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TITLE 41
PART 50-204
(SECTION I)
OF THE CODE OF FEDERAL REGULATIONS

General Safety and Health Standards for Federal Supply Contracts

UNDER THE WALSH-HEALEY PUBLIC CONTRACTS ACT

(Radiation Standards appear in a separate publication—Section II)

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UNITED STATES DEPARTMENT OF LABOR
Bureau of Labor Standards
WASHINGTON, D.C. 20202

LSB-408

PART 50-204—SAFETY AND HEALTH STANDARDS FOR FEDERAL SUPPLY CONTRACTS

Section I—General

AUTHORITY: The provisions of this Part 50–204 issued under secs. 1, 4; 49 Stat. 2036, 2038; 41 U.S.C. 35, 38; sec. 7, 60 Stat. 241; 5 U.S.C. 1006.

SOURCE: The provisions of this Part 50–204 appear at 25 F.R. 13809, Dec. 28, 1960, unless otherwise noted.

RADIATION STANDARDS (secs. 50–204.305 through 50–204.320) appear in a separate publication—sec. II.

SCOPE AND APPLICATION

Section 50–204.1 Scope and application

(a) The Walsh-Healey Public Contracts Act (49 Stat. 2036, 41 U.S.C. 35 et seq.) requires that contracts entered into by any agency of the United States for the manufacture or furnishing of materials, supplies, articles, and equipment in any amount exceeding $10,000 must contain, among other provisions, a stipulation that "No part of such contract will be performed nor will any of the materials, supplies, articles, or equipment to be manufactured or furnished under said contract be manufactured or fabricated in any plants, factories, buildings or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of the contract." This Part 50–204 of this chapter expresses certain minimum safety and health standards which will be applied in the administration and enforcement of the Act, including proceedings under its section 5 and 41 CFR Part 50–203, Subpart A, to determine whether particular contracts subject to the Act are being, or have been, performed in compliance with its safety and health requirements.

(b) In all administrative, enforcement, and investigative proceedings conduced by the United States Department of Labor under the Act, official notice will be taken of the fact that failure to comply with the requirements expressed in this Part 50–204 of this chapter results in working conditions which are "unsanitary or hazardous to employees" within the meaning of section 1(e) of the Act, and contracts incorporating the stipulation it requires.

(c) In formal enforcement proceedings under section 5 of the Act, respondents will be permitted to demonstrate, by reliable, substantial, and probative evidence, that their failure to comply with the requirements expressed in Part 50–204 of this chapter did not result in working conditions which were "unsanitary or hazardous or dangerous to employees," but only if the answer to the complaint, filed under 41 CFR 50–203.3, makes express allegation to that effect, identifying the particular code unit challenged and setting out the factual basis for the challenge. In the event such issue is drawn, and reliable, substantial, and probative evidence is introduced in support of the challenge, the pertinent portions of the publications of the American Standards Association, Inc., American Society of Mechanical Engineers, National Fire Protection Association, National Board of Fire Underwriters, the Public Health Service of the United States Department of Health, Education, and Welfare, the Bureau of Mines of the United States Department of the Interior, and the Atomic Energy Commission will be considered, together with any other evidence that may be adduced in support of the regulation.

...ce of the reliable, substantial, and probative evidence supports a finding that the working conditions prohibited in the regulation are unsanitary or hazardous or dangerous to the health and safety of employees.

(d) The standards expressed in Part 50–204 of this chapter are for application to ordinary employment situations, and do not preclude proof or recognition of the necessity of higher standards for employment situations of extraordinary hazard. Neither do the standards expressed in this Part 50–204 of this chapter purport to describe all of the working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees. Other working conditions may be found to be unsanitary or hazardous or dangerous to the health and safety of employees on evidence to that effect, or without such evidence, where such unsanitary or hazardous or dangerous characteristic should be apparent to a rational and prudent person of common experience.

(e) Compliance with the standards expressed in Part 50–204 of this chapter will not relieve anyone from any obligation to comply with any more strict standard stemming from any other source whatsoever.

BUILDINGS AND APPURTENANCES

Section 50–204.2 Buildings

Buildings and all appurtenances thereto, including bridges, towers, balconies, runways, and platforms, shall be structurally safe to prevent collapse.

Section 50–204.3 Floors

(a) No floor or platform shall be so loaded as to have a factor of safety of less than four. That is, the weight placed upon a floor or platform shall not exceed one-fourth of the breaking strength of the platform or floor.

(b) Floors, other than those resting directly on solid ground, when used for heavy storage shall be clearly posted to show maximum safe floor loads.

(c) All floor surfaces shall be kept clean and dry and maintained in a smooth (free from holes or projections that might cause tripping and reasonably nonslippery) condition.

(d) Where the type of operation necessitates working on floor areas which would be otherwise wet or slippery, such areas shall be covered with mats, grates, cleats, or other high friction floor coverings.

(e) Safe means of access, suited to conditions, shall be provided to every overhead point to which employees are called upon to go in connection with their employment.

Section 50–204.4 Building egress

(a) *Exits.* Not less than two means of egress (other than ladders or elevators) as remote from each other as possible, shall be provided on every floor, including basements and cellars of every building or section where persons are employed. On the street floor at least one of these shall be a door leading directly outside the building, and the other may be a door leading outside the building, or a standard horizontal exit. On upper floors and basements, one exit shall be an enclosed stairway or smokeproof tower and the other or others may be inside stairways or horizontal exits or fire escape stairs.

(b) *Exit doors.* Doors shall swing in the direction of exit and open in such a manner as not to obstruct passageways or corridors used as ways of egress. No chairs or seats, fixtures, chutes, materials, or equipment shall block or in any way jeopardize the use of ways and means provided for egress. All exit doors and windows used as means of egress in case of fire or panic shall be so arranged as always to be opened readily from the inside. Locks on doors and windows, if provided, shall not require the use of a key to open.

(c) *Exit signs.* All exits or means of egress shall be provided with a sign having on it the word "EXIT" which shall be in letters at least five inches in height and plainly indicate to persons within the building the location of such egress.

Directional signs to the means of egress should be provided where necessary.

STAIRWAYS OR STEPS

Section 50–204.9 Stair width of treads and height of risers

There shall be no variation in the width of treads and height of risers in any flight. Where variation in heights of risers in different flights is necessary on account of varying story heights, such variations shall not exceed ⅛ inch. All treads shall be at least 10 inches wide.

Section 50–204.10 Stairway maintenance

Every stairway or step shall be maintained in good repair, free from protruding bolts, screws, nails, dirt, or slippery conditions, and no storage shall be permitted on stairways.

Section 50–204.11 Treads

Treads shall be renewed when the surface, including the nosing, shows wear to the extent of ¼ inch or more. All metal treads shall have a surface which will reasonably prevent slipping.

Section 50–204.12 Stairway railings and handrails

Every flight of stairs having four or more risers shall be equipped with a stair railing or handrails constructed to conform to the requirements of sections 50–204.28 and 50–204.29 under the following conditions:

(a) On stairways of width less than 44 inches and having both sides enclosed—at least one handrail on the right side descending.

(b) On stairways of width less than 44 inches and having one side open—at least one stair railing that shall be on the open side.

(c) On stairways of width less than 44 inches and having both sides open—one stair railing on each side.

(d) On stairways of width 44 inches or more but less than 88 inches—one handrail on each enclosed side and one stair railing on each open side.

(e) On stairways 88 inches or more in width—one handrail on each enclosed side, one stair railing on each open side and one intermediate stair railing located approximately midway of the width.

(f) Winding stairs shall be equipped with a handrail so offset as to prevent walking on any portions of the treads having width less than 6 inches.

GUARDING OF FLOOR OPENINGS AND FLOOR HOLES

Section 50–204.17 Stairway floor openings

A railing constructed to conform to the requirements of sections 50–204.28 and 50–204.29 shall be provided on all exposed sides of stairway floor openings (except at entrance to stairway). Standard toe boards shall be provided also, except in stair towers.

Section 50–204.18 Ladderway floor openings

Every ladderway floor opening shall be guarded by a standard railing with standard toe board on all exposed sides, except at entrance to opening.

Section 50–204.19 Hatchway and chute floor

Every hatchway and chute floor opening shall be guarded either by:

(a) Hinged floor-opening cover of standard strength and construction equipped with railing constructed in accordance with sections 50–204.27 and 50–204.29 so as to leave no exposed side. When the opening is not in use the cover shall be closed.

(b) A removable railing with toe boards on not more than two sides of the opening and permanent railings with toe boards on all other exposed sides both constructed in accordance with sections 50–204.27 and 50–204.29. The removable railing shall be kept in place when the opening is not in use.

(c) Where operating conditions necessitate the feeding of material into any hatchway or chute opening from all sides, the guarding requirements will be satisfied if bars, chains, or other adequate protection is provided to prevent a person from falling through the opening.

Section 50–204.20 Floor hole

Every floor hole except those described in sections 50–204.17, 50–204.18, 50–204.19 shall be guarded either by:

(a) A railing constructed in conformance with the requirement in sections 50–204.27 and 50–204.29 with standard toe board on all exposed sides; or

(b) A floor opening cover, hinged in place. While the cover is open, floor holes shall be constantly attended by someone or shall be protected by a portable enclosing railing.

GUARDING OF OPEN-SIDED FLOORS, PLATFORMS AND RUNWAYS

Section 50–204.25 Open-sided floor and platform

(a) Every open-sided floor shall be guarded by a railing constructed in accordance with section 50–204.27 and 50–204.29 on all open sides 5 feet or more above the adjacent floor or ground level, except where there is entrance to a ramp, stairway or fixed ladder. The railing shall be provided with a toe board wherever, beneath the open sides

(1) Persons can pass,

(2) There is moving machinery, or

(3) There is equipment with which falling materials could create a hazard.

(b) The intermediate railing and the toe board required by sections 50–204.27 and 50–204.29 may be omitted where materials have to be regularly passed over the edge of the floor (as in lumber storage), or

...r more from the ...

(c) The entire railing may be temporarily removed from particular sections of open-sided floors where regular operating conditions make a permanent railing wholly impracticable.

Section 50-204.26 Runway guarding

Every runway shall be guarded by a railing constructed in accordance with sections 50-204.27 and 50-204.29 on all open sides 5 feet or more above floor or ground level. Wherever tools, machine parts or materials are likely to be used on the runway, a toe board shall also be provided on each exposed side.

(a) Runways, used exclusively for special purposes (such as oiling, shifting or filling tank cars), may have the railing on one side omitted where operating conditions necessitate such omission, providing there is no falling hazard.

RAILINGS AND GUARDS

Section 50-204.27 Standard railing

A standard railing shall consist of top rail, intermediate rail and posts, having a vertical height of 42 inches from upper surface of top rail to floor, platform, runway or ramp level. The top rail shall be smooth surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and floor, platform, runway or ramp. The ends of the rails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard.

Section 50-204.28 Stair railing

A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

(a) Intermediate rails shall not be required where stairways are 22 inches or less in width.

Section 50-204.29 Strength of standard railing and stair railing

The strength of standard railings and stair railings under different types of construction is specified as follows:

(a) Wood railing: For wood railings, the posts shall be of at least 2 inch by 4 inch stock spaced not to exceed 8 feet; the top rails shall be of at least 2 inch by 4 inch stock or of two right angle pieces of at least 1 inch by 4 inch stock and the intermediate rails shall be of at least 2 inch by 2 inch stock or of at least 1 inch by 4 inch stock.

(b) Pipe railing: For pipe railings, the posts and top rails shall be metal pipe of at least 1¼ inches inside diameter and the intermediate rails shall be metal pipe of at least 1 inch inside diameter. The spacing of posts shall not exceed 8 feet.

(c) Structural metal railings: For structural metal railings, the posts and top rails shall be angle iron of at least 1½ inches by 1½ inches by 3/16 inch or other structural shapes of equivalent bending strength; and the intermediate rails shall be angle iron of at least 1¼ inches by 1¼ inches by ⅛ inch or other structural shapes of equivalent bending strength. The spacing of posts shall not exceed 8 feet.

(d) *Anchor posts:* The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point of the top rail.

