



SCOR

SAFETY COMPLIANCE FOR OSHA REGULATIONS

A Cottingham & Butler Program

Fire Prevention Plan

Subpart E 29 CFR 1910.39



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LEARNING OBJECTIVE

Provide general guidelines on how to develop and implement an effective written fire prevention program.



OVERVIEW

- Requirements of a Fire Prevention Plan
- Fire Prevention Plan Procedures
- Hazardous Materials
- Hot work (welding, cutting, grinding)
- Summary

POLL

A written fire prevention plan must include?

- a) A list of all potential fire hazards in your facility
- b) Proper handling and storage procedures for hazardous materials
- c) The type of fire protection equipment necessary to control each major hazard
- d) All of the above

FIRE PREVENTION PLAN REQUIREMENTS

- Must be in writing,
- Be kept in the workplace, and
- Be made available to employees for review
- Employer with 10 or fewer employees may communicate the plan orally to employees



FIRE PREVENTION PLAN PROCEDURES

- A list of all major fire hazards,
- Proper handling and storage procedures for hazardous materials,
- Potential ignition sources and their control, and
- The type of fire protection equipment necessary to control each major hazard;



FIRE PREVENTION PLAN PROCEDURES (CONT.)

- Procedures to control accumulations of flammable and combustible waste materials



Cans of paint left open, not stored or disposed of

FIRE PREVENTION PLAN PROCEDURES (CONT.)

Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials



FIRE PREVENTION PLAN PROCEDURES (CONT.)

- Employees responsible for maintaining equipment to prevent or control sources of ignition or fires
- The name or job title of employees responsible for the control of fuel source hazards



EMPLOYEE INFORMATION

- An employer must inform employees upon initial assignment to a job of the fire hazards to which they are exposed
- An employer must also review with each employee those parts of the fire prevention plan necessary for self-protection



FLAMMABLE LIQUIDS

- The two primary hazards associated with flammable liquids are *explosion* and *fire*
- Safe handling and storage of flammable liquids requires the use of approved equipment and practices per OSHA standards



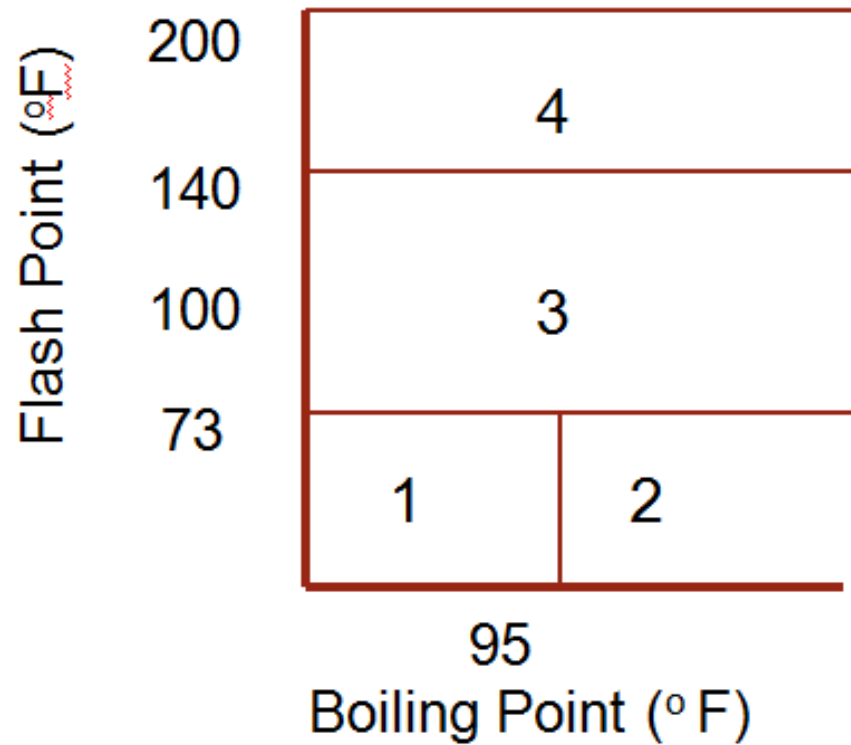
FLASH POINT

- Flash point means the minimum temperature at which a liquid gives off enough vapor to form an ignitable mixture

In general, the lower the flash point, the greater the hazard

- Flammable liquids have flash points below 200oF. The different classes of flammable liquids helps us determine storage requirements.

