
Related Terminal Operations and Equipment

- 29 CFR 1917 – Subpart G

29 CFR 1917 - Subpart G

- 1917.151 - Machine guarding
- 1917.152 - Welding, cutting and heating (hot work)
- 1917.153 - Spray painting
- 1917.154 - Compressed air



29 CFR 1917 - Subpart G

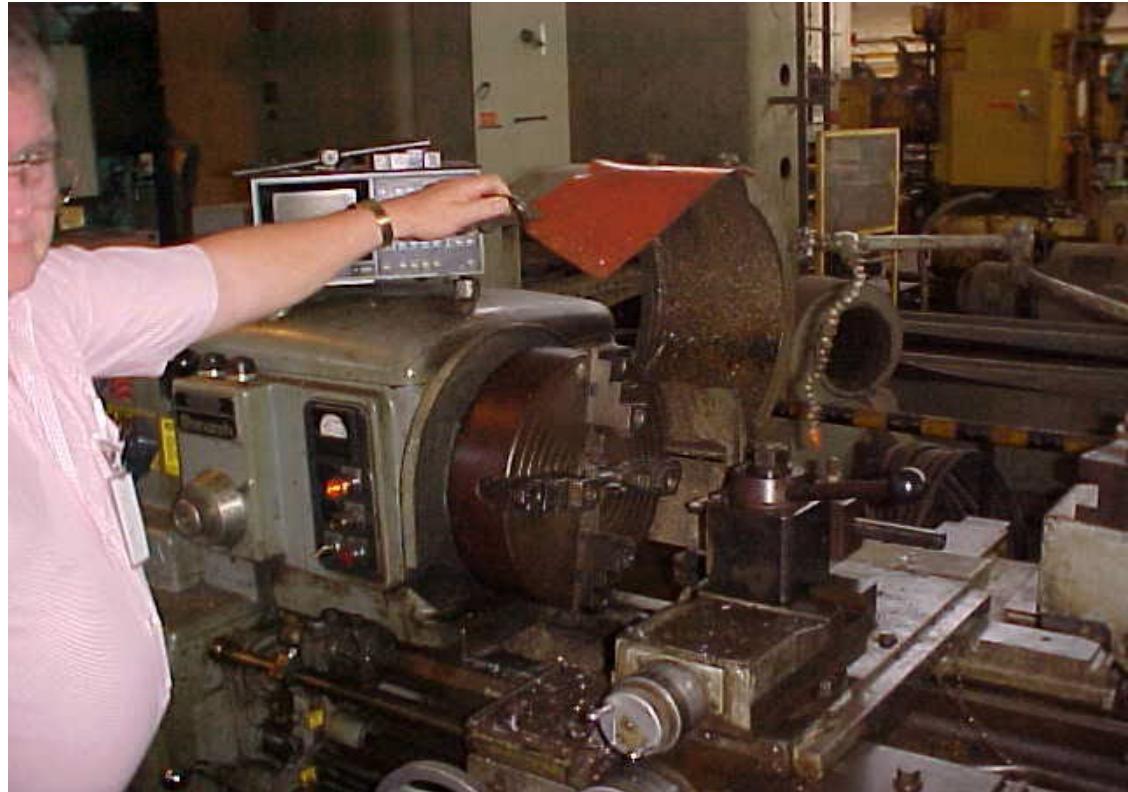
- 1917.155 - Air receivers
- 1917.156 - Fuel handling and storage
- 1917.157 - Battery charging and changing
- 1917.158 - Prohibited operations



Machine Guarding

1917.151(b)(1)

- Danger zones on machines and equipment guarded



Machine Guarding

1917.151(b)(2)

- Where machine operation produce chips and dust:
 - Effective exhaust system at point of origin, **or**
 - Other effective means to protect operator



Machine Guarding

1917.151(b)(3)

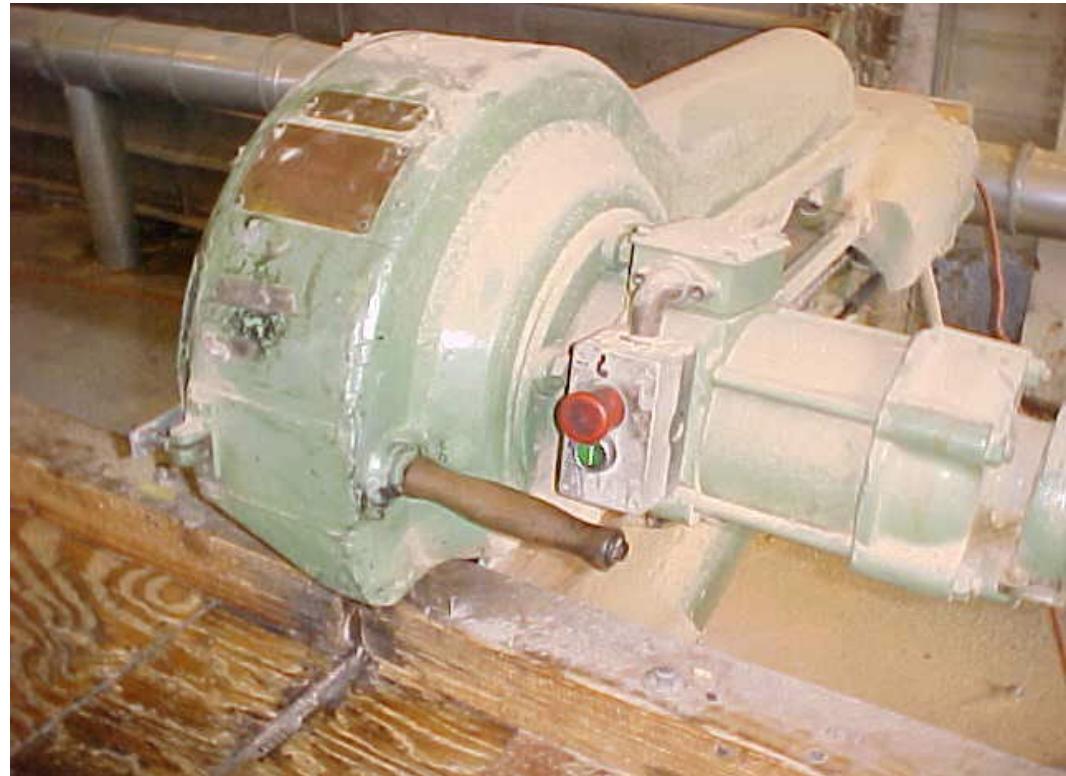
- Fixed machinery secured to prevent shifting



Machine Guarding

1917.151(b)(4)