(e) *Toe board:* A toe board shall be 4 inches in vertical height from top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than ¼ inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in length.

ELEVATORS

Section 50-204.34 Elevator inspection

Elevator inspection by a competent elevator inspection service or maintenance contract on an annual basis will be acceptable as evidence of satisfactory installation and maintenance.

Section 50-204.35 Hoistways

All hoistway openings at the floor level to the elevator shall be protected by doors or gates either manually or mechanically operated, and interlocked with the elevator control so that it is impossible to start the elevator until the door or gate is locked in the closed

... it impossible to open the door or gate when the car is not at the landing.

Section 50–204.36 Under car safety device

All elevators other than hydraulic elevators shall be equipped with an under car safety device operated by speed governor control that will hold the elevator in case of cable failure or over speeding.

Section 50–204.37 Hatch limit controls

All types of elevators shall be equipped with upper and lower travel limit devices that will normally bring the car to rest at either terminal, and a final limit switch that will prevent the movement in either direction if opened by the car as the result of excessive over travel in either direction.

ILLUMINATION

Section 50–204.42 Minimum standards

(a) Illumination shall be provided and distributed to all working areas as required in these regulations.

(b) Seeing tasks requiring discrimination of fine detail under conditions of fair contrast and where the nature of the work is very exacting and prolonged shall be provided with a minimum of 100 foot-candles of illumination.

(c) Seeing tasks requiring moderate discrimination of detail over prolonged periods of time and under conditions of moderate contrast shall be provided with a minimum of 50 foot-candles of illumination.

(d) Seeing tasks requiring moderate discrimination of detail over intermittent periods of time and under conditions of normal contrast shall be provided with a minimum of 30 foot-candles of illumination.

(e) Casual seeing tasks not involving discrimination of fine detail shall be provided with a minimum of 10 foot-candles of illumination.

(f) Rough seeing tasks not requiring critical seeing shall be provided with a minimum of 5 foot-candles of illumination

LADDERS

Section 50–204.47 Construction and use of portable ladders

Portable ladders shall be substantially built, set level and well secured.

Section 50–204.48 Rails of portable ladders

Rails of portable ladders shall always project at least three feet above working level and shall be of sound material.

Section 50–204.49 Painting of wooden ladders

Wooden ladders shall not be painted, as painting covers up defects. Linseed oil or oil stain shall be used instead.

Section 50–204.50 Stepladders

All stepladders shall be provided with an automatic locking device or spreader of not more than 40 degrees to hold the front and back sections in open position.

Section 50–204.51 Fixed ladders

(a) Rest platforms: If fixed ladders are used to ascend to heights exceeding 30 feet, a landing or rest platform shall be provided for each 30 feet or fraction thereof unless the ladder is provided with safety cages.

(b) Rails: Rails of fixed ladders to landings shall extend a distance of at least 3 feet above the landing.

(c) Rungs: The rungs may be omitted above the landing. Where an employee must step a greater distance than 14 inches from the ladder to roof, tank, hoist, etc., a landing shall be provided.

(d) Guard rails: All fixed ladder landings shall be equipped with a standard guard rail and toe boards, so arrange as to give the safest possible access to the ladder. Such platforms shall not be less than 24 inches in width.

AISLES AND PASSAGEWAYS

Section 50–204.56 Maintenance

Permanent aisles and passageways shall be kept clear and in good repair, with no obstructions across or in aisles that might cause tripping. Where, due to lack of proper identification, aisles and passageways are likely to becomes hazardous, they shall be clearly defined by painted lines, curbings, or other methods of marking.

Section 50–204.57 Aisle widths

Where industrial trucks are in customary use, one-way traffic aisles shall be at least 2 feet wider than the widest vehicle. Two-way aisles shall be at least 3 feet wider than twice the width of the widest vehicle.

...MATERIAL STORAGE

Section 50–204.62 Height

(a) All material in bags, containers, or bundles, stored in tiers, shall be stacked, blocked, interlocked, and limited in height so that it is stable, so that it is secure against sliding or collapse.

(b) Where automatic sprinkler protection is provided, clearance of at least 18 inches shall be maintained between the tops of materials and the underside of lowest beams or other overhead structures. Where reliance is placed on hose streams, clearance of at least 3 feet shall be maintained between the tops of piles and the underside of the lowest beams, girders, or other obstructions which restrict the play of hose streams over the material.

Section 50–204.63 Small articles

Small articles shall be stored in containers suitable to the material, such as small cans or trays that can be stacked.

Section 50–204.64 Pipe and other long stock

Pipe and other long stock shall be stored in suitable racks or blocked to prevent spreading or rolling. Projecting ends shall be protected by location, railings, or barriers.

Section 50–204.65 Hazardous chemicals

Hazardous chemicals shall be distinctively marked to indicate their nature and stored in containers or locations suitable to the material.

Section 50–204.66 Gases in cylinders

(a) Cylinders shall be supported in an upright position so as to prevent them from falling or rolling.

(b) Cylinders shall be kept away from excessive heat, such as the direct rays of the sun.

(c) Cylinders shall be stored away from combustible materials.

(d) Empty cylinders shall be plainly marked "EMPTY," and the valves shall be closed. The empty cylinders shall be segregated from the full cylinders and returned to the supplier as soon as practicable.

(e) Valve covers shall be kept in place at all times when the cylinder is not in use.

OUTDOOR STORAGE

Section 50–204.71 Aisle spacing

Aisles shall be maintained between piles, between buildings, and between piles and the boundary of the storage site. Aisles shall be wide so as to reduce the danger of spread of fire from pile to pile and to permit ready access for fire fighting or emergency removal of material.

Section 50–204.72 Housekeeping

The entire storage site shall be kept free from unnecessary accumulations of combustible materials. Weeds and grass shall be kept down and the area kept clean.

Section 50–204.73 Drainage

Proper drainage shall be provided.

Section 50–204.74 Clearance signs

Clearance signs to warn of clearance limits shall be provided.

Section 50–204.75 Derail and bumper blocks

Derail and bumper blocks shall be provided on spur tracks.

Section 50–204.76 Traffic control signs

Traffic control signs to warn pedestrian, vehicular, and railroad traffic shall be provided.

Section 50–204.77 Open pits, tanks, vats, ditches, etc.

Covers or guard rails shall be provided to protect all open pits, tanks, vats, ditches, etc. near which people are regularly employed.

FLAMMABLE LIQUIDS

Section 50–204.82 Sources of ignition

All sources of ignition shall be prohibited in areas where flammable liquids are stored, handled, and processed. Suitable warning and "No Smoking" signs shall be posted in all such areas.

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Section 50–204.83 Vegetation removal

The areas where flammable liquids are stored, handled, or processed shall be left clear of rubbish, brush, long grass, or other combustible material at all times.

Accumulations of flammable liquids on floors, walls, and other surfaces, are prohibited. All spills of flammable liquids shall be cleaned up immediately.

Section 50-204.85 Electrical lighting

Electrical lighting shall be the only means used for artificial illumination in areas where flammable liquids, vapors, fumes, dust, or gases are present. All electrical equipment and installations shall be of the explosion proof type.

Section 50-204.86 Ventilation

All buildings, rooms and compartments where flammable liquids are stored, processed, or used shall be properly ventilated to prevent accumulation of flammable vapors.

Section 50-204.87 Refuse storage

In buildings, shops, or rooms where flammable liquids are handled or stored, a self-closing metal refuse can shall be provided and maintained in good condition.

Section 50-204.88 Open flame devices prohibited

Open flame heating devices shall not be used in areas where flammable liquids are present.

Section 50-204.89 Bonding and grounding

Storage tanks and systems shall be electrically bonded and grounded.

Section 50-204.90 Relief vents

Storage tanks shall be equipped with proper relief vents. Tank vents shall not be located close to open flames, stacks, heating apparatus, or any other source of ignition. Vent screens shall not be painted.

Section 50-204.91 Storage in other than flammable storage buildings

A ventilated steel cabinet or a cabinet lined with noncombustible material shall be provided for the storage of more than a total of 10 gallons of flammable liquids in buildings used for other than storage. Not more than a total of 50 gallons shall be stored in any one cabinet, nor shall any individual container exceed 5 gallon capacity in such a cabinet. Containers must be of metal and kept tightly closed. Storage in drums of over 50 gallons of flammable liquids shall be outside the work room.

Section 50-204.92 Safety containers

Handling of all flammable liquids by hand containers shall be in approved type safety containers substantially constructed to avoid the danger of leakage and designed to minimize the likelihood of spilling.

PAINTS AND PAINTING

Section 50-204.97 Storage of paints, varnishes, lacquers, thinners, etc.

Packages containing paints, varnishes, lacquers, thinners, or other volatile materials shall be kept tightly closed when not in actual use.

Section 50-204.98 Storage locations

Sealed containers of paints, varnishes, lacquers, thinners, and other flammable paint materials, shall be kept in a well-ventilated location, free from excessive heat, smoke, sparks, flame, or direct rays of the sun.

Section 50-204.99 Storage of flammable paint materials in opened containers

Flammable paint materials, when in excess of 10 gallons and not exceeding 50 gallons, shall be stored in a ventilated steel cabinet, or a cabinet lined with noncombustible material. Containers shall be kept tightly closed when not in use.

Section 50-204.100 Paint-soiled clothing and drop cloth

Paint-soiled clothing and drop cloths, when not in use, shall be stored in well-ventilated steel cabinets.

Section 50-204.101 Housekeeping

Paint scrapings and paint saturated debris shall be removed from the premises daily.

Section 50-204.102 Ventilation of harmful substances

Ventilation adequate to reduce the concentration of harmful substances in the atmosphere shall be provided, as referred to in section 50-204.86.

Section 50-204.103 Ventilation of flammable vapors

Ventilation adequate to prevent the accumulation of flammable vapors to hazardous levels of concentration shall be provided in all areas where spray painting, dipping or similar processes are performed.

Section 50-204.104 Smoking or open flames prohibited

No smoking, open flame, exposed flame heating elements, or other sources of ignition of any kind shall be permitted in areas or rooms where spray painting, paint dipping or similar processes are done.

... equipment

... switches, or electrical equipment are necessary where indoor spray painting, paint dipping or similar processes are performed, they shall be of the explosion-proof type.

Section 50–204.106 Electric motors

Electric motors driving exhaust fans shall not be placed inside booths or ducts exhausting flammable materials.

Section 50–204.107 Enclosure driving belts

Belts shall not enter duct or booth exhausting flammable materials unless belt and pulley within the duct or booth are thoroughly enclosed.

Section 50–204.108 Storage of combustible and flammable cleaning materials

Combustible and flammable cleaning materials at the establishment shall be stored in tightly closed metal containers.

FIRE PREVENTION

Section 50–204.113 Equipment general

Fire fighting equipment suitable to the conditions and hazards involved shall be provided and maintained in an effective operating condition. A systematic inspection of these devices is required.

Section 50–204.114 First-aid fire fighting extinguishers, general rules

The following general rules shall be applied to all types of first-aid fire extinguishers:

(a) Persons who may have occasion to use any fire extinguisher shall have knowledge of the proper way to use the device effectively.

(b) The instructions of the manufacturer of the extinguisher as to charging, maintenance and operations shall be followed exactly. All extinguishers shall be examined at least once a year to determine positively that they are in operating condition.

(c) Frequent inspections shall be made to determine that extinguishers are in their designated places, are readily accessible, have not been damaged or tampered with, and that nozzles are not clogged.

Section 50–204.115 Classification of extinguishers

Listed below are various classes of fires and the extinguishing equipment which shall be maintained appurtenant to the various materials identified.

(a) *Class "A" Fires.* Fires in ordinary combustible materials where the quenching and cooling effects of quantities of water or solutions containing large percentage of water are of first importance. Required extinguishing equipment—soda and acid, pump tank extinguishers or water barrels and buckets.

(b) *Class "B" Fires.* Fires in flammable liquids, greases, and similar materials, where blanketing effect is essential. Required extinguishing equipment—foam, carbon tetrachloride, CO_2, dry powder type extinguishers, or sand buckets and scoops. Carbon tetrachloride extinguishers shall not be used in a confined area.