CLASSES OF FLAMMABLE AND COMBUSTIBLE



CLASSES OF COMMON FLAMMABLE LIQUIDS

	Common Name	Flash Point (° F)	Boiling Point
CLASS 1	Propane	-103	-44
	MEK	22	79.6
CLASS 2	Gasoline	-45	100-400
	Acetone	-4 to 15.8	134
	Isopropyl Alcohol	54	181
CLASS 3	Diesel	>125	325-700
	Kerosene	100.4	>300

PROGRAM COMPONENTS

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

- Control of ignition sources
- Proper storage
- Fire control
- Safe handling

SOURCES OF IGNITION

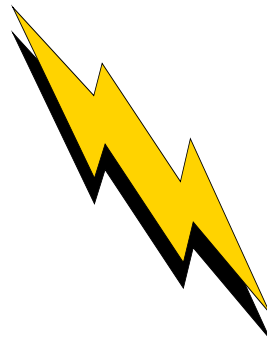
Must take adequate precautions to prevent ignition of flammable vapors.
Some sources of ignition include:

- Open flames
- Smoking
- Static electricity
- Cutting and welding
- Hot surfaces
- Electrical and mechanical sparks
- Lightning



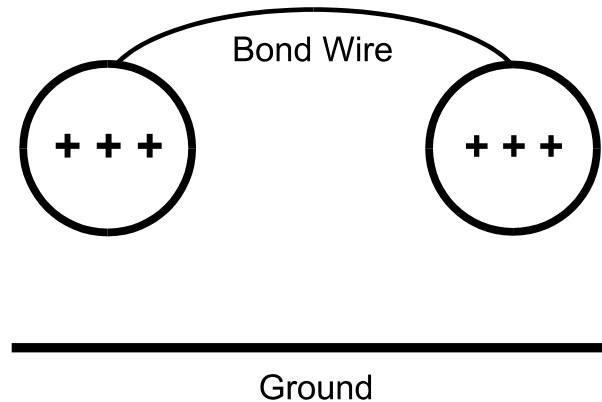
STATIC ELECTRICITY

- Generated when a fluid flows through a pipe or from an opening into a tank
- Main hazards are fire and explosion from sparks containing enough energy to ignite flammable vapors
- Bonding or grounding of flammable liquid containers is necessary to prevent static



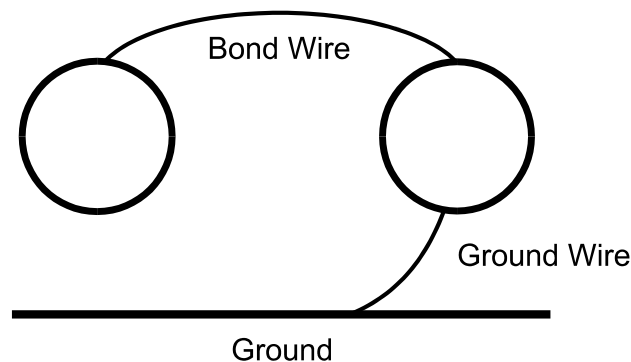
BONDING

- Physically connect two conductive objects together with a bond wire to eliminate a difference in static charge potential between them
- Must provide a bond wire between containers during flammable liquid filling operations, unless a metallic path between them is otherwise present



GROUNDING

- Eliminates a difference in static charge potential between conductive objects and ground
- Although bonding will eliminate a difference in potential between objects, it will not eliminate a difference in potential between these objects and earth unless one of the objects is connected to earth with a ground wire



VENTILATION

Always provide adequate ventilation to reduce the potential for ignition of flammable vapors.