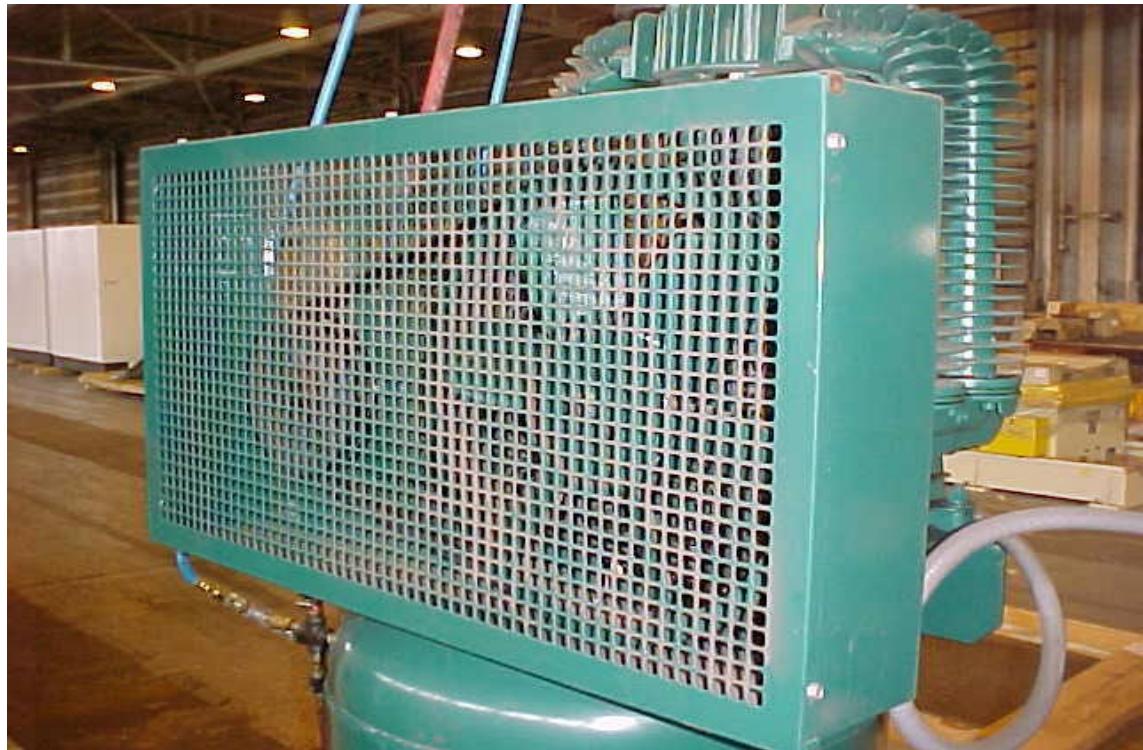
- Power cut-off device provided at operator's working position



Machine Guarding

1917.151(b)(5)

- Belt or shaft driven machines have belt or shaft guarded



Machine Guarding

1917.151(b)(7)

- Power supply to machines
 - Turned off
 - Locked out, **and**
 - Tagged out during repair, adjustment, or servicing





Machine Guarding

1917.151(b)(8)-(10)

- Machines maintained in safe condition
- Only designated employees repair and maintain machinery and equipment
- Machines with defects not be used



Machine Guarding

1917.151(c)

- Hand-fed circular ripsaws and hand-fed circular crosscut saws guarded as follows:
 - Equipped with hoods
 - Spreaders to prevent material from squeezing saw
 - Non-kickback fingers or dogs



Machine Guarding

1917.151(d)

- Swing cutoff saws guarded
 - Hood completely enclosing upper half of saw
 - Device return saw to back of table without rebound
 - Inverted swing cutoff saws have hoods covering part of saw above table



Machine Guarding

1917.151(e)(2)

- Radial saws used for ripping have non-kickback fingers or dogs



Machine Guarding

1917.151(e)(1) and (4)

- Lower portion of blade guarded
- Cutting head on radial saw return to starting position when released



Machine Guarding

1917.151(f)

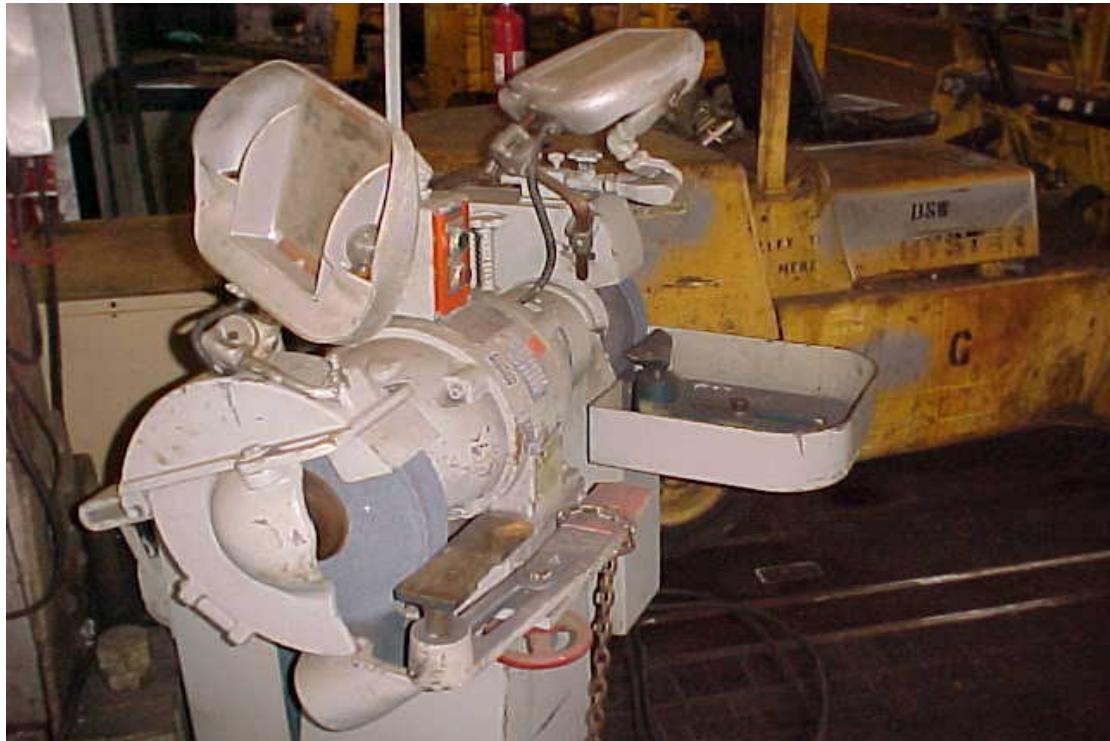
- Band saw blades and wheels enclosed or guarded
 - Non-working portion of blade guarded



Machine Guarding

1917.151(g)(1)

- Abrasive wheels and machinery
 - Enclosure guards over grinding wheel



Machine Guarding

1917.151(g)(1)

- Adjustable tongue guard close to periphery of wheel



Machine Guarding

1917.151(g)(3)

- Guarding is not required:
 - Wheels used for internal work where wheel is contained within work
 - Mounted wheels 2" and smaller in diameter used in portable operation



Machine Guarding

1917.151(g)(4)

- Work rest closely adjusted to wheel with maximum opening of 1/8"







Machine Guarding

1917.151(h)(1)

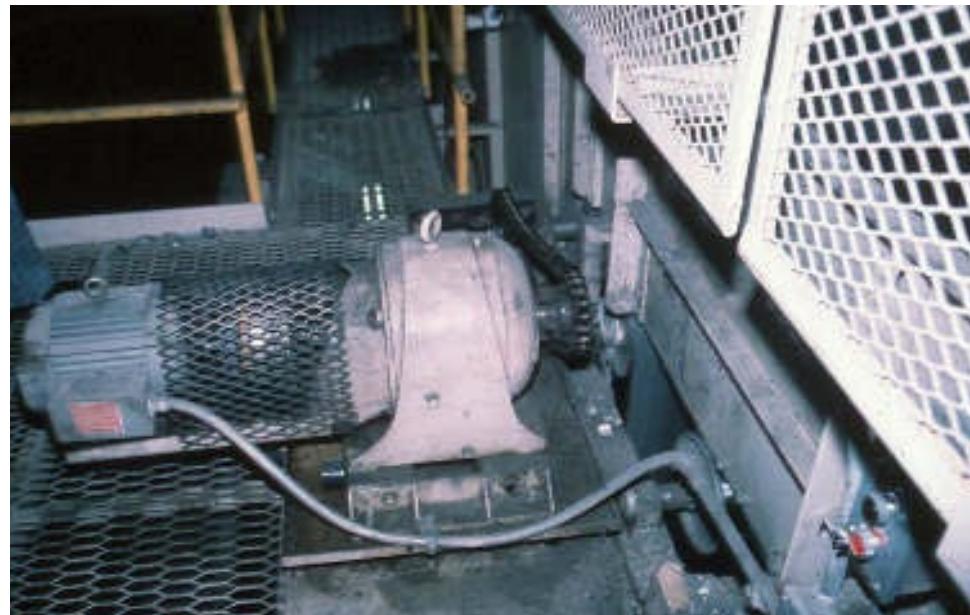
- Rotating parts, such as gears and pulleys
 - Located 7 feet or less above working surface guarded