(c) *Class "C" Fires.* Fire in electrical equipment where the use of nonconducting extinguishing agent is of first importance. Required extinguishing equipment—CO_2, or dry powder pressure-type extinguishers.

PRESSURE VESSELS

Section 50–204.120 Boilers

Boiler inspection and approval on an annual basis by a recognized boiler inspection service will be acceptable evidence of satisfactory installation and maintenance.

Section 50–204.121 Steam cookers, digesters, glue pots, etc.

All pressure vessels to which steam is supplied from an outside source shall be designed for the maximum line pressure to which the vessel will be subjected. On such vessels it is required that, in addition to the necessary pressure reducing valve, a safety valve be installed on the vessel itself or on the line between it and the pressure reducer. There shall be no means of cutting off or bypassing this safety valve. Inspection and adequate maintenance of the vessel, including regular testing of the safety valve, are mandatory.

Section 50–204.122 Unfired pressure vessels

(a) Air receivers shall be so installed that all drains, handholes, and manholes therein are easily accessible.

(b) Air receivers shall be supported with sufficient clearance to permit a complete external inspection and to avoid corrosion of external surfaces.

(c) Under no circumstances shall air receivers be buried underground or located in an inaccessible place.

(d) The receiver shall be located as close to the compressor or aftercooler as is possible to keep the discharge short.

(e) The receiver shall be located in a cool place to facilitate the condensation of moisture and oil vapors.

TOOLS AND EQUIPMENT

Section 50–204.127 Maintenance

Each employer shall be responsible for the safe condition of the tools used by his employees, whether furnished by him or by them, and be sure that such tools are suited by safe design and construction for the work to be done.

Section 50–204.128 Portable electric power tools

(a) Electric power tools showing worn, deteriorated or inadequate insulation, split or chipped plugs, worn or bent plugs, terminals, defective switch, shall be repaired.

(b) Portable electric power tools shall be effectively grounded to maintain at all times an effective ground on the noncurrent carrying parts of the tools.

Section 50–204.129 Portable pneumatic tools

(a) The operating trigger on portable hand-operated pneumatic equipment shall be so located as to minimize the possibility of accidental operation and shall be arranged to close the air inlet valve automatically when the pressure of the operator's hand is removed.

(b) A tool retainer shall be installed on each piece of pneumatic equipment which, without such a retainer, may eject the tool.

(c) No tool change or work other than regular operations shall be made or done on any piece of portable hand-operated pneumatic equipment unless the stop valve in the air line supplying that equipment is closed.

Section 50–204.130 Cables, ropes, and chains

(a) Chains, ropes, cables, hooks, rings, slings, and other devices and accessories used for hoisting and lifting shall not be subjected to greater working loads than recommended by their manufacturers. They shall be frequently inspected and shall be renewed when inspection reveals unsafe conditions.

(b) Bolts or nails shall not be used to connect, splice, or shorten chains. Knots shall not be tied in the chain.

(c) A hoist cable shall be considered unsafe and shall be replaced when upon inspection 10 percent or more of the total number of wires are broken in a length equal to eight diameters of the cable, or when the wires on the crown of the strand are worn down to less than 60 percent of their original diameter.

(d) Crane hoist cable shall be lubricated and inspected at frequent intervals.

VENTILATION AND PROTECTION IN WELDING AND CUTTING

Section 50–204.135 Welding and cutting in confined spaces

For the purpose of this section a confined space shall mean:

(a) A space of less than 10,000 cubic feet per welder, or

(b) A space having an overhead height of less than 16 feet, or

(c) A space in which there are structural barriers to the extent that they significantly obstruct cross ventilation.

Section 50–204.136 Ventilation in confined spaces

All welding and cutting operations carried on in confined spaces shall be adequately mechanically ventilated to prevent the accumulation of toxic gases or possible oxygen deficiency or air supplied respirators approved by the U.S. Bureau of Mines shall be provided to the welder and all other personnel in the immediate vicinity.

Section 50–204.137 Mechanical ventilation

Mechanical ventilation shall consist of either general ventilation systems or local exhaust systems.

(a) General ventilation shall be at the minimum rate of 2,000 cubic feet per minute per welder.

(b) Local exhaust shall consist of freely movable hoods intended to be placed by the welder as near as practicable to the work being welded and provided with a rate of air flow sufficient to maintain a velocity in the direction of the hood of 100 linear feet per minute in the zone of welding when the hood is at its most remote distance from the point of welding.

and cutting involving
...cance

(a) ...g and cutting involving the following metals whether or not in confined spaces or in other enclosed spaces shall be done in accordance with the provisions of sections 204.136 and 204.137.

(1) Zinc-bearing base of filler metals or metals coated with zinc-bearing materials.

(2) Lead base metals.

(3) Cadmium-bearing filler materials.

(b) Welding or cutting involving the following metals in confined spaces shall be done using local exhaust ventilation or air-line respirators approved by the U.S. Bureau of Mines.

(1) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials, including paint.

(2) Cadmium-bearing or ...adium-coated base metals.

(3) Metals coated with mercury-bearing metals, including paint.

(4) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air-line respirators.

Section 50–204.139 Protection to other employees

In all cases employees in the immediate vicinity of welding operations shall be protected in accordance with sections 50–204.269 and 50–204.298.

Section 50–204.140 Inert-gas metal-arc welding

Since the inert-gas metal-arc welding process involves the production of ultraviolet radiation of intensities five to thirty times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process unless:

(a) The use of chlorinated solvents is kept at least 200 feet from the exposed arc; surfaces prepared with chlorinated solvents are thoroughly dry before welding is permitted on such surface.

(b) Shaded goggles with side shields are worn by helpers and others in the area not protected from the arc by screening.

(c) Protective clothing is worn by welders and others within the area exposed to radiation so that the skin is covered completely to prevent burns and other other damage by ultraviolet rays; shirts worn are dark in color to reduce reflection to the face from underneath the helmet; exposed cotton clothing is covered since it disintegrates rapidly when exposed to high intensities of ultraviolet rays; welding helmets and hand shields are free of leaks and openings, and free of highly reflective surfaces.

(d) Local exhaust ventilation or supplied air respirators are provided in all cases when doing inert-gas metal-arc welding of stainless steel to protect against dangerous concentrations of nitrogen dioxide.

Section 50–204.141 General welding and cutting

Welding and cutting not involving conditions or materials described in sections 50–204.135 and 50–204.138 may normally be done without special precautions, but where, because of unusual physical or atmospheric conditions, a harmful accumulation of contaminants would exist, mechanical ventilation or suitable respiratory protective equipment shall be provided.

ELECTRICAL INSTALLATION AND EQUIPMENT

Section 50–204.148 Electrical installation and equipment

Electrical conductors and equipment installed within or on buildings and other premises and the conductors that connect the installation to a supply of electricity and other outside conductors adjacent to the premises shall conform to the minimum requirements of the National Electrical Code, 1959 Edition, National Fire Protection Association.

MECHANICAL POWER TRANSMISSION APPARATUS

Section 50–204.158 Flywheels

Flywheels located so that any part is 7 feet or less above floor or platform shall be guarded in one of the following ways:

(a) With an enclosure of sheet, perforated, or expanded metal, or woven wire. For standards, see sections 50–204.179 and 50–204.180.

(b) With guard rails placed not less than 15 inches

...rom rim. When flywheel ex... within 12 inches of floor, a standard toe board shall also be provided. For standards, see section 50-204.185.

(e) An adjustable guard to be used for starting the engine or for running adjustment may be provided at the flywheel of gas or oil engines. A slot opening for the jack bar will be permitted.

(d) Wherever flywheels are above working areas, guards shall be installed having sufficient strength to hold the weight of the flywheel in the event of a shaft or wheel mounting failure.

Section 50-204.154 Cranks and connecting rods

Cranks and connecting rods, when exposed to contact, shall be guarded in accordance with sections 50-204.179 and 50-204.180 or by a guard rail as described in section 50-204.185.

Section 50-204.155 Tail rods or extension piston rods

Tail rods or extension piston rods shall be guarded in accordance with sections 50-204.179 and 50-204.181 or by a guard rail on sides and end, with a clearance of not less than 15 nor more than 20 inches when rod is fully extended.

Section 50-204.156 Governor balls

Governor balls 6 feet or less from the floor or other working level, when exposed to contact shall be provided with an enclosure extending to the top of the governor balls when at their highest position. The materials used in the construction of this enclosure shall conform to sections 50-204.179 and 50-204.181.

Section 50-204.157 Shafting installation

(a) Each continuous line of shafting shall be secured in a position against excessive end-wise movement.

(b) Inclined and vertical shafts, particularly inclined idler shafts, shall be securely held in position against endwise thrust.

Section 50-204.158 Guarding horizontal shafting

(a) All exposed parts of horizontal shafting 7 feet or less from floor or working platform, excepting runways used exclusively for oiling, or running adjustments, shall be protected by a stationary casing enclosing shafting completely or by a trough enclosing sides and top or sides and bottom of shafting as location requires.

(b) Wherever shafting extends over a driveway, it shall be protected as stated above unless it is located 15 feet or more above driveway.

(c) Shafting under bench machines shall be enclosed by a stationary casing, or by a trough at sides and top or sides and bottom, as location requires. The sides of the trough shall come within at least 6 inches of the underside of table, or if shafting is located near floor, within 6 inches of floor. In every case the sides of the trough shall extend at least 2 inches beyond the shafting or protuberance. For requirements regarding materials and construction, see sections 50-204.179 and 50-204.181.

Section 50-204.159 Guarding vertical and inclined shafting

Vertical and inclined shafting 7 feet or less from floor or working platform, excepting maintenance runways, shall be enclosed with a stationary casing in accordance with requirements of sections 50-204.179 and 50-204.181.

Section 50-104.160 Projecting shaft ends

(a) Projecting shaft ends shall present a smooth edge and end and shall not project more than one-half the diameter of the shaft unless guarded by non-rotating caps or safety sleeves.

(b) Unused key-ways shall be filled up or covered.

Section 50-204.161 Power-transmission apparatus located in basements

All mechanical power transmission apparatus located in basements, towers, and rooms used exclusively for power transmission equipment shall be guarded in accordance with these standards, except that the requirements for safeguarding belts, pulleys, and shafting may be omitted if the following conditions are met:

(a) The basement, tower, or room occupied by transmission equipment is locked against unauthorized entrance.

(b) The vertical clearance in passageways between the floor and power transmission beams, ceiling, or any other objects, is not less than 5 feet 6 inches.

(c) The footing is dry, firm, and level.

(d) The route followed by the oiler is protected in such manner as to prevent accidents.

Section 50-204.162 Pulleys

Any parts of which are 7 feet or less from the floor or working platform shall be guarded in accordance with the standards specified under section 50-204.179 and 50-204.181. Pulleys serving as balance wheels (e.g., punch presses) on which the point of contact between belt and pulley is more than 6 feet 6 inches

... guarded with a disk
cover... ...section 50-204.180.

Section 50-204.163 Horizontal belts, ropes and chain drives

(a) Where both runs of horizontal belts are 7 feet or less from the floor level, the guard shall extend to at least fifteen inches above the belt or to a standard height (see table, section 50-204.181) except that where both runs of a horizontal belt are 42 inches or less from the floor, the belt shall be fully enclosed in accordance with sections 50-204.179 and 50-204.181. In power plants or power-development rooms, a guard rail may be used in lieu of the requirement in section 50-204.163.

(b) Overhead horizontal belts, with lower part 7 feet or less from the floor or platform, shall be guarded on sides and bottom in accordance with section 50-204.183.

(c) Horizontal overhead belts more than 7 feet above floor or platform shall be guarded for their entire length under the following conditions:

(1) If located over passageways or work places and traveling 1800 feet or more per minute.

(2) If center to center distance between pulleys is 10 feet or more.

(3) If belt is 8 inches or more in width. For detail of guard construction and for sizes of material see section 50-204.183 and table following section 50-204.184.

(d) Where the upper and lower runs of horizontal belts are so located that passage of persons between them would be possible, the passage shall be either:

(1) Completely barred by a guard rail or other barrier in accordance with sections 50-204.179 and 50-204.181, or

(2) Where passage is regarded as necessary, there shall be a platform over the lower run guarded on either side by a railing completely filled in with wire mesh or other filler, or by a solid barrier. The upper run shall be so guarded as to prevent contact therewith either by the worker or by objects carried by him. In power plants, only the lower run of the belt need be guarded.

