquids. Engineering controls might include:

- Installation of HVAC and ventilation systems in buildings and chemical storage areas.
    - Ensure processes that use or make flammable materials do not exhaust back in the work site.
    - Ensure equipment, such as spray booths, where flammable materials are used, are exhausted outside of the building, and away from air intakes.
- Building design features that reduce the risk of fires, i.e. use of fireproof materials; storage areas designed to contain spills and slow the spread of a fire.
- Installation/use of non-sparking electrical equipment in chemical storage spaces and removal of other possible ignition sources.
- Installation of fire alarms, smoke detector, sprinklers, and other fire suppression systems.
- Furnishing portable fire extinguishers and other firefighting equipment in/near hazardous liquid storage areas. Check with fire and building code standards for specifics of quantity and location.

Note: Your engineering controls must meet the safety standards set out in federal, provincial, and state regulations and local building and fire codes.

***Level 2: Work/Administrative Controls***: The next layer of hazard control is the use of safe work practices and/or administrative controls. These controls deal with how work operations are carried out. These controls often must meet at lease a minimum of certain regulations and fire/building codes, including:

- Controlling Ignition Sources
    - Identify ignition sources.
    - Don’t place ignition sources (hot materials, flames, or sparking equipment) in the general vicinity of these liquids. If possible, replace open flames by electrical heating.
    - Ground equipment likely to produce a static spark, i.e. whenever liquids are transferred from one container to another, both containers must be bonded and grounded to dissipate static electricity.
    - Use adequate ventilation to reduce vapor buildup.
- Proper Storage
    - Keep only the amount needed on site and only the amount needed for a task at work locations.
    - Ensure all stored containers, storage cabinets, and storage areas are in good condition, closed and properly labeled or marked.
    - Identify compatible/incompatible materials – isolate and separate incompatibles.
    - Store waste and residue in covered containers and dispose of daily, i.e. oily rags must be kept in a covered metal container and emptied daily.
- Safe Use and Handling
    - Use flammable/combustible liquids in a fume hood to prevent buildup of ignitable vapor/air mixtures or inhalation of toxic vapors or gases.
    - Transfer liquids:
        - By means of a safety pump.
        - By gravity through an approved self-closing safety faucet.
        - Through a closed piping system.
        - From safety cans.
    - Fire Control
        - Implementation of an emergency evacuation and action plan for responding to spills, fires and other workplace emergencies.
        - Don’t permit flames or smoking in or near areas where flammable/combustible liquids are stored or used.
        - Store materials that react with water in a different room from flammable/combustible liquids.

***Level 3: PPE & Protective Clothing***: When a hazard cannot be eliminated or reduced to a safe level then you must provide workers with the right PPE. Use the Safety Data Sheet or label, manufacturer instructions, regulations or industry best practices to determine what PPE is required. Typical PPE includes:

- Safety glasses/goggles
- Face shield
- Gloves
- Respirators
- Protective aprons

**Implementation Strategy**: Engineering, work controls and PPE are not mutually exclusive, i.e., not either-or, and should be used in combination with each other.

**Step Three: Provide Flammable and Combustible Liquids Training (Day 16-20)**

The next step is to provide training to workers. At a minimum, training should provide a review of your Flammable/Combustible Liquids plan, including these 12 items:

1. Major hazards they are exposed to.
2. Methods used to control those hazards.
3. Safe work practices to follow to control each hazard.
4. Housekeeping requirements they're expected to meet.
5. How to check their work areas for hazards and protocol to follow when hazards are found.
6. Other general use, storage, and handling information and education.
7. Required PPE and protective clothing and how to use/care/store/dispose of it.
8. Safe way to clean up small spills – and explain what defines "small".
9. Alarm and detection systems in place to warn of fires, spills, or leaks.
10. How to report a fire, spill, or other emergency.
11. The firefighting equipment necessary to control fire hazards.
12. The fire emergency and evacuation procedure.

You must also have a program to educate workers on general principles of fire extinguisher use and the hazards of "incipient stage firefighting," i.e., fighting fires capable of being controlled or extinguished by portable fire extinguishers in their early stage without the need for protective clothing or respiratory protection. Most regulations require fire extinguisher training be provided to workers expected to use extinguishers when they're first hired and at least every year after that.

**Implementation Strategy**: Use training programs and resources, such as those offered by SafeSupervisor and SafetyNow, to deliver effective and compliant safety training. Keep in mind that simply providing training isn't enough. You must also ensure that workers understand and can apply their training on the job. Methods of verifying the effectiveness of training include:

- Quizzing workers on the lesson after you deliver it. (Quizzes are included in all SafeSupervisor/SafetyNow "Meeting Kits" and e-Learning courses.)
- Making workers demonstrate the safe work procedures covered during the training.
- Making workers demonstrate proper use of the PPE covered during the training.
- Observing workers on the job to ensure they're following their training.

**Step Four: Inspect, Monitor, Reinforce and Improve (Day 21-30 and forever after)**

The final step is to monitor hazard controls and safety measures to see if they're effective and determine if changes or corrective actions are necessary. Monitoring should also include reviewing training records, observing employees at work and helping when needed.

**Implementation Strategy**: Monitoring must be done on an ongoing and regular basis. For example, storage areas, storage cabinets, and containers should be part of monthly work inspections and scheduled safety audits, and in response to red flags like:

- Worker complaints.
- Incident and injuries.
- Changes to operations, equipment, personnel, etc. that weren't accounted for or anticipated in the previous hazard assessment.