Machine Guarding

1917.151(h)(2)-(3)

- Belt, rope, and chain drives guarded to prevent contact with moving parts
- Gears, sprockets, and chains guarded to prevent contact with moving parts

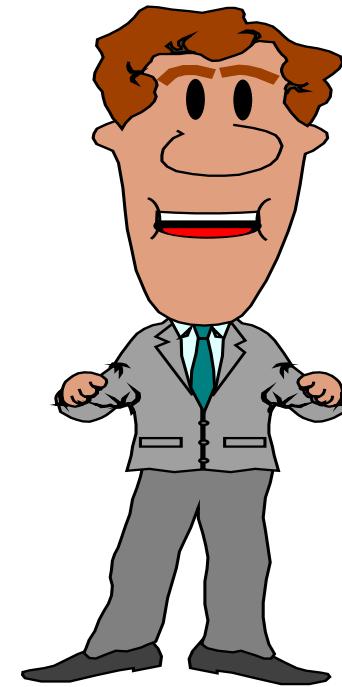


Welding, Cutting and Heating (hot work)

1917.152(a)

- **Definition**

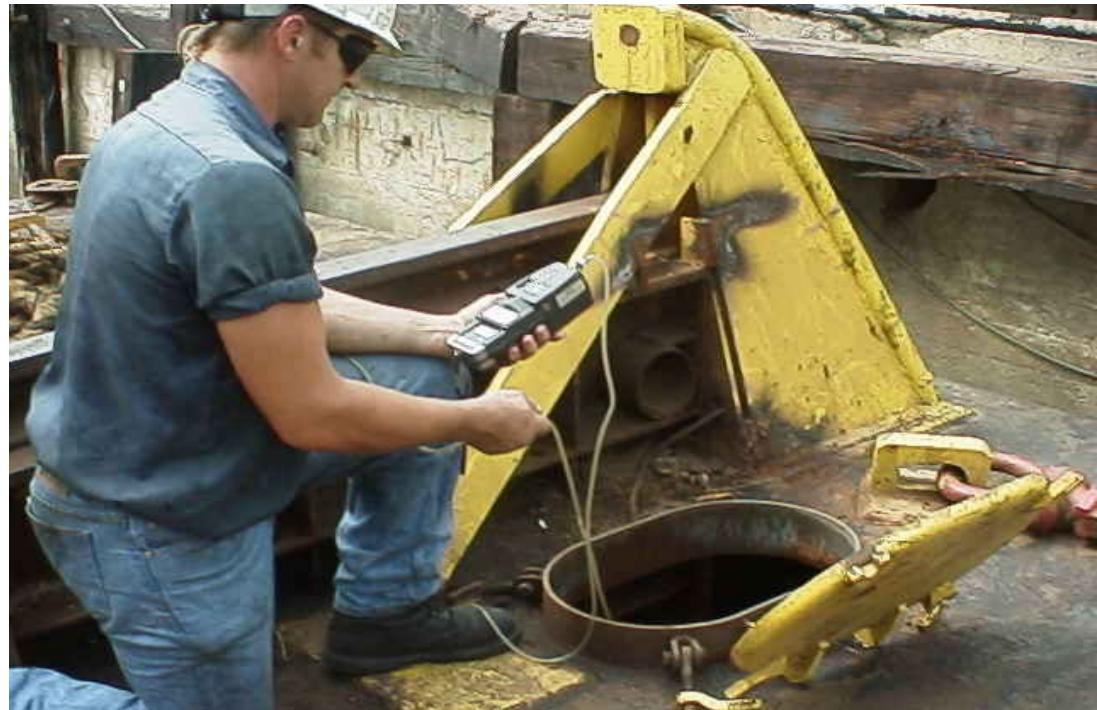
- “Hot work” means riveting, welding, flame cutting, or other fire or spark-producing operation



Welding, Cutting and Heating (hot work)

1917.152(b)

- Hot work not performed in confined space
 - Until designated person has tested atmosphere



Welding, Cutting and Heating (hot work)

1917.152(c)(1)-(2)

- To extent possible, hot work performed in designated areas free of fire hazards
- Hot work done in areas not free of fire hazards:
 - Precautions taken to confine heat, sparks, and slag
 - Cannot contact flammable or combustible material



Welding, Cutting and Heating (hot work)

1917.152(c)(3)

- Fire extinguisher readily available
- Maintained in readiness for use



Welding, Cutting and Heating (hot work)

1917.152(c)(4)

- When normal fire prevention precautions are not sufficient
 - Additional personnel assigned to guard against fire during hot work



Welding, Cutting and Heating (hot work)

1917.152(c)(5)

- Drums and containers of flammable or combustible liquids kept closed
- Empty containers removed from hot work area



Welding, Cutting and Heating (hot work)

1917.151(d)(1)(i)

- Compressed gas cylinders valve protection caps in place except when in use



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(ii)

- Compressed gas cylinders hoisted while secured
 - As on a cradle or pallet
- Cylinders not hoisted by magnet, choker sling, or cylinder caps



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(iii)

- Cylinders moved by tilting or rolling on their bottom edges



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(iv)

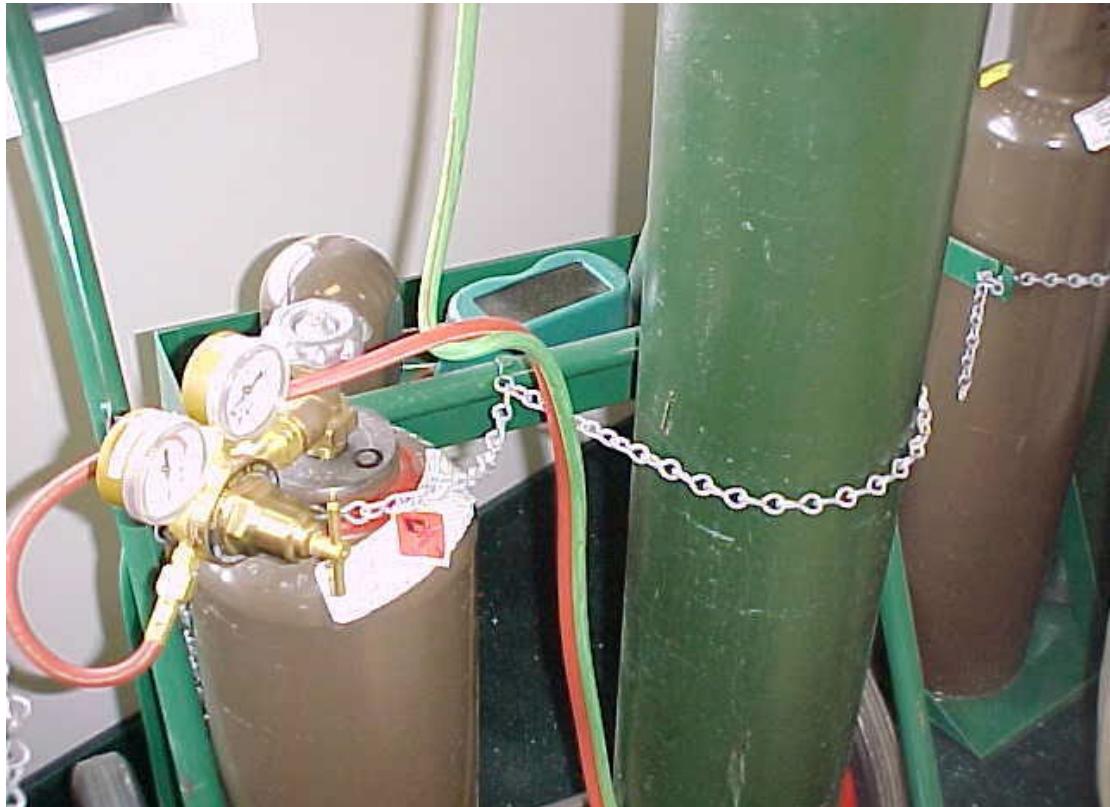
- Cylinders secured when moved by vehicles