Section 50-204.164 Overhead chain and link belt drives

Overhead chain and link belt drives are governed by the same rules as overhead horizontal belts and shall be guarded in the same manner as belts (section 50-204.163).

Section 50-204.165 Vertical and inclined belts

(a) Vertical and inclined belts shall be enclosed by a guard conforming to standards in sections 50-204.179 and 50-204.181.

(b) All guards for inclined belts shall be arranged in such a manner that a minimum clearance of 7 feet is maintained between belt and floor at any point outside of guard.

Section 50-204.166 Vertical belts

Vertical belts running over a lower pulley more than 7 feet above floor or platform shall be guarded at the bottom in the same manner as horizontal overhead belts, if conditions are such as stated in section 50-204.163(c) (1), (2), and (3).

Section 50-204.167 Cone-pulley belts

(a) The cone belt and pulley shall be equipped with a belt shifter so constructed as to guard adequately the nip-point of the belt and pulley. If the frame of the belt shifter does not adequately guard the nip-point of the belt and pulley, the nip-point shall be further protected by means of a vertical guard placed in front of the pulley and extending at least to the top of the largest step of the cone.

(b) If the belt is of the endless type or laced with rawhide laces, and a belt shifter is not desired, the nip-point of the belt pulley shall be protected by a nip-point guard located in front of the cone extending at least to the top of the largest step of the cone, and formed to show the contour of the cone in order to give the nip-point of the belt and pulley the maximum protection.

(c) If the cone is located less than 3 feet from the floor or working platform, the cone pulley and belt shall be guarded to a height of 3 feet regardless of whether the belt is endless or laced with rawhide.

Section 50-204.168 Gears

Gears shall be guarded in accordance with one of the following specifications:

(a) A complete enclosure.

(b) A standard guard as described in section 204.-181 at least 7 feet high extending 6 inches above the mesh point of the gears.

(c) By a band guard covering the face of the gear and having flanges extended inward beyond the root of the teeth on the exposed side or sides. Where any portion of the train of gears guarded by a band guard is less than 6 feet from the floor a disk guard or a complete enclosure to the height of 6 feet shall be required.

Section 50-204.169 Sprockets and chains

All sprocket wheels and chains shall be enclosed unless more than 7 feet above the floor or platform. Where the drive extends over other machines or working areas, protection against falling shall be provided.

Section 50-204.170 Openings for oiling

When frequent oiling must be made, openings with hinged or sliding self-closing covers shall be provided. All points not readily accessible shall have oil feed tubes if lubricant is to be added while machinery is in motion.

Section 50-204.171 Friction drives

(a) The driving point of all friction drives when exposed to contact shall be guarded.

(b) All arm or spoke friction drives and all web friction drives with holes in the web shall be entirely enclosed.

(c) All projecting bolts on friction drives where exposed to contact shall be guarded.

Section 50-204.172 Keys, set screws, and other projections

All projecting keys, set screws and other projections in revolving parts shall be removed or made flush or guarded by metal covers. This does not apply to keys or set screws within gear or sprocket casings or other enclosures, nor to keys, set screws, or oil cups in hubs of pulleys less than twenty inches in diameter where they are within the plane of the rim of the pulley.

Section 50-204.173 Collars

All revolving collars, including split collars, shall be cylindrical, and screws or bolts used in collars shall not project beyond the largest periphery of the collar.

Section 50-204.174 Couplings

(a) Shaft couplings shall be so constructed as to present no hazard from bolts, nuts, set screws, or revolving surfaces.

(b) Bolts, nuts, and set screws will, however, be permitted where they are covered with safety sleeves or where they are used parallel with the shafting and are countersunk or else do not extend beyond the flange of the coupling.

GUARD STANDARDS FOR MECHANICAL POWER TRANSMISSION

Section 50-204.179 Materials

(a) Standards conditions will be secured by the use of the following materials: Expanded metal, perforated or solid metal or wire mesh on a frame of angle iron or iron pipe securely fastened to floor or to frame of machine (see section 50-204.181).

(1) All metal shall be free from burrs and sharp edges.

(2) Wire mesh shall be of the type in which the wires are securely fastened at every cross point either by welding, soldering, or galvanizing, except in case of diamond or square wire mesh made of No. 14 gauge wire, ¾ inch mesh or heavier.

(b) Design of guards:

(1) Where it is necessary to change belts, make adjustments or apply oil or grease, guards shall have hinged sections or be removable.

(2) Guards shall be designed so as not to interfere with the usual machine operations, but give the maximum protection to the operator.

(c) Methods of manufacture:

(1) Filler material shall be expanded metal, sheet or perforated metal, or wire mesh and be securely fastened to frame.

(2) By welding to frame every 4 inches. By weaving through channel or angle frame, or if No. 14 gauge ¾ inch mesh or heavier is used, by bending entirely around rod frames.

(3) Where openings in pipe railing are to be filled in with expanded metal, wire or sheet metal, the filler material shall be made into panels with rolled edges or bound with "Y" or "U" edging of No. 24 gauge or heavier sheet metal fastened to the panels with bolts or rivets spaced not more than 5 inches center to center. The bound panels shall be fastened to the railing by sheet-metal clips spaced not more than 5 inches center to center.

(4) Where the design of guards requires filled material of greater area than 12 square feet, additional frame members shall be provided to maintain panel area within this limit.

(5) All joints of framework shall be made equivalent in strength to the material of the frame.

Section 50-204.180 Disk, shield, and "U" guards

(a) Disk guard: A disk guard shall consist of a sheet-metal disk not less than No. 22 gauge fastened by U bolts or rivets to spokes of pulleys, flywheels, or gears. Where possibility of contact with sharp edges of the disk exists, the edge shall be rolled or wired. In all cases the nuts shall be provided with lock nuts

which shall be placed on the unexposed side of the wheel.

(b) Shield guards.

(1) A shield guard shall consist of a frame filled in with wire mesh, expanded, perforated, or solid sheet metal.

(2) If area of shield does not exceed 6 square feet the wire mesh or expanded metal may be fastened in a framework of ⅜ inch solid rod, ¼ inch x ¾ inch x ⅛ inch angle iron or metal construction of equivalent strength.

(3) Metal shields may have edges entirely rolled around a ½ inch solid iron rod. All material of shield guard shall meet the requirements of section 50-204.181.

(c) U Guards: A U guard consisting of a flat surface with edge members shall be designed to cover the undersurface and lower edge of a belt, multiple chain, or rope drive. It shall be constructed of materials specified in table of section 50-204.181 and shall conform to the requirements of sections 50-204.183 and 50-204.184. Edges shall be smooth, and if size of guard requires, these edges shall be reinforced by rolling, wiring, or by binding with angle or flat iron.

Section 50-204.181 Approved materials

(a) Minimum Requirements. The materials and dimensions specified in this section shall apply to all guards except horizontal overhead belts, rope, cable or chain guards more than 7 feet above floor, or platform. (For the latter, see table following section 50-204.184.)

TABLE OF STANDARD MATERIALS AND DIMENSIONS

Material	Clearance from moving part at all points	Largest mesh or opening allowable	Minimum gauge (U.S. standard) or thickness	Minimum height of guard from floor or platform level
Woven wire	Under 2"	½"	No. 16	7'0".
	2"-4"	½"	No. 16	7'0".
	Under 4"	½"	No. 16	7'0".
	4"-15"	2"	No. 12	7'0".
Expanded metal	Under 4"	½"	No. 18	7'0".
	4"-15"	2"	No. 13	7'0".
Perforated metal	Under 4"	½"	No. 20	7'0".
	4"-15"	2"	No. 14	7'0".
Sheet metal	Under 4"		No. 22	7'0".
	4"-15"		No. 22	7'0".
Wood or metal strip crossed	Under 4"	⅜"	Wood ¾" / Metal No. 16	7'0".
	4"-15"	2"	Wood ¾" / Metal No. 16	7'0".
Wood or metal strip not crossed	Under 4"	⅜" width	Wood ¾" / Metal No. 16	7'0".
	4"-15"	1" width	Wood ¾" / Metal No. 16	7'0".
Standard rail	Min. 15" / Max. 20"	See Standard for Railings Section 204.185.		

(b) Framework:

(1) Minimum dimensions of material for the framework of all guards except as noted in subparagraph (5) of this paragraph shall be angle iron 1 inch x 1 inch x ⅛ inch, metal pipe of ¾ inch inside diameter or metal construction of equivalent strength.

(2) All guards shall be rigidly braced every 8 feet or fractional part of their height to some fixed part of machinery or building structure. Where guard is exposed to contact with moving equipment additional strength is necessary.

(3) The framework for all guards fastened to floor or working platform and without other support or bracing shall consist of 1⅛ inch x 1½ inch x ⅛ inch angle iron, metal pipe of 1⅛ inch inside diameter or metal construction of equivalent strength. All rectangular guards shall have at least 4 upright frame members each of which shall be carried to the floor and be securely fastened thereto.

guards shall have at least 3 supporting members carried to floor.

(5) Guards thirty inches or less in height and with a total surface not in excess of ten square feet may have a framework of ¾ inch solid rod, ¾ inch x ¾ inch x ⅛ inch angle or metal construction of equivalent strength. The filling material shall correspond to the requirements of the table contained in paragraph (a) of this section.

(c) The specifications given in paragraphs (a) and (b) of this section are the minimum requirements; where guards are exposed to unusual wear, deterioration or impact, heavier material and construction shall be used to protect amply against the specific hazards involved.

Section 50–204.182 Wood guards

(a) Wood guards may be used in the woodworking and chemical industries, in industries where the presence of fumes or where manufacturing conditions would cause the rapid deterioration of metal guards; also in construction work and in locations outdoors where extreme cold or extreme heat makes metal guards and railings undesirable. In all other industries, wood guards will not be allowed.

(b) Material and construction.

(1) Wood shall be sound, tough, and free from any loose knots.

(2) Guards shall be made of planed lumber not less than one inch rough board measure and edges and corners rounded off.

(3) Wood guards shall be securely fastened together with wood screws, hard wood dowel pins, bolts, or rivets.

(4) While no definite dimensions are given under this heading for framework or filler materials, wood guards shall be equal in strength and rigidity to metal guards specified in section 50–204.181(a)(b)(c).

(5) For construction of standard wood railing, see section 50–204.185.

Section 50–204.183 Guards for horizontal overhead belts

(a) Guards for horizontal overhead belts shall run the entire length of the belt and follow the line of the pulley to the ceiling or be carried to the nearest wall, thus enclosing the belt effectively. Where belts are so located as to make it impracticable to carry the guard to wall or ceiling, construction of the guard shall be such as to enclose completely the top and bottom runs of belt and the face of pulleys. See section 50–204.163 (b) and (c).

(b) The guard and all its supporting members shall be securely fastened to wall or ceiling by gimlet-point lag screws or through bolts. In case of masonry construction, expansion bolts shall be used.

(c) Suitable reinforcement shall be provided for the ceiling rafters or overhead floor beams, where such is necessary, to sustain safely the weight and stress likely to be imposed by the guard. The interior surface of all guards, by which is meant the surface of the guard with which a belt will come in contact, shall be smooth and free from all projections of any character, except where construction demands it; protruding shallow round-head rivets may be used. Overhead belt guards shall be at least one-quarter wider than the belt which they protect, except that this clearance need not in any case exceed 6 inches on each side. Overhead rope drive and block and roller-chain-drive guards shall be not less than 6 inches wider than the drive on each side.

In overhead silent chain-drive guards where the chain is held from lateral displacement on the sprockets, the side clearances required on drives of 20 inch centers or under shall not be less than ¼ inch from the nearest moving chain part and on drives of over 20 inch centers a minimum of ½ inch from the nearest moving chain part.

(d) The table following section 50–204.184 gives sizes of materials to be used and general construction of guards for belts 10 inches or more in width. No material for overhead belt guards should be smaller than that specified in this table for belts 10 to 14 inches wide, even if the belt is less than 10 inches in width. However, No. 20 gauge sheet metal may be used as a filler on guards for belts less than 10 inches wide. Expanded metal, because of the sharp edges, shall not be used as a filler in horizontal belt guards.