STORAGE FUNDAMENTALS

Identify incompatible chemicals – check the Safety Data Sheet Isolate and separate incompatible materials

- Isolate by storing in another area or room
- Degree of isolation depends on quantities, chemical properties and packaging
- Separate by storing in same area or room, but apart from each other

STORAGE OF FLAMMABLE LIQUIDS

Storage must not limit the use of exits, stairways, or areas normally used for the safe egress of people

In office occupancies:

- Storage prohibited except that which is required for maintenance and operation of equipment
- Storage must be in:
 - closed metal containers inside a storage cabinet, or
 - safety cans, or
 - an inside storage room



Inside storage room

SAFETY CANS FOR STORAGE AND TRANSFER

- Approved container of not more than 5 gallons capacity
- Spring-closing lid and spout cover
- Safely relieves internal pressure when exposed to fire



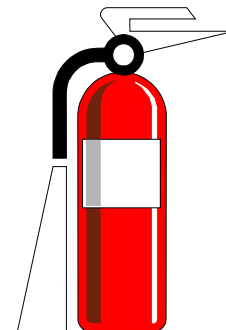
STORAGE CABINETS

- Not more than 60 gal of Class 1, 2, or 3 liquids, or not more than 120 gal of Class 4 liquids permitted in a cabinet
- Must be conspicuously labeled, “Flammable - Keep Fire Away”
- Doors on metal cabinets must have a three-point lock (top, side, and bottom), and the door sill must be raised at least 2 inches above the bottom of the cabinet



FIRE CONTROL

- Suitable fire control devices, such as small hose or portable fire extinguishers must be available where flammable or combustible liquids are stored
- Open flames and smoking must not be permitted in these storage areas
- Materials which react with water must not be stored in the same room with flammable or combustible liquids



TRANSFERRING OF FLAMMABLE LIQUIDS

Since there is a sizeable risk whenever flammable liquids are handled, OSHA allows only four methods for transferring these materials:

- Through a closed piping system
- From safety cans
- By gravity through an approved self-closing safety faucet
- By means of a safety pump

SELF-CLOSING SAFETY FAUCET

- Bonding wire between drum and container
- Grounding wire between drum and ground
- Safety vent in drum



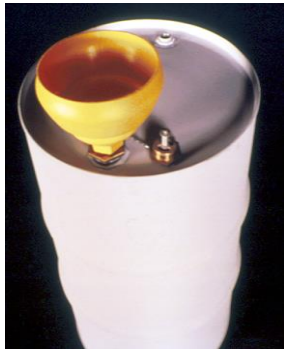
SAFETY PUMP

- Faster and safer than using a faucet
- Spills less likely
- No separate safety vents in drum required
- Installed directly in drum bung opening
- Some pump hoses have integral bonding wires



WASTE AND RESIDUE

Combustible waste and residue must be kept to a minimum, stored in covered metal receptacles and disposed of daily.



Waste Drum with disposal funnel



Safety Disposal can



Oily waste can (Self-closing lid)

SAFE HANDLING FUNDAMENTALS

- Carefully read the manufacturer's label on the flammable liquid container before storing or using it
- Practice good housekeeping in flammable liquid storage areas
- Clean up spills immediately, then place the cleanup rags in a covered metal container
- Only use approved metal safety containers or original manufacturer's container to store flammable liquids
- Keep the containers closed when not in use and store away from exits or passageways
- Use flammable liquids only where there is plenty of ventilation
- Keep flammable liquids away from ignition sources such as open flames, sparks, smoking, cutting, welding, etc.

WELDING HAZARDS

- Toxic gases, fumes and dusts
- Burning eyes, dizziness, nausea, pulmonary function problems
- Zinc – metal fume fever
- Fire hazards
- Metal splatter
- Electric shock
- Explosion hazards



GENERAL SAFE WORK PRACTICES

- Use a platform with toeboards when working from elevated surfaces
- Protect workers from stray sparks or slag in areas below elevated work surfaces



GENERAL SAFE WORK PRACTICES (CONT.)

- Warn others of hot metal by marking work areas
- Keep floor areas clear of electrodes and/or electrode stubs
- Purging and cleaning of drums



GENERAL SAFE WORK PRACTICES (CONT.)

- Never use bare conductors, damaged regulators, torches, or electrode holders
- Never arc weld or resist weld while standing on damp surfaces



GENERAL SAFE WORK PRACTICES (CONT.)

Keep fire extinguishers near areas where hot work is performed!