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(v)

- Cylinders secured while in use



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(vi)

- Valves closed when cylinders are empty, being moved or stored



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(vii)

- Cylinders secured upright except when being hoisted or carried



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(viii)-(ix)

- Frozen cylinder valves must not be:
 - Pried with bars
 - Hit with a tool
 - Thawed by boiling water



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(x)-(xi)

- Cylinders not exposed to sparks, hot slag or flame
- Cylinders not part of an electrical circuit or have electrodes struck against them



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(xii)

- Cylinders not used as rollers or supports



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(xvi)

- Oxygen cylinders separated from fuel gas cylinders and combustible materials
 - Either a minimum of 20 feet, **or**
 - Barrier having a fire resistance rating of 30 minutes



Welding, Cutting and Heating (hot work)

1917.152(d)(1)(xvii)

- Cylinders not have objects placed on top
 - Might damage safety device, **or**
 - Obstruct valve when in use



Welding, Cutting and Heating (hot work)

1917.152(d)(2)(i)

- Before regulators are connected, valve slightly opened
 - Then immediately closed to clear away dust or dirt



Welding, Cutting and Heating (hot work)

1917.152(d)(3)(i)

- Fuel gas and oxygen hoses easily distinguishable from each other by color or sense of touch



Welding, Cutting and Heating (hot work)

1917.152(d)(3)(ii)

- When oxygen and fuel gas hoses are taped together
 - Not more than 4" of each 12" taped



Welding, Cutting and Heating (hot Work)

1917.152(d)(3)(iii)

- Hoses inspected before use
- Hose subjected to flashback, severe wear or damage
 - Tested to twice normal working pressure
- Defective hose not used



Welding, Cutting and Heating (hot work)

1917.152(d)(4)(i)

- Torch tip openings only cleaned with devices designed for that purpose



Welding, Cutting and Heating (hot work)

1917.152(d)(4)(ii)

- Torches inspected before each use
 - For leaking valves,
 - Hose couplings,
 - Tip connections
- Defective torches not used



Welding, Cutting and Heating (hot work)

1917.152(d)(4)(iii)

- Torches not lit from matches, cigarette lighters, other flames or hot work



Welding, Cutting and Heating (hot work)

1917.152(d)(5)

- Pressure regulators and gauges maintained in safe working order



Welding, Cutting and Heating (hot work)

1917.152(d)(6)

- Gas welding equipment maintained free of oil and grease



Welding, Cutting and Heating (hot work)

1917.152(e)(1)(i)

- Only manual electrode holders designed for arc welding to be used



Welding, Cutting and Heating (hot work)

1917.152(e)(1)(ii)

- Parts of manual electrode holders held by user
 - Insulated against maximum voltage



Welding, Cutting and Heating (hot work)

1917.152(e)(2)(ii)-(iii)

- Cables free of repair or splices for 10 ft. from holder
 - Unless insulated to equal value of cable
- Worn or exposed cable protected by insulation
 - Equal to original value of cable or not used



Welding, Cutting and Heating (hot work)

1917.152(e)(3)(i)

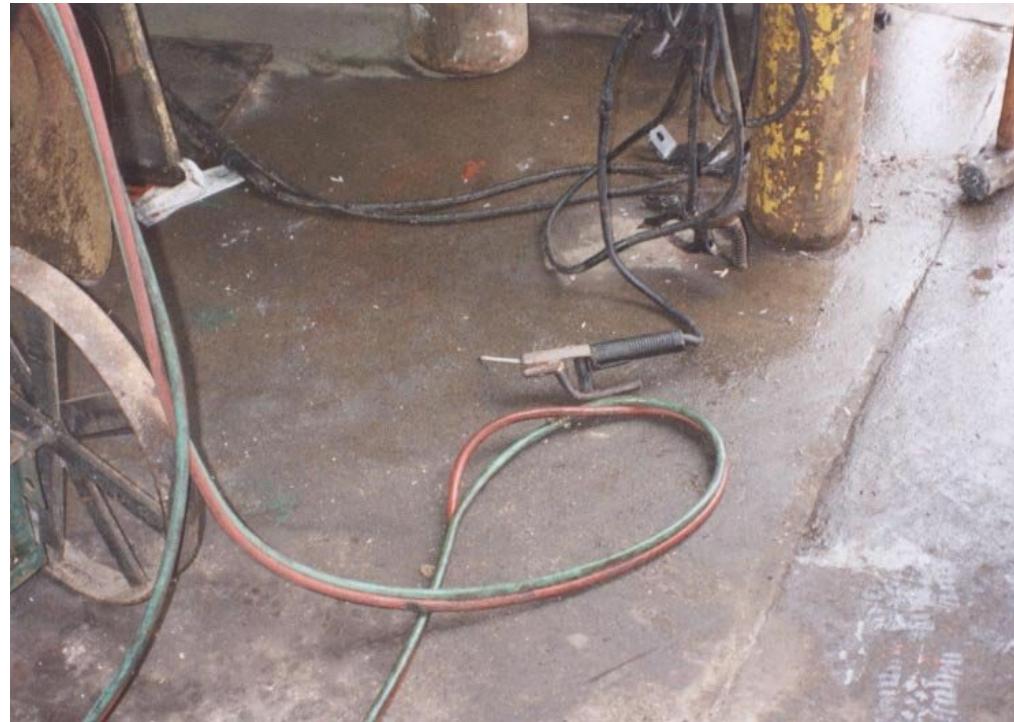
- Ground return cables have maximum current carrying capacity of unit served



Welding, Cutting and Heating (hot work)

1917.152(e)(4)

- Unattended electrode holders made safe
 - By removing electrodes and placed to prevent injury



Welding, Cutting and Heating (hot work)

1917.152(e)(6)

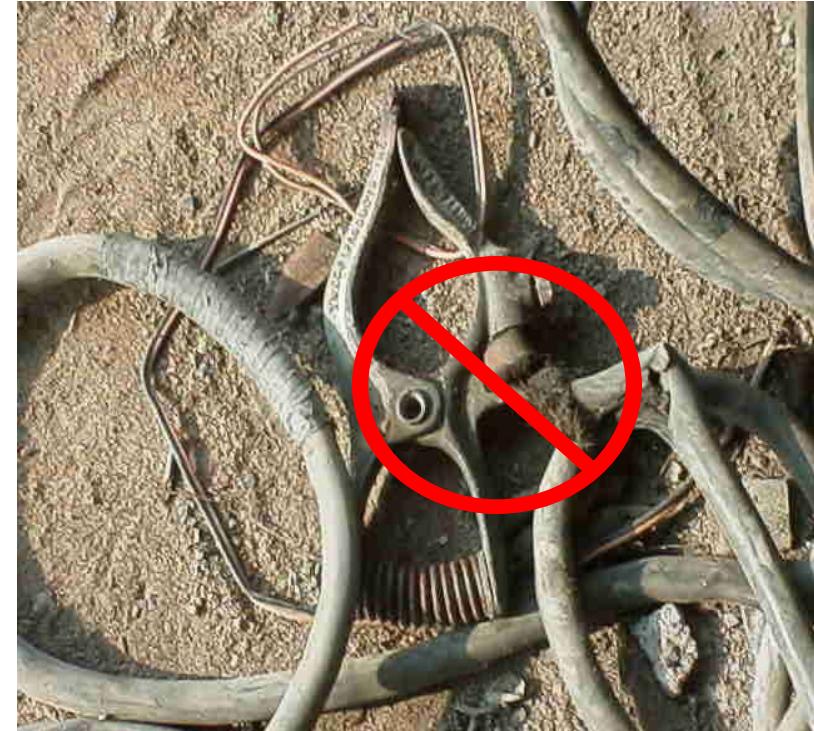
- When welder leaves or stops work or moves machine
 - Power supply switch turned off