(e) For clearance between guards and belts, ropes or chains of various center to center dimensions between the shafts, see bottom of table following section 50–204.184.

Section 50–204.184 Guards for horizontal overhead rope and chain drives

Overhead-rope and chain-drive guard construction shall conform to section 50–204.183 for overhead-belt guard construction of similar width, except that the

filler ... ...e solid type as shown in table following section 50-204.181(a) unless the fire hazard demands the use of open construction. A side guard member of the same solid filing material shall be carried up in a vertical position 2 inches above the level of the lower run of the rope or chain drive and 2 inches within the periphery of the pulleys which the guard encloses thus forming a trough. These side filler members shall be reinforced on the edges with 1½ inch x ¼ inch flat steel, riveted to the filling material at not greater than 8 inch centers; the reinforcing strip shall be fastened or bolted to all guard supporting members with at least one ⅜ inch rivet or bolt at each intersection, and the ends shall be secured to the ceiling with lag screws or bolts. The filling materials shall be fastened to the framework of the guard and the filler supports by 3/16 inch rivets spaced on 4 inch centers. The width of the multiple drive shall be determined by measuring the distance from the outside of the first to the outside of the last rope or chain in the group accommodated by the pulley.

Section 50-204.185 Guard rails and toe boards

(a) Guard rails shall be 42 inches in height, with mid-rail between top rail and floor.

(b) Posts shall be not more than 8 feet apart; they are to be permanent and substantial, smooth, and free from protruding nails, bolts, and splinters. If made of pipe, the post shall be 1¼ inches inside diameter, or larger. If made of metal shapes or bars, their section shall be equal in strength to that of 1½ by 1½ by 3/16 inch angle iron. If made of wood, the posts shall be 2 x 4 inches or larger. The upper rail shall be 2 x 4 inches or two 1 x 4 strips, one at the top and one at the side of posts. The mid-rail shall be 1 x 4 inches or more. The rails (metal shapes, metal bars, or wood), shall be on that side of the posts which gives the best protection and support. Where panels are filled with expanded metal or wire mesh as noted in table, section 204.181 the middle rails may be omitted. Where guard is exposed to contact with moving equipment, additional strength may be necessary.

(c) Toe boards shall be 4 inches or more in height, of wood, metal, or of metal grill not exceeding 1 inch mesh.

MISCELLANEOUS MACHINE GUARDING

Section 50-204.190 Lathes and automatic screw machines

(a) Chucks and face plates shall be free from projections, and dogs, if used, shall be of the safety type only—circular in shape with no projections beyond the periphery.

(b) Chip guards to catch flying chips, particularly in the case of the high speeds used in the softer metals, shall be provided.

(c) Rotating stock in turret lathes and automatic screw machines shall be completely enclosed in pipe long enough to contain the longest stock used.

(d) Suitable shields and oil catchers shall be provided to prevent slipperiness from oil thrown from the automatic screw machines.

Section 50-204.191 Drill presses

(a) All projections on the rotating spindle and as much as possible of the spindle itself should be guarded.

(b) Spindle drive belts, when in range of the operator's head or body, shall be guarded to protect the operator from both contact and breakage.

Section 50-204.192 Planers and shapers (metal)

(a) The spaces between the ways of planer frames shall be filled in smoothly with heavy sheet metal to eliminate the shear hazard.

(b) Where there is not a 12-inch clearance between a fixed object and the planer table and the work carried on the table, a railing shall be provided between the fixed object and the table and the work on the table to protect workers passing between the fixed object and the planer.

Section 50-204.193 Shears

(a) Alligator shears shall be guarded by running a heavy U-shaped metal strap horizontally around the moving (upper) jaw with the lower edge of the strap just far enough above the cutting edge of the fixed (lower) jaw to allow the material to be inserted in the shears.

(b) Squaring shears shall be provided with a fixed barrier which clears the top of the table by not more than ⅛ inch plus the minimum thickness of material for which used. Automatic clamps shall be acceptable as guards when cutouts are filled in so that fingers of the operator cannot enter the danger zone.

GUARD REQUIREMENTS FOR HORIZONTAL OVERHEAD BELTS, ROPES, AND CHAINS 7 FEET OR MORE ABOVE FLOOR OR PLATFORM

Members	Width			Material
	Over 10" to 14" incl.	Over 14" to 24" incl.	Over 24"	
Framework	1½" x 1½" x ¼"	2" x 2" x 5/16"	3" x 3" x ⅜"	Angle iron.
Filler (belt guards)	1½" x 5/16"	2" x 5/16"	2" x 5/16"	Flat iron.
Filler and vertical side member	No. 20 A.W.G.	No. 18 A.W.G.	No. 18 A.W.G.	Solid sheet metal.
Filler supports	2" x 5/16" flat iron	2" x ⅜" flat iron	2½" x 2½" x ¼" angle.	Flat and Angle.
Guard supports	2" x 5/16"	2" x ⅜"	2½" x ⅜"	Flat iron
FASTENINGS				
Filler supports to framework	(2) 5/16"	(2) ⅜"	(3) ½"	Rivets.
Filler flats to supports (belt guards)	(1) 5/16"	(1) ⅜"	(2) ⅜"	Flush rivets.
Filler to frame and supports (rope and chain guards).	5/16" rivets spaced	8" centers on sides and 4" centers on bottom.		
Guard supports to framework	(2) ⅜"	(2) 7/16"	(2) ⅜"	Rivets or bolts.
Guard and supports to overhead ceiling.	½" x 3¼" lag screws or ½" bolts.	⅝" x 4" lag screws or ⅝" bolts.	½" x 6" lag screws or ¾" bolts.	Lag screws or bolts.
DETAILS—SPACING, ETC.				
Width of guards	one-quarter wider than belt, rope, or chain drive.			
Spacing between filler supports	20" C. to C.	16" C. to C.	16" C. to C.	
Spacing between filler flat (belt guards).	2" apart	2½" apart	3" apart	
Spacing between guard supports	36" C. to C.	36" C. to C.	36" C. to C.	
OTHER BELT GUARD FILLING PERMITTED				
Sheet metal fastened as in rope and chain guards.	No. 20 A.W.G.	No. 18 A.W.G.	No. 18 A.W.G.	Solid or perforated.
Woven wire, 2" mesh	No. 12 A.W.G.	No. 10 A.W.G.	No. 8 A.W.G.	

CLEARANCE FROM OUTSIDE OF BELT, ROPE, OR CHAIN DRIVE TO GUARD				
Distance center to center of shafts	Up to 15' incl.	Over 15' to 25' incl.	Over 25' to 40' incl.	Over 40'.
Clearance from belt, rope, or chain to guard.	6"	10"	15"	20".

Section 50–204.194 Guillotine cutters, power-driven

(a) Power-driven guillotine cutters shall be equipped with a guard or device which will prevent the hands of the workers from entering the zone traveled by the knife while the knife is in motion. This may be a fixed barrier or it may consist of a two-handed device requiring the simultaneous use of the worker's two hands at points outside the zone of danger.

(b) In addition to the point of operation guard or device described in section 50–204.194(a), the power-driven guillotine cutter shall be provided with an arrangement which will prevent the cutter from making a second stroke until the lever or two-handed device is again used.

Section 50–204.195 Power presses

(a) *Safeguarding classification.* One or more means of safeguarding the press at the point of opera-

tion shall be provided and used on every power press, depending upon the method of feeding, in accordance with the following:

SAFEGUARDING CLASSIFICATION

Method of feeding press	*Safeguarding required*
Automatic feed:	Fixed barrier guard or gate guard (section 50–204.195 (c), (d).
Automatic roll feed. Automatic push, pull or dial feed.	
Semiautomatic feed:	Fixed barrier guard or gate guard (section 50–204.195 (c), (d).
Chute feed (both gravity and follow feed).	
Slide or push feed.	
Sliding dies.	
Dial feed.	
Revolving dies.	
Manual feed	Fixed barrier guard or gate guard, two-hand tripping device, or pull-out guard, electronic sweep guard (section 50-204.195 (c), (d), (e), (f), (g), (h)).

(b) *General requirements for point of operations guarding.* Every point of operation guarding device shall be simple and reliable in construction, application, and adjustment. It shall be permanently attached to the press or the die. It shall not offer any accident hazard in itself.

(1) The device shall be designed and constructed so that it is impossible for the operator to place or permit his hand or finger to remain within the danger zone created by the movement of the ram.

(2) Care shall be used in the selection of the method of guarding for each particular job. Guards shall be installed, maintained, and adjusted to produce safe operation at each setting of the press.

(3) Guards which are attached to the ram and which move downward so that the operator's hand or fingers might be caught between gate and lower die shall not be used.

(c) *Fixed barrier guard.* (1) A fixed barrier guard is an enclosure to prevent the hands or fingers of the operator from entering the area between the dies. It may be attached to the press or individual guards may be attached to the dies.

(2) There shall be no exposed shear points between the guard and any moving part.

(3) Openings in the guard or between the guard and working surface shall not be greater than those shown in the Table below.

PERMISSABLE OPENINGS (INCHES)

Distance of opening from nip point:	*Maximum width of opening*
0 to 1½	¼
1½ to 2½	⅜
2½ to 3½	½
3½ to 5½	⅝
5½ to 6½	¾
6½ to 7½	⅞
7½ to 8½	1¼

(4) For the portion of the guard between the operator and the die or working area, it is required that $\frac{5}{16}$-inch minimum vertical steel rods, vertically slotted material, or shatterproof, nonflammable, transparent material be used. Mesh, or perforated plate shall not be used between the operator and the die.

(5) Any hinged or movable section of a fixed barrier guard shall be connected to an interlocking device that will prevent tripping the press while the section is open.

(d) *Gate guards.* (1) A gate guard is a movable barrier arranged so that it completes the enclosure of the point of operation before the operating clutch can become engaged.

(2) Openings in the barrier of the gate guard shall be not greater than those specified for the openings in fixed barrier guards in section 50–204.195(c)(3). The mechanism of the guard shall be designed so that there will be no positive linkage or other close motion which may trap the hand of the operator.

(3) Gate guards shall include either fixed or movable side enclosures around the die.

(4) When the speed of the ram is so slow that an operator might beat the ram on the down stroke after the press has been tripped, the gate guard shall be designed so that the gate remains closed until the ram has completed the down stroke.

(e) *Two-hand tripping device.* (1) Two-hand tripping devices include only those which make it impossible to trip the press without the simultaneous use of both hands outside the danger zone. It shall be designed, located, and arranged so as to prevent tying, wedging, or otherwise securing one handle or button or operating it with any gesture or device and tripping the press while the other hand may be in the danger zone.

(2) On friction-clutch-operated presses, the con-

trols shall be arranged so that if any hand is removed from a control during the down stroke of the ram, it will be instantly stopped.

(3) Where two or more persons are engaged in the operation of a single press, separate two-hand controls shall be provided for each person, except that an auxiliary foot control (air or electric) may be used in lieu of one set of two-hand controls, provided the foot control is located so that the nip point is out of the reach of the operator, but the foot controls shall in no case be less than a distance of 36 inches measured horizontally from the nip point.

(f) *Pull-out guards.* (1) Pull-out guards shall be so constructed as to be attached to the operator's hands or arms and connected to the ram, plunger, or outer slide of the press in such a way that the operator's hands and fingers will be withdrawn from the danger zone before the ram, plunger, or outer slide descends to a hazardous point.

(2) Where the open distance between the top of the work and the lower extremity of the punch is less than 2 inches the multiplying action of this guard shall be such that the hands will be withdrawn a safe distance before this open distance is ¼ closed.

(g) *Electronic safety device.* (1) An electronic safety device shall be so designed and installed that when the operator's hand or any part of the body is in the die zone, the press cannot be tripped and if the hand or any part of the body is inserted while the ram is in a downward motion, it will immediately stop the ram.

(2) These guards shall be operated from a circuit wired so that interruption of the electric current will automatically prevent the press from tripping until the current has been restored.