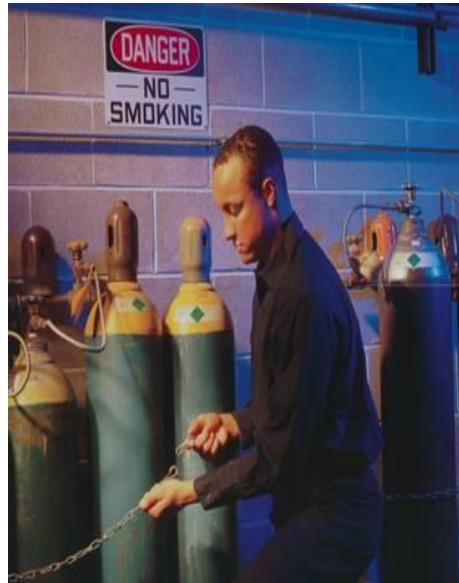
COMPRESSED GAS CYLINDER HANDLING AND STORAGE

- Never accept compressed gas cylinders (CGCs) that were shipped in a horizontal position
- Store CGCs upright
- Keep CGCs secured with chains or cables



COMPRESSED GAS CYLINDER HANDLING AND STORAGE (CONT.)

- Group cylinders by type of gas
- Store full and empty cylinders apart
- Store gases so that old stock is removed and used first



COMPRESSED GAS CYLINDER HANDLING AND STORAGE (CONT.)

- Keep protective caps on stored CGCs
- Prevent the dropping or banging of CGCs
- Don't roll CGCs along the bottom rim



COMPRESSED GAS CYLINDER HANDLING AND STORAGE (CONT.)

- Don't lift CGCs by the cap
- Separate oxygen from fuel gas cylinders/combustibles
 - Minimum 20 feet or
 - 5 feet – ½ hr rating



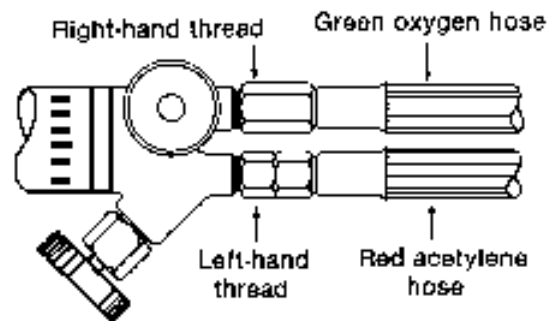
COMPRESSED GAS CYLINDER HANDLING AND STORAGE (CONT.)

- Empty CGCs must be labeled “MT” or “Empty”
- Keep oil and grease away from oxygen CGCs, valves, and hoses



FUEL GAS

- “Cracking”
- Open fuel valve 1 ½ turns
- When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 12 inches shall be covered by tape.
- Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work



HOT WORK PERMITS AND FIRE WATCHES



HOT WORK PERMIT

- Checklist to prevent fires
- Must be authorized
- Used outside designated hot work area

HOT WORK PERMIT			
BEFORE INITIATING HOT WORK, CAN THIS JOB BE AVOIDED? IS THERE A SAFER WAY? This Hot Work Permit is required for any temporary operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding.			
INSTRUCTIONS 1. Firesafety Supervisor: A. Verify precautions listed at right (or do not proceed with the work). B. Complete and retain PART 1. C. Issue PART 2 to person doing job.		PART 1 REQUIRED PRECAUTIONS CHECKLIST ☐ Available sprinklers, hose streams and extinguishers are in service/operable. ☐ Hot Work equipment in good repair. Requirements within 35 ft. (11m) of work ☐ Flammable liquids, dust, lint and oily deposits removed. ☐ Explosive atmosphere in area eliminated. ☐ Floors swept clean. ☐ Combustible floors wet down, covered with damp sand or fire-resistive sheets. ☐ Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields. ☐ All wall and floor openings covered. ☐ Fire-resistive tarpaulins suspended beneath work. ☐ Protect or shut down ducts and conveyors that might carry sparks to distant combustibles. Work on walls, ceilings or roofs ☐ Construction is noncombustible and without combustible covering or insulation. ☐ Combustibles on other side of walls, ceilings or roofs moved away. Work on enclosed equipment ☐ Enclosed equipment cleaned of all combustibles. ☐ Containers purged of flammable liquids/vapors. ☐ Pressurized vessels, piping and equipment removed from service, isolated and vented. Fire watch/Hot Work area monitoring ☐ Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks. ☐ Fire watch is supplied with suitable extinguishers, and, where practical, charged small hose. ☐ Fire watch is trained in use of this equipment and in sounding alarm. ☐ Fire watch may be required for adjoining areas, above, and below. ☐ Monitor Hot Work area for 4 hours after job is completed. Other Precautions Taken ☐ _____	
HOT WORK BEING DONE BY: ☐ EMPLOYEE ☐ CONTRACTOR DATE _____ JOB NO. _____ LOCATION/BUILDING & FLOOR _____ NATURE OF JOB _____ NAME OF PERSON DOING HOT WORK _____ I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for this work. SIGNED: (FIRESAFETY SUPERVISOR/OPERATIONS SUPERVISOR) _____		3441152	
PERMIT EXPIRES: _____ DATE _____ TIME _____ AM PM NOTE EMERGENCY NOTIFICATION ON BACK OF FORM. USE AS APPROPRIATE FOR YOUR FACILITY. FM Global 2630 (1/2000) ENG. PRINTED IN USA © COPYRIGHT 2000 Factory Mutual Insurance Company All rights reserved.			