Welding, Cutting and Heating (hot work)

1917.152(e)(7)

- Arc welding or cutting equipment with functional defect not used



Welding, Cutting and Heating (hot work)

1917.152(e)(8)(i)

- Arc welding/cutting operations shielded or screened off
 - Protect employees in vicinity from direct rays and sparks



Welding, Cutting and Heating (hot work)

1917.152(e)(8)(ii)

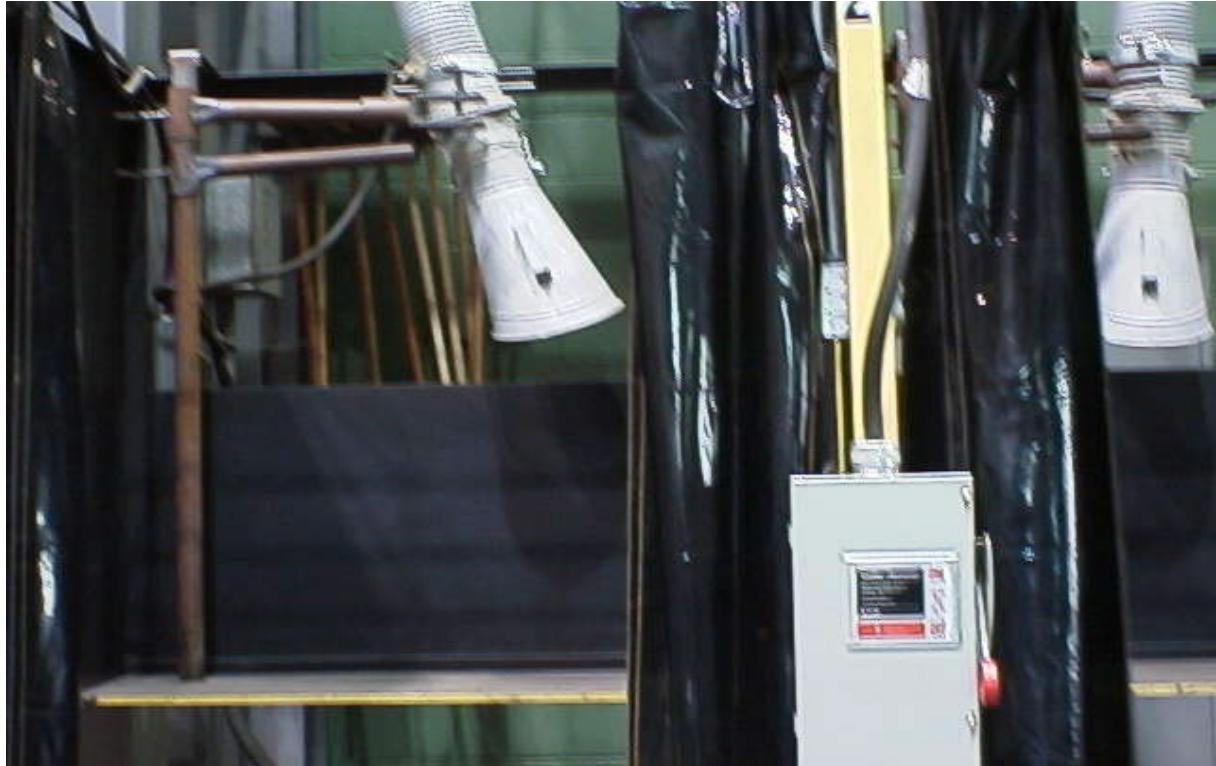
- Employees exposed to welding arcs or sparks
 - Protected by wearing appropriate filter lenses



Welding, Cutting and Heating (hot work)

1917.152(f)(1)

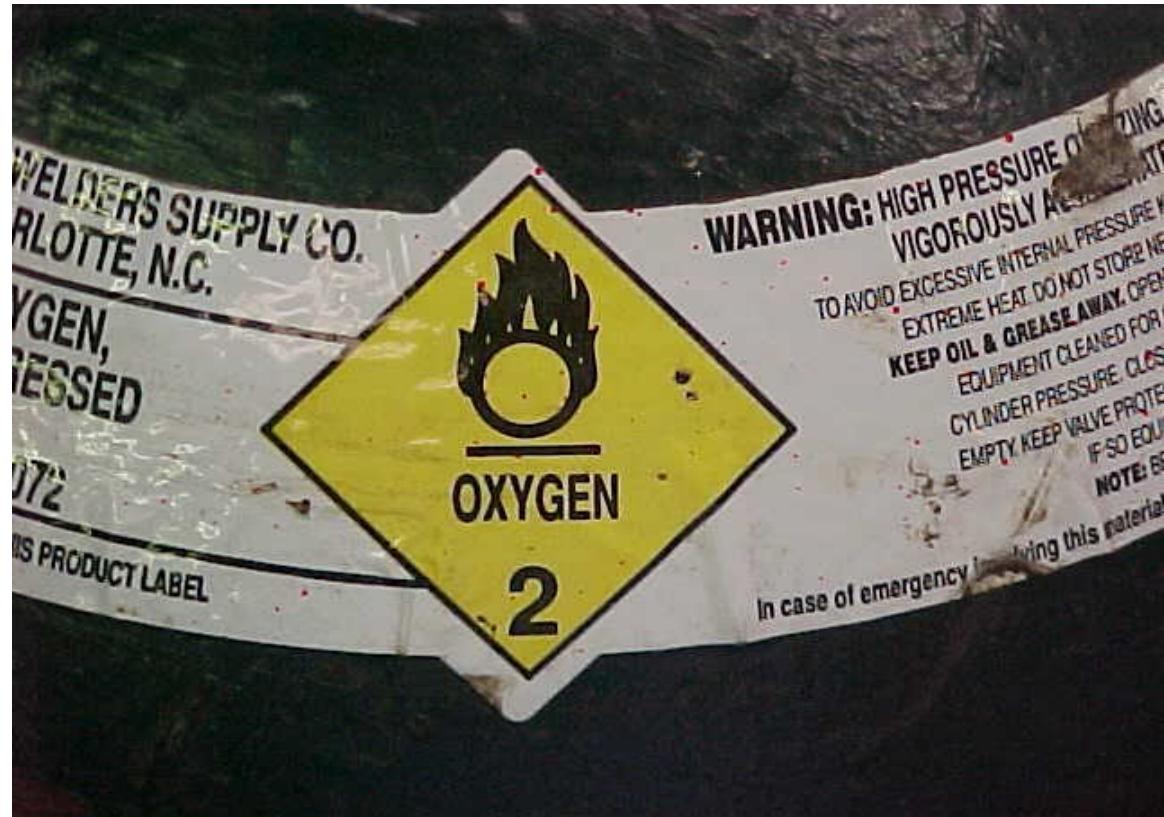
- General mechanical ventilation keep vapors, smoke and fumes below hazardous level



Welding, Cutting and Heating (hot work)

1917.152(f)(1)(v)

- Oxygen not used for ventilation, cooling or cleaning



Welding, Cutting and Heating (hot work)

1917.152(f)(2)

- When hot work performed in confined space:
 - General mechanical or local exhaust provided, **or**
 - Employees in space wear supplied air respirators, **and**
 - A standby on outside equipped and prepared to provide emergency aid



Spray Painting

1917.153(a)

- Scope:

- This section covers painting operations connected with maintenance of structures, equipment and gear at the marine terminal.
- It does not apply to overall painting of terminal structures under construction, major repair, or rebuilding of terminal structures.