(3) Electronic safety devices shall not be used on positive clutch presses where the ram continues for a complete stroke after each tripping of the press.

(h) *Sweep guards.* (1) Sweep guards may be provided with either single or double sweep arms. The sweep arm, or arms, shall be connected to the ram in such a way as to forcibly sweep the hands of the operator from the die zone as the ram or plunger descends and before there is danger of injury.

(2) Sweep guards shall be so designed and operated that the operator cannot reach behind the guard in the danger zone before the ram has completed its downward stroke.

(3) The sweep or sweeps shall not offer any hazard of or in themselves by creating a shear hazard between the sweep arm and press tie rods, die straps, or other parts of the press or guard.

(i) *One-hand tripping device.* Whenever a press is set up so as to require tripping the ram or plunger by one hand, additional guarding as specified in section 50–204.195 shall be provided.

(j) *Special hand tools.* Hand tools for placing and removing material shall be such as to permit easy handling of material without the operator's placing a hand in the danger zone. Such tools shall not be accepted in lieu of other guarding as provided in this section.

Section 50–204.196 Foot presses

Foot presses shall be guarded by one or more of the guards described in section 50–204.195 (a) to (d), inclusive.

(a) *Fixed barrier guards.* Fixed barrier guards shall conform to section 50–204.195(c).

(b) *Limitation of stroke.* If a foot or kick press is guarded by limitation of the ram stroke, the adjustment must be set and locked securely in position to limit the maximum travel of the ram to ¼ inch on each stroke. There shall be no pinching or crushing hazards between other parts of the ram or die shoe.

(c) *Gate guards.* A gate shall be designed to close the openings at the front of the press before the foot lever can be operated.

(d) *Two-hand operation.* Two-hand operations shall conform to section 50–204.195(e).

(e) *Sweep guards.* Sweep guards shall conform to section 50–204.195(h).

(f) *Pull-out guards.* Pull-out guards shall conform to section 50–204.195(f).

(g) *Location.* Foot presses shall not be located in a position which will permit the operating lever to extend into an aisle or passageway.

(h) *Mounting.* Foot presses shall be securely bolted to the floor.

Section 50–204.197 Other power-press safety devices

(a) *Treadle guard.* A substantial guard shall be placed over the treadle of every foot-operated power press to prevent accidental tripping.

(b) *Foot treadle.* The use of tension springs or counterweights on any treadle shaft or tension springs on any treadle-shaft level is prohibited.

(c) *Latch or hand-operating lever.* Hand-operated power presses, shall be equipped with a spring latch on the operating lever to prevent accidental or premature tripping.

...*ocking device.* Each hand-operated power press, if tended by more than one person at one time shall conform to the requirements of section 50-204.195(e) (1) and (3).

(e) *Single-stroke attachments.* On positive-type clutch presses a single-stroke attachment shall be provided, by which the treadle or operating lever is disconnected after each stroke.

Section 50–204.198 Platen presses

Platen presses shall be provided with an automatic feed device, an automatic stop device, a guard gate or sweep motion device, or another device, all as defined in this section.

(a) An automatic feed device is one which does not require the operator's hand to be placed between the platen and bed.

(b) An automatic stop device is one which will prevent the platen from closing if the hand or hands of the operator are caught between the platen and the bed.

(c) A guard, gate or sweep motion device, is one which will throw the operator's hands out of the way before the press closes. If the guard is of the type which lifts the hands out of the danger zone, it shall rise at least 4 inches above the platen before the press closes. The guard shall be arranged so that it will prevent a shear between the guard and the top of the platen.

(d) "Another device" is one that will prevent the platen from closing on the operator's hands before they are removed from between the platen and the bed.

Section 50–204.199 Abrasive wheels

(a) The machine shall be securely mounted on substantial floors, benches, foundations or other adequate structures.

(b) *Guards.* Every stationary abrasive wheel and portable wheel used in stationary position shall be equipped with a hood or band guard strong enough to withstand the shock of a bursting wheel. A guard of this type shall also be used on every portable wheel where the nature of the work will permit.

(c) *Spindle.* The spindle and nut and flange projection, if any, shall be guarded.

(d) *Mountings and fastenings.* Hoods shall be mounted so as to maintain proper alignment with the wheels, and the strength of the fastenings shall exceed the strength of the hood.

(e) *Dust exhaust provisions.* Hoods on machines used for dry grinding and other operations where dust is produced shall have provisions made for connection to an exhaust system.

(f) *Work rests.* Work rests shall be kept adjusted close to the wheel with a maximum distance of 1/8 inch to prevent the work from being caught between the wheel and the rest.

Section 50–204.200 Revolving drums and cylinders

Every revolving barrel, drum or other revolving container shall be guarded by an enclosure which is interlocked with the driving mechanism, so that the barrel or drum cannot revolve unless the guard enclosure is in place.

Section 50–204.201 Fans

When the periphery of the blades of a fan is less than 7 feet above the floor or working level the blades shall be guarded.

WOODWORKING MACHINERY

Section 50–204.208 Circular table saws

(a) *Guards.* Each circular saw shall be guarded by a hood which shall completely enclose that portion of the saw above the table and shall be arranged so that the hood will automatically adjust itself to the thickness of, and remain in contact with, the material being cut. Where there is a possibility of contact with a portion of a circular saw beneath or behind the saw table, that portion shall be covered with a guard to prevent accidental contact with the saw.

(b) *Spreaders.* Each circular ripsaw shall be furnished with a spreader to prevent material from squeezing the saw or being thrown back on the operator. A spreader need not be used for work which is restricted to grooving, dadoing, or rabbeting.

(c) *Non-kickback fingers or dogs.* Each circular ripsaw shall be provided with non-kickback fingers or dogs so located as to oppose the thrust or tendency of the saw to pick up the material or to throw it back toward the operator.

Section 50–204.209 Swing and sliding cut-off saws

The requirements expressed in this section apply to all swing cut-off saws and to those sliding cut-off saws which are mounted above the table.

(a) *Hood.* Each of the saws to which this section applies shall be provided with a hood that shall

completely enclose the upper half of the saw, the arbor end, and the point of operation at all positions of the saw. The hood shall be constructed in such a manner and of such material that it will protect the operator from flying splinters and broken saw teeth. It shall be designed so that it will automatically cover the lower portion of the blade, so that when the saw is returned to the back of the table the hood will rise on top of the fence, and when the saw is moved forward the hood will drop on top of and remain in contact with the table or material being cut.

(b) *Counterweights.* Each of the saws to which this section applies shall be provided with an effective device to return the saw automatically to the back of the table when released at any point in its travel.

(c) *Limit stops.* Limit chains or other equally effective devices shall be provided to prevent the saw from swinging beyond the front or back edges of the table.

(d) *Latches.* A latch or equivalent device shall be provided to prevent the saw from rebounding upon its return to the rear of the table.

Section 50–204.210 Inverted swing cut-off saws (jump saws)

Inverted swing-cut-off saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or above the material being cut. It shall automatically adjust itself to the thickness of, and remain in contact with, the material being cut.

Section 50–204.211 Radial saws

(a) *Hoods and guards.* The upper hood shall completely enclose the upper portion of the blade down to a point that will include the end of the saw arbor. The upper hood shall be constructed in such a manner and of such material that it will protect the operator from flying splinters, broken saw teeth, etc., and will deflect sawdust away from the operator. The sides of the lower exposed portion of the blade shall be guarded to the full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with stock being cut to give maximum protection possible for the operation being performed.

(b) *Spreaders.* When radial saws are used for ripping, a spreader shall be provided for meeting the requirements expressed in section 50–204.208(b).

(c) *Non-kickback fingers or dogs.* Each radial saw used for ripping shall be provided with non-kickback fingers or dogs located on both sides of the saw so as to oppose the thrust or tendency of the saw to pick up the material or to throw it back toward the operator.

(d) *Adjustable stops and return devices.* An adjustable stop shall be provided to prevent the forward travel of the blade beyond the position necessary to complete the cut in repetitive operations.

Section 50–204.212 Portable circular saws

All portable power-driven saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the arc required to permit the base to be tilted. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to covering position.

Section 50–204.213 Band saws and band resaws

(a) *Enclosing band-saw blades.* All portions of the saw blade shall be enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table. Band-saw wheels shall be fully encased. The outside periphery of the enclosure shall be solid. The front and back of the band wheels shall be either enclosed by solid material or by wire mesh or perforated metal. Such mesh or perforated metal shall be not less than 0.037 inch (U.S. Gauge No. 20), and the openings shall be not greater than ½ inch. Solid material used for this purpose shall be of an equivalent strength and firmness. The guard for the portion of the blade between the sliding guide and the upper-saw-wheel guard shall protect the operator from the saw blade at the front and outer side. Brakes shall be provided to stop the wheel in case of blade breakage.

(b) *Tension.* Each band-saw machine shall be provided with a tension control device to indicate a proper tension for the standard saws used on the machine.

(c) *Feed rolls.* Feed rolls of band resaws shall be protected with a guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point.

Section 50-204.214 Jointers

(a) *Point of operation.* (1) Each hand-fed planer and jointer with horizontal head shall be equipped with a cylindrical cutting head, the knife projection of which shall not exceed ⅛ inch beyond the cylindrical body of the head.

(2) The clearance between the edge of the rear table and the cutter head shall be not more than ¼ inch. The table throat opening shall be not more than 2½ inches when tables are set or aligned with each other for zero cut.

(b) *Automatic guards.* (1) Each hand-fed jointer with a horizontal cutting head shall have an automatic guard which will cover all the section of the head on the working side of the fence or gage. The guard shall keep the operator's hand from coming in contact with the revolving knives. The guard shall automatically adjust itself to cover the unused portion of the head and remain in contact with the material at all times.

(2) Each hand-fed jointer with horizontal cutting head shall have a guard which will cover the section of the head back of the gage or fence.

(3) Each wood jointer with vertical head shall have either an exhaust hood or other guard so arranged as to enclose completely the revolving head, except for a slot of such width as may be necessary and convenient for the application of material to be jointed.

Section 50-204.215 Wood shapers, hand-fed panel raisers and similar machines

(a) The cutting heads of each wood shaper, hand-fed panel raiser, or other similar machine not automatically fed, shall be enclosed with a cage or adjustable guard designed to keep the operator's hands away from the cutting edge. The diameter of circular shaper guards shall not be less than the greatest diameter of the cutter. In no case shall a warning device of leather or other material attached to the spindle be acceptable.

(b) Cylindrical heads shall be used whenever the the nature of the work will permit.

(c) All double-spindle shapers shall be provided with a starting and stopping device for each spindle.

Section 50-204.216 Planing, molding, sticking and matching machines

(a) Each planing, molding, sticking, and matching machine shall have all cutting heads, and saws if used, covered by a metal guard. If such guard is constructed of sheet metal, the material used shall be not less than $\frac{1}{16}$ inch in thickness; and, if cast iron is used, it shall be not less than $\frac{1}{16}$ inch in thickness.

(b) Where an exhaust system is used, the guards shall form part or all of the exhaust hood and shall be constructed of metal of a thickness not less than that specified in paragraph (a) of this section.

(c) Feed rolls shall be guarded by a hood or suitable guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point. The guard shall be fastened to the frame carrying the rolls so as to remain in adjustment for any thickness of stock.

(d) Surfacers or planers used in processing multiple pieces of material simultaneously shall be provided with sectional infeed rolls having sufficient yield in the construction of the sections to provide feeding contact pressure on the stock, over the permissible range of variation in stock thickness specified or for which the machine is designed. In lieu of such yielding sectional rolls, suitable section kickback finger devices shall be provided at the infeed end.

Section 50-204.217 Sanding machines

(a) *Feed rolls.* Feed rolls of self-feed sanding machines shall be protected with a semi-cylindrical guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point. The guard shall be constructed of heavy material firmly secured to the frame carrying the rolls so as to remain in adjustment for any thickness of stock. The bottom of the guard shall come down to within ½ inch of a plane formed by the bottom or contact face of the feed roll, where it touches the stock.

(b) *Drum sanding machines.* Each drum sanding machine shall have an exhaust hood, or other guard, arranged to enclose the revolving drum, except for that portion of the drum above the table, if a table is used.