HIGH RISK AREAS

- Ducts and conveyors
- Pipes
- Confined spaces

FIRE WATCHES WILL.....

- Have fire extinguishers readily available, and be trained in their use
- Be familiar with alarm systems and their operation in the event of a fire
- Watch for fires in all exposed areas
- Only try to extinguish fires obviously within the capacity of the equipment



FIRE WATCHES WILL... (CONT.)

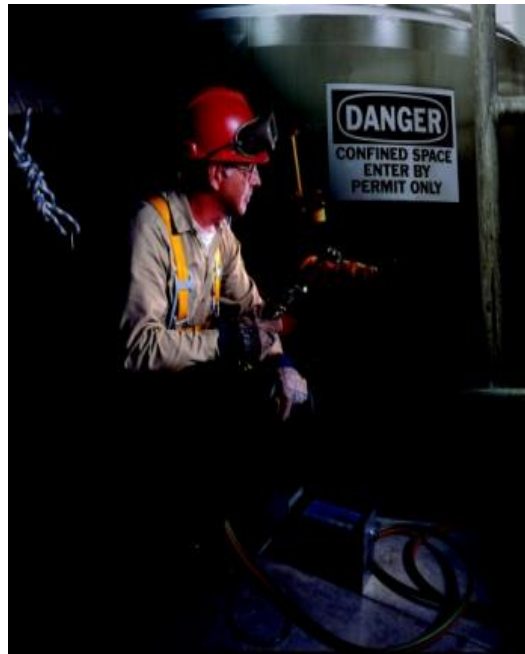
Stay in hot work areas for at least one half hour after hot work operations have ceased to detect and extinguish smoldering fires



WELDING SAFETY IN CONFINED SPACES

Before entry, test the work space for the following types of hazards:

- Oxygen levels
- Flammability
- Combustibility
- Toxic fumes



WELDING SAFETY IN CONFINED SPACES (CONT.)

Use ventilation and a safety harness attached to a lifeline



WHEN HOTWORK IN CONFINED SPACE IS INTERRUPTED

- Disconnect power to arc welding or cutting equipment
- Remove electrodes from holders
- Turn off torch valves
- Turn off gas supply to gas welding and cutting units at a point outside the space
- Remove the torch and hose from the confined space, if possible



GRINDING AND CUTTING

- Sparks, noise, eye and skin injury from flying metal filings, grinding wheel pieces, etc.).
- Having fingers or hands caught in the grinding wheel, resulting in amputation.

Possible Solutions:

- Wear appropriate PPE, such as face shield. Use cotton or denim clothing.
- Inspect grinding equipment before use.



POLL

Now that you know the requirements of a “Fire Prevention Plan”, how many of you have a written up-to-date Fire Prevention Plan?

- a) Yes
- b) No
- c) Not Sure

SUMMARY

- Requirements of Written Fire Prevention Plan
- Fire Prevention Plan Procedures
- Hazardous Materials
- Hot work (welding, cutting, grinding)

QUESTIONS?



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