Spray Painting

1917.153(b)(1)

- Spraying area
 - Any area where flammable vapors, mists or combustible residues, dust or deposits may be present due to paint spraying operations.
- Spray booth
 - An enclosure containing a flammable or combustible spraying operation and confining and limiting the escape of paint, vapor and residue by means of a powered exhaust system.
- Approved means
 - The equipment has been approved for the specified use by a nationally recognized testing laboratory.

Spray Painting

1917.153(b)(3)

- Equipment “approved” will have label permanently affixed to equipment



Spray Painting

1917.153(c)(1)

- Shut-off valves, containers or piping with attached hoses or flexible connections
 - Shut-off valves closed when not in use



Spray Painting

1917.153(c)(4)(iii)

- Where combustible residues accumulate on electrical installations,
 - Wiring in rigid conduit or in boxes containing no taps, splices, or connections



Spray Painting

1917.153(c)(4)(iv)

- Portable electric lights not used during spraying operations
- Lights used during cleaning or repairing operations approved for location



Spray Painting

1917.153(c)(6)(i)

- Spraying performed only in designated spray booths or spraying areas



Spray Painting

1917.153(c)(6)(ii)-(iii)

- Spraying areas kept free from combustible residue accumulation as practicable
- Residue scrapings, debris, rags, and waste removed from spraying area as they accumulate



Spray Painting

1917.153(c)(7)

- Spraying with organic peroxides and other dual-component coatings
 - Only conducted in sprinkler-equipped spray booths



Spray Painting

1917.153(c)(8)

- Only quantity of flammable or combustible liquids required for operation
 - Allowed in spraying area
- Not exceed one-day supply



Spray Painting

1917.153(c)(9)

- Smoking prohibited and “No Smoking” signs posted in spraying and paint storage areas



Spray Painting

1917.153(d)(5)

- Spraying areas mechanically ventilated
 - For removal of flammable and combustible vapor and mist



Spray Painting

1917.153(d)(6)

- Mechanical ventilation in operation during spraying operations
- Long enough thereafter to exhaust hazardous vapor concentrations



Spray Painting

1917.153(d)(7)

- Rotating fan elements
 - Nonsparking or casing consist of or lined with nonsparking material



Spray Painting

1917.153(d)(9)

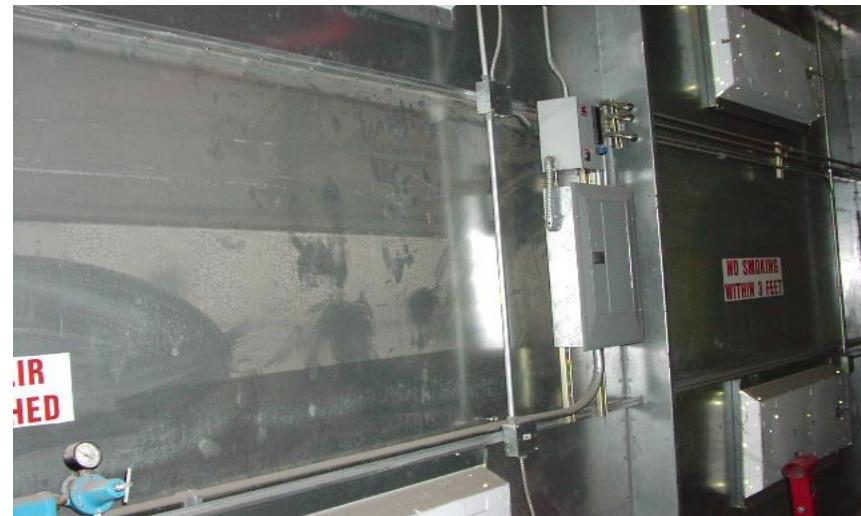
- Air exhausted from spray operations
 - Not contaminate makeup air or other ventilation intakes



Spray Painting

1917.153(d)(12)

- Wiring, motors and equipment in a spray booth
 - Approved explosion-proof type for Class I, Group D locations
- Equipment within 20 feet not separated by vapor-tight partitions
 - Comply with Subpart S of Part 1910, for Class I, Division 2, Hazardous Locations



Spray Painting

1917.153(e)(3)

- Space of at least 3 feet on all sides of spray booth
- Maintained free of storage or combustible materials



Spray Painting

1917.153(e)(4)

- Metal parts of:
 - Spray booths
 - Exhaust ducts
 - Piping
 - Airless high-pressure spray guns, **and**
 - Conductive objects



- Being sprayed must be grounded

Spray Painting

1917.153(e)(5)-(6)

- Electric motors driving exhaust fans not located inside booths or ducts
- Belts not enter ducts or booths
 - Unless belts completely enclosed



Compressed Air

1917.154

- Employees protected by chip guarding and PPE during cleaning with compressed air
- Compressed air used for cleaning not exceed pressure of 30 psi
- Compressed air not used to clean employees



Air Receivers

1917.155(a)

- Section applies to compressed air receivers and equipment used for operations such as cleaning, drilling, hoisting and chipping.
- Section does not apply to equipment used to convey materials or in such transportation applications as railways, vehicles or cranes.



Air Receivers

1917.155(b)(1)-(2)

- Air receivers equipped with indicating pressure gauges and spring-loaded safety valves.
- Safety valves prevent receiver pressure from exceeding 110% of maximum allowable working pressure.
- No other valves permitted between air receivers and their safety valves.

Fuel Handling and Storage

1917.156(a)(1)

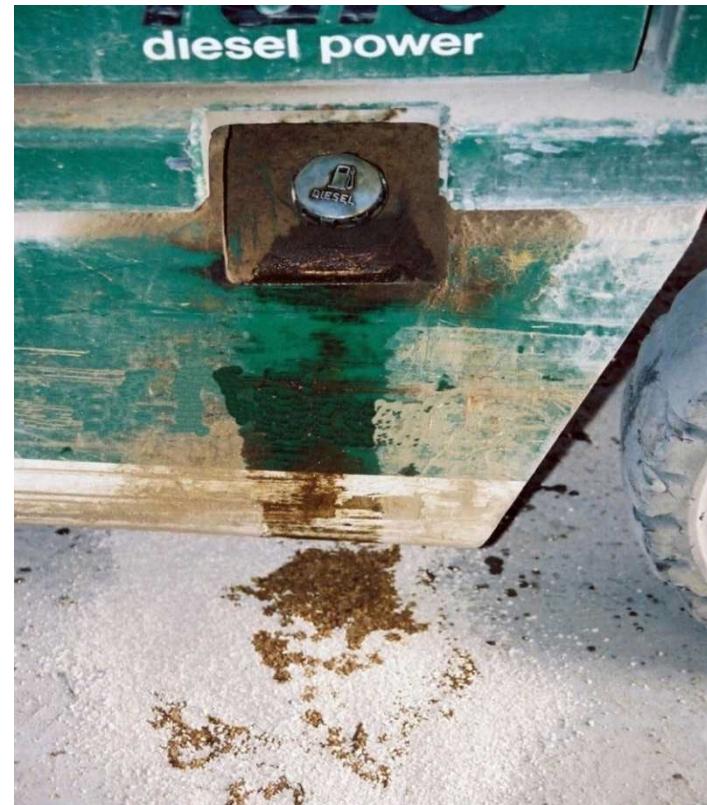
- Only designated persons permitted to conduct fueling operations