(c) *Disk sanding machines.* Each disk sanding machine shall have the exhaust hood, or other guard if no exhaust system is required, arranged to enclose the revolving disk, except for that portion of the disk above the table, if a table is used.

(d) *Belt sanding machines.* Belt sanding machines shall be provided with guards at each nip point where the sanding belt runs on to a pulley. The unused run of the sanding belt shall be guarded against accidental contact.

HOUSEKEEPING

Section 50-204.229 General

All phases of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Section 50-204.230 Floors

(a) Floors of every workroom shall be maintained in a clean, and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places should be provided where practicable.

(b) Cleaning and sweeping shall be done in such a manner as to minimize the contamination of the air with dust and, so far as is practicable, should be done outside of working hours.

(c) Every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards.

Section 50-204.231 Flammable materials

Oily rags, oily waste, waste paper and other flammable and combustible material shall be stored in tightly closed metal containers. Magnesium and other flammable metal scraps shall not be mixed with other scrap. All flammable scrap material of any kind shall be removed from the work areas daily.

Section 50-204.232 Tools and other materials

Tools, materials, or debris shall not be strewn about in a manner which may cause tripping or other hazards.

Section 50-204.233 Receptacles for water disposals

Any receptacle used for decaying solid or liquid waste or refuse shall be so constructed that it does not leak and may be conveniently and thoroughly cleaned, and it shall be maintained in a sanitary condition. Such a receptacle shall be equipped with a tight-fitting cover.

Section 50-204.234 Sweeping and refuse removal

All sweepings, solid or liquid waste, refuse, and garbage shall be removed in such a manner as to avoid creating a nuisance or menace to health and as often as necessary to maintain the place of employment in a sanitary condition.

TOILET FACILITIES AND WASH ROOMS

Section 50-204.239 Separate toilet for each sex

Every place of employment shall be provided with adequate toilet facilities which are separate for each sex.

Section 50-204.240 Location

Toilet facilities shall be provided so as to be readily accessible to all employees. Toilet facilities so located that employees must use more than one floor-to-floor flight of stairs are not considered as readily accessible.

Section 50-204.241 Water closets

Water closets, or chemical closets or privies where permitted by local law, shall be provided for each sex and shall be in accordance with the following table. The number to be provided for each sex shall in every case be based on the maximum number of persons of that sex employed at any one time at work on the premises for which the facilities are furnished. When persons other than employees are permitted the use of toilet facilities on the premises, a reasonable allowance shall be made for such other persons in computing the minimum number of toilet facilities required.

(a)

Number of persons	*Minimum number of facilities*
1 to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
Over 100	(1)

[1] 1 for each additional 30 persons.

Where 10 or more are employed, one water closet less than the number specified in the foregoing may be provided for men for each urinal, except that the number of water closets in such cases may not be reduced to less than two-thirds of the number specified in the foregoing. Two feet of trough urinal shall be considered as equivalent to one individual urinal.

(b) An adequate supply of toilet paper with holder shall be provided for every water closet.

(c) Covered receptacles shall be kept in all toilet rooms used by women.

Section 50-204.242 Construction of toilet rooms.

(a) Each toilet facility (closet) shall occupy a separate compartment, equipped with a door, latch, and clothes hook.

(b) The walls of compartments or partitions between fixtures may be less than the height of room walls, but the top shall not be less than six feet from the floor and the bottom not more than one foot from the floor.

(c) The door to every toilet room shall be fitted with an effective self-closing device, and the entrance to the toilet rooms shall be so screened that the interior of the toilet room is not visible from the workroom.

(d) The floors, walls, ceilings, partitions, and doors of all toilet rooms shall be of a finish that can be easily cleaned.

(e) Toilet rooms, except those in work places accessible to men only, shall be completely enclosed with solid material that is nontransparent from the outside.

Section 50-204.243 Chemical closets and privies

When chemical closets or privies are permitted by local law they shall be of a type approved by the health authorities having jurisdiction and shall be maintained in a sanitary condition.

Section 50-204.244 Washing facilities

Adequate facilities for maintaining personal cleanliness shall be provided in every place of employment. These shall be convenient for the employees for whom they are provided and shall be maintained in a sanitary condition.

(a) At least one lavatory (wash basin) with adequate hot and cold water, shall be provided for every 20 employees (men or women) or portion thereof, up to 100 persons, and one lavatory (wash basin) for each additional 25 persons or portion thereof. Twenty-four inches of sink with individual faucet shall be considered as equal to one lavatory. In all instances, a suitable cleansing agent shall be provided at each wash place.

(b) Where employees are exposed to skin contamination by poisonous, infectious, or irritating material, one lavatory supplied with hot and cold water, shall be provided for every 5 employees.

(c) One shower bath with ample supply of hot and cold water from one fixture shall be supplied for every 15 workers, or portion thereof, exposed to excessive heat or to skin contamination by poisonous, infectious, or irritating material.

(d) Individual hand towels, or sections thereof, of cloth or paper, or mechanical apparatus for drying the hands, shall be provided. Proper receptacles or other sanitary means shall be maintained for the disposal of used towels. Towels for common use shall not be provided.

(e) Adequate washing facilities shall be provided in every toilet room or adjacent thereto.

Section 50-204.245 Change rooms

Separate change or dressing rooms shall be provided for each sex wherever it is the practice to change from street clothes or wherever it is necessary to change because the work performed involves exposure to excessive dirt, heat, fumes, vapor, or moisture. Where change rooms are not provided, facilities shall be furnished for hanging outer garments:

(a) Where employees work clothes are exposed to contamination by poisonous, infectious, or irritating material, facilities shall be provided in change rooms so that street and work clothes will not be stored in contact with each other.

(b) Where the process in which the worker is engaged is such that his working clothes become wet or have to be washed between shifts, provision shall be made to insure that such clothing is dry before re-use.

Section 50-204.246 Retiring rooms for women

Where 10 or more women are employed at any one time, at least one retiring room shall be provided.

(a) Where less than 10 women are employed and a retiring room is not furnished, some equivalent space shall be provided which can be properly screened for privacy and made suitable for the use of women employees.

(b) At least one couch or bed shall be provided in every place where women are employed. The number of such beds or couches required shall be as follows:

	Beds
1 to 100	1
100 to 250	2

1 additional bed for each additional 250 women employees. A minimum of 60 square feet per bed shall be provided.

LUNCH ROOMS AND FOOD HANDLING

Section 50-204.251 Location

In all places of employment where employees lunch on the premises, an adequate space suitable for that purpose shall be provided for the maximum number of employees who may use such space at one time. Such space shall be separate from any location where there is exposure to toxic materials.

Section 50-204.252 Waste food disposal

A covered receptacle shall be provided and shall be used by employees for the disposal of a waste food.

Section 50-204.253 Presence of toxic materials

No employee shall be permitted to store or eat any part of his lunch or other food at any time where there are present any toxic material or other substance that may be injurious to health.

DRINKING WATER

Section 50-204.258 Potable water

(a) An adequate supply of potable water, approved as to source and distribution by appropriate authority, shall be provided for drinking, washing and cooking purposes in all places of employment.

(b) In all instances where water is cooled by ice made from non-potable water the construction of the container shall be such that the ice does not come in direct contact with the water.

(c) Open containers such as barrels, pails, or tanks for drinking water from which the water must be dipped or poured, whether or not they are fitted with a cover, shall not be allowed.

(d) The common drinking cup is prohibited.

(e) Where single service cups are supplied, a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

Section 50-204.259 Non-potable water

Outlets for non-potable water, such as water for industrial or fire-fighting purposes only, shall be posted to indicate that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.

MEDICAL SERVICES

Section 50-204.264 Medical services

(a) The employer shall assure the ready availability of qualified medical personnel for advice and consultation on plant health problems, for emergency medical services, and for the supervision of first-aid attendants.

(b) In the absence of an infirmary, a person trained to render first aid and a kit containing the following items shall be available at every place of employment.

1 Adhesive Plaster ½" x 5 yd. Roll.
1 Adhesive Plaster, 1 x 5 yd. Roll.
2 Absorbent Cotton, 2-ounce packages.
1 Absorbent Gauze, 1 yd.
1 Activol Soap, 2-ounce bottle.
100 Adhesive Bandages, 1".
1 Aromatic Spirits of Ammonia, 2-ounce bottle.
1 Boric Acid Solution, 2-ounce bottle.
1 Castor Oil, 2-ounce bottle.
12 Compress Bandages, 2".
4 Compress Bandages, 4".
12 Cotton Wound Applicators.
1 Eye Cup.
1 Eye Dropper.
6 Finger Cots.
6 Foille for Burns, ¼ oz. tubes.
1 Foille for Burns, 2-ounce bottle.
6 Gauze Roller Bandages 1" x 6 yds.
6 Gauze Roller Bandages 2" x 6 yds.
6 Gauze Roller Bandages 3" x 6 yds.
10 Gauze Sterilized 12" x 18".
1 Merthiolate, Tincture, 2-ounce bottle.
1 Medicine Glass.
1 Manual First Aid Instruction.
1 Scissors Pair 4" Bandage.
1 Tweezers Pair 3½".
12 Safety Pins.
1 Spoon.
1 Tourniquet.
2 Triangular Bandages 40".
6 Wood Splints for Fractures.
12 Wood Tongue Depressors.

EYE PROTECTION

Section 50-204.269 General requirement

Eye protection shall be provided where persons are exposed to any hazard which may cause injury to the eyes from the following operations: chipping, caulking, coarse grinding, riveting, sledging, scaling, light grinding, stone dressing, spot welding, woodworking, metal-

working, babbitting, casting, dipping in hot metal baths, handling of acids and caustics, electric arc welding, oxyacetylene and oxyhydrogen welding and cutting, furnace tending, and irradiation with ultraviolet light.

Section 50–204.270 First-aid for chemical burns

Where workers' eyes may be exposed to injurious chemical materials such as acids, caustics, etc., suitable facilities for quick drenching or flushing of the eyes shall be provided within the workroom, for immediate emergency use.

ENVIRONMENTAL CONDITIONS

Section 50–204.275 Toxic gases, vapors, fumes, dusts, and mists

No employee shall be exposed to any of the gases, vapors, mists, dusts, or fumes on the list in section 50–204.276 which exceed the limits there stated when applied to him on an average basis for an eight hour workday, unless he is protected therefrom by respiration equipment approved for the purpose by the United States Bureau of Mines of the United States Department of the Interior and operated in accordance with the recommendations of its manufacturer. Exposures without such equipment which exceed such limits temporarily, without exceeding them on a daily average basis, or which involve more than one such toxic substance, regardless of the degree of its concentration, are also hazardous unless they are undertaken in strict conformity with prior written approval of a qualified industrial hygienist who has studied the particular circumstances of exposure and the toxic substances and concentrations involved.