Fuel Handling and Storage

1917.156(a)(2)

- In case of spillage
 - Filler caps replaced
 - Spillage disposed of before engines started



Fuel Handling and Storage

1917.156(a)(3)

- Engines stopped and operators not on equipment during refueling operations



Fuel Handling and Storage

1917.156(a)(4)

- Smoking and open flames prohibited in:
 - Areas used for fueling
 - Fuel storage
 - Enclosed storage of equipment containing fuel



Fuel Handling and Storage

1917.156(a)(5)

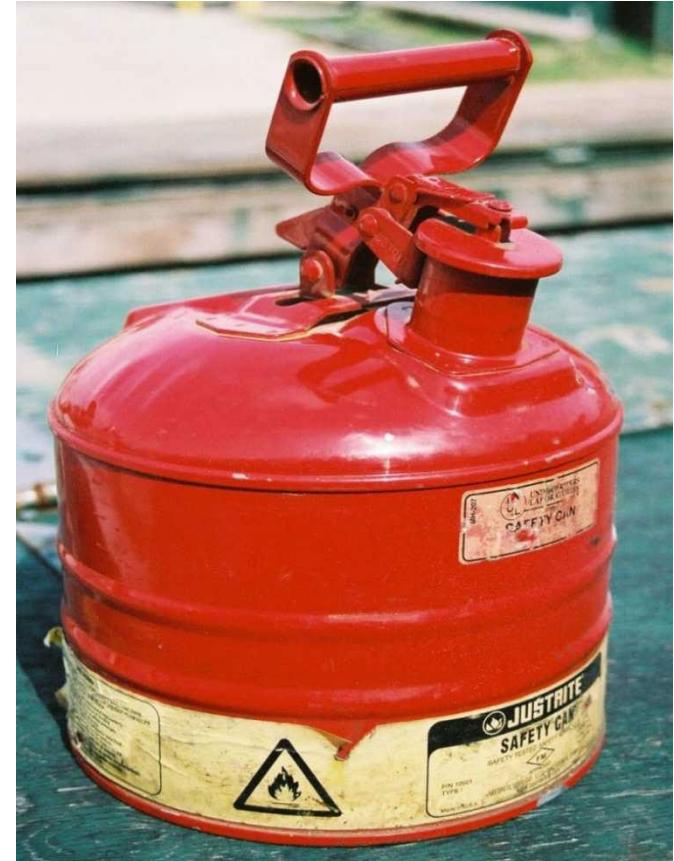
- Equipment refueled only at designated locations



Fuel Handling and Storage

1917.156(a)(6)

- Liquid fuels not handled by pump
 - Handled and transported in portable containers designed for that purpose
- Portable containers
 - Metal
 - Tight closures with screw or spring covers
 - Equipped with spouts
- Leaking containers used



Fuel Handling and Storage

1917.156(a)(7)

- Flammable liquids dispensed
 - In open from tank, or
 - From other vehicles equipped for delivering fuel to another vehicle only **IF**: [Next slide]



Fuel Handling and Storage

1917.156(a)(7)(i)-(ii)

- Dispensing hoses not exceed 50 feet in length
- Powered dispensing nozzles used are automatic closing type



Fuel Handling and Storage

1917.156(a)(8)

- Liquid fuel dispensing devices provided with an:
 - Easily accessible
 - Clearly identified shut-off device



Fuel Handling and Storage

1917.156(a)(9)

- Liquid fuel dispensing devices, such as pumps:
 - Mounted either on a concrete island, **or**
 - Otherwise protected against collision damage



Fuel Handling and Storage

1917.156(b)(1)(i)-(ii)

- Liquefied gas powered equipment
 - Fueled only at designated locations
- Equipment with permanently mounted fuel containers
 - Charged outdoors



Fuel Handling and Storage

1917.156(b)(1)(iii)

- Equipment not fueled or stored near:
 - Underground entrances
 - Elevator shafts
 - Places where gas or fumes might accumulate



Fuel Handling and Storage

1917.156(b)(2)(i)

- When removable fuel containers are used:
 - Escape of fuel minimized by automatic quick-closing couplings in fuel lines, **or**
 - Closing fuel container valves and allowing engines to run until residual fuel is exhausted



Fuel Handling and Storage

1917.156(b)(2)(iii)

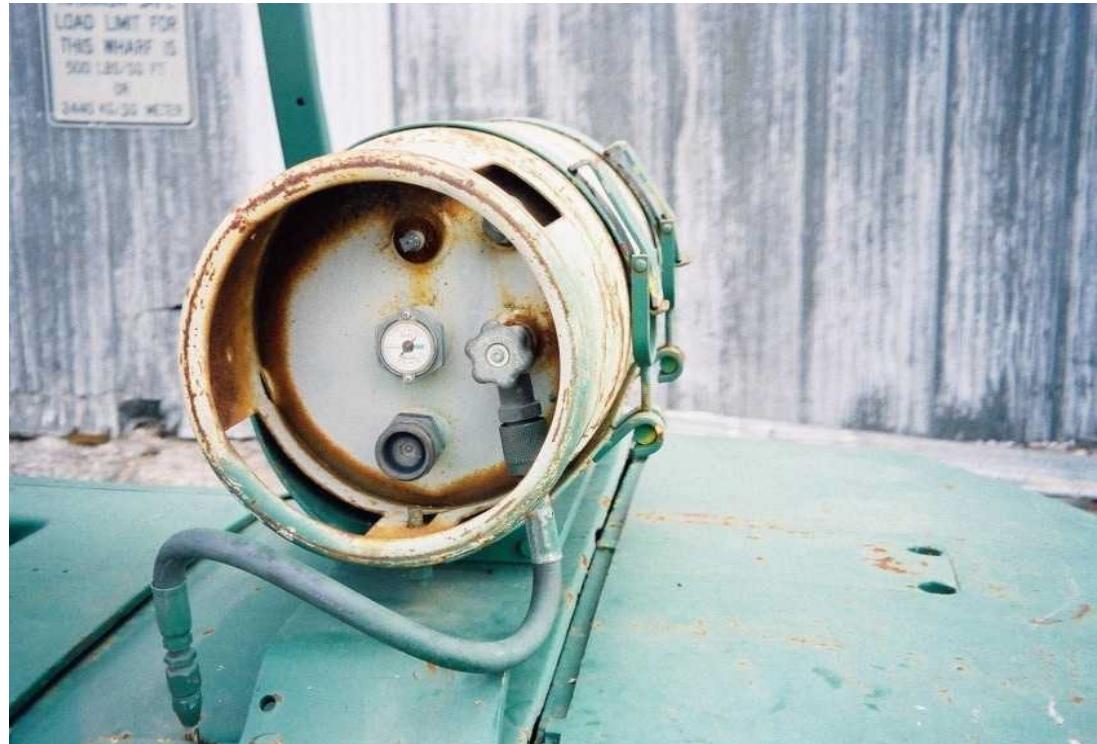
- Fuel containers secured to prevent being jarred loose, slipping or rotating



Fuel Handling and Storage

1917.156(b)(2)(iv)

- Containers near engine or exhaust system shielded against direct heat radiation



Fuel Handling and Storage

1917.156(b)(2)(vi)