Section 50–204.276 Threshold limit values

Gases and vapors—Substance	Parts per million parts of air by volume	Milligrams per cubic meter of air
Acetaldehyde	200	360
Acetic acid	10	25
Acetic anhydride	5	20
Acetone	1,000	2,400
Acrolein	.5	1.2
Acrylonitrile	20	45
Allyl alcohol	5	12
Allyl chloride	5	15
Allyl propyl disulfide	2	12
Ammonia	100	70
Amyl acetate	200	1,050
Amyl alcohol (isoamyl alcohol)	100	360
Aniline	5	19
Arsine	.05	.2
Benzene (benzol)	25	80
Benzyl chloride	1	5
Bromine	1	7
Butadiene (1, 3-butadiene)	1,000	2,200
Butanone (methyl ethyl ketone)	250	740
Butyl acetate (n-butyl acetate)	200	950
Butyl alcohol	100	300
Butylamine	5	15
Butyl cellosolve (2-butoxyethanol)	50	240
Carbon dioxide	5,000	9,000
Carbon disulfide	20	60
Carbon monoxide	100	110
Carbon tetrachloride	25	160
Cellosolve (2-ethoxyethanol)	200	740
Cellosolve acetate (2-ethoxyethyl acetate)	100	540
Chlorine	1	3
Chlorine trifluoride	.1	.4
Chlorobenzene (monochlorobenzene)	75	350
Chloroform (trichloromethane)	100	490
1-Chloro-1-nitropropane	20	100
Chloropicrin	1	7
Chloroprene (2-chloro-1, 3-butadiene)	25	90
Cresol (all isomers)	5	22
Cyclohexane	400	1,400
Cyclohexanol	100	410
Cyclohexanone	100	400
Cyclohexene	400	1,350
Cyclopropane	400	690
Decaborane	.05	.3
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	50	240
Diborane	.1	.1
o-Dichlorobenzene	50	300
Dichlorodifluoromethane	1,000	4,950
1,1-Dichloroethane	100	400
1,2-Dichloroethane (ethylene dichloride)	100	400
1,2-Dichloroethylene	200	790
Dichloroethyl ether	15	90
Dichloromonofluoromethane	1,000	4,200
1,1-Dichloro-1-nitroethane	10	60
Dichlorotetrafluoroethane	1,000	7,000
Diethylamine	25	75
Difluorodibromomethane	100	860
Diisobutyl ketone	50	290
Dimethylaniline (N-dimethylaniline)	5	25
Dimethylsulfate	1	5

Gases and vapors—Substance	Parts per million parts of air by volume	Milligrams per cubic meter of air
Dioxane (diethylene dioxide)	100	360
Ethyl acetate	400	1,400
Ethyl acrylate	25	100
Ethyl alcohol (ethanol)	1,000	1,900
Ethylamine	25	45
Ethylbenzene	200	870
Ethyl bromide	200	890
Ethyl chloride	1,000	2,600
Ethyl ether	400	1,200
Ethyl formate	100	300
Ethylidicate	100	850
Ethylene chlorohydrin	5	16
Ethylenediamine	10	30
Ethylene dibromide (1, 2-dibromoethane)	25	190
Ethylene imine	5	9
Ethylene oxide	50	90
Fluorine	.1	.2
Fluorotrichloromethane	1,000	5,600
Formaldehyde	5	6
Furfural	5	20
Gasoline	500	2,000
Heptane (n-heptane)	500	2,000
Hexane (n-hexane)	500	1,800
Hexanone (methyl butyl ketone)	100	410
Hexone (methyl isobutyl ketone)	100	410
Hydrazine	1	1.3
Hydrogen bromide	5	17
Hydrogen chloride	5	7
Hydrogen cyanide	10	11
Hydrogen fluoride	3	2
Hydrogen peroxide, 90%	1	1.4
Hydrogen selenide	.05	.2
Hydrogen sulfide	20	30
Iodine	.1	1
Isophorone	25	140
Isopropylamine	5	12
Mesityl oxide	25	100
Methyl acetate	200	610
Methyl acetylene	1,000	1,650
Methyl acrylate	10	35
Methyl alcohol (methanol)	200	260
Methyl bromide	20	80
Methyl cellosolve (2-methoxyethanol)	25	80
Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate)	25	120
Methyl chloride	100	210
Methylal (dimethoxymethane)	1,000	3,100
Methyl chloroform (1, 1, 1-trichloroethane)	500	2,700
Methylcyclohexane	500	2,000
Methylcyclohexanol	100	470
Methylcyclohexanone	100	460
Methyl formate	100	250
Methyl isobutyl carbinol (Methyl amyl alcohol)	25	100
Methyl styrene	100	480
Methylene chloride (dichloromethane)	500	1,750
Monomethyl aniline	2	9
Naphtha (coal tar)	200	800
Naphtha (petroleum)	500	2,000
Nickel carbonyl	.001	.007
Nitric acid	5	25
p-Nitroaniline	1	6
Nitrobenzene	1	5
Nitroethane	100	310
Nitrogen dioxide	5	9
Nitroglycerin	.5	5
Nitromethane	100	250
2-Nitropropane	50	180
Nitrotoluene	5	30
Octane	500	2,350
Ozone	.1	.2
Paradichlorobenzene	75	450
Pentane	1,000	2,950
Pentanone (methyl propyl ketone)	200	700
Perchlorethylene (tetrachloroethylene)	200	1,350
Phenol	5	19
Phenylhydrazine	5	22
Phosgene (carbonyl chloride)	1	4
Phosphine	.05	.07
Phosphorus trichloride	.5	3
Propyl acetate	200	840
Propyl alcohol (isopropyl alcohol)	400	980
Propyl ether (isopropyl ether)	500	2,100
Propylene dichloride (1, 2-dichloropropane)	75	350
Propylene imine	25	60
Propylene oxide	100	240
Pyridine	10	30
Quinone	.1	.4
Sabine	.1	.5
Stoddard solvent	500	2,900
Styrene monomer (phenylethylene)	100	420
Sulfur dioxide	5	13
Sulfur hexafluoride	1,000	6,000
Sulfur monochloride	1	6
Sulfur pentafluoride	.025	.25
Tertiary butyl alcohol	100	300
p-Tertiary butyltoluene	10	60
1,1,2,2-Tetrachloroethane	5	35
Tetrahydrofuran	200	590
Tetranitromethane	1	8
Toluene (toluol)	200	750
o-Toluidine	5	22
Trichloroethylene	200	1,050
Triethylamine	25	100

Gases and vapors—Substance	Parts per million parts of air by volume	Milligrams per cubic meter of air
Trifluoromonobromomethane	1,000	6,100
Turpentine	100	560
Vinyl chloride (chloroethylene)	500	1,300
Vinyl toluene	100	480
Xylene (xylol)	200	870
Xylidine	5	25

TOXIC DUSTS, FUMES, AND MISTS

Substance	Milligrams per cubic meter of air
Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethanonaphthalene)	0.25
Ammate (ammonium sulfamate)	15
Antimony	5
ANTU (alpha naphthyl thiourea)	3
Arsenic	5
Barium	5
Beryllium	0.002
Cadmium oxide fume	1
Calcium arsenate	1
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane)	2
Chlorinated camphene, 60%	5
Chlorinated diphenyl oxide	5
Chlorodiphenyl (42% chlorine)	1
Chlorodiphenyl (54% chlorine)	5
Chromic acid and chromates (as CrO_3)	1
Crag herbicide (sodium 2-(sodium 2-[2,4-dichlorophenoxy) ethanol hydrogen sulfate)	15
Cyanide (as CN)	5
2,4-D (2,4-dichlorophenoxyacetic acid)	10
DDT (2,2-bis [p-chlorophenyl]-1,1,1-trichloroethane)	1
Dieldrin (1,2,3,4,10,10-hexachloro-6,7-epoxy,1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-dimethanonaphthalene	.25
Dinitrobenzene	1
Dinitrotoluene	1.5
Dinitro-o-cresol	2
EPN (O-ethyl O-p-nitrophenyl thionobenzenephosphonate)	.5
Ferbam (ferric dimethyl dithiocarbamate)	15
Ferrovanadium dust	1
Fluoride	2.5
Hydroquinone	2
Iron oxide fume	15
Lead	.2
Lead arsenate	.15
Lindane (hexachlorocyclohexane, gamma isomer)	.5
Magnesium oxide fume	15
Malathion (O, O-dimethyl dithiophosphate of diethyl mercaptosuccinate)	15
Manganese	5

TOXIC DUSTS, FUMES, AND MISTS—Con.

Substance	Milligrams per cubic meter of air
Mercury	1
Mercury (organic compounds)	0.01
Methoxychlor (2,2-di-p-methoxyphenyl-1,1,1-trichloroethane)	15
Molybdenum:	
Soluble compounds	5
Insoluble compounds	15
Nicotine	5
Parathion (O, O-diethyl O-p-nitrophenyl thiophosphate)	0.2
Pentachloronaphthalene	0.5
Pentachlorophenol	0.5
Phosphorus (yellow)	0.1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Picric acid	0.1
Pyrethrum	2
Rotenone	5
Selenium compounds (as Se)	0.1
Sodium hydroxide	2
Sodium fluoroacetate (1080)	0.1
Strychnine	0.15
Sulfuric acid	1
TEDP (tetraethyl dithionopyrophosphate)	0.2
TEPP (tetraethyl pyrophosphate)	0.05
Tellurium	0.1
Tetryl (2,4,6-trinitrophenylmethylnitramine)	1.5
Thiram (tetramethyl thiuram disulfide)	5
Thallium (soluble compounds)	0.1
Titanium dioxide	15
Trichloronaphthalene	5
Trinitrotoluene	1.5
Uranium:	
Soluble compounds	0.05
Insoluble compounds	0.25
Vanadium:	
V_2O_5 dust	0.5
V_2O_5 fume	0.1
Warfarin (3-[acetonylbenzyl]-4-hydroxycoumarin)	0.5
Zinc oxide fumes	15
Zirconium compounds (as Zr)	5

MINERAL DUSTS

	Millions of particles per cubic foot of air
Aluminum oxide	50
Asbestos	5
Dust (nuisance, no free silica)	50
Mica (below 5% free silica)	20
Portland cement	50
Silica:	
High (above 50% free SiO_2)	5
Medium (5 to 50% free SiO_2)	20
Low (below 5% free SiO_2)	50
Silicon carbide	50
Soapstone (below 5% free SiO_2)	20
Talc	20

VENTILATION

Section 50-204.288 General ventilation and temperature requirements

(a) Outside air shall be provided to all workrooms at the rate of 15 cubic feet per minute per person, or one and one-half air changes per hour, whichever is greater. In most instances, leakage through walls, doors, and windows will produce at least one and one-half air changes per hour.

(b) A minimum air temperature of 60° F. should be maintained at all workrooms where work of a strenuous nature is performed, and a minimum air temperature of 65° F. should be maintained in all other workrooms unless prohibited by process requirements.

Section 50-204.289 Local exhaust ventilation

(a) Every local exhaust ventilation system shall produce and maintain a movement of air toward the opening, sufficient to prevent escape of contaminant to the workroom during working hours, beyond the limits shown in section 50-204.276.

(b) Air flow through branch and main ducts shall be sufficient to transport the contaminant through the system without settling.

(c) Piping shall be located so as to be accessible for inspection and maintenance.

(d) Air flow equipment including hoods, pipes, fans, motors, and collectors shall be effectively grounded.

(e) Two or more operations involving more than one substance shall not be permitted to be connected to the same exhaust system when a combination of the substances removed may constitute a fire hazard, an explosion hazard, or otherwise dangerous mixture.

(f) Those processes or operations using or generating flammable dusts, gases, fumes, vapors, mists, fibers or other impurities shall be completely protected from all sources of ignition.

(g) The capacity of an exhaust system shall be calculated on the basis of all hoods, booths, and enclosures connected to the system being open, except where the system is so interlocked that only a portion of it can be operated at a given time, in which case the capacity should be calculated on the basis that all the hoods in the group requiring the greatest volume rate of exhaust are open.

(h) Suitable air inlets shall be provided for replacement of exhausted air.

(i) Exhaust systems handling dusts and discharging to the outer air shall be provided with suitable air-cleaning devices to remove air contaminants prior to the discharge to the outer air, except under unusual circumstances.

(j) The discharge from any exhaust system shall be such that no air contamination therefrom will enter any window, door, or other opening of any work space in quantities sufficient to create a health hazard to such space or create a nuisance to surrounding areas.

(k) Collected materials shall be removed at intervals frequent enough to insure that the exhaust system will meet the requirements of section 50-204.289 (a), at all times.

NOISE

Section 50-204.293 Noise

Noise shall be reasonably reduced or eliminated as a means of preventing fatigue or accidents.

PERSONAL PROTECTIVE EQUIPMENT

Section 50-204.298 Personal protective equipment

Personal protective equipment or protective shields or barriers shall be provided and maintained in usable condition whenever substances, radiation, or mechanical irritants are encountered in a manner capable of causing injury or impairment in function of any part of the body through skin or mucous membrane absorption.

BITUMINOUS COAL AND LIGNITE MINES

Section 50-204.300 Federal Mine Safety Code

The Federal Mine Safety Code for Bituminous Coal and Lignite Mines of the United States, Part I—Underground Mines, and Part II—Strip Mines, as published by the Bureau of Mines, United States Department of Interior is hereby adopted by reference as the safety and health standard required for observance in the bituminous coal and lignite mining to which section 1(c) of the Walsh-Healey Public Contracts Act has application.

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