- Valves and connections protected from contact damage
- Permanent protection provided for fittings on removable containers



Fuel Handling and Storage

1917.156(b)(2)(vii)

- Defective containers removed from service



Fuel Handling and Storage

1917.156(b)(3)(ii)

- Use of matches or flames to check for leaks prohibited



Fuel Handling and Storage

1917.156(b)(3)(iii)

- Containers examined before recharging and before reuse
 - Damage and leaking valves



Fuel Handling and Storage

1917.156(b)(4)(i)

- Stored fuel containers located to:
 - Minimize exposure to excessive temperatures and physical damage



Fuel Handling and Storage

1917.156(b)(4)(ii)

- Containers not stored near exits, stairways or areas normally used or intended for egress



Fuel Handling and Storage

1917.156(b)(4)(iii)

- Outlet valves of containers in storage or transport closed
- Relief valves connect with vapor spaces



Fuel Handling and Storage

1917.156(b)(5)(i)-(iii)

- Liquefied gas vehicles stored or serviced inside garages or shops if no fuel system leaks
- Vehicles not parked near open flames, sources of ignition or unventilated open pits



Battery Charging and Changing

1917.157(a)

- Only designated persons change or charge batteries



Battery Charging and Changing

1917.157(b)

- Battery charging and changing only performed in areas designated by employer



Battery Charging and Changing

1917.157(c)

- Smoking and other ignition sources prohibited in charging areas



Battery Charging and Changing

1917.157(d)

- Filler caps in place when batteries are being moved



Battery Charging and Changing

1917.157(e)

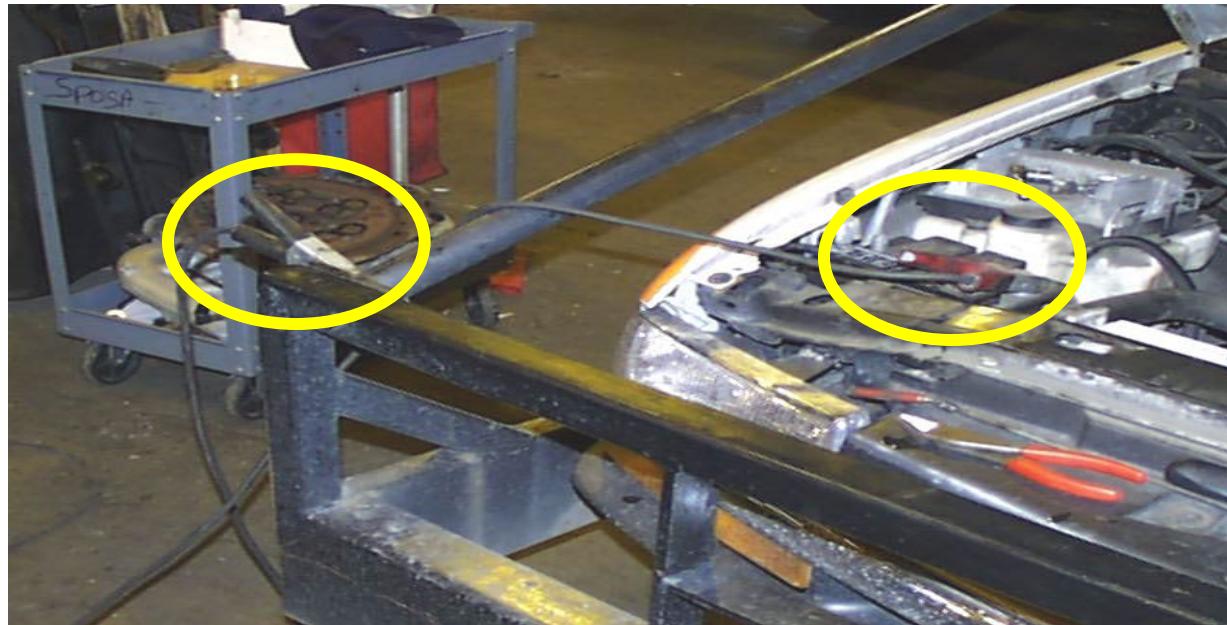
- Parking brakes applied before batteries are charged or changed



Battery Charging and Changing

1917.157(f)

- When jumper battery connected to battery in a vehicle
 - Ground lead connect to ground away from vehicle's battery



Battery Charging and Changing

1917.157(g)

- Batteries free of corrosion buildup
- Cap vent holes open



Battery Charging and Changing

1917.157(h)

- Adequate ventilation provided during charging



Battery Charging and Changing

1917.157(i)

- Facilities for flushing eyes, body and work area with water
 - Provided wherever electrolyte is handled
- Does not apply when only checking battery levels or adding water



Battery Charging and Changing

1917.157(j)

- Carboy filters or siphons used to handle electrolyte in large containers



Battery Charging and Changing

1917.157(k)

- Battery handling equipment which could contact battery terminals or cell connectors
 - Insulated or otherwise protected



Battery Charging and Changing

1917.157(l)

- Metallic objects not placed on uncovered batteries



Battery Charging and Changing

1917.157(m)

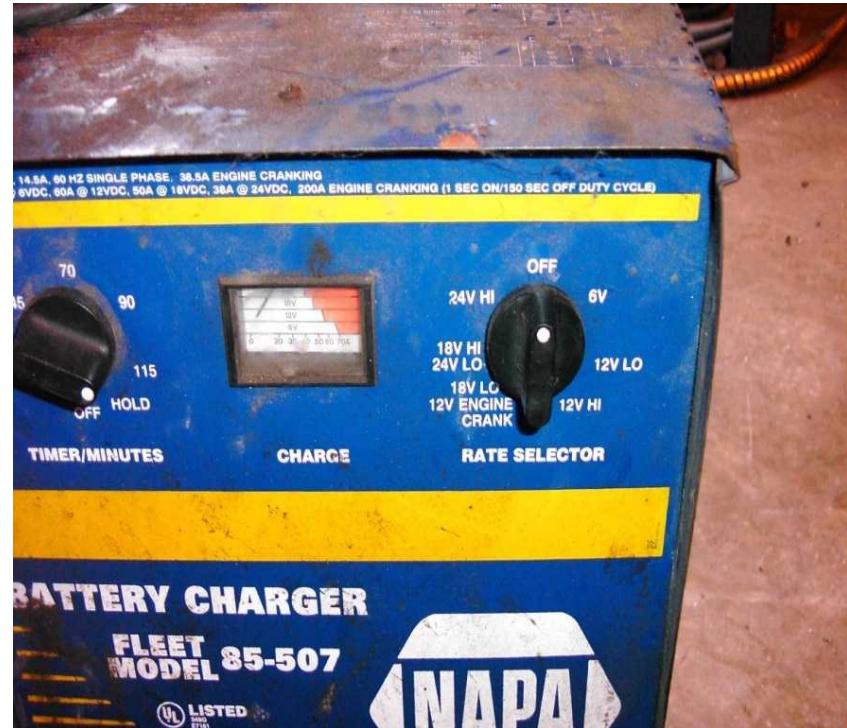
- Vent caps in place when batteries are being charged



Battery Charging and Changing

1917.157(n)

- Chargers turned off when leads are being connected or disconnected



Battery Charging and Changing

1917.157(o)

- Installed batteries secured
 - Avoid physical or electrical contact with compartment walls or components



Prohibited Operations

1917.158(a)

- Spray painting and abrasive blasting
 - Not conducted in vicinity of cargo handling operations



Prohibited Operations

1917.158(b)

- Welding and burning operations
 - Not conducted in vicinity of cargo handling operations
 - Unless hot work is part of cargo operation



Thank You For Attending!

Final Questions